

**MEMORANDUM FOR THE RECORD****SUBJECT: 18BON14 MFR - Cascades Island LPS Pacific Lamprey Mortalities**

On the morning of 4 June FFU personnel found the climbing section of the CI LPS did not have water flow and lampreys were present in the rest boxes (RB). They were able to reset one pump's GFI, reestablishing flow.

FFU removed morts from RB3, RB4, no fish were in RB5, thirty five morts were removed from RB6 (top most). RB1 and RB2 were flushed using pneumatically controlled valve and four mort fell from RB1. There were thirteen live lamprey left to continue their migration through the LPS. Ten mort were frozen for later study by the Lower Columbia River Fish Health Center and the remainder were returned to the river.

- A. Species – 54 Pacific Lamprey (*Entosphenus tridentatus*).
- B. Origin – Assumed naturally spawned
- C. Total Length – average 69.9 cm (range 52.8 to 74.5 cm)
  - a. Inter-dorsal distance mean 3.5 cm (range 1 to 5.5 cm)
- D. Marks and tags – No PIT tags (full or half duplex) or external tags discovered
- E. Marks and Injuries found on carcass – NA
- F. Cause and Time of Death – Pump failure between 2 June and 3 June.
- G. Future and Preventative Measures – Investigating using a lead pump and a lag pump vs. two in continuous operation. Investigating alarm systems to implement with new pump setup.
- H. Photos –
- I.



Figure 1. Pacific Lamprey mortalities from pump failure at Cascades Island LPS. In coordination with the Lower Columbia River Fish Health Center (Ken Lujan) ten were frozen for later study, the remainder were returned to the river.

Sincerely,  
Project Fisheries

Comments from others –

**NWP PM-E bios –**

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

From: Walker, Ricardo W CIV USARMY USACE (US)

Sent: Tuesday, June 05, 2018 8:44 AM

To: Mackey, Tammy M CIV USARMY CENWP (US) <Tammy.M.Mackey@usace.army.mil>; Kovalchuk, Erin H CIV USARMY CENWP (US) <Erin.H.Kovalchuk@usace.army.mil>; Bissell, Brian M CIV USARMY CENWP (US) <Brian.M.Bissell@usace.army.mil>

Subject: RE: FPOM: Official Coordination 18BON14 MFR CI LPS lamprey morts

Good morning Tammy et al,

Reading the MOC it looks like project may consider a lead lag pump set up. I just wanted project folks to be aware that this alternative was looked at for the JDA North Fish Ladder LPS. The concern is when you have one pump go down the switching mechanism can also fail. Whenever adding additional mechanical and electrical parts you increase the risk of failure. Ben and Brandt can provide more details if needed.

My question would be did the one pump failing cause the other pump GFI to trip? If the answer is likely yes then I would consider making sure the pumps are on isolated breakers / circuits. If they currently are on truly isolated circuits then we should investigate the likely cause of failure and correct the fault.

Based on discussions that happened for the JDA work I would consider lead lag pumps as the last resort.

Ricardo

**NWP Electrical –**

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

From: Bannister, Brandt D CIV CENWP CENWD (US)

Sent: Tuesday, June 05, 2018 8:54 AM

To: Walker, Ricardo W CIV USARMY USACE (US) <Ricardo.W.Walker@usace.army.mil>; Mackey, Tammy M CIV USARMY CENWP (US) <Tammy.M.Mackey@usace.army.mil>; Kovalchuk, Erin H CIV USARMY CENWP (US) <Erin.H.Kovalchuk@usace.army.mil>; Bissell, Brian M CIV USARMY CENWP (US) <Brian.M.Bissell@usace.army.mil>

Subject: RE: FPOM: Official Coordination 18BON14 MFR CI LPS lamprey morts

A little more information would be helpful. There are no "GFIs" for the pumps...each pump has a MCP (motor circuit protector) and an overload relay. So it's not clear what actually took the pump off line. Did a pump fail or did it just trip off line? Regardless, the float switch in the upwell box should have sent an alarm to the Operator's HMI in the Control Room. This should have given sufficient notice for someone to go out and check the situation. Do we know if the float switch is actually working correctly? Design was never notified of any field tests conducted during construction to verify this.

Brandt Bannister

Senior Electrical Engineer

Electrical Design Section

U.S. Army Corps of Engineers, Portland District

(503) 808-4924

brandt.d.bannister@usace.army.mil

**CRITFC –**

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

From: Laurie Porter [mailto:porl@critfc.org]

Sent: Tuesday, June 05, 2018 9:15 AM

To: Mackey, Tammy M CIV USARMY CENWP (US) <Tammy.M.Mackey@usace.army.mil>; Kovalchuk, Erin H CIV USARMY CENWP (US) <Erin.H.Kovalchuk@usace.army.mil>; Baus, Douglas M CIV USARMY CENWD (US) <Douglas.M.Baus@usace.army.mil>; Scott Bettin <swbettin@bpa.gov>; blane.bellerud@noaa.gov; Charles Morrill (charles.morrill@dfw.wa.gov) <charles.morrill@dfw.wa.gov>; Statler, Dave <daves@nezperce.org>; david\_swank@fws.gov; Ed Meyer (ed.meyer@noaa.gov) <ed.meyer@noaa.gov>; Eppard, Matthew B CIV CENWP CENWD (US) <Matthew.B.Eppard@usace.army.mil>; Erick VanDyke <erick.s.vandyke@state.or.us>; Hockersmith, Eric E CIV USARMY CENWW (US) <Eric.E.Hockersmith@usace.army.mil>; Jen Graham <jennifer.graham@ctwsbnr.org>; Kiefer,Russell <russ.kiefer@idfg.idaho.gov>; Tom Lorz <lorz@critfc.org>; Lundell, Tina M CIV USARMY CENWP (US) <Tina.M.Lundell@usace.army.mil>; Petersen,Christine H (BPA) - KEWR-4 <chpetersen@bpa.gov>; Setter, Ann L CIV USARMY CENWW (US) <Ann.L.Setter@usace.army.mil>; Sears, Sheri <Sheri.sears@colvilletribes.com>; Shutters, Marvin K CIV USARMY CENWW (US) <Marvin.K.Shutters@usace.army.mil>; Tidwell, Kyle S CIV (US) <Kyle.S.Tidwell@usace.army.mil>; trevor.conder@noaa.gov; Wertheimer, Robert H CIV USARMY CENWP (US) <Robert.H.Wertheimer@usace.army.mil>; Wright, Lisa S CIV USARMY CENWD (US) <Lisa.S.Wright@usace.army.mil>

Subject: [Non-DoD Source] RE: FPOM: Official Coordination 18BON14 MFR CI LPS lamprey morts

How often during the night time hours are these inspected to ensure the pumps are operating efficiently during the hours that lamprey are routinely passing?

Laurie Porter

**USFWS –**

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

From: Swank, David [mailto:david\_swank@fws.gov]

Sent: Tuesday, June 05, 2018 9:11 AM

To: Mackey, Tammy M CIV USARMY CENWP (US) <Tammy.M.Mackey@usace.army.mil>; Kovalchuk, Erin H CIV USARMY CENWP (US) <Erin.H.Kovalchuk@usace.army.mil>  
Subject: [Non-DoD Source] Re: [EXTERNAL] FPOM: Official Coordination 18BON14 MFR CI LPS lamprey morts

Hi Tammy,

Does this mean that there are two pumps for the LPS and both failed at the same time?

Dave

**Nez Perce –**

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

From: Dave Statler [mailto:daves@nezperce.org]

Sent: Tuesday, June 05, 2018 9:22 AM

To: Mackey, Tammy M CIV USARMY CENWP (US) <Tammy.M.Mackey@usace.army.mil>; Kovalchuk, Erin H CIV USARMY CENWP (US) <Erin.H.Kovalchuk@usace.army.mil>;  
Subject: [Non-DoD Source] RE: FPOM: Official Coordination 18BON14 MFR CI LPS lamprey morts

This is very unfortunate and disturbing. Pacific Lamprey genetic, metric and run-timing data have indicated that long distance migrants tend to be larger bodied and migrate earlier. Some of the mortalities from the pump failure may have been long distance migrants destined for the Snake Basin.

The vast majority of the Corps' effort for adult passage improvements has been at Bonneville Dam. Lamprey adult Passage Systems (LAPS) have essentially been the centerpiece of these efforts. The LAPS involves establishing fish-way approach and entrance conditions to promote passage within the smooth climbing sections, avoiding passage obstacles, such as excessive water velocities, sharp angles, poor attachment surfaces, predators, etc.

It is vital to implement necessary precautions to keep the adult lamprey out of harm's way as they are coaxed and shunted to use the LAPS. Future and preventative measures identified in the subject MFR include investigating using a lead pump and a lag pump vs. two in continuous operation, and investigating alarm systems.

I concur that it is extremely important to implement these precautionary measures as soon as possible, not only for the site of the subject pump failure, but for all LAPS where this type of water supply failure may occur. It is understood that logistical challenges may affect the timing of implementation. More frequent monitoring of LAPS should be carefully considered until such time that functional alarm systems are in place.

Additional comments and/or suggestions may follow this initial input.

Thank you for the opportunity to respond to the MFR concerning Pacific Lamprey.

Dave Statler

**BON Fisheries responses –**

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

From: Hausmann, Benjamin J CIV USARMY CENWP (US)

Sent: Tuesday, June 05, 2018 11:16 AM

To: Walker, Ricardo W CIV USARMY USACE (US) <Ricardo.W.Walker@usace.army.mil>; Mackey, Tammy M CIV USARMY CENWP (US) <Tammy.M.Mackey@usace.army.mil>; Kovalchuk, Erin H CIV USARMY CENWP (US) <Erin.H.Kovalchuk@usace.army.mil>; Bissell, Brian M CIV USARMY CENWP (US) <Brian.M.Bissell@usace.army.mil>

Cc: Tackley, Sean C CIV USARMY CENWP (US) <Sean.C.Tackley@usace.army.mil>; Bissell, Brian M CIV USARMY CENWP (US) <Brian.M.Bissell@usace.army.mil>; Derugin, Andrew G CIV (US) <Andrew.G.Derugin@usace.army.mil>; Smith, Brian K CIV (US) <Brian.K.Smith@usace.army.mil>; Filan, Benjamin J (Ben) CIV USARMY CENWP (US) <Benjamin.J.Filan@usace.army.mil>; Bannister, Brandt D CIV CENWP CENWD (US) <Brandt.D.Bannister@usace.army.mil>; Welton, Brent C CIV USARMY CENWP (US) <Brent.C.Welton@usace.army.mil>; Turaski, Michael R CIV USARMY CENWP (US) <Michael.R.Turaski@usace.army.mil>; Bluhm, Eric V CIV USARMY CENWP (US) <Eric.V.Bluhm@usace.army.mil>; Schroeder, James W CIV USARMY CENWP (US) <James.W.Schroeder@usace.army.mil>; Eppard, Matthew B CIV CENWP CENWD (US) <Matthew.B.Eppard@usace.army.mil>; Zorich, Nathan A CIV USARMY CENWP (US) <Nathan.A.Zorich@usace.army.mil>; Wertheimer, Robert H CIV USARMY CENWP (US) <Robert.H.Wertheimer@usace.army.mil>

Subject: RE: FPOM: Official Coordination 18BON14 MFR CI LPS lamprey morts

Yes, Ricardo, the project is pursuing a lead/lag system for the LPSs. We are also moving to standardize the individual systems because they have been installed over many years with different PDTs/contractors resulting in different pumps, voltages, alarms, etc. This is completely understandable but once the project inherits these systems into our O&M program, these differences cause significant inefficiency, cost, and headache. Our plan is to have one model of pump for all locations where possible (obviously not in the CI pool or the tailrace pumps for the LFS). We are well aware of the concept of more electrical/mechanical parts increasing the potential for failures and if we could have these systems function as gravity feed, we would. Short of that we want to pursue a lead/lag system that has proven itself in many other locations at Bonneville. Once we develop cost estimates per system and a timeframe, we'll share with all concerned.

Thanks for the e-mail.

Ben

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

From: Hausmann, Benjamin J CIV USARMY CENWP (US)

Sent: Tuesday, June 05, 2018 11:39 AM

To: Laurie Porter <porl@critfc.org>

Cc: Mackey, Tammy M CIV USARMY CENWP (US) <Tammy.M.Mackey@usace.army.mil>; Kovalchuk, Erin

H CIV USARMY CENWP (US) <Erin.H.Kovalchuk@usace.army.mil>; Walker, Ricardo W CIV USARMY

USACE (US) <Ricardo.W.Walker@usace.army.mil>; Zorich, Nathan A CIV USARMY CENWP (US)

<Nathan.A.Zorich@usace.army.mil>; lort@critfc.org; Statler, Dave <daves@nezperce.org>; Erick

VanDyke <erick.s.vandyke@state.or.us>; Charles Morrill (charles.morrill@dfw.wa.gov)

<charles.morrill@dfw.wa.gov>; david\_swank@fws.gov; Blane Bellerud <blane.bellerud@noaa.gov>;

Trevor Conder - NOAA Federal <trevor.conder@noaa.gov>; Wertheimer, Robert H CIV USARMY CENWP

(US) <Robert.H.Wertheimer@usace.army.mil>

Subject: RE: FPOM: Official Coordination 18BON14 MFR CI LPS lamprey morts

Laurie,

I tried to send this response only to folks who might be interested in the details of this issue. The systems are not checked at night. There are no biologists that work at night and the only personnel onsite are a skeleton crew of powerhouse operators. For what it's worth, the concept of insuring that the pumps are "operating efficiently" is probably not even possible during the daylight. The best we can do is say whether they are operating or not. Our plan is to move forward with more robust alarm systems while also pursuing the most reliable pump configuration that we can. Unfortunately, that's the best we can do. Our adult fishways were designed as gravity feed and as such, are extremely reliable. However, that is just not an option with these LPSs so we are at the mercy of equipment reliability and alarm functionality.

I can assure you that these events are very disturbing for the biologists that monitor and work to insure these systems operate properly. We are diligently working to make them better.

Ben

**FFU and BON Fisheries –**

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

From: Hausmann, Benjamin J CIV USARMY CENWP (US)

Sent: Tuesday, June 5, 2018 11:27 AM

To: Mackey, Tammy M CIV USARMY CENWP (US) <Tammy.M.Mackey@usace.army.mil>; Zorich, Nathan A CIV USARMY CENWP (US) <Nathan.A.Zorich@usace.army.mil>  
Cc: Bissell, Brian M CIV USARMY CENWP (US) <Brian.M.Bissell@usace.army.mil>; Derugin, Andrew G CIV (US) <Andrew.G.Derugin@usace.army.mil>; Halvorson, Leif J CIV (US) <Leif.J.Halvorson@usace.army.mil>  
Subject: RE: FPOM: Official Coordination 18BON14 MFR CI LPS lamprey morts

- 1) Yes, there are two pumps that failed but the CI system actually has 4 pumps. All pumps have to be working together for the system to operate. This is why we want to pursue a lead/lag system where this isn't the case. It's too hard to explain the whole system in an e-mail if folks are unfamiliar. Dave should come check it out some time.
- 2) There are no checks at night. No bios on duty and Ops does their rounds in the daylight hours. Hence the need for a reliable alarm system.
- 3) There are two GFI's that the pumps plug into. It looks like they are wired into the same circuit (see attached photo).
- 4) Brandt's question needs to be directed to an electrician. I think he was involved in the system design but if he has questions about how well the alarms or float switches are working he would need to either come out or speak with a powerhouse electrician. I would suggest Troy St. John as the PH2 electrical supervisor.

I hope this helps.  
Ben

4) Bannister is referencing the 2nd upwelling box, pumps, and controllers (near the exit). I don't think he knows about the 1st one that draws water from the pond area. There are no alarms, level sensors, or flow indicators that I know of in the 'old' part of the CI LPS.

-Nathan



