

## OFFICIAL COORDINATION REQUEST FOR NON-ROUTINE OPERATIONS AND MAINTENANCE

**COORDINATION TITLE-** 15BON01 Hydraulic measurements in BI serpentine section

**COORDINATION DATE-** 11 February 2015 updated on 19 February

**PROJECT-** Bonneville Lock and Dam Bradford Island serpentine section

**RESPONSE DATE-** 12 February 2015 (FPOM) or by 24 February at the latest.

**Description of the problem** – (please see 14BON03, 14BON54 for prior work) The University of Idaho (UI) requests access to the BI Serpentine Weir location during an approximately 3 day period during February to conduct hydraulic measurements using an Acoustic Doppler Velocimeter (ADV). The purpose of this effort is to supplement video observations of adult Pacific lamprey behavior at the serpentine weir slots (14BON03, 14BON54) and Adult Fish Facility (AFF) lamprey test flume measurements completed in 2014. **The measurements need to be in the ladder because the two main goals are to explicitly relate lab measurements to conditions at the weirs, which are a known passage bottleneck. The second reason for direct field measurements is that we are also estimating turbulence at small (<10 cm) scales, which is not feasible with CFD models.**

Substantial proportions (25-30%) of adults reaching the serpentine weir section fail to pass and permanently move downstream (Keefer et al. 2013a, 2013b). The University of Idaho (UI, Caudill) hypothesized that lamprey have difficulty passing through some of the serpentine weirs, particularly those with particularly long, overlapping slots. Individual weir slots vary in width from 21” to 28” and vary in length from 13” to 44”. At Bradford Island, the longest four slots (44”) are those with FDX-PIT antennas in place.

The ADV would be deployed from a cross-beam that will span serpentine weir slot 5 (**Figure 2**). The beam will be placed on the walkway grate and attached with j-bolts on one side and the top of the wall of the serpentine on the other side. No concrete anchors will be used. The ADV will be mounted on a machine/robot similar to that used in the AFF flume (**Figure 3**). The probe and shaped shaft that is in the water is ~1" wide.

**Length of Time for Testing** – Work will be conducted over 3 days (February 25-27, 2015) with the in-water work time occurring from 1000 on 26 Feb to 0030 on 27 Feb. For safety reasons, UI must install the robot during the day; no personnel shall enter the fishway or leave the fishway deck area. **The probe will enter the water to test robot movements less than thirty minutes during initial testing. The shaft will move slowly.** After UI completes one cross section of test measurements, they can make any adjustments needed and finish measurements at night. The anticipated schedule is as follows:

February 25:

15:00 - Arrive on site, complete sign in and safety talk

16:30 - Begin installation of equipment above water

February 26:

10:00 - Finish installation of equipment above water

15:00 - Begin data recording in water

17:00 - Adjust robot as needed before night

**20:00 - Restart data recording (Revised to minimize potential impacts on steelhead)**

**02:30 - Finish data recording and remove equipment from water**

February 27:

10:00 - Remove robot and clean up site

**Type of outage required** – No outage required.

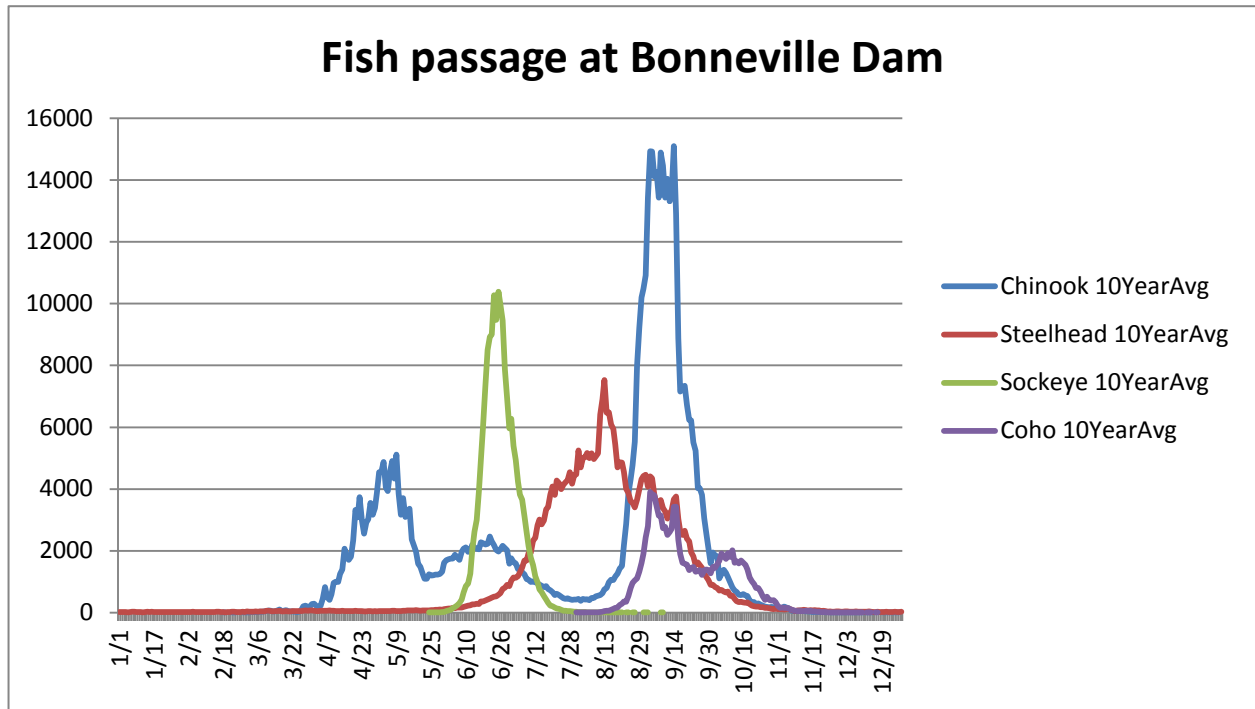
**Dates of Impacts** – February 25-27, 2015.

**Impact on facility operation.** No impacts are expected on facility operations. Limited project support is needed to facilitate access continued operation of the monitoring system and power supply.

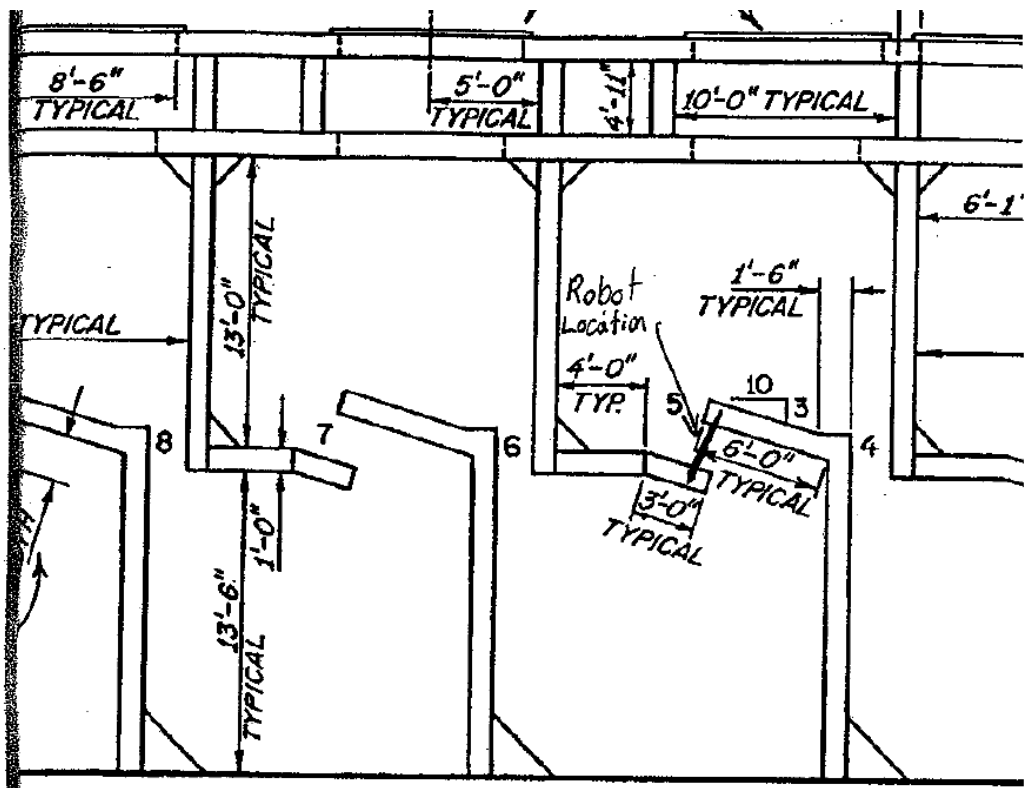
**Expected impacts on fish passage**

Downstream Juvenile Migrants: None

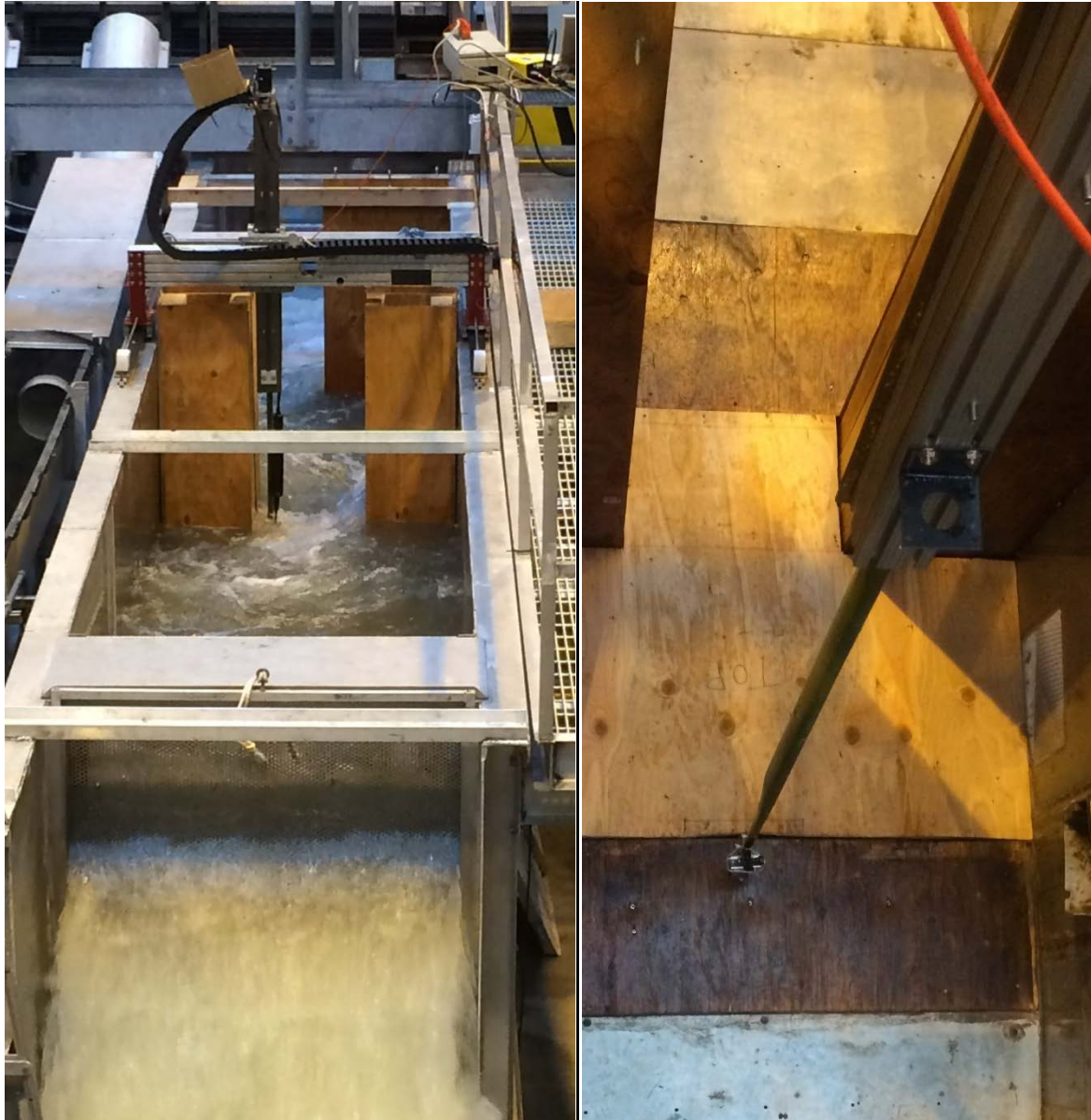
Upstream Adult Migrants: Observations are proposed to be made from 25-27 February 2015, generally a period of very low passage rate by adult salmonids. The 4” mounting I-beam and attached ADV probe is not expected to have measurable impact on adult migrants. **Because of the slim design of the probe there will be space for the fish to maneuver and pass it even during sensor deployment and sensor movement. Sensor motion will be slow to avoid any potential contact with fish if present. Any steelhead moving upstream are unlikely to contact the probe and would rather likely maneuver around it.** During deployment, there is potential for upstream migrants to bump into the structure. When the ADV probe is initially deployed, it will be monitored for potential impact and removed if necessary. Additionally, Bonneville Project Fisheries staff will continue observations of the structure during their fishway inspections from the deck level. If negative impacts are noticed, the ADV probe and associated structures will be removed.



**Figure 1.** Fish passage and timing at Bonneville Dam.



**Figure 2.** Drawing showing location of proposed deployment, at Serpentine Weir Slot 5.



**Figure 3.** Photo of ADV probe structure mounted in AFF lamprey test flume during measurements (left), and photo of the probe with AFF lamprey test flume dewatered (right). In-water portion of the shaped probe beam is ~1" in diameter.

**Comments from others:**

**BON Riggers - -----Original Message-----**

From: Smith, Brian K NWP

Sent: Wednesday, February 11, 2015 6:51 AM

To: Mackey, Tammy M NWP

Subject: RE: FPOM: Official Coordination - 15BON01 UI hydraulic analysis in BI (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

Tammy,

There is no mention here of need of assistance from Project personnel, which is good, because we have neither the people nor the time next week to assist with this.

Brian

**NOAA Fisheries - -----Original Message-----**

From: Gary Fredricks - NOAA Federal [mailto:gary.fredricks@noaa.gov]

Sent: Thursday, February 12, 2015 7:15 AM

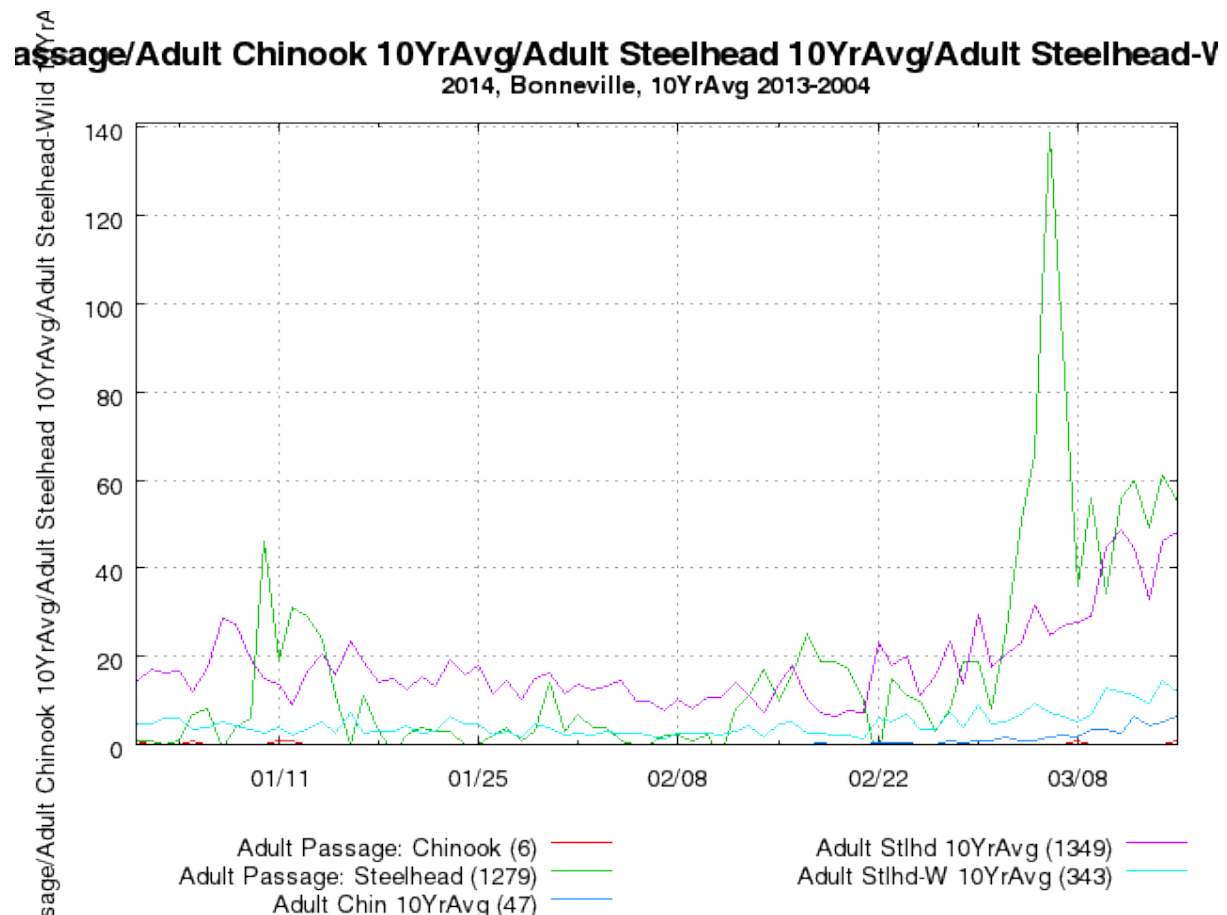
To: Mackey, Tammy M NWP

Cc: Tackley, Sean C NWP; Trevor Conder - NOAA Federal

Subject: [EXTERNAL] Re: FPOM: Official Coordination - 15BON01 UI hydraulic analysis in BI

Tammy, Right now I'll say NO to this simply on the basis of that 365 day passage graph that is supposed to assess risk to adults passing in a three day period.

Please see revised graph below. The counts on the graph are ten year averages and are total counts for all of Bonneville (i.e., assume all passage through a single ladder). The total expected count of steelhead (wild and clipped combined) is less than 40 per day during February based on 2014 counts and the ten-year average count and these rates are nearly constant through out January and all of February. The ten-year average count and daily counts begin to increase starting in March.



The UofI of all people should be able to do better than this. This isn't how we manage listed fish. This needs to state how many and of what species are passing now (only a couple of weeks from the proposed work). What is the 10 year and last year's passage for these dates. What ladders are running on these dates, what is the expected exposure of this system to fish?

Currently CI/WA Shore is dewatered. BON Project anticipates rewatering the ladder starting 23 February, with the aim of fully operational ladders by 1 March (or earlier).

Why can't this be done in the lab or with CFD that the Corps is so fond of? If it has to be in a ladder, why not do during the lowest passage days (which isn't late February)?

The measurements need to be in the ladder because the two main goals are to explicitly relate lab measurements to conditions at the weirs, which are a known bottleneck. The second reason for direct field measurements is that we are also estimating turbulence at small (<10 cm) scales, which is not feasible with CFD models.

What steps are being taken to keep foreign odors out of the ladder during deployment?

The probe will be wiped down with river water prior to deployment in an effort to minimize potential odorants. Personnel will wear gloves to further minimize potential for odorants to enter the water.

Since this installation is near the count window, we should have a good idea of adult passage timing at the site, what is it?

Steelhead (and salmon) passage rates peak in the afternoon and drop very quickly after 2000 hrs:

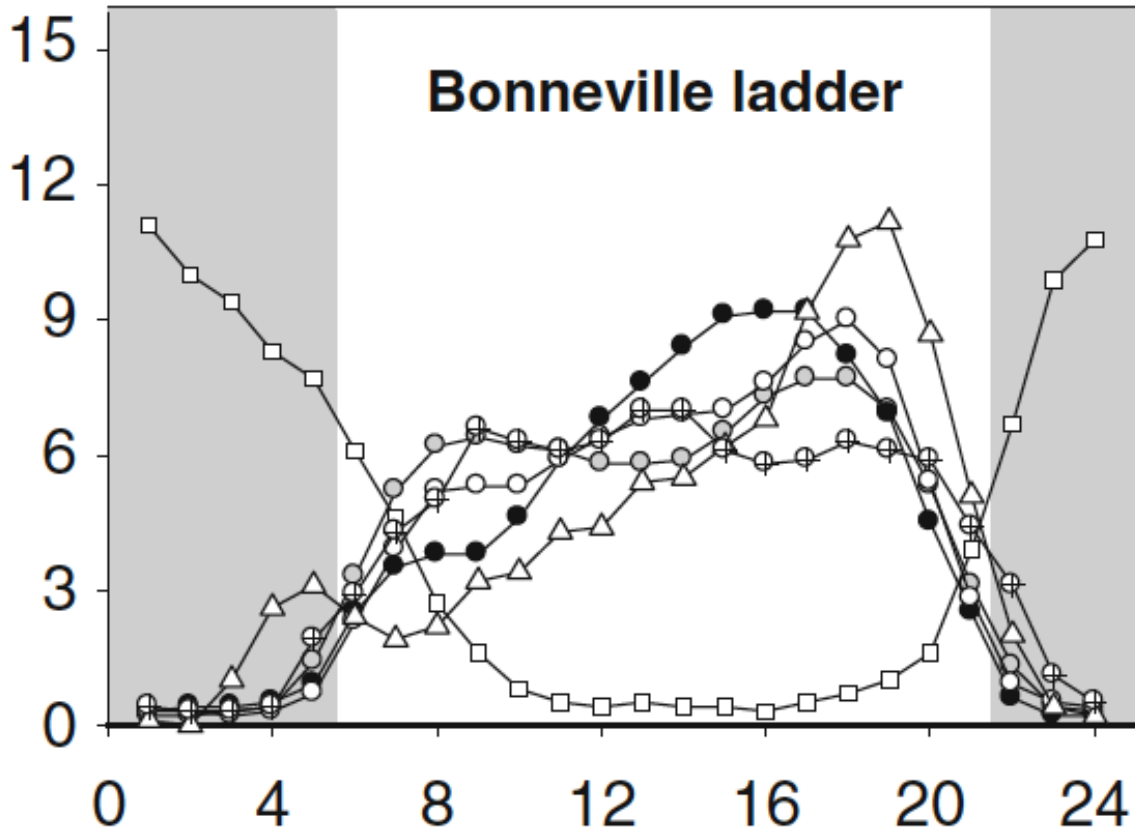


Fig. 2 Three-hour moving averages of diel movement by tagged spring–summer Chinook salmon (grey circle), fall Chinook salmon (black circle), steelhead (white circle), sockeye salmon (crossed ○), Pacific lamprey (white square), and

American shad (*delta*). Data combined across years for each species at each site. Shaded areas cover 21:00–05:00 h (Pacific Daylight Time), the hours defined as nocturnal for analyses

From Keefer, M. L., C. C. Caudill, C. A. Peery, and M. L. Moser. 2013. Context-dependent diel behavior of upstream-migrating anadromous fishes. *Environmental Biology of Fishes* **96**:691-700. Y-axis values = percent.

Based on the total expected passage rate and diel passage patterns, we conservatively estimate ~ 4 steelhead (= 40\*10% passing during hours 2000-2300) may pass during the experimental period and potentially encounter the ADV probe. The small cross-section of the probe relative to the fishway slot ensure that there will always be sufficient room for a potential migrating fish to pass without touching the probe. .

I know it is only for a few hours, but I'm not seeing the justification for the potential (and undefined) risk to winter steelhead passage here at all. I know folks don't have a lot of time but the bar is a bit higher than this. Thanks, Gary

**NOAA Fisheries –**

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

From: Gary Fredricks - NOAA Federal [mailto:gary.fredricks@noaa.gov]

Sent: Monday, February 23, 2015 8:43 AM

To: Tackley, Sean C NWP

Cc: Trevor Conder - NOAA Federal; Caudill, Christopher; Mackey, Tammy M NWP

Subject: Re: [EXTERNAL] Re: FPOM: Official Coordination - 15BON01 UI hydraulic analysis in BI (UNCLASSIFIED)

Sean, Sorry to be so blunt with the response to Tammy but we really do need folks to do a better job in assessing risk during these types of activities. This work has pretty minimal risk but that really was not assessed in the MOC. I'm not asking for much but these MOC's should at least include an estimate of the number of fish by species passing the ladder during the day or days the work is to be done (use 10 yr avg plus recent estimates of run size) and some general estimate of impact. Also, there should be some description of why the work needs to be done now rather than when fish numbers were lower (say early January for steelhead), how the deployment (time, methods) will be done with least impact, what will be done to keep human scent, hydrocarbons, etc. to a minimum while the work is being done. In short, we need to demonstrate that we have done all we can to minimize impact while getting the work done. Sounds like there may be a new MOC (I was out last week) so I'll go look for that. Thanks, Gary

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

From: Gary Fredricks - NOAA Federal [mailto:gary.fredricks@noaa.gov]  
Sent: Monday, February 23, 2015 9:15 AM  
To: Caudill, Christopher (caudill@uidaho.edu)  
Cc: Trevor Condor; Mackey, Tammy M NWP; Tackley, Sean C NWP  
Subject: [EXTERNAL] Re: FW: University of Idaho- Bradford Island Data Collection (UNCLASSIFIED)

Now that is what I was hoping to see in an MOC. Thanks for updating this Chris and I see no reason why the work can't proceed as described. Thanks, Gary

**CRITFC –**

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

From: Tom Lorz [mailto:lorz@critfc.org]  
Sent: Friday, February 20, 2015 2:55 PM  
To: Mackey, Tammy M NWP  
Subject: [EXTERNAL] Re: FPOM: Official Coordination - 15BON01 UI testing in BI  
Do not have big issue with this one, this is a better version and I think should take care of most of the concerns raised. Thanks tom

**University of Idaho -** -----Original Message-----

From: Caudill, Christopher (caudill@uidaho.edu) [mailto:caudill@uidaho.edu]  
Sent: Friday, February 20, 2015 1:55 PM  
To: Mackey, Tammy M NWP; Tackley, Sean C NWP  
Subject: [EXTERNAL] Re: University of Idaho- Bradford Island Data Collection (UNCLASSIFIED)  
FYI, I've also sent to Gary and Trevor at Sean's suggestion as we'd like to get the measurements done next week to minimize the potential for the count numbers to start going up.  
Thanks for all your help on this. C

**Final Action:** This action may go forward as coordinated above.

**Thank you,**

Sean Tackley  
NWP-PM-E

[Sean.C.Tackley@usace.army.mil](mailto:Sean.C.Tackley@usace.army.mil)