



Science Update

Effects of Predators on Salmon

Special Committee on Bay-Delta

Item 3a

May 28, 2019

Understanding Stressors is Required to Take Targeted, Effective Management Actions

● Examples of stressors

- Altered flows
- Temperature
- Habitat loss
- Food sources
- Disease
- Predation
- Contaminants



How do Landscape Modifications Influence Predation?



Predation Video



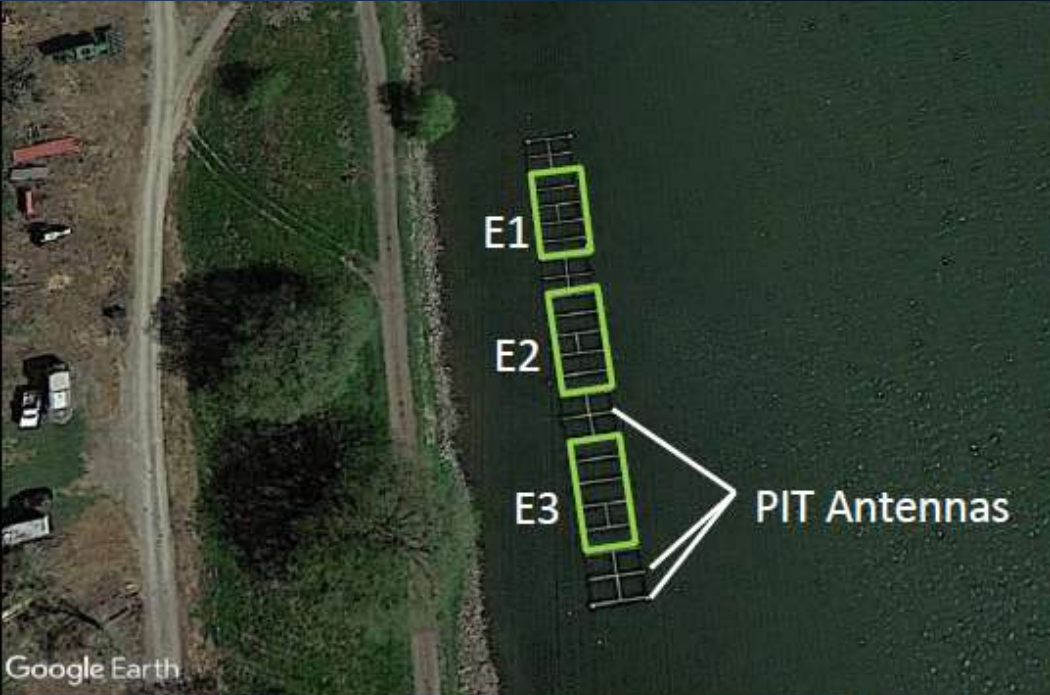
Study Questions

- Do the number of predators influence juvenile Chinook salmon survival?
 - No

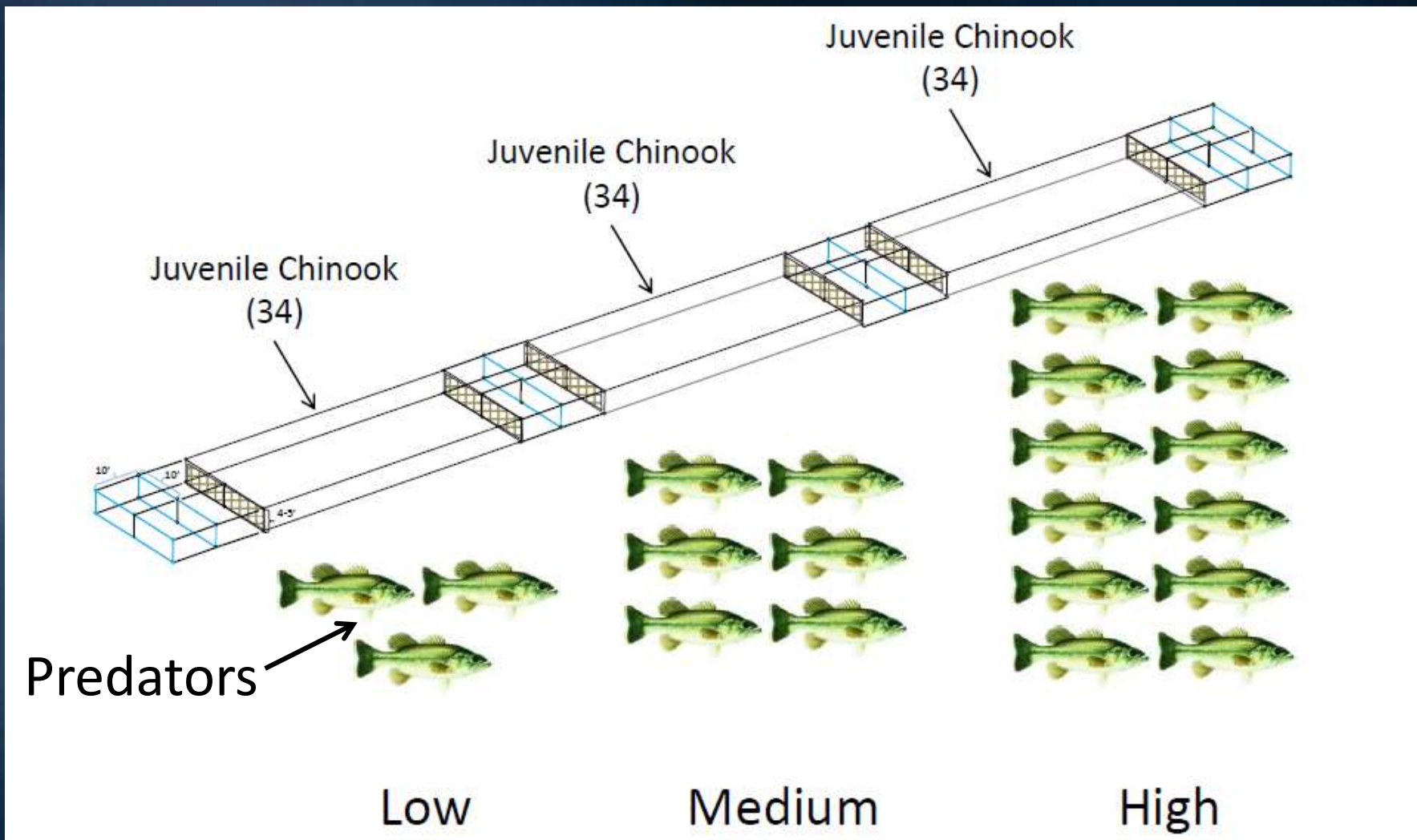
Study Questions

- Do the number of predators influence juvenile Chinook salmon survival?
 - No
- Does habitat type modify juvenile Chinook salmon survival?
 - Submerged Aquatic Vegetation (SAV) decreased salmon survival

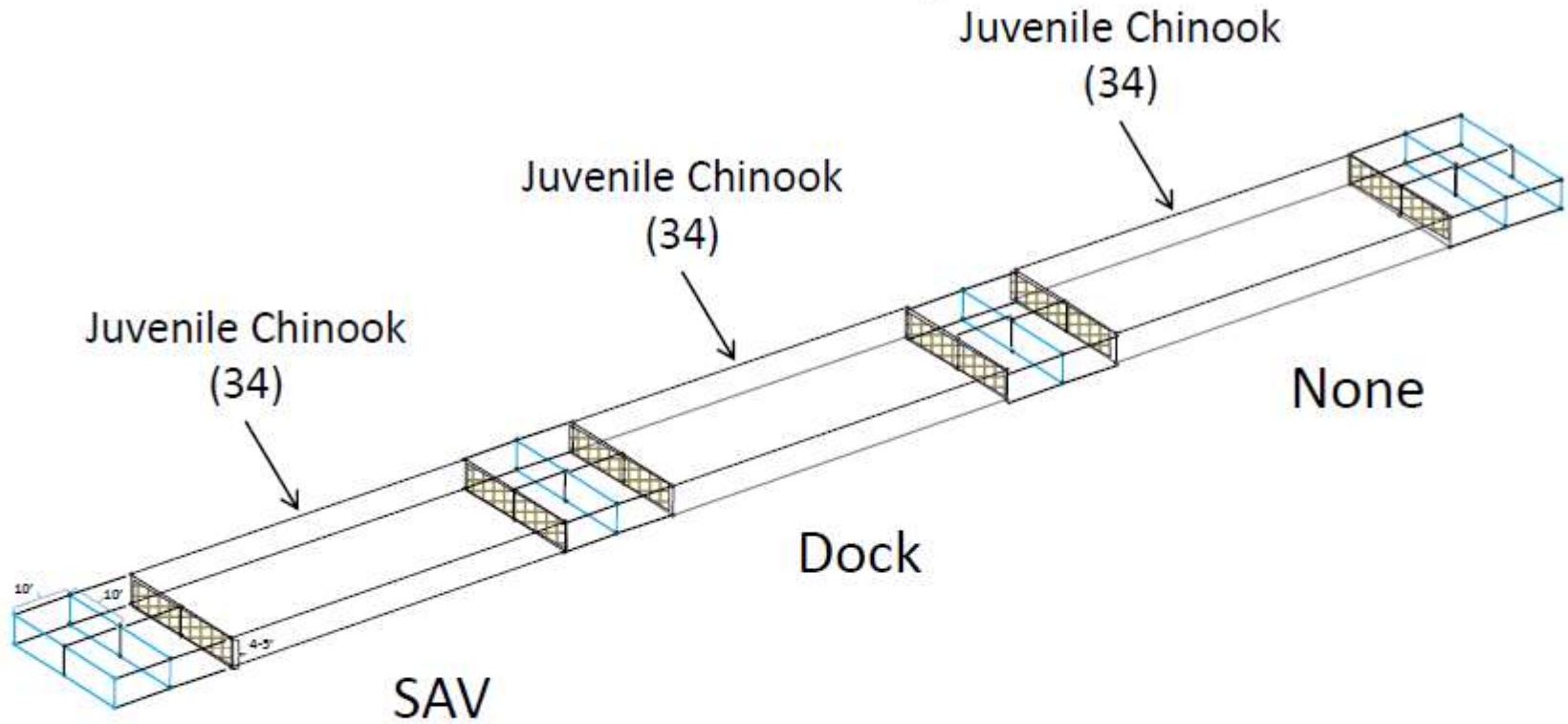
Experimental Enclosures



Does Predator Density Affect Salmon Survival?



Does Habitat Affect Salmon Survival?



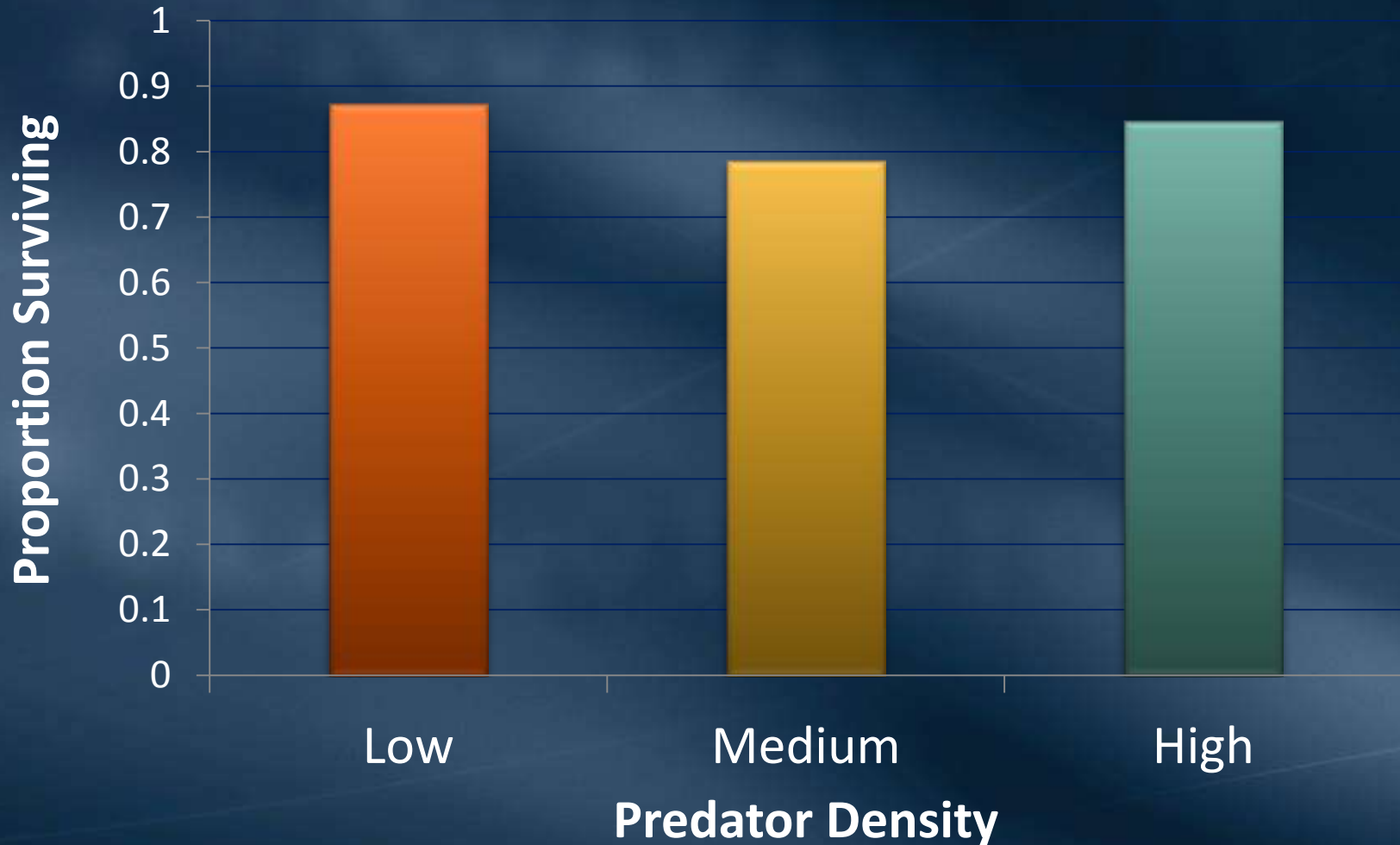


Dock

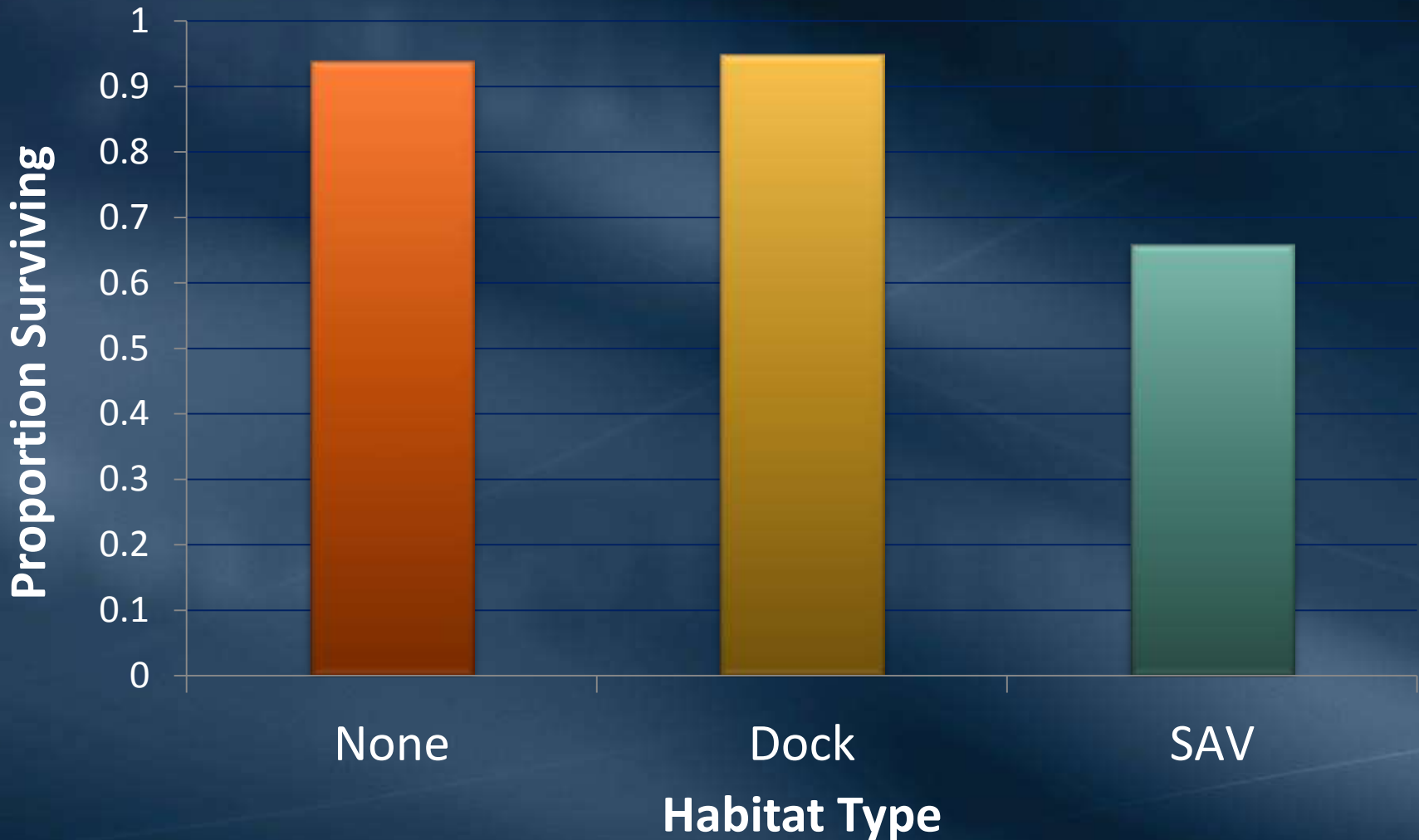
Submerged Aquatic Vegetation



Predator Density Does Not Affect Salmon Survival



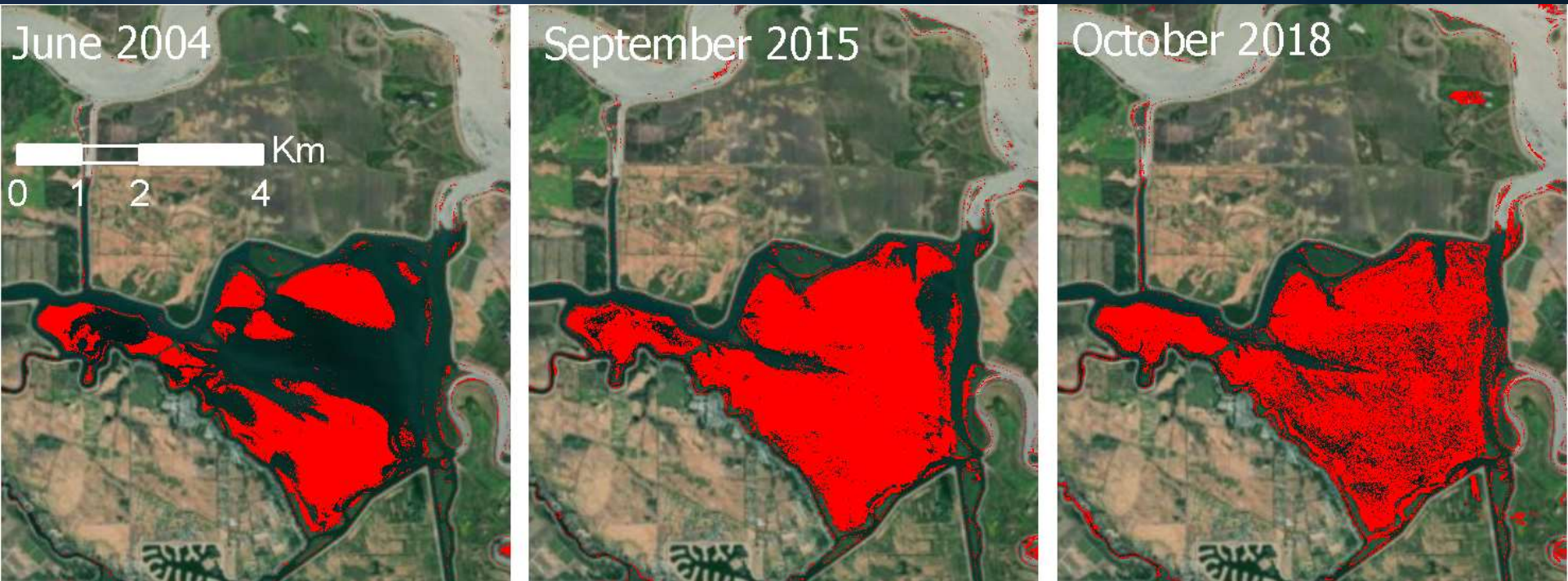
Submerged Aquatic Vegetation (SAV) Decreased Salmon Survival



Conclusions

- Changes in predator density did not affect salmon survival
 - Reducing largemouth bass may have limited success to increase salmon survival
- SAV decreased salmon survival
- SAV removal has potential to increase salmon survival
- Developing manuscript to publish

Potential to Remove a lot of Submerged Aquatic Vegetation (in Red)

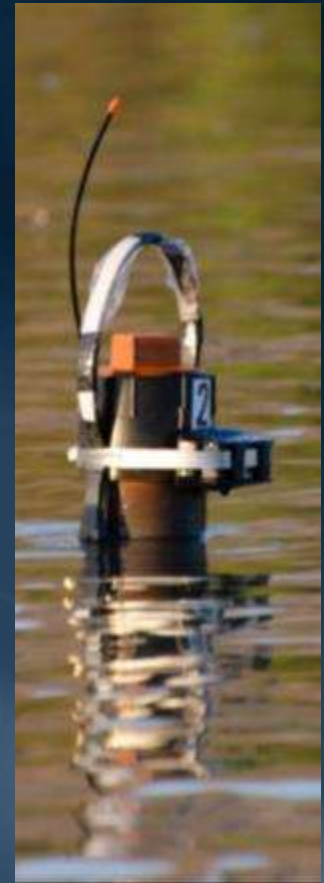
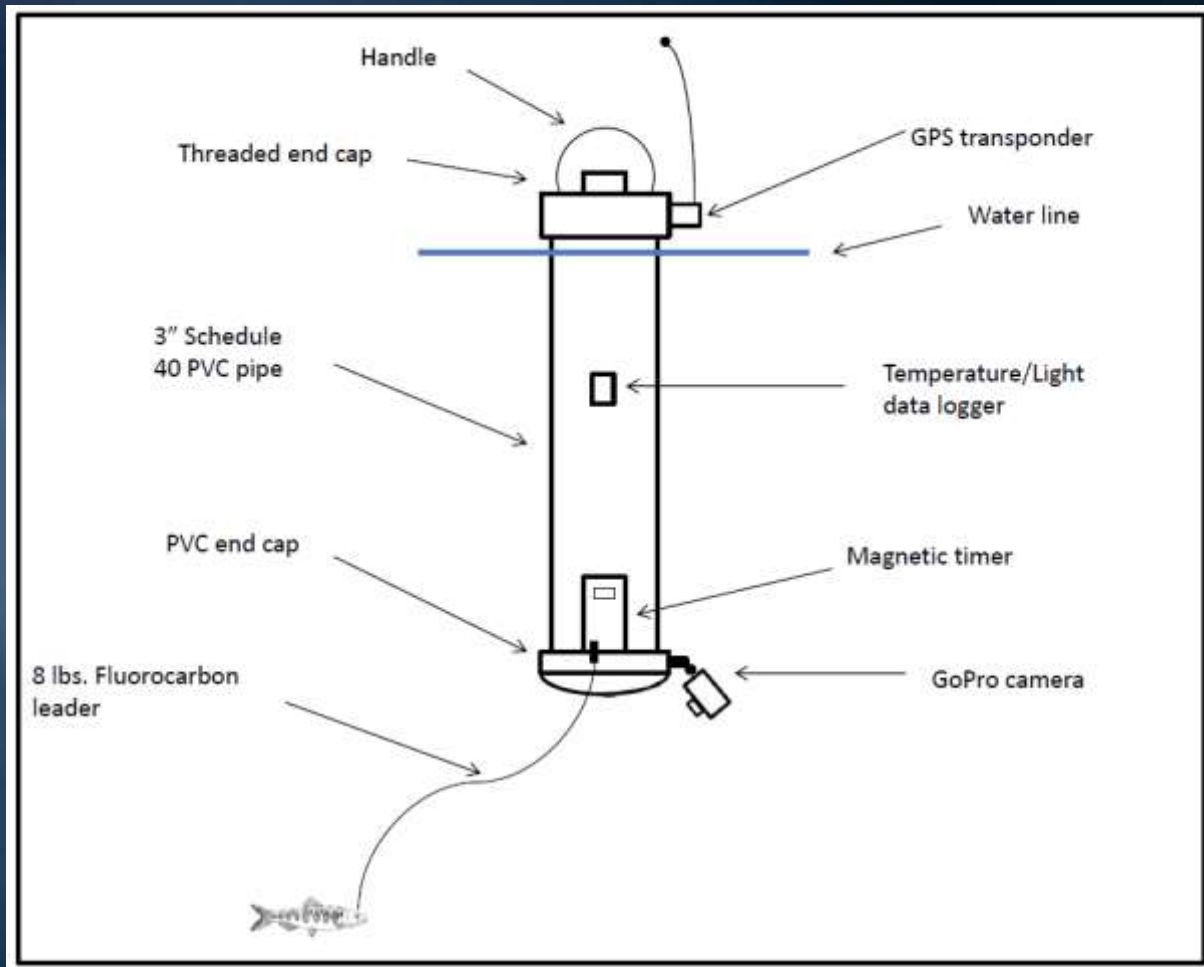


Ustin SL, Khanna S, Lay M, and Shapiro K, 2019. Enhancement of delta smelt (*Hypomesus transpacificus*) habitat through adaptive management of invasive aquatic weeds in the Sacramento-San Joaquin Delta. Submitted to California Department of Water Resources.

Can Predator Contact Points be Modified to Reduce Predation?



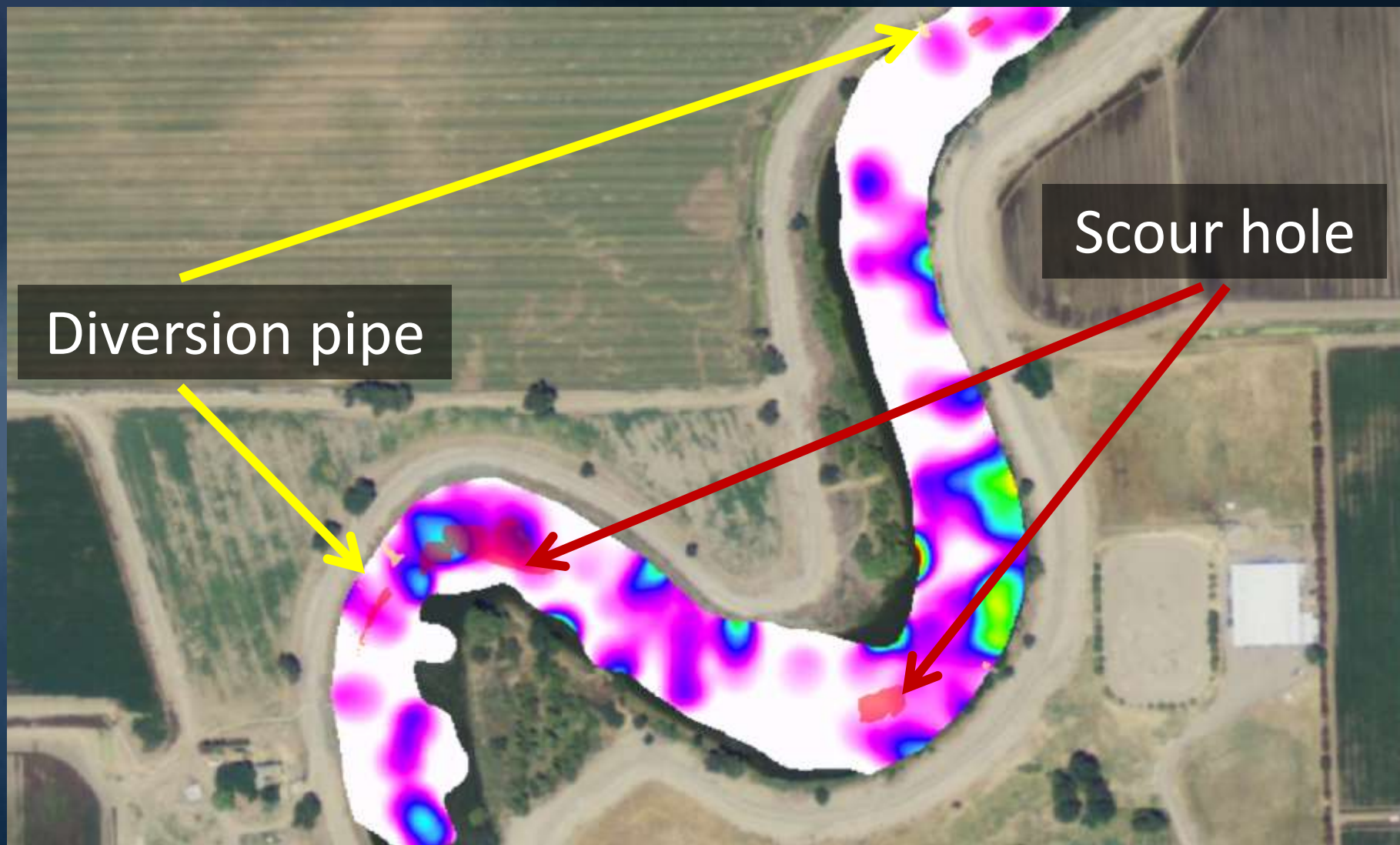
Predation Event Recorders (PER)



Predation Study Video



Identify Structures with Predation



Next Steps

- Year 1 of 5 year study
- Results inform Central Valley Project Improvement Act model which prioritizes restoration actions
- Identifying which stressors can be influenced via management actions
- Targeted, effective management can lead to resilient salmon populations

