

JOHN DAY SOUTH LADDER TEMPERATURE DATA

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Fiscal Year 2023 AFEP Research Summary Review and Development Meeting notes (March 1, 2022):

- ✓ JDA project staff are preparing a memo for **FPOM** with their findings from 2021 temperature monitoring
- ❖ If FPOM's (pending) review of existing data determines additional RM&E is needed, it will be coordinated through **SRWG**
- ❖ Trevor Conder has seen enough already and suggested the Corps [**FFDRWG**] go straight to designing a cooling structure

d. ****NEW****: Ladder cooling potential at John Day Dam

- *IF* FPOM's (pending) review of existing data determines additional RM&E is needed, it will be coordinated through SRWG
- Corps may seek SRWG advice on objectives, priorities, and (eventually) technical review of proposals and reports
- Figure 5-8 from Lundell, 2019 ([link to report](#)) shows periods where water at depth is several degrees cooler than water at the surface near the JDA South ladder exit. Is there any way to use that cooler water to improve passage conditions in the ladder?
- JDA project staff are preparing a memo for FPOM with their findings from 2021 temperature monitoring.
- JDA project staff are adding temperature-depth profiles at JDA-SS-2 to their temperature monitoring for 2022.
- SRWG will help identify additional RM&E needs as they arise.
- Trevor Conder (NOAA) has seen enough already and suggested the Corps go straight to designing a cooling structure.



Figure 4-1. The John Day South Fish Ladder Exit and Locations of the Four Temperature Profile Strings; JDA-SS-1 and JDA-SS-2 (red triangle) are attached to the Structure, while JDA-SS-3 and JDA-SS-4 are Floating Strings (yellow circle).

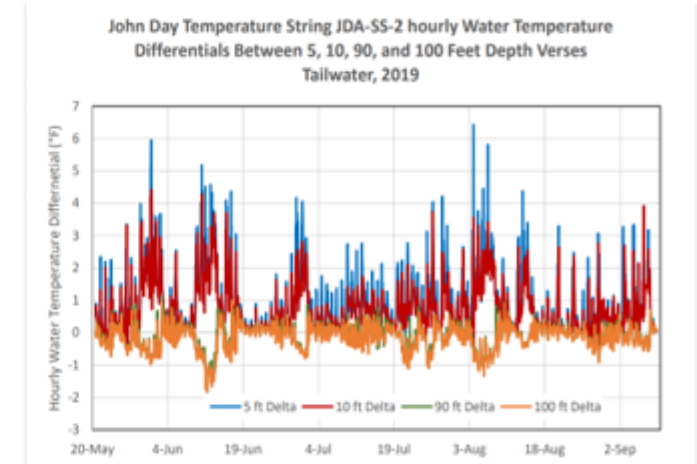
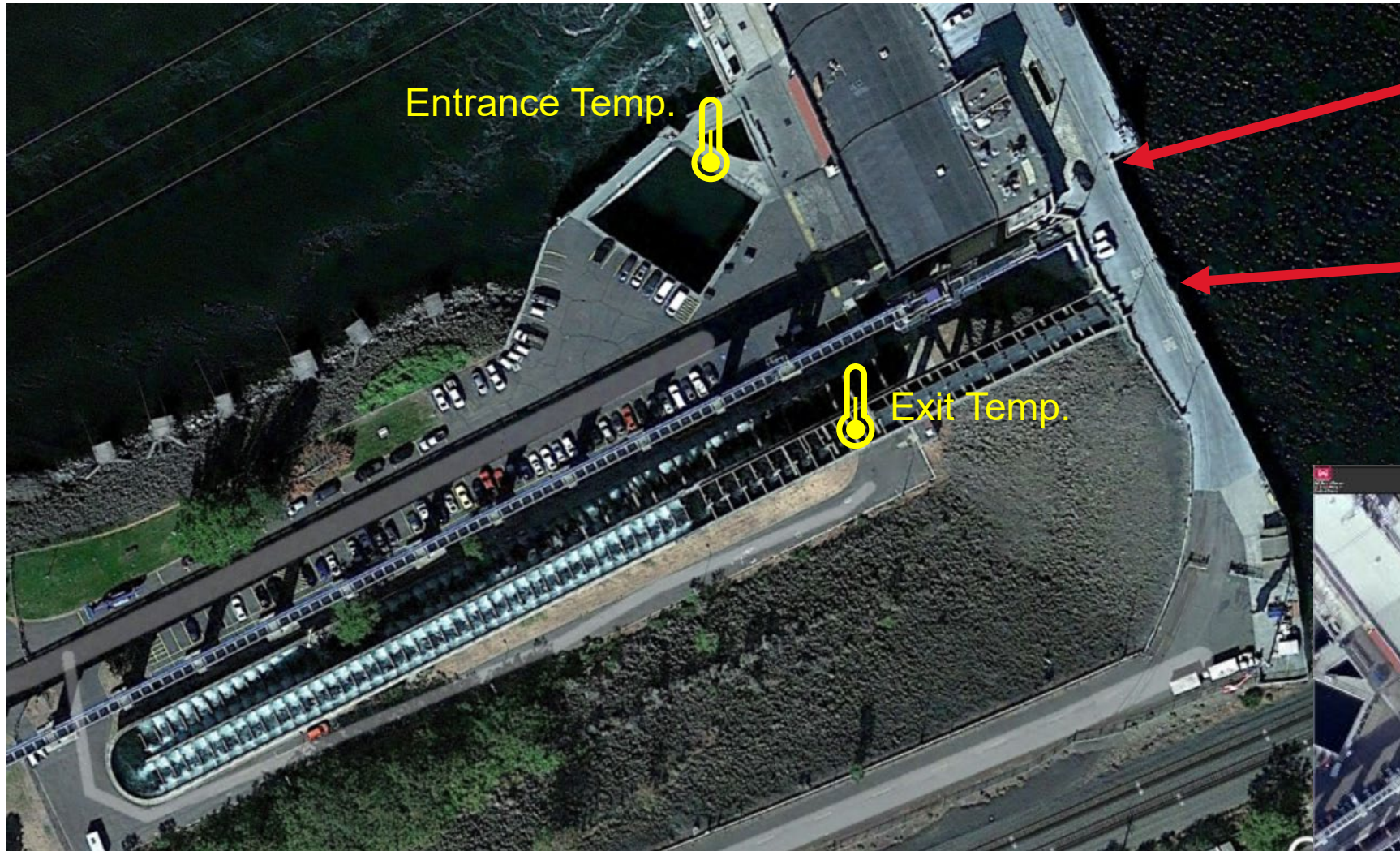


Figure 5-8 John Day Forebay Hourly Vertical Profile Temperatures Differentials JDA-SS-2 Calculated between Selected Depths and Tailwater TDG Station (JHAW) Water Temperature, May 20 - September 9, 2019



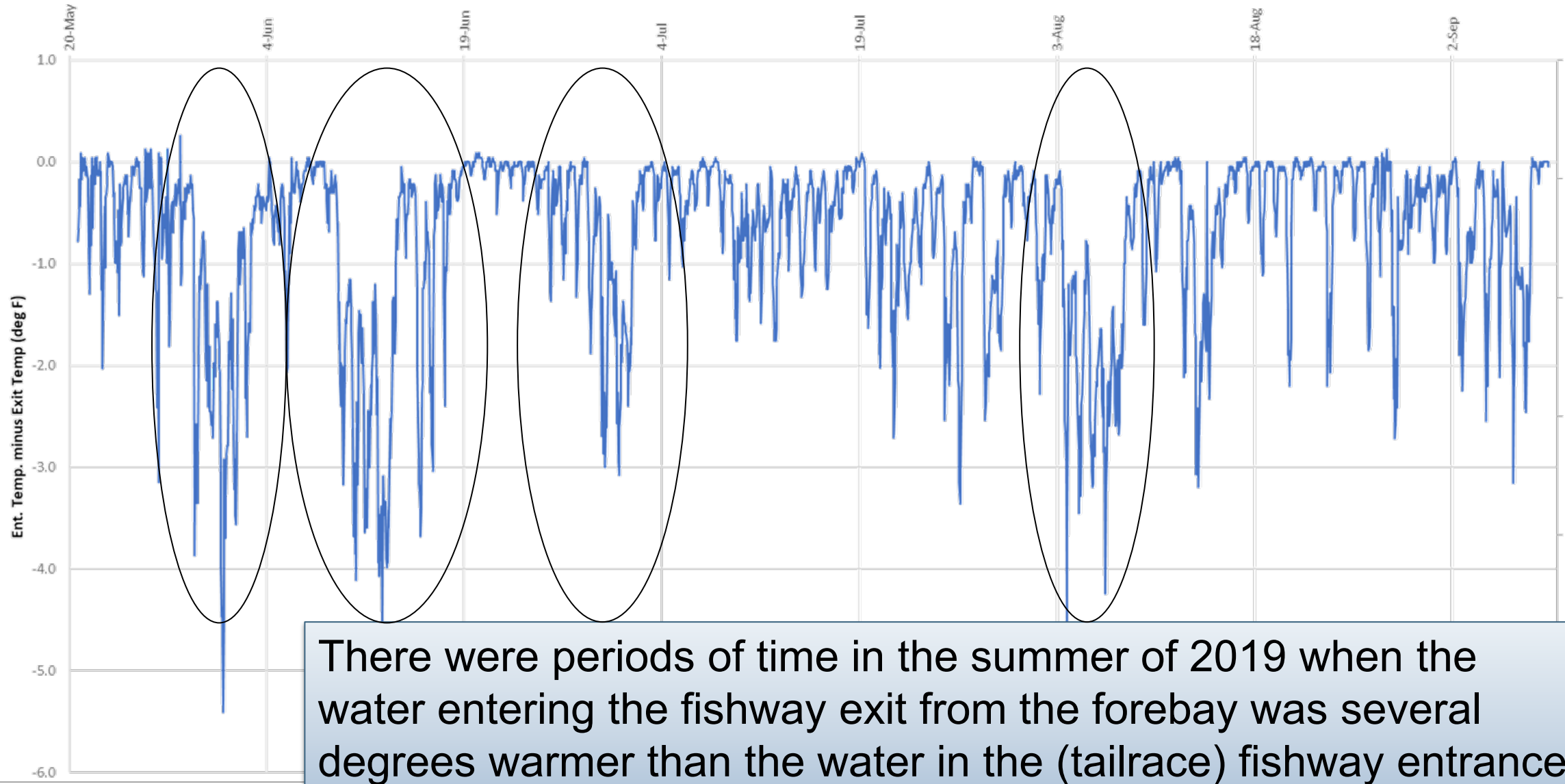
Monitoring site
JDA-SS-2 is here

JDA South Fish
Ladder exit is here





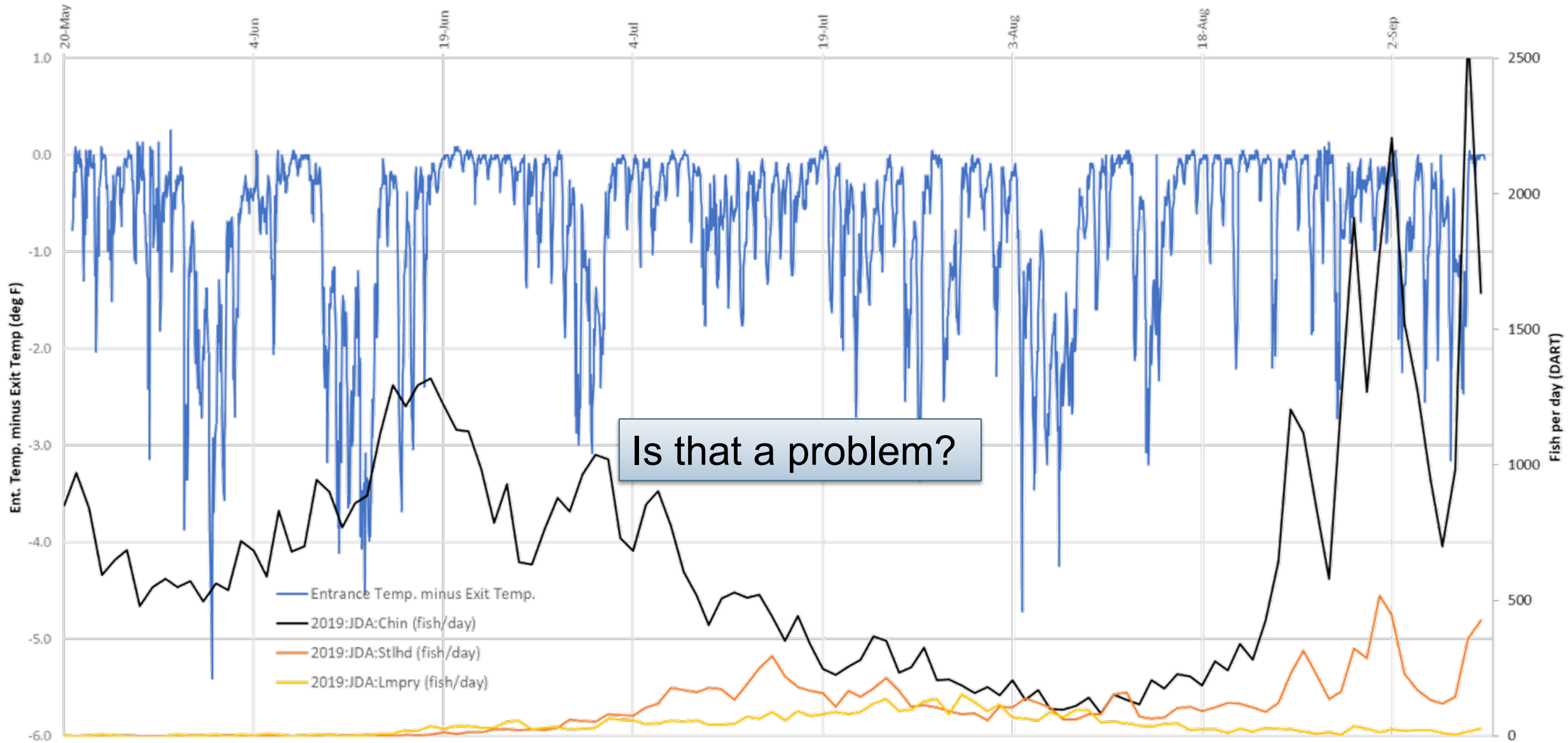
John Day South Ladder 2019 Temperature Differentials (deg F) Between the Fishway Entrance and Fishway Exit (Entrance and exit temperatures were recorded by JDA project staff)



There were periods of time in the summer of 2019 when the water entering the fishway exit from the forebay was several degrees warmer than the water in the (tailrace) fishway entrance



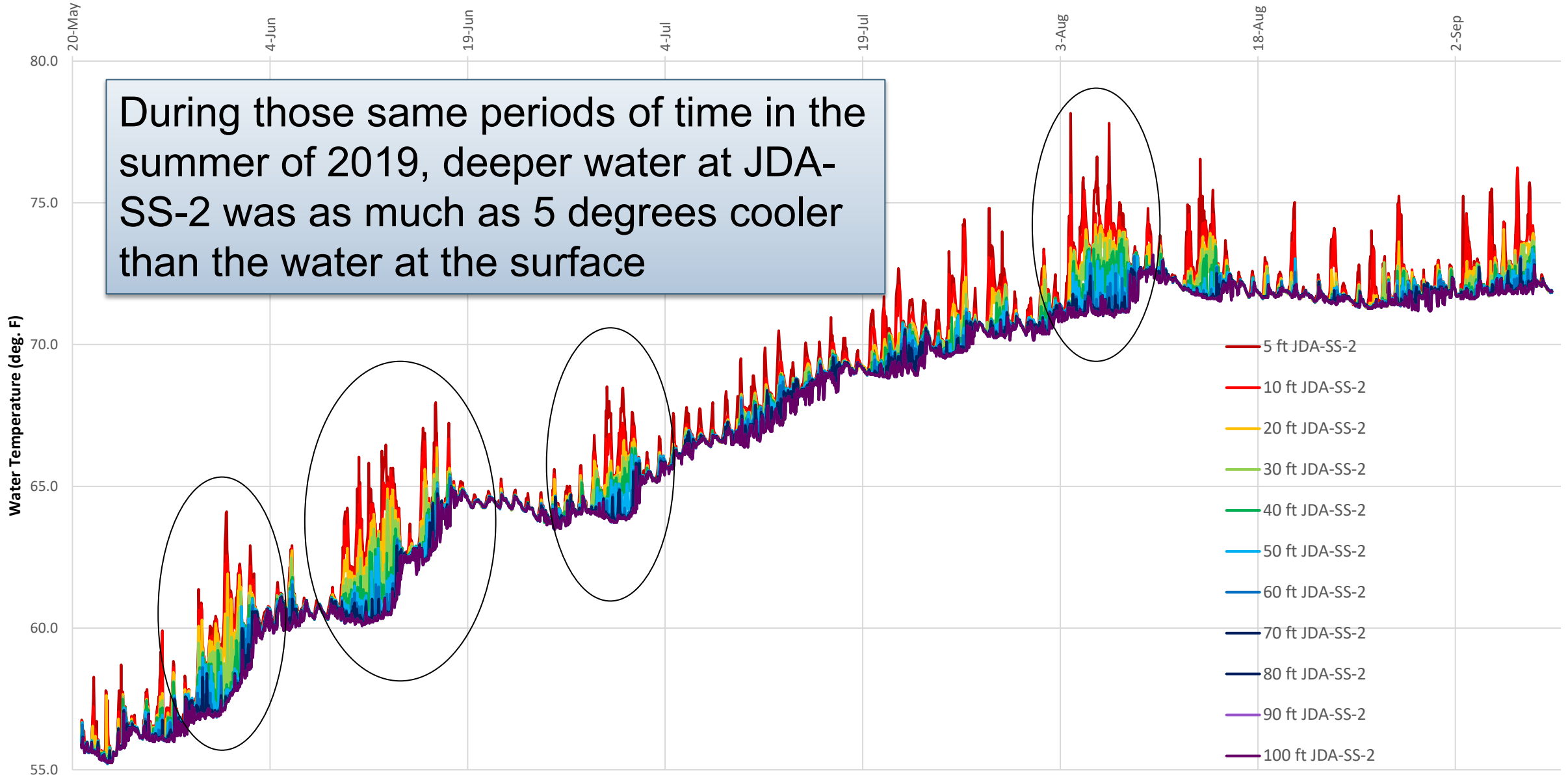
John Day South Ladder 2019 Temperature Differentials (deg F) Between the Fishway Entrance and Fishway Exit (Entrance and exit temperatures were recorded by JDA project staff)



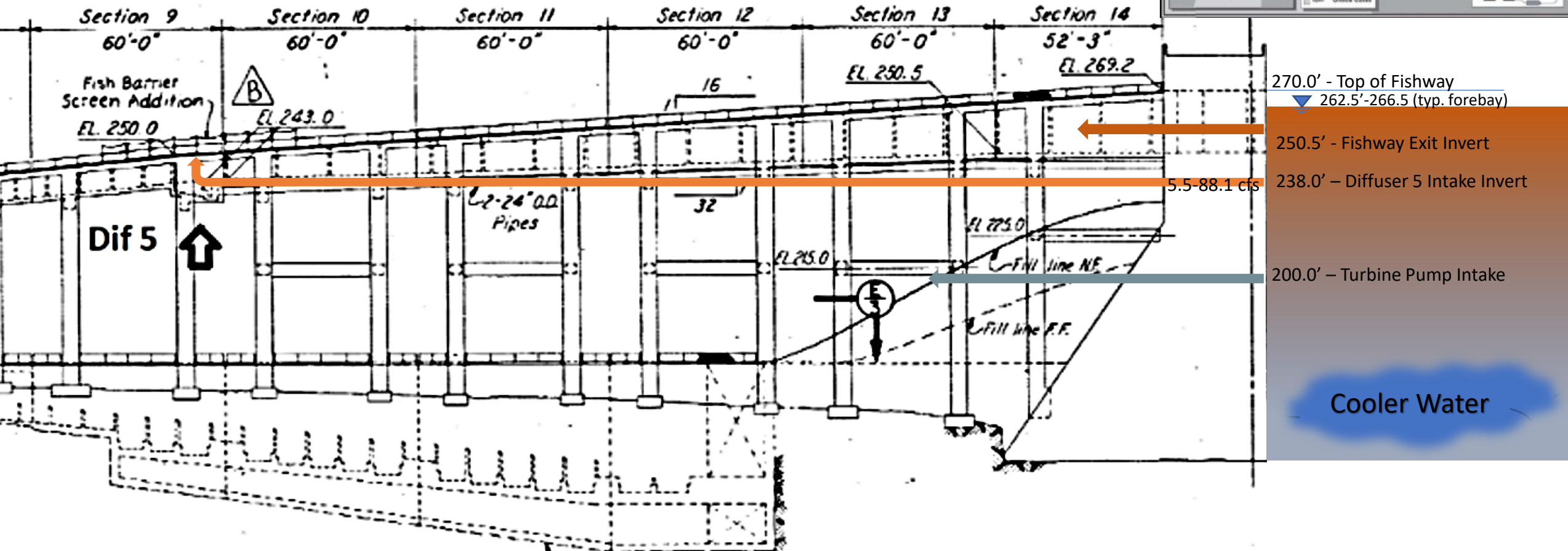
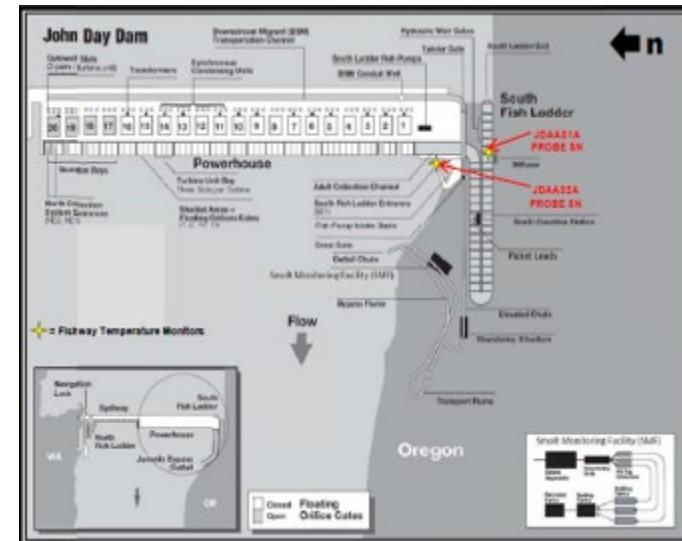


John Day South Ladder Forebay Temperature String JDA-SS-2 2019 Profiles

(From Lundell et al. 2019)

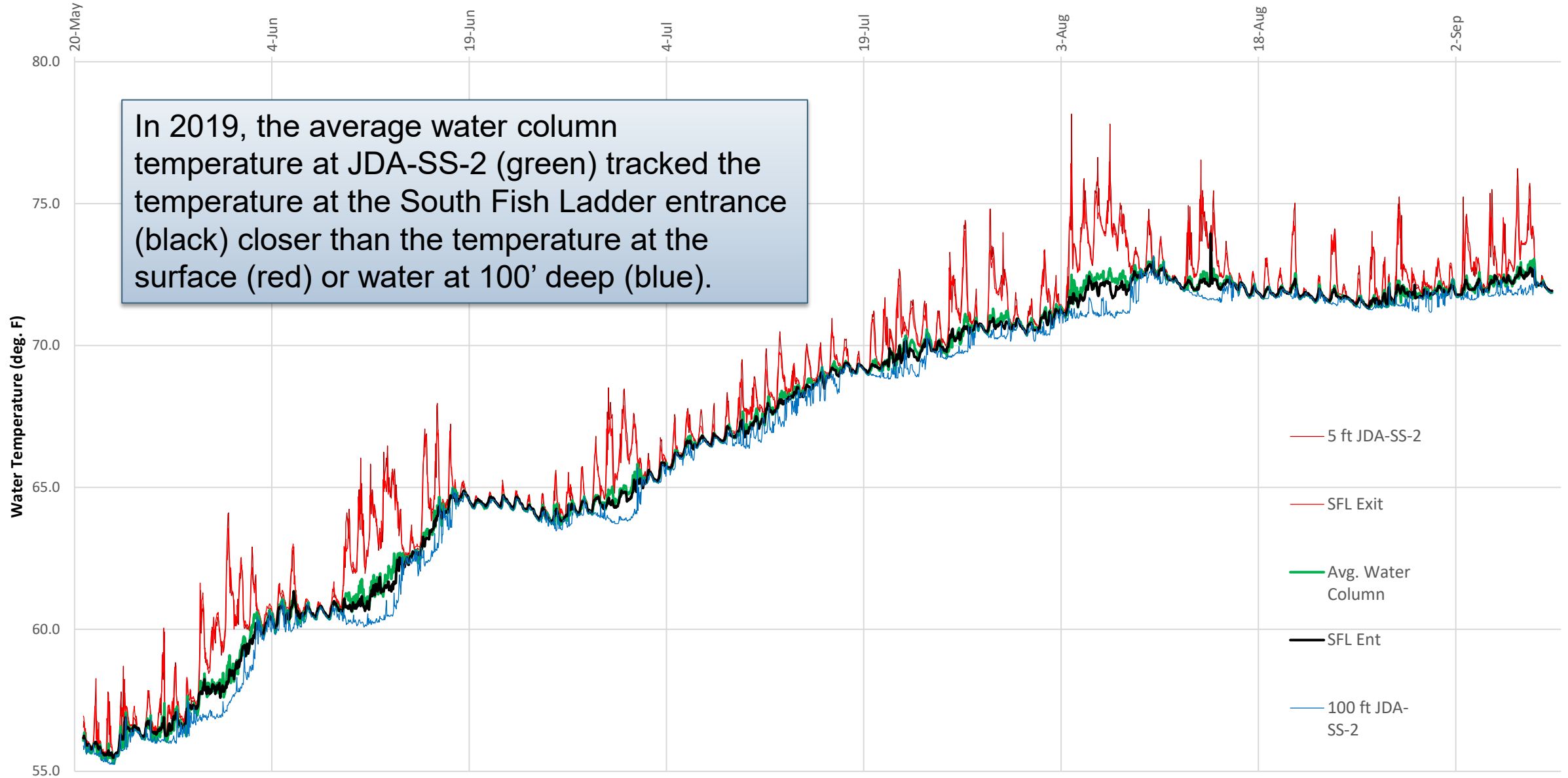


1. The top ~15' of the water column is gravity-fed through the control section
2. Auxiliary water from a depth of ~25' in the forebay is added in at diffuser #5
3. A penstock at ~65' deep drives fish pumps that add attraction water at the entrance from a sump in the tailrace





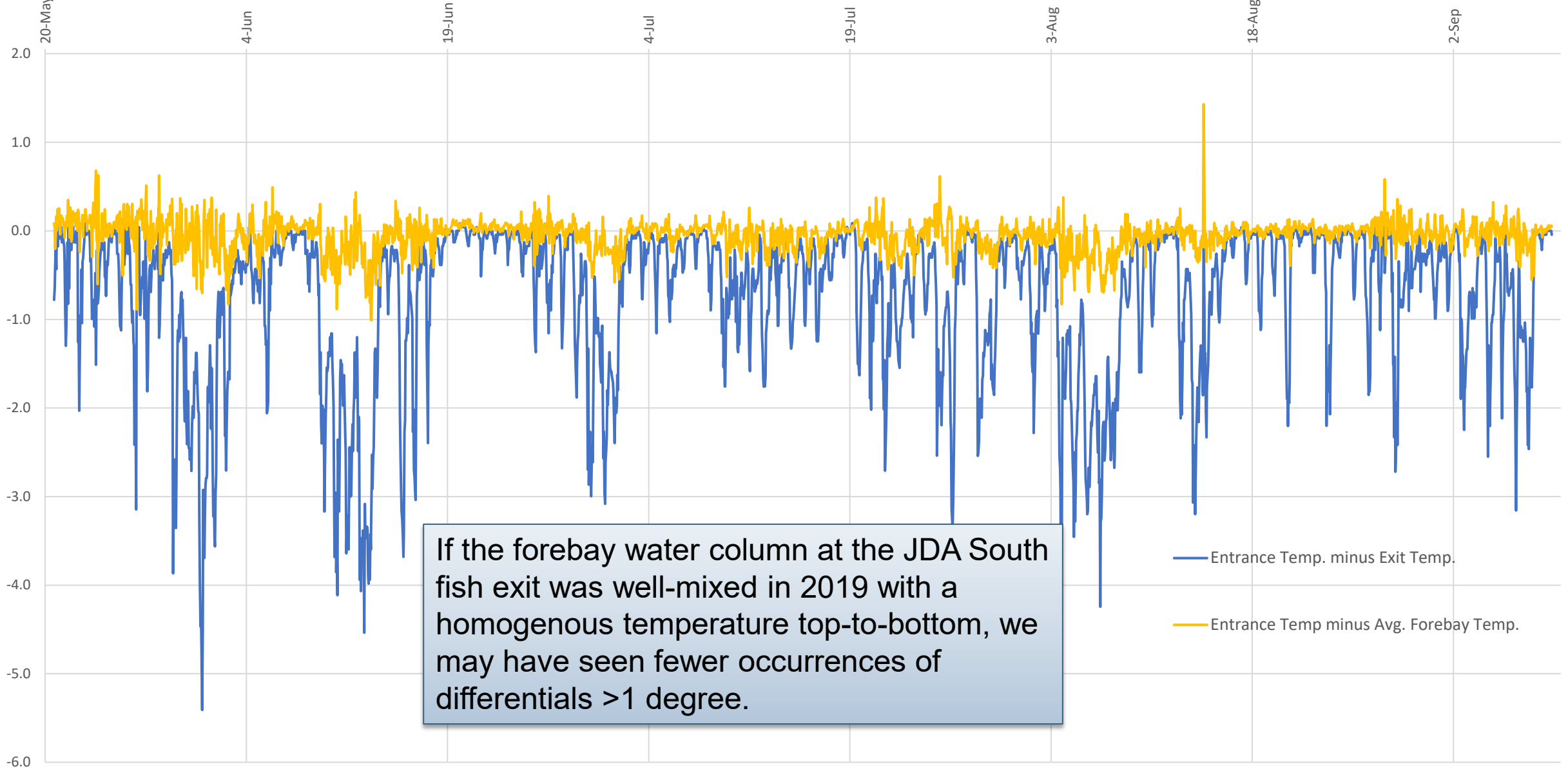
John Day South Ladder Forebay Temperature String JDA-SS-2 2019 Profiles (From Lundell et al. 2019)





John Day South Ladder 2019 Temperature Differentials (deg F) Between the Fishway Entrance and Fishway Exit and Average Forebay Water Column Temperature

(Entrance and exit temperatures were recorded by JDA project staff, average forebay water column tempera



If the forebay water column at the JDA South fish exit was well-mixed in 2019 with a homogenous temperature top-to-bottom, we may have seen fewer occurrences of differentials >1 degree.



POTENTIAL NEXT STEPS



1. FPOM:

- ✓ a) Test an extended “shad mode” operation to determine if ladder temperatures in the overflow section can be cooled by additional water from the diffuser intake at 238’ msl (~25’ deep).
- ✓ b) Operate a temperature string at 10’ depth intervals in the John Day forebay (at JDA-SS-2) in 2022 to determine if patterns observed in 2019 are repeatable.

2. FFDRWG **could** seek funding to design a structure for the JDA South Ladder to pump deep water up to the surface, like to those in operation at the Snake River projects. (design FY24, construction FY25??)

3. SRWG **could** seek funding to test alternative (cheaper!) methods to thermally mix the water column near the fishway exit to reduce the magnitude of entrance-exit temperature differentials.

