



SUSITNA-WATANA HYDRO

Agenda and Schedule Fish Passage Technical Workgroup Meeting February 22, 2013

LOCATION: MWH office Conference Room
806 SW Broadway, Suite 200
Portland, OR

TIME: 9:00 am – 2:00 pm AKST (10:00 am – 3:00 pm PST)

SUBJECT: Kick-off meeting to review study plan, set protocols, refine information needs, and review meeting schedules

ATENDEES: **Betsy McGregor** AEA, **Wayne Dyok** AEA, **MaryLouise Keefe** R2, **Dana Postlewait** R2, **Dan Turner** R2, **Dennis Dorratcague** MWH, **Kirby Gilbert** MWH, **Steve Padula** McMillen, **Leslie Jensen** ARRI, **Matt Love** Van Ness Feldman, **Marie Steele** OPMP, **Ed Meyer** NMFS, **Sue Walker** NMFS, **Jeff Davis** ARRI, **Graham Hill** NHC, , **Ed Zapel** NHC, **Bryan Carey** AEA

ON PHONE: **Brian Bjorkquist** State of Alaska, **Stormy Haught** ADF&G, **Kathryn Toews** McMillen, **Greg Auble** USGS

The purpose of today's meeting is to kick off the efforts of the fish passage TWG. The main goal is to achieve agreement on the work approach and to address the desired content of acceptable work products. Although presentations will be displayed, the intended approach for today's meeting is interactive with input desired from all attendees.

MaryLouise Keefe discussed the study goals of the Fish Passage Study as explained in the RSP Section 9.11.1. The primary goal is to develop a passage strategy to support the ILP. The secondary goal is to understand, from an engineering perspective, the feasibility of fish passage. Sue Walker asked for the original stated purpose of the proposed Susitna-Watana Project. Wayne Dyok noted that this is explained in the PAD and includes meeting Alaska's state energy demands, to achieve 50% renewable energy goal by 2025, and fulfilling AEA's obligations under Senate Bill 42. Sue Walker asked that the Project purpose be included in the Fish Passage Study. Wayne Dyok agreed to make these changes.

Ed Meyer asked about the protocol for meeting notes at the Fish Passage meetings. Steve Padula said that notes will be posted according to the Project's communication protocol, with a goal of within 2 weeks after the meeting.

The following engineers introduced themselves and provided a brief overview of their relative experience:

- Dennis Dorratcague (MWH) was involved in his first fish passage project in 1979. Most of his experience is in the Pacific Northwest and California.

- Dana Postlewait (R2) was involved in his first fish passage project in 1991. He has experience in the Pacific Northwest, Idaho, California, and Canada.
- Dan Turner (R2) is a civil engineer with about 20 years of fish passage experience, including many projects involved with FERC licensing.
- Ed Meyer (NMFS) is a civil engineer with specialization in hydrology. He has international experience and primarily works on relatively large hydro projects.
- Ed Zapple (NHC) worked on his first fish passage project in 1987. He has experience in California, the Pacific Northwest, the mid-West, and Canada.
- Graham Hill (NHC) has much experience in natural channel bypasses to about 80-90 feet in height.

Sue Walker asked how much of Dennis Dorratcague, Dana Postlewait and Dan Turner's experience is with new dams. Most, if not all, of their major work has been related to retrofitting to existing dam structures.

Sue Walker informed the attendees that NMFS had filed a study dispute with FERC on three studies, including fish passage, the previous day. She warned that changes in the fish passage study plan may be requested. Steve Padula acknowledged this and said any required changes would be addressed when necessary, but for now the TWG process must follow the current Revised Study Plan (RSP).

To ensure that everyone had a complete understanding of the study plan, Dana Postlewait reviewed the Fish Passage RSP study goals and tasks (available under the study plan tab on the Project website <http://www.susitna-watanahydro.org/study-plan/>). The intended work product of the TWG's efforts is information on passage alternatives that can be utilized when decisions are being made regarding the feasibility of fish passage. The process throughout the study will be documented so decisions and how they are made will be recorded.

Clarification was made regarding the third study goal in RSP Section 9.11.1. It was clarified that "retrofit" includes a fish passage structure that is either geographically or temporally independent of the dam design. A retrofitted passage facility may be constructed some distance upstream or downstream from the dam or later in the future after the construction of the dam, and thus is independent of the dam design process. Jeff Davis questioned the importance of the third goal in this study. MaryLouise Keefe explained that the three specified goals were created as result of a conversation with licensing participants in September 2012. Dennis Dorratcague explained that the retrofit option avoids constraints with having the only option of fish passage being part of the dam structure. The language in the study report will be elaborated on to further define the full intent of "retrofit". Sue Walker added that NMFS may reserve the request to require fish passage at a later date.

The Fish Passage TWG is considered a subgroup of the Fish and Aquatic TWG. For efficiency and practicality, the TWG will consist only of fish passage experts. They will develop information and present it to the larger workgroup. Sue Walker requested that meeting notifications include USFWS representatives so that the opportunity for their involvement is assured. The TWG Workshop #2 will be a "brainstorming session". This may include experts outside of the current participants. The attendees are asked to compile a list of experts that they would like to involve in the brainstorming session. The logistics of the brainstorming session are

currently uncertain because many people may be in Seattle/Portland and many may be in Alaska. The idea of using videoconferencing was mentioned, as well as holding multiple brainstorming sessions.

Dana Postlewait explained that fish passage structures are unique compared with other engineering structures. There are so many driving factors related to biology that it is not as simple as “does it work” or “does it not” (such as a bridge). The involvement of experienced experts is necessary to create an acceptable work product.

Dana Postlewait mentioned that 6-8 weeks between each workshop would be ideal. If they were scheduled too close together there would not be enough data finalized to present at each meeting. He said that materials will be posted 2 weeks before each meeting, and during those 2 weeks, more revisions may be made. A tentative schedule (Attachment A) was provided and confirmation of the dates was discussed. Steve Padula said that the closer dates needed to be finalized. The later dates can remain tentative and at later meetings they can be confirmed. Sue Walker noted that the proposed March 20 date is 2 days after comments are due to FERC on the 14 outstanding study plans, and commenters may not be prepared for the fish passage meeting.

Marie Steele suggested using a Gantt chart and creating a standing agenda item to update the chart at every meeting.

Other possible participants to include in the fish passage TWG were discussed. Sue Walker will contact EPA to confirm if it would like a representative present. Either Stormy Haught or Joe Klein will likely represent ADF&G. Sue Walker asked for clarification on FERC’s involvement in the Fish Passage TWG efforts. Wayne Dyok agreed to follow up with FERC.

One component of Task 2 of the RSP is a spreadsheet based biological performance tool. This tool will be used to identify pros and cons related to fish passage alternatives, allowing the team to narrow down the list of alternatives. It will also be used to identify data gaps. Many attendees, including Ed Meyer, have used the biological performance tool on other projects. An example of this tool will be distributed before the brainstorm session. Per Jeff Davis’ request, an example from other projects will be provided to allow for a better understanding of what to expect. MaryLouise Keefe explained that this tool can be created with data pulled from other projects. It identifies issues associated with alternatives from a biological perspective. Ed Meyers added that the spreadsheet can also be used to compare / rank one alternative to another qualitatively. The data compilation, also a part of Task 2 will be completed before site reconnaissance (TWG #4) so the participants can use the time in the field efficiently with an understanding of hydrological, ecological, and biological implications of various alternatives.

Dana explained that he will condense information for the workshops to avoid overloading attendees with details and risk running out of time to make decisions. Marie Steele would like all of the 1980s data to be provided to the TWG in order to allow members to confirm AEA’s approach based on 1980s data. MaryLouise Keefe said that the synthesis of 1980s fish data will be posted by March 1, 2013. Jeff Davis mentioned that he has performed a synthesis as well and asks that any assumptions and uncertainties related to the use of 1980s data be identified. MaryLouise Keefe said that when historic data are presented, uncertainties should be given so that everyone understands the limitations. Dennis added that these limitations are essential to understand when evaluating data used in the biological performance tool.

Sue Walker asked how biological data gaps will be addressed. Dennis mentioned that there are many other studies on the biological aspects of the area. The Fish Passage Study will identify needs and if there are gaps identified that will affect the fish passage feasibility analysis, more data will be collected.

A check-in TWG meeting will occur on March 20, 2013 as a 1-hour long teleconference. The purpose of this meeting is to have everyone understand the status of today's action items and for the TWG members to present any comments or questions. It was agreed that the fish passage team will digest any provided materials prior to the meeting.

MaryLouise Keefe presented a data request table, explaining the engineering and biological data needs, and said that it will be updated and distributed at least 2 weeks before Workshop #1 in April. The licensing participants can present their edits at the meeting.

Dennis discussed Task 3 of the RSP (site reconnaissance), which is currently scheduled to take place on June 19, 2013. Wayne Dyok asked if the videography provides enough detail and questioned the need for a site visit. The group felt that it would be useful because NHC and others have not been to the dam site. This will be a 2-day trip, 1 day on a helicopter tour and 1 day for debriefing. It was noted that restrictions are in place through August 15 for nesting eagles and other raptors and vegetation clearing is not allowed through July 15. Dennis mentioned that the participants need information and understanding of Task 2 and all interim consultation so they can apply this information in the field. Visiting the site and envisioning the application of alternatives are very helpful in supporting later decisions. Sue Walker mentioned the extensive logistics that need to be arranged before a site visit, such as refueling and landing locations. Wayne Dyok said that a logistics coordinator has been hired and will be starting with AEA soon to coordinate these efforts. The date for the site visit was pushed back into July 2013 in anticipation of better conditions along the river.

Dana explained Task 4 as the development of passage concepts. This consists of a 2-3 day interactive workshop beginning with a day of systematically going through ideas to create a list for further development. The second day would consist of a brainstorming session. Ed Meyer said that if outside resources are included in the brainstorming, half of the first day would be used getting everyone up-to-date with the study/Project status so they can suggest approaches. MaryLouise Keefe asked about the advantage of having a large meeting vs. a small meeting. Ed explained that larger groups provide more perspectives and experience. Sue Walker liked the idea of including outside resources and having a larger brainstorming session. Dan said that logistics need to be considered immediately if outside resources are being invited. The attendees need to be identified and location of the meeting needs to be confirmed. Because any new experts will not be fully informed about the Project, Wayne Dyok suggested having them attend (by phone if needed) at the informational workshop. AEA's Fish Passage Consultants will compile a list of prospective attendees and distribute it for the group's review. AEA will still need to determine if additional experts will be brought into the process.

Task 5 includes creating an evaluation matrix to establish and weight criteria. This is a result of the brainstorming session (Task 4). The matrix is a comparison tool used in evaluating options. Dennis presented an example of this matrix. Weights are assigned to each criterion as a group effort. Once alternatives are established based on these criteria, the participants apply "grades" and these are compared. Dana mentioned that there are generally several cycles of refining the matrix as more information becomes available and is discussed. Sue Walker asked if a narrative is provided to define the grades as well as to explain the disagreements and agreements. Dana confirmed that such a narrative is provided.

Dana presented a sample report and explained that all consultation is applied to and included in the report. He presented sample drawings of fish passage structures from multiple perspectives to express the level of detail to anticipate in the fish passage final work product. Alternatives are narrowed down while considering many aspects such as feasibility, risks, cost, and stability.

The chart listing the data needs for this fish passage study was discussed (**Attachment B**). MaryLouise Keefe explained that other resources will be engaged to complete the table and it will be distributed for comment. She continued by explaining each item and asking for feedback. Once the data needs are confirmed, AEA and its contractors will collect all data available and identify the data gaps. These gaps will influence plans for 2013 and 2014 studies.

Jeff Davis requested that, rather than providing a list of target migratory species at the dam site, AEA provide a list of all species and life stages in the Susitna River and indicate which ones were considered not to pass through the dam site (not part of the fish passage study) and rationale for not including them. MaryLouise Keefe agreed to provide this list. Sue Walker requested that all salmon species, except pink, be added to the target species list.

MaryLouise Keefe added that, for the species chosen, a periodicity chart will be provided. This chart will be based on life stage information, behavioral information, migratory/habitat information, abundance and distribution information both upstream and downstream of the dam site, known spawning and rearing habitat, and ecological conditions. Jeff Davis requested that discrepancies be provided when an inference is being made. MaryLouise Keefe agreed to do so.

Sue Walker asked how the predatory invasive species will be evaluated. Betsy McGregor explained that in addition to the stream surveys, ponds and lakes to be inundated will be sampled to determine fish species, such as lake trout, that need to be evaluated. Ed Zapel said we should be aware of changes in the trophic structure that may occur due to the likelihood of lake trout moving into the reservoir and decreased turbidity in the reservoir. Sue Walker mentioned the loss of salmon spawning habitat in the reservoir due to inundation. She noted the possibility of salmon moving upstream of the reservoir if spawning habitat is available. Sue Walker mentioned a FRED study in the 80s that may have useful habitat measures of the area.

Jeff Davis asked if effects on migration will be studied, such as ice on the reservoir and up tributaries. MaryLouise Keefe said that this might be an additional data need and inquired where these data could be collected. She said that today's focus is to see what data need to be collected. A placeholder was added for this reservoir ice topic. How to obtain such data will be discussed later. Steve Padula said that the data needs should be established first. Then, at the first workshop in April, the list will be narrowed to items relevant to the study and items identified for which data cannot be collected. MaryLouise Keefe requested that additional items be provided ASAP. If additional items are provided via email, Betsy McGregor, Wayne Dyok and Sue Walker need to be Cced. Jeff Davis requested that information on the distribution of spawning and rearing habitats after inundation be added to the list. Clarification will be added to the "floating debris" item.

PROTOCOL

Protocols, as discussed in the PAD, will be applied to fish passage, unless the participants agree on fish-passage-specific protocol.

A meeting notice will be posted at <http://www.susitna-watanahydro.org> 30 days prior to the meeting date. MaryLouise Keefe explained that the goal is to provide meeting dates as soon as possible to allow for accommodations to be made. Sue Walker added that the lack of State-approved overtime should be considered.

Meeting materials will be posted 2 weeks prior to the meeting date.

Draft meeting notes will be posted 2 weeks after the meeting has taken place. They are considered “draft” for 2 weeks and participants may provide edits within that time. A standing agenda item will be included for each fish passage meeting to discuss any concerns with the notes from the previous meeting. Sue Walker voiced concern about the level of detail in the meeting notes. Attendees agreed that future meeting notes should include decisions made, “parking lot” items, and action items. Wayne Dyok mentioned that if someone wants to ensure that something is included in the notes, they should request that the item be captured in the notes.

Sue Walker requested that a neutral facilitator be present for each meeting. Wayne Dyok asked if there were any concerns about having Steve Padula as the facilitator. There were no objections, although it was noted that a request could be made in the future to change the facilitator. Throughout the meetings, the facilitator will write all action items, “parking lot” items, and decisions on an easel to ensure a full understanding of these items.

MaryLouise Keefe asked where the future fish passage meetings will be held. Betsy McGregor mentioned that AEA prefers that as many meetings as possible be held in Alaska. Wayne Dyok and Betsy McGregor will speak with Sara Fisher-Goad regarding acceptable locations for the fish passage workshops and TWG meetings. Seattle or Oregon would be preferred by most attendees because they are located in those areas. It was mentioned that conference centers located at the airports may be a possibility. Betsy McGregor also proposed rotating the meeting location.

Confirmed representatives to be part of the fish passage technical team include: Ed Meyer (NMFS), Graham Hill (NHC), Ed Zapel (NHC), Jeff Davis (ARRI), Dana Postlewait (R2), Dan Turner (R2), Dennis Dorrattcague (MWH), Tim Sullivan (R2), MaryLouise Keefe (R2), Betsy McGregor (AEA), and Bryan Carey (AEA). Attendees need to be confirmed. The outstanding confirmations include whether Stormy Haught or Joe Klein will represent ADF&G (Stormy Haught will find out), and if there will be a USFWS staff representative (Sue Walker will find out). Will EPA contribute a staff representative (Sue Walker will find out)?

Betsy McGregor requested that all fish passage email communications between contractor groups CC her. Ed Meyer and Sue Walker should be CCed as well.

MaryLouise Keefe asked if anyone has a conflict with the workshop scheduled on April 9 and 10. Steve Padula will be unable to attend as facilitator for this session. MaryLouise Keefe will confirm with Michael Barclay so he can present video taken on the Upper River. The ice study had also taken video in 2012. This will be available on AEA’s website before the April 9 and 10 meeting. A 10:00 a.m. time was agreed upon for the March 20 meeting. Wednesdays at 10:00 a.m. was established as the default day and time for all fish passage meetings. Also, at all meetings, WebEx will be available.

The May 22 TWG meeting (#3) was rescheduled to take place on May 21 starting at 10:00 a.m.

The June 19 meeting was rescheduled to a date during the week of July 8 (TBD).

The July 23 Workshop (#2) meeting was rescheduled for 2 days during the week of August 19. This is the brainstorming session with possible additional attendees from outside organizations. Once their availability is known, a date will be chosen.

MaryLouise Keefe will provide a Gantt chart of meeting dates at the April meeting, and attendees can provide feedback.

Marie Steele mentioned that the multiple layers on DNR's GIS files are not available. Betsy McGregor went online to view the available data. She mentioned that only final data are presented so people can expect to see data after QA/QC review has taken place. Betsy McGregor added that DNR staff members are in transition and this may be cause for delay in data posting.

Action Item	Date	Responsibility
Identify Strategy Statement (e.g., Senate Bill; PAD)	3/8/13	AEA
Clarify meaning of "retrofit" with space/time components	3/8/13	R2
Propose meeting and workshop locations	3/8/13	AEA
Data needs table: Input from TWG on list of items	3/8/13	All participants
Add changes in spawning and rearing habitat in proposed inundation zone to data needs table	3/8/13	R2
Include discrepancies in data to information table	3/8/13	R2
Produce/distribute communications protocol from PAD (cc: Betsy, Ed, Sue)	3/8/13	McMillen
Standing agenda item for agendas – review and approve previous meeting notes and future meeting schedule	NA	NA
Meeting protocol – summarize action items, decisions, parking lot items	NA	NA
Follow-up with others re: future participation in TWG; FERC (AEA), EPA (Sue W.), NGOs (AEA), ADF&G (AEA), FWS (Sue W.), ADNR (Marie S.), Jan Konigsberg (AEA)	3/20/13	AEA, Sue Walker, Marie Steele
Identify other fish passage at high head dam experts	3/20/13	MWH, R2, Ed Meyer
Issue updated meeting and workshop calendar (Gantt chart)	3/20/13	R2
Provide a list of all Susitna River species and life stages. Provide rationale of species not considered to travel to dam site	XXX	R2
Distribute updated table and data synthesis to TWG	3/26/13	R2
Issue sample biological tool spreadsheet and description of tool	3/26/13	R2
Presentation of videography at first workshop	4/9/13	AEA

ATTACHMENT A

RSP 9.11 – Fish Passage Meeting and Workshop Summary

(Prepared for TWG Meeting #1 held on 2/22/2013)

February 22, 2013 – Fish Passage TWG Mtg #1 (Portland, OR)

Purpose:

- Kick-off meeting to review study plan, set protocols, refine information needs, and review meeting schedules.

Agenda Items:

- Facilitate TWG member introductions and general kick-off
- Review goals for feasibility assessment
- Review RSP plan, deliverables, and schedule
- Provide more detail and refine feasibility process to be used
- Review and confirm TWG protocols
- Review and Confirm WORKSHOP and Meeting schedule
- Define additional, and obtain input on information needs
- Define action items

March 20, 2013 – Fish Passage TWG Meeting #2 (Web call)

- This is a placeholder for now, meeting only if needed

Purpose:

- Regularly scheduled interim check-in meeting for TWG, Tentative at this point in time to address any issues that may arise following Mtg #1.

Tentative Agenda Items:

- Review action items from Meeting #1.
- Discuss general progress
- Identify any additional data needs
- Review agenda for WORKSHOP #1

April 9-10, 2013 – Fish Passage TWG 2-DAY Workshop #1 – Review Background Information (Location TBD, Anchorage tentative)

Purpose:

- Review background project information

Agenda Items:

- Review of dam design and project operational concepts
- Review hydrologic conditions

- Review of physical conditions and site specific information
- Review of existing biological information and goals

May 22, 2013 – Fish Passage TWG Meeting #3 – Regular Check-in (web call)

Purpose:

- Regularly scheduled interim check-in meeting for TWG

Agenda Items:

- Review action items from WORKSHOP #1.
- Review information needs.
- Discuss preparation for Site Reconnaissance planned for Meeting #4
- Discuss upcoming Brainstorming WORKSHOP #2

June 19, 2013 – Fish Passage TWG Meeting #4 – Site Reconnaissance (AEA Offices and Site Tour)

Purpose:

- TWG to tour site

Agenda Items:

- Logistics and safety protocols
- Site tour
- Debrief
- Prepare for upcoming Brainstorming WORKSHOP #2

July 23 – 24, 2013 (2 days) – Fish Passage TWG WORKSHOP #2 – Brainstorm Alternatives, Task 4 (location TBD)

Purpose:

- Conceptual Alternatives Brainstorming

Agenda Items:

- Review background information, address any questions
- Review evaluation criteria
- Review evaluation process
- Brainstorm concepts, and record ideas
- Review Biological Performance Tool
- Assign action items for concept development

September 19, 2013 – Fish Passage TWG Meetings #5

Purpose:

- Regular check-in

Agenda Items:

- Review Workshop #2 Action Items
- Discuss general progress
- Identify any additional data needs

November 15, 2013 – Fish Passage TWG Meetings #6

Purpose:

- Regular check-in

Agenda Items:

- Review Action Items from last call
- Discuss general progress
- Identify any additional data needs
- Discuss agenda and prepare for upcoming WORKSHOP #3

January 14-15, 2014 – Fish Passage TWG WORKSHOP #3 – Critique and Refine Alternatives, Task 4 (location TBD)

Purpose:

- Critique and refinement of concepts
- Package concepts into fish passage alternatives

Agenda Items:

- Review updated alternatives.
- Review Biological performance tool.
- Prepare for next steps

March 19, 2014 – Fish Passage TWG Meetings #7

Purpose:

- Regular check-in

Agenda Items:

- Review Action Items from last meeting
- Review draft report
- Review alternatives and Pugh Matrix
- Discuss next steps

May 15, 2014 – Fish Passage TWG Meetings #8

Purpose:

- Regular check-in

Agenda Items:

- Review Action Items from last call
- Discuss general progress
- Discuss agenda and prepare for upcoming WORKSHOP #3

July 11, 2014 – Fish Passage TWG WORKSHOP #4 – Final Alternatives Selection, Task 5 (location TBD)

Purpose:

- Alternatives selection for final refinement.

Agenda Items:

- Review updated alternatives
- Review evaluation matrix
- Review biological performance tool results
- Select final list of alternatives
- Critique alternatives for final refinement and cost estimating assumptions

Meetings #9, #10 and #11 (confirm schedule and location)

- Purpose and Agenda items TBD
- Tentative dates are:
 - September 8, 2014
 - November 4, 2014
 - December 31, 2014

April 13, 2015 – Fish Passage TWG Meetings #12

Purpose:

- Review final report

Agenda Items:

- TBD

- **Susitna-Watana Hydroelectric Project**
 - **Fish Passage Study**
 - **Information Needs**
 - **Rev #1: March 7, 2013**

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- In meetings on September 24 and 25, 2012, Fisheries agencies and AEA agreed to an approach to the fish passage study and the general outline of data required for the study. After this meeting a list of information needed for the fish passage study was developed, reviewed by NMFS and issued to AEA on October 3, 2012. The Revised Study Plan (RSP) for fish passage was issued by AEA in December, 2012 as “RSP 9.11 Study of Fish Passage Feasibility at Watana Dam”. This study plan listed data requirements from this table.
- On February 22, 2013 the kickoff meeting for the fish passage study was held in Portland. In this meeting a schedule of milestones and meetings were set for the first six months of the study. The next meeting will be Workshop No. 1 on April 9 and 10, 2013, which is intended to provide background information on the project for the fish passage study team. The first draft of information to be presented at this meeting is to be sent to the participants two weeks before the meeting, on March 26. Given the amount of information necessary for this study, we plan on ongoing development and updates to this information as the study progresses, with the goal of providing a thorough coverage of all subject matters prior to the Site Tour scheduled as Meeting #4 during the week of July 8.
- The list of information in the tables below is based on the previous list of data needs noted above, the NMFS letter dated March 2012 commenting on Scoping Document 1, the material listed in RSP 9.11, and input from the fish passage study consulting team. Additional information and guidance will be obtained from NMFS, Northwest Region, “Anadromous Salmonid Passage Facility Design”, July 2011 and other accepted fish passage design books and papers.
- Please provide the data and information listed in the table below to Dennis Dorratcague by March 26. In the “Item” column is a list of data, needed in order to develop fish passage design concepts. Please attach the information and give it an Appendix number. The “Data” column will contain the data or the appendix reference where the data can be found. Much of the requested information is still being developed or augmented. We are asking that the latest information be supplied and that you use the “Comments” column to describe its limitations and whether additional information will be developed in the next two

years. This table and the appendices will form the information packet used by the fish passage Technical Work Group (TWG) to supplement the Site Reconnaissance trip, and in the brainstorming session and development of fish passage alternatives.

Table 1 – Biological Data Needs

No.	Item	Data	Comments
B1	Target fish species for passage		
B2	List of other species in the system that may be accessible to any passage facilities		
B3	Life stage specific periodicity,		
B4	Migratory characteristics - routes, seasonal timing & duration by species & life stages		
B5	Estimated numbers & sizes of fish for upstream and downstream migrants		
B6	Life stage specific parameters – size, migratory behavior, swimming behavior & speed, other physical passage constraints		
B7	Fish relative abundance upstream and downstream of project including tributaries		
B8	Locations of spawning and rearing habitats		
B9	Predators – species, abundance, location		
B10	Existing ecological conditions – invasive species, light, temperature, flows		

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Table 2. Physical, Hydrologic and Engineering Information

No.	Item	Data	Comments
P1	Water quality & water temperature under existing conditions, main stem &B tributaries		
P2	Water quality & water temperature above & below proposed dam		
P3	Tailwater Rating curves at dam and expected trap location		Forebay rating information is in Item No P5 below
P4	Flow duration by month, through turbines, spillways, other outlets		From operations modeling
P5	Reservoir elevation duration curves by month		From operations modeling
P6	Other project operations data (rule curve, expected operating restrictions)		
P7	Ice cover on river and tributaries in project area before project		
P8	Ice cover on reservoir and in river below dam		
P9	Water temperatures during upstream migration period		
P10	Water temperatures during downstream migration period		
P11	Air temperature information by month (max, min, average)		
P12	Sediment information (transport rates, sediment gradation, sediment sources & their location)		

Table 2. Physical, Hydrologic and Engineering Information

No.	Item	Data	Comments
P13	River morphology trends after project operation		
P14	Topographic mapping of the project site and along river downstream		Fish passage will be sketched on these sheets
P15	Current dam layout drawings, plans, elevations, and cross sections (include details of outlet works and spillways)		Fish passage will be sketched on these sheets. Prefer simplified, scale drawings with a plan, section, and elevation suitable for brainstorm sketching in 11x17 format. Any 3D drawings showing general arrangement would also be helpful.
P16	Makeup of project components – turbines (number & type), outlet valves & gates		
P17	Projected operation of project turbines, gates, & valves		
P18	Site access or restrictions to access for operation and maintenance. Include entire project area at dam, along reservoir, and into tributaries (i.e., existing or planned access roads)		
P19	Electrical power availability		
P20	Amounts and types of debris expected in the reservoir		
P21	Amounts and types of debris expected below the dam		
P22	Location downstream of any barrier and trap & haul locations		
P23	Other data which you feel are important to fish passage		