# Fish Passage Plan (FPP) Change Form

**Change Form # & Title**: 22TDA001 – Flow Velocity Measure Change

**Date Submitted**: 10-November-2021

**Project**: The Dalles Dam

**Requester Name, Agency**: Bob Cordie, Corps TDA

**Final Action: APPROVED 10-February-2022**

**FPP Section**: TDA section 2.4.2. Adult Facilities / Fish Passage Season (March 1-Nov 30)

**Justification for Change**: Using a new method of measuring flow velocity.

**Proposed Change**:

**2.4.2. Adult Fish Facilities – Adult Fish Passage Season (March 1 – November 30).**

**2.4.2.6.** Measure fishway channel water velocities once per week during adult passage season as part of the fishway inspection program. If operating the AWS backup system, check velocities 3 times per week.

A portable flow meter will be used in accessible locations of the fishway channels that are supplemented by auxiliary water and results provided in the project weekly fishway status report.

Maintain water velocity in the range of 1.5–4.0 feet per second (fps), 2 fps optimum, for the full length of the powerhouse collection channel and the lower ends of fish ladders that are below tailwater.

**Comments**:

FPOM FPP Meeting 1/27/22:

Morrill - why only once per week?

Cordie - based on past observations, the velocity doesn’t change much and doesn’t range outside of the 1.5-4 fps criteria.

Lorz - ok with once a week. Have you compared the methods side by side to confirm they're close enough?

Cordie - in the process of comparing now. Hydraulics can really impact readings. Looking at finding best representative method.

Conder – what about a better flow meter? Figure out average velocity and find a location that represents that and put a flow meter there.

Cordie – a portable meter is a lot better than floats which can get hung up and throw readings off. A stationary meter would only measure one spot. They looked at RT data and decided the best way would be to record data in representative locations to evaluate the whole channel rather than one spot. The new meter is mechanical and deployed in standard locations to get reading throughout channel.

Conder - that's fine but once a week might lose ability to see if there's a problem. A stationary meter would address that.

Morrill - more comfortable with 2-3 x/week.

Bellerud - which site is the decision point? Once a week seems a little thin. Why would velocity change?

Cordie - it doesn't. Some variability depending on tailwater but no real change, so once a week is sufficient to determine if something is off.

Derugin - hoping to do same thing at BON. He’s never seen it go out of criteria.

Cordie - one location won’t be representative. Will get back to FPOM after they finish the study to determine locations and compare to historic data.

PENDING more review and discussion at the February 10 FPOM.

7-Feb-2022 email from Bob Cordie:

Fishway Velocity Evaluation

A new velocity meter was purchased at The Dalles to replace the old method of timing a float down the fishway channels and entrances areas. The resulting data had some evident differences. (Data collection and evaluation by Jim Day)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Measurement Location | Velocity meter (ft/sec) | Float velocity (ft/sec) | Difference |
| 11/4/2021 | Transportation east | 2.46 |   |  |
| 11/4/2021 | Transportation west | 4.66 |   |  |
| 11/4/2021 | Collection east | 1.66 |   |  |
| 11/4/2021 | Collection west | 1.45 |   |   |
| 11/4/2021 | South entrance | 4.01 |   |   |
| 11/22/2021 | South entrance | 4.39 |   |   |
| 11/22/2021 | Collection west | 2.39 |   |   |
| 12/6/2021 | North entrance | 2.74 | 2.6 | 0.1 |
| 1/27/2022 | Transportation east | 4.17 | 3 | 1.8 |
| 1/27/2022 | ITS south | 4.32 | 3.1 | 1.2 |
| 1/28/2022 | Collection east | 2.02 | 3 | 1.0 |
| 1/28/2022 | Collection west | 3.19 | 3 | 0.2 |
| 1/28/2022 | South entrance | 3.89 | 3.9 | 0.0 |
| 1/28/2022 | ITS south | 4.17 | 3.9 | 0.3 |
| 1/28/2022 | Transportation east | 4.46 |   |   |
| 1/29/2022 | Transportation east | 4.43 | 2.9 | 1.5 |
| 1/29/2022 | South entrance | 4.20 | 3.9 | 0.3 |
| 1/29/2022 | South bridge east | 4.17 | 3.9 | 0.3 |
| 1/30/2022 | Transportation east | 4.31 | 2.8 | 1.5 |
| 1/30/2022 | South entrance | 4.79 | 4.2 | 0.6 |
| 1/30/2022 | South bridge east | 4.18 | 3.3 | 0.9 |
| 1/30/2022 | Collection east | 1.77 |   |   |

Conclusion;

-Using the float method down long sections of channels we usually underestimating the total velocity average due to surface tension and having the float hang up in various areas.

-Entrance area with short straight runs had similar results

-The meter is more likely to measure the highest velocity in the channel because it measures closer to mid channel. Areas along walls, floor and at surface will always be slower due to friction.

Questions;

-Where did 1.5-4.0 (optimum 2) come from? Reference to this criteria should be included in the FPP?

-If we have areas >4 fps, is that a problem for fish passage? They can follow the floor with less velocity.

FPOM 2/10/22:

Cordie went over the report (copied above). There is a significant difference between results from the float and the meter. Float underestimates. The sensor found some areas over the 4 fps criteria.

Bellerud – the float equates to a functional fish passage. How does the meter relate?

Cordie – the sensor finds the max velocity in that location, but the perimeter (wall, surface, bottom, etc.) is less. Is that an issue? Is the 1.5-4 criteria the best range? Where did it come from?

Bellerud – unsure. Will need to talk to engineers about source for that velocity range. Maybe need to reexamine what are acceptable passage conditions.

Cordie – if we do find spots that are out of criteria, there are no options to remedy.

Bellerud – find a spot to monitor that is representative (a surrogate), then watch for variability that might indicate a problem.

Cordie will put together a one-pager of proposed monitoring locations and present at a future FPOM to have more discussion on this topic. In the meantime, the edits in the change form are good to go.

**Record of Final Action**: Approved at FPOM on 10-Feb-2022.