CENWP-PM-E 14 October 2015

MEMORANDUM FOR THE RECORD

Subject: DRAFT meeting summary and meeting minutes for the 14 October 2015 Willamette Valley Project Downstream Fish Passage RM&E meeting.

The meeting was held at the Missouri River Room Corps NW Division Office, Portland OR. In attendance:

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1. **Introductions and Meeting Purpose** 
   1. Evaluate the current state of knowledge in the Willamette Valley supporting design of downstream fish passage improvements, determine what we still need to know, and discuss study approaches and designs for critical outstanding data needs.
2. **General summary of data needs to support design of downstream fish passage solutions, based on the October 14, 2015 workshop discussions and in-meeting survey. See meeting minutes for further details in support of the information in this summary table.**

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| --- | --- | --- |
| **DATA CATEGORY** | **ADEQUATE? (y/n)** | **COMMENTS** |
| Reservoir entry timing | Y |  |
| Abundance entering reservoir | Y |  |
| Reservoir survival, < 90mm | N | Need to assess at LOP; may not be necessary at other sites. |
| Reservoir survival, > 90mm | Y |  |
| Forebay entry timing, < 60mm | N | Important for determining size of trap & haul facilities during design phase. Lifecycle models could help estimate. |
| Forebay entry timing, > 60mm |
| Forebay abundance |
| Horizontal and vertical forebay distribution | N | Need for LOP.; have for CGR & DET |
| Movement patterns of fish in reservoir | N | Need for FOS; Need for LOP if pursue at-dam passage |
| Survival through existing dam routes | Y | May need if new operational fish passage planned as a long-term solution |
| Hydraulic setting on fish performance | N | Need at CGR and DET. Need at LOP if at-dam passage pursued. |
| Debris loading at fish facilities | N | Need where surface collection facilities planned |
| Effects of operations on passage timing | Y | However, may need if new operational fish passage planned as long-term solution |
| Effects of operations on passage success |
| Contribution of different life history types to adult Chinook recruitment | N | Highest priority at LOP, to inform decisions on at-dam or head-of-reservoir bypass |
| Delayed mortality following passage of WVP dams via operations | N | Need where operational fish passage planned as a long-term solution |
| Cohort replacement rate | Y | Adequate for supporting design of fish passage solutions |
| Effective population size |

**MINUTES:**

1. **Summary of State of Knowledge** 
   1. Piaskowski said there are several project specific teams working on downstream passage improvements, including Cougar, Detroit, and at Foster. The RM&E program has collected significant data since 2008. Now we need to check in and ask what are the critical questions that need to be addressed to help us move toward design and implementation of each downstream passage project.
2. **Critical Uncertainties** 
   1. Piaskowski said the table (hand out) is a list of categories summarizing the available information as adequate or inadequate. The green spaces are what we believe, from Corps perspective, to have adequate available information. White is indicated by having inadequate information available. Skalski asked are these capturing the critical questions for the Willamette Valley, are there some that need to be added or removed? Skalski said we are not looking for a consensus, but we need to confirm the important issues. Graham-Hudson asked if there is a time component associated with these critical questions, is it critical before we implement a passage structure.Graham-Hudson said some of these are critical to know in the long term, but may not be critical prior to taking action. Piaskowski said Corps looking for input today on short term needs to support design of fish passage improvements, but it would be good to identify long term needs if they come up.
      1. **Reservoir entry timing - ADEQUATE.** Yes, there is agreement among the group.
      2. **Abundance entering reservoir - ADEQUATE.** Yes, there is agreement among the group.
      3. **Reservoir survival, <90mm – INADEQUATE (especially LOP).** Inadequate information available. Unable to tag fish smaller than 90mm. Burchfield asked do you really have to have a number for reservoir mortality if you know how many fish are coming into the head of the reservoir. Burchfield said if you know how many fish are in the forebay and there are JSATs studies, you may not need to know that number in order to design a fish passage facility. Burchfield said, at Cougar, we don’t think the reservoir is killing a ton of fish, so do we need to get an actual number in order to make decisions. Griffith asked if a qualitative estimate is sufficient. Burchfield said yes, in some cases. Piaskowski said Lookout might be the one case where we have considered it to be important because of the potential for low survival. What about Detroit? Piaskowski said there it is unclear, the pedigree results indicate the population has replaced itself, or at least there are early indications showing it. Skalski said is it important but also how qualitative or quantitative is the information? Lookout needs further discussion, Cougar is good.
      4. **Reservoir survival >90mm - ADEQUATE.** The table is marked as having a fair amount of information. We have not studied Lookout, but we have at Fall Creek. Burchfield said these studies were designed to look at behavior, not survival. However telemetry studies have provided survival information for Fall Cr, Cougar, and Detroit (and for Foster in FY 15 and FY16).
      5. **Forebay entry timing (<60mm and >60mm) and Forebay abundance – INADEQUATE (where trap and haul planned)**. Yes, there is a fair amount of information. Graves said there are interactions with operations and the overall passage. Graves asked if the telemetry studies show reservoir survival rates for the entry to the Forebay, how come we don’t have timing to the forebay? Taylor said to flip flop green blocks, it seems like we have more information on larger fish than smaller. Piaskowski said he laid this out in regards to Monzyk’s work for near shore timing for fry, and the understanding of baseline conditions of when they arrive in the forebay. When the fish move off-shore in June as parr, we don’t have as much information for greater than 60mm. There is information for greater than 90mm fish. Burchfield suggested adding a row for greater than 90mm fish. Griffith said we typically see a lull in July, August and early September for the entry timing of fish that are greater than 60mm, are these fish at a depth where they can pass. Burchfield said I thought the purpose of having this forebay entry timing was to help define if you were to build a structure or facility, when would you be operating it? Burchfield said it would need to be operating in the spring based on what we have seen at most projects. Burchfield said the rationale would be to have a facility that will operate during the spring and fall water levels. Griffith said we have information for Cougar and Foster, Fall Creek is unique, and I’m not sure about Lookout and Detroit. Hudson said we need to be able to provide the flexibility to change the timing of passage and adjust to different operations. Hudson said the three main questions that need to be answered in order to build a structure are when do the fish enter the reservoir, when do fish enter the forebay, and where are the fish in the forebay. Taylor said with a larger scale facility, it may need to be adjusted and keep adjusting to make it work. Graves said the survival of the different groups is the absolute critical path in where you put the structure. Griffith said when you have peaks and abundance of fish ready to pass and we need to make sure we have our systems set up to perform at the peak times so it becomes more about the design. Piaskowski said if we understood timing and abundance, we would be able to design a facility correctly. Skalski said these are important questions and will stay on the list. Skalski said if you know what enters the reservoir and you know the survival through the reservoir, theoretically you will know what the survival of the forebay is.
      6. **Horizontal and vertical Forebay Distribution and Individual movement patterns - INADEQUATE.** Skalski said if we got the fish to the forebay, now how do we collect them. Most projects have large reservoirs and a “stagnant” forebay. Behavior data is available for >90mm Chinook and steelhead in Detroit, Foster, and Cougar. Behavior data has not been collected for Chinook in Lookout Point forebay. There is limited information on how fish would respond to new operations or surface flow outlets at any project. After group discussion, Skalski said there is consensus to keep these categories. Ruff said if you change the operation it will alter the vertical and horizontal fish distribution.
      7. **Survival and Efficiency through existing dam routes – ADEQUATE (unless new ops planned).** Yes, it was important, but now we have survival through Detroit, Cougar and Foster for Chinook, but not steelhead. We also have some information on efficiency of >90mm Chinook through Cougar, Detroit and Foster. This is referring to concrete survival for fish that are greater than 90mm. Griffith said we need to understand concrete survival and passage efficiency of the routes. If they are unscreened and operating, what portion of the run is going to go through? Griffith said this will give us the idea of how it will affect overall project survival. Griffith said a great example is Cougar, in the design, the facility operates down to the existing temperature weir slots and when the pool drops we pass fish through existing routes. The other alternative at Cougar is a screened structure where 100% of the flow, within a certain range, will be screened. This is much more expensive but it lowers the risk for having fish go through routes of lower survival. Burchfield said we may be using existing routes for some of the year to get fish out, so it is important to know if we want to use them, what kind of survival will we see. Skalski asked if dam passage survival is high, do you care what route they are going through. Burchfield said no. We need to know which routes are priority.If operational passage will be used, more data is needed on survival and passage efficiency.
      8. **Hydraulic setting and Debris loading – INADEQUATE (for CGR and DET).** Yes, there is inadequate information available. Griffith said hydraulic setting needs discussion and it is the most important at high head facilities. In particular Cougar and Detroit, and at LOP if at-dam downstream passage pursued there. Griffith specifically said we still have work to do at Cougar for understanding fish behavior and interactions with the hydraulics.
      9. **Effects of operations on passage timing and Effects of operations on passage success – INADEQUATE (for new ops).** Skalski said these are associated with passage survival and passage efficiency at the dams. Griffith asked what would make these green, I thought we had information for these already. Piaskowski said it is complicated; it depends on what you envision the solution to be (structural or operational). Khan said we are collecting data at Foster on the operations. Beeman said, for many of these categories it depends on the size of the fish due to the tagging technology. Griffith asked are we green on Fall Creek, we have a good understanding of the current passage operation. Burchfield said we have good information on the Fall Creek operation, but we don’t know what will happen if you hold the reservoir low through the spring and summer. Burchfield said it is similar to Detroit, but we don’t know what will happen if we modify reservoir refill. Burchfield said we have been assuming that if you build something that works within the current operational structure that will be the least impactful on the resources that the Corps and BPA have to manage, so we were willing to do this if we can get fish to pass the dam without high mortality. Skalski clarified these are important to know for the current operational plan, but this isn’t adequate, you need to be able to adjust when flows change. Burchfield said if we can get good fish passage using the current operations that work best for recreation (and other missions), then we are good. Burchfield said, if you can’t get fish passage under the existing operations then you start looking at it more closely. Burchfield said the reason why we are doing the drawdown at Fall Creek is because there isn’t any hydro so it’s easier to do that operation. Need to know behavior, so that we can get fish to move. Graham-Hudson said once you know what your flexibility will be with operation and accommodations with a structure, it will come after. We have a good handle on how fish are behaving now, so designing to current operations seems adequate for now. Graham-Hudson said in the future if we do not see a response we expect, there may need to be additional operations that are implemented in accommodation with that structure. Skalski said it is a two stage process, if current operations work you don’t need to go any further, but, if conditions are not acceptable, you need to look at alternatives to improve passage. Skalski said, these are important and stay on list. Piaskowski clarified we do not have a good understanding of the effects of operations on fish passage at Lookout; Cougar we have a fair understanding; at Foster, we need additional data on spillway operational effects and we are currently collecting data. Piaskowski said at Detroit there may be power peaking effects that we currently do not understand, the concept is a surface collector under existing conditions. At Fall Creek we are moving forward (i.e. we have adequate information for the existing operation). Burchfield has been asking to do survival studies through the Fall Creek reservoir, without changing operations.
      10. **Contribution of different life history types to adult Chinook recruitment – INADEQUATE (for LOP).** Burchfield said although it is an interesting thing to know, but in terms of design and constructing downstream passage, if you can design something that will pass all life stages, you will be able to maintain the diversity. Ruff said the important thing is to maintain the different life histories in the Willamette, as opposed to the Columbia where we have not done a very good job. Piaskowski said some life histories are more successful than others, at Lookout for example, should we pass fish at the head of reservoir or should we let fish rear through the reservoir. When you look at this problem, you will be passing fry downstream to a degraded system (if fish are passed from head-of-reservoir). Piaskowski said the worst case will be we don’t have much recruitment and we would be favoring specific life histories. Piaskowski said should there be consideration in balancing adult recruitment with diversity. Looking at the conservation literature and the recovery plan criteria, the abundance is more important than diversity. Graham-Hudson said you need the diversity to get the recovery. Piaskowski said Fall Creek suggests if fish go out large from the reservoir you will have more recruitment, if fish go out as young fry we don’t know what you will get. Piaskowski said the literature suggests if young fry enter the estuary early, their survival trajectory is lower. Skalski said the point is we want to maintain diversity and we need to find out which age class is the greater contributor to returns, so that we can make sure our mitigations are benefitting those age classes. Griffith asked how do you measure success at how you are maintaining diversity if you don’t know what it is and do we have adequate information for it? Graham-Hudson said I think we do have good information on the diversity of life history stages and down through the system. Hudson said the measure of success is on the back end, because you have the ability to evaluate all the life histories. Griffith asked what do you compare it to. Piaskowski said if we have a surface collector at Cougar and Detroit we could adaptively manage them once they are in place to ensure passage of a variety of sizes. Piaskowski said the problem for Corps at Lookout is that we wouldn’t want to invest without some sense that passing fry downstream would result in a self sustaining population. Burchfield agreed if we are seriously thinking about a head of reservoir collector. Burchfield said we have discussed developing a study to collect the fry passing downstream to see if they are contributing as well. Skalski asked are we interested in monitoring life history diversity or are we trying to figure out the relative contributions of the different age classes to the returns. Piaskowski said for the design of facilities we know it is less important for surface collection and can operate for diversity later. Piaskowski said the most important is at Lookout to make a decision for head of reservoir. Hudson said we do know there is life history diversity and Lookout is not a research need but rather a conversation we need to have to better preserve life history diversity and implement downstream passage. Burchfield asked whey is not a research need? Hudson said it is a design issue, if you have a head of reservoir collector then if you don’t move everything downstream then perhaps you put fry into the reservoir and possibly a secondary collection method. Hudson said the idea is we have to address survival a different way and still have passage at the dam. Burchfield said it makes sense to study it prior to making a decision to implement a head of reservoir collector. Hudson said this is a contribution to life histories not the reservoir survival. Griffith said you need to know at Lookout if life history is vital if you aren’t going to do head of reservoir collection and the same could be said about fry. Hudson asked are you talking about head of reservoir survival. Griffith said it is a combination because if you have lower fry survival and migrants are more successful, what is the adult abundance. Burchfield said we are not ready to build a head of reservoir collector because we don’t have the supporting data. Burchfield said it may be better to leave the fish in the reservoir and have good passage out of the reservoir. Griffith said we don’t understand where the hit is; it is somewhere between the head of reservoir and the tailrace of Dexter. Burchfield said the categories previously discussed will help answer this question and we don’t need to study the percent of fry survival, subyearling, yearling and back to adulthood. Burchfield said it is necessary to know if survival is better at Lookout Point if you do head of reservoir collection for fry or better survival of the fish that go through the reservoir. Gray suggested adding a tier level to the categories so we don’t get locked into a specific project or location.
          1. **What is the availability and quality of mainstem habitat, flood plain connectivity, sloughs and upstream rearing**? The question is do you want to pass fry if the habitat is not there? Jundt said we can’t forget about life history strategy of disbursement. Graves asked are you trying define what you think it will look like after you have a successful structure or are you trying to assess the baseline? Graham-Hudson said currently the baseline is influenced by the dam. Graves asked do you know what you’re getting now. Burchfield said yes, we do know what is getting passed the dams now, it is mainly the larger fish when the reservoir is at a lower level. Burchfield said the intention of having this category is to inform what kind of a structure to build and where it would be. Burchfield said it is difficult to study because the baseline doesn’t resemble what the natural system would look like.
      11. **Delayed mortality following passage of WVP dams via operations – INADEQUATE (for sites using operational passage).** Graham-Hudson said we need to know the structure that is built and its effect. Jundt said this is relevant at Detroit for a direct release versus trap and haul or a bypass release pipe. Skalski said yes, this is important. Graham-Hudson said do we need to know delayed mortality under current operations or do we need to answer for the alternative. Burchfield said yes if you are planning to use the project operation as a solution for fish passage. Burchfield said we need to know the long-term effects of passage efficiency. Jundt asked don’t we want to know what the combined effects are from one project to the next. Burchfield said you don’t need to know until after facility has been built. Piaskowski said where the solution becomes structural trap and haul, delayed mortality may be less important. Piaskowski said looking at the spill operations at Foster could be important. Griffith said conveyance has not been designed at Cougar. Piaskowski asked do we need to measure at Fall Creek (where we will be continuing to pass fish via operations). Unclear if need to know delayed mortality of new trap and haul facilities. Skalski said we will keep this category. Where new facilities are planned, studies of delayed mortality under existing conditions may not be needed.
      12. **Cohort replacement rate and Effective population size – ADEQUATE (for supporting designs).** Burchfield said do they need to be known prior to making a decision. To evaluate success, it would be after. Hudson said it could be valuable information to know before, but it is not necessary to have to implement fish passage solutions. Hudson said you should recognize that you may want a baseline so you can evaluate how effective downstream fish passage is and implement it. Hudson said if it is not there it doesn’t define the success or failure of passage. Skalski said in terms of near and intermediate goals it isn’t as critical, but in terms of the overall health of the system it might be in the future. Hudson said in terms of implementation it is not critical. Graves said, conceptually, if you can’t put it all together and have replacement, then it’s a signal it will not work. Graham-Hudson said it seems like it is a good measure to track over time, but I would want my success to be monitored on project survival, not replacement rate. Burchfield said we have done modeling, but we don’t know exactly what kind of dam passage efficiency we will get until you build it. Piaskowski said we can look at genetic pedigree analysis to show replacement. Skalski asked do we want to keep these categories on for near term or should we take them off? Griffith said these help answer broader questions that are important in the system that are not necessarily related to downstream passage. Griffith said yes these categories are important for downstream passage and the genetic results show the importance. Skalski said for near term it is unlikely we need these categories, but we need to keep them for long term. Burchfield wanted to provide clarification, assume the other categories may entail juvenile to adult methods. Griffith said it would be a metric you would get as ancillary studies, similar to the genetic pedigree studies at Cougar or the paired release studies.
   2. **Are there any critical questions that we have not listed?** 
      1. **Taylor has questions for the Rearing capacity in the reservoir.** This blends with reservoir survival. Piaskowski said NOAA Northwest Fisheries Sc. Center is currently updating estimates of reservoir capacities for juvenile salmonids in the Willamette.
      2. **Operational Synergistic effects.** Flow, temperature, juvenile, and adult are all important components. Need to consider the small, fragile Chinook population sizes at Foster and Fall Creek.
      3. **Downstream habitat quality.** In particular Lookout
3. **Overview of Relevant Study Designs.** See slides of presentation given by John Skalski (sent to meeting attendees 10/15/15 by Piaskowski).
4. **Summary of In-Meeting Survey of Research Priorities Supporting Downstream Fish Passage Designs. Out of** 24 people attending the meeting, 18 people participated in the survey. For example, the far right column for Detroit, N/A of 11% means that 11% of the respondents chose not to vote. Of the remaining people that did vote, 50% thought it was critical and 50% thought it was not critical. Not all three columns will add up to 100%, but the first two columns do. The darker the red cell, the higher the percentage, the lighter red indicates around 50%, and the greener cells indicate lower priority. **Action:** Piaskowski emailed the excel spreadsheet with results from the in-meeting survey to meeting attendees on 10/15/15).
   1. **Detroit**. Detroit forebay abundance and hydraulic setting are given high scores. The two highest critical needs are forebay abundance and hydraulic setting on fish performance. Contribution of life histories is 56% and survival of small fish in the reservoir. Skalski asked are you surprised by these categories. Graham-Hudson said the hydraulic setting makes sense, but the forebay abundance is surprising. Piaskowski is not surprised by these categories, it is important to know the forebay abundance if we are going to trap and haul and hydraulic information will also help design a facility. Hudson said I do not understand the need to know abundance for trap and haul, because what you are seeing now is going to likely be very different once you have a passage facility. Hudson said doing a study to estimate abundance in the forebay is one approach but there may be a better approach in terms of what the recovery goal is and what potentially can you see in terms of production. Graves asked is the survival through the reservoir a surmountable challenge and how do you get them out of the reservoir forebay? Hudson said yes, it could. Burchfield said there is consensus for the need of a collector at the dam, but the question is do you have to do forebay abundance, there is a definite need for hydraulic studies and how do you locate the facility so it attracts fish. Burchfield said if we do need to get the forebay abundance could we estimate it. Graves said if you need to size the facility on the back end, how many fish can you hold and store, it could be a paper calculation and not a study. Skalski said are there surprises in terms of any categories not listed higher. Piaskowski said peaking operations could be an influence on the design of the facility. Burchfield said the difficulty at Detroit is knowing where to locate a facility and how to get the hydraulics so it will attract fish, but we won’t know until you build it. There are CFD models but not physical.
      1. Gray pointed out that the most tallies in any one box scored a 12, and it shows that we don’t agree what needs to be done. Gray said the critical versus not critical are often lighter in color, the critical versus not critical is 40-60, the bigger problem is to be able to agree with what needs to happen with fish passage facilities and then have someone like Skalski to tell us the best way to get that information. Burchfield said in trying to simplify detailed study concepts into something simple, I’m not surprised to see there is disagreement within the group. Skalski said the hope is to identify a few important categories and then how can we get there.
   2. **Foster:** The highest ranking category ismovement patterns in the reservoir at 75%, followed by 69% of effects of operations on passage success. Khan said we are currently collecting data on the effects of operations on passage success. Skalski said these ring true with the group. Khan said yes, we are currently testing, but there is a data need for movement patterns in the reservoir and the effects of operation. Graham-Hudson said it is surprising to see forebay abundance listed high at 67%. Khan said it is surprising to see forebay abundance because this is volitional passage.Monzyk said it looks like forebay abundance was ranked high at all projects except Cougar.Skalski said there are a few really red critical and some really red non-critical categories, like debris loading at Foster was voted 90% critical, is this a surprise. Burchfield said it is not critical to design a study to analyze debris loading, if debris loading is a problem then we will figure out a way to get the debris out of the reservoir. Piaskowski said he didn’t think of it as, is it critical to design a study, but instead is it a critical information need in order to design fish passage solutions – yes.
   3. **Cougar:** Forebay abundance is 67%, Graham-Hudson said she would raise the same question as Foster. Burchfield said you would just need to recycle it more frequently. Graves said this is more about safely holding and moving fish. Kelley asked looking at the columns for Cougar, the majority of high scores are in the non critical column, which says to me that the people in the room do not think these are high priority, so what do people think the priority is for Cougar? The consensus from the group is that we know enough, so build it. Piaskowski said he didnlt know of any critical information needed before beginning designs.
   4. **Lookout Point/Dexter.** Piaskowski said Corps sees survival through the reservoir as the first step in looking at passage. Khan said both operation categories (reservoir survival and forebay distribution) are ranked high and seems consistent because there is less certainty in the current information. Burchfield said the operations studies were punted because they would be addressed later in the Biop. Friesen asked do we need to assess survival below Dexter to support fish passage decisions. Piaskowski said we should study Lookout Point first, then if we are considering at dam passage then you would want to look at Dexter if we are considering releasing fry in the Dexter pool. Friesen clarified, do you need to know what the survival is in the reservoir versus survival below dams. Burchfield said when talking about the paired release model, we are not meeting the mixing assumptions. Burchfield said if you compare a head of reservoir collection to in-reservoir rearing, the fish don’t mix, conditions in the mainstem Willamette are different. Burchfield said we’re testing how well they survive in the reservoir, but also, are they getting better conditions downstream. Burchfield said looking the paired release study results, when were the different groups released and what flow and temperature conditions did they experience in the mainstem, and is that what we would expect if we had a head of reservoir collector. Burchfield asked when were the fish released in the tailrace. Friesen said the fish were released in May. Burchfield asked would that represent when you would release the fish if we had a full head of reservoir and when were you releasing in-reservoir fish. Friesen said the same day. Piaskowski asked do we need the below dam survival, if the critical question is reservoir survival. Piaskowski said if survival through the reservoir is high enough then we would look at specific fish passage questions at the dam, if it’s too low then it becomes more important to evaluate survival below the dams because you then have to consider head of reservoir collection and moving fry downstream of the dams. Graham-Hudson said it sounds like Friesen is suggesting using the downstream survival, below Dexter, as the comparison threshold, what is the line and what is the reference point for downstream survival. Friesen said yes, that is essentially what I was saying. Beeman asked if you are taking fish out of Lookout Point, are you trying to decide if you should put them below Lookout Point or should you put them below Dexter? Friesen said below Dexter. Friesen asked which risk is worse, fry collected at the head of reservoir and releasing into the mainstem versus releasing into the long reservoir. Piaskowski said another way of comparing could be to compare reservoir survival in Lookout Point to another reservoir, ideally where we have a population showing the genetic pedigree replacement like Foster or Detroit; if the reservoir between the two systems is similar, then you would have reason to believe a self sustaining population at Lookout Point is possible. Graves asked what years have been analyzed. Piaskowski said just one year for Detroit - it is from the 2009 brood year and their returns in 2014. Sharpe said we don’t need anything for Lookout because we know if we put 4,000 fish above to spawn; we only get 100 fish back four to five years later, so we are nowhere near replacement there. Graves asked, what is the best payoff for fish coming down the river to the reservoir, do you get more smolts if you collect them at the top of the reservoir or do you let them rear in the reservoir and collect them after that point. Skalski said of the different ways to handle fish, what gives us a greater proportion of fish down to Willamette Falls Dam, it doesn’t matter if they’re small, big, early, or late, then you need to make sure you are comparing apples to apples for the different recovery rates. Burchfield asked is there a way to get better estimates of efficiency at Willamette Falls, can we do a better expansion for juvenile detection to make it more comparable? Skalski said there are problems with recovery estimates and time bearing rates may help correct the efficiency estimates. Burchfield said how do you do that? Perry said to relate the efficiencies to flows and other co-variables. Friesen said we would release fish several miles above the dam, in the middle of the river, and we assumed they would distribute by the time they got to the dam. Beeman said sometimes we release at several different locations across the river. Burchfield asked do you have acoustic data showing which part of the mainstem the fish are in. Beeman said we can’t determine the precise location. Burchfield asked how can we do a better reservoir survival study. Burchfield said can we tag fish and release them in the tributaries, then recapture them at the screw traps at head of reservoir, and then tag the same fish again? Skalski said yes this could possibly give information for reservoir mortality. Skalski said it depends on the size of the fish, you could potentially use different types of tags when fish are recaptured. Graves said there are some PIT-tag detection capabilities and we are starting to see some success with the big, open detectors. Graves said they were originally intended for adult detections and the detectors were mounted on dykes, and they are starting to pick up some juvenile detections. Burchfield said, Dick Ledgerwood give a presentation to RM&E and there has been discussion to mount them to boat docks.
      1. **Analysis.** Piaskowski asked Skalski if he will need a detection rate in order to design a valid analysis. Skalski said on the DART website there are sample size programs for single release, paired release, relative recovery, and triple release models, so it’s all interactive and you are able to put in your own sample size; it will give you precision curves. Skalski said there are different software applications that will help, but we can also calculate by hand.
   5. **Reservoir mortality and head of reservoir**. Burchfield asked did we reach a consensus regarding reservoir mortality and information for head of reservoir. Burchfield said since we have already started looking at what will happen if we have a head of reservoir collection, but Graves suggested looking at reservoir mortality first, it seems like we could be doing these studies concurrently. Skalski said we are looking at how alternative handling of fish effects downstream survival. Skalski said the issues are heterogeneity and fish detections probability because fish are not going through at the same time, so the best solution is with efficiency releases. Skalski said he could provide information that will show the best and worst outcomes of different efficiency releases.
   6. **Hills Creek.** Lower priority. BiOp indentifies LOP as the preferred location to improve passage in the Middle Fork, and investigations are ongoing there. Should be considered if at-dam fish passage at Hills Creek Dam pursued.
   7. **Fall Creek. Reservoir survival.** Piaskowski saidCorps doesn’t see it as priority because already have implemented operational fish passage improvement (consistent with the RPA), and there are other locations planned for major fish passage improvements in Willamette. Hudson said if there is a way to change operation and look at survival, but maybe the current operation is the best possible survival and we don’t need to improve it. Burchfield said you wouldn’t work to change it unless you have data that says otherwise. Hudson said if this operation continues, although lamprey are not listed, the rapid drop in water will leave them dry.
5. **Study Designs for Research Priorities**
6. **More discussion** 
   1. **Ideas for reservoir survival.** Piaskowski asked if there is a specific model.Monzyk said it is the staggered entry model. Monzyk said, when applying this model to LOP, it is about estimating survival through a time period, not across a distance, so we are looking at fry to parr, from April-July in Lookout Point. Monzyk said the idea would be to release 100,000 fry in April, collect fish in July and record how many recaptures. Monzyk said the second batch would be released immediately after the first recaptures, and one more collection in September or October. This is the 2 release staggered entry model. Piaskowski said this is all occurring in reservoir. Monzyk said the study would be completed by October before the fish leave the system. Perry said this will estimate the joint probability remaining in the reservoir and surviving, if fish are passing the dam it will be incorporated into the estimate of survival. Monzyk said yes, that is why I would like to study during this time period because there are not many fish leaving the system. Skalski asked if this is two different benchmark groups, Monzyk said yes. Monzyk said the most effective way to capture the fish is with gill nets, and depending on how much effort we can put in, we could get the recapture numbers to get the precision we want to run the estimate Perry asked is there an assumption that survival is common between both groups. Skalski said yes. Burchfield said we would end up with an estimate of reservoir survival for the time period. This is an important time period we need because they are escaping the risk as they get larger. Skalski asked where will you release in the reservoir. Monzyk said we will need a bench mark for comparison, do we study at another reservoir like Detroit. Graves asked how are you going to base a decision if you get 50% survival at one location and 40% survival at the other location. Burchfield said reservoir survival will change if you have a good passage facility. Piaskowski said if it’s the same or better at Lookout, then we know to pursue dam passage, if it’s worse, then you need to factor in what else do we know about the system (i.e. can survival be adequately improved). Graves is weary of not having criteria of how to deal with this but he is comfortable with it as long as everyone knows where we are going into it. Mullan asked can you increase survival by shortening the time they are exposed to whatever is causing them to not survive. Burchfield said this is getting back to asking the question, do we want to promote reservoir rearing or promote get them out. Piaskowski said this would be good to get this type of a study design in comparison to a PIT-tag approach from Skalski. Skalski said he could get several scenarios and list out all of the alternatives. Sharpe asked Monzyk when would you want to implement this. We will need production from hatchery, it is not likely for FY’16, but it is likely for FY’17. Monzyk said we will need to finesse numbers to see how much work will be involved for recapturing. Piaskowski said this may need to wait until a typical operation year.
7. **Wrap Up and Next Steps** Skalski said it didn’t seem like there were some really big hot spots. Sharpe asked why is delayed mortality following passage of operations not on the list as a high priority. Sharpe said we have great data from Beeman’s group showing there is an issue with mortality and getting down to Willamette Falls. Sharpe said there seems to be a lot of uncertainty, why didn’t it rise to the top. Graham-Hudson said because in some of these basins we are planning structures so we wouldn’t be as concerned with delayed mortality. Piaskowski said it’s also not a critical information use in design solution, but it may need to be considered after solutions are implemented. Jundt said finding a method in designing a bypass associated with these structures, delayed mortality could be a factor. Graham-Hudson said if we are talking about operations then it would be listed higher. Skalski asked have we listed the studies that need to be evaluated. Skalski said at Cougar, where do we need to place it (collector) and evaluate it. Jundt said the hydraulic information is not promising because the wind is causing surface currents to go upstream, so it forced us to look at other aspects. Skalski asked is everything that needs to be done to begin locating the facility in the right place has been done. Piaskowski said our engineers would need to answer that but there are no major studies scheduled for Cougar. Piaskowski said post effective monitoring has not been discussed, but we have been working with Burchfield and discussing them. Piaskowski said we are still in the design phase and getting structures on the ground.
   1. **Action:** Piaskowski emailed Skalski’s power point presentation and in-meeting survey results to the meeting attendees on 10/15/15. Piaskowski to send out (3) publications from Skalski.
   2. Graves asked would it be useful if NMFS spoke to the Science Center to think about ways to use recovery abundance goals to generate a range of the number of fry or smolt that we are likely to see coming out of some of these systems, making the leap that you can get to the recovery levels. Piaskowski said we have been working with the Science Center and they have produced life cycle models for each of the populations and they are currently on contract to look at capacity above the projects and within the reservoirs. Do you think that work will generate those numbers, asked Graves? Piaskowski said it will provide the capacity which then can be run through the life cycle model to produce juvenile production estimates. Burchfield said we could go back and look at the model, it said if you accept all of the different hits on survival as fish enter the reservoir, it will give you a number of fish in the forebay that are ready to be captured, but it is difficult to get the actual total numbers. Petersen said NOAA has a contract where they have experimental tributary PIT detection at BON and JDA experimental PIT detection, it seems like it would be convenient to take something that they have developed and focus on the smaller tributaries. Graves said they have been focused on smaller tributaries, but here it is a big river and more difficult to implement.
   3. **Action:** Skalski will write up the results of the meeting.
      1. **Cougar reservoir**
      2. **Multiple release strategies in the reservoirs**
      3. **Improving efficiency detections at Willamette Falls.** Burchfield asked Skalski about providing recommendations for Willamette Falls detections. Piaskowski asked Burchfield what information needs she was thinking about associated with improving Willamette Falls detections. Burchfield said delayed mortality and evaluating head-of-reservoir versus at-dam passage alternatives.