

Application of DIDSON and underwater video to evaluate adult Pacific lamprey behavior and passage performance at McNary Dam south fishway entrance

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Background

Relatively high passage of lamprey at SFEs

Lamprey passage structure scheduled for installation in 2014

In 2012, 16 inch slot installed at bottom of telescoping gate of SFE2

Objectives

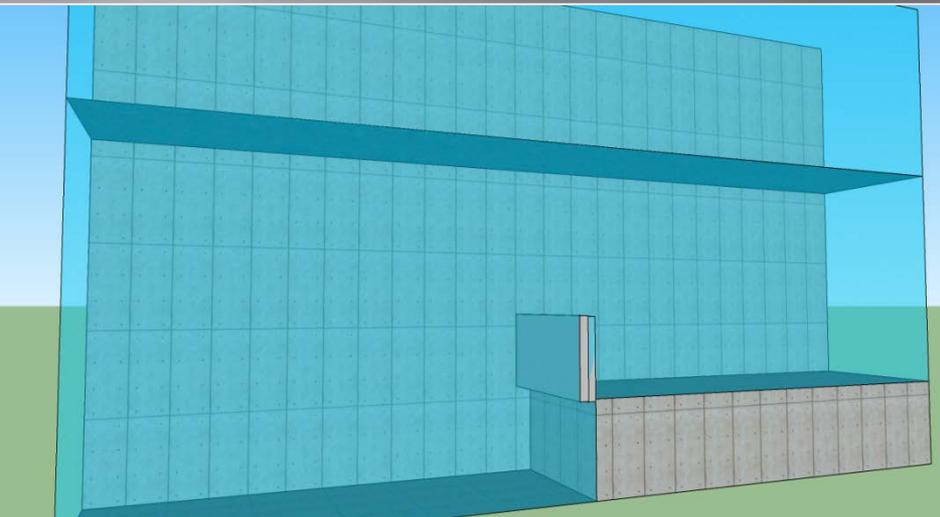
- Use video technology to evaluate lamprey approach behavior at SFE2 and entrance into deep slot
 - Approach (DIDSON)
 - Passage (Optical video)
- Evaluate salmonid entrance into deep slot

McNary SFE Structure



SFE1

SFE2



No Slot- nighttime operation



16" Slot: no nighttime operation

Experimental Design

DIDSON Cameras

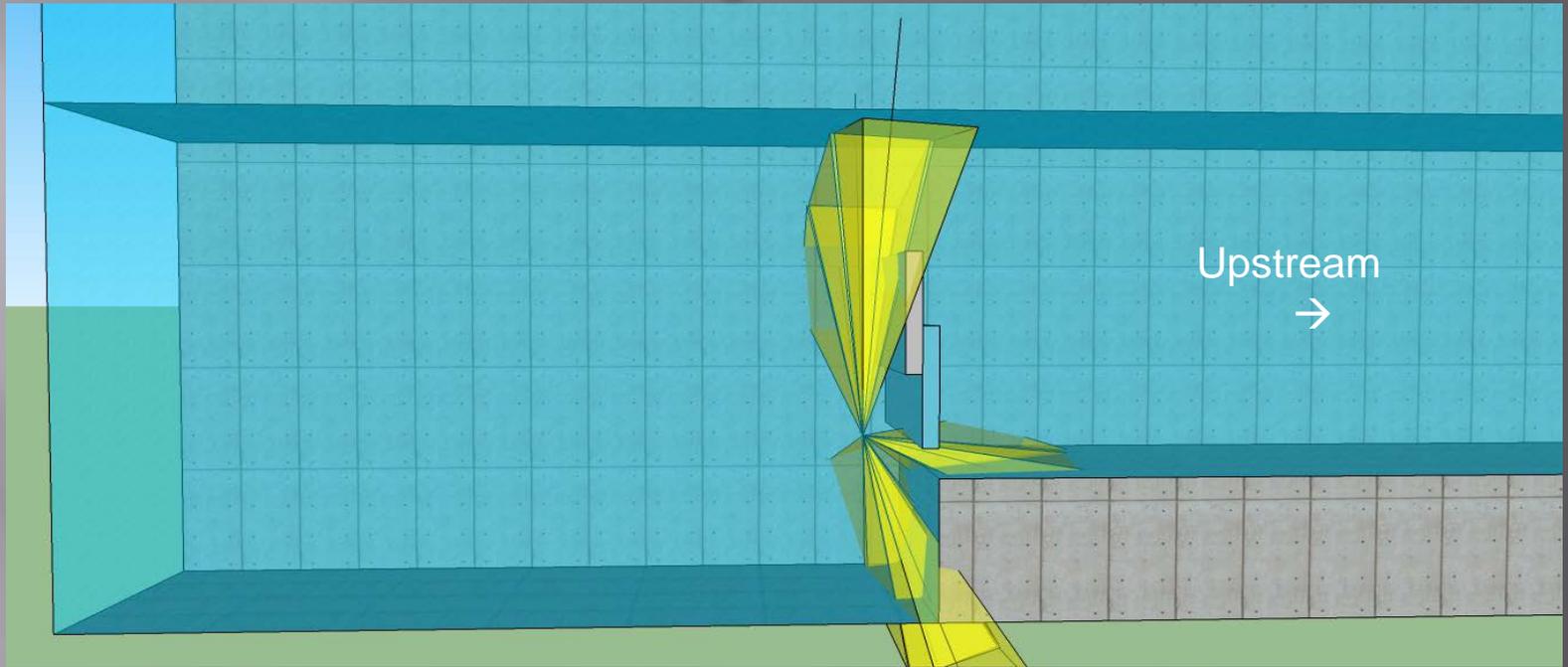
- Sample specified volumes 3xs a night (21:00-05:00)
 - Programmed pan and tilt in time increments
- Operational from July 7-Aug 7; Aug 21- Sept 3
 - Mechanical rotator failure (1 camera/rotator)
- Data Review
 - 704 hours processed using DIDSON software

Optical Cameras

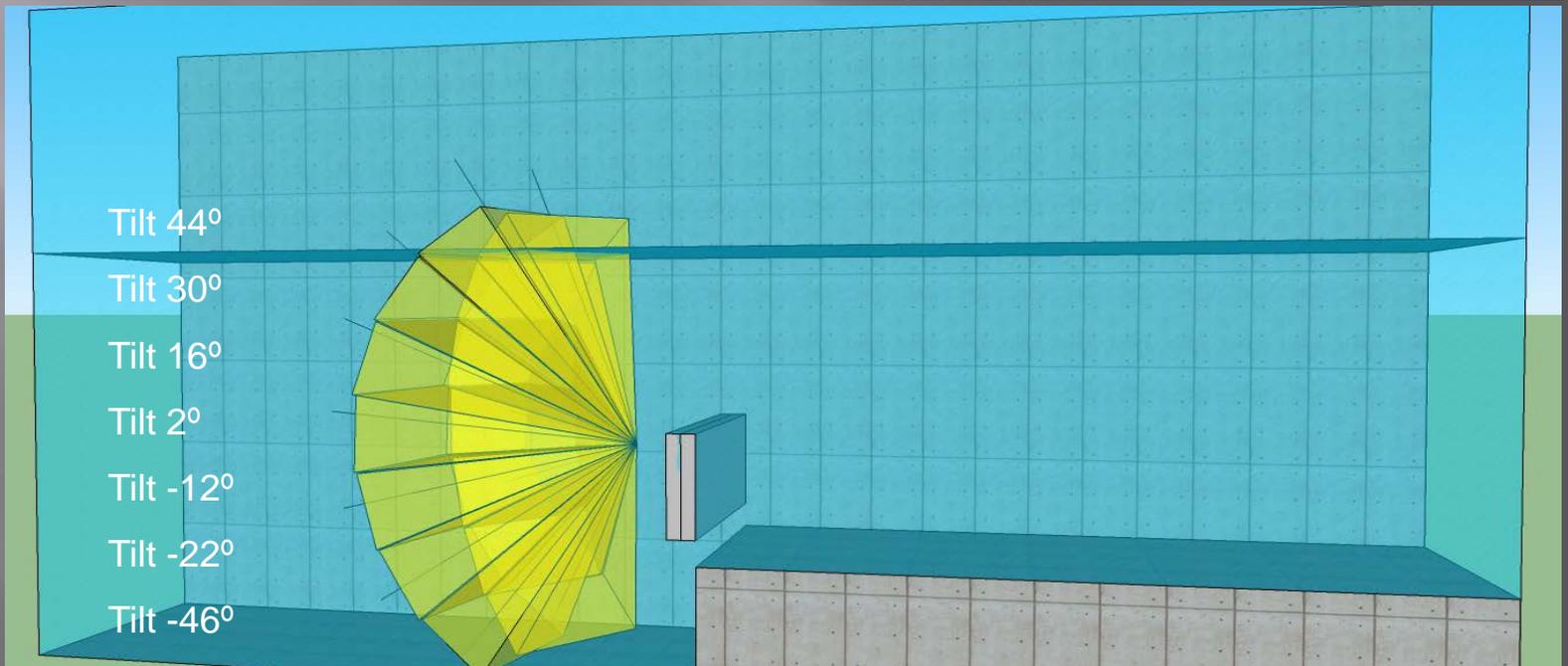
- 3 at SFE2 to evaluate slot entrance of lamprey
- Data Review
 - 6,500 hours processed using CBVision

DIDSON Coverage Area SFE2

Upstream-facing
DIDSON



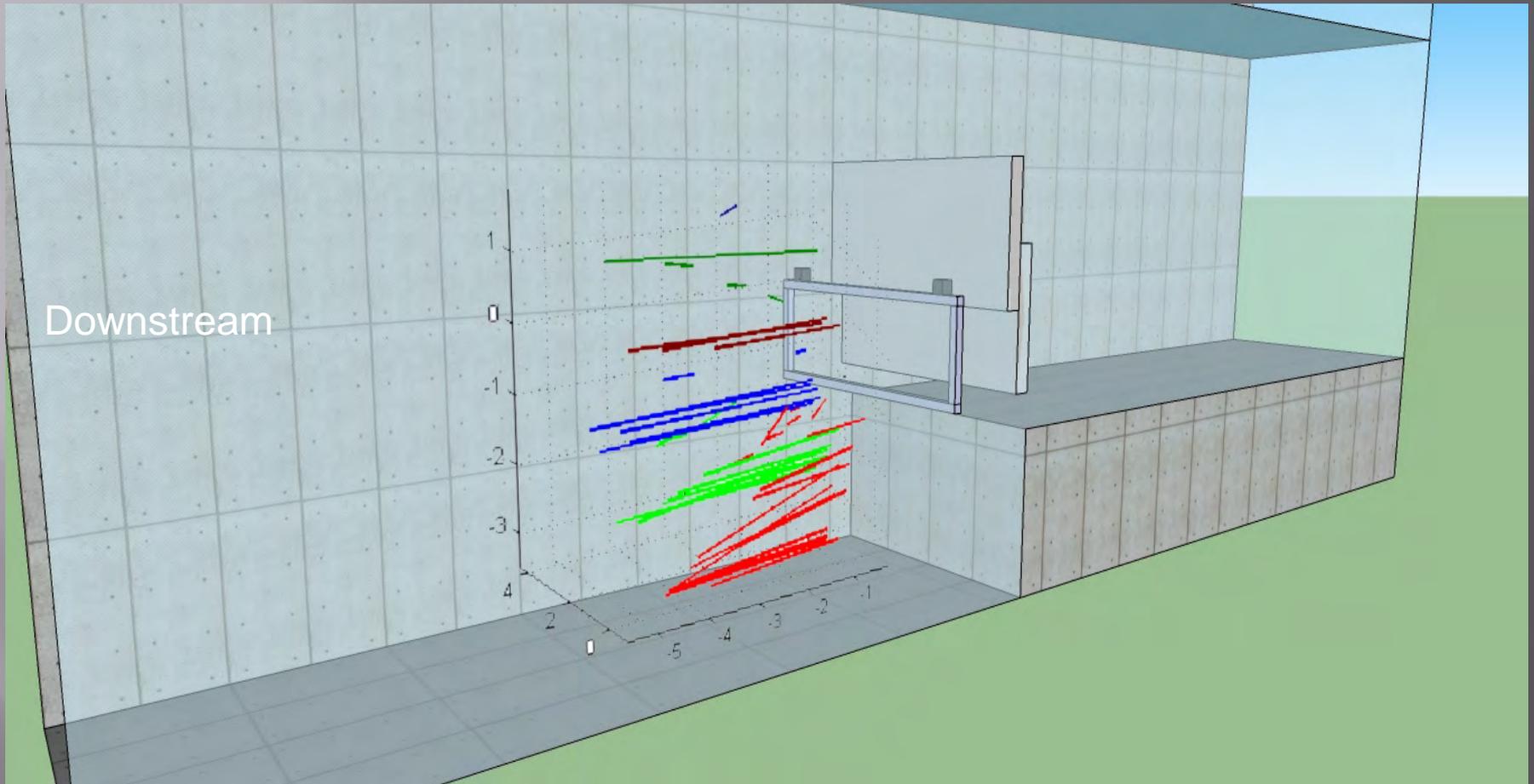
Downstream-facing
DIDSON



DIDSON in SFE2 Entrance



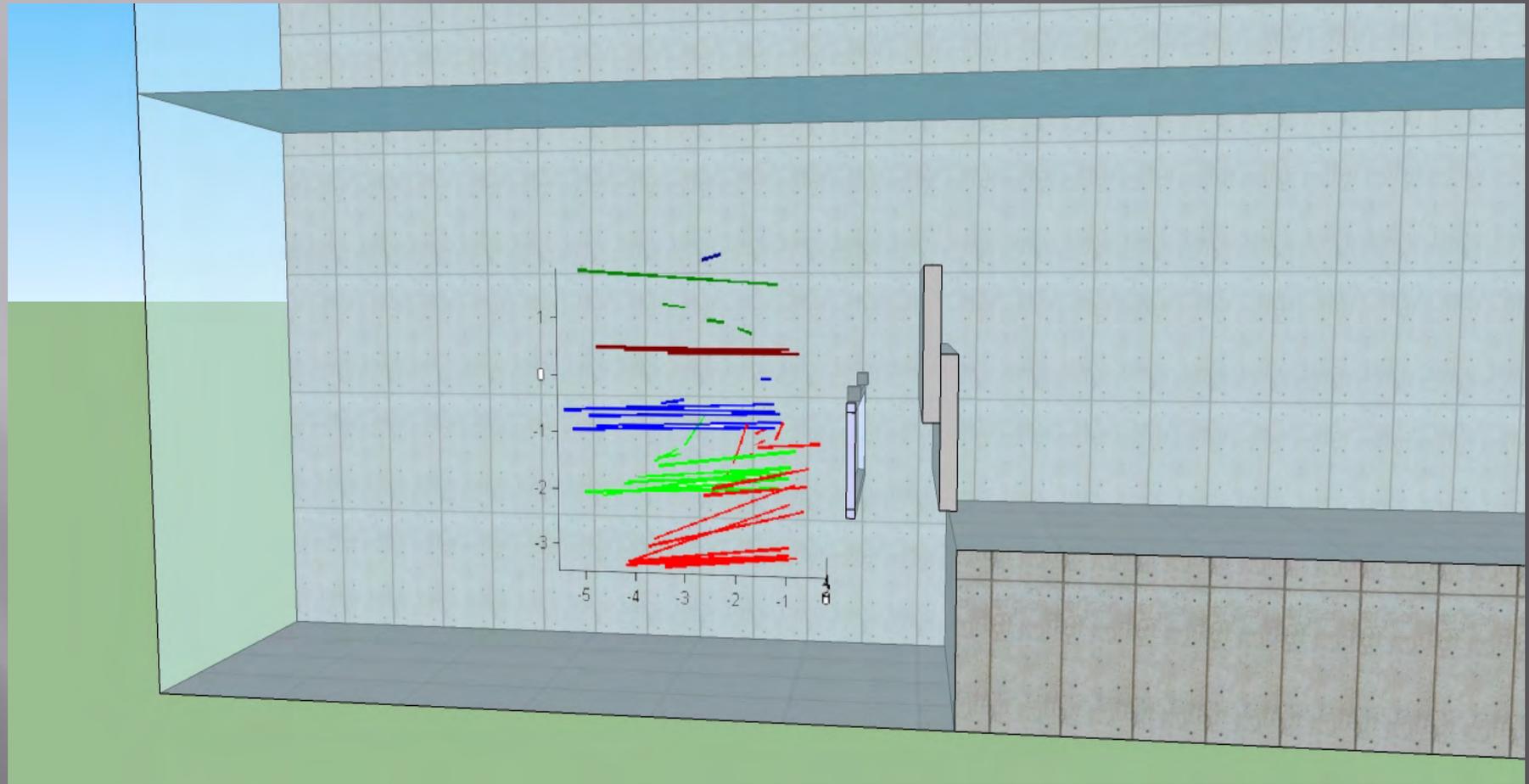
Downstream-facing DIDSON



N = 40

- -46° Tilt (N= 17)
- -12° Tilt (N= 6)
- 16° Tilt (N= 4)
- -26° Tilt (N= 10)
- 2° Tilt (N= 2)
- 34° Tilt (N= 1)

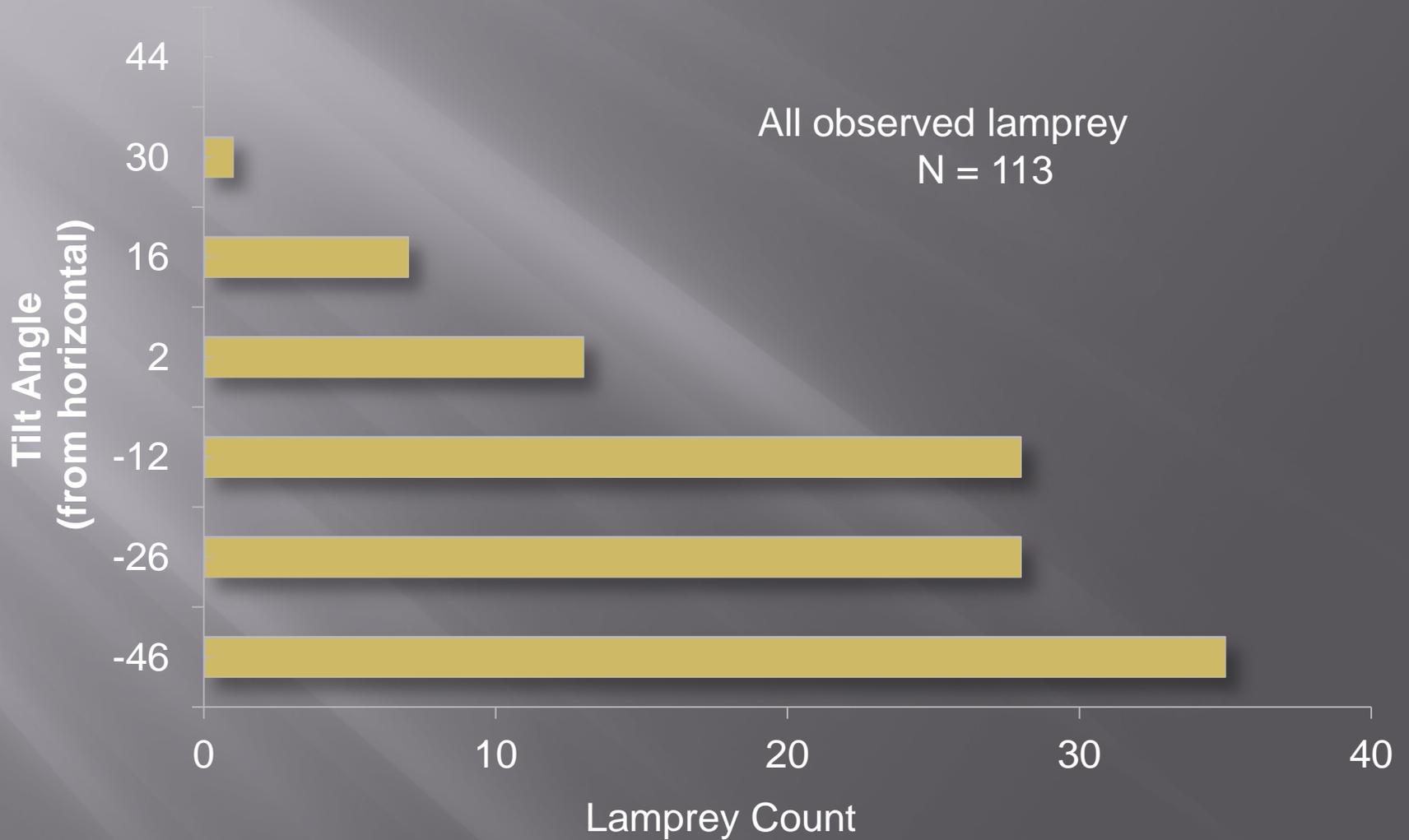
Downstream-facing DIDSON (side-view)



N = 40

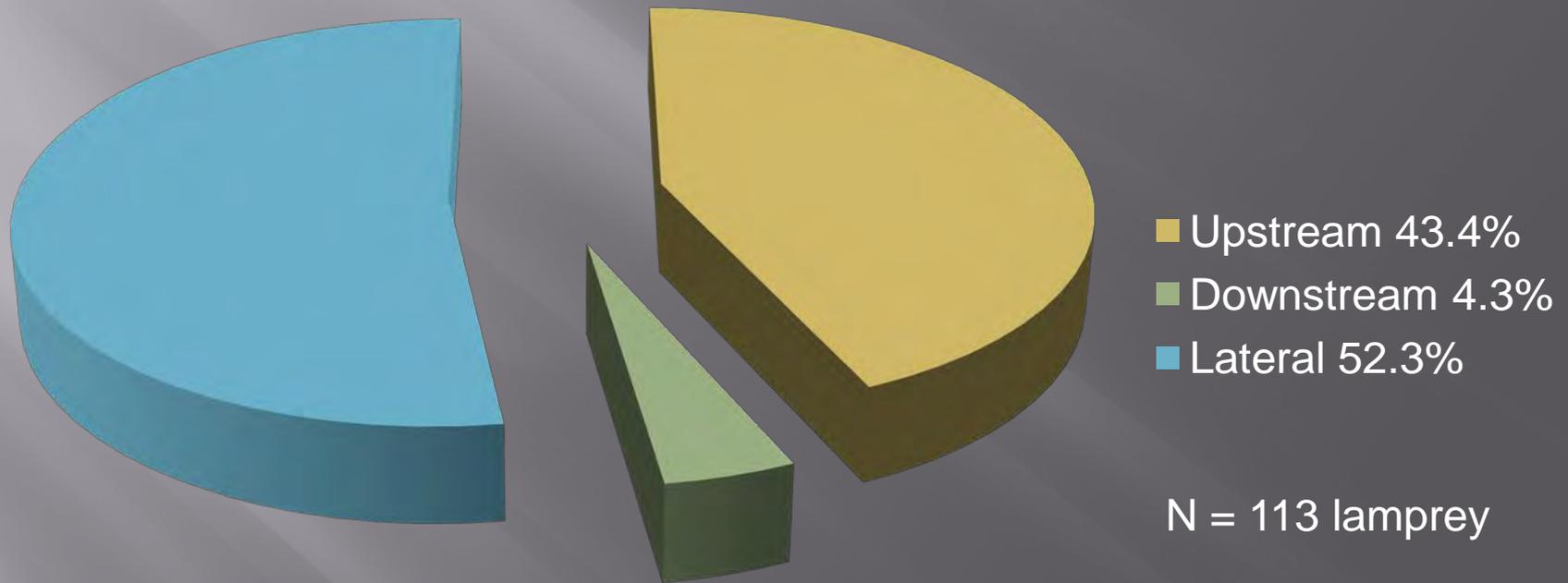
- -46° Tilt (N= 17)
- -12° Tilt (N= 6)
- 16° Tilt (N= 4)
- -26° Tilt (N= 10)
- 2° Tilt (N= 2)
- 34° Tilt (N= 1)

Vertical Distribution in Water Column

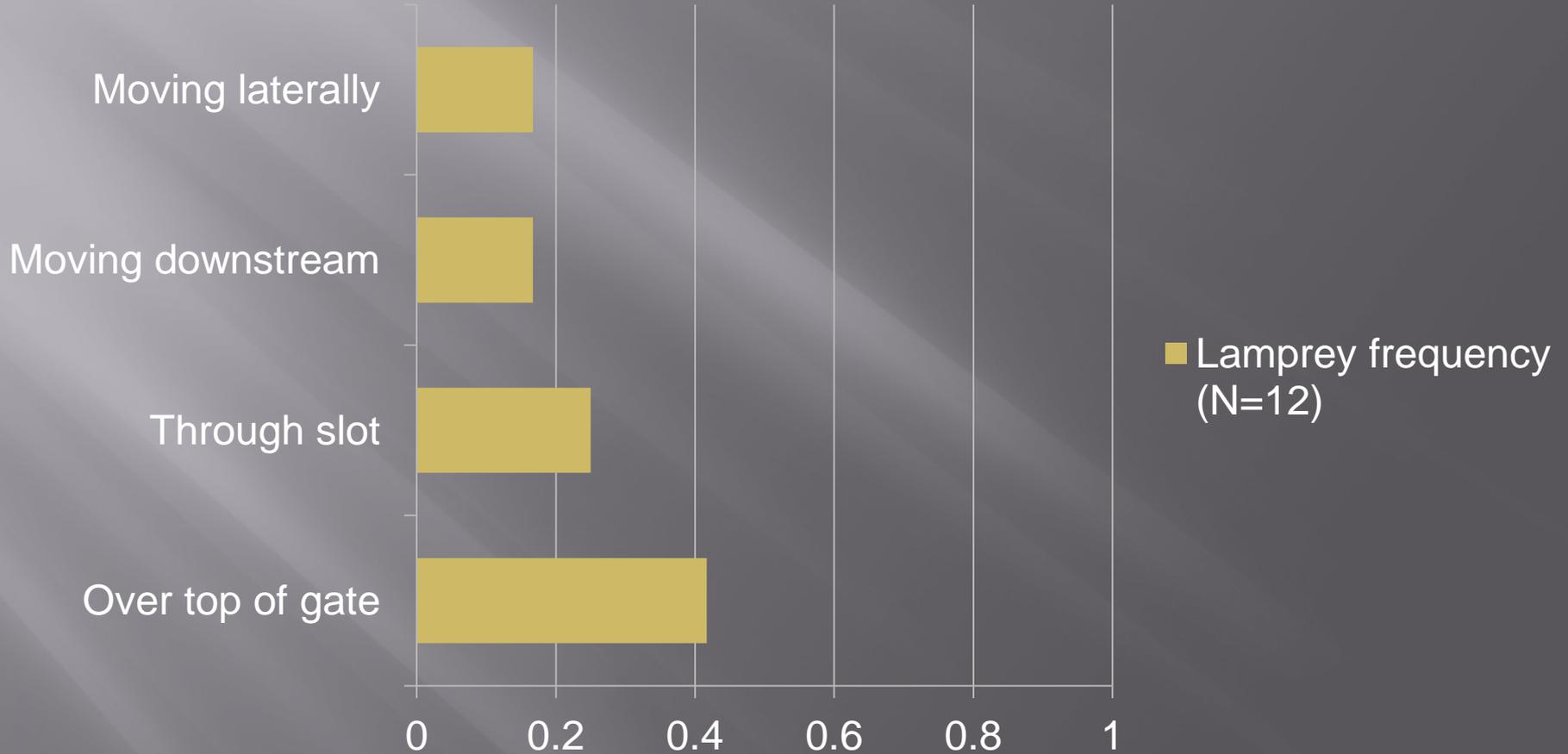


Downstream-facing DIDSON Observations

Lamprey Movement in SFE2



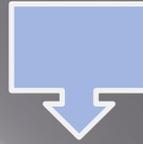
Upstream-facing DIDSON Observations



Optical Video at SFE2

Count at SFE2

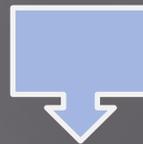
3 cameras



7 lamprey



Lamprey passing window



2,013 lamprey



0.35%
Observed

Salmonid Passage through Deep Slot

Count comparison of slot vs. window

	Sept 5	Sept 7	Sept 9	Sept 10
Deep Slot Count*	237	229	288	336
Window Count*	741	465	611	619

*Mean of (3) half hour counts

Conclusions

- DIDSON data was successful at characterizing lamprey approach behavior
- Majority of lamprey approach telescoping gate at SFE2 deep in water column
- Optical video data was successful at enumerating number of lamprey entering the deep slot
- Lamprey entrance into deep slot low relative to numbers passing count window
- Salmonid entrance into deep slot was moderate to high relative to numbers passing the count window

Acknowledgements

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