If you build it they will come: An experimental vertical climbing wall for Pacific lamprey

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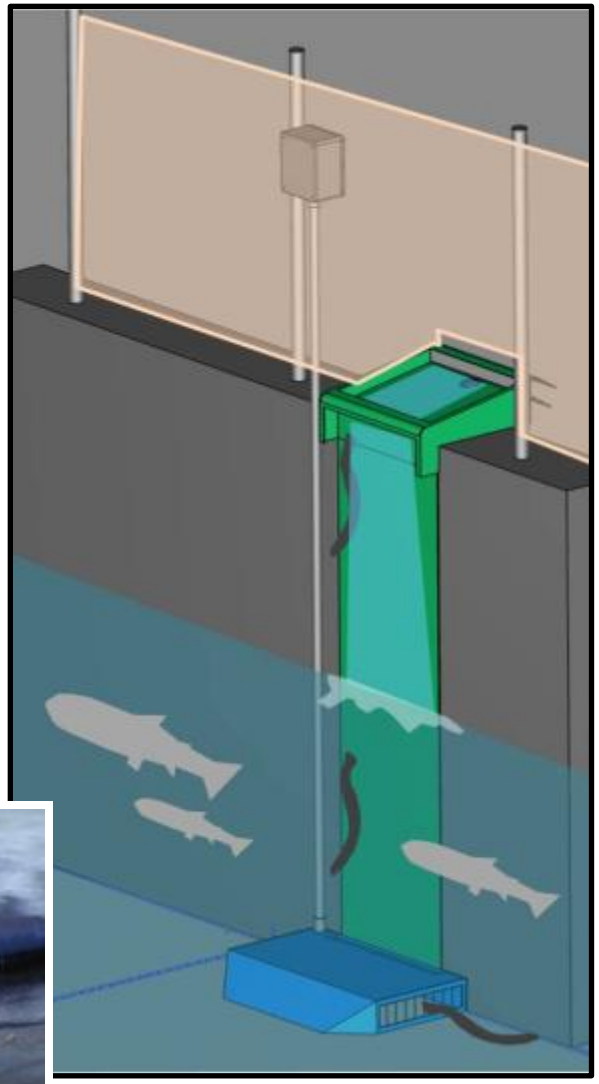
Taking advantage of lamprey climbing ability

- 45 degree climb maximizes climbing speed
- Capable of climbing vertical walls

Could we use vertical climbing ability at Bonneville?



Wetted Wall Climbing Structure

- Height: 5.4 feet
- Wall Width: 18 inches
- Pan length: 18 inches
- Exit Width: 4 inches

Experimental Design

- 3 ways of supplying water:
  - Overflow
  - Sidewell
  - Upwell

- 3 flow levels per type

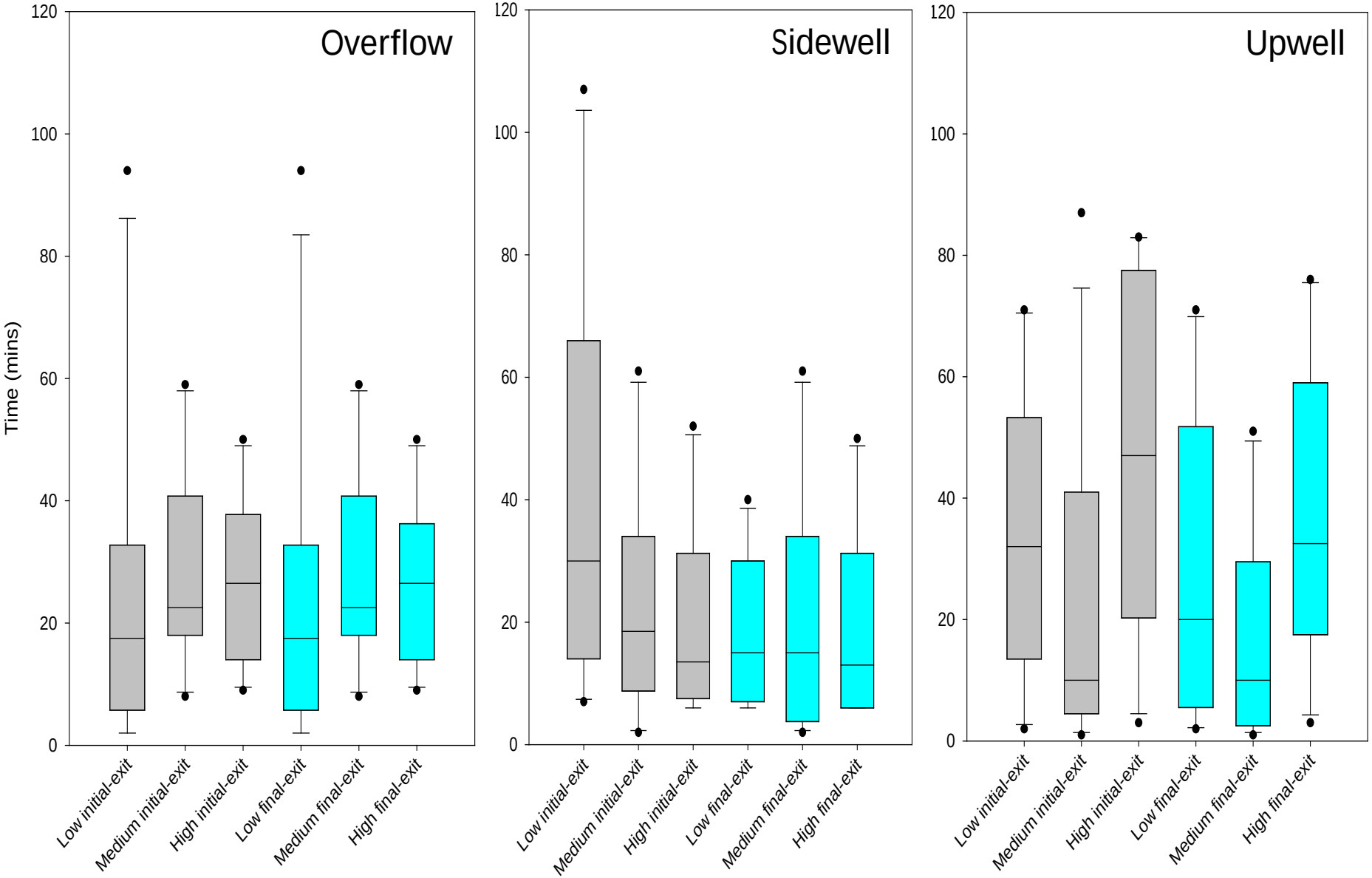
	Cascading volume (gpm)		
	Overflow	Sidewell	Upwell
Low	3.8	6.0	1.7
Medium	24.0	19.8	3.9
High	47.5	27.4	8.2

Experimental Design

- Lamprey individually marked
- 2.5 hours per trial
- Up to 8 individuals simultaneously, until 10 total had interacted with the wall
- Response variables:
  - First wall touch
  - Time to crest
  - Time out exit
  - Number of attempts

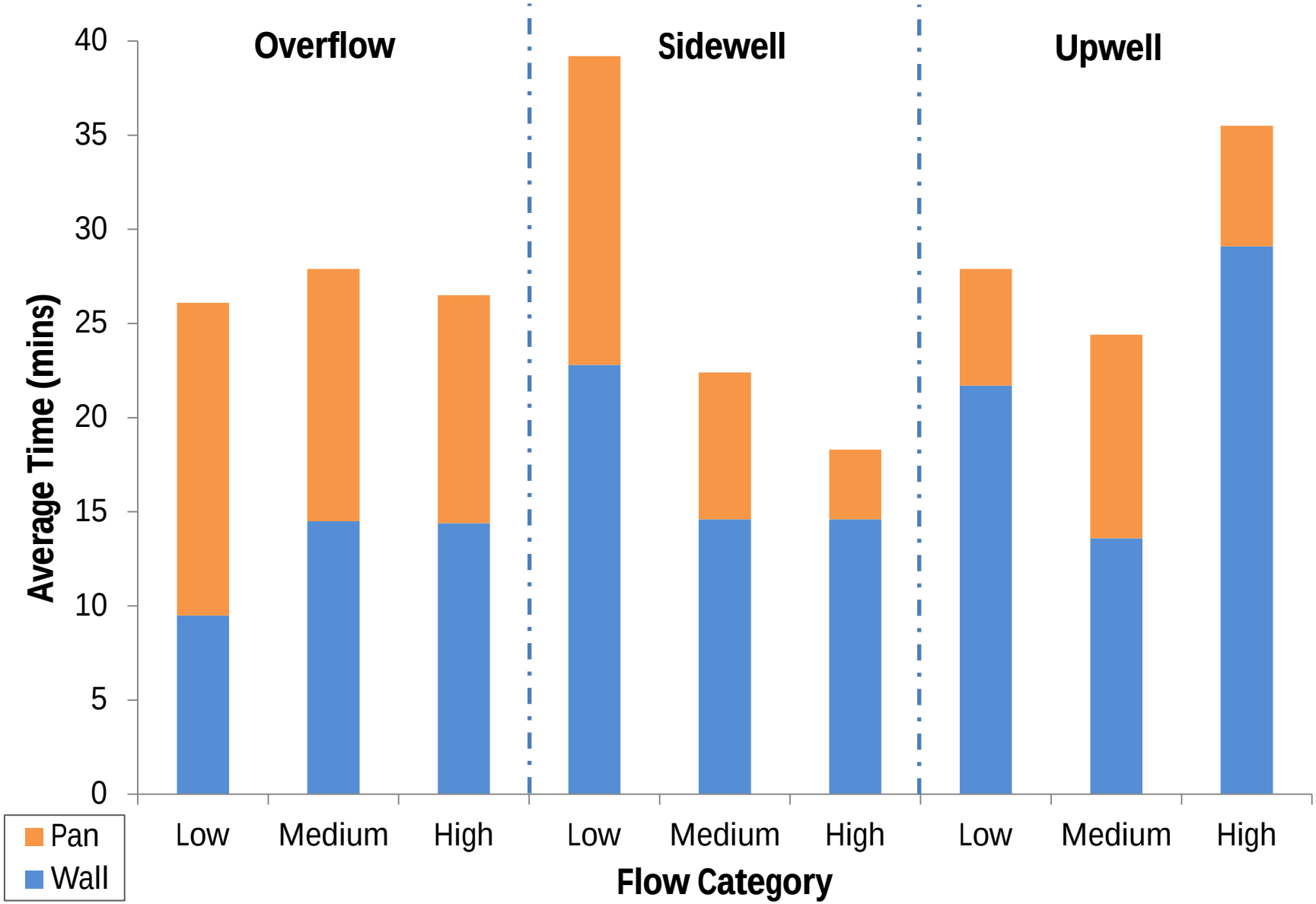
847

Results: Wall touch to Exit



N	12	10	10	12	12	11	13	14	11

Time spent vertical vs. in the pan



Conclusions

- Lamprey will climb a vertical wall at any of these flow levels and successfully exit.
- Of the conditions we tested, a sidewelling water supply of 6-20gpm (low-medium) would be recommended for field testing.
- Given the success, this shows great potential for field applications.

Lessons Learned

- Lengthen the pan to improve ease of passage for larger fish.

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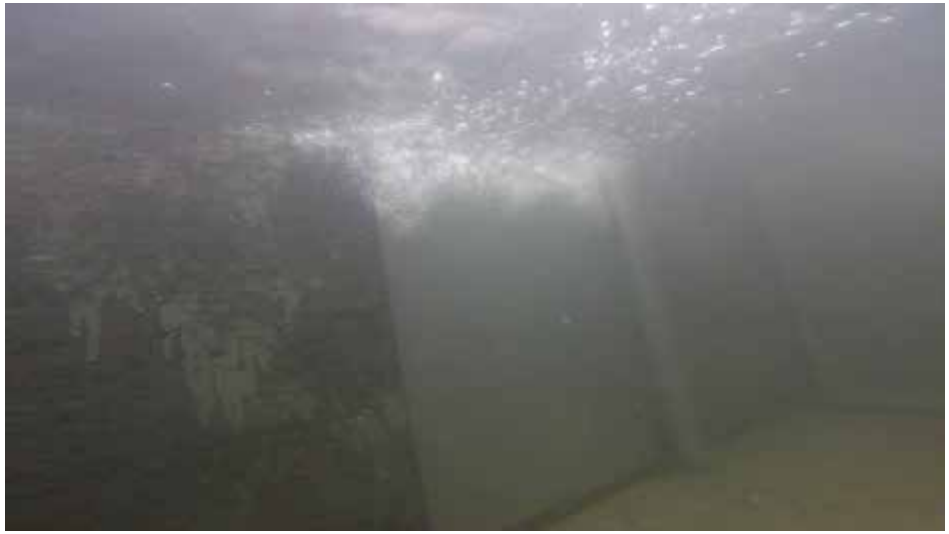
- Conduit attached on upstream side of climbing surface advantageous to directing lamprey but provide dead-end climbing avenue.



- Higher (dry) walls in the pan will help prevent accidental exits.

- Removing perforated plate for upwelling functionality will allow attachment to exit point (functionally extending the pan).