

OFFICIAL COORDINATION REQUEST FOR NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION TITLE – 16 LWG 010 - Lower Granite Juvenile Bypass System Upgrade Schedule Update – **Outfall Installation Schedule**

COORDINATION DATE – 10 August 2016; **Re-coordination** 1 September 2017

PROJECT – Lower Granite Lock and Dam

RESPONSE DATE – 1 September 2017 ~~23 May 2017~~ **August 19, 2016**

Description of the problem - The Lower Granite Lock and Dam Juvenile Bypass System (JBS) is currently being upgraded to improve downstream fish passage. Construction of the JBS upgrade began in October 2014 and was originally slated to be completed for the 2017 fish passage season.

The Corps, with input from the Fish Facility Design Review Work Group (FFDRWG), has decided to extend project completion to spring 24 March 2018 **to comply with the court ordered operations**. This schedule slip is due to a variety of factors including unanticipated site conditions, the need to incorporate additional design features associated with the selected routing of the new primary bypass outfall, and additional time necessary to complete reviews of contractor submittals.

This MOC updates the overall project schedules and coordination efforts to date, primarily described in the following MOC's (See Table 1 for list of MOC's relating to overall JBS Upgrade effort):

- 13 LWG 17 Juvenile Fish Collection Channel Upgrade
- 15 LWG 004 Lower Granite Juvenile Fish Collection Channel Upgrade Update
- 15 LWG 025 LGR JBS Primary Outfall Construction

The Corps construction contractors have requested the ability to start final outfall related construction activities in August 2017 (Figure A). Remaining work associated with outfall installation includes completion of upper portions of support piers (out of water components), installation of pipping saddles on top of drilled piers, installation of new outfall pipe, and installation of walkways and appenditures. All outfall construction activities will occur above / outside of the river; however a work platform will need to 'spud' down in order to provide a stable work platform along the outfall alignment.

In order to minimize potential impacts to adult passage, the number of times a work barge/platform is moved and 'spudded down' will be limited to up to 10-20 moves during the work period prior to 15 November 2017 (i.e., prior to previously coordinated in-water work window). Work barge(s) will be moved during afternoon/evening periods when adult fish passage is lower (i.e., no earlier than 1 pm). No in-water work such as drilling or other river-bottom disturbing activities (e.g., old pier removal) will occur until after 15 November 2017.

Currently, the agreed to In-Water Work Window for this project starts 15 November 2017; however there are several advantages to allowing outfall related construction activities to start 15 August 2017 as follows:

- Reduced potential to impact spawning fall chinook and associated redds, if present, due to earlier construction activities.
- Phase 1 system commissioning activities will be more complete and thorough with all bypass routes available through entire commissioning process.
- Additional time for winter maintenance activities in the Juvenile Fish Facility, if necessary.
- Fewer fish rescue events during commissioning are anticipated with the bypass routes completed and available for use.
- More flexibility to adapt to weather delays. Lower Granite Dam often experiences harsh winter weather conditions that can negatively impact construction activities and quality of workmanship (e.g., welding and paint qualities).
- Improved coordination between multiple contractors during extended JBS outage.
- Additional time to resolve unanticipated issues leading to better ability to meet new court ordered JBS operational date of 1 March 2018.

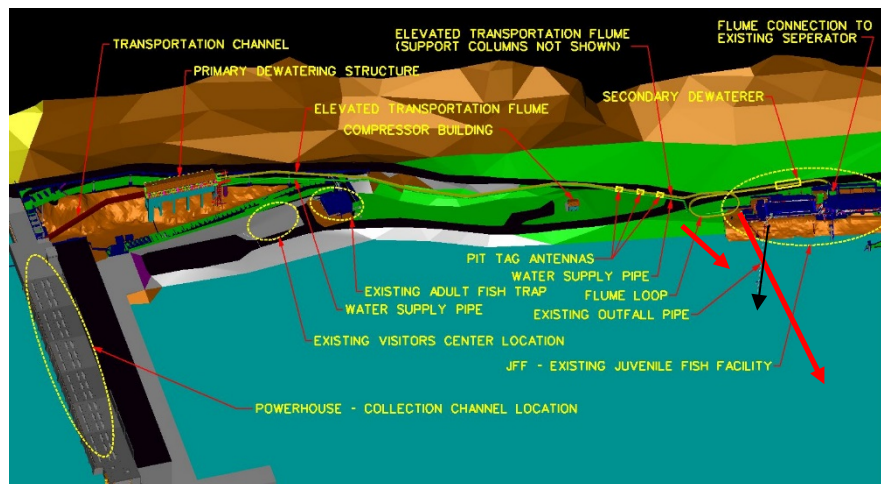


Figure A. Depiction of overall Lower Granite Dam JBS Phase 1 upgrade. Bright red lines in tailrace indicates location of new primary and emergency bypass outfalls.

Type of outage required – Based on the current, revised schedule, Lower Granite Dam’s JBS will be taken out of service according to the following schedule (see Figure 1):

2016/17 JBS Winter Maintenance Window: 15 November 2016 to 24 March 2017

2017/18 JBS Winter Maintenance Window: 1 August 2017 to ~~24~~ March 2018

2016/17 In-Water Work Window: 15 November 2016 to 28 February 2017

2017/18 In-Water Work Window: 15 November 2017 to 28 February 2018

2017/18 Outfall Construction: 15 August 2017 to 28 February 2018

Turbine Unit Priority Changes (FPP Table LWG-5. Lower Granite Dam Turbine Unit Operating Priority Order):

1 Day - November 2016, November 2017 – Deviate from FPP specified turbine unit priorities, and voluntary spill operations as described elsewhere herein and MOC 13 LWG 17, for up to 1 day annually to determine suitable tailrace conditions for in-water construction work. The 1 day of testing is anticipated to last no longer than 8 daylight hours prior to the start of in-water construction activities in the Lower Granite Dam tailrace.

15 November 2016 – 15 December 2016: Deviate from FPP specified priorities for up to 3 days to facilitate construction of outfall structures.

15 November 2017 to 15 December 2017: Deviate from FPP specified priorities for up to 3 days to facilitate construction of outfall structures.

Extended JBS Outage Spill Operations – As a result of these schedule changes, the previously coordinated RSW spill operations associated with the extended JBS outage will occur during the extended 2017/18 outage. As previously coordinated, the Corps will operate the RSW 12 hours per day (6 am to 6pm) from 1 September to 15 December (i.e., Daytime Hours) if there is sufficient water to operate the RSW and maintain minimum generation (total project outflow \geq approximately 19 kcfs).

During 15 November to 15 December 2017, it may be necessary to deviate from the agreed to 6.8kcfs RSW spill to support in-water construction activities associated with outfall construction. Changes to spill operations will be coordinated with project and RCC staff in the following order:

1. Continue daytime (6 am to 6 pm) RSW operations as proposed in FPOM MOC 13 LWG 17.
2. Operate the RSW from 6 pm to 6 am during construction periods.
3. Pass approximately 6.8 kcfs (4 stops) for 12 hours per day through 2 bays in a manner that facilitates safe tailrace conditions for construction activities while providing larger spillbay openings for adult salmonids that may be passing through this spill route. This modified bulk pattern will be implemented initially in bays 6 and 8 and, if necessary, subsequently adaptively managed in coordination with RCC and Lower Granite Dam operators to facilitate suitable tailrace conditions.
4. Pass approximately 6.8 kcfs (4 stops) for 12 hours per day through a non-RSW spill pattern in accordance with the proposed FPP Change Request Form “16LWG005 - Low Flow Spill Patterns w/ No RSW”
5. Pass a reduced amount of water (1-3 stops; 1.7 – 5.1 kcfs) for 12 hours per day that allows for safe in-water work conditions through a non-RSW spill pattern in accordance with the proposed FPP Change

Request Form “16LWG005 - Low Flow Spill Patterns w/ No RSW”

6. Terminate spill during periods when spill operations described herein (MOC 13 LWG 17, 15 LWG 023) conflict with in-water construction activities. If feasible, the Corps will only terminate spill for the duration necessary to support construction activities (e.g., less than 12 hours of spill may be possible on a daily basis).
7. If it is necessary for the Corps to implement these steps, the Corps will prioritize the operation during the hours of 6 am to 6pm first and 6 pm to 6 am second when necessary to support construction activities.
 - If the Snake River Zero Discharge operation is triggered to begin before December 15, nighttime spill operations would preclude the ability to reduce Lower Granite to zero discharge.

~~For 1 September 2017 to 15 November 2017, the Corps requests the ability to change the 12-hour daytime RSW operation to a nighttime RSW operation (i.e., 6 pm to 6 am), if necessary, to provide improved tailrace hydraulic conditions for fish passage or construction activities.~~

Impact on facility operation –

- The JBS will be out of service as described above. Removal of Lower Granite’s ESBS are anticipated to begin on the first day of the respective JBS outage window. The JBS will be returned to service by the end of the respective outage window in accordance with Fish Passage Plan (FPP) requirements.
- During the 2016/17 winter maintenance window of 15 November 2016 to 24 March 2017, mining of the juvenile collection channel to the final 9.5’ channel width will be continued through Units 3 and 4 (Units 5 and 6 were widened during the 2015/16 winter maintenance window). The collection channel will be tapered back to the existing channel width within NFMS acceleration requirements.
- During the extended winter maintenance window 1 August 2017 to 15 December 2017, approximately 6.8k kcfs will be spilled through the RSW (see 13 MOC 17 and 15 LWG 023 for previous coordination efforts). This spill may be adjusted as described above, including requirements to meet minimum generation requirements and from 15 ~~August~~ **November** to 15 December 2017 if necessary to support in-water work activities associated with outfall construction efforts as described above.
- In-water work windows will coincide with JBS outage periods such that impacts to construction activities associated with JBS operations will be limited (e.g. JBS water discharges).
- Adult ladder outages are anticipated to follow FPP outage guidelines for the purposes of this JBS project.
- The existing outfall will remain in place and operation until the 2017/18 in-water work window.

- Turbine units may need to be operated outside of FPP priority order (FPP Table LWG-5) for limited durations as described above. Changes to turbine unit operations will be coordinated with project staff and RCC as necessary. As a note, FPP Table LWG-5 will be revised when repairs to Unit 1 are completed. Unit 1 is currently anticipated to return to normal operations in early 2017.

Dates of impacts/repairs – See Figure 1 below for construction and outage dates.

Length of time for repairs – All construction activities associated with the JBS Phase 1 upgrade are anticipated to be completed prior to the 2018 fish passage season.

Expected impacts on fish passage – Expected impacts to fish passage have been generally described through previous MOC's and discussed in NWW FFDRWG meetings.

For the upcoming in-water work windows, in-water work will primarily be conducted from a floating barge platform and from limited distances from shore (e.g. via temporary truss structures). As such, fish will be able to pass through the tailrace generally unobstructed during in-water work efforts starting 15 November 2016 and 15 August ~~November~~ 2017. Due to the change in the 2017 outfall work window, only a small percentage of juvenile salmonids are anticipated to be exposed to this action due to timeframe of work being after the majority of the smolt outmigration and very limited footprint of work activities at any given time (Figure 2).

For the extended JBS outage period starting 1 August 2017, fish passing downstream will travel through the spillway through 15 December 2017, as described above, or through the powerhouse.

There are a limited numbers of juvenile salmonids passing through the project downstream during the 15 November to 15 December timeframe with the JBS typically operated during this time period for bypassing adult salmon fallbacks (Fish Passage Plan Chapter 9 – Lower Granite Dam – 2.3.1 Juvenile Fish Passage Facilities and FPP Table LWG-1; Figure 1, Figure 2).

For in-water work starting 15 November, typically less than 30 adult chinook per day pass Lower Granite Dam upstream starting and up to 500 adult steelhead per day may be passing the project upstream during this time period (Figure 3).

For remaining outfall work starting 15 August 2017, the majority of the adult fall chinook run (Figure 3) will pass through the tailrace during this period; however the footprint of activities will be very limited on any given day. The work activities will occur in the vicinity of the Juvenile Fish Facility (JFF) 1500+ feet downstream of the adult ladder such that no sound/vibration concerns are expected to passing fish (JBS construction activities producing significant sound/vibration concerns in the vicinity of the ladder will continue to occur from 6 pm to 6 am as previously coordinated). Remaining outfall construction activities will be occurring primarily over-water (Figure A) with in-water

work to be limited to ‘spudding down’ of a work barge/platform (i.e., only in-water work is the temporary placement of barge stability and anchoring supports to be moved once every 2-5 days as work progresses along outfall alignment).

For outfall work starting 15 August 2017, approximately 80-90% of the adult steelhead run generally passes through the tailrace during this timeframe (August – December), however the footprint of activities will be very limited reducing the potential exposure to any individual fish.

A known fall Chinook spawning area will be disturbed as part of constructing the new bypass outfall structures during the specified time periods. It is possible that 5-15 fall chinook redds may be disturbed based on historical survey efforts (Figure 4). As agreed to at the 28 May 2015 and 19 June 2016 NWW FFDRWG meetings and through previous FPOM coordination, no new spawning surveys will be conducted as part of constructing the new outfall structures. **As a result of starting the remaining outfall construction work in August 2017, the potential to disturb redds in 2017 is anticipated to be reduced.**

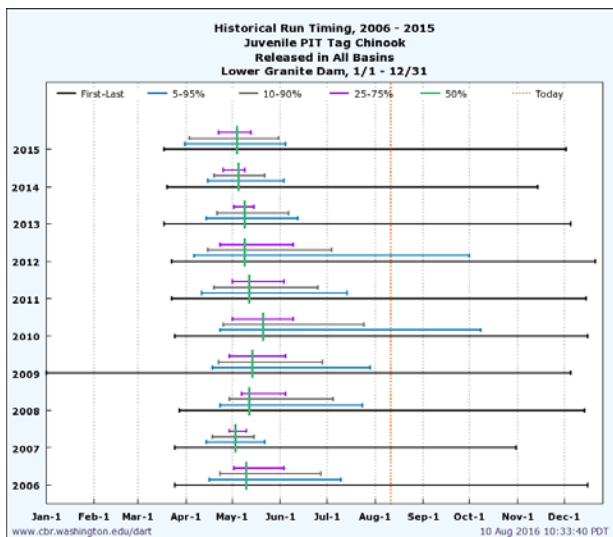


Figure 1. Historical juvenile chinook run timing through Lower Granite Dam based on PIT tag detection data.

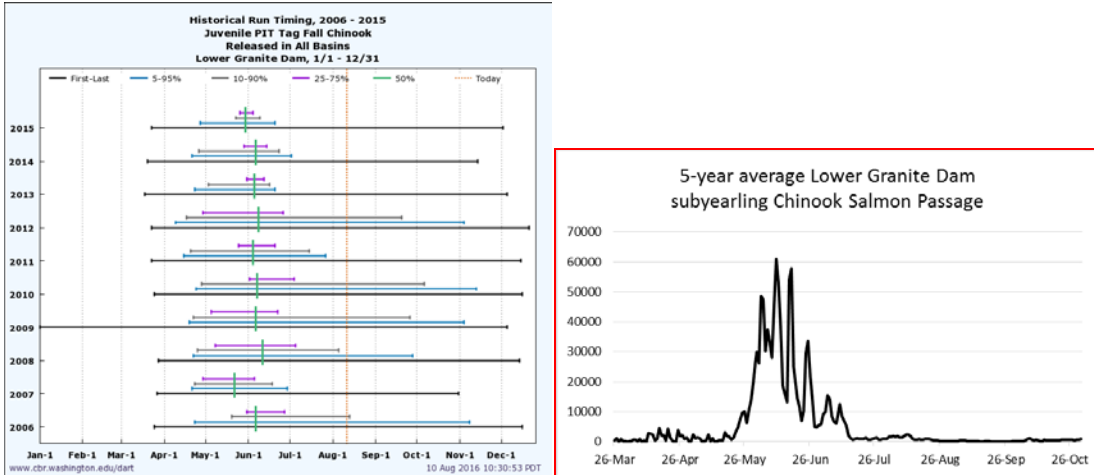


Figure 2. Historical juvenile fall chinook run timing through Lower Granite Dam based on PIT tag detection data and Smolt Monitoring Data.

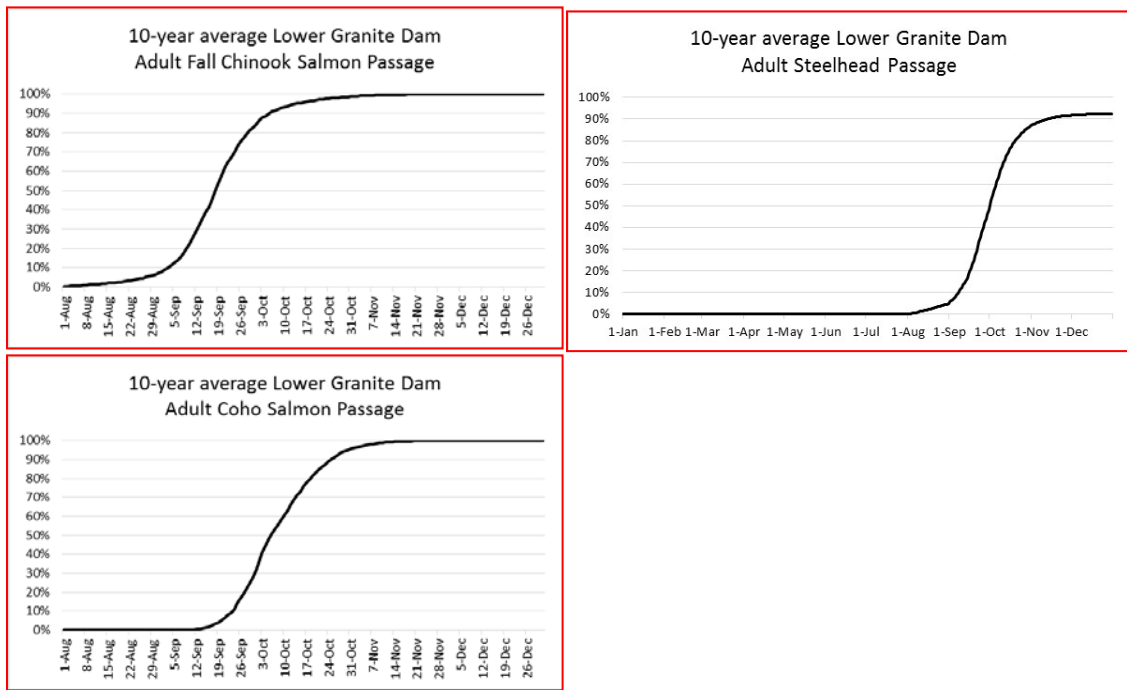


Figure 3. Historical adult salmon passage past Lower Granite Dam for period of interest.



Figure 4. Typical fall Chinook spawning area in the Lower Granite Dam tailrace (area circled in dark red) and new primary bypass outfall construction area (area circled in yellow). The emergency bypass outfall will be constructed upstream of the existing facility bypass pipe where there has been no record of chinook spawning efforts.

Summary statement - expected impacts on:

Downstream migrants – Limited impacts due to potential presence in the area.

Upstream migrants (including Bull Trout) – Limited impacts to due low presence in the work area. Fish should be able to easily avoid activities. Requested timing would reduce potential to impact fall Chinook redds.

Lamprey – None expected.

Comments from agencies –

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

From: Baus, Douglas M CIV USARMY CENWD (US)
 Sent: Friday, September 01, 2017 1:09 PM
 To: Peery, Christopher A CIV (US) <Christopher.A.Peery@usace.army.mil>
 Cc: Setter, Ann L CIV USARMY CENWW (US) <Ann.L.Setter@usace.army.mil>;
 Wright, Lisa S CIV USARMY CENWD (US) <Lisa.S.Wright@usace.army.mil>
 Subject: FW: [EXTERNAL] Lower Granite Spillway operation

Chris,

NOAA feedback below.

I will give you a call and follow up.

Regards,

Doug

Doug Baus
US Army Corps of Engineers
Northwestern Division
Fisheries Biologist

(503) 808-3995
Douglas.M.Baus@usace.army.mil

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

From: Paul Wagner - NOAA Federal [mailto:paul.wagner@noaa.gov]
Sent: Friday, September 01, 2017 12:01 PM
To: Baus, Douglas M CIV USARMY CENWD (US)
<Douglas.M.Baus@usace.army.mil>
Subject: [EXTERNAL] Lower Granite Spillway operation

Doug,

The subject of how Lower Granite spill should occur was discussed at TMT this past week. The relevant question was whether the spill should occur over the RSW or should the spill be provided through spill bays. You were hesitant to make any change to the operation without coordinating the change with the FPOM membership, who had coordinated this operation and expected spill to occur over the RSW, but left the matter of providing spill through the deep spill bays as a contingency operation.

I said I would followup the conversation with some of the salmon managers who were not on the TMT call to see what their preference was. I have done that, and the consensus was they did not object to providing the spill through the deep spill. The rationale for the provision of deep spill is for temperature control below the project. The temperature is forecast to be in the 100 degree range for the next five days at Lewiston, and the discharge from Dworshak will also be reduced on September 2. The provision of deeper spill should provide some temperature moderation given the temperature forecast.

The desire is to make the change in spill operation at the project as soon as practically possible. This operation will be discussed among the salmon mangers once again on September 5.

Paul

1 September 2017, Chris Peery contacted Bill Hevlin by telephone to discuss spill operations at Lower Granite. Bill agreed with the change from spill through the RSW to deep spill, 2 stops each in spill bays 6 and 8, as long as water temperatures are high. He suggested returning spill to RSW when forebay temperatures reached 68°F again.

The revisions to construction periods, work windows, and construction sequencing were presented to interested parties through a special FFDRWG meeting on 19 June 2016. All participating fish reps either concurred, or did not object, with the path forward as described herein including NOAA, CRITFC/CTUIR, ODFW, WDFW, and IDFG. No written comments were received from FFDRWG members that were unable to participate in the meeting.

Revised 16 LWG 010 FPOM Distribution 9 May 2017 Response Date 23 May 2017 – Regional Comments received:

FPOM 170511 Notes

7.2. 17LWG06 MOC JFF Phase 1B Outfall Installation - The contractor has asked for an earlier construction window. Most of the work is above the water except moving the dock between the shorelines. NOAA is okay with this. CRITFC is okay but will double check with Nez Perce. Hockersmith still needs to address the concerns of BPA. ODFW needs to review the MOC and will respond.

Phone conversation between Hockersmith and Scott Bettin (BPA) on 24 May 2017: BPA asked the Corps to reiterate to the contractor that the coordination is not providing project operational changes to facilitate construction activities. This has been passed on to both the contractor as well as the Corps construction representative.

Emails:

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

From: Tom Lorz [mailto:lort@critfc.org]
Sent: Tuesday, May 23, 2017 5:13 PM
To: Hockersmith, Eric E CIV USARMY CENWW (US)
<Eric.E.Hockersmith@usace.army.mil>
Subject: [Non-DoD Source] Re: FW: 16 LWG 010 MOC_LWG JBS
Phase 1 Revised Outfall Schedule

My bad thought I gave a response at FPOM, but I am ok with the update moc

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

From: Erick VanDyke [mailto:erick.s.vandyke@state.or.us]
Sent: Tuesday, May 23, 2017 4:10 PM
To: Hockersmith, Eric E CIV USARMY CENWW (US)
<Eric.E.Hockersmith@usace.army.mil>
Cc: 'lort@critfc.org' <lort@critfc.org>
Subject: [Non-DoD Source] RE: 16 LWG 010 MOC_LWG JBS Phase
1 Revised Outfall Schedule

Afternoon Eric,

Busy time so not able to fit this in as hoped. Given this year's unusual suite of conditions it remains to be seen how the MOC's description of biological expectations play out, and given the scheduling constraints experienced thus far it will be interesting to see what is to come. At this point I don't feel compelled to recommend a change in the suggested path described in the revised MOC or feel compelled to endorse the documents suggested impacts to fish. I appreciate the effort to focus language on minimizing impacts, but given the state of things any additional operational constraints that increase powerhouse passage will likely degrade things more. However, since spill for juvenile fish passage is expect to be unchanged through August 31, and additional fish passage via spill is continuing to use the language coordinated earlier, I don't see a reason to delay this planning document process. I would suggest not moving the barge Aug 15-Aug 31 if it requires additional spill reductions, or if absolutely unavoidable during this period have it timed to correspond with other navigation safety related spill reductions. Looking back on earlier planning discussions and the delays that continue to pop-up it may have been better to go with the original recommendation of moving barge dock and outfall out of the tailrace all together... both changes that may have had better potential for overall benefit to fish in the tailrace and potentially fewer constraints along the way.

Erick

Final results

Please email or call with questions or concerns.

Thank you,
David Trachtenberg
Fish Biologist
Environmental Analysis Section

U.S. Army Corps of Engineers
Walla Walla District
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Walla Walla, WA 99362
Phone: 509-527-7238

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Figure 1 – Lower Granite Dam JBS Upgrade Schedule for August 2016 to March 2018.

LGR JBS Construction Schedule	2016						2017						2018								
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March
JBS In Standard Operation	25 March - 14 Nov '16						25 March - 31 July 2017						1-Mar-18								
JBS Maintenance Periods - As Coordinated with Deviations from standard FPP requirements							15 Nov '16 - 24 March '17 Outage to Mine Collection Channel Install 14" Orifices in Wide Channel						1 August '17 to 28 Feb '18 Complete collection channel mining & crossover activities with tie-to collection channel & JFF. Commission new systems in Feb with JBS RTS by 1 March '18								
Standard FPP/FOP Spill	-31 Aug '16								3 April - 31 August 2016						3 April -						
Phase 1a RSW Spill during Extended JBS Outage (~6.8kcf 12 hrs per day)													1 Sept to 15 Dec '17								
Over/In-Water Work Window													Primary and Emergency Bypass Outfall Construction								
In-Water Work Window							15 Nov '16 - 28 Feb '17 Phase 1b Outfall Pier Drilling & Phase 1a E-bypass Pier Drilling						15 Nov '17 - 28 Feb '18 Complete Phase 1a E-bypass & Phase 1b Primary Bypass Outfalls & old outfall removal								
Standard FPP Turbine Priorities In-Effect	1 March - 15 Dec 2016						1 March - 15 December 2017						1 March -								
Test Tailrace Conditions for Phase 1b In-Water Work - Potential Turbine Unit Priority and RSW Spill Deviation (1 Day Annually ≤8 daylight hrs)							1-Day Test						1-Day Test								
Potential Phase 1a Spill Modifications to Support Phase 1b In-Water Work													15 Nov - 15 Dec								
Turbine Unit Priority Changes to Support Phase 1b Construction and Existing Outfall Removal (Up To 2 Days Deviation total per year)							15 Nov - 15 Dec Up to 3 Days of Deviation						15 Nov - 15 Dec Up to 3 Days of Deviation								

Table 1 – List of Activities and Memorandum’s of Coordination for Activities Associated with JBS Phase 1 Upgrade Activities

Activity	Start Date	Actual/Anticipated End Date	Related MOC’s
Granite Phase 1A	October 2014	21 February March 2018	13 LWG 17 15 LWG 004 <u>16 LWG 010 revised</u>
Mining Transportation Channel inside Dam		Fall 2017	
Mining inside the dam	12 May	Substantially complete spring 2016; limited additional mining through Fall 2017	15 LWG 002 15 LWG 010
Transportation Channel outside dam		January 2018	
Drill and pour piers	March 2015	Spring 2015	15 LWG 004 15 LWG 007
Fish Screen Slot Plugs	Oct 2014	Oct 2015	13 LWG 022 15 LWG 001
Mining Collection Channel		Fall 2017	
Units 1-3A	1 Aug 2017	Fall 2017	13 LWG 017 15 LWG 004 16 LWG 010
Units 3&4 widening	15 Nov 2016	24 March 2017	16 LWG 010
Unit 5&6 widening	1 Dec 2015	24 March 2016	13 LWG 17 15 LWG 007 15 LWG 023
Primary Dewatering Structure		Fall 2017	
Drill and pour piers		Spring 2015	15 LWG 004 15 LWG 005 15 LWG 007
Transportation Flume		Fall 2017	
Drill and pour piers		Winter 2015	13 LWG 17 15 LWG 004 15 LWG 005 15 LWG 007
Truss, Pipe, Flume Installation			13 LWG 17

Secondary Dewatering Structure			13 LWG 17
Crossover Activities	August 2017	January 2018	15 LWG 025 16 LWG 010
On-shore Activities w/in JBS (e.g., tie-in flume to separator; tie-in transport flume to collection channel, tie-in primary dewaterer to existing systems, fill and convert downwell to emergency water supply)	August 2017	January 2018	
Remove existing outfall	15 November 2017	January 2018	15 LWG 025
Emergency Outfall Pipe (Phase 1a)	15 Dec 2015 15 Nov 2016 15 Nov 2017 <u>15 Aug 2017</u>	28 Feb 2016 28 Feb 2017 28 Feb 2018 <u>28 Feb 2018</u>	13 LWG 17 15 LWG 025 16 LWG 010 <u>16 LWG 010 revised</u>
Primary Outfall Pipe (Phase 1b)	15 Nov 2016 15 Nov 2017 <u>15 Aug 2017</u>	28 Feb 2017 28 Feb 2018 <u>28 Feb 2018</u>	15 LWG 025 16 LWG 010 <u>16 LWG 010 revised</u>
Government System Commissioning	Feb 2018	March 2018	13 LWG 17 16 LWG 010