Attachment 1

lnitial Study Report Meeting Transcript

March 22, 2016

Susitna-Watana Hydroelectric Project
(FERC No. 14241)

Initial Study Report Meetings
March 22, 2016
Transcripts

Cook Inlet Region Inc.
725 E. Fireweed Ln.
Anchorage, AK 99503

SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

SUSITNA-WATANA HYDRO

Agenda and Schedule

Initial Study Report (ISR) Meetings

The Future Watana Reservoir Fish Community and Risk of Entrainment Study (Study 9.10), Aquatic Resources Study Within The Access Alignment, Transmission Alignment and Construction Area (Study 9.13), Analysis of Fish Harvest in and Downstream of the Susitna-Watana Hydroelectric Project Area (Study 9.15), Cook Inlet Beluga Whale Study (Study 9.17), Eulachon Run Timing, Distribution and Spawning in the Susitna River (Study 9.16), Genetic Baseline Study for Selected Fish Species (Study9.14), Study of Fish Barriers in the Middle and Upper Susitna River and Susitna Tributaries (Study 9.12), Study of Fish Passage Feasibility at Watana Dam (Study 9.11), Characterization and Mapping of Aquatic Habitats (Study 9.9), River Productivity Study (Study 9.8), Salmon Escapement Study (Study 9.7), Study of Fish Distribution and Abundance in the Upper Susitna River Study (Study 9.5), Study of Fish Distribution and Abundance in the Middle and Lower Susitna River (Study 9.6)

Cook Inlet Region, Inc.
725 E. Fireweed Lane
Anchorage, Alaska
March 22, 2016

ATTENDEES PRESENT

Sunny Morrison, Accu-Type Depositions
Sydney Hamilton, Accu-Type Depositions
Julie Anderson, DMS
Dan Smith, Alaska Energy Authority
Adriane Stutes, DOWL
Hal Geiger, St. Hubert Research Group
Ray Beamesderfer, R2 Resource Consultants
Phil Hilgert, R2 Resource Consultants
Bill Fullerton, Tetra Tech
Dudley Reiser, R2 Resource Consultants
Mary Lou Keefe, R2 Resource Consultants
Doug Ott, AEA
Jeff Davis, ARRI
Douglass Cooper, USFWS
Steve Padula, McMillen-Jacobs Assoc.
Wayne Dyok, H20 EcoPower
Becky Long, SRC
Mike Wood, SRC
Ken Hogan, FERC
David Turner, FERC
Tim Sundlov, BLM
Laura Briggs
Matt Cutlip, FERC
Jason Mouw, FRC
Betsy McGregor, AEA
Marie Steele, DNR
Betsy McCracken, USFWS
Jason Brune, CIRI
Matthew LaCroix, EPA
Tim Ruga, AKRF
Dirk Pederson, Stillwater
Matthew Burak, Louis Berger
Tyler Rychener, Louis Berger
Sue Walker, NMFS

Sean Eagen, NMFS
Ron Benkert, ADFG
Cassie Thomas, National Park Service
Heather Leba, SRC
Emily Anderson, WSC
Melissa Heuer, SRC
Bryan Carey, AEA
Chris H. Johnson, USGS
Sam Snyder, Trout Unlimited
Kathryn Peltier, MCMJ
Joe Klein, ADF&G
Steve Swope, PGG
Fred Winchell, Louis Berger
Pete Cleary, ADF&G
Richard Yanusz, ADF&G
Jack Erickson, ADF&G
Lyle Zevenbergen, Tetra Tech
Rob Plotnikoff, Tetra Tech

ATTENDEES ON PHONE
Alice Shelly, R2 Resource Consultants
Rachel Burns
Lucius Caldwell, Fish Sciences
Cassie Thomas, NPS
Erik Schoen, UAF
Greg Auble, USGS
Bjorn Lake, NMFS
Tim Nightengale, R2 Resource Consultants
Heide Lingenfelter, Ahtna
Chuck Guthrie, NOAA
Jon Ludwig, Tetra Tech
Jeff Guyon, NOAA
Thomas Meyer, NOAA
Ed Meyer, NMFS
Daniel Reichardt, ADEC
Leanne Hanson, USGS

Sarah O'Neal, Wild Salmon Center
Jerry George, R2 Consultants
George Gilmour, Meridian
Jennifer Curtis, EPA
Birdie Budnik, Corps of Engineers
Greg Ruggerone, NRC
Kirby Gilbert, MWH
Jan Konigsberg, AK Hydro Project
Russ Liebig, FERC
Ken Jarrett, FERC
Kai Steimle, R2 Resource Consultants
Peter Foote, Louis Berger
Chris Holmquist-Johnson, USGS
Laura Arendall, R2 Resource Consultants
Dana Postlewait, R2 Resource Consultants

INTRODUCTION

MR. BRUNE: (recording begins mid-sentence) so there's probably some questions (indiscernible) to us, and like I said, it's an honor to have all of you today here to learn more about the project, understand more about this project. This is incredibly important to CIRI and its village corporations before we make a final decision. So, it's a work to be done. It's incredibly important and I appreciate all the work and all of you here with the intent on learning more.

I just want to give a brief safety moment. Obviously we have exit and coming. If there's any kind of a disaster and we need to get outside, our muster point is to the right straight out there, next to the China King Buffet; you can go in there if you want. Hopefully we won't have to have any emergencies. Also, for those who need restrooms, you go through that back door and to your left, there'll be both a men's and a women's bathroom there. Are there any questions from a safety perspective? If you have any other issues that you have about the building, don't hesitate to find me. I'll be in and out -- my office is upstairs, but I'll be in and out. Julie Anderson is here, as well, and we can make sure we take good care of you. Again welcome to the CIRI building, and thanks for being here.

MR. PADULA: Again welcome, everyone. It's been a long time since I've seen a lot of your faces, but it's good to see you all again. This is the Susitna-Watana integrated licensing process; we're at a very specific point in that process of these ISR meetings. (indiscernible) here for meetings this week and next week. Before we get started, let's start with introductions around the room; then we will go to the phone. Please, name and organization this first time, and then afterwards if you have additional comments you can please say your first name again, I think we'll be (indiscernible). Wait one second; I have a microphone that we can pass around. That way the people that are on the phone can hear.

ATTENDEES PRESENT INTRODUCE THEMSELVES:

MR. PADULA: So, folks on the phone, if you could identify yourself by name and organization, please.

PHONE ATTENDEES IDENTIFY THEMSELVES

MR. PADULA: Again, welcome, everyone. I appreciate your patience getting started here. Again, we've had our safety moment. Again, restrooms are outside in the back of the room to the left. We will do a lunch break. A reminder: we have court reporters here in the room, and if you look above you in the room, all those little balls up there are

microphones. They're very sensitive, so just a caution about sidebar conversations -- they'll be picked up and again probably cause us some issues with people talking over one another, in terms of what the court reporters hear. So just appreciate you paying attention to that. Again, if you could identify yourself when you speak or make comments, that would be much appreciated. On a screen in the room here we have the written agenda for Day One. Hopefully those folks -- let me ask the folks on the phone -- are you able to see the main screen that has the Susitna-Watana Hydro slide on it?

(Phone attendees reply in the affirmative)

MR. PADULA: Okay, good. That will be the main screen that we use for all the presentations today. In addition, in the room we're showing the -- we have a couple of screens available to us -- we are showing the written agenda for today, which was posted. We'll refer tothat if we need to during the course of the day. We're also going to have, as needed, basically a word document, and we'll have a "parking lot" if you will. And if there are any issues that come up today that are not directly germane to today's agenda, we will capture those so that we can address those later. Again, probably won't show that -- we'll have an ability to go

to that screen if we need to over the course of the meetings. Folks here in the room, if you can silence your cell phones, that would be awesome. And I think that's probably it for logistical details, unless anyone has any questions.

One other reminder for folks on the phone: if you could mute yourself if you are not making a comment, that would be great. It will help cut back on extraneous noise and feedback, so appreciate that, too. Please don't put us on hold -- we will all hear music.

We're gonna move off this first slide. So, on the second slide here -- hopefully everyone on the phone can see this, and it's up on the... This slide is intended to summarize the purpose for which we're meeting over these couple of weeks, here. There is a progress report required at this stage of the ILP process. These meetings are the opportunity to have a discussion around the results completed thus far. And, to have a discussion and presentation about modifications

to this study plan, as proposed by AEA or by any of the other participants. And that's the focus of the five days. There's the opportunity here, again, for anyone to raise questions about work that's been done to date, thoughts about any additional work folks may think is needed, or

potential modifications to the approved study plan. What we've put up on the boards over here to my left are the regulations that apply to making a request for a modification to the approved study plan, or a new study; what those criteria are for the content of a study request. I think everyone's probably very familiar with those parts of the process. But again, we're here for the first time, so we thought it would be good to remind folks. Again, we expect that we would see details like that ultimately in written, filed comments record. But we hope today again folks will take the opportunity to raise any of those kinds of interests people may have, in terms again, of the work that's been done to date or thoughts about how studies may need to be modified. We may refer to those over the course of the day -- we'll leave those up all day long so folks can see those. And the subsequent steps to these meetings are an opportunity for written comments, an opportunity for reply comments and then ultimately a decision by FERC in terms of the status of the study program. This has been a long process that we fully -- I think all of us that have been here from the beginning -- totally recognize that. And there have been some modifications and accommodations along the way as we've worked ourselves through the study program. The main

components now on the slide here, showing the written components that are part of the record. Again, we are up to four parts to the initial study report at this point. Parts A, B and C were filed with FERC in June of 2014. Additional technical memoranda came out later in ’14. And then ultimately there was a Part D. This was a very important element of the written record, because we were challenged with being able to show folks the complete record and how the information related to itself over time. And to hopefully provide that road map so that people could get through what is undoubtedly a very large record that’s been filed with FERC -- show the work that’s been done to date relative to the approved study plan. Been a fair amount of time trying to be clear on variances and modifications. We know that’s challenging, probably followed some of that over the course of time. And we’re gonna focus today in our individual presentations particularly on variances and modifications that have occurred to date. Hopefully, we will be able to clarify any questions again that folks may have about those kinds of changes. In addition, there were some changes that AEA made to the proposed transmission and access corridor options, and that was part of the update late here.

Then we brought forth steps for -- proposed steps for completing

the study, as were previously approved.

The last large component of the written record were the two kinds of reports that have been filed with the commission. Study implementation reports where a study has not yet been completed -- and AEA has indicated the steps remaining from its perspective to complete the approved study plan. And, in some instances, actually a study completion report where AEA has made the assessment, based looking back on the approved plan it believes it has accomplished all of the (indiscernible) of that plan.

That's what we have as the, if you will, the cumulative written record available for discussion again today. In each of these instances as we walk through the study plans, that's the information that we're definitely interested in hearing feedback on.

Basic summary of upcoming deadlines. Again, we start with the meetings this week and next. Meeting summaries -- April 24th. Opportunity for written filings on the record regarding study disagreements of the ISR summaries that are filed , as well as again, recommendations with regard to either modified or new studies. Again, that's where we are in the process. In August then, there is the opportunity

for reply comments, and they can come from any of the participants through the filings made in June, and then currently we have an October 21 target for FERC -- the office director of FERC to make its determination with regard to disagreements or recommendations modified or... A lot of work this year, starting now and running through October to really wrap up this phase of the ILP, relative to this major check-in point on the study program and progress to date. Three days of meetings this week, focused on fish, water quality, aquatics and related studies. Two days of meetings next week on the 29th and 30th relative to more the (indiscernible) the dry side of things. And those poor folks are going to have their meetings back in the basement at the AEA building -- so you definitely got the long straw in terms of meeting accommodations.

So the approach that we'll start with today -- and you'll see this in each of the presentations made by our leads -- there'll be a brief review -- (and again, brief) -- study objectives, highlights from the studies, plans for completing a study that is not yet complete from AEA's perspective, and importantly, any proposed modifications from AEA's perspective in terms of the ongoing work. Specific study results and information on variances during the study efforts to date -- that's all been made available and again

we really are encouraging discussion about that, about what's happened historically in terms of variances and proposed modifications as well as the plans for moving forward. Again, in a few instances -- the last bullet here -- there are some specific decision points that are identified in the approved study plan. And again, discussions around those, in terms of activity that's happened since the ISR material has been filed, as well as proposed study plans and modifications going forward -- is all up for discussion.

And the only thing I have back here is essentially the same material that's over on the sideboard there. But for folks on the phone, what we have on poster boards in the room are three slides that summarize the criteria for modifying an approved study. And these, I think they're verbatim -- we intended them to be verbatim out of the FERC regulations. The demonstration that needs to be made, criteria for requesting a new study and content of a study request. I won't belabor any of those -- we can come back to those, if need be.

MR. DAVIS: Criteria for a study modification, where it says the study wasn't conducted as provided. And most of the studies were conducted exactly as provided, so I assume (indiscernible) study

modifications. But if you suggest a modification must be tied to, germane to the exact area where that study was not (indiscernible). That is, there's multiple sub- components within a study. (indiscernible) or if the study was just modified somewhere in there, that opened up (indiscernible).

MR. PADULA: I think the study itself is open to modification. (rest of comment is not discernible)

MR. DAVIS: ...an objective if it's in that study.

MR. PADULA: Right.

MR. DAVIS: One other question. On the meeting summary, when I read through the regs, is there any requirement for the applicant to carry forward recommendations for study modifications that people in this room might provide? Or is it just how they propose to go forward irregardless of comments that are obtained in this meeting?

MR. (indiscernible): I'm not sure I'm following your question. But (coughing) need to address the recommendation that others have been doing as to why or why not they're not doing it. Doesn't mean they have to agree to it, and that would be part of what the commission makes its decision on in terms of resolving that disagreement. Is that getting at what you were asking?

MR. DAVIS: I guess (indiscernible) mediates meeting summary that we're counting on, does it need to include recommendations at this meeting we're addressing, or not? Where people outside may need it?

MR. (indiscernible): The meeting summary is intended to summarize what folks have asked for in terms of presenting -- what they may, what people have asked for. When the (indiscernible) was (indiscernible) I think the concept was people would be engaged by the (indiscernible) objectives, what the variances were (rest of sentence indiscernible). Those were the kind of things that we envisioned when we kinda walked through it to understand whether (rest of sentence indiscernible). A summary would hopefully engage and explain that discussion and carry forth any recommendations.

Let me ask the folks on the phone again -- we had someone text in that it was hard to hear Jeff's questions. Could you hear David's response? Was that clear?

(Unidentified phone participant): Only part of it. Maybe if the questions and the answers could be summarized?

MR. PADULA: Yeah, I think we're gonna do that. And we're gonna also -- this may be, hopefully not too disruptive, but I think we're

gonna pass that mike around when somebody has a comment or question and a response. And please hold that mike pretty close to your mouth in order to get the best clarity.

(Unidentified phone participant): That was pretty muddled -- David's response.

MR. PADULA: Okay, please keep the feedback coming; we're going to keep trying to make adjustments here in the room. So here's the next person with a comment to make, who has a microphone, so let's see how this goes.

MS. LONG: This is Becky Long, and I have two things. First, I want to get on the public record. I'm with the Susitna River Coalition and I have to explain to our members about the FERC process. I've been involved in it from the very beginning, so I kind of understand it. But the latest, the ISR meetings, the roadmap and everything, it has been -- people are very confused. There's a few people that try to muddle through it. They just didn't understand what they should be commenting on, what they should be looking at. So I just want a record for people to realize. I -- I wish it had been just in one document. I realize that would have been thousands of pages, but I think it would have been easier for us to review

it. And then, number two, I just wanted to ask the applicants what their plans are for our field -- is field work going to be going on as this ISR process is playing out in the future? I mean, are we stopped now until the governor -- I'm thinking of the July -- last summer's July executive order where the governor said, "Let's finish up this study thing and then we'll look at it in 2017". So I just wonder if we're looking at more field work going on with the leftover money. Thanks.

MS. McGREGOR: To answer Becky's question, we have continued with very limited fieldwork, primarily to preserve the data we've already collected. So for example, where we had maybe a (indiscernible) of moose or caribou, we continued those studies. There was a little bit of fieldwork that went on this winter, (indiscernible) surveys were completed. The area of aquatic fur-bearer surveys were done -- when we finally had a decent snowfall. I think that's about it for winter -- ice processors did go out. They had the opportunity to measure ice at this (indiscernible) water surface elevations. But none of those were we planning on fieldwork this summer, except to remove equipment or (indiscernible) that's adequate -- primarily hydrology related stuff.

(More comments from phone attendees on sound problems)

MR. PADULA: Okay, thank you. I think these are good opening questions. I hope by getting them out early and addressing them we'll be able to now move into the presentations for the balance of the day. No doubt, this has been a challenging record in process. I think for everyone who's been involved -- for staff and their contractors, the applicants, the participants. Fully acknowledge -- again there was a tough decision with regard to the record and how to pull it all together. FERC got on board with the proposal to do the Part B roadmap. Again, maybe that hasn't satisfied all needs, which is understandable, but that's where we are in the process.

So that record is out there, and again, just encourage everybody who's participating -- everything that's in the record to date regarding the studies is part of that record that we're really hoping to get feedback on, in terms of work that's been done to date relative to that approved study plan, to Jeff's question about modifications and how folks should be addressing any interests or concerns they may have. It's really that entire record. So appreciate people's perseverance in working themselves through that.

I think we're ready to move on today's agenda. And first up, that

will be Mary Keefe.

MS. KEEFE: Okay, I'm going to start off this morning. Mary Lou Keefe, R2 Resource Consultants. I'm going to start by talking about the three studies that were deferred -- start off easy, get more complicated seems to be the way to go -- give everybody a chance to wake up. So the first study that was deferred is the Future Reservoir Condition for Fish Community and Risk of Entrainment (Study 9.10). It's gonna take me a little bit of time, because I'm not gonna go through these individual presentations. That was Study 9.10.

The second study I'm gonna talk about that was deferred is Fish Harvest Study, 9.15. Those two studies are both desktop studies, and they were deferred to the next year of study. It's actually a benefit to do that, both of these studies will be improved by some of the information that's being collected from the field studies. So putting them off 'til the second year of study will actually help us do a more thorough job.

The third study that I'm gonna talk about is the Access Alignment study. Again, this was deferred. It was originally proposed to be conducted over two years, and it was deferred and the decision was made to put this study into one season. So the status of this study is that nothing

has been completed since the ISR as far as work goes. There hasn't been any fieldwork or any analysis -- no (indiscernible) filed. The initial study report was filed and then Part D, roadmap. The objectives are the same, components are the same. The only variance is the timing of this study. In the ISR we reviewed the results -- some of the results of existing information on this study and because of that, AEA added the Denali Corridor. They eliminated the Chulitna Corridor and they're keeping the Gold Creek Corridor. The modifications for this study then, are -- to summarize them -- are the addition of the Denali East option as an alternative for road access and transmission line corridor, conducting two sampling events in one field season -- single open water period, and elimination of the Chulitna Corridor from further study.

Steps to complete will be all the fieldwork that we have to do, any additional information that needs to be synthesized from the studies that are ongoing, and then the data analysis and reporting in the USR. With that, I am done on these three deferred studies.

(UNIDENTIFIED FEMALE): Just a quick question: when will this deferred fieldwork be conducted?

MS. KEEFE: In the next year of study.

(UNIDENTIFIED FEMALE): This 2017, according to ...?

MS. KEEFE: I don't have it memorized so I'm looking at AEA to see if 2017 is the next year of study on the current schedule.

MS. McGREGOR: This is Betsy with AEA. No, we do not plan on doing any additional fieldwork in 2017 other than removing equipment -- hydrology related equipment.

MS. LEBA: This is Heather Leba with the Susitna River Coalition. I have a question regarding the Analysis of Fish Harvest study, 9.15. I am wondering what the process is for doing that desktop analysis and whether there has been a data request submitted to agencies such as Fish and Wildlife Service or Fish and Game, to get those data sets that will be required for the desktop study. And how -- what the process is right now if that study is being deferred, and if Fish and Wildlife Service or Fish and Game can be given enough lead time to have their staff be able to have that data set that is gonna be requested by AEA.

MS. KEEFE: The only information I can give you is that the study has not been initiated at all; there has been no effort expended on getting that up and going, so... So it's deferred until a time when the study gets going and I would assume that we will give ourselves enough lead time to

get the information we need.

MS. LONG: This is like testimony on 9.13. Is that okay? Is this the appropriate time?

[transcript follows -- recording not captured]

Study Modification Request under 18 C. F. R. 5.i5 (c) & (d)

Turbidity conditions, fine sediments, heavy metals and hydrocarbons from construction- related activities and post-project traffic and use will occur in the alignments, airport and temporary and permanent land development. A water quality testing component needs to be implemented in order to address back ground water quality conditions at stream crossings, buffer zones and project infrastructure. Currently there is no water quality study for the border of the construction area.

Revised study plan 9.13.1 General Description of Proposed Study states study goal as a baseline description for assessing potential project effects and to help in PM&E measures. An explicit study goal is to provide data for determining the least environmentally damage alternative for the purposes of the 404 C Dredge and Fill Permit by the Army Corps of Engineers. This modification would give more thorough baseline conditions of aquatic habitats.

Least Environmentally Damaging Access and Land Use are the Study Goals

Can this goal be carried out adequately in one more study year, is my major concern. Will the second season studies be able to carry all the objectives out? The October 2014 meetings stated that there will be a field crew of 3 people that can “knock out” (R2's phrase) 2 sites a day in a field session of 20 days. Is this still the plan to gather data? What about data for infrastructure areas? Second season must do data analysis and incorporate into project’s geospatial database. Some of the 9.13's data is dependent on other study data. Is this forthcoming?

No data accumulation on the airport and project infrastructure have been included. The specific location of the airport and constructions camps have not been established. There is a significant distinct lack of detailed maps regarding the infrastructure. Within 3 miles north of the dam site in sections 13-16, 21, 22 of T12NRSE of the UCGS map shows a lot of wetlands in the very general area of infrastructure.

At the October 2014 ISR meeting, I requested a more detailed map. That has not happened. We need to know about the creeks and wetlands in the land developed footprint.

Is the Chulitna corridor dropped for consideration?

Has any data been gathered for the Denali East option?

According to 4.10.61 of study 6.5 Geomorphology, Number 10 component is to characterize the geomorphic conditions at stream crossings along the access road/transmission line alignments. Has this been done yet? Why does this component not look into streams in the construction area and airport?

The Denali W. and Gold Creek corridors have 23 proposed stream crossings with no known historical data classified as unknown. RSP 9.13.4.22 states the Alaska Department of Fish and Game requested at the TWG meetings that water bodies where no fish were found, that to adequately assess fish presence a sampling in a different season is necessary. With unknown fish presence at a number of streams and with a whole new corridor proposed, will AEA be able to get this done in a field season?

MR. PADULA: Thank you, Becky. Thanks for providing that in writing.

MR. BENKERT: Hi, Ron Benkert, Fish and Game. First I really appreciate you guys abandoning the Chulitna corridor, just because of the

potential impact to anadromous fish. What I'm curious about is, as I recall the original study for this was conducted by ADOT -- or at least they were the ones that were responsible for selecting the original alignments, as I recall. On the new Denali East corridor has DOT been consulted on this? Is this just a desktop exercise at this point or has any ground proofing been done on this new access corridor?

MR. DYOK: This is Wayne Dyok. As far as whether DOT has been consulted on the corridor, the answer is no. We had our engineering consultant MWH look into that corridor, so they had the base information. But clearly, as this study has not been done, they would take that alignment and do the environmental studies at that point, when the studies resume.

MS. McGREGOR: This is Betsy with AEA. I just wanted to address one of the comments that Becky made with respect to the least environmentally damaging alternative. We do have two studies: 11.5 and 11.7, which have not yet been completed. But that's where all the mapping of all the corridors, including a two mile buffer around the entire footprint of every corridor is occurring. The information just isn't available yet.

MR. PADULA: Thanks Betsy. Mary Lou do you want to move on?

MS. KEEFE: Okay, I think I'm done here, if there aren't any more questions then we're gonna move on to 9.17.

MR. PADULA: Beluga Whale Study MS. KEEFE: Beluga whales.

MS. STUTES: Good morning, my name is Adrienne Stutes and I'm a senior biologist with DOWL. I'll be discussing the progress to date for 9.17 Cook Inlet beluga whale, including variances, modifications and next steps moving forward. We'll start by discussing the current status of Study 9.17 and work completed to date. This study outlines the various documents that have been prepared and submitted to this point. Since no additional work has been completed, these documents provide all current information and results. ISR part A was completed in June 2014, followed by ISR Part C which captured modifications to the study plan. The 2014, study implementation tech memo discusses the pilot study conducted in 2014 and the 2015 tech memo discusses work completed to date and studies to be completed in the future.

The first year of data collection was completed in 2013 and followed the study plan with some variances. In 2014, a pilot study was conducted using vessel-based surveys to collect data on beluga whale prey

species and marine mammal distribution behavior and group composition. After this data was collected and reported in the September 26, 2014 tech memo, modifications to the June 2014 ISR were identified, but have not yet been implemented. These are outlined in both the September 30, 2014 tech memo and ISR Part D.

So the original objectives of Study 9.17 were three-fold. These have been presented in several documents, including ISR parts A and D, so we'll not spend any more time on them here. That also holds true for the components, which are presented in ISR parts A and D. There were several variances that came out of the studies completed in 2013 and these are also presented in ISR parts A, C and D.

So we'll move on to the summary of results from -- we'll start with the 2013 aerial studies. These results can be found in ISR Part A, section 5.1. Beluga whales were sighted during 12 of the 17 aerial studies conducted, including all surveys between May and August with the exception of one incomplete survey on June 27th. No belugas were sighted after August 30th. Most beluga whale sightings occurred within two miles of the shoreline in the Susitna River Delta between the Beluga and Little Susitna Rivers. Sighting rates increased from May to July, as

seen in this figure, with peak sightings occurring in July and August.

A summary of the results from the 2013 cameras. Video cameras recorded activity between September 3rd and 24th at PRM6. Seven sightings were made on September 20th, however they were likely the same group of individuals. Two sightings were made on September 22nd, but because these sightings were on recorded video from only one camera, we don't know if these animals were moving upstream or downstream at this time. Live-feed video was monitored from September 25th to October 17th, with no sightings of beluga whales during this time. Still cameras were installed at video camera stations near PRM6 and were operational between September 3rd and October 17th. One group of two individuals was photographed on September 4th . Still cameras located between river mile 11 and 16 did not photograph any beluga whales between July 1st and October 8th, although thousands of them had just been retrieved from these cameras.

Vessel-based surveys for beluga prey species were conducted in June and July of 2014.

The surveys were designed to follow the shoreline between the Little Susitna River and the Beluga River in a zig zag pattern. A total of

nine surveys were conducted, five during high tide and four during low tide. Fish were consistently found in the center of the Susitna flats, and towards the west near the Beluga River. The highest densities of fish were detected near the edge of the exposed mud flats during low tide.

Marine mammals were observed during the surveys and transits to the surveys, and included beluga whales, harbor seals and unidentified seals. Marine mammals were observed on every survey except June 14th.

So to move on to the list of proposed modifications based on the results of previous studies, first, aerial surveys would be replaced by vessel-based incidental observations to document both beluga whale presence and the distribution of beluga whale prey species. This modification will better support AEA's efforts to document beluga whale and other marine mammal presence within the Susitna River delta, and improve AEA's ability to correlate those data with information on ecology and habitat requirements of beluga whale prey species.

Second, the camera stations would be replaced by land-based observations of beluga whales in the Susitna River. Stations would be located near the 2013 camera stations. In addition, members of the eulachon study team would be utilized to survey for beluga whales further

upstream. Third, the water elevation model would be replaced by habitat model in using the ongoing (indiscernible) study and the water quality study to evaluate potential project effects on beluga whale foraging habitat.

This figure shows the proposed study area associated with these modifications. The boundaries of the vessel-based activities are denoted by the red lines. The blue circles indicate the land-based observation stations.

So we've discussed current status of the beginnings. The steps needed to complete thisstudy include three things. One, the study team will conduct land-based surveys as discussed in the 2015 implementation plan. The study team will opportunistically conduct vessel-based incidental observations, as provided in the 2015 implementation plan. And third, the study team will use ongoing modeling in the geomorphology study and water quality study to evaluate potential project effects on beluga whale foraging habitat. And with that, I'll open the floor to questions.

MR. PADULA: Thanks Adrienne; we have questions back here.

MS. LEBA: This is Heather with the Susitna River Coalition. I do

have a question regarding the 2014 vessel-based surveys. Were those conducted in the later part of June and into July? I'm just wondering if those studies overlapped with any of the eulachon migration that happens in May and the early part of June. Because that's a huge portion of the beluga prey diet.

MS. STUTES: No, my understanding is they were all through June and July.

MS. LEBA: So eulachon were not taken into consideration into these fish studies? MS. STUTES: No.

MS. LEBA: Okay, I'd suggest that be modified for the next round, because that's a huge portion of their diet.

MS. KEEFE: This is Mary Lou Keefe. Eulachon will be addressed in the next presentation. But we do have eulachon surveys in a separate study, focused on the distribution of those. And those folks were -- when they were out there, they were looking incidentally to see if they saw any whales.

MS. WALKER: This is Sue Walker with National Marine Fisheries Service. Mandy Migura, who has the lead for Cook Inlet beluga whale, is in training this week and unfortunately couldn't be here. But she did

provide some comments on this study, which we will flesh out in our written comments to FERC. The proposed modifications to the study, which are focused on just portions of the lower Susitna River, don't technically meet the original objectives which reference the Susitna delta, which is where most of the beluga whale use occurs.

Another change in the study is that the water surface elevation model has changed, and we'll be addressing the effects of using a different model than what was originally in the study plan. Given that sightings are now planned to be incidental, there's no plan to conduct targeted area or vessel surveys. But you'll be collecting incidental sightings during eulachon surveys, and I assume this is at some future point -- not in 2017. Our recommendations are that for all studies with the potential to observe belugas, that they all record incidental sighting information, not just the eulachon studies but any study that would have incidental sightings.

NMFS is developing a database, a scientific database that's image based for all scientific studies that observe belugas and the Susitna studies are one of those -- one of five. So we've developed some guides for observations -- we have a form. We'd like to provide that to you for use of all of your studies. You could either use it as is, or modify it to your

needs, but that would help us with the database that we're collecting. And just for your information, this year, in the first two weeks of June our scientists will be flying aerial surveys to estimate the Cook Inlet beluga whale abundance. I'm not sure if AEA plans any studies this year -- it doesn't sound like it, but we thought you might be interested if possible. And of course, that information will be made available to you.

MR. LaCROIX: This is Matt LaCroix with USEPA. I have just a couple of questions specific to the proposed modifications to characterize the habitat using the geomorphology study. Does the current geomorphology study, the modeling of potential project changes -- or even characterization of baseline -- extend to the tidal habitat in the delta? I'm not aware that it does. There are no transects in the intertidal habitat. I'm not sure how you would extend the geomorphology modeling to the intertidal habitat and then potentially characterize that habitat.

The second question is: are the current water quality studies documenting salinity (indiscernible)? If that would be a relevant water quality parameter in the intertidal habitat.

MS. STUTES: For the geomorphology question, I'd like to defer to Bill.

MR. FULLERTON: This is Bill Fullerton. We did an analysis or documented in our decision point technical memorandum that was back in September of 2014. And based on the results of that analysis, we made the decision not to extend the geomorphology modeling downstream of PRM 29.9. So right now we don't have -- the modeling, we found that the project effects would be very minor. We can talk more about this tomorrow; it was done under Study 6.6. So we don't have plans. And then in terms of water quality, Rob's not here, but I believe that they have not done salinity (indiscernible). But I don't know that for sure. 29.9 is at Susitna Station.

MR. PADULA: Thanks, Bill.

MR. WOOD: Hello, Mike Wood, Susitna River Coalition. I'd like to add -- I think Sue brought it up -- in terms of adding observations, adding local observations or interviews of locals, because... For instance I travel that country between Deshka Landing and Willow, to outside of the mouth all year from breakup until hunting season in November. There are belugas in May chasing the hooligan all the way up towards the Yentna River. And there's seals up there, as well -- big pods, like in numbers of 50. The belugas are in the main river at that time, as well they're in the

Ivan River, they're in the side channel rivers after the hooligan in May. They're in front of our house all May, June and July, in the river down there. And as far as extending the observation areas -- your cameras were poorly placed. I think I brought that up last time we were here. So I think paying attention to where you're observing is important. And they're chasing the food; that's why July and August is so productive. They are out there all the way through the fall, usually with their young ones, the little grey guys. So I just want to add that they are there every day between May and November.

MS. WALKER: Mike, National Marine Fisheries Service also has a form for incidental observations of beluga, and we would like to gather those observations, as well. They'd be helpful, so we can get that to fishermen, including yourself.

MR. PADULA: Thanks, Sue. Does anyone on the phone have any comments or questions on this study? Anyone else in the room?

MR. DAVIS: I just want to get this clear. So, the beluga surveys in the lower Susitna River are not coinciding with the eulachon run? Is that correct?

MS. STUTES: They haven't to this point, correct? Or did they? I'll

defer to Betsy for this one.

MS. McGREGOR: In 2013 when the aerial surveys were done, they started in April and they went through either the end of October (I think you might have them in your slides) to I believe, the end of October.

MR. PADULA: Thank you Adrienne. We're going to move on to the eulachon study next. And that's Mary Lou.

MS. KEEFE: This is Study 9.16: Eulachon Run Timing, Distribution and Spawning in the Susitna River. Status of the eulachon study is that the white paper was done, collecting all the existing information for hooligan in the river. We also filed the ISR. We prepared a TM that specifically talked about a modification to this study that we'll talk about. And that was filed in September of 2014. The first year of data was completed. AEA has not conducted any additional fieldwork since that first year, 2013. And we have some modifications to discuss.

No changes to study objectives as filed with the ISR, or study components. We do have some variances from the 2013 study that you've all heard about before. We've talked about these -- it had to do with actually collecting the data in the field, and not using the blocking -- none of these are new; they've all been reported and discussed.

Just a quick summary of the results here, because you've all seen it before. I just wanted to remind you that what we learned doing the fieldwork in 2013 was that the distribution based on the visual and sonar surveys, and the radiotelemetry was that the distribution of hooligan in the system in 2013 was very similar to that in the '80s. And that's what you see here, with all the colored dots.

So the modifications to the study are to actually continue with the visual and sonar surveys, with a little bit of a focus down more in that intertidal area. We haven't been able to find the lower extent of spawning for these fish. We'll also collect population data while we're out there doing that.

We will not be bringing the radiotelemetry component forward in the next year of study, because we don't feel that there's a need to spend the effort on that. We know the distribution - - the current distribution corresponds with historic distribution. So we'd be eliminating the radiotelemetry and instead picking up this wetted perimeter model that we talked about in 2014, which will allow us to correlate stage changes in the lower river back to the flow routing model. And through that we'll be able to get estimates of eulachon spawning based on depth and substrate. Then

we'll be able to predict changes to that spawning habitat depth and substrate with project operations.

Steps to complete the study then, are additional field work in the next year of study, visual and sonar surveys, transects and habitat sampling to support inputs to the model, development of the model and running the model to get numbers on habitat availability.

MR. PADULA: Any comments or questions in the room?

MS. WALKER: This is Sue Walker with NMFS. Have you looked at the existence of the winter run of eulachon in this river?

MS. KEEFE: No, it's the first I've heard of it, personally.

MS. WALKER: It's a recent discovery in a lot of the eulachon runs in Alaska, especially in Haines, is that there is a small, pulsed definite winter run.

MR. PADULA: Are there any comments or questions from folks on the phone about this study?

MR. DYOK: (Inaudible question)

MS. WALKER: It's something biologists are finding out from traditional fishermen, is that there is, in most rivers with a eulachon run, there is a small winter run. And they're delicious!

MR. PADULA: That last question was from Wayne and the response was from Sue.

MS. McCRACKEN: This is Betsy McCracken with Fish and Wildlife Service. I'm just wondering if the white paper that was completed, was it just for the Susitna River?

MS. KEEFE: I am sorry, that paper was filed in 2012, and I honestly don't remember. I do remember reading it, and it had extensive information about the historic data on the Susitna and the two different runs that they had historically . But I -- I can't tell you honestly if she brought in information outside the river, or not. I can look and find out later though, Betsy. I have it on my computer.

MS. McGREGOR: Betsy, I can answer that question. This is Betsy with AEA. The eulachon ISR Part D, the title of it is: "Eulachon Distribution and Abundance in the Susitna River"

MS. McCRACKEN: Okay.

MS. McGREGOR: And the description specifically discusses eulachon run time, distribution and habitat use in the Susitna River.

MS. McCRACKEN: So that's clarification. Also, while I have the mike, I just was wondering if Mary Lou wouldn't mind telling me. During

the beluga presentation, you mentioned that the highest densities of fish were found during exposed mud flats at low tide and near the Beluga River. Can you just tell me briefly what species were found, or were you able to discern that?

MS. KEEFE: I don't know what species were found. Again, I can look and tell you. I'm pretty sure they were doing sonar, so it may be that we have size signals and not species.

MS. McCRACKEN: Alright, thank you.

MS. LEBA: This is Heather again, with the Susitna River Coalition. I wanted to make a few comments regarding the implementation of this study. From reading the study report, they weren't able to get out into the river until the end of May. So my concern is that they -- the study does not capture the full extent of the run for that year. I know that it was an anomalous late breakup that year, as everybody knows. It was very cold and there was ice on the river for a long time. So that I'm just wondering if there is going to be an effort to make sure the next study -- round of studies begin earlier in the season, obviously pending weather. But that's just one of my comments.

And then my next comment is that, you know, I think that this study

modification to address the lower ten miles of the river is a good one. I think a lot more effort should be focused on using mobile sonar, as they did in 2013, to characterize that run and distribution of that run in the lower river. But I'm wondering how that will impact migrating beluga in those areas. Because there is that concern that having boats in the lower ten miles may impact -- or may encounter beluga. So this study is also intended to have incidental beluga observations, so I'm just wondering how that will work with all the permitting that needs to occur to enable folks to be down in the lower river. And then my one additional comment is that because eulachon use a variety of habitats for spawning -- fine silt and also gravel and cobbles- that the study should really focus on those lower flows in the lower ten miles of the river, to identify how a drop in CFS in the summer time and early spring after breakup will impact any habitat that eulachon may be utilizing in those lower areas of the delta. Thanks.

MS. KEEFE: This is Mary Lou. We did go out as soon as we could after ice breakup in 2013. But they also went out prior to ice breakup and did what they could in holes, to see -- just dip netting and whatever they could -- to see if they were missing a run. And we've discussed this in the

past and to the best of our ability to detect anything, it did not appear that we did miss the run. We will get out as soon as we can, as it's safe to go out on the river, but we can't do anything if there is ice on the river in the next season of study.

Don't have any information for you on the permitting process. It is what it is, and we'll have to -- we understand what the permit deadlines are and we'll have to make sure we do what we need to do on that.

And then, the last comment was that the lower river and the low flows. That's exactly what we're hoping to get out of this model. It's basically modeling in the same fashion that they did in the '80s to look at eulachon habitat. But it is -- it will allow us to get at lower flows than they did in the '80s.

MR. EAGAN: This is Sean Eagan, National Marine Fisheries Service. You said you were going to look at wetted perimeter effect and compare it to the open water flow routing model. My understanding is that model will stop at mile 29.9. It doesn't really function below -- not even gonna try to. It also -- when the river starts braiding out below Deshka, it becomes less and less precise as to what's wet and what's not wet. So the wetted perimeter seems really important, but it seems like maybe you

need another tool besides that open water flow routing model to assess those lower 35 miles.

MS. KEEFE: I'm going to let Phil answer that, because he's actually doing that work.

MR. HILGERT: This is Phil Hilgert with R2. You are correct; the open water flow routing model and geomorphology will end at river mile 29.9. We have eulachon spawning in that lower river below river mile 29.9. What we're planning on doing is, identifying those eulachon spawning areas, setting up transects, putting in pressure transducers and rather than a running the open water flow routing model downstream, we'll develop a correlation between what happens at 29.9 and what happens at those transects.

One of the difficulties is, you get into the extreme lower river -- low river mile 11 or 12, you start getting into the tidal influence zone. And so that adds a complication to it. We look at eulachon spawning habitat and at this point we're trying to concentrate on areas that have proper substrates, as well as proper depths. We're looking at velocities, but because of the tidal influence zone it's going to be very difficult to model what happens from a velocity standpoint. We can do stage, we can do

substrate, but velocity is really tough in that tidal influence zone. One of the things we're trying to do during the 1980's they looked at eulachon spawning and they conducted the study during that eulachon spawning period. And they identified that they couldn't see any effect -- they didn't anticipate any project effects between about 35,000 cfs and about 90,000 cfs. But they didn't look at how to extend the model or how to extend that analysis down into lower flow. So what we're using is more of a physical base model and then going out in September during low flow conditions, collecting data. Even though the eulachon won't be there, we'll be looking at what are the changes in stage associated with the project operations. So that's how we're trying to look at extending beyond what they did in the 1980's.

MR. EAGAN: Thank you.

MR. WOOD: Mike Wood, Susitna River Coalition. I'll be brief. You refer to the 80's studies, but there was historically beyond the 80's, studies of hooligan being as far up as toward Talkeetna. So tracking the history is important, and how even now it may be different than it was in the 80's. Because it is different from what it was a hundred years ago when they were recording catching fish up there.

I just want to say that the winter run of hooligan or eulachon is may a confusing- I'm a little confused by that. I've seen in the springtime, actually with Dave (Name) and Jerry George -- even we documented what I think were Bering cisco up in Whiskers Creek even, under the clear ice we could watch them swimming around. And they looked like little hooligans, too. So I don't know if people have their fish straight, but I know there is a lot going on under the ice up there prior to breakup. And R2 biologists and I have even seen it.

MR. BENKERT: Hi, Ron Benkert, Fish and Game. Just to address the permitting question, currently AEA has all the permits they need. I think the first ones expire in July and we'll be working with Betsy and AEA to determine which ones need to be amended for extensions and which ones we won't be using any more. But as far as specifically to the game refuge, which is what we're talking about, obviously it's just how they're gonna access the site. If they're accessing by boat they don't need any permits from us. If they're accessing via helicopter obviously we can permit that, but we just need to be aware and, areas that we do have springtime flight restrictions for spring waterfowl staging. But we can work with these guys to figure out what to do with that.

MS. LEBA: Thanks Ron, I guess I was specifically thinking about ESA consultation and impacts to marine mammals.

MR. PADULA: Any other comments in the room?

MR. HOGAN: Phil, you comment that monitoring the velocities in the tidal area would be difficult to do that. Do you have any plan to do so? But in here you have - oh, maybe I missed it. (Indiscernible).

MR. HILGERT: No. We're looking at metrics of eulachon spawning habitat being depth and substrate. We do know that the eulachon spawn in faster velocities. But when we're looking at the project effects, keep in mind that from a flow standpoint, the Susitna is 187 miles upstream and it has probably 16 percent of the total flow down at river mile 29.9. So as you go downstream you have less and less of a change in flow. So now we're getting into very minor change in stage, and an even more difficult change in velocity. We'll take our transects where the eulachon are spawning and we will take velocity measurements when we're out there. But I don't want to try to promise that we're going to go ahead and look at using velocity changes as a metric in that tidal influence zone.

MR. PADULA: That response was from Phil Hilgert. Before we

leave that, again, opportunity for any further comments from the phone, folks on the phone about the eulachon study? We are running a little early, so we'll go ahead and take one more study and then we'll take our break.

The next up is the Genetic Baseline Study for Selected Fish Species.

MS. WALKER: We have people calling in at 10:30.

MR. PADULA: We weren't anticipating that, so we'll take a bit of an extended break and we will stay on our agenda and be back at 10:30 with genetics.

Off Record: 9:58:36

On Record: 10:28:47

MR. PADULA: Okay, we're gonna get started again; appreciate everybody being prompt, getting back for our restart here. A reminder for folks on the phone, please mute yourself. We had someone or someones several times during the first session come off of mute and we picked up a lot of background. So, please mute yourself unless you intend to make a comment and also please don't put us on hold 'cause we hate that music. We will continue with the hand-held mikes again, I think that worked pretty well. Without further ado, we're gonna move on to Study 9.14 with

Chris.

MR. HABICHT: Hello, my name is Chris Habicht, I work for the Alaska Department of Fish and Game. I'm presenting Study 9.14 Genetic Baseline Study for Selected Fish Species. My co-presenter is Andy Barclay (ph) who is in the audience today. I'm on the second slide - study status. So the ISR Part D overview has the initial study report. Parts A, B and C were filed in 2014 and final 2014 implementation plan was also filed. And a study implementation report was filed in 2015. So (indiscernible) that have been completed to date are two years of field collections. We have screened 48 single nucleotide polymorphisms for upper Cook Inlet Chinook salmon. And we've screened 12 microsatellites for juvenile Chinook salmon collected in the middle and upper Susitna River. Still pending are some laboratory analyses, statistical analyses and reporting.

I'm not gonna go over all the project objectives, they're in all the reports that you've seen, starting from the initial study plan and they have not changed. The study components also have not changed. This shows you in which reports they're spelled out.

We do have a few study variances. In 2013 we did not have full

access to land in the Cook Inlet regional working group, so therefore we had limited access to Devil Canyon and Portage and Prairie Creeks. In 2014 there were 12 adult Chinook salmon collected in Fog Creek from which we did not take latitude, longitude, fish length and sex data. In 2014, we replaced caudal fin collections for Chinook salmon in the upper river. These are lethal collections and there are very few Chinook salmon up there -- to do a buccal swab sampling method, which is non-lethal. And, in 2014 in consultation with the services - so that's Fish and Wildlife Service and National Marine Fisheries Service -- we included 190 SNP markers and 12 microsatellite markers to be analyzed for all Chinook salmon captured in the middle and upper river. That was to increase statistical tests among hypotheses.

I am now going to go through a brief summary of results. This first slide shows the sampling effort that's been done by all AEA contractors and Fish and Game. It shows both the sites that were sampled and notes samples (indiscernible). These were for juvenile Chinook salmon in the river above Devils Canyon.

Now I am going to go through all of the different species and what we've collected so far. For Chinook salmon we've collected about 2,400

fish at 41 sites throughout the study area. Within the Susitna River we've collected most of those fish (2,347) at 37 sites. And then as we move up into within and above Devils Canyon, 107 adult Chinook salmon have been sampled at 7 sites. If we go above Devils Canyon, we've collected 18 fish above Devils Canyon.

As for juvenile Chinook salmon we've collected -- these were collected in two locations within and above Devils Canyon, and also in the lower river. 398 fish have been collected at 9 sites above Devils Canyon, the last impediment, 226 fish at 5 sites. In the lower river, this is part of the study where we're looking at stock compositions among habitat types. We've only collected 8 fish in one habitat type.

Of a species identification component to this study, and for our component we've looked at putative Chinook salmon within and above Devils Canyon, 398 of them, and all of those successfully speciated were Chinook salmon; I believe it was 96 percent were speciated. We've also done some species ID for other related projects - we'll hear about those later today. For other Pacific salmon species, we've collected samples from Sockeye salmon, chum salmon, Coho salmon, and pink - both even and odd years. The numbers are represented here; you can see the

distribution of the samples. Again, these samples were only collected to put into a sample archive. There is no analysis of these samples in this project.

As for other species outside of Pacific salmon, we've collected all the project combined have collected about 2,400 fish. Our target was 50 fish for each species. We've reached 50 fish for 9 species. We've collected between 1 and 50 fish for 6 species. And for 6 species no fish have been collected for this study.

So, just a summary of results: Pacific salmon sampling, almost 5,000 adult salmon have been sampled and 230 non-Pacific salmon. Under other studies, 3,361 tagged Chinook salmon have been sampled. And of those, 12 of those fish ended up above Devils Canyon. So we have collected genetic information from those 12 adult Chinook salmon.

As far as laboratory analysis is concerned, for upper Cook Inlet adults, we've successfully screened for at least 48 markers for all of those collections. Within and above Devils Canyon adults, we've also screened for the 48 and we've upped it to 188 SNPs and all 12 microsatellite markers. For the juveniles that were collected within and above Devils Canyon, we had some issues with DNA quality and quantity. We were

able to screen for the 12 microsatellite markers, but we have not been successful in screening for the 188 SNP markers.

There have been a few modifications. No modifications were specified in the ISR, but we'd like to clarify that the following are proposed for study plan modifications. One is the use of non-lethal sampling. This is where the buccal sampling is proposed as opposed to caudal fin, which is lethal to Chinook salmon, for juveniles above Devils Canyon. And the increase of markers from 48 originally planned to 190 SNP markers, and 12 microsatellite markers for Chinook salmon captured in the middle and upper river to increase statistical power. Again, that was from consultation with agencies.

Finally these are the steps we need to do to complete the project. There's a little bit more laboratory analysis of Chinook salmon collected within Susitna Basin. Screen and statistically analyze the additional SNPs and microsatellite genetic markers in the middle and upper Susitna River. Examine and the population structure of Chinook salmon within sampled upper Cook Inlet tributaries. And examine potential mixed stock analysis of Chinook salmon within the Susitna River. AEA would like to clarify that one of the tasks that we had before as a modification was to establish

a biological basis for species determination by genetic marker.

That was never in the original plan; that was something that was added later. We still plan to do this work, but it's not part of this project. And now I'd like to open up for questions.

MS. McCRACKEN: This is Betsy McCracken with Fish and Wildlife Service. Thanks for your presentation, Chris. I'm wondering if you found any difference in DNA yield between the caudal fin and the buccal swap samples that were taken?

MR. HABICHT: We did. We didn't expect to, because we had run buccal samples from other collections. And in past experience buccal collections worked really well, which is why we proposed moving from caudal fin collections to buccal samples. So we were surprised to find lower yields than we anticipated, yes.

MS. McCRACKEN: Thank you. Also, I think the report acknowledges the lack of data to identify the temporal stability, and I'm wondering if you think you'll be able to get that information in order to complete that.

MR. HABICHT: As scientists, we always want more. But there's quite a bit here. So we have two years' worth of juvenile samples, and we

know those two years come from two different sets of breeding individuals. So we expect to get some information about temporal stability just in the juvenile sample collections that we have from 2013-- 14. We would love to get more years of collections; I mean that's just the case with all science. But we expect we should have some pretty good information on temporal stability or lack thereof.

MS. McCRACKEN: Also, if the project doesn't move forward to complete licensing and construction and operation, how often -- or do you anticipate that the project would need to again test for temporal stability at length of time -- at some point? If the project were to start again, and then they wanted to continue again, would they need to do the testing of temporal stability or not?

MR. HABICHT: I think we'll have to wait and see what the results we get from this first analysis are. We may find that there's a lot of instability temporally here. So then the question is, well maybe it's more stable if you looked at a longer time period. Two years is a bit light on looking for temporal stability. So if we don't find differences in temporal stability, we don't find differences in allele frequencies between years, it would be weak evidence to throw out the hypothesis that there is no

temporal stability -- not a lot of statistical power.

MS. McCRACKEN: Okay, thank you. And just one more question. I noticed that you were able to get samples from arctic lamprey.

MR. HABICHT: If it was in the slide, yes. I don't remember. MS. McCRACKEN: Do you know where those came from? MR. HABICHT: I don't.

MS. McCRACKEN: You don't?

MR. HABICHT: They were probably in an associated study. I can tell you where in the river they were collected based on our study report. Would that be helpful?

MS. McCRACKEN: Yeah, that would be. I'm just trying to recall, because I thought the project had only documented Pacific lamprey in the lower and middle river. So I'm just curious where you found arctic lamprey.

MR. GEORGE: Hi, this is Jerry George with R2. I'd just like to clarify that we've - the lamprey that have been identified, the species to date have all been arctic lamprey; there have been no Pacific lamprey.

MS. McCRACKEN: Okay, very good, thank you.

MR. HABICHT: On page 31 of our SIR report, we have a table that

shows the collections that we have received to put into the archive, and there are ten arctic lamprey that were collected in the lower Susitna River. I don't know what year that was. But, over the period of this -- 2013? And no Pacific lamprey have been collected.

MS. McCRACKEN: Okay, thank you, Chris.

MR. GUYON: This is Jeff Guyon from NMFS.

MR. HABICHT: Hi, Jeff.

MR. GUYON: Just a few questions. Some of them are very similar. Is there any progress in optimizing the buccal swabs that you have? Or do you anticipate in the future that the same type of DNA yield which was not as good this time? Do you see any changes to that procedure?

MR. HABICHT: So you're talking about future collections, rather than trying to get DNA out of current samples?

MR. GUYON: Just trying to see -- and some of it goes back to a different question, too. Are there future collections that are planned along the way, and if so, are you going to continue with this buccal swab protocols along the way? And do you anticipate that the yields might be different?

MR. HABICHT: I think I should allow AEA to answer the question

of whether this project is planning to be continued.

MS. McGREGOR: There's still work that's supposed to be done in the upper river for fish distribution and abundance. So they will continue to collect genetic samples from all the Chinook that they capture. And if they don't reach the target -- the goal that was in the study plan for the genetic study, then we would collect additional samples.

MR. HABICHT: And so Jeff, to answer your question, for those additional samples that will be collected in the upper river, our plan is to continue to collect with buccal samples -- with buccal swabs. We'll treat them differently in the laboratory than we did in the past. We'll cut them in half, so that we have a backup set. And we'll do preamplification on all markers.

MR. GUYON: Sounds great, Chris a non-lethal nature that makes it really good. But the juveniles that were collected in the past, when you went through you were able to get microsatellite data from the buccal swabs, but not SNP data. How do you think that will impact the study?

MR. HABICHT: Well, if I had to pick between microsatellites and SNPs, I'd take microsatellites any day, for the types of questions that we're asking. Microsatellites have a lot of alleles, so we can look at allele

richness and there's just a lot more information in the microsatellite data than there would be in the SNP data, to test among the hypotheses that we have on the table. So, I'm -- if I had to pick one marker set, I'm glad we have microsatellites.

MR. GUYON: That sounds great, Chris. Then the last question I have has to do with the adults. So the adults that you have genetic tissue from, do they all come from the radio tagged fish that go through, the 12 adults? Or were there adults that were collected upstream, you know the proposed dam site, that were -- didn't have radio tags in them?

MR. HABICHT: There are both. We have the radio tagged fish and we also have fish that were sampled on the spawning grounds. And those fish that were sampled on the spawning grounds were sampled both within the canyon and above the canyon.

MR. GUYON: How many total adults were there?

MR. HABICHT: Hold on one second. So Jeff, within and above Devils Canyon we have 107 fish. And above Devils Canyon we have 18 fish. So the fish that I spoke about earlier, the radio tagged fish, those happened to be 18 as well. But some of those were found within Devils Canyon. So the 18 that you're seeing here are a combination of radio

tagged and fish that were sampled on the spawning grounds.

MR. GUYON: And so for those 18, what do you think the limitations are gonna be for some of the future analyses that you're gonna do? Has there been some preliminary power analyses and things like that done to try to figure out what you'll be able to say with those samples?

MR. HABICHT: We haven't done those yet, and that's part of what we want to get consultation with the agencies - with Fish and Wildlife Service and you guys. We expect that we'll be able to look at some of these fish in relatedness to some of the juvenile fish. And that will be an interesting analysis. I think that just simply looking at 18 fish we would lack statistical power to detect much difference between a fish above Devils Canyon and below. I think the more interesting analyses are going to be looking at the juvenile collections that we have in relationship to the adult samples that have been collected.

MR. GUYON: That's great, Chris, thanks a lot; I appreciate that.
MR. PADULA: Thank you. We've got one comment back here.

MS. LEBA: Hi, Chris. The previous questions actually addressed a lot of my own comments. But I wanted to ask what your -- what the differences between using SNPs and microsatellites are to address the

hypotheses that are being asked during this study, and to identify distinct population units among the juvenile salmon that have been sampled. And this is Heather, with the Susitna River Coalition.

MR. HABICHT: The microsatellites have lots of alleles and SNPs only have two. So we can look at things like allele richness -- which, with SNPs would always be two no matter what population you look at. Whereas the microsatellites you can see large degrees of variation. And those numbers will be really useful in trying to understand effective population size. So that's why the microsatellites are more powerful than SNPs for these types of analysis.

MS. LEBA: Yeah, that answers my question. And I have one more comment or question regarding sample size. Do you feel that the samples you have collected - or that have been collected - are gonna give you enough statistical power, for the juveniles specifically, to identify any of those population differences?

MR. HABICHT: It will really depend on how much difference there is. So, the bigger the difference, the lower power you need to detect it. And until we dive into these and start looking at them, we don't really know what differences we anticipate seeing. So we may have enough

power, but won't really know until we start looking.

MR. GEIGER: Hi, it's Hal Geiger. Chris, can you explain how the buccal swabs work? And my other part of the question is: Do you have any idea of what went wrong in this particular case?

MR. HABICHT: The way buccal swabs work is they're basically a piece of filter paper that's attached to a plastic stick. And you wipe the fish back and forth to gather cells onto this piece of filter paper. And then we put that filter paper in a bunch of beads in a tube. Those beads then dry out the water so that the DNA stays stable. So that's how the buccal swab works.

MR. GEIGER: Okay, so I'm familiar with taking epithelial swabs inside of mammals, but there you go inside the mouth. The buccal muscle is the one on the cheek. So is this on the outside or the inside of the mouth?

MR. HABICHT: It's all on the outside of the fish; you swipe the whole fish.

MR. GEIGER: And the other part of the question: any speculation as to what went wrong?

MR. HABICHT: Well when we ran the microsatellite work we

used a lot of the DNA that was available. And by the time we got to the SNP work, we ran it once with most of what was left and we didn't have the (indiscernible). We think the DNA concentration was really low. In hindsight, we wish we had preamplified this genetic material, and I think we probably could have gotten it to work. But, by the time we were done, there was nothing left to work with. We ran out of sample.

MS. WALKER: Sue Walker for NMFS. Maybe this question is to AEA. What is the plan for analysis of the samples that have been collected now? We've just received a request for consultation on the 2016 implementation of the study. But we're not quite sure how you proceed. Could you please give us some details?

MS. McGREGOR: This is Betsy with AEA. Part of the implementation of the study was ongoing consultation with both of the service's genetic labs. So Chris - that's the point of why we would like to meet on April 12th. But that is exactly what the consultation is supposed to be about - is discussing how we're going to do the analysis of the samples we've already collected moving forward. And Chris could speak more to that.

MR. HABICHT: Yeah, that's exactly right; we really want to get

together and make sure that we have a plan that everybody's comfortable with and has had outside review, before we implement the analysis of the data that we've collected so far. We anticipate that we'll be looking at sibling relationships. We can anticipate a lot of types of things that we might do, but we wanted to make sure that we have this consultation before we move forward. So we've kind of been waiting for this consultation, and we just got the green light. We're really excited about taking the next step.

MS. WALKER: That's great, and we look forward to working with you on that. We've got Jeff Guyon and a couple of other geneticists. But I'm still not clear on whether the analysis is going to proceed right away, or if this needs to wait on any resumption of the project.

MS. McGREGOR: The state wants to make sure that we preserve the value of what data we've already collected. So, we're not collecting any additional samples in 2017. We want the Fish and Game genetics lab to move forward and analyze the samples that have already been collected.

MS. WALKER: So you are planning to analyze these samples pretty soon?

MS. McGREGOR: Yes, yes.

MS. WALKER: Excellent; thank you.

MR. BURAK: Matthew Burak, with the Louis Berger Group, contractor to FERC. In the implementation report you say your "pool populations". Could you explain a little bit how you grouped the populations with the limited analysis that you've already done?

MR. HABICHT: So I think we said we pooled collections into populations -- is that right?

MR. BURAK: Right, correct.

MR. HABICHT: Okay, so we have some standard analyses that we use for mixed stock analyses, where we pool collections that are made in similar geographic area, similar temporal time of the year. And if they're both taken at the same time and the same spot, we pool them automatically. If they're taken somewhat in a different location, but they're close by and there's a biological reason why they're likely to be from the same population, then we do a test, a homogeneity test, and we verify that the allele frequencies are similar between the sets of individuals. Then we pool those together and create populations that way.

We don't extend that to every collection that we have. We don't

check every collection to see if they're poolable. But we do do it when there's a biological reason for that.

MR. BURAK: Have you observed multiple (indiscernible) in those collections?

MR. HABICHT: Are we talking about collections above Devils Canyon, or within and above Devils Canyon?

MR. BURAK: Yes.

MR. HABICHT: We haven't done our full analysis and that's what we're waiting for consultation for. What we have done, and we showed last time, was that the few collections that we did have were highly divergent between Kosina River and Oshetna River - I believe those were the two. So there's indication that the allele frequencies are really different. The big question is: why? Are they different because they represent different populations? Are they different because they just had a few individuals that spawned up there? And so you have this very strong (indiscernible) from a single generation. And that's what these juveniles are going to help us with, in looking at the adults that we've collected so far.

MR. PADULA: Any other comments or questions from anyone on

the phone or in the room? One more in the room, here.

MR. BENKERT: Hi Chris; Ron Benkert, Fish and Game. So you said you had developed a genetic tool to differentiate between species. I'm just curious because of the issue we had with fish identification a year or so ago. If there's been any cross-referencing with your genetic data and the protocols that were developed to try to determine which species, either Chinook or Coho, would be captured up there. I mean obviously we've spent a lot of efforts developing additional protocols, but for those identifications. I'm just wondering if there's been any cross-referencing, or looking at that to see if that's helping you guys at all.

MR. HABICHT: Maybe I can let AEA speak to that. I can tell you how we do it, how we use the genetic techniques to differentiate among species. If that's what your question is, I can answer that one.

MR. BENKERT: No, I think it's great that you guys have developed that tool. I mean, we've had that issue in other areas, too. And I understand the difficulty of trying to identify some of these very small salmonids. But I'm just wondering if this genetic test could be helpful with the field crews, basically just additional confirmation that we're identifying these Mary Lou Keefe, R2 Resource Consultants. There is

cross- referencing. It's part of protocol that we filed with FERC, and Jerry will talk about that later this afternoon. Don't want to steal his thunder.

MR. PADULA: Okay, I think that is a wrap on this study. Appreciate everybody's contribution there; that was awesome. We'll move on to Study of Fish Barriers 9.12, and that's Mary Lou.

MS. KEEFE: Okay, we're moving on to Study 9.12, Fish Passage Barriers in the Middle and Upper Susitna River and Tributaries. Study status: We've filed a tech memo in addition to the ISR in 2014. And we filed the study implementation report in 2015.

For Objective 1, we have completed objective 1. The first part of that was assessment of physical barriers, waterfalls, etc. 43 of those were investigated and 42 were classified as barriers. We used remote imagery also, and identified 433 potential beaver dams, 164 intact.

For Objective 2, we initiated that. We've completed the field work component of that in the thalwegs. Now it's 16 total that were proposed thalweg profiles in the middle river tribs. And we've identified target species and life stages and refined that list through consultation with the stakeholder group. And then we've also developed and proposed passage criteria that are specific for that.

Objectives 3 and 4 remain to be completed. And that's really taking the field data, taking the criteria, taking the outputs from the models that we don't have yet, and integrating that information to identify potential barriers that exist now and that may occur in the future.

MR. PADULA: I want to interrupt for just a moment. Is the NMFS contractor on the phone, for this study? Greg, are you on the phone?

MR. RUGGERONE: Yes, sorry, I was muted. Yes, Greg Ruggerone is here.

MR. PADULA: Thank you.

MS. KEEFE: So our study objectives have not changed. Our study components have not changed. We have the same variances, with one additional variance, and that's this one - the fourth one here. In 2014, we added a remote assessment of beaver dams in coordination with the riparian study. They had the ability to go in and look at remote imagery and create a beaver dam layer, which will lay on top of the other habitat layers that we have really nicely. It identifies 444 potential beaver dams, and then they went through and determined --they did an assessment to see if it was intact, partial or not intact.

Just a quick summary of results: This is the refined species list that

includes input from participants. It was filed in 2014 TM in the ISR. The criteria for depth and height and (indiscernible) velocities were also filed in the SIR: Section 5, there are these four tables - a lot of criteria, I'm not going through them all. The SIR also contained the field data that was collected in 2014 for the complete set of data from both the physical barrier surveys and the thalweg surveys. Then finally, the SIR contained the output of the remote imagery. This is largely in Appendix A. There's a number of maps showing the locations of all these potential and beaver dams, and then their classification.

We don't have any modifications proposed for this study plan. There is a lot of analysis left to complete. We are finished with the fieldwork, but we still need to put together the changes that the project effects will have on water elevations and work with the model outputs, as I mentioned before, to come up with an approach on how we're going to predict potential barriers. And I'm ready for comments, questions.

MR. RUGGERONE: This is Greg Ruggerone, consultant with the services. I have a few questions for you. Regarding Objective 2, I notice ISR Table 4.3-3 identified tributary mouths that would be surveyed. And in that table 27 tributaries were listed, yet you mention here that only 16

surveys were conducted in the middle river.

MS. KEEFE: These are thalweg surveys, so I'll do the best I can - I'm not the study lead with this, but I'm almost a hundred per cent confident that the discrepancy here is, geomorphology was doing 2-D modeling in a number of tributaries, and we had to go in and fill in where they weren't going with thalweg surveys. And I believe at the last ISR meeting we presented a table that clarified where the tributary -- what the tributary was, and who was doing the work. And that's filed with the documents, as well. And Bill is shaking his head in the back of the room, so, I got it.

MR. RUGGERONE: So that Table 4.3-3 has been modified? Because I'm just looking at it right now, and the ISR indicated that these are the major tributary mouths, and the middle river is selected for fish passage barrier investigation?

MS. KEEFE: You're talking about the ISR that was filed in June? Or are you talking about the SIR, which is the supplement?

MR. RUGGERONE: This is the ISR filed back in 2014 -- I think it was the June 2014 report. The SIR -- one of my -- makes it very difficult for me to review these reports because they're not comprehensive. So like

the SIR did not incorporate a lot of the information from previous reports. That's why I went back to this other table ISR to try to figure out what streams were supposed to be surveyed.

MS. KEEFE: You're correct, the SIR is not comprehensive for 2013 and 2014. It was just a second step in the process in describing the data that was collected in 2014. I'm trying to pull up that table that you're talking about, 9.12, Part A?

MR. RUGGERONE: Yeah, it's page 22. There it is.

MS. KEEFE: Major Tributary Mouths In The Middle River -- correct. And then there is a similar table for the upper river. And off channel. So these are the tributary mouths selected for passage barrier investigation in the study.

MR. RUGGERONE: Right. But I think you mentioned in one of your first slides that only 13 tributary mouths have been surveyed. And that's about what I observed in the report.

MS. KEEFE: And I think you need to look at -- see these x's here? So Chase Creek was completed in 2013. Whiskers Creek was completed in 2013. And then, what we did in the SIR in 2014 was, we went into how ever many additional -- the numbers should add up. If you add up the

numbers that were completed on that table -- if you add those x's up with the numbers that were completed in 2014. And I didn't add them up, so hopefully, they do. But that would be how you get that. The x's in that table indicate those were already done in 2013 -- that's what that table intended. 2014 was to go into the places that hadn't been completed, that are identified on that table and complete those surveys.

MR. RUGGERONE: This is just one example, I think, of why comprehensive reports are necessary. You know, reading the SIR -- which is sort of the last report completed -- failed to mention all these previous apparently surveys. And just going back to the ISR, there were these streams that are identified in this table, there were no data related to all of those streams. So I'm not quite sure where to find (indiscernible) data for all 27 of these.

MS. KEEFE: Well, I'd be happy to help you find the data. It may be that it's presented in an appendix to the ISR, and it's not actually in a table. But all of the data for all of the streams that were surveyed should be presented and should be filed. And I'm happy to take the time and find that for you -- help you find that.

MR. RUGGERONE: Okay, that's fine. I have some other questions

if that's alright-- maybe we have some time. With beaver dams it seemed the methodology changed a little bit. And with the aerial surveys I think you went to identifying -- characterizing the beaver dams as being intact or not intact, and so forth. And then I think you're planning to rely on a modeling approach to evaluate fish passage over and through beaver dams, and it's not clear to me how one would model fish passage over and through beaver dams.

Especially when the data that's collected for those beaver dams is just qualitative observations of whether or not the dam's intact or not intact.

MS. KEEFE: I don't think we're intending to model passage through beaver dams. Just so you know, there are many components to the beaver dam story. Beaver dams were evaluated with the 2-D model by the geomorphology crew in the focus areas, and they got some measurements off of them. Beaver dams were identified and characterized by the field crews in the fish and aquatic studies. The remote assessment that is described in 2014 was an additional assessment in an attempt -- because we were focusing where we were on the ground, it's the only time you can do anything with a beaver dam, as you're mentioning -- is when you're

on the ground. And we were on the ground and we were trying to get information on beaver dams. And we got what we could. Beaver dams are highly dynamic in the system. We have data from the fish and aquatic study where we went out in 2013 and we sampled a pool behind a beaver dam. And we went out the next year, and it was gone, and it was no longer a pool, so the habitat changed. So I don't think that the study plan ever suggests that we're going to model passage into and out of beaver dams. The modeling into and out of sloughs and tributary mouths is definitely an objective of the study plan.

MR. RUGGERONE: Going back to the tributary mouths, which is an important question in your study, what percentage of the tributary mouths in the middle river were surveyed?

MS. KEEFE: All of the ones that we identified that we would survey in the implementation plan. I don't know the percentage. If you're asking me of the basin, what is the percentage of the basin that's being represented by those field surveys? I can't give you that answer; I don't have that.

MR. RUGGERONE: Right. I'm asking because, you know if it's some fraction of the total, just looking at the data that you collected, each

one of those tributary mouths was quite unique. And so it may be difficult to extrapolate fish passage issues from those survey areas to all tributary mouths.

MS. KEEFE: Bill Fullerton would like to address that.

MR. FULLERTON: All the data collected: the topography, the bathymetry in the focus areas that describe these tributary mouths, and in the focus areas, they're going to be modeled with the 2-D model, both hydraulic and sediment transport. So looking at sediment accumulation and we've actually run an FA-128, the 2-D model, and we're gonna link that, or compare that with a procedure that we're using to look at tributaries outside of the focus areas; where it would be a 1-D model. And we will talk more about that I think tomorrow when we do Study 6.6. And that information is all presented in a technical memorandum that was filed at the same time as the SIRs, back in November. But anyway, all the tributary deltas or tributary mouths where there's potential deltas, in the focus areas have data collected and are being modeled. So it's kind of at the same level of representation as other types of features that we're using the focus areas to represent a larger area.

MR. RUGGERONE: Okay, thanks. Another question related to

those tributaries. ISR mentioned that all measurements on those thalwegs were taken during the migratory timing of the target species. I'm just -- hard to visualize that all the different target species have the same migratory timing into the tributaries? My understanding is that the thalwegs were only measured once, during a low flow period. And then a related question is, measurements of velocity and depth along the thalweg were taken, but there was no discharge measurements taken in the tributary mouths? You did relate -- did note the discharge in the Susitna during that time period, but there were no measurements that I saw in the SIR on discharge in the tributaries. I'm not quite sure how you're going to relate those measurements back to your modeling exercise.

MR. FULLERTON: Well the tributaries, again, that are in the focus areas will have the 2-D hydraulic model, which is calibrated overall for the entire area of the tributaries outside of the focus areas that we're modeling in 6.6 have a 1-D backwater model -- got a series of cross sections. So that model is being calibrated based on the physical characteristics of the substrates, selecting appropriate meanings and values. So there were not discharge measurements collected when we did the data; there was a visual estimate of the discharge. But we're basing

our velocity steps on the 1-D model -- the ATC.

MR. RUGGERONE: Then the thalweg data indicate that each one of those tributaries is unique and if each one is unique, and other studies indicate that there are likely effects of power-peaking flows in the lower river, it may be necessary to take additional measurements in the lower river to evaluate those unique tributaries and fish passage issues in that area.

MS. KEEFE: And there is a next step -- bullet on that, I believe, that says that if in fact we find the potential for barrier creation in the middle river tributaries, then we will look to connect with the in-stream flow model in the lower river for tributary (indiscernible).

MR. RUGGERONE: Regarding fish passage criteria, what are the surrogate species and life stages that would be used for those species in life stages where there's relatively little swimming performance data? I didn't see that in the fish passage criteria report.

MS. KEEFE: I don't -- I'm sorry; I know we discussed that at our consultation and we discussed the ones that didn't have surrogates, and we got some feedback from folks, like ADFG provided some velocity data on species after that meeting. I don't, off the top of my head, know what the

surrogates are, but I do know we've had discussion and if it's not in the report, I know it's some place. And I can find that for you, Greg.

MR. RUGGERONE: Okay, I think that covers most of my questions.

MR. POSTLEWAIT: Hey, Mary Lou, this is Dana. Can you guys hear me?

MS. KEEFE: Yes.

MR. POSTLEWAIT: In the appendix of the SIR for the fish passage study, there's the biological criteria, it's Study 9.11. That's got a good summary of all the swimming speed in species and how we've lumped them into different categories. That could help with that question.

MS. KEEFE: Thanks, Dana.

MR. RUGGERONE: So you're saying that the surrogate species are identified in 9.11?

MS. KEEFE: No, I think he was just providing supplemental information about swimming speeds and life history - passage criteria for different life histories. It is for a different study, but the criteria are the same across studies. They actually -- the Barrier study Kevin went to the fish passage appendices and pulled a lot of information from them. So the

criteria should be the same across the studies.

MR. RUGGERONE: Right, right. That's again getting to my key point is these different study reports should be comprehensive.

MS. KEEFE: AEA would like to address that comment.

MS. McGREGOR: I just want to point out that in the SIR in Section 4.2 there's a link to the TM from 2014, where the passage criteria for fish are identified.

MR. RUGGERONE: Right. Going back to the fish passage criteria report. We reviewed that report and there was no mention of the species that would be used as surrogates for those species life stages where there's fewer fish swimming performance information.

MR. HILGERT: This is Phil Hilgert. Greg, if you'll look at Study 9.12 barriers -- the SIR, table 5.1-5, it lists the target species and it provides the references for the prolonged speed and the first speed for each of the species.

MR. RUGGERONE: Right. But I think there's probably -- it's not clear how all that information would be used for the --some of the species don't have information. What I'm getting at here, is that the reports mention that surrogate species would be used, but they don't mention

which ones are surrogates for those species that don't have adequate data.

MS. KEEFE: Right, and as I mentioned, I'll dig up that conversation that we had about surrogates, and I will get back to you on that. I think we have another question here. Jeff?

MR. DAVIS: I guess my question is for fish passage barrier assessment. I mean, now we've developed -- there are some questions about the criteria for velocity barriers or depth barriers. I mean, you've got some ranges there that need to be worked out. But now that you've got velocity criteria and depth criteria, I really don't see how you're going to implement those criteria, particularly in upper river tributaries, and identify barriers. For example, you've done a survey, and you've said, "Okay, here is a waterfall", that's one type of barrier, a (indiscernible) barrier in an upper river tributary. And the implication is that if you inundate that barrier, that you're gonna increase access up into the (indiscernible) of the tributary above that barrier, for adult salmon or for any other fish species. We all know there's lots of streams. Upper Willow Creek goes through a canyon that doesn't have any anadromous fish upstream. But it doesn't have any waterfall. The Nenana River doesn't have any waterfall, but there's no anadromous fish so far. There's other

barrier types beside waterfalls in these tributaries. So now we've got this velocity criteria for an adult or juvenile salmon. And I'm wondering how you're gonna say, "Okay, here's where are pool elevation is post-project." What the distance is to the first barrier upstream. You've said that you're through collecting field data, but as far as I know, in evaluating velocity and depth criteria, you need to model velocities and depths within the tributaries. And I don't see any method or means of how you're going to do that. To evaluate project effects we need so how far can a fish move from the Susitna out into a tributary now, any of your target fish species. How far post-project can they move from the reservoir up into the tributaries? But there could easily be a tributary that has another type of barrier -- a velocity barrier or a depth barrier in these tributaries -- under some flow condition. And that hasn't been assessed at all.

MS. KEEFE: No, that wasn't an objective of the study.

MR. DAVIS: But the objective was to identify all seasonal barriers, all partial barriers, that's Objective 1. So, I mean, just one type of barrier doesn't tell you anything about fish passage in those tributaries.

MS. KEEFE: Comment noted.

MR. DAVIS: Well, so my recommendation is you need to develop

methods, and it has to come out in a study plan, as how you're going to identify and implement these velocity criteria that you come up with. And the same recommendation applies to tributary mouths. The modeling that Phil's been talking about is mainstem modeling -- mainstem channel modeling. But we're not modeling how flows within these tributaries are going to affect fish ability to pass over this delta. So, for example, if you have a low main flow and you have all the tributary flow going across this delta, you haven't developed velocity discharge, (indiscernible) discharge for the tributary. You've got to develop a method to measure what those velocities and depths are in a (indiscernible) in the water crossing that delta under different tributary (indiscernible). But if the mainstem is low, and a tributary is going over a delta, you don't have any way to model that. You haven't provided any data to model that. And the thalweg data that you have is so spread apart, it's just the thalweg. Is there passage lateral to the thalweg? Is this the max velocity that you're measuring? Or is this the minimum velocity? So, none of those methods have yet to be developed.

MR. HILGERT: This is Phil Hilgert, and you're correct. When you're looking at changes in the zone of fluctuation, you're not gonna be

able to really identify changes in velocity. But that's why you have a gradient. If you look at the criteria (indiscernible) you look at a steep channel you generally find that different species have different passage criteria based upon channel gradient. So if you've got a 4 percent gradient or a 3 percent gradient, it starts getting up to an 8 percent gradient, you start dropping out certain life stages for certain species. And one of the issues is if we have post-project flows that inundate that delta, you might have passage. But under low flow conditions you might actually increase that gradient. And that's where fluvial geomorphology comes in, and looks at -- okay, if you have a delta under post-project conditions, are you allowing the project to erode the toe of that delta, increase the gradient and create a barrier? You might actually have it inundated for most of the time, but we'll be able to calculate, does that toe of the delta create an increased gradient such that presents a passage barrier? And then, how frequently would that passage barrier be inundated under post-project conditions? But we're not using velocity, in that case, as the barrier, you're using gradient.

MR. DAVIS: Well you've provided gradient criteria for some, but you have a big list of velocity criteria, both burst swimming speed and

sustained swimming speed for most of the target fish species. And you haven't really specified that, "Okay, we're gonna use a sloped distance criteria at this location" or "We're gonna use the velocity criteria at this location." You haven't said, "Okay, here's how we're gonna evaluate fish passage within an upper river tributary." If you're proposing to use a slope distance criteria, you should say how you're going to apply that out in the field, where you're gonna get that slope data and what's gonna be an actual barrier.

And as far as the tributary deltas in the middle river, I'm not talking about changing the delta. But just by having, storing water in the spring, you're lowering the water surface elevation, and you've increased the gradient that a juvenile fish has to migrate to get into that tributary. Whereas, if the water was flow, you weren't storing water, that would be inundated. It would be like a backwater into a culvert. So you do have to assess what the velocities are gonna be going across that delta, to say "Okay, a juvenile Coho that's entering into the mainstem can access across this barrier and get into this rearing habitat in a tributary."

MR. FULLERTON: And in the focus areas -- Bill Fullerton, sorry. In the focus areas the deltas in that area that's within the backwater

influence of the mainstem Susitna, are modeled. And we will have flows coming down the tributaries, and we'll have hydraulics with the grid -- the two meter high resolution grids in those areas. So we will be modeling the hydraulics, the depths, and velocities.

MR. DAVIS: Right, but that's a very small subset of tributaries within the middle river that are gonna fall within focus areas. I still haven't seen the model data yet for tributaries. I've seen how you've been modeling the main channel, but not modeling flow out of tributaries. And the velocities within those deltas, it's gonna be function of the tributary flow, not the mainstem flow.

MR. FULLERTON: It will be a combination.

MR. DAVIS: Well, when the mainstem is at low water surface elevation the passage we're talking about is from the mainstem across that delta in the tributary. And the flow's gonna be primarily from the tributary.

MR. DAVIS: Two questions. One, is it gonna be really representative and two, how are you gonna model that even in the focus area but outside all the focus areas. Because the data you've collected so far is (indiscernible).

MR. FULLERTON: Actually we can talk more about this when we present 6.6 tomorrow, but we actually model Skull Creek as a tributary delta, as kind of proof of concept for the 2-D bed evolution model. And it's documented in the modeling development tech memo that was filed in November of 2015.

MR. DAVIS: It still doesn't address all the other tributary mouths, for one thing. But the point is made, we still need to be able to model passage into these tributaries. It hasn't been done thus far.

MS. KEEFE: It hasn't, and that is what the next step to complete is. Once we get the output from the models, once we know what it's going to look like, then we can work that approach. We can't work that approach before we have the data. Unfortunately for this one, we can't. We can't decide what the data's gonna look like and develop an integration protocol that there's no point in it. We have to wait for the model outputs, you know. And we've got one for Skull Creek, we have zero for instream flow at this point in time because they're all inter-dependent.

MR. DAVIS: Right, but if you don't have the field data for these deltas at other locations, then you're never gonna be able to model it.

MS. KEEFE: We have the field data that we said we would collect

from the implementation plan. And based on that -- and I'm not a barriers person, which is why I'm glad that these guys are here -- but based on that, it's my understanding of the folks who put this plan together, that that data was sufficient to connect with the models.

MR. DAVIS: I'll just make this simple. Your fish passage barrier studies did not say how you're gonna implement your passage criteria now that they've been developed in tributaries or tributary mouths, and make it representative. And so I think -- when I look at it, I think you need a lot more field data collection, particularly in upper river tributaries, before you're gonna be able to implement those velocity passage criteria.

MR. PADULA: Thanks, I appreciate you summarizing like that. Do we have any other comments to make on this study?

MR. DAVIS: Well we haven't seen how accurate the model of velocity and depth at the 2D study sites in the focus area is gonna be. The passage criteria for juvenile salmon is pretty small. We're talking about velocities from zero to one foot per second. I guess it remains to be seen if they're gonna be able to evaluate passage.

I also haven't seen the field data collected to model when beaver dams are gonna be over-topped, even within the focus areas. It may be

someone from the geomorphology or hydraulic modeling study could tell me how you're gonna model when -- not passage through a beaver dam, but when is it gonna be over-topped, or when is the berm at the upstream end gonna be over-topped to allow fish (indiscernible)? And are the beaver dams within the focus areas representative of beaver dams as a whole throughout the middle Susitna River?

MS. KEEFE: It sounds like we're gonna have to address that during... MR. PADULA: Tomorrow, when Lyle is available.

MS. KEEFE: Yeah, tomorrow when the right people are here, Jeff. But we had that, you know, the nice part about the remote barrier assessment. Again, it's a snapshot in time, but we have tools available to address your comment about representativeness. But you know as well as I do that beaver dams come and go.

MR. PADULA: Mary Lou, we've got a question back here, move on to Mike. MR. WOOD: Mike Wood, SRC. I just want to make a note that during the year 2013 these baseline -- while the baseline studies were being collected, there were two major flooding events on the river and three mouths of creeks coming in -- like Fourth of July Creek, Gold Creek and Fog Creek were dramatically changed, in some places, completely re-

routed. So that was a year of collecting baseline data, and all three of those mouths were moved in a big way. It's not even in the same place any more.

MS. KEEFE: Thanks -- that's good information.

MR. BURAK: Matt Burak, Louis Berger Group. You have a slide up there that shows 42 potential barriers. That list came from Table 4.3-1 in the ISR. And those potential barriers were identified only using Chinook salmon leaping criteria. I think it would be important to go back and reevaluate all potential barriers for the target species in terms of assessing project effects. Because that list there you have in 4.3-1 for the upper river and 4.3-2 for the middle river were only identified for Chinook salmon.. Are you planning on going back and reevaluating those barriers and (indiscernible) with those barriers for all target species, given the criteria?

MS. KEEFE: No.

MR. LaCROIX: Matt LaCroix, USEPA; just two real quick questions. Regarding the beaver dam data, you've got a slide that indicated that for 88 of the dams that were identified remotely, you were not able to characterize whether or not they were intact or whether they

were a barrier. How do you intend to use the data for those dams?

MS. KEEFE: I don't intend to use the data for those dams for anything. It's more of a comprehensive characterization of how many beaver dams are out there, how many at that snapshot in time, what their evaluated status was. The only data we would ever use from beaver dams is ground data -- data that was collected from the folks on the ground.

And a lot of those, you know, I have to say, a lot of those beaver dams are bank beavers that wouldn't affect passage anyway. I mean, that's something to consider.

(Unidentified Speaker): Dams or lodges? I'm sorry -- I'm just a little bit confused. I mean, you're presenting this as results and information, but then you're saying you're not gonna use it.

MS. KEEFE: I'm not using it for any of the modeling or any predictive capability. The beaver dam characterization that was done was to provide a characterization of beaver dams.

(Unidentified Speaker): So basically just an inventory of dams and then where you were able to identify the condition, you would do that.

MS. KEEFE: Use on the ground data for the evaluations.

MR. LaCROIX: Thank you. So the second question relates to the

Northern Pike velocity barrier question. Could you just really briefly explain how the velocity barrier for pike is intended to be evaluated? Is that at a single transect? For example, where you're measuring or...?

MS. KEEFE: We haven't got there yet. That was added to the target species list at the request of FERC, I believe. That we would evaluate velocities of Northern Pike in the mainstem. And that was the last action that we had post- data collection efforts. And we haven't really gotten to how we would use the data that we have to get at that.

MR. PADULA: I don't want to cut off any important discussion, but to try and get us back on schedule because we have folks joining us on the call for the next study. Anybody have anything new on this study that hasn't been discussed? Then let's move on. Our last study before lunch is Study of Fish Passage. I think Dana's on the phone. Dana are you still there?

MR. POSTLEWAIT: Yes, I am, can you hear me okay?

MR. PADULA: I understand from Sue that we have a couple of NMFS fish passage experts who should also have joined. Can you let us know if you're there, please?

MR. LAKE: Yes, this is Bjorn Lake with NMFS. MR. PADULA:

Ed, did you join us?

MR. MEYER: I did, I'm here, thanks. MR. PADULA: Go ahead, Dana.

MR. AUBLE: This is Greg Auble with USGS, I'm on the call, too. MR. PADULA: Hello Greg, glad to hear you.

MR. POSTLEWAIT: This is Dana Postlewait with R2. I'm the study lead and work closely with Dan Turner our lead engineer. A lot of this is repeat from the last meeting. ISR document was produced in June of 2014. Tasks 1, 2 and 3 are now completed. Task 4, we're about halfway through by December of 2014 and we'll get into that later. The rest of the task 4 and 5 and 6 are still remaining.

The objectives -- none of the objectives have changed from the original study, we can probably move on from there. The same with the study components -- they have all remained exactly the same as the study plan. Variances: This is not new from the last big meeting, either. (Indiscernible) to get into low flow. Four was delayed -- follow on with a recon meeting and then get the other studies integrated better. So we really kicked that off with the brainstorm workshop that was conducted in September of 2014.

For task 4, this is where most of the progress was made that's new, and this was all reported in SIR. So the biological operational information: Everything was shared at that workshop and was compiled into the document. The workshop was quite successful. We had a couple of days, went through a lot of ideas and then got those ideas organized well in concept. And then we continued on with the development of the biological performance tool that will be used to help evaluate the fish passage performance, the various downstream alternative. And that's all documented in the ISR Part A, Appendix B. And at that meeting we put up some of (indiscernible) matrix. That work still needs to be completed with that task. And then our last real meeting was a technical team meeting in December of 2014. And from that we had a really good working session. The entire team went through a pretty long day of getting through all the lists, clarified concepts, got those consolidated. Then we carried on last year after that meeting and published a compiled summary of that list of concepts. One point I might add with that is that we did that both as a technical exercise, and also really were careful with the accounting. We wanted to make sure this was very transparent. Every concept that was identified in that other meeting was accounted in that

table -- you can go back and cross reference the meeting note with the last column.

There's been no change in the study plan, other than the schedule that is old news. And this is kind of the same summary of the other side, but SIR has a full summary of all this information.

The remaining task is task 4 and then the remaining tasks 5 and 6 which have not yet started. It's really working through them, the fine tuning of compiling, organizing and further developing each alternative. Running it through the BPT, the Biological Performance Tool and then working together as a team to recommend preferred alternatives that could provide fish passage. And that's all I have so, if there's any questions.

MR. PADULA: I don't see any in the room. Does anyone on the phone have any comments?

MS. WALKER: This is Sue Walker with NMFS. I did have a question about going from development of the biological performance tool and updating and performing runs, I don't believe that we've been provided with that biological performance tool. I'm maybe not remembering correctly, it's been awhile. Could you update us on that, Dana?

MR. POSTLEWAIT: Yeah, yeah. The BPT: the framework is done, there have been no runs completed yet to date. That's where everything was when everything got suspended.

MS. WALKER: So this slide is steps to complete the study? That says, "Develop and update, perform runs with BPT". It's the next step?

MR. POSTLEWAIT: That's correct, yeah. The framework's done, and that was published in Appendix A, and it has the summary of how it works and some sample input/output and the collection site. And then next steps would be after these are organized, then there would be runs. So Sue, you're correct. There have been no runs conducted with that yet, just input/output.

MS. McCRACKEN: Hi Dana, this is Betsy McCracken with Fish and Wildlife Service. I'm looking at the summary of results on Slide 7. And it says "Continued development of BT". So I'm wondering if the project is considering that it's complete, and then the next step is to perform the runs?

MR. POSTLEWAIT: Yeah, the model in the Appendix A of the SIR has the summary - that was new information that had not been produced or delivered at any of the previous meetings. So this has the

write-up of what it is, the criteria. The model was set up to where it -- you may need to jump in; I don't recall what the final practice run (indiscernible). That's what we've got all the (indiscernible) set up with.

MS. KEEFE: It's really hard to hear you - you've got a lot of reverberation going on, but let me summarize and maybe you can tell me if I'm wrong, or Phil can. So the BPT that you saw the last time before the SIR was an example. And then what they did was, they took it from the example to be a little more specific for the logic that the fish passage team had been talking about - Susitna River specific. So that was the one that was filed with the SIR - had some specific points of capture in it that would be specific for the Susitna.

MR. POSTLEWAIT: That, and the parameters that go with that - that's correct.

MS. McCRACKEN: Okay, thank you. So, we have not looked at that yet.

MS. WALKER: But we will look at that. I'd also just for (indiscernible) we did hire Bjorn Lake as a new fish passage engineer. He's got responsibilities nationwide, so we were able to bring him on to this project. And then we've got Ed Meyer, he's the senior fish passage

engineer out of the West Coast region. In order to plan their workload, I assume we're not going to have any work in the foreseeable future, besides reviewing this SIR, this Biological Performance Tool and getting our comments. Is that correct?

MS. KEEFE: There's no work planned for that study for 2016.

MR. PADULA: Any other comments or questions? Anyone on the phone or in the room. We ran a little bit over, but not too bad. I appreciate best efforts to be back by 1:00 o'clock.

Off record: 11:55:01

On record: 01:06:05

MR. PADULA: Welcome back, hopefully everybody had a good lunch break. Let me ask anybody on the phone if you could identify yourself by name and organization, that would be great.

MR. GILMOUR: Sure, this is George Gilmour. MR: LIEBIG: Russ Liebig - Stillwater Sciences.

MS. BUDNIK: Birdie Budnik - Corps of Engineers MR: JARRETT: Ken Jarrett - Stillwater Sciences MR. SCHOEN:- Eric Schoen with UAF

MR. GEORGE: This is Jerry George with R2 MR. AUBLE: Greg

Auble with USGS

MR. NIGHTENGALE: Tim Nightengale with R2 MS. STEIMLE: Kai Steimle with R2.

MR. PADULA: We're gonna start with the one o'clock agenda item, Characterization and Mapping of Aquatic Habitats. And Kai, you're up and Mary Lou is gonna drive slides for you. Please go ahead.

MS. STEIMLE: Thank you. I'd like to present the update on the Characterization and Mapping of Aquatic Habitats, for Study 9.9. Since the last ISR meeting, we've presented an errata to the Initial Study Report's Appendix A, and also developed a Study Completion Report. The data was collected in 2013 and completed in 2014. The ISR presented a subset of summary data from 2013. Habitat frequency and characteristics are presented in the Study Completion Report, along with updated and comprehensive (indiscernible).

The objectives for the study remain unchanged from Revised Study Plan. ISR documents -- don't go into detail, but the general objectives were for each river segment to characterize baseline and provide support for coordinated study. Study components remain unchanged and we'll see those as we go through the key findings.

Variances from the study plan for the study included some access limitations that restricted the scope of random sampling that were described in both the ISR and the Completion Report. The second variance was that the special habitat features were expanded from the study plan, in accordance with the study plan determination to include backwaters, beaver complexes and clearwater plumes. The third variance was that the ground survey flow conditions were more variable than anticipated during study planning, due to unexpected flow variation and the challenge of surveying such a large area during a compressed window of opportunity. But although the flows were variable, looking at the concurrence between the remote mapping and our ground survey, the variation in flows did not have a large impact on creating differences between those remote map features and the ground survey.

This is an overview of the areas mapped -- this is from the Completion Report -- this is an overview of areas mapped in the upper river segment, and the next slide shows the middle river, including the mainstem habitat and lake area surveys, along with surface areas.

The Completion Report includes the frequency and (indiscernible) of mesohabitats in the upper river tributaries and upper river mainstem,

along with summary of habitat characteristics. It includes a review of ground mapping alongside the remote mapping, an analysis of discrepancies in which 2 of 52 macrohabitat classifications were changed in the upper river. It includes a summary of the lake habitats that were surveyed and an updated map book of upper river habitat as Appendix A.

The middle river has a similar scope of results with a summary of habitat characteristics in both the study area of middle river tributaries and the mainstem. A similar review of agreement between ground surveys and remote line mapping, in which 6 of 192 macrohabitat classifications were changed. Again, we have an updated map book.

So just to walk through the maps that have been developed for this study, the ISR included the initial remote line mapping effort from 2012. After our meeting, we identified an error in the mapping in which side sloughs had not been included on a portion of the survey, so that was updated in November of 2014. And then the final product is that in the Completion Report we have it updated with the ground-truthing refinements. That's in Appendix A.

There's no modifications proposed moving forward. The study effort is complete at this point. And at this point we have surveyed in

accordance with the study plan, presented the data outlined in the study plan, and so we've met the study objectives and the study is complete at this time. And with that, I'd be happy to take comments and questions.

MR. LaCROIX: Hello, this is Matt LaCroix with USEPA. Could you summarize what portion of the lower river was actually mapped and characterized? Was there anything below River mile 29.9?

MS. STEIMLE: There was not.

MR. LaCROIX: That's fine - I was just curious. This morning in presentation specifics - the belugas and eulachon - there was discussion about characterizing habitat use for those species. So clearly it's not part of this study.

MS. STEIMLE: Yeah, the lower river was characterized according to the (indiscernible) geomorphic mapping.

MS. McGREGOR: This is Betsy with AEA. That's correct; the macrohabitats were mapped. It's one of the TMs, and we can look up which one it is - I think it's part of Study 6.5. And that one in the lower river below 29.9.

MR. DAVIS: Yeah Kai, this is Jeff. I have quite a few questions on this. I guess, as you know, I've been involved in looking at this study

since its first inception. We've provided interim comments on the proposed study plan and Revised Study Plan. And I feel it's a pretty critical component of an evaluation approach that really is habitat based. And so I've been looking at this very closely. And before I kinda talk about questions, I think a real proposed study modification would be to get an interdisciplinary technical team together and review a lot of the classifications through here and make a kind of joint or informed more - I feel like lot of the decisions were not made in a kind of systematic quantitative way - just in reviewing it. And I feel like one of the study objectives is to -- well, one was to inform other studies. The other was to evaluate project effects. And I feel like if two people were to take the same set of data and go through the classification criteria, they would come out with two different answers. So I think, in order to meet that study objective, real detail needs to be paid on how these different classes are made.

Just for example - and maybe this - just pose this as a question. For tributary mouths, we've got them in your classification as clearwater areas. Let me just read this correctly, so I can get it right -- one second. Any of them in your definitions table - your RSP, your ISR, all of them.

It's usually the first table you provide, you have definitions for all your macrohabitat classes. So "tributary mouths are clearwater areas that exist where tributaries flow into the main channel or side channels". Back in the 1980s that was defined as both where the mainstem backed up into tributaries and the length of the clearwater plume downstream. And that was the macrohabitat. And then on our comments on the Revised Study Plan, tributary mouths were shifted from the macrohabitat level to the mesohabitat level, so they're contained within a tributary mouth.

But I notice on your line maps that clearwater plumes are listed as mesohabitats within the main channel, not part of the tributary mouth. To me, the biological characteristics of a clearwater plume are gonna be those more closely related to the tributaries, since most of the water quality, food sources that are coming out of the tributary that enters the mainstem, are gonna be most closely related to the tributary. The only change really, is gonna be kinda surface slope as it hits the mainstem.

So I'm, wondering why -- what was the biological reasoning or the systematic approach that went to determining that these clearwater plume mesohabits were in the main channel instead of the tributary mouth.

MS. STEIMLE: So I think our challenge generally with habitat

mapping is that there are continuous features that were put in, in boxes and tributary mouth confluence areas are put in where the mainstem river is interacting with the tributary. And they both have influence there. So in our hierarchy we've put tributary mouths as part of a main channel habitat, because they're affected by main channel flow. And we have clearwater plumes nested within them. They're still available for analysis or selection for whichever question or coordinated study is using them, whether they're nested within main channel or tributary. I think here our goal was to find them in the landscape, characterize their frequency and attributes. And I think we've successfully done that in a way that supports their use with different question, as needed by other studies. So I think you could make a case that a clearwater plume has tributary source water, it's influenced by mainstem flow conditions and ice processes. One could defend putting them either place. We put them in the main channel, and we've done that in a consistent way that makes it suitable for analysis for other questions.

MR. GILMOUR: This is George. I agree with you, especially when it comes to sitting down with the group and coming to a conclusion on, you know, what the calls were for some of these areas that may be more

controversial or raise some questions.

The other thing that I think is really important, is that we get a handle on observer bias. I think the study would certainly benefit from a discussion of observer bias and how it can influence habitat mapping data. In particular if you're using that data to evaluate the effects of project operations, for example, on habitat conditions over a 50 year time frame. And I think one way around that is to put together a fairly detailed guidance document or a document that describes the methods that were used, with photographs, calls, how decisions were made for different habitat types. Simply that that can be on the record, that a researcher down the road -- if this project is built -- could look at it 50 years from now and say, "Okay, we're going to do the best we can to compare apples to apples here, when we look at project effects".

MR. DAVIS: To get back to the tributary mouths though, I mean, when you read the definition of a tributary mouth it clearly includes a clearwater plume. And you have sites on your map that have clearwater plumes that are not designated as tributary mouths. So if you went through a search and said, "Okay, where are all my tributary mouths?" You wouldn't come up with them, even though they had a clearwater plume.

So that's why I believe they should be in that category.

Another question - can I go ahead?

MS. STEIMLE: Go ahead, yeah.

MS. KEEFE: This is Mary Lou. We do have an operation plan that was provided to the field crews with photos and characteristics. It's a take-off from the implementation plan, and just goes one step further.

MR. DAVIS: I think the intent of George's comment and my comment was to have somebody outside of AEA also involved, or other -- you know -- people involved in the decision making, working through it similar like the technical working group process, only where a joint product would come out. Even if there wasn't agreement on all of the calls.

Back to this classification though, and I'm not gonna drag this out too long because a lot of this stuff can be in writing. But I read in there the definition for - and I'm reading the Revised Study Plan - the definition for split main channels was that "there are two or more channels separated by an island or bar without vegetation, or with annual vegetation". And when I look at the classification maps in focus area 104 at Whiskers Creek, you have a side channel classification that's separated by the mainstem by an

island that's got permanent vegetation (cottonwoods mainly, birch trees). And when I go up to FA 115 near Slough 8A, the channel that flows in front of Gash Creek (it's a small one, it's non-navigable under most flows) -- it's classified as a split main channel. And it's separated from the main channel, again by an island that's vegetated with trees on it. And then when I go up to Indian, again I have these side channels separated from the mainstem by islands with trees on them. But then they're again split channels. So I didn't see any consistency really in how you made this determination between split channels and side channels. And why you didn't follow the language within the RSP.

MS. STEIMLE: I think we have a lot of area to map, and I don't know how productive it is to go channel by channel. But there was clear guidance described in the Completion Report of the distinction between split channels and main channels, that includes both proportion of flow and vegetation. It's what's described in the Completion Report, and consistent with the study plan. I think we could probably go in writing if there's specific areas where you have concerns about the specific call.

MS. KEEFE: I think another point to make here is that there were two methods applied in habitat typing , and a resulting two map books.

The remote method clearly used - - it was done before -- it was started in 2012. It was done in order to inform the study plans for other studies, and there are side channels and split main channel calls that were made on the remote map.

Now, we ground-truth a sub-sample, we couldn't possibly go everywhere that the remote map went, so we ground-truthed a sub-sample, and we have a separate map book - and there were a couple of corrections: 6 out of 192. So that there may be, in fact, a difference between somebody looking on a remote image and calling something a split main versus side channel, and a ground-truth where the person is on the ground at that flow making the call. But in all reality we have to ask ourselves how does calling this -- at this flow -- how does calling this a split main or a side channel really affect our ability to analyze project decisions?

MR. DAVIS: I'd like to comment on that. The two different methods in the example I just gave -- there's vegetation there or not. I mean whether you look at an aerial photo or on the ground, there's either cottonwood trees there, or not. So that criteria seems like it could be applied either way. And the examples I gave were in focus areas, which were 100 percent ground-truthed, I'm quite positive in your Appendix B.

So, they were all on the ground, so they all should have been correct and they should have all been consistent. And I think we won't know if those differences are real or not, or result in differences in biologic communities. Unless we classify them correctly and then sample them correctly so we can test those. But we've (indiscernible) in the hypothesis, that these classifications change the physical habitat characteristics and change the biotic community. So if we don't classify it right in the first place and then we go out there and we study and test is there a difference between split mains or side channels, but they're all mixed up, then how are we gonna ever evaluate it?

So that's why I think that's important, and I can give other examples, but just one other I want to bring up. That's in FA-174. In this case we're looking at the difference between a side channel and a side slough. And a side channel is defined as "not having or is connected to the mainstem and having turbid flow at the upstream end". So the upstream end of the channel is connected to the mainstem.

A side slough is only intermittently connected to the mainstem under certain flows, but most of the time it's not, and it has clearwater ground water showing up. And I understand that that's a difficult call to

make. But in FA-174 you have a side channel that intercepts and hits a side slough. And then it continues on down as a side slough habitat. So if it's open at the upstream end to be a side channel, how can it change halfway down and be no longer connected at the upstream end and be a side slough on downstream?

I don't want to put you on the spot; I just want to bring these things up as things that I see as inconsistencies in the classification. And you know there's quite a few other examples. But I think that's probably enough right now to just make my point, and I'll put the rest in writing. So thank you very much.

MR. GILMOUR: This is George Gilmour. I guess there's gonna be no response on AEA's end. But I have another quick comment I'd like to make regarding integrating this information -- this habitat data -- with the life history requirements of the fish species that are the focus species in this study effort. Particularly, certain habitat types are preferred by certain life stages of different species at different times of year. And if a document, or a portion of this habitat study is updated to include a description of when those species are using those areas, the habitat data can then be parsed out to look at, for example, off- channel rearing

habitat. Or, you know, spawning habitat areas. They can serve as a focus of some particular enhancement measure, education measure, particularly (indiscernible). So I see the habitat data here, it's all laid out. For the most part it's been summarized pretty well. But I'm still feeling the need for linkages here. I'm still feeling the need for a discussion of why are these certain habitats important? What time of year are they important? Do we need to worry about these habitat types? Questions like that. And I think as things move forward, that may ultimately be rolled into a Fish Population and Fish Habitat management plan. I don't know what it would look like, but I just feel a real need for the linkages, you know; it's an important next step.

MS. STEIMLE: This is Kai. I think the goal of all of these studies is to provide baseline information and the basis to form those sort of linkages and interconnections moving forward through the licensing process. We're here putting the building blocks of each piece within a program, within a broader study context. So the goal for this study was to characterize habitat. Moving forward, there's clear linkages with other coordinated studies that would go into any sort of evaluation of project effect. Evaluation of project effect is not a study goal. Providing a

baseline to support a future evaluation is the goal for this study.

MR. GILMOUR: I completely understand that. I think my point in making that comment was more -- obviously it's a very big picture comment. Being who I am, I can only focus on the minutiae for so long, and then I start thinking about 'how is this getting to a larger management decision'? Or an operational scenario that is seasonally based.

Something along those lines. So I think at this point I just want to be on the record that this is just a beginning and I think the services, as well as myself, are interested in seeing how this is gonna all be incorporated into these management plans, or these management approaches. So I think we agree here. I just feel the need for some more information, or for some sense that we're moving towards that goal. And I realize there are funding issues, there are all kinds of things in play right now. That doesn't mean this project won't get going hot and heavy again in the next few years and we may see some movement towards developing new alternatives, et cetera, et cetera. So again, I just want to have that on the record.

MS. WALKER: This is Sue Walker with NMFS. I want to echo what both Jeff and George have said. We believe that there are some

significant errors in the habitat mapping and classification that really have important implications for when these data are used to estimate projects impacts on these habitats and on the fish that they support.

We haven't had a chance to look at those to get this reviewed; we don't believe that this study is complete. And even when we look at focus areas where there is 100 percent ground-proofing, we see significant errors. So we will provide a very detailed critique of these habitat classifications.

And if we go forward, it is important to have an inter-disciplinary group looking at these habitats, agreeing on classification and documenting just how these classifications were made. So, when the next group of people come up they understand how and why these were applied, and it's very clear to future scientists working on these studies.

MR. GILMOUR: This is George, again. I have a quick question. I know that a portion of the river was covered using LiDAR associated with the geomorphology study. Was that the whole river downstream from the proposed dam site? I can't remember exactly the extent of that LiDAR coverage.

MR. FULLERTON: This is Bill Fullerton. The LiDAR coverage

that has the entire middle river and the lower river down to around PRM 60-ish. But I can't...

MR. GILMOUR: And that's where things really get braided and start to become a real challenge with actually capturing it all, right?

MR. FULLERTON: Oh, and yeah, that was the high density LiDAR collected partially in 2013 and 2014. But there's also complete coverage of the river from the Mat-Su Borough LiDAR. Not quite as high quality, not as high density of points, but it covers the entire river.

MR. GILMOUR: Well I think that LiDAR coverage is gonna be very helpful down the road, here. Something that we also talked about I think, previously, was that there may be a need for some additional aerial photography work, especially for the higher flows, to see how some of these sloughs and off-channel areas may respond to peak flow events.

And I think Jeff and I talked a little bit about that, and he can certainly chime in, if he wants to. But I think, you know, full coverage of the major flows when looking at habitat, especially some of these off-channel areas, is something that would be very helpful down the road.

MS. McCRACKEN: Thank you, George. This is Betsy from Fish and Wildlife Service. I was just gonna mention the desire to have these

habitats mapped at a range of flows, and echo the same concerns that you and Jeff have brought up for the service. And as we all know, these habitat classifications are the foundation of many other studies that we're integrated with the other studies. So I just want to say that I appreciate both yours and Jeff's comments and hope that we can get this worked out.

MR. HOGAN: This is Ken Hogan with FERC. I just have a couple of questions/clarifications. Jeff and George talk about concerns with consistency in the habitat classification and how it was applied. And I heard Sue mention mapping concerns and (indiscernible) flows. I didn't hear what the concerns were. Was it just flows, or were there other mapping concerns and how that was applied?

MS. McCRACKEN: We have concerns about the flows in regards to the lateral habitats -- the side sloughs and side channels-- and so we want to make sure those are appropriately noted and characterized. I feel like they're getting most of the mainstem habitats, but the lateral habitats are not being well-represented.

MS. WALKER: As far as mapping, habitat characterization is to -- is to develop a mapping. We believe that there are a lot of errors in the habitat classification being applied to the mapping; therefore the mapping

is in error. So if the mapping is applied to assess project impacts, we've got a magnification of error.

MR. DAVIS: I don't have too much to add to that. Basically the mapping is the output of the classification, data was presented. I should point out that RSP said that all the lengths, areas of all the line segments from the mapping would be provided in a table, which was not included.

I think the whole argument about different flows is really just another way to -- if you classify it at a low flow and you classify it at a higher flow-- then you know relative distribution of the different habitats that are flow dependent, like side sloughs versus side channels. And that just gives you another tool to evaluate project effect. So if we're the river at this flow, there's gonna be more of these areas that are not over-topped at the upstream berm and more groundwater driven. Where, at a higher flow it might be the other way around. So I think that different flow classification just helps you to (indiscernible).

MR. WOOD: This is Mike Wood with SRC again. I really like this one, because it's a really big picture. You've got to think broadly. And I think it would require integrating what happens just in the summer with large flood events, but also in the winter with ice jamming. Once you see

how all these side channels way back in the woods, why they have little fish in them and then they don't have little fish in them, is very appropriate seasonally. So there's sometimes a huge disconnect from the main channel and yet the river goes there.

And I agree, even though these definitions might seem nit picky, there's a reason why all these side channels and far backwaters are out there with fish in them. And it has as much to do with winter as it does flooding events in the summer.

MR. DAVIS: Excellent point.

MR. JOHNSON: Chris Holmquist- Johnson with USGS. Echoing kinda what Jeff had said with the mapping side of it, looking at the various ranges of flows, I think that that has a tie-in as well when we look at project effects on seeing how some of these lateral habitats might evolve. Under project operations where you may have a side channel or a side slough, that all of a sudden, because of the various flow variations and effects of that, become or turn into now, an upland slough rather than a side slough.

And looking at that in terms of what may be (indiscernible) value, you know, is causing those to over-top at certain flows, and how that then

ties in to future operations. Those future operations may change the amount of time that they over-top, which then may in turn affect the type of classification that is. So if they're not classified properly to start with and we don't look at that range of flows of how that ties in, the harder to assess those project effects in the long run.

MS. STEIMLE: I just want to highlight that we do have tools for looking at the frequency of inundation to distinguish between slough types and side channels, that take into account markers of the effects of flow. Things like vegetation presence, that were used consistently to distinguish among these types, rather than mapping different flows. It's not to say the effect of seasonal flows was not accounted for in the macro-typing. And I think that's apparent from both the descriptions that are written in the completion report, along with definitions that have been previously referenced. That would be included in the protocols that are cited and the operational reports that were used in the field. I appreciate the concern about the frequency of inundation on the macro-habitat types, but I disagree with the characterization that that was not accounted for in this effort.

MR. PADULA: Any other comments or questions regarding this

study?

MS. KEEFE: It's Mary Lou, may I make one? I want to make one comment - just a very simple comment. The remote mapping was done with interpretation. That is how remote mapping is done. Ground surveys went out, and they -- the ground crews were not given remote maps to look at. They were given the definitions that were used and developed in the study plan. And they went out and they surveyed 192 different habitats, and they agree with the remote mapping in all but a handful of cases. And those handful of cases were reviewed, and they were reviewed with different flows. So, I understand that NMFS has decided that those differences in interpretations that they have -- to what our remote mappers and our field crews have -- are errors. But I would like to propose that they are simply differences in interpretations. I brought the map books with me today, and focus area 174 is in the back. And you can see, for example, how the upland slough runs along. And there are side channels that run into that upland slough. And that was an interpretation that was made because of the origin of the flow, to call it an upland slough all the way to the mouth. So there are justifications for why people made the interpretations that they made. Those should be provided in our

documentation. And if the documentation needs clarification, then we'd be happy to accommodate that clarification.

MR. DAVIS: That wasn't so short that it doesn't need some followup on. When I looked at your original maps that you put out in 2014 and compared that with the maps from field surveys, I found much more than 6 differences. Some of the calls were, like 40 percent off on the calls on classification. We'll provide details of that when we look at your maps before the last ISR, and then compare it with your field surveys at that point, I found a lot of errors. I think that it looks like when you compare - well, let's leave it at that.

MS. KEEFE: Very clear in our QA/QC when we had our habitat meeting that part of our protocol for QA/QC in habitat discrepancies was to look at the flow. So if you're out there and you're in a dry channel, you're gonna call that a dry channel because you're standing out there. If you're out there and if you're looking at a remote image, you're gonna make a call whether that's a side slough or upland slough, based on your definition.

So there are discrepancies for sure, but there were only a handful of discrepancies that couldn't be explained by changes in the hydrology

between the field surveys and the remote mapping.

MR. DAVIS: I don't think this is probably the point to argue that, but I'll go ahead and provide some backup for my comments.

MS. WALKER: I'd just like to say that this really demonstrates why we think this is an important issue to be resolved in an interdisciplinary technical work group meeting. If we're applying the same criteria that you're using and getting different results, given the importance of these data for extrapolating project impacts to habitats and fish, it needs to be resolved. And it needs to be clearly documented for the future. So that is our recommendation -- that we look at this very, very carefully. And we do disagree -- I probably shouldn't use the term 'error' -- but we need to document how we are characterizing these habitats and come to agreement as much as possible.

MR. PADULA: Thank you, Sue. I appreciate the followup that's gonna happen in writing. That will be very helpful. I'd like to move us on, unless someone has a comment that we haven't covered already. Okay, great. Great discussion, appreciate everybody's participation in that.

We're going to move on to River Productivity Study 9.8 and Tim Nightengale is on the phone and Mary Lou is gonna drive the slides again.

MR. NIGHTENGALE: Okay - Mary Lou's driving? Alright. My name is Tim Nightengale; I am with R2 Resource Consultants. I am the study lead for the River Productivity Study. On the phone with me is also Dr. Erik Schoen with UAF who partner with us for a number of the components of this study.

Today I'd like to summarize what we've done since the ISR was submitted; our activity through 2014 and 2015, and the steps we need to take to complete the study. As you can see here, after the ISR we produced a number of technical memorandums and reports. For ISR, we really didn't have a lot of results, because we were still waiting on the massive amount of samples to get through the lab. So at the time we were submitting our ISR, we were actually getting our data back to start analyzing.

All of our analysis for 2013 data was completed. We have the results split between two different reports. One was the 2013 Initial River Productivity Results tech memo.

That was submitted in September of 2014. That pretty much covered almost all of our results, except for some stragglers such as the adult emergence traps, woody debris and the organic matter, which took a

little longer in the lab. Those results are given and discussed in the 2014 Study Implementation Report.

During 2014, we had a more limited and more focused field effort. Most of it was focused on completing our Trophic Modeling objectives. UAF was our partner with that, and they were on a two year grant and had some grad students involved, so we really needed to focus on getting their parts of this completed so they could actually finish.

So, for that we had Stable Isotope Analyses. We had drift samples and stomach contents for the Fish Diet Analysis. And these results -- all of this was done in 2014 – the same sites, using the same methodology as in 2013 with variances. The results here were summarized and discussed in the 2014 Study Implementation Report. So we consider the Trophic Modeling and Fish Diet Analysis and drift samples complete objectives for field, and the data is in.

Also in 2014, we went ahead and implemented one of the proposed modifications in the ISR Part C. This was what we called the Upper Tribs and Lakes surveys. We had nine selected tributaries and three large lakes above Devils Canyon, up in the upper basin, that we sampled for macroinvertebrates, algae and water quality to get a sense of how

productive -- what those streams look like in terms of food resources. These are all tributaries sampled that would be leading into the proposed reservoir area. They'd be above the inundation zone. So that was a proposed modification that was implemented, we summarize those results also in 2014 Implementation Report and consider that objective complete. Next slide.

Slide 4: Nothing new changed here; we had the same nine study objectives. Next slide. Slide 5: These are our study components, all detailed in the ISR Part A, Section 4. Next slide.

Slide 6: We had a number of variances in 2013 and 2014. Some of the 2014 were repeated - those are the ones in blue. So let's go to Slide 7.

Slide 7: We had three new variances in 2014. These were proposed modifications from Part C, Section 7.1.2 that were implemented. I have already mentioned the Upper Tribs and Lakes sampling. Also involved were, we added Arctic Grayling juveniles and adults as target species and life stages for the trophic modeling, stable isotope analysis and the Fish Diet analysis. So those were new modifications that were implemented, therefore becoming variances. Next slide.

Slides 8 – 12: We have a large series of slides that just summarize

our general results that are in those two reports. I will say generally that we had a lot -- there was a lot of data that were collected during 2013. We counted about 1340 different benthic samples alone. Those include algae, drift and all the benthic stuff.

From all this data we have been able to really get a handle on our study objectives.

We're characterizing those macrohabitats and the communities that live within them. We're getting a good baseline of data on how things work. We have five different study areas that span a hundred miles of the river, starting from where the dam is, all the way down to Montana Creek in the lower river. And 21 sites that cover a variety of five different macrohabitats.

So we're getting a really good handle on what is where and how it works, and tie it in with the food web and the trophic modeling, we're getting a good idea of what the fish eat and how they incorporate that. With that, we'll move on to Slide 13.

Slide 13: I want to take a moment to touch upon our Fish Diet Analysis. In the last meeting we had in October of 2014, we had talked about this a little bit. We had 261 target fish species that we had been able

to collect in the field, as of 2013. 196 of those had non- empty stomachs that were used in the Fish Diet Analysis, so this was a good start.

But we had a lot of comments about how maybe that wasn't a lot of fish, or was that enough fish. In 2014, because most of the fish crew was up in the upper basin, we went ahead and got a dedicated fish crew to come out with (indiscernible) team, in order to really focus heavily on getting some good data for the Stable Isotopes Analysis and the Fish Diet Analysis. That has paid off, as you can see. We collected twice as many fish in 2014. We have 449 target species fish, and 410 of those had non-empty fish stomachs. You could see a big difference in fish diet items that we were able to analyze as part the Fish Diet Analysis. Also, taking into account that probably adding Grayling in definitely helped with some of those numbers. Next slide.

Slide 14: I'll also point out that from the last meeting we were requested to do a Fish Diet Sample Size Sufficiency Analysis. We completed a TM of that and filed it in December of 2014. The bottom line is that most curves that we looked at stabilized between 4 and 8 samples. That would suggest that a sample size of 8 fish is sufficient to characterize the diet compositions. From there, let's head to number 17.

Slide 17: We have to make a clarification as we start to talk about our proposed modifications . In Section 7.2 of Part D we left out a word, which is a very important word. It was reading “As detailed in the Study Implementation Report, AEA plans no modifications of the methods for this study”. The missing word is ‘additional’ modifications. So, we do propose all the ones that were previously given in Section 7.1. Those were the ones that are taken from previous ISR Section C, and they’re also included in Section D.

Slide 18: What these basically are, is we proposed to carry forward all the 2013 variances that were reported and discussed within the ISR Part A, Section 4. And they were again repeated in Part C, and again in Part D in Section 6.2.

In addition to that, carrying forward the -- also as part of that ISR Part C -- we proposed some other things, like the redesign of adult emergence traps. We had some pretty significant losses in how they worked, so we’d like to redesign those and improve on the deployment methodology that we worked with a little bit in 2014.

And the other two are really focused around our colonization study that we did in 2013, changing things up and putting them in their

macrohabitats as opposed to turbidity and temperature combinations. And then adding an additional set out in the main channel, to look at the effects that these stage changes and exposures on the fluctuating shoreline have on colonization mechanics. Now we can go to the next slide.

Slide 19. So the remaining steps to complete this study, we need a second year of characterizing macroinvertebrate and algal communities. That's all the Hesses and Ponars and algae samples. So another year of that.

We need to do an analysis to evaluate the suitability of the Talkeetna river samples that we took, to see if they are suitable as reference sites for what would be going on in the Susitna. That's at a decision point, and the result of that will indicate whether or not we'll need to have an additional season of collection from the Talkeetna or not. So that would -- that's in play, I guess.

We need to continue to develop our habitat suitability criteria, using an additional second year, from the macroinvertebrate and algal samples for that. Because we're collecting a bunch of benthic samples, we'll have an organic matter component from those that will also continue to characterize it in a second year. And finally, we would be continuing a

second year of looking at colonization.

So with that, that is all I have to say. Ready for comments and suggestions. Thanks. And Eric is available -- he's on line I believe -- or, on the phone, so you can address either one of us.

MR. CALDWELL: This is Lucius Caldwell. I guess I'll jump in with a couple of things. In general, I think that what we've seen, you know, it looks like there's a lot of work, but we haven't really seen a lot of the synoptic analyses and interpretation of these data that you're mentioning. Like for instance the trophic modeling. We've seen some data; we haven't seen what's pulling that all together. I don't know if that just hasn't gotten to us or that hasn't been done, but that was one thing that was concerning.

MS. KEEFE: Mary Lou Keefe. Could you clarify - I don't think we quite understood what you were saying. Could you say that again, please?

MR. CALDWELL: Sure. So in our synoptic reviews, what we've provided in the past are technical memos and whatnot. We've specified a number of areas where questions that we've raised in the past have not been addressed with the information that we've been provided. In general, what we've seen have been a lot of data, but we haven't seen a lot of the

tying it together, the interpretation, the analysis of these data.

So I'm wondering if these have actually been done. These things like, for instance, the trophic modeling. We've seen some of the data that would underlie somebody undertaking an effort to do some trophic modeling. But we haven't seen anything that resembles any sort of a quantitative and synoptic analysis of those data. Are those data available -- excuse me -- those analyses. Are those analyses available or are those analyses ongoing?

MS. KEEFE: This is Mary Lou again. So I guess there are at least two points to your comment. And the first is that we did not respond to previous comments and make modifications based on previous comments. And in fact I would guess since the last time we heard from your team was at the ISR meeting in October 2014. We haven't had an opportunity to collect any new data since then, you would be in fact, correct. Your comments that you gave at that meeting have not been incorporated into the study plan in any way, shape or form at this time. And that's just part of the process - don't take it personally. It's just where we are in the FERC process.

The second part of the question I believe, is we have to go back --

and maybe Tim or Eric can pick this up -- to the study objectives. The specific study objectives for the trophic model and the growth model were that -- to develop the isotope model and they were not to create a food web. But maybe those guys would be better able to address that.

MR. CALDWELL: Right -- sure, sure. I understand that, but we haven't seen anything that resembles a model. I've seen some data, but nothing that resembles any sort of a pulling it all together model.

MR. SCHOEN: Hi Lucius, this is Erik Schoen, jumping in. I appreciate that comment. To answer your question of if there's new data that there's a new report that's adding new interpretation. The Study Implementation Report that we submitted in October is our last report interpreting these data. And I guess I'd appreciate a little bit of clarification. We did include a discussion section where we interpreted the data, and we -- I guess in my opinion -- we did what we said we were gonna do in the study plan, the implementation plan, in terms of talking about whether fresh water or marine or terrestrial food sources are the predominant energy pathway supporting different fish species. Asking whether physical processes like temperature or stream flow versus food seems to be more limiting in terms of salmon growth.

So those are the types of interpretation that we laid out in the study plan. And I guess if you are interested in other types of interpretation, if you could clarify what you're -- what you'd be interested in seeing.

MR. CALDWELL: No, that's precisely what I'm talking about. So I guess when you guys do have a chance to review the technical memos that we've generated, then you can sort of go through the details that I laid out in there, and see if at that point it looks like there's still something that's missing.

MR. PADULA: Would the person who spoke prior to the last person identify himself?

MR. SCHOEN: Yeah, this is Erik Schoen at UAF. Thanks Lucius, we'll look forward to reading those tech memos.

MS. McGREGOR: This is Betsy with AEA. I have a question. What tech memos are you referring to?

MR. CALDWELL: Some documentation that we've recently provided to (indiscernible).

MR. NIGHTENGALE: This is Tim. To my knowledge we haven't received any - I have no knowledge of those tech memos, honestly. And pretty much like Erik said, everything -- all the culmination of the stable

isotopes analysis and the trophic modeling -- the growth model, the bioenergetics is all in the Study Implementation Plan. So I'm not sure what more was required. I'm assuming that you have read the Study Implementation Plan that we released in November.

MR. CALDWELL: Yes, are you talking about the...? Yes. So we've reviewed everything that we have been passed. The Study Implementation Report?

MR. NIGHTENGALE: Yeah, that and we would have had the 2013 initial study tech memo.

MR. CALDWELL: Right, right.

MS. STEELE: Hi Lucius, this is Marie Steele. The tech memos you're referring to, that Betsy asked you about, you're referring to the deliverables to the services, correct?

MR. CALDWELL: Yes.

MS. STEELE: Okay, thank you.

MR. CALDWELL: So I guess it sounds like the stuff that we passed to the services hasn't made its way up the chain to you guys, yet. Is that an appropriate assessment?

MS. WALKER: That's correct. Those deliverables were to be

discussed here, as you are doing, but they are the basis for the written comments that we will provide to FERC by the June 23rd due date. Actually, none of your previous reviews - there's been no outside expert review of any studies submitted to either AEA or FERC so far. The only thing that's been presented are the verbal comments at the October 2014 ISR meeting-- first half of the last ISR. So it's a process issue as Mary Lou...

MR. CALDWELL: That's fine; I just wanted to make sure that that was the program, because we voiced some additional concerns that are -- that have been put into writing as well, about the sample size for the diet study.

MS. WALKER: And this is the appropriate time to bring those up.

MR. CALDWELL: Great, great. So can you guys go to that slide?

So a little bit of background on this. The report describes - cites Van Tassel and Beauchamp from 2011 to demonstrate the diet stabilizes at 7 - 12 samples. But we could find no example of that number in the document. And the only assessment we could find that comes close to that to a sample size, found a mean diet overlap value based on stomach contents decreased considerable up to 10 samples; it plateaued around 25.

And if you look at what's going on in this figure, there's only a few of those samples that actually go out to the 8. And so what's happening here, is there's actually an inappropriate statistical treatment of this data set that forces that fit line, that need increase per sample, down to zero, because we only have a couple of data points that are actually going out to 8. So taken together, what that means is that first of all even if the goal of 8 samples is sufficient, that goal is not being met. And second of all that that goal of 8 stomachs is dubious and not supported by the literature, or by a rigorous treatment of that empirical data that are presented here.

MR. SCHOEN: I guess the first point - this figure comes from the 2013 Coho sampling. And clearly we didn't achieve our target sample sizes at a number of sites. So that's -- I agree that many of those at many sites during many sampling periods we didn't achieve our target sample size. The two papers we cite (indiscernible) chapter from USS publication. (Indiscernible) talked about 8 to 10 sample size - a sample size of 8 to 10. And then Beauchamp, et. al. talked about 7 to 12, I believe. So when we took the sample size of 8, we described in -- it was either the study plan or the implementation plan -- we picked a sample size that was at the low end of the range in the literature. And that's including both Van

Tassel and Beauchamp, et. al. book chapter. And the reason we went on the low side is because we weren't trying to comprehensively identify all of the prey items that fish in each study consumes. But our objective was to look at broad dietary patterns across the landscape.

So we weren't really interested in how many -- counting the exact number of macroinvertebrate families consumed at each site. A big question was whether aquatic prey, marine prey or terrestrial prey were the dominant energy pathways for these fish. So I think with the sample sizes we used in the stomach content analysis and then in combination with the stable isotope analysis, which is a very robust analytical process when you have low sample size. I think in combination our data set was quite sufficient to meet our objectives.

I appreciate your comment; you brought up a statistical issue with the red line, and I'll need to look into that. I -- I believe we addressed that, but maybe I didn't make that clear in the tech memo. But I'd like to look into that and I appreciate that comment.

MR. CALDWELL: Okay, I think that in general a lot of what our comments have been surrounding is that it sounds like there's been a continuation with the status quo as far as the methodology goes from the

very beginning of the project, in spite of comments going back to 2014.

MR. PADULA: We have a comment in the room.

MR. DAVIS: I think that one thing that this feeds into, since we're talking about - well, the growth of fish among different habitats and the growth rate potential that was developed in the bioenergetic model. I think the services have always - and the way we've always looked at this study and the comments on the RSP - was to say, "We want to see if there's differences in growth among these different macrohabitats". Do Sockeye or do Chinook and juveniles grow faster in a side slough or an upland slough habitat? So really we wanted to compare macrohabitats. And the comment on the RSP was, "Let's get multiple replications of macrohabitats".

And a part of the problem was, I think when we got the study determination, it was "well, these are our sample sites". With the classification at that time, we were gonna have 4 or 5 representation at each macrohabitat types. And then when we got up there in the field -- and particularly this applies to all the studies-- but for the trophic study if you look at the area where there are juvenile Chinook and Coho salmon, you only have one side slough habitat. One side slough habitat. And that's

the one at FA-104, which is no way representative of side slough habitats throughout the middle river. And it certainly isn't representative of side sloughs like at FA-128 or FA-138.

So when you pool your data and say, "this is the growth", and in fact you've pooled multiple different habitats. But when you report your data saying 'this is the growth of juvenile salmon in sites of habitat", you're really only talking about one side slough. And on top of that, you didn't mark the fish and you get growth rates for marked fish. I understand that was difficult to mark fish and see if they actually reared in that habitat, so that your reporting is for fish that were actually there.

But even when you shifted to measuring growth based on size frequency distribution, the mode of distribution, you had so few numbers. I mean, for 2013 you have 3 or 5 Chinook salmon that went into the growth rate. And for 2014 in this side slough habitat, this one side slough habitat, you had what? Three age-0 Chinook in mid-Summer sampling; none in Fall. So when you talk the growth of Chinook and how representative it is, I have a real problem either representing the growth of the species under investigation, or representative of the macrohabitat. Particularly side sloughs and upland sloughs.

I think I'm just gonna go ahead and go through a couple of comments that I had here, because I want to get some - I want to be able to get my highlight comments out to FERC. And I recognize that these guys want a chance to respond, and I'm certain that it will be responded in writing at some point. But, at least to get through this without kind of dragging this on.

I think that comment about replication of macrohabitats also applies to the benthic sampling. So if you've only got two side sloughs and three upland sloughs, and you're doing your benthic invertebrate sampling there, it's not really that representative. When you look at just the middle river, then you again only have the one side slough habitat that overlaps with Chinook and Coho. You have another one further upstream above the canyon but below the dam, which is clearly not very representative of that habitat type.

Upland sloughs - there's one that was selected at FA-141 at Indian Creek that was probably a decent upland slough. And they've got one at 104. But the one at Montana Creek is really a distributary channel of Montana Creek that was blocked off when the highway was built and the railroad was put in. And so there's still water that backs up in its old

channel. But it's not really an off-channel habitat of the Susitna River, so it's not really representative of an upland slough. So I have a real problem with once they got out there at these sites, and they picked these macrohabitats that they actually had something mis- representative.

And that same comment goes -- and I think I've made this before at the previous meeting -- that Indian River, you pick a side channel habitat to sample, to represent side channels, but the one that was picked was just the downstream end of an island that just kind of cut across this island at the downstream end. It's a question of whether it can even be classified as a side channel habitat. But even if it is, there's whole other side channel habitats, why pick that site to sample be representative of that macrohabitat type, particularly when there's so few replication.

And then, why -- when the concern was to get adequate replication of these macrohabitats in the middle river -- and that was the main comments in the RSP. Why say, "We're gonna expand the study, now we're gonna go upstream and sample all these tributaries in the upper river, and we're gonna sample these lakes in the upper river", when we still don't have enough replication in the middle river? So why not put this effort into getting real replication of macrohabitats in the middle river

versus somewhere else?

That was a real concern. When we talk again about representation, we're talking about say, the side channel habitat study. There was a recommendation, a FERC determination that there would be some consultations with NMFS and the services before those sites were selected. And that wasn't done. And now we've got a study looking at stable isotopes, with samples taken up from Indian, and samples taken down at Whiskers, and down at Montana, and one in the upper river. But is that really representative of the food base? Especially when the sites that are replicated again -- the sites who have that (indiscernible) so small, is that really representative? In the next year of study when they do this, I really recommend again that we get adequate replication and we move these down to say, FA-138 or FA-128, where most of the other studies are going on, so we get some kind of good representation. Certainly fish sampling has to be intensified so we can get enough fish to really get growth rates.

Even when the benthic sampling occurred, the sampling didn't, within these macrohabitats really follow the study plan. Instead of separating out the sampling points for (indiscernible) samples at multiple

places through the slough habitat, they were all really concentrated at one point. And you can look at the figures at the ISR that has the exact GPS locations for each spot.

So instead of spreading them out and saying, "Okay, we're gonna get multiple samples within this macrohabitat so it's representative", and the RSP says they're gonna be at least 10 meters apart, they're really all concentrated. So you've got them bunched up.

So is it really representative, again, of what you're sampling? And I think the problem with that was the use of this Hess sampler. And we talked about this is the RSP comments. You had samplers limited to the depths that you could really sample. So maybe a foot and a half, possibly two feet before it gets over-topped. And so if you're gonna find a place within this side channel or the main channel habitat where you place a Hess sampler, you're really limited, and you're really only sampling one habitat type, say a riffle or something like that. So you can't really spread your samples out - you can't sample at multiple depths.

This led to another problem. Because you can't sample at multiple depths, you can't get multiple measures of algal abundance at depths, which was another recommendation in the FERC study determination.

You take algal samples from one to three feet deep. So you get an idea how abundance might change with the differences in light, with different depths. And that wasn't conducted in this study, as well. I'm kinda running out of steam, so you guys are probably running out of steam, too.

That's some of the highlighted points I think I have comments on. But I think there's definitely some modifications that go into this study for next year that will definitely improve it. To get some more representative samples; and use sampling methods that are appropriate at the sites that are sampled.

MR. SCHOEN: I just wanted to respond briefly. I think clearly more samples are always better, and more sites are always better. But I think between you and Lucius we've kind of hit on the, just a core trade-off in any study design, which is, if you spread yourself too thin across too many sites, your sample size will be small within each site. And if you really want to get a big sample size within sites, you need to just take a few sites. So I think clearly we had to deal with that trade-off in this study. I think, given our constraints, and compared to many other food web studies that I've read, I think having, you know, thousands and thousands of stable isotope samples is really an enormous sample size. And I think

having 21 sites for the stable isotope study, other than say, a review paper or synthesis of multiple studies, I haven't seen very many individual food web studies that have that many samples from that many sites. So I appreciate your thoughts and I guess I would urge reviewers -- or I would make a case that our goal here wasn't to estimate diet composition or growth rate with high levels of precision at each individual site. The goal was to, like you said, to determine how growth rates and how diet vary among macrohabitats. So I think our study design did that fairly well.

And I guess our statistical approach was focused on identifying those differences among macrohabitats, and it was conservative in that, say for Age-0 Coho, we didn't find evidence that growth differed among macrohabitats. But with Age-0 Chinook, we did - we found that main channel and side channel habitats had faster growth. So I think in the instances where the ANCOVA model actually showed a difference in growth rates, I think we can be fairly confident that those were real.

MR. DAVIS: Yes, and I don't want to argue points too much. But I would say the counter argument to that would be sample size of fish to growth rates, as to why you didn't find significant differences in Coho. Regarding if you're testing for differences among macrohabitats and you

say there are no differences, how do you know that with a side slough when you only have one. So there's no differences in Coho growth rate or Chinook growth rate among these macrohabitats. But you only have one replicate of a side slough.

You're really not saying, 'I've sampled multiple side sloughs', you've got one value. Not saying, 'I've sampled multiple side sloughs and multiple upland sloughs and I tested for a difference'.

MR. SCHOEN: Sure, yeah -- I appreciate that concern.

MS. WALKER: This is Sue Walker again. I'd also like to point out that this is a really good illustration of how the process has inhibited the ability of these studies to proceed. These are comments that we've brought up multiple times at technical work group meetings, at the October ISR. We don't see them addressed. There really hasn't been a step in the ILP process, but the ILP process itself does include license participants' reviews. We expect that if the process changes, that our reviews, our comments will be considered. But this is at least the third time that we're making all of these same comments, without them being addressed.

There was an issue too, where some of the fish sampled for growth

rate analysis - there were very short time intervals in between measurements. We're talking about two to three weeks. We really don't find them to be very accurate.

MR. CALDWELL: This is Lucius and I just wanted to chime in and say that's exactly my point that I was trying to bring up early on in this process is that there appears to be concerns that we've been raising for -- you know, going back a year and a half or more, now --we're just shouting into the void, essentially. These issues keep getting raised of standardization of sampling, sample size and especially problems we've had with (indiscernible) design have not been addressed. And there's been a continuation of the status quo in spite of explicit recommendations to the contrary. We have these technical issues that have been repeatedly raised, and in spite of these early admonitions to address these problems, there's been no change.

MR. NIGHTENGALE: This is Tim. To be fair, when we first heard from you, it was in the October ISR meeting in 2014. We had completed 2014 field season. So really there was no -- there's really no reaction that we can make when we're actually done with our field season. Again, you might have then made some comments, but we have not seen any of your

comments. It's hard for us to react and take those into account, when we're writing the Study Implementation Report, when we haven't seen any of these comments.

I'd like to address a few things that Jeff has brought up. I think he brought them up also in the October meeting. There's this indication that we didn't consult properly with the stable isotope samples. I'm going to read straight from the determination. " FERC recommended that AEA consult with NMFS and Fish and Wildlife Service when identifying the appropriate two focus areas for stable isotope sampling, where within the focus areas each type of stable isotope samples will be collected." So there's been a, I guess, a notion that the consultation that would allow the agencies to dictate or to input entirely new sites, where it is clear in the determination that they are to select two of the five focus areas that were part of the approved study plan.

So what we did was, instead of just doing two, we did four. So the only input really, is which one did we leave out? That was the only real option that would be available to the agencies. We felt that our selection was above and beyond what was actually recommended. We informed the agencies during several consultation meetings that were following TWG

meetings. So I'm not really sure how much more we could have done, given the language that is here in this determination.

There's also an issue that's been brought up that we didn't sample deep for algae samples. I'll again refer to this determination. What I will say is, that we did sample algae as far as we could go. When I look at the distribution of what we had, it is true that the majority of them were in shallower waters of a foot or less. But the sampling of two feet or greater was approximately about 4 percent of the samples. So it isn't a big one, but we did go out as far as 3.3 feet; we have records of that in the data.

But I would call attention that it does say that we should try these categories, but in the determination it does say "to the extent feasible given the limits of field safety". For a lot of these sites, going out into the main channel, out past two feet the waters pick up tremendously. In order for us to actually reach down and get a sample at two feet, you have to submerge; you have to snorkel down to get it. Going out as far as three feet, in many cases when we would try to do that it was - we felt unsafe doing that. You're literally hundreds of feet away from the shoreline, and the velocities are picking up at four to five feet per second. It's very difficult to dive down and grab a rock there. So I think we did what was

required from the determination, and that we met our objectives according to the study plan.

As for Hess samples, the same. We've addressed this several times. Going out deeper to get more samples, my concern would be, especially here when we're talking about main channels, these are very turbid habitats. We had a PAR meter and we were getting measurements -- the PAR was disappearing, was going to zero at 10 centimeters. So going out as far as two to three feet and sampling deeper - there is really no light penetration going down. Kind of wondering whether or not there is any algal penetration there. But you know, it's a methodology issue. Sampling deeper is something that we have addressed in one of the appendices, or we looked at the exposures, sampling Hesses when they were exposed PER within a 30 day period. That was, I believe, one of the appendices in the ISR. And we recommended a few things that we could do, to perhaps sample out deeper. So we do have that in mind. We haven't repeated any of the benthic sampling in the second year, so those are under consideration.

MR. PADULA: Thanks, Tim. I don't want to cut off the discussion if there's anything new that anyone needs to bring up that hasn't been

covered previously.

Otherwise, I would like to move on, take a short break and come back. Anyone have anything else they want to contribute to this discussion? I'm assuming the services will be turning in some detailed written comments on this study.

MS. McCRACKEN: I just have one question. This is Betsy, with the Fish and Wildlife Service. I might have missed it on the slides, but I'm wondering if Tim can remind me of what winter work was done for the River Productivity, in particular, anything new, recent.

MR. NIGHTENGALE: No, we didn't have any Winter sampling at all. It was Spring, starting in June, and then we had Summer, that was usually around August. And then sampling that was done for Fall that was around the end of September. We did have some initial when some of the other fish crews were out, we did have them collect some kick samples, just to see if there was anything present there, or what was going on. Ice is definitely an issue getting out under the ice. But we hadn't - but that was not part of the formal study plan.

MS. McCRACKEN: Okay, so you don't anticipate being able to acquire any pre- project Winter river productivity or post-projected

predictive capabilities?

MR. NIGHTENGALE: Like I said, that's not part of our study plan, to look at things going on under the ice in the winter. With the thickness of the ice, you really are - any kinds of efforts would be pretty expensive to go out and get samples through the ice.

MR. PADULA: Thanks, Tim. We have one, Mike promised me, brief comment.

MR. WOOD: A practical part of sampling, I'm just wondering about in the fall, say late October - November, you can walk half way out into the river. So where you're saying it's three feet deep in the summertime, June. You're walking out there in the fall, in November, before it even freezes up. So you can make it halfway out there across so you're not diving in three or feet of water. So maybe it's the timing of what you're sampling, I'm not sure of. Right now, in the wintertime there's a lot of open leads. Like, I'm fishing out there now, and there's only six feet of water and I'm looking down at green algae on all the rocks on the very bottom of the river, dead center of the river, where those open velocity leads are. So, if you're not sampling in the winter, or you're only sampling in June or July or August, you're really limiting yourself.

Because the bottom of the river is very accessible for other months of the year, throughout the fall and winter.

MR. PADULA: Thank you, Mike. Okay, I want to wrap this up, unless somebody is violently opposed. Let's take a 10 minute break and we'll start up at 2:45 with the next study, Salmon Escapement with our esteemed guest, Ray Beamesderfer. Off record 2:36:49

On record: 2:49:16

MR. PADULA: For just the purposes of knowing who is joining us by phone, can folks again quickly indicate who is with us here for the last portion of today's meeting?

MS. CURTIS: Jennifer Curtis, EPA

MR. JARRETT: Ken Jarrett, Stillwater Sciences

MR. KONIGSBERG: Jan Konigsberg

MR. AUBLE: Greg Auble, USGS

MR. GEORGE: Jerry George, R2

MS. LINGENFELTER: Heide Lingenfelter, Ahtna, Incorporated

MS. THOMAS: Cassie Thomas, National Park Service

MR. PADULA: Thank you for joining us and we're gonna turn it over to Ray Beamesderfer, who is gonna walk us through the Salmon

Escapement Study.

MR. BEAMESDERFER: Thanks, Steve. I am a fish scientist with R2 Resource Consultants. Today I'm gonna review completion of the Salmon Escapement Study. And I want to refer you to a few documents, to start the initial study report, which is 2013 data.

There was a preliminary technical memo that came out in the interim. And this project has a study completion report, which includes the 2014 data.

For this study, the fieldwork, the data collection, analysis and reporting are all complete. All the objectives in the FERC- approved study plan have been successfully met. None of the variances affected the successful completion. So the bottom line on this is AEA has completed the study.

There's the main objectives: I'm not gonna read through them here because they're in the presentation here. I'm gonna step through each one, one by one and we'll look at some of the sample results on those. This next slide just has some references where to find information on each one of those objectives.

There are a number of variances involved in the study, and again,

I'm not gonna read them all -- they're documented here. If anybody's got any questions on any of the variances, we can take them up after we go through the slides. There is some more documentation of variances for your information, and some more.

The key point I wanted to say about the study design is, you know you go in based on the best available information at the time and come up with a study design. As you get into the study some initial expectations don't prove out. And you also learn better ways to go, as you go. So ultimately at the end of the day you end up with a lot more robust methodology than you started with. And I think this is a good example -- this study is a good example of that. The bottom line is, through all those variances the objectives have been met.

Slide 8: Now I want to go through one by one, like I said, each one of the objectives. The first objective was the capture, radio-tag and track adults. This table just shows you the number of fish that were radio-tagged in the different areas by species in the different years. The study radio-tagged almost 10,000 salmon. 10,000 -- that's a really big number for these kind of studies. Usually it's a few hundred, so a really large sample size. The table shows the breakouts. There were tagging goals for

each species in each location, and the goals were reached at least 90 percent of the specific tagging goal in 24 of the 28 instances. The ones where it didn't make it are up there in the white boxes, in the red. So you can see a few cases for 2012, and then 2013 Sockeye. So by and large the tags were very well distributed among the tagging areas, among the species, among the years.

Slide 9: A big question with the tagging was representative tagging of fish across the run. And so this particular slide shows you from three years what the distribution of the catch was in the middle river. And the red line on there shows the distribution of when fish were tagged, across the scope of the run. And you can see for all the species that, you know, the objective was to tag in proportion to the run, and so those frequency distributions match up pretty nicely.

Slide 10: The second objective had to do with migration and spawning -- characterizing the migration behavior and spawning locations up from the radio-tagged fish in the lower, middle and upper Susitna. This is example data from radio-tagging in the lower river. There's also similar information from radio-tagging in the upper river. And this graph shows the fates where the fates were known for Coho and Chinook. So for the

lower river, the very large majority of fish that were tagged in the lower river (Coho and Chinook), where the fates were known, went into the tributaries.

Slide 11: The third objective was to characterize adult salmon migration behavior within and above Devils Canyon. So this is a summary of those results and this is from the radio-tagging. Only Chinook were tracked upstream of Devils Canyon. In the three years, 17 tagged Chinook passed upstream of Devils Canyon. 10 had final destinations in the upper river, in the tributaries: Kosina, Devil and Tsusena. And 7 of those 17 returned downstream of the canyon.

Three tagged Sockeye moved upstream of Impediment 1 in Devils Canyon. Those were all in 2014, and all three of those fish moved downstream within a couple of days.

Slide 12: This graph shows the temporal pattern of fish moving past impediment 3 in Devils Canyon -- Chinook, of course -- relative to stream discharge. And the dots on there are dates and the flows when Chinook were observed to move. You can see that all the movements occurred under relatively low flow conditions. So obviously a couple of things have to happen before fish move. They need to be staging and ready to move in

the time frame. And then the flows that are suitable for moving have to occur in the period when they're staging.

I think a question came up before on the effect of the size on movement. And the Study Completion Report looked at that in detail. And they concluded that there wasn't strong or consistent evidence that body length influenced passage success. And we can talk about that some more if anybody's got some questions on that.

Slide 13: So looking at the movements into Devils Canyon above, there's really three different ways of looking at it. And they're all useful because they kind of can cross- validate results of each of the other methods. So we looked at the radiotelemetry -- these are the results of the aerial spawning surveys -- or, these are the extent of the aerial spawning surveys. These are the streams that were flown, and fish counts were made in those streams to backup the telemetry results. You can see that there's good coverage of all those major tributaries throughout the upper river.

Slide 14: A fourth objective was to examine the feasibility of sonar to document the spawning locations in the turbid waters, particularly in the mainstem. The short answer on this is it didn't work very well. And this is the conclusion: "The utility of using sonar to document spawning

behaviors in turbid waters was limited, given the current state of sonar technology, by bed topography and shallow depths at which things occurred." There was a species differentiation issue, and there was also a lot of fish were spawning in shallow water where they just couldn't get that big boat with the sonar unit on it. So, limited success there.

Slide 15: The fifth objective was to compare historical and current data on run timing, distribution, relative abundance, and specific locations of spawning and holding salmon. And so there was species comparisons from the 2012 - 2014 data, and the historical data, looking at the migration timing, spawning timing, distribution in the mainstem and tributaries, habitat use in the mainstem and tributaries, and also abundance. That figure there is just an example of one of the river reaches, showing potential spawning locations that were identified. It's based on telemetry results and the results of on the ground surveys to supplement that information.

Slide 16: The sixth objective was to go ahead and generate counts of adult Chinook spawning in the river and the tributaries to estimate the proportions of fish with tags in the various populations or sub-populations throughout the watershed. So this figure shows the relative proportions of

Chinook returning to specific tributaries. This is 2012 - 2014 data. And as you can see they're distributing themselves throughout the major tributaries in some proportion. Big runs in the Deshka and the Talkeetna and the Chulitna, and smaller returns in a lot of the other areas. Actually if you look over, Kosina Creek was about .2 percent, was the estimate of that, into the upper river.

Slide 17: The study also collected additional information on Chinook numbers at the dam site, based on sonar. In 2013 it was a feasibility analysis. In 2014 it was implemented. And the 2014 results were 24 Chinook were counted moving upstream through the sonar at the dam site. The daily passage was low, not a lot of fish, not a lot of fish per day. There weren't diel passage patterns, and the passage (indiscernible) was heavily skewed toward the banks, particularly the right bank.

Slide 18: The next slide shows the aerial survey results. These are the counts of Chinook salmon observed in the different areas. It includes both the historical and current numbers. And you can see that in these upper tributaries there's small numbers in all years; never large counts. This is particularly interesting because as everybody knows, Chinook

abundance throughout a lot of Alaska has declined by about half, or 60 percent or so, over the last ten years. We're in a period of extended low numbers. Regardless of that, the numbers seen here really haven't changed. So even though 2012, 2013, 2014 were relatively low total Chinook returns into the Susitna, the numbers are generally comparable to the numbers in the 80s when there was twice as many Chinook coming back.

Slide 19: Another objective was to collect samples for genetic analysis, and we saw those results. Some of those results were presented this morning. These are just the sample sizes -- thousands and thousands of sample sizes provided over to the genetic guys.

Slide 20: The last objective was to estimate the system-wide Chinook salmon escapement to the entire basin. This table summarizes the numbers. So 89,000 and change in 2013 in the Susitna above the Yentna. 68,000 in 2014, there was estimated in 2014 for Chinook in the Yentna. And then Coho abundance estimates were 130, 0000 and 85,000.

These are mark-recapture study estimates; the standard errors are there are about 10- 20 percent, plus or minus 10-20 percent. For those of you familiar with these kind of mark-recapture studies, those are very high

levels of precision, particularly for population estimates of the scale in this kind of system. So, plus or minus 10-20 percent...

The thing that everybody wants to know at the end of the day is, when you put the abundance numbers together with a proportion distributions, what does that tell us about fish that are going above Devils Canyon, going above the project areas. And the Study Completion Report estimated those numbers or magnitude numbers (they're not statistical estimates) from multiple different methods, based on available data. And they concluded that there was fewer than a hundred fish, possibly fewer than 50 fish migrating above Devils Canyon. Again, it's only a portion of that hundred is going above the dam site, and it's less than .2 percent of the total return to the Susitna according to the Study Completion Report. And that brings us to your comments and questions. Mr. Geiger?

MR. GEIGER: Thanks. Well this is a really complicated study with a lot of moving parts. And as we went through and did review, there was a lot about it we really liked, and thought this really demonstrated a lot of competence.

But there were three things that jumped out, that I wanted to go over. As we tried to do our statistical review, we had to kinda parse out

some of the English in the objectives, and turn it into scientific language for our purposes. And so for example we have this objective 6 that talks about generating counts. But really, I think for a scientific review, that really is asking a question about generating statistical estimates. So for modern statistical estimates there needs to be an accompanying study of both the sampling error and the precision on one hand, and the accuracy on the other. So having to do with generating counts, this is (indiscernible) based on -- because the weir washed out -- there was a need to use the area-under-the-curve approach to estimate the abundance.

But in order to use the area-under-the-curve, you have to really demonstrate to a skeptical reader that you've adequately captured the abundance, both rising and falling. And, that the observers are adequately calibrated. So one of the things that I -- we didn't find was information to assure us that the observer calibration - which I think in the report is called observer efficiency -- that that observer calibration was really precisely and accurately estimated. So first of all, let me ask you why wasn't that in the report -- the information that a reader would need for that?

MR. BEAMESDERFER: So you referred to -- well let's break it

down. So the sonar counts...

MR. GEIGER: We're talking about the area-under-the-curve questions, not the sonar counts.

MR. BEAMESDERFER: So you're talking about the expansions of the actual counts during the aerial surveys that estimate abundance in the tributaries in the upper basin, correct?

MR. GEIGER: Correct. So if you go to the literature and just find an article that tells you how to do that, it will be cast in a statistical context. So that you can, at the end of exercise, generate a confidence interval or a standard error or something like that.

In the report that we reviewed it was treated more like an algebra exercise. We couldn't find a study of the sampling error having to do with the area-under-the-curve counts.

MR. BEAMESDERFER: In the report what they did is, they looked at what they concluded was a reasonable range of expansion for the actual counts they've seen, right? So it wasn't - as you say - statistical calculation per se, but the other thing that they did is they looked at, "Well, what are the effects of alternative assumptions?" And that's where ya gotta go. And so the count is 'x', you assume a 30 percent efficiency

rate and you get a number. And the question is, "Well, what would the efficiency rate have to be, to get a substantively different number?" And it, even if you assume, you know, really high expansion, small expansion, the number is so low that you don't substantively change the conclusion. And so whether it's less than - you know - whether it's 30 fish or 100 fish or 150 fish, it gets you to the same place. Mary Lou, do you want to add on that?

MS. KEEFE: May I address the first part of your question? And that is, we specifically chose the word 'counts' in our study plan, because we were not making statistical estimates of population size in the upper river. We specifically chose the word 'counts', that we would be 'counting' in different ways, the number of fish. I just want to clarify that.

The reason that the area-under-the-curve came up, was because the mark-recapture method that they were hoping to be able to use, failed. And it failed in the middle of the season, and it's all explained in the report. And they had to quickly come up with something, and that was the only alternative they could see. The intent wasn't to provide a rigorous statistical estimate. And I think Ray captured that.

MR. GEIGER: Well, as we were reviewing them, we tried to parse

up some of this English and put it in a scientific context, like I say. And then we were looking, and saying, "Are the estimates that are generated, are they supported by the data?" And then the other part of that we thought, what really constitute a scientific technical review is, we then say, "Are the estimates suitable for intended purpose?" And we had a hard time -- well, it was more than a hard time -- we often did not find that information in the reports. What really is our basis for determining whether it's suitable for the purpose.

But if you go to the literature on area-under-the-curve estimates, it really explains how to generate that, so as to generate a reasonable estimate of the sampling error, which can be expressed either as a confidence interval or standard error. And that's what's typically done in scientific estimates.

MS. KEEFE: And you're absolutely right, with area-under-the-curve. But the problem is, it's July 6th and the run's already started, and the weir gets blown out, and you're going to save the data somehow. So they went and they flew and they did the best they could. They didn't have time to generate, you know, criteria before and plan it all out. So, we can throw the area-under-the-curve out, if you want. That's why they have

the sonar estimates that year. That's why they also had the counts in the upper river that year. Because we were wingin' it to get it done, modified it on the fly to get the best information we could, when we were handed a bad turn from the weir blowing out.

MR. GEIGER: Well it looked to me like for Objective 6, all that was really missing was just a way to show the skeptical reader that you had really nailed down the observer efficiency. That looked to me like the only missing piece.

MR. DYOK: So Hal, did you look at the previous report? Because I think they did a much better job in the first report, when they looked at the observer efficiency and did an analysis to show -- I can't remember the exact number -- but somewhere in the high 30s, I think they had, as observer efficiency. And they did some statistics with that. They looked at having Fish and Game guys go, and LGL; and then compared the observations for the same areas. So they have a much better assessment of that in the original report -- I think in the June 3, 2013. And then this last one for the last year of the study, I don't think they went into that detail because I think they felt like they had addressed it the year before.

MR. GEIGER: Well like I said, this is a really complicated study

and a lot of it looked to me like it was done really well. But I will say in reviewing the previous studies, too, Objective 6 is another one that I stumbled over. And I don't want to get into that here in this meeting and burn up our time. But I would think that consistently Objective 6 is one that caught our attention as one that we didn't think had actually - was really done perfectly. The other thing that I was wondering about. Again, I kept coming back to this question: "Are the estimates really supported by the data? And are the estimates suitable for their intended purpose?" That's was our guiding criteria as we went through this. And so when I got to Objective 8, I thought here again the estimates weren't really the best possible use of the data. And why I say that is because it didn't look to me like there had been a complete examination of both sampling and non-sampling errors. I'll get to where this comes up in a more important way in just a second.

When you think about how you could go wrong with this mark-recapture, the thing that's gonna go wrong is you're gonna lose marks, or the marked fish are gonna die. Then if you look at how that works into the Petersen estimate, the denominator will be too small and that will make the estimates be too big. So when I looked at how they generated the

analysis, they were just guided by this tactic that was based on the statistical hypothesis tests. And I think there are some statements in the report that are just factually wrong - something to the effect that if they passed the test, then the assumption is correct. I don't know if those are the exact words but that was the intent. And indeed, that's wrong. That's the basis of the alpha -- when you report a statistic with an alpha of .05, you're saying 5 percent of the time you'll be wrong on that, even if everything is perfect, which it isn't in this case.

Though they were guided by this tactic that generated an estimate that was 68,000, I think, for that one year. But I think if you just do the Petersen estimate, you'll get a smaller number. So I think if they had done a more complete job of thinking of the precision, which is what they were guided by, and the accuracy issue, they would have maybe done a different pooling. I don't know if I'm getting my point across, but there's accuracy and precision. You can study precision and generate a confidence interval, but these non-sampling errors are really slippery and hard to deal with.

But you can see the principle, that when you tag these fish and send them on their way, some of them will die. And that will generate a

Petersen estimate that's too big. So this all figures into this whole issue of uncertainty and gets back to that guiding question: are the estimates appropriate for their intended purpose? And that's the thing I could not find, really, how to get any traction on that, both in these reports we looked at this year, or elsewhere.

But where that comes up in a really big way is the years that we've studied -- as you point out -- were really anomalous from the point of view of Chinook salmon. This is a period of low Chinook salmon abundance. And this is a period where the Chinook salmon age distribution has been shifted down. So when we were trying to put these pieces all back together, I was left wondering, "How is somebody going to try to take these data from these two years and infer what's typical for Chinook salmon? Both going up the Susitna River and using these tributaries. How is that piece of uncertainty going to be dealt with in the end, in these other models?"

MR. BEAMESDERFER: Well there was a lot in there, Hal. I look forward to your written comments so we can get into those in additional detail. So, by non-sampling errors -- for the non-statisticians among us -- you were talking about the mark-recapture assumptions, representative

sampling, tag loss, equal probabilities of recapture, trap happy/trap shy -- kind of those basic assumptions?

MR. GEIGER: These relate to the word ‘accuracy’. And I think in the report they’re often dealt with, with the word ‘bias’. Those are all things that can’t be quantified as easily as a confidence interval. Yes - biases, inaccuracies, accuracies - these are all part of the same thing. They’re different than precision and confidence intervals and standard errors.

MR. BEAMESDERFER: Right, and so in the study analysis and design there was a series of hypotheses tests based on comparing, you know, recapture rates, cross time, sizes, different areas to try to evaluate the significance of potential biases. The conclusion was that there weren’t any significant biases identified or apparent in the mark-recapture data, as well. So my question for you is, apart from the explanations and the use of language, when you looked at it did you see any areas of substantive concern that you didn’t think were addressed by the hypotheses tests?

MR. GEIGER: Well, yes. When I hear you say ‘significant’, I translate that in my brain to the word ‘detectable’. So what you’re saying when you go through these hypotheses tests, did we detect any

inaccuracy? Did we detect an assumption failure? And even in the report, like I said, I saw that kind of language that if it passed the test, then the assumption was correct. Now that's not true because you can pass the test and the assumption can still be wrong.

I think the obvious thing that's gonna happen is putting these tags on will somehow diminish some of the Chinook salmon. It will diminish their ability to thrive and move.

And so some question is, is that of any practical significance? Or is that just a small little matter? And of course we don't really know. But I think that needs to be acknowledged that there's some diminishment. And so you can track through how that will affect these estimates. And I thought that was a deficiency, that that logic wasn't in the report somehow.

MR. BEAMESDERFER: Okay, well maybe I'm guilty of significant versus substantive. But what I meant was, were there any substantive effects or biases like in the tagging information and the movement and the handling pattern. Was there anything you saw in the data that led you to think there was a substantive issue there that wasn't effectively addressed?

MR. GEIGER: I think the -- there's nowhere I would point to for objective 8 and say, "They did this wrong". I wouldn't do that. But I do think that an alternative analysis, which probably would have produced a smaller number, would have been the best possible use of the data. But I'm not saying , "Oh that 68,000 was a wrong number". But I think if you had a more complete thinking about the non-sampling errors, you probably would have come up with a pooling tactic that would have led to a slightly smaller estimate. Then again, that's just kinda quibbling about how a guy might do it.

But where this really comes up, is how do the numbers we've generated relate to what will be typical? How are these numbers gonna be used to predict dam effects or project operations?

MS. KEEFE: I would like to ask a clarifying question. And that is, this alternative that I heard you mention -- alternative method for estimating escapement is a Petersen estimate. And I just want to clarify that -- that's the point you're trying to make?

MR. GEIGER: They're all Petersen estimates, but they're based on how you pool and how you stratify. So the authors of the report laid out how they did it, so that's good. And as near as I can tell, they followed

what they said they would do. But because we know that these tags will diminish some Chinook salmon. Some Chinook salmon – maybe one, maybe more -- will have died or not made it all the way to where he or she was going. It would make sense that we know ahead of time, without any hypothesis test, that probably the estimate is gonna be too big, because some of those fish are gonna fall out of the denominator. So it makes sense to me to blend the poolings, following both the hypothesis test tactics that were used, but also acknowledge that we know (indiscernible) that the estimate would probably be too big. And then pool a different way. I think if you just do a pool Petersen you end up with a number, isn't it about 50,000?

So anyway, that's a small matter. The bigger issue I'm trying to raise is one about how do we determine whether the estimates are appropriate for their intended use? We're ignoring sources of uncertainty, like the fact these estimates were generated during a period of low Chinook salmon abundance. And I'm pointing out several sources of uncertainty that just have been sort of ignored.

MR. BEAMESDERFER: So I'm gonna quibble a little bit on the language. We could have a really interesting statistical discussion. I don't

think ‘ignored entirely’. I think there were substantial efforts throughout to look at those non-sampling errors with the information, and to include corrections, adjustments. Consider that in the analytical design. And your question is the degree to which those were affected. So we’ll look forward to the written comments and we can parse those out some more.

MR. GEIGER: Again, to be clear, I’m not saying I look at that 68,000 and say, “That’s wrong”. That was an estimate that was generated with one set of choices.

MR. BEAMESDERFER: You had three things; what was the third thing? Or was that it?

MR. GEIGER: The three things -- let me try again. The generate counts, I thought the discussion of the area-under-the-curve was incomplete. Because as a reviewer I couldn’t see where the observer efficiency -- and other parts of it -- I couldn’t see how to calculate sampling error, and it looked to me like the description of observer efficiency was incomplete. That’s one issue.

The system-wide escapement, I’m just raising the issue that it looked like there was a lot of emphasis on precision, but there wasn’t enough issue on accuracy. And that spring- boarded me to a bigger issue

of accuracy, that somehow we have to take these estimates, and they're gonna be used in models down the line. And I'm wondering how were you gonna make an adjustment so that we, we're considering what's gonna happen under more typical conditions for Chinook salmon?

MS. KEEFE: I'm just gonna clarify that the escapement estimates will not be used in models down the road.

MR. BEAMESDERFER: Another question for you, Hal. So on the third one you're wondering how representative the distribution and abundance estimates are under a higher Chinook return situation. Obviously if there's more Chinook the abundance estimates will be higher. But the assumption is the distribution sampling under these current run sizes are representative of what you would have.

MR. GEIGER: Well, these may or may not be used explicitly in models that I don't know about. But I know that we've reviewed in this room, listening to things that have been said today, we are already assuming that a small number of Chinook salmon are making it up, are going to make it up past the upper river. And that we're assuming that these estimates -- this process we went through for these two years -- are somehow representative of the future. But how it's gonna be

representative of the future, that has never been explained to me.

But I don't think there's anybody in this room who's gonna say, "Well, these estimates from these years have nothing to do with how we think the project operation will affect Chinook salmon." I don't think anybody thinks that, do they?

MS. WALKER: This is Sue Walker with NMFS. I'm unclear how these escapement estimates will be used, if they're not going to be used in models. Maybe that could be clarified. But I'd also like to ask a couple of questions about two slides -- number 16 and number 18.

MR. BEAMESDERFER: We'll do 16 first.

MS. WALKER: Do you have estimates for the percentage of fish that have returned to the Oshetna and upper river upstream of the Oshetna? Well they are not estimates, they are numbers.

MR. BEAMESDERFER: Is that the question, is the return or destination?

MS. WALKER: Yeah, do you have any...

MR. BEAMESDERFER: Well, these are destination. Oh, above the Oshetna?

MS. WALKER: Zero tagged fish returned to the Oshetna or the

upper river upstream of the Oshetna River.

MR. BEAMESDERFER: Zero.

MR. GEORGE: This is Jerry George with R2. There have been no radio-tagged fish that have gone in an assigned spawning fate above Kosina Creek.

MS. WALKER: No radio-tagged fish, okay. I understand, thanks for that clarification. That's a little confusing when we have a couple of hundred juveniles out of the Black River, a trib to the Oshetna. But my next question is on Summary of Results. Peak counts of Chinook salmon from aerial surveys. You have listed here peak counts of Chinook salmon, and you're looking at the 80s. My question is, are those truly peak counts in 1982 through '85? I don't believe that they are, yet they're presented here as a comparison to the current peak counts. Am I wrong?

MR. BEAMESDERFER: We can double check them, but the counts would be the maximum count that they observed on any...

MS. WALKER: Yeah, I know what a peak count is, but don't believe that there were counts. I believe that in 1983 the very first Chinook was observed, but that there weren't actual counts. I'm not sure of that, but that would be good to clarify because the comparison might

not be...

MR. BEAMESDERFER: Yeah, we can check that. None of these fish (indiscernible), but we will check on that.

MS. WALKER: Thank you.

MR. DAVIS: I had a couple of questions, but after that discussion I feel like they're stupid questions. Anyway, on the spawning in tributaries - and you can (indiscernible) while you're looking because it's an easy question. The question has always been to me as to what portion of each species is spawning in turbid main channel or side channels?

Whether they go into the Yentna or Susitna. And you're always reporting -- and every time I've seen that figure, that pie graph -- whatever percentage is in tributaries. Asked what portion spawned in turbid main channel habitat? Answer that question for me? I mean, why not just provide a number? "Here's how many went up the Yentna. Here's how many (indiscernible) tributaries to the Susitna".

MR. BEAMESDERFER: Yeah, Jeff. I didn't put them in the pie, it was getting kinda busy. But I can show you in the Study Completion Report. So it does break down of the fates - where they went, whether it was in a slough or a side channel or the mainstem proper. So it's got finer

breakdowns on those.

MR. DAVIS: The ground surveys - what portion of those that went to main channel including site - main channels, blind areas - did you do ground-truth surveys on and what was the distribution of habitat selection within the mainstem habitat.

MR. BEAMESDERFER: There were ground-truth surveys, and I don't have the proportion at the top of my head. Maybe Jerry might. But we can check that.

MR. DAVIS: I just wondered if you had a good sample size of the ones that sampled in the mainstem habitats, and say, "Okay this is representative of where they're (indiscernible)?"

MS. KEEFE: This is Mary Lou. I think we'd have to look at a sample size. I don't think any of us know the sample size to give you.

MR. BEAMESDERFER: Yeah, the one thing I will say about that is, you know -- so there was multiple years. There was historical samples, and there was multiple fish. And so there was a lot of places that were seen in multiple years where telemetry fish went. A lot of the places where telemetry fish went were, you know, they saw them in the ground surveys, and there was multiple of those spawning sites in the mainstem

areas where multiple radio-tagged fish went. So I'm not exactly sure of the sample proportion, but kinda that consistency of results gives us some assurance that it was a pretty good estimate.

MR. DAVIS: And in the report then -- I'm sorry if I'm not -- I'm just trying to get an idea of where these fish spawn (indiscernible) mainstem, and what habitats they selected. So you're saying that in there, there's a good description of where Coho spawn in mainstem habitats and what those conditions were there?

MR. BEAMESDERFER: Yeah, and there's a bunch of those dot...dot maps that shows locations. I think there were 44 mainstem spawning sites identified in the middle river for Chinook. So, 44. That's a pretty good number there.

MR. DAVIS: 44 Chinook in the mainstem?

MR. BEAMESDERFER: Yeah, and there were including sloughs and side channels and creeks.

MR. DAVIS: Right, right - everything that's in the flood prone area of the Susitna River. In the 1980's studies, particularly for Coho, some of those lower middle river tribs were pretty important. Gash Creek, Whiskers Creek. You guys have a good proportion of Coho in the lower

middle river. You could say if it's still – like Gash Creek, for instance. In the 1980s was the biggest return of all (indiscernible) for Coho. Can you say how it compares now with then?

MR. BEAMESDERFER: And again, I'd have to fish out the results and look at it. But I mean, yes, Coho are distributed throughout all those areas. And they're distributed basically the same areas. But the relative proportions...

MS. KEEFE: It is in the SCR.

MR. DAVIS: I saw the proportion, but I couldn't make it out on that detail, so I'm sorry if I missed it, thanks.

MR. BEAMESDERFER: Need better glasses.

MR. DAVIS: I told you it was a dumb question but I wanted to (indiscernible).

MR. BEAMESDERFER: Well, I mean, it does highlight that there is a ton of information in all of those reports, and lots of figures and tables -- it's a huge study.

MS. KEEFE: If I can go back to Sue's question, I was able to pull up the errata that was filed for this study in, I believe it was filed in February 2016. Table 5.3-5 of that errata has the data from 1982, '83, '84.

It has the number of flights that were flown. It has the date of the peak count and the peak count. So those counts were in fact, peak counts.

MS. WALKER: It's good to know where that is; I'll certainly look at it. We were advised that that didn't really have much bearing and didn't warrant our examination. And our consultants weren't...

MS. KEEFE: That errata wasn't the only place that that table was updated. It was also filed with the SCR. And it would have the same table number. An errata is when you make a correction, so the table was filed with the SCR, and then we made a correction to one of the data points in that table. And it was re-filed with that correction.

MS. WALKER: One of the data points has changed?

MS. KEEFE: I believe that in that table the -- let's see -- it says right here that there were.

MS. WALKER: We don't actually need to look at that. We need to look back to this report that's in the SCR.

MS. KEEFE: I would look at the errata, because that's the most recent, and the updated version.

MS. WALKER: Helps to know where to look. Appreciate it.

MR. PADULA: Any other questions from anyone on the phone or

in the room? Betsy, are you preparing?

MS. McCRACKEN: This is Betsy McCracken with the Fish and Wildlife Service. And I'm thinking of the Black River pilot study. I'm curious because I think that large numbers of juveniles were found, but no radio-tagged fish. So I'm just wondering how is it that we're not able to account for returning adults to the Black River? I mean, can you offer some explanation?

MS. KEEFE: This is Mary Lou; I'll offer some. I believe the biggest group of Black River fish that were captured, were captured in 2013... Maybe I should let Jerry answer.

Jerry, are you there?

MR. GEORGE: Yes, I'm here.

MS. KEEFE: Can you talk about the numbers of captures in Black River and the timing and how -- you have to back up a year, right, before the numbers of adults coming in?

MR. GEORGE: Sure. We did very intensive sampling in the Black River in 2014, and did not find any Chinook there. 2013 - I don't have the numbers right in front of me, but there was a lot of sampling effort there with directives, with ADF&G genetics crews, and with FDA sampling.

And there were fairly good numbers of Age 0 Chinook there, which would have been from the 2012 spawning year. That 2012 spawning year is when we did see 12 Chinook move above Impediment 3, with the radio-tagging. None of those 12 was assigned a fate in the Black River, but we do know that that year had more radio- tagged fish move up past Impediment 3 then the 2013 or 2014 studies. So there were not fish that were identified in the aerial survey. A lot of these fish that we're encountering could be the offspring from just a couple individuals up there that spawned. MS. McCRACKEN: And there were hundreds of juveniles, you said?

MR. GEORGE: I'd have to get the exact number. I didn't -- I'd have to get the number and get back to you.

MS. McCRACKEN: Well I'm just suggesting that maybe it's worthwhile to get some contrasting data to try to better understand why we're finding juveniles, but no adults. Or maybe you haven't looked hard enough to get that information at this point.

MS. WALKER: This is Sue Walker again. I would like to just clarify. In 2014 you didn't find any adult Chinook in the Black River, but you did sample juveniles. Is that correct?

MR. GEORGE: No, in 2014 we did not find any juveniles in the Black River. We did collect, I believe 3, in the rotary screw trap at the mouth of the Oshetna River. In 2013 we had many more juveniles collected in the Black River.

MS. WALKER: And was your timing similar between the years?

MR. GEORGE: The collection timing was similar. The installation of rotary screw trap at the Oshetna River was a little bit later in 2013 because of the late breakup. But overall the timing of sampling was pretty similar. The size of the fish that were collected in 2014 were generally larger than the 2013 Chinook in the upper river, which would indicate that most of these fish spent a winter up there and were Age-1 fish that we were collecting. Those size ranges are shown in the Upper River Study Implementation Report.

MS: LEBA: This is Heather, with the Susitna River Coalition. I just wanted to have a clarification on a comment you said earlier. That there were 12 fish that went above Devils Canyon. And when you do a radio tag in a mark-recapture, those 12 fish represent a proportion of the population. So I'm wondering if you can give us kind of a broader estimate of how many fish you think that, that 12 fish are actually going upstream.

MR. BEAMESDERFER: The 12 radio tagged fish? MS.: LEBA: Yes.

MR. BEAMESDERFER: I'd have to look in the report to get an exact number. A useful number to look at was the sonar count. So we've got tagging data: 17 tagged fish total, across the three years (indiscernible). You're asking how representative are those 17 tagged fish (simultaneous speech). And then we've got the sonar number where, in 2014 24 fish were represented moving past the dam site. So 3 tagged fish, 24 counted...

MS. LEBA: Where is that sonar located?

MR. BEAMESDERFER: At the proposed dam site. And when you expand those out, you know, that's when you get into that 50 to 100 range.

MR. PADULA: Any other questions for Ray on this study? Anybody on the phone? Awesome, thank you, Ray -- got us right on schedule. Next up, it's 3:45 and Jerry, on the phone, is gonna move us into the Fish Distribution and Abundance, first the upper river and then the middle and lower river.

MR. GEORGE: The purpose of today's presentation is to give you

a quick summary of the study efforts completed since the June 2014 ISR. And I'll go through variances from the FERC approved study plan and proposed modifications moving forward.

Slide 2: The initial study year occurred in 2013; it was reported in the June 2014 ISR. Following the ISR, several technical memoranda were provided to stake holders, including a proposed modification to sampling design, a Study Implementation Plan update on gear type selection and use, a draft protocol to better understand juvenile Chinook and Coho, field identification and an evaluation of an alternative upper river tributary sampling scheme that was tested in the Black River in 2014.

And finally, the 2014 - 15 Study Implementation Report was summarized, the 2014 - 2015 efforts. Next slide, please.

Slide 3: Since the June 2014 ISR, the following field activities were implemented: A second year of downstream migrant trapping, second year of radio-tagging and tracking, sampling of sites that were not accessible in 2013, and an evaluation of the proposed sampling modifications by conducting sampling in the mainstem and in the Black River. At this point, a second year of study is necessary to complete some tasks to fulfill study objectives.

I'll skip over the objectives and ISR variances and go to slide 7. Many of the variances from the 2013 study year reported in the ISR were carried forward and implemented during data collection in 2014 and 2015. A complete list of these can be found in Section 6 of the ISR Part D. Slide 7 shows new variances since the ISR.

As for the variances in 2014, we implemented an increase in sample length in the Black River. Also in 2014, since PIT tag arrays were not installed, PIT tags were distributed throughout the upper river study area instead of concentrated near arrays. Upon our initial visit to three upper river tributaries with limited access, we sampled them with the direct sampling approach instead of a GRTS approach. One of 38 mainstem sample locations was inadvertently not sampled during the Fall sampling event. Radio-tag targets were not met for all species due to low abundance or absence from the study area. Next slide, please.

I'll summarize at a high level some of the results from the 2014 activities. A GRTS and transect -- what we're referring to as a hybrid sampling approach -- was implemented in the upper river with the goal of increasing the number of replicates of rare off-channel habitat types. To do this, we used the output from 2013 habitat mapping, and using a GRTS

approach selected six replicate side channel, side slough, upland slough, tributary mouth and clearwater plume sites for sampling, as well as the two backwater sites that were mapped in the upper river.

With the addition and inclusion of sites along three transects that were sampled, a total of 38 sites and over 6,000 meters were sampled over three events in 2014. Sampling efforts demonstrated the GRTS approach was more effective than the transects for locating and sampling these rare habitats and support the proposed approach moving forward. Next slide, please.

Following the 2013 field season AEA evaluated sampling adequacy in upper river tributaries. In ISR Part C we proposed modifying target sample lanes in upper river tributaries in order to provide more replication of mesohabitats and better characterize fish habitat associations for rare species and rare mesohabitats. In most tributaries the proposed change, based on channel width instead of originally we used drainage basin, resulted in an increase in sample lines.

In 2014, we implemented a pilot study in the Black River to test whether this increased sample lines yielded an increase in habitat types and better-supported fish habitat associations. Indeed we increased

mesohabitat types from 11 in 2013, to 28 in 2014. This is the number of mesohabitat units. And the full panel sampling approach yielded rare species not collected during sub-sampling. Further analysis of the proposed sampling approach was provided in a December 2014 TM on the Black River. Next slide, please.

In 2014, AEA implemented a second year of downstream migrant trapping in the upper river, with modified locations that reflected the FERC staff determination. In 2014, a rotary screw trap was operated on the mainstem river at River mile 200 between Kosina Creek and a proposed dam site. Photos of that trap are there on the right side of the slide.

The Kosina Creek rotary screw trap had very low catch in 2013 and was replaced with fyke netting in the tributary mouth and clearwater plume at Kosina Creek. The Oshetna River screw trap was operated in the same location as 2013, and catch was consistent between years at the Oshetna trap. We saw an increase in catch by utilizing the fyke netting at Kosina Creek. Next slide, please.

The resident fish radiotelemetry component continued to be implemented with tagging and tracking in 2014 and 2015, preliminary

observations of the 2013 - 2014 overwintering in upriver were reported in a September 2014 tech memo on winter studies. Tagged individuals overwintered in the mainstem, with some species making migrations to areas where they aggregated, while others had a more dispersed pattern. The tags-at-large table shown here summarizes the number of tagged fish, there just to the right of the species name, the timing of tagging (whenever a number increases in this table, tags have been applied to fish), and the duration at which tags are active and being detected in the study area. Next slide, please.

I won't spend a lot of time here; I just wanted to provide a comprehensive summary of the 2013 and 2014 - 15 work. To date nearly 19,000 observations of nine species have been documented in the upper river. Nearly 3,000 fish have been collected during downstream migrant trapping. 248 fish were radio-tagged. Over 2,500 fish were PIT tagged, and 81 were recaptured.

Next slide, please.

This table just shows species distribution by mainstem reach and tributary in the upper river. And I just wanted to show that we're getting a pretty good understanding of the distribution of species in the upper river.

And with the new mainstem sampling approach we've been able to add quite a few records by sampling those side slough, side channel, upland slough areas in 2014. Those are highlighted in blue. The records near the top are for the mainstem locations.

Next slide, please.

We saw this briefly earlier in the genetic results study. Chinook salmon were first documented in the upper river in 2003 by ADF&G when they were doing an inventory. And over the last decade we've developed a pretty decent understanding of their distribution. We continue to see the highest concentration of samples where Chinook salmon are present in Kosina Creek, the Black River and lower Oshetna River.

The 2014 mainstem sampling and downstream migrant trapping was effective at filling data gaps for juvenile Chinook salmon in the mainstem and lower tributary reaches between the proposed Watana Dam site and Jay Creek.

Next slide, please.

I will discuss the species ID and genetic results more in Study 9.6 in the middle river, but I just wanted to indicate that we've collected over 1,200 genetic samples on juvenile salmon and 228 of those were from the

upper river, and 100 percent were identified by the Gene Conservation Lab as Chinook salmon. We've also developed a draft Chinook and Coho identification protocol to improve and better understand our species ID accuracy below Devils Canyon.

Next slide, please.

Moving into the proposed modifications from the ISR Part D, we propose to include ELH sampling targeting juvenile Chinook in the next year of study. This is something that we added to the study in 2013. We feel that ELH sampling gives a good opportunity to somewhat opportunistically go and look for these fish in areas where we know they could be, where we've seen them in the past and try to look in some new areas. We've proposed to weigh and measure and PIT tag a sub-sample of fish collected at each site, and not all individuals. We also propose to reassess and select smaller streams for PIT tag array monitoring with better channel coverage. We didn't have real great success with the number of detections in 2013 because we were trying to cover large streams. We propose to continue to use single pass sampling for all gear types.

Next slide, please.

Based on the results of the Black River pilot study, we've proposed to implement the new tributary sampling target lines. We also propose to use the hybrid GRTS and transect approach for future sampling of the mainstem. This approach would involve sampling along ten transects, with the addition of six replicate off and side channel sites for each habitat type. We have proposed to repeat the downstream migrant trapping, using the same sampling locations as 2013. This would give us three years of data collection on downstream migrant trapping at the Oshetna and Kosina, and two years in the mainstem.

Due to access limitations (indiscernible) sample, continue to sample the three tributaries of 2014, with the direct sampling approach instead of a GRTS approach. Finally, we propose to use sampling gear as outlined in Appendix 3 of the Implementation Plan --this is an update made to the Implementation Plan. Next slide, please.

And to complete the study, another year is necessary. In summary of the ISR Part D, seasonal tributary and mainstem fish distribution and abundance sampling, with modifications is proposed to occur. Downstream migrant trapping and PIT tagging with modifications would be needed for the second study year. Next slide.

Salmon ELH sampling between ice breakup at the end of June, fish length and weight measurements and PIT tag recaptures for life stage classification, fish condition and growth, and the collection of fish of sufficient size for otolith microchemistry. This is to get at the objective of whether or not there are any anadromous Dolly Varden or humpback white fish in the upper river, and to document invasive species through all sampling efforts. And finally, genetic samples to be collected in support of the Genetic Study (9.14) and for the fish identification protocol. That's what I have for today, and I'd be happy to take any questions or comments.

MR. GEIGER: This is Hal Geiger again. So I'm just gonna pool the comments I have for 9.5 and 9.6, and I won't plow this field again when we get to the other studies. I'll just repeat what I said when we were talking about 9.7. This has been very hard for us to review, because we sat down and we first said, "Well okay, the estimates that are gonna be generated from these studies, we want to know are these estimates appropriate based on the data that was generated?" And then we want to know, "Are these estimates appropriate for their intended use?"

And as we've reviewed 9.5 and 9.6 a couple of times now, we can't

find estimates. So that remains really puzzling to us. How we go about conducting a scientific review of these. The fact that there was a GRTS sampling approach, a spatially-balanced sampling, seems to imply that these are gonna be used for some kind of estimates or make some kind of inference. But we need -- we really need to get some traction on a review here, we really need to get more information on what's gonna be calculated. And we need to know something about the variability in the data so we can pass some judgement on whether these estimates are gonna be generated or supportable by the data, or whether there's too much variability to make comparisons. And then we also need to know whether they're gonna be appropriate for the intended uses.

I know last fall when we got together, we were very confused. We thought these estimates were gonna be poured into 8.5. And we were told that they weren't. But now if I look at this graph flow chart from 8.5 -- the Study Implementation Report -- we see that Study 9.6 does pour into the habitat-specific model of 8.5. So I hope I'm getting across the point that we're just kinda lost, and we're trying to do a review here. Because we don't see how the estimates are gonna be generated. We don't see whether or not they're appropriate. We don't have the data, so we can't even get

some traction on how much variability there is there. So we're having a hard time figuring out whether the data are suitable for the intended estimates.

One other thing that I would say, too - and I'm changing subjects now. But the PIT tagging -- I think the last time we got together we made the comment that we didn't think it was very useful the way it is right now. And we think we need PIT tag arrays so we can get direction of travel. That's a comment that I guess I'll just repeat from our last meeting.

MR. GEORGE: Well, in response to your first comment, what we've been looking to demonstrate in terms of meeting the intentions of the study, is that we are sampling a sufficient number of habitats, whether that's macrohabitats in the mainstem below Devils Canyon or the mainstem upper river, or mesohabitats within tributaries, to be able to make inferences among macro and meso habitat types. So what we're looking to do is generate catch per unit effort estimates for every single site. And we've been working on developing a tool in which we can combine gear types, since two or three or sometimes four gears are used at one site, where gear types can be combined into generating one number for that specific species and life stage for their abundance at that site,

relative to their catch with those gears at all other sites throughout the river system.

So that is not something that we have made available yet, but it's something that we've been working on and are excited about. We have provided catch per unit effort estimates in the initial study report, so you can see how those numbers were generated.

In terms of PIT tagging, PIT tagging is a -- to get useful information -- it is a numbers game, with getting enough tags out in the water in your study area, and either recapturing them in hand or getting those fish to swim across your antennas. We have found that the streams that were selected in the upper river for PIT tag arrays were just way too large to get two antennas, to get your directionality to even try to cover the entire channel was not feasible in Kosina Creek or the Oshetna River. And we only have about three percent of PIT tag recaptures to date in the upper river, which I would like to be higher. It's over 13 percent in the middle river, so we're getting a lot of good information in the middle river on movement and some growth information just by being able to recapture more fish in hand. But that being said, be great to get your written comments on PIT tagging. And if we continue it for another study year. If

you have suggestions on locations or the arrangement of the array, that would be great to see.

MR. GEIGER: Not to just keep beating this into the ground, but I think for us, for reviewing it, the PIT tag was very much less important than the catch per unit of effort.

And I know in previous meetings, as we tried to make some sense of this, catch per unit of effort is a word that's being used for several different things. So each catch per unit of effort for each year type is a completely different thing, and they do need to be combined.

And there's the issue of variability, so that's important that you've told us that you're gonna try to find a way to combine it. But from the point of view of reviewing it, we're not sure how to get any traction on that until we see some specific suggestions on how the estimates are gonna be generated. And, we need to specifically see something about the variability that's in the data, so we can make some judgement on whether those estimates are appropriate.

MR. REISER: Hal, this is Dudley Reiser. I just wanted to make one quick comment on -- you referenced Study 8.5. And I remember that conversation before. I know there was some confusion about how these

different studies are being linked together, and how the fish distribution work was gonna be done, and how was that factoring in to the instream flow work. And for this particular study (9.5) it's the upper upstream. So we're really not concerned with that because the instream flow work is really all downstream in the middle river segment.

But in 9.6, this type of information the fish distribution is gonna provide important data that relates to things like periodicity, the timing, the distribution of where fish are located in those systems that we can bring into the modeling. Not directly -- not in the sense of habitat suitability criteria that will -- I think we've talked about that, and we'll talk more about that on Thursday. But there is a linkage and you've got the figure up on the screen. And yes, we're using information from a variety of studies, some more so than others. And this is one of those that we're using the information, but it's not directly -- like feeding depth, velocity, substrate data into the instream flow piece.

MR. GEIGER: I guess we're just trying to say we're still trying to figure out how the information is going to be used. That's what's important for us from the point of view of reviewing. And we're still kind of in the dark about that. We want to know how you're gonna use the

information.

MR. GEORGE: One of things that we would love to do in a license application is to bring things together when we have results of modeling output, and we know specific areas of impact and specific areas that wouldn't be impacted, we can discuss what the findings have been in those areas in terms of fish abundances.

MS. KEEFE: This is Mary Lou. I just put the study objectives back up so that we could have those as reference as well. So we are in the phase of the ILP process for baseline characterization. So the study objectives that we have here, that we're setting out to meet, are describing the seasonal distribution, relative abundance and fish habitat associations. And Jerry just alluded to down the line we're hopeful that we provide good, solid, comprehensive baseline data that feeds into impact analysis. That is the objective.

But we have not determined precisely what those analyses will look like at this time. You have to have the data in hand; you have to know the project operations.

And just to clarify, we are not planning on having our numbers, our relative abundance estimate feed into the instream flow model. I think

that's specifically not -- just so you understand -- they're not feeding into the instream flow model, numbers of fish for 9.6.

MR. DAVIS: Jeff. I've got a couple of questions. I know when we commented on the RSP, we recommended to FERC that you select macrohabitats for your fish sampling in the mainstem habitats for the upper river. And I'm glad to see that you did that and that you think that's working, or at least this hybrid between the transects and the macrohabitats. I would suggest that that happens in the lower river, as well. We had that same comment in the lower river where sampling was just done along -- I think it was six -- transects, and no selection of macrohabitats, and I think that that mainstem sampling method should be applied in the lower river, too, so we get good representation of the major macrohabitats down there.

That was my main comment. Another question: for the upper river and this fyke net that you're using instead of a screw trap. What was the mesh size on that fyke net? I couldn't see that in there. And how often did you have to take net out and clean it off?

How often could it be in the water -- or they, I guess there's two of them.

MR. GEORGE: Those fyke nets that were fished there were 1/8-inch mesh; they were fished on the same schedule as the rotary screw traps. So they would be in the water for two days -- three days, two nights -- and then out of the water for three nights. So, the same schedule. We really -- there was a couple of instances where flows came up, and knocked a wing out or I think once knocked one of the fyke nets over. But otherwise we didn't have issues with fowling or debris coming out of the Kosina Creek. So they performed pretty well.

MR. DAVIS: I'm glad to hear that, because I've never been able to keep a net in the water for very long before it fills up, particularly like block nets for electrofishing or something. Was that included in the report - how long it was in and wasn't?

MR. GEORGE: In the SIR there is a figure that shows the timing of screw trap operation and fyke netting.

MR. DAVIS: Yeah, I saw that; I just didn't know if that meant that about every hour you had to pull it out and clean it out and then put it back in again.

MR. GEORGE: It was checked at least once daily, and when it was checked it was reset, and if there was any sticks or any debris it was taken

out. But we really didn't have any issues with debris in Kosina Creek.

MR. DAVIS: On this secret tool to compare catch from different methods and different gear types, my recommendation would be that that comes out in the public and reviewed before you start doing your next season of sampling, so that we're sure that when you go out there and collect fish data using different gear types among different macrohabitat that we can have a comparison of relative abundance among those habitats.

But it seems to me that should be either explicitly laid out in some kind of modified study plan or something, so reviewers can take a look at that and be confident that we'll have some real comparable numbers.

MR. GEORGE: Okay, that's a great comment. We're hopeful we can provide that share pretty shortly. I don't want to speak on behalf of the AEA, but we're close -- we feel like we're close. We'd like to bring it out and get comments on it.

MS. WALKER: This is Sue Walker with NMFS. I had a question on the timing of your fyke netting. It looked to us as if the nets were set fairly late and they missed most of fish migration. Do you agree, have any comment, or plan to (simultaneous speech).

MR. GEORGE: We began fyke netting and screw trapping as soon as we could get out there after ice out. You can see in Slide 10 that there's snow all over the ground and big pieces of ice on the river banks there. So we were out there as soon as it was feasible, within 7 - 10 days from breakup.

MS. WALKER: But that can miss a lot of the out-migration. Another comment on the PIT tagging is that we had previously recommended an array in order to detect direction of movement. Your response addressed the number of PIT tagged fish that needed to be in the environment in order to have a sufficient number of recaps. Those are different things. And we have recommended previously that, given the paucity of information gained from the PIT tagging and the enormous effort and expense, that PIT tagging be dropped and replaced with other more effective simple methodologies like mark-recapture efforts in off-channel habitats.

MR. GEORGE: That would be great, if you could provide those in your written comments so we can take them into account.

MR. BENKERT: Ron Benkert, Fish and Game. For PIT tag arrays, I just wanted to make you guys aware that US Fish and Wildlife Service is

proposing to have an alternative array this year on Montana. Rather than having your typical PVC frame on the bottom, they're proposing to put a cable across about eight feet above the water, so you're less susceptible. (Indiscernible) results of that study it was (indiscernible) or it may be a little bit more -- provide some more flexibility of your sampling.

I just want to beat a dead horse again, real quick. The Black Creek data is interesting, because obviously we previously haven't known (Not captured). But it's interesting in the fact you only found - (recording changed since others became aware he was cutting out). We saw about 80 juveniles captured in 2013, probably from a 2012 event. I guess it raises more questions, though. I mean, do we have missing year classes up there? Are there fish that are staging that just can't get there -- obviously a previous presentation indicated that you need all the stars to align -- you have to have fish staged in mid-July, you've got to have flows under 20,000 cfs. So are there fish that are available to get up there and just can't physically make it? Or are there missing year classes?

Back to the point where we've got a five-year life history of this fish and we've only got one cohort that we know of in the Black River at this point. We've missed one year, so it's just an interest question. What is

the fate of those fish? Are they there and they just can't get there, or is there just one year class or two years classes of fish that can actually utilize in that area?

MR. GEORGE: Those are good questions, and I think part of the -- you know, we're finding juveniles in there going several river miles up the Black River. There's (indiscernible) that's got to be their natal stream, is what we think. And they're had to have been some adults in there. And by the size of the juveniles that we were seeing in 2013, we would think that those would have been the offspring of 2012 spawners. One of the challenges with the Oshetna and the Black River is, depending on the survey period, that those streams can be turbid for aerial surveys for escapement. So if you don't have any radio-tagged fish getting up there, and the radio-tag data, the turbidity can sometimes be challenging for aerial surveys in those streams. I'm not sure what it was in 2012 when they did the surveys, but there's the potential that there's adults in there, and they just weren't seen in 2012. But by all means, we think that that year class was larger, based on the RT going above Impediment 3. The number of fish going above Impediment 3, so we think that that year class is responsible for most of the fish we observed in 2013 and 2014.

MR. WOOD: Mike Wood again, Susitna River Coalition. I just want to say I feel Jerry's pain a little here. Because I'd like to remind people once again that in 2013 and 2014 we had two 100-year floods, and the latest breakup ever recorded on the Susitna River. So in terms of getting those traps in, and it was late - it had to be late because it was the latest breakup ever. And it's - for baseline the years are pretty rough years.

MR. PADULA: Any other comments? Go ahead, Jerry.

MR. GEORGE: I was just gonna say we even - both years we've mobilized and installed our traps within a week of ice out, which is about as quick as we can expect to do it. So we feel like, given the weather and climate we've been thrown in the study years, that we've met the intent of the study and gotten out there as soon as we could.

MR. PADULA: If there's nothing else specific to 9.5, Jerry can you move us into 9.6? We have a request for a five minute break, in the room, so we'll take five.

Off record: 04:22:55

On record: 04:27:04

MR. PADULA: Okay, 9.6.

MR. GEORGE: Once again, the purpose of this presentation is, I'll

give a quick summary of the activities completed since the June 2014 ISR, including the variances and proposed modifications moving forward.

The initial year of study 2013, was reported in the ISR. Following the ISR several technical memoranda were reported and provided to stake holders, including one summarizing the methods and results of 2013-2014 Winter fish studies. An Implementation Plan update for the use of sampling gears, a draft protocol to better improve and understand juvenile Chinook and Coho field identification, and the 2014-15 Study Implementation Report, which summarized the 2014 -15 efforts.

Next slide, please.

Since the June 2014 ISR, the following activities have been implemented in the middle river: a second year of salmon early life history sampling, a second year of radio tracking with some limited tagging above Devils Canyon, the sampling of sites that were not accessible in 2013 in order to complete the first year of study, and also since the ISR, juvenile salmon genetic samples collected in 2013 and 2014 were analyzed by the ADF&G Gene Conservation Lab. At this point, a second year of study is necessary to complete some tasks for Study 9.6.

Please skip over the objectives and ISR variances to the new SIR

variances, slide 8. Many of the variances from the 2013 study year were reported in the ISR and were carried forward in 2014 and 2015. Those can be found in Section 6 Part D. As for new variances, in 2014 to minimize mortality when large numbers of chum and Sockeye salmon fry were collected during ELH they were not identified to the species level.

Additional tissue samples were collected from juvenile Chinook and Coho salmon for genetic analysis, to better understand field identification accuracy. I'll summarize these results later. The timing of Winter fish studies was adjusted to include a November sampling trip during the freeze-up process in 2013.

Next slide, please.

Resident fish radiotelemetry continued to be implemented, with tagging above Devils Canyon, and tracking throughout the middle and lower river. In June 2014 and June 2015 preliminary observations of 2013 -2014 overwintering locations in the middle river were reported in a September 2014 TM on winter studies. And the tags-at-large table shown here shows the number of tagged fish, the timing of tagging and the duration the tags were active and being detected in the study area.

Next slide, please.

This slide was intended to provide a comprehensive summary of the 2014 ISR and the SIR results. In total nearly 90,000 observations of eighteen fish species have been documented in the middle and lower river. Over 11,000 fish were collected during 2013 downstream migrant trapping. 179 fish have been radio-tagged. Over 7,000 fish have been PIT tagged, and we've had over 1,000 fish either captured, recaptured in hand or 248 fish were radio-tagged. Over 2,500 fish were PIT tagged, and 81 were recaptured or detected (indiscernible).

Next slide, please.

This table of fish distribution shows the documentation of species in the highlighted boxes in locations in 2014 or they were not detected in 2013. And we can see by sampling the reaches in and above Devils Canyon in 2014 that were not accessible in 2013, we were able to fill in and get a better understanding of fish distribution in these tributaries.

Next slide, please.

After recognizing challenges with field identification of juvenile Chinook and Coho salmon in the middle and lower river in 2013, the FDA sampling program increased training for field staff and began to implement species ID quality control measures in 2014. We wanted to

better understand species identification accuracy. Following the 2014 field season a draft ID protocol was developed for future study efforts. The results of field ID accuracy based on genetic samples were reported in Appendix B of the SIR.

In summary, species determinations were made for over 1,200 samples. All samples collected in the middle river upstream of Impediment 1 were correctly identified in the field as Chinook salmon. Species identification accuracy of juvenile Chinook and Coho salmon in 2013 was 86 percent. An error was directional, meaning that many Coho salmon were incorrectly called Chinook salmon in the field. But true Chinook salmon were nearly always identified as Chinook salmon. In 2014, increased training and review of photo documentation resulted in improved accuracy, around 95 percent for both species.

Based on genetics results and review of the overlap in juvenile diet, life history and habitat preference --these are included in Appendix B of the SIR-- we have proposed to combine juvenile Chinook and Coho salmon from 2013 for future analysis. We also plan to continue to collect genetic samples and photograph fish in implementing the ID protocol. Next slide, please.

Moving into the proposed modifications, these are all in Part D of the ISR. We propose to include ELH sampling in six focus areas in the middle river above Devils Canyon, and in the lower river, targeting juvenile salmon in the next year of study. We propose to continue with sampling adjustments made to FDA sampling locations, including the addition of focus area 113. And, the combining of main-channel habitat types.

We propose to relocate the Curry Station downstream migrant trap closer to Portage Creek and to relocate the Montana Creek trap to the mainstem in the lower river. We also propose to relocate the Indian and Montana Creek PIT tag arrays to a suitable location nearer sources of PIT tag fish.

Next slide, please.

We propose to adjust fixed locations of fixed RT stations in the middle river for the next year of study. We will weigh and measure and PIT tag a sub-sample of fish instead of all individuals, and continue with the target of 4,000 PIT tagged fish per species. However, we propose to disperse tags with sampling effort and not in proximity to (indiscernible) locations.

We propose to conduct an additional year of winter fish studies, following the methods described in the ISR Appendix C, and using the same sites as the 2013 - 2014 for winter PIT tag arrays.

We propose to continue to use 500 meter sample lengths for main and side-channel habitats for both electrofishing and drift gillnetting, and 200 meters for other techniques in those habitats. We propose to continue to use single-pass sampling for all gear types. Next slide.

We propose to increase staff training on species ID and collect genetic samples and photo document juvenile Chinook and Coho to inform field species ID. And we finally propose to follow the updated gear specifications outlined in Appendix 3 of the Implementation Plan.

Next slide.

The following steps are needed to complete the study. These are summarized in ISR Part D. Seasonal fish distribution abundance sampling in tributaries above Devils Canyon, the middle river mainstem and the lower river mainstem. Winter fish studies concentrated at three middle river focus areas.

Next slide.

Downstream migrant trapping is planned at three locations in the

middle river and one in the lower river. PIT tagging will continue and PIT tag arrays will monitor fish movements at three locations in the middle river and one in the lower river. Radio-tagging and tracking of target species will continue as described in the study plan.

Next slide.

Salmon ELH sampling between breakup at the end of June at six middle river focus areas, and in the middle river above Impediment 1 and in the lower river. This should give us three years of salmon ELH in middle river focus areas. Radio tagged Burbot and whitefish will continue to be tracked through the winter months, to support that study objective.

Fish weight and length measurements and PIT tag recaptures will support life stage classification, growth and condition. And for Objective 6 the distribution, relative abundance and habit associations of Northern Pike will continue to be addressed through the seasonal sampling program.

And finally, under Objective 7 we will continue to collect genetic samples to support the Genetic Baseline Study and for species ID purposes. That's the end of the middle river slides; I'll take any questions or comments.

MR. DAVIS: I'm glad Jerry, to see that you've got the Chinook and Coho identification figured out. I think that's important, and I agree that with some proper field training that ID-ing those fish would be fairly straightforward. Do you think it was the protocol or did you have staff the second year that had experience from the previous year's sampling?

MR. GEORGE: I still -- it is a challenge in the system, and other people have had challenges in the system. I think that the more fish you see, the better you get at it. And the more photos you review and the more you go to some of these habitats where the fish can look very similar, for training purposes, can really help people with identification. I still believe it is a very difficult system to differentiate the two species, though. And others have had problems in it and folks have had problems in nearby basins as well. But I think with increased training, there is room for improvement always.

MR. DAVIS: Well it sounds like you figured it out if you went to 96 percent accuracy the second year of study. And I don't want to get into that too much. I would like to say I think it's important to know the difference, to look at habitat relationships. I would extend that to Sockeye and chum, because you know, Sockeye of course have a freshwater

residency and chum don't. So I think it's important to know which one of those species are migrating out, emerging from the gravel and migrating out. I would suggest if you collect that many fish that (indiscernible) mortality that you sub-sample (indiscernible) Of the fish, which ones are Sockeye. I don't think it's a good idea just to (indiscernible).

MR. GEORGE: That would be great if you could provide it in your comments.

What we ran into in ELH in 2014 was we would pull fyke nets at quite a few of our locations downstream of spawning areas, and they would 3-4-5-6 hundred fry in them, and they're really fragile at that life stage. And the decision was made just to get those fish back in the water instead of trying to ID them all.

MR. DAVIS: I think they had that same problem in the 1980s. Again, I'd suggest sub-sampling at least so you'd know what you've got.

MR. GEORGE: Comment noted.

MR. DAVIS: There's a lot of studies that look at the different habitat preferences of Chinook and Coho. And I think we can just cite all those in written comments. And those are the main things that were--most of the stuff that you reported for this study happened in 2013. We already

commented on a lot of it. I would say, when I reviewed the TAG resident fish data, and you say you located spawning locations, when I looked at those locations they seemed to be pretty broad. That is, maybe within a couple miles of the stream. And I didn't see that you did the boat, foot, snow machine surveys to see the exact kind of spawning habitat that those were selecting to over-winter. Am I correct in my reading and interpretation?

MR. GEORGE: Can you repeat that? You were breaking up a little.

MR. DAVIS: Did you guys go to find final locations of tagged fish to identify the habitats they were selecting for over-wintering, by either foot, boat, snow machine or some way like that?

MR. GEORGE: For identifying over-wintering locations, what was done, it was done through the aerial surveys. And they would locate tags and they would spend dedicated time in the winter to circle around and try to pinpoint the locations of those tags as best they could. There were no foot or boat surveys to identify those over-wintering areas.

They felt like they had pretty good resolution from the aerial surveys.

MR. DAVIS: That was the method that was described in the study

plan, was to go find out where they're at. Because even if they're hanging out at the confluence of the three rivers, there's lots of different habitats there: there's open river, mainstem, there's places under the ice, there's backwater pools into side channels and sloughs. So those kind of specifics would help, particularly if you're talking about modifying the flow and probably modifying those habitats.

MS. WALKER: Jerry, this is Sue Walker. Wondering if you were able to use any of the genetic species ID to eliminate or highlight some habitats that you may have been erroneously identifying fish species, such as Chinook in beaver ponds. If you were able to sort out this Chinoho issues and identify what the problem was. And I know there are certain habitats - just from being in the field and looking at fish, where fish do look different. They're more pigmented or they're -- you know, you just look at the fish and you go, "This looks different - this definitely looks different". Were you able to correlate the genetic ID with some more unusually appearing juvenile fish?

MR. GEORGE: We weren't -- what we did learn from the genetics results is that we have a lot of the two species are co-occurring in many of the same habitats -- upland sloughs, side sloughs and many of the habitat

features up and down the middle river. What we've also learned is that we do have the presence of some large juvenile Chinook in the system that we didn't do aging on them but they're in the range of 170 to 180 millimeters, and presumably age-2 fish. We're learning that there's just a lot of overlap among the habitat types they're using, and in their sizes. I really stress with the field crews to not use size or habitat as a determining factor in trying to bias their judgement in the field, or make a field call based on that.

MS. WALKER: But do you have any detailed data species mis-identified by evident variables or size or appearance? Or any data that -- it would be interesting for us to look at, as well.

MS. KEEFE: Sue, this is Mary Lou. Jerry, correct me if I'm wrong, but there were Chinook identified genetically Chinook in beaver ponds, correct?

MR. GEORGE: Yeah, quite a few, yes.

MS. KEEFE: So that's specific to your answer. And we do have information by habitat type for the species that were genetically identified. For every fish we collected, we know where it was found, we know if it was genetically identified or photographically identified as a Chinook or a

Coho -- field identified.

MS. WALKER: Are those data available in the report? I would just like to know where those data are. I'd like to look at it.

MS. KEENE: I don't think we did any of that -- we did any kind of habitat analysis in the -- it would have been in that TM, and I don't think we did any of that. But it's available, it could be done.

MS. McCRACKEN: Hi Jerry, this is Betsy McCracken with Fish and Wildlife Service. I'm just wondering if you can give me an update on the lamprey and it looks like the project hasn't been able to tag any. And I'm just wondering if you can give me a status update on lamprey species in general. We have both anadromous and resident lamprey in the river. And the juveniles can only be distinguished by doing genetics. They are an important prey species as juveniles, and then the adults of course contribute to the marine derived nutrients in the system. And I think maybe they're being kinda missed because their run timing is really brief and narrow. So I'm just wondering if you can tell me where they're falling out in the study.

MR. GEORGE: Yeah, so to date we've collected in many lower river tributaries, and in the middle river, in Whiskers Creek and Chase

Creek. Most all of the fish we get are juveniles. We catch a lot of them (indiscernible) fishing and quite a few of them in fyke nets. All of the ones that were metamorphosed that we could identify based on the teeth were all Arctic Lamprey, all the ones we've been able to identify. We have tried some PIT tagging with the juveniles, and we've decided -- these fish are usually under 15 centimeters and they're very fragile -- we've had a hard time PIT tagging them, and so we've stopped PIT tagging them.

We've collected pretty good numbers of them in locations where they are found, so we have a pretty good idea of their size ranges for the juveniles, and some of the metamorphosed life stage as well.

Ms. McCRACKEN: Thank you. Do you have any - have you identified any known spawning areas?

MR. GEORGE: We have not looked at lamprey spawning, no. Not under the study.

MR. PADULA: Any other comments or questions on this study? Oh - Mike?

MR. WOOD: This is Mike Wood again, SRC. I just have given this a lot of thought, over time. And I just want to say I think -- I was at Ground Zero with Jerry George and Dave (indiscernible)and Mike and

Adam (indiscernible) back the very first winter when we were out there trapping those fish and came up with that name “Chinoho”, it just kinda stuck. But I think what it speaks volumes of, is not these guys competency but the pace in which they had to learn, because it was “right now” the very first year, and it was fast. And it was hard to figure out. And I think now over the years, that’s what it takes --is time to see what’s actually going on out there, to identify and really understand what’s going on. And again it’s the pace of this whole process. So I guess it’s in defense of those guys in many ways, but the more time you spend out there, the more you learn. And I think that confusion in the beginning was unfortunate for everybody, because they saw a lot of fish.

MR. HOLMQUIST-JOHNSON: Chris, with USGS. I just had a comment, and it might tie in later in the week when we talk about some of the integration stuff with instream flow studies. But the fish data that I think Mary Lou was just talking about that they have the information for where those locations were, the type of habitats and those kind of things, that that data, if it isn’t being used, could be utilized in instream flow integration components for validating those models for where we see the models are showing habitats - effective habitat is available. And we could

then use that data that was collected to see those match or not. I don't know if it is being used, it may be discussed later, but I just want to bring (indiscernible) that isn't available or being utilized it's certainly there and could be useful.

MR. PADULA: Thanks, Chris. Any other comments about this study?

MR. EAGAN: This is Sean Eagan. In the winter study it looked like a lot of the fish that were captured were really captured in March and the very start of April. And there's gonna be major changes in the river in December, January and February. And if seems like if we're doing more Winter Study work, it's important to understand where the fish are in January and February. Can't say exactly where they are in March represents the entire Winter, 'cause things are starting to change in March.

MR. GEORGE: Just to clarify, in both the pilot study year and in the 2013-14 study year, we -- in 2013, we did a November sampling trip. And in both years we did a February sampling trip. The challenge for part of December and January is just the photo period and there's not a lot of productive time during the day to get out there and work.

We also like to get solid ice on the river before we get out there.

MR. PADULA: Thanks, Jerry. Any other comments for Jerry before we wrap today? Great. Thank you very much everyone for your really solid participation today. We almost stayed on schedule, so I really appreciate your help with that. For those coming back tomorrow, another 8:30 start.

Off record: 04:57:43