

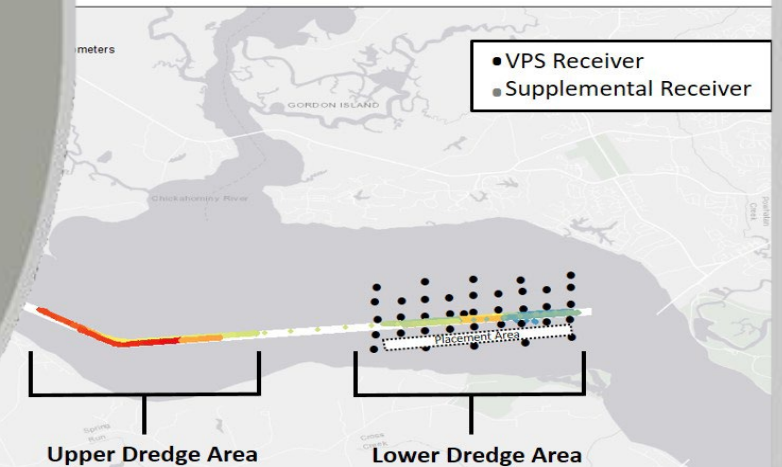


Overview of Atlantic Sturgeon & Dredge Research in the James River, VA

USACE

Engineer Research and Development Center
Environmental Lab

WEDA October 12th 2023



US Army Corps
of Engineers®

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NOT SHOWN

ERDC
Engineer Research and Development Center

Overview

- Dredging Operations
- Why
- Adult Sturgeon Migration
 - VPS Study
- Juvenile Behavior
 - Capture and Telemetry

Off The Cuff

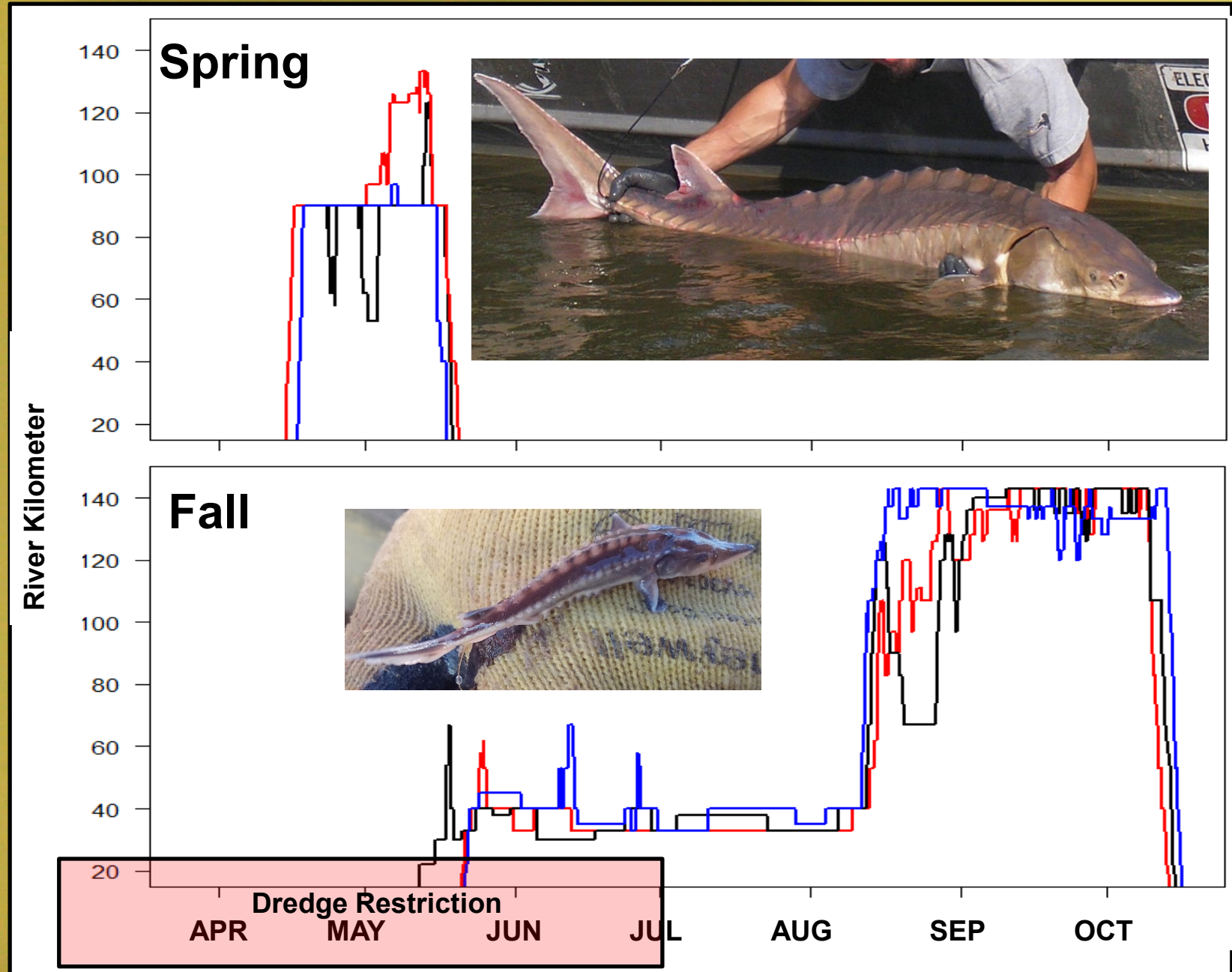


James River Dredge Operations



Why

- Dredge TOYR
 - Anadromous Fish
- James River Feb 15 to July 1
- Spring Run, Not Fall Run
- Concern?
 - Precautionary Principle
 - Extending TOYR



Adult Migration VPS Study



Vemco Positioning System (VPS)



ST5

ST13



Dredge VPS

What we need:

Telemetered Fish:

VCU tagging fish since 2011: ~130 fall adults (106 Detected in Study)

VPS Receiver Array:

37 receiver Vemco Positioning Array with two reference tags deployed July through November 2017.

Dredge and Dredge Positions:

Dredge Lexington

The AISAP tool maintained by USACE was used for dredge position data.

Fish to cooperate. (Clockwork)

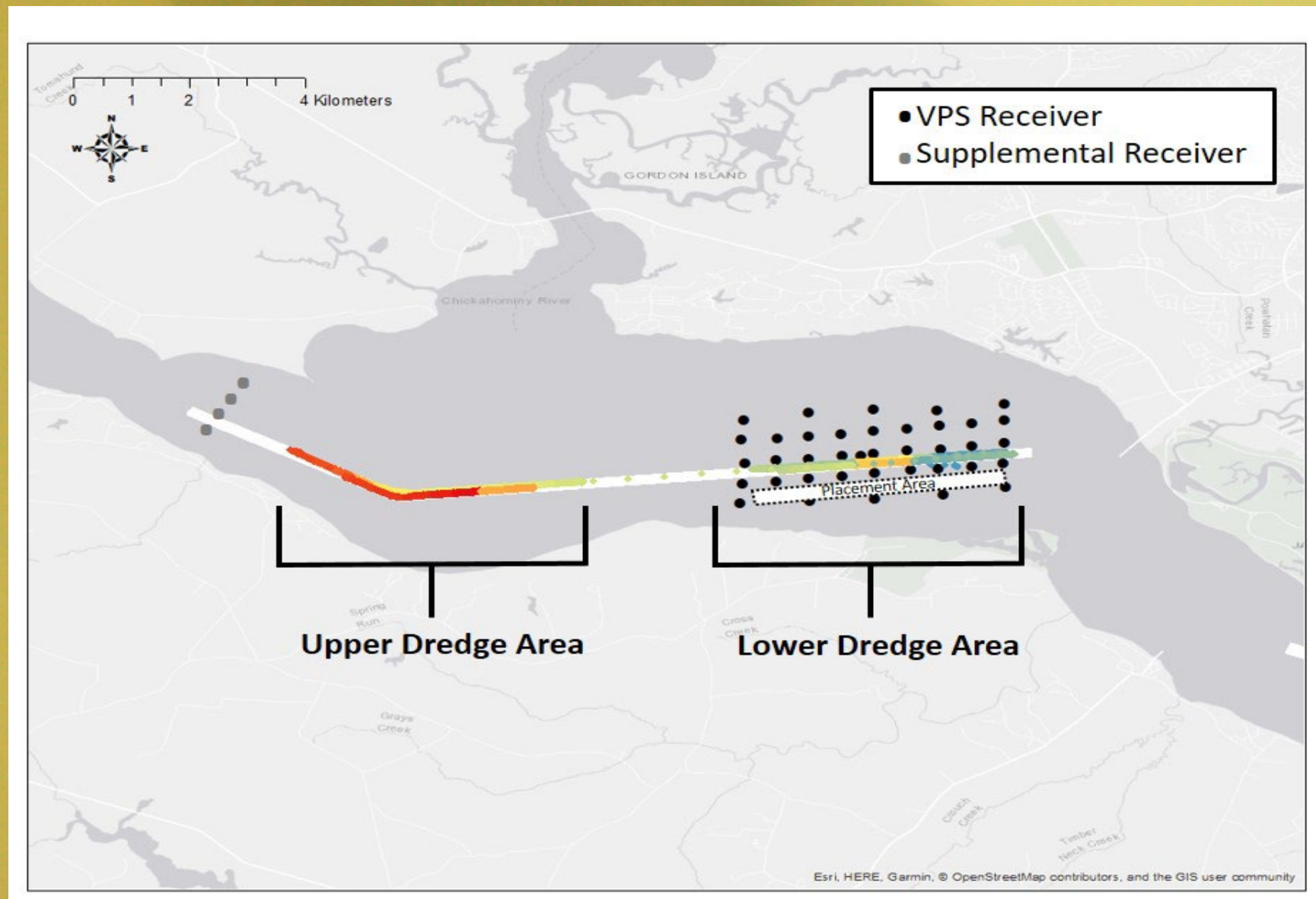
Funding:

NOAA/VDGIF Section 6 Grant

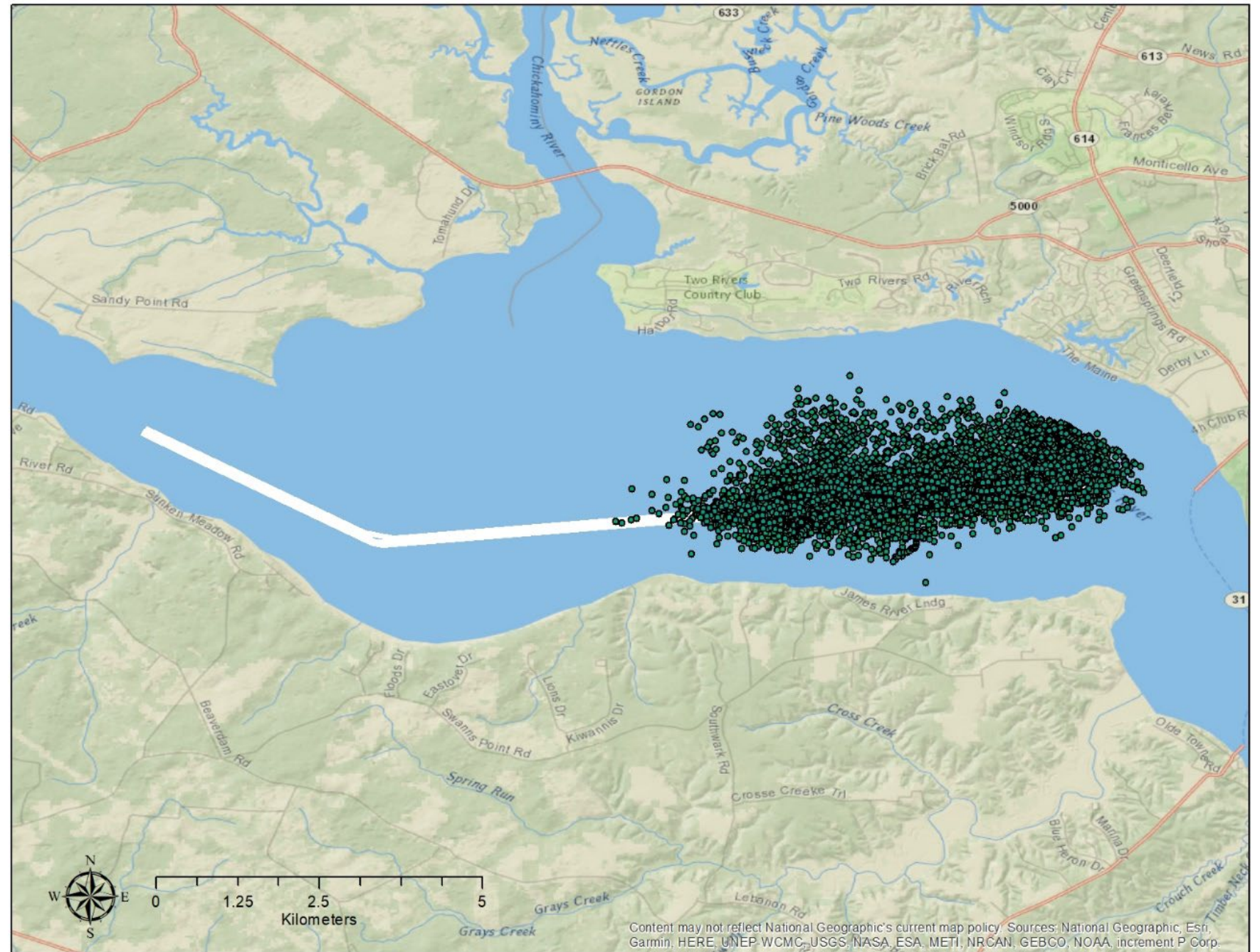
#NA13NMF4720037

USACE DOER Grant

Project #17-10



Dredge VPS



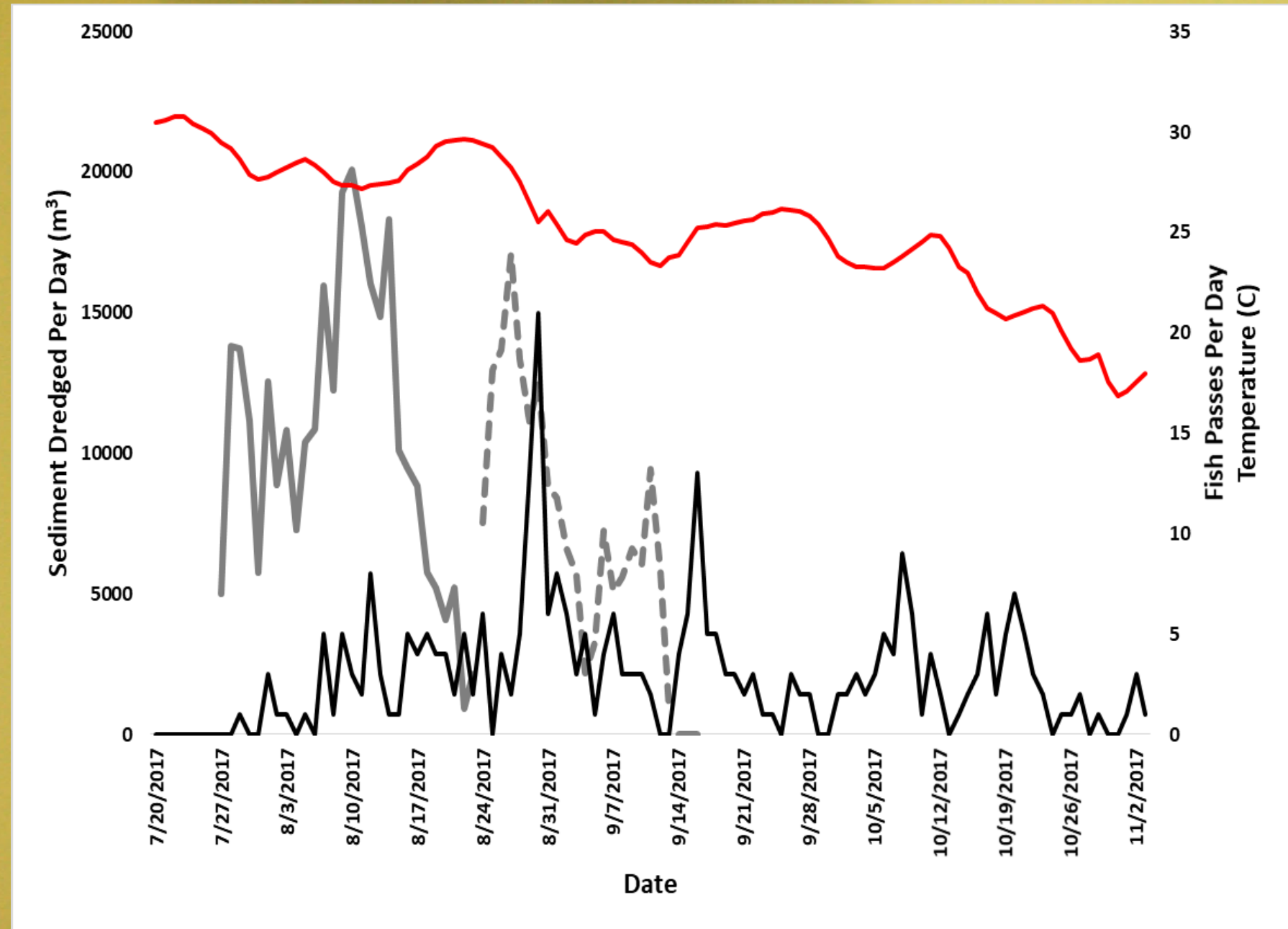
Dredge VPS

Overview:

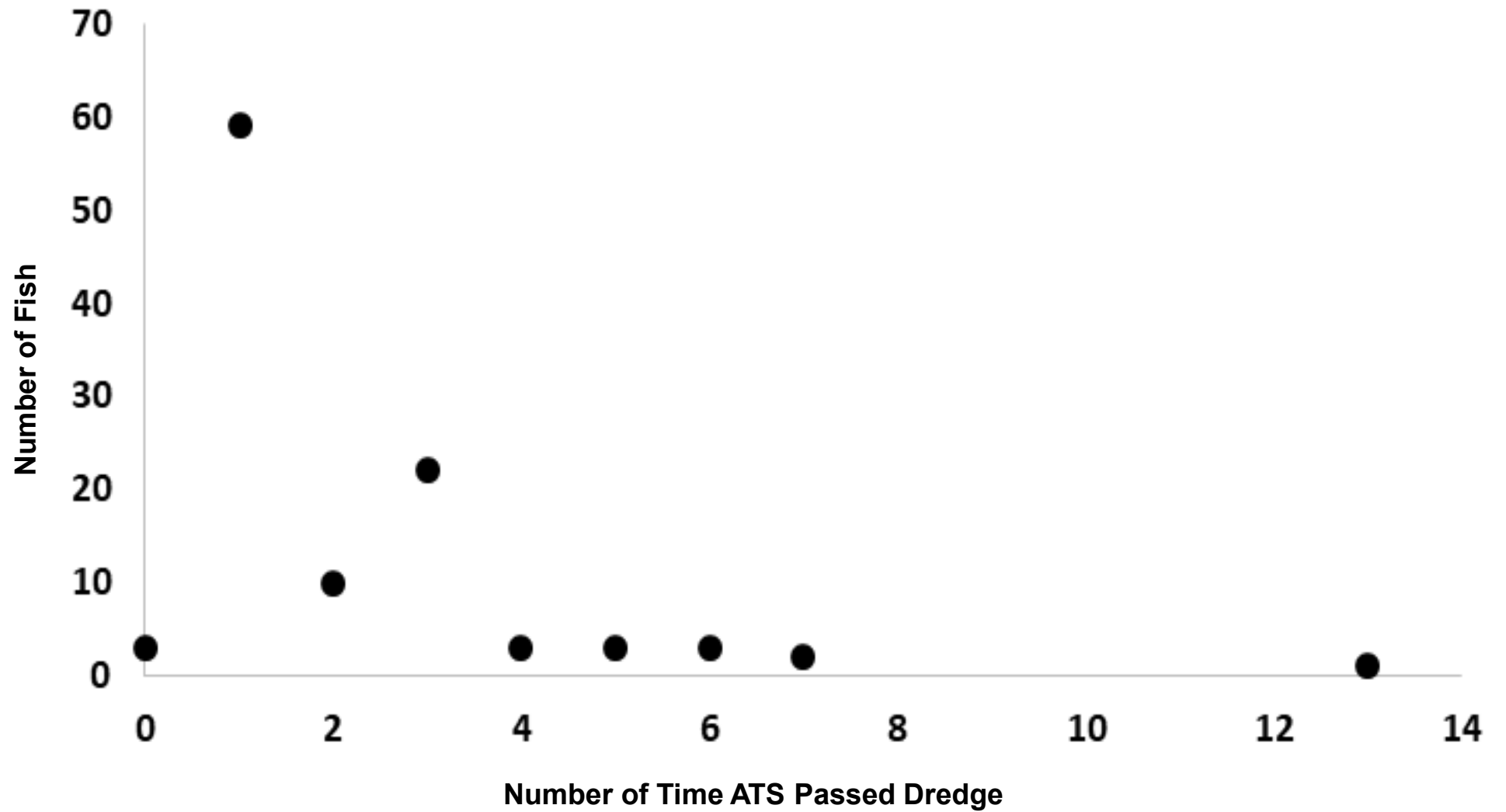
Red Line: water temperature (right y axis).

Grey Line: Material dredged per day, solid line lower area, dashed line upper area (left y axis).

Black Line: number of times ATS moved passed the study area per day (right y axis).



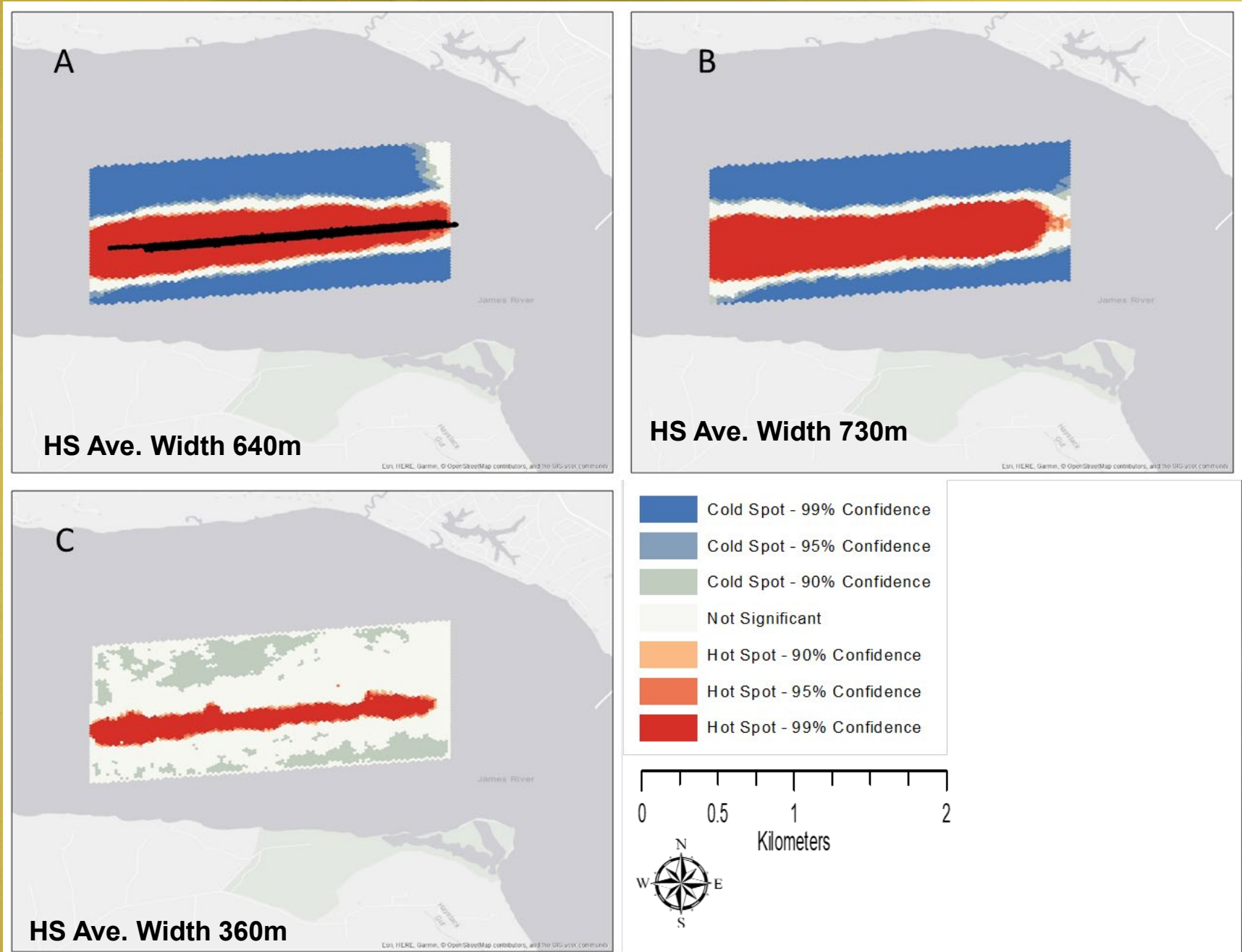
Dredge VPS



Dredge VPS

Optimized Getis-Ord Gi*
(ESRI 10.5.1) Hotspot
Analysis with block border

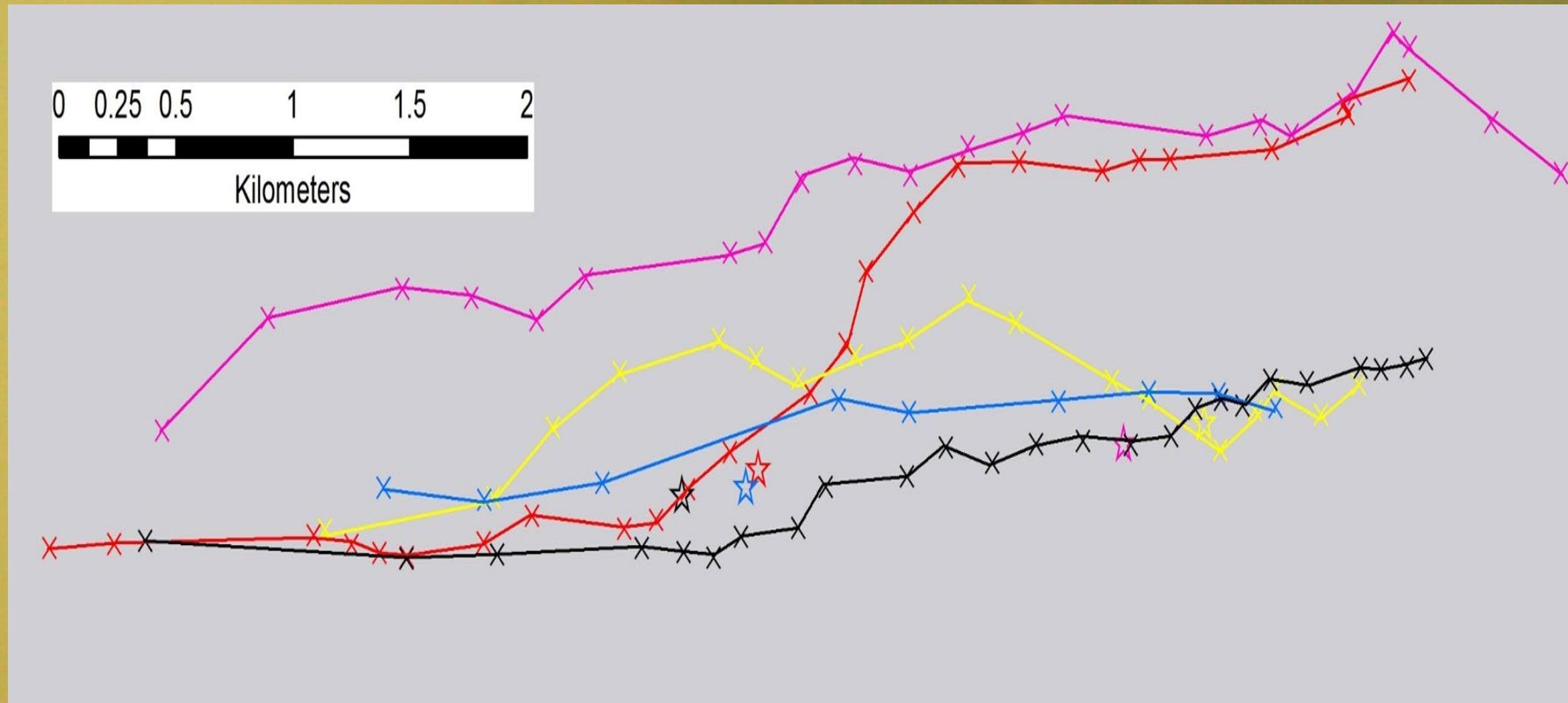
Consider Goals of the Fish



Dredge VPS

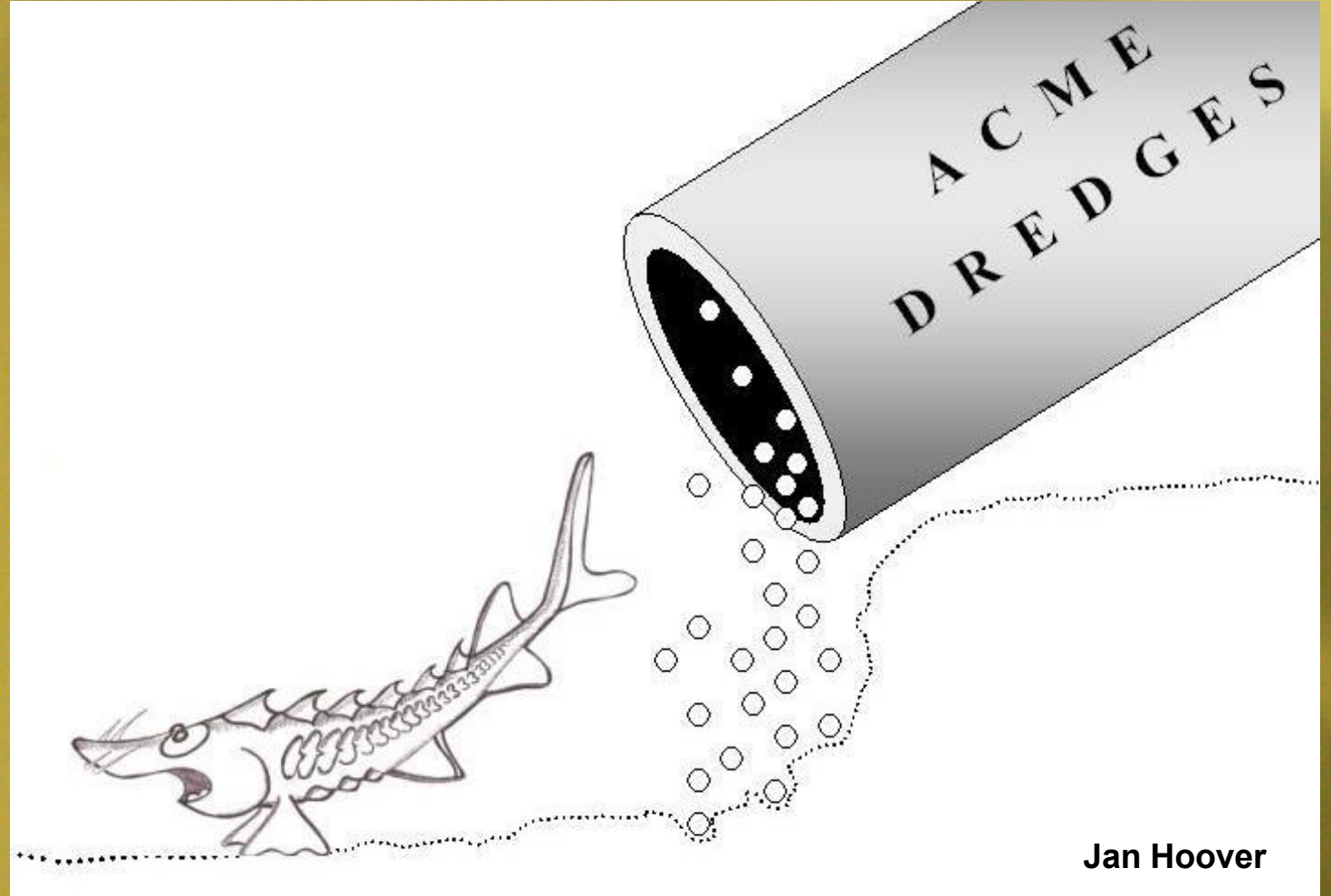
Summary: In this situation, data show active dredging did NOT cause noticeable problems for adults migrating to spawning habitat.

Published in PLOS1: <https://doi.org/10.1371/journal.pone.0230029>



Concern (Juveniles)

- Precautionary Principle
- Dredging Perceived as Creating Death-Cloud Conditions for all Life
- Behavior Modification
 - Avoidance
- Entrainment
- Water Quality*



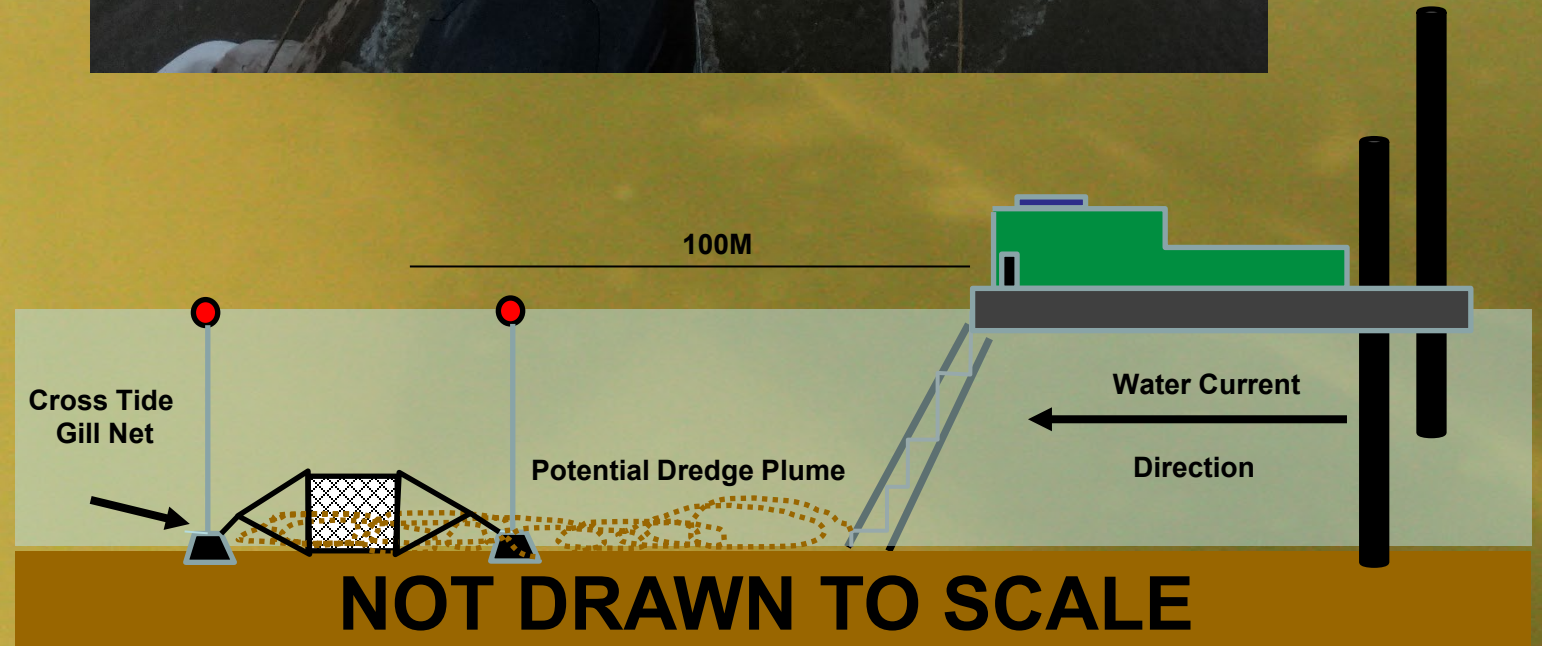
Juveniles

Extremely Successful 2018 Fall Cohort

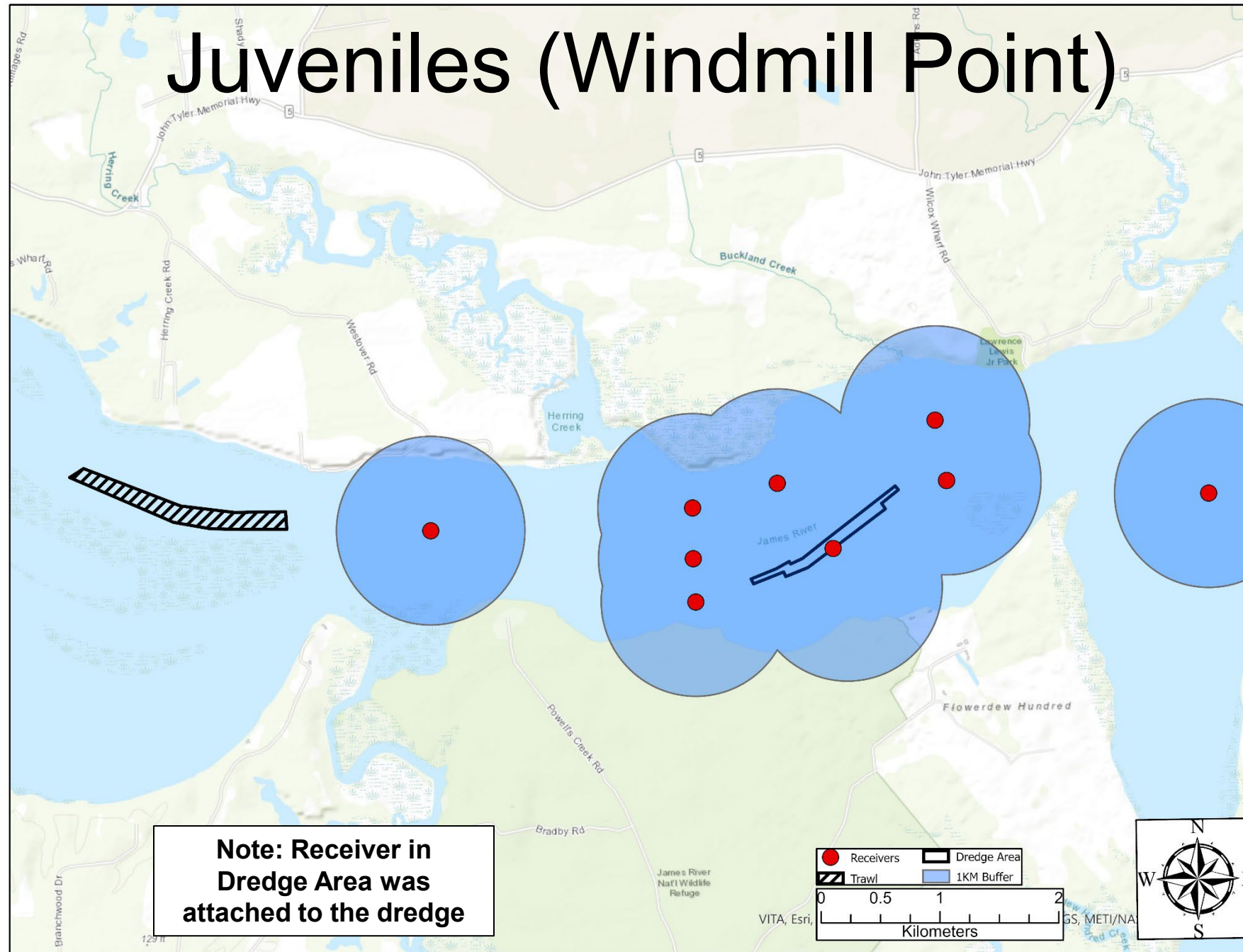


Juveniles

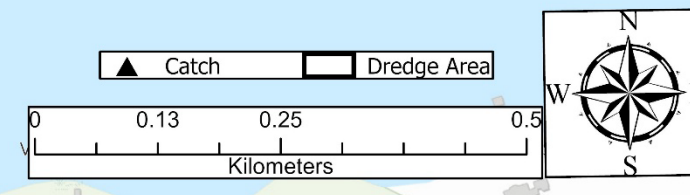
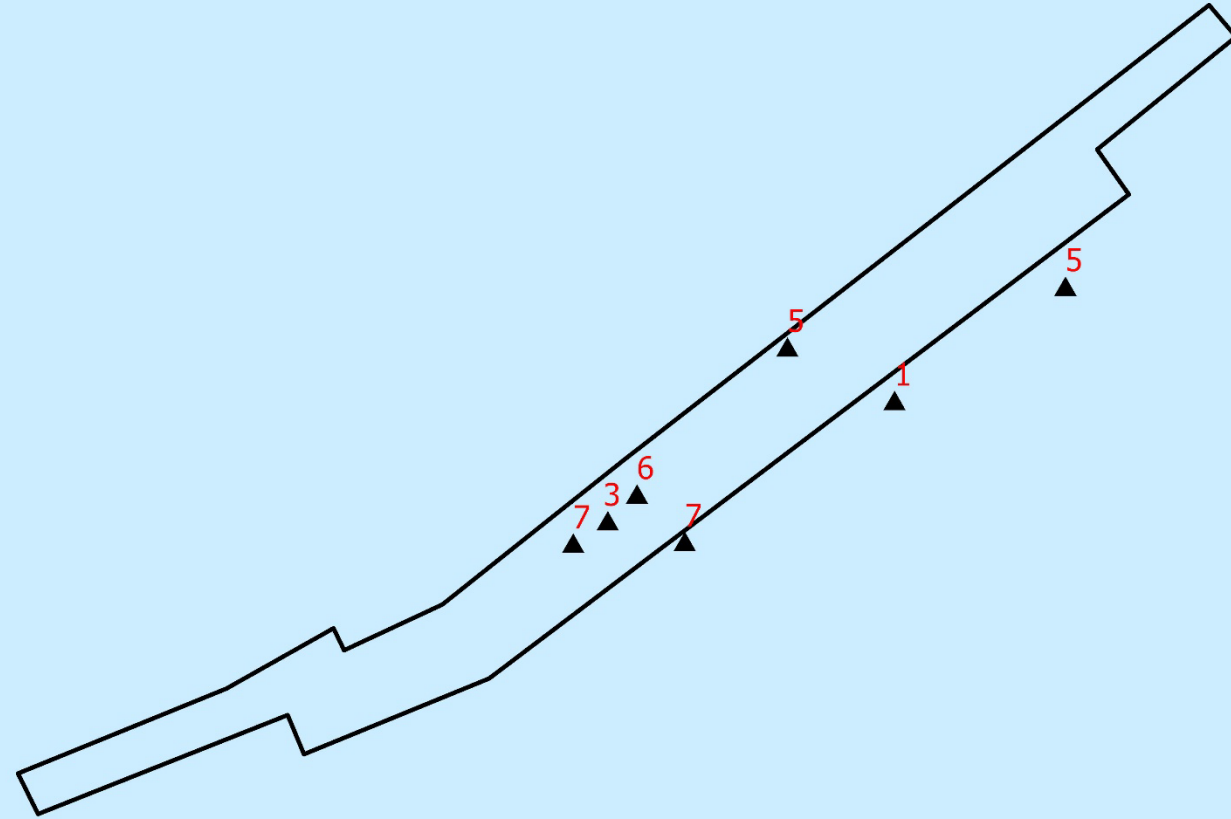
- Catch/tag juveniles around active cutterhead dredge
- Telemetry
- Gill Nets/Trawls



Juveniles (Windmill Point)



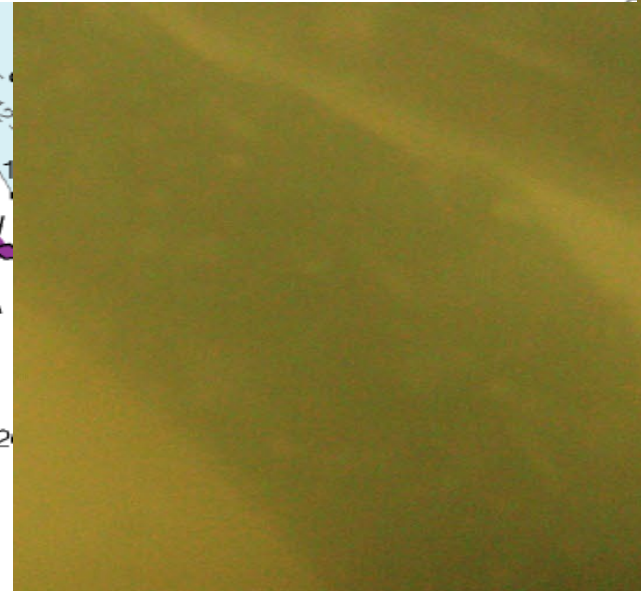
Juveniles (Windmill Point)



Juveniles (Windmill Point)

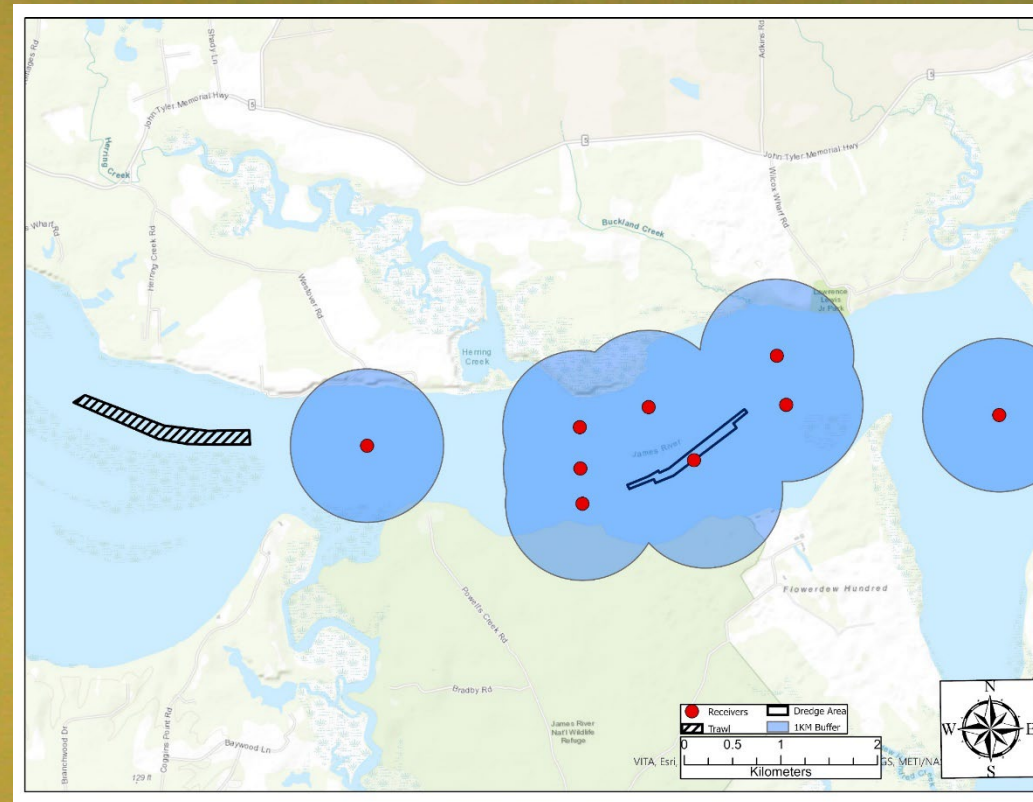
- Dredging Nov 4 – Dec 5, 2019
- 105 (30-47cm FL, 1y old)
 - Gill Net (7 sets)
 - 4 Up, 3 Down
 - 34 Unique Fish
 - Recaptures
 - 2 Gill Nets
 - » 3-7 D.A.L
 - 1 Trawl
 - » 4 D.A.L
 - Trawl (5 Comparison Tows)
 - Dredge 39
 - Reference 32





Juveniles (Windmill Point)

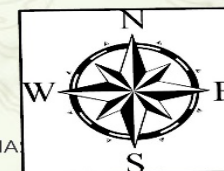
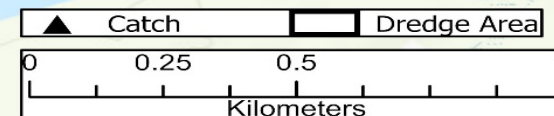
- 19 Fish in Array
- Time in array
 - Few Hours
 - Few Weeks
- Dredge Passes
 - 0-12 Passes
 - 2.3 Average



Juveniles (Dancing Point)

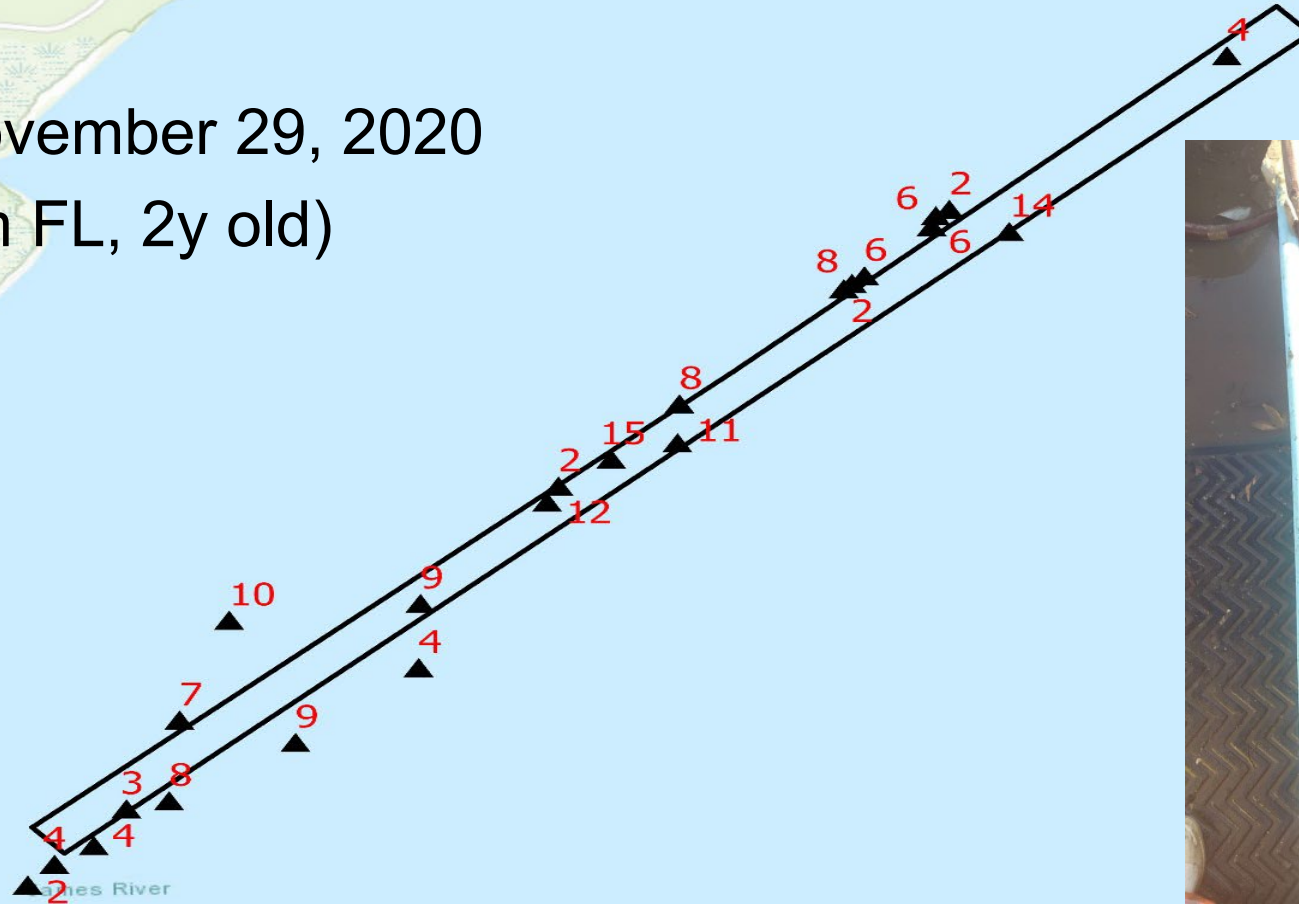


- October 11 – October 21, 2020
- N=36 (50-64cm FL, 2 yr old)
 - 6 Sets
 - 3 up, 3 down
- Telemetry Tags (n=4)

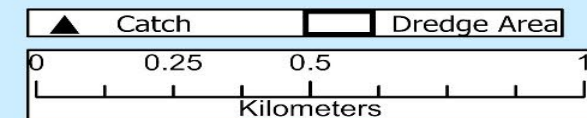


Juveniles (Goose Hill)

- October 23 – November 29, 2020
- N=159 (45-71cm FL, 2y old)
 - 23 Sets
 - 15 up, 8 down
 - 6 Recaptures
 - 2-12 D.A.L.



- Telemetry Tags (n=5)



Juveniles

Summary: Evidence suggests cutterhead dredging does not cause juveniles to flee the area. Seem to be actively feeding within a hundred meters of active dredging.

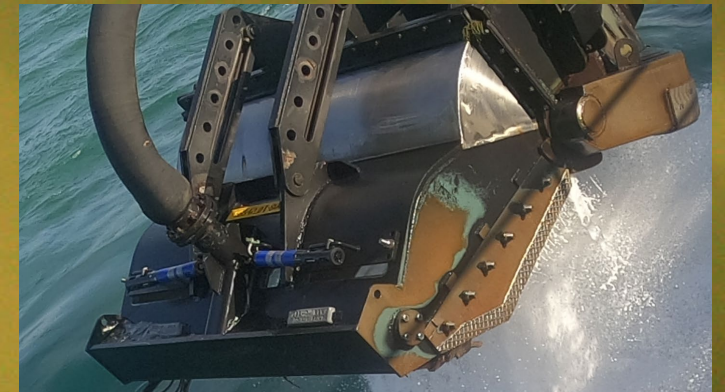


Conclusions

- VPS Study resulted in robust (LUCKY) data showing that adult sturgeon passed the cutterhead dredge closely without incident
- Juvenile Studies show that juvenile sturgeon swim and feed near dredge without incident

On-Going Work

- Testing Alosa movements around active dredge operations
- Using sidescan sonar to monitor turtle and sturgeon behavior around hopper dredges
- Monitoring the extent, amplitude and duration of dredge plumes
 - Clamshell
 - Cutterhead
 - Hopper
 - Sidecast



Acknowledgements

- Funding
 - Multiple NOAA/VDGIF Section 6 Grants
 - USACE DOER 17-10
 - USACE Norfolk District
- James River Atlantic Sturgeon Restoration Partnership
- **THANKS**
- **QUESTIONS?**

