

# RECLAMATION

*Managing Water in the West*

## **Site fidelity and emigration of adult green sturgeon (*Acipenser medirostris*) in the middle Sacramento River**

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U.S. Department of the Interior  
Bureau of Reclamation



# Introduction

- **April, 2006 the Southern Distinct Population Segment of Green Sturgeon was listed as threatened under the Endangered Species Act.**
- **June, 2009 Reclamation was issued a Biological Opinion for long term operations of the Central Valley and State Water Projects.**
- **From 2009 thru 2011, Reclamation in collaboration with State Department of Water Resources captured, tagged and released 32 adult green sturgeon.**

# Goal

## Research & Monitor

- **Out migrant survival & timing**
- **Migration patterns within Sacramento River and thru RBDD**
- **Site Fidelity**

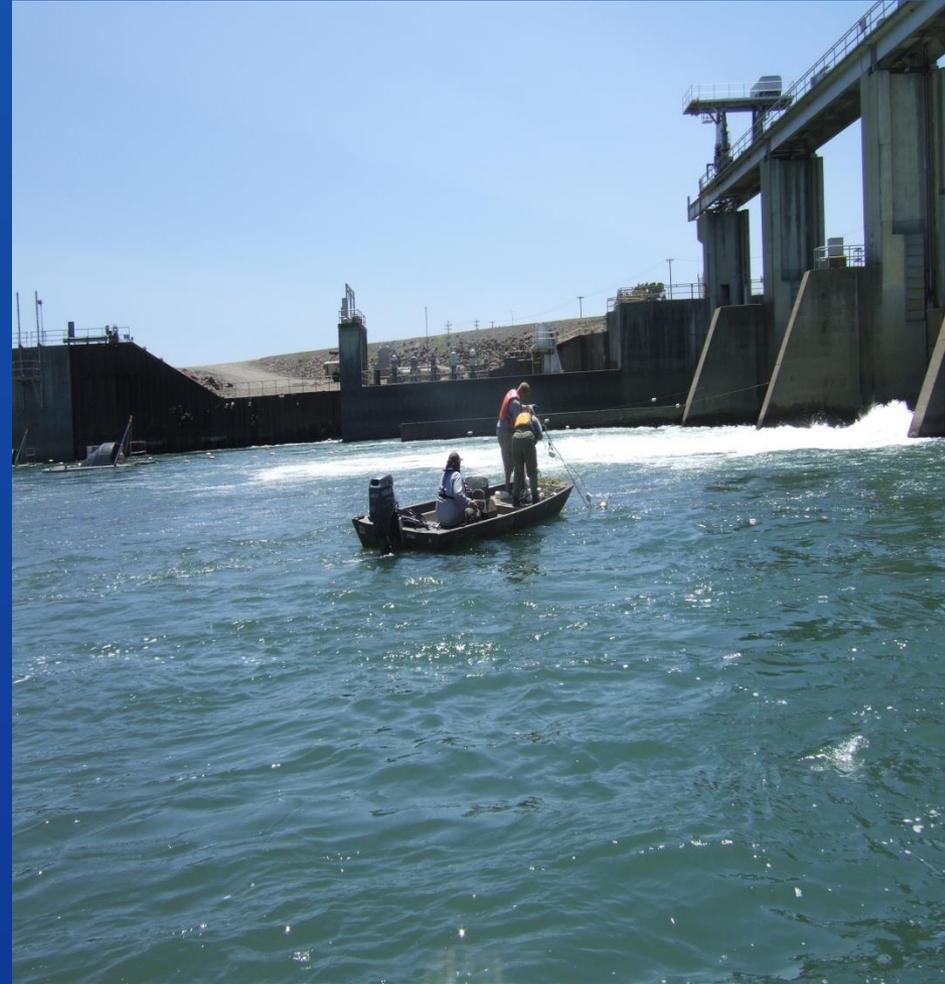


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# Original Objective

## RBDD

- Capture adult green sturgeon with experimental gill net
- Implant adults with acoustic transmitters
- Transport upstream of RBDD and observe movements through dam



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# Secondary Objectives

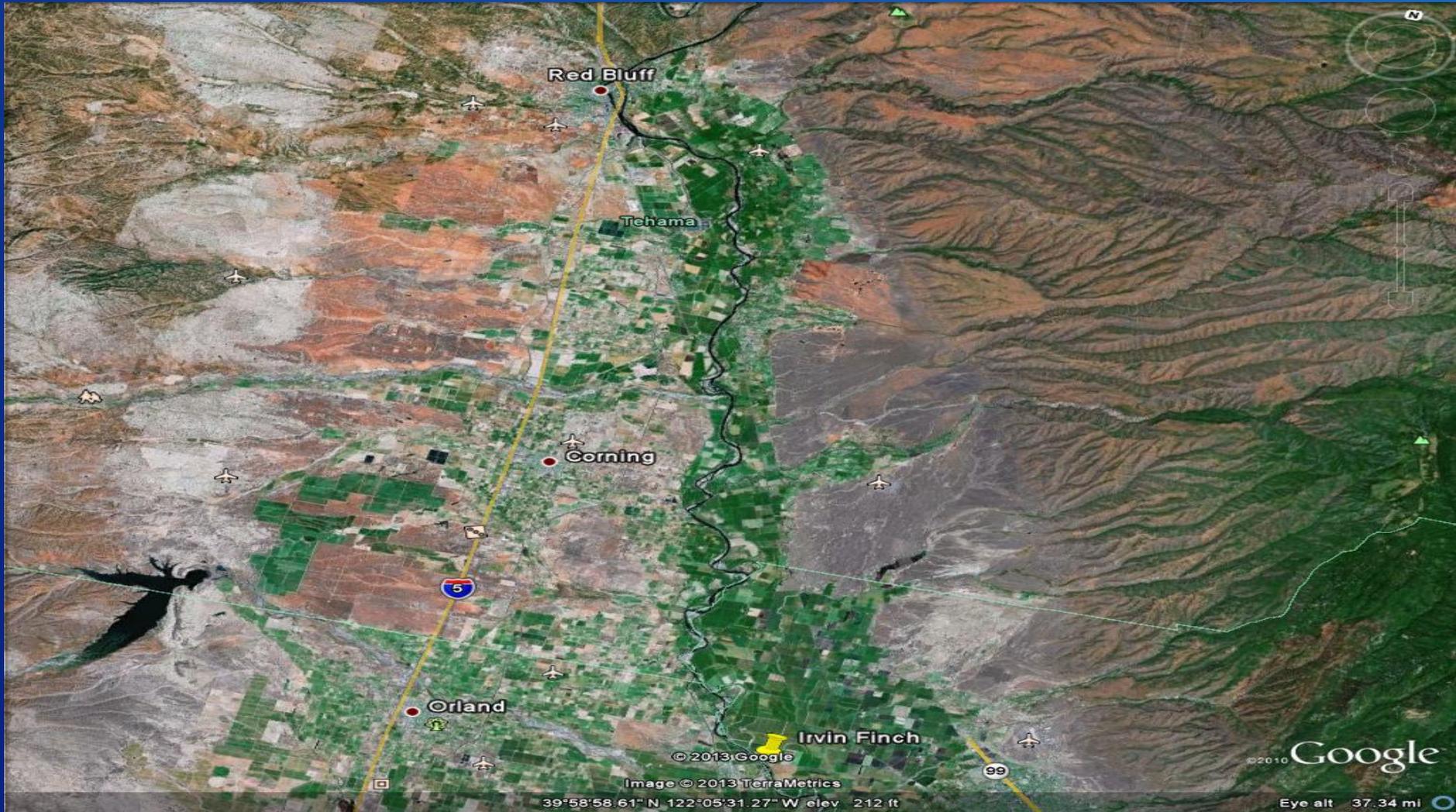
1. Successfully catch adult green sturgeon
2. Surgically implant acoustic transmitters
3. Volitional release with no mortality
4. Track movements in the river system



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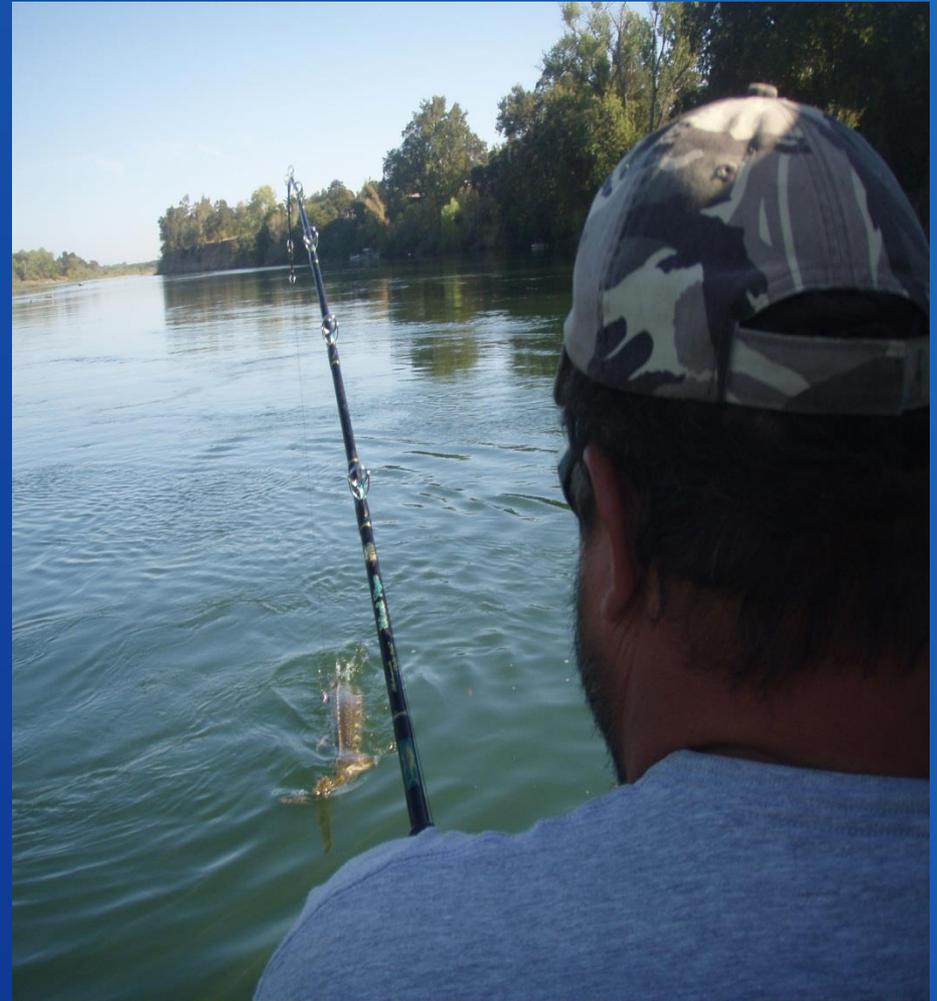
# Primary Study Area



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# Methodology Contd.

- Adults were captured utilizing angling as stipulated in permits



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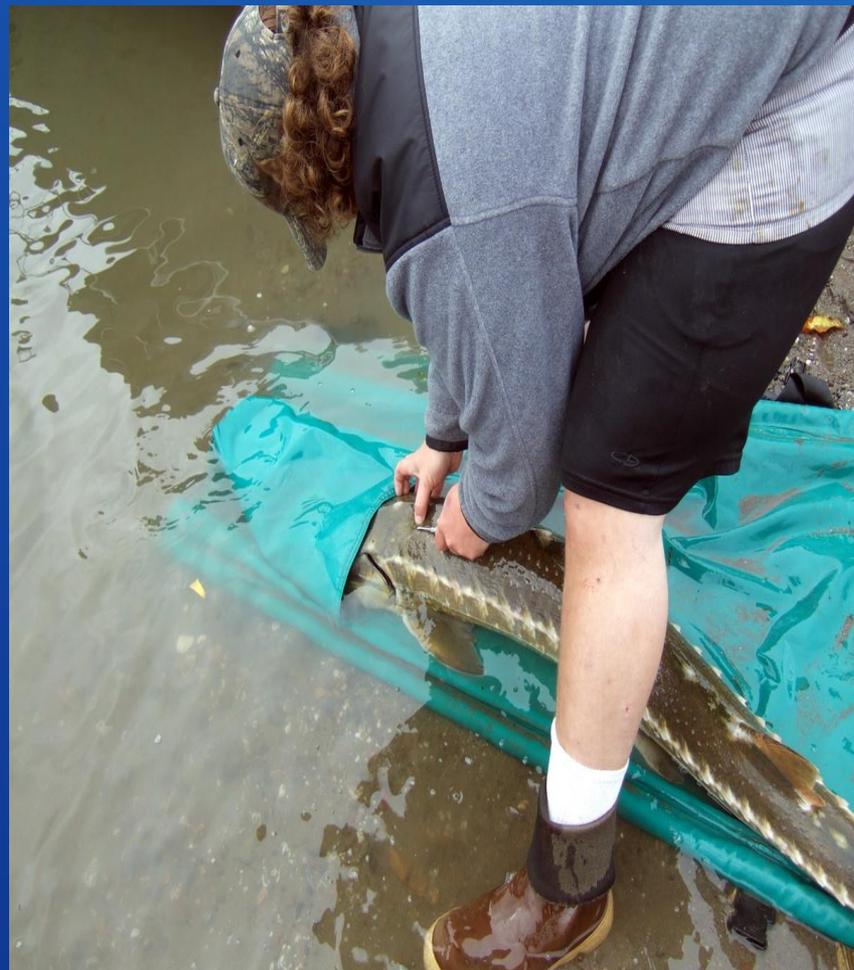
# Methodology Contd.

- Adult green sturgeon were implanted with acoustic transmitters in the peritoneum (body cavity)
- Adults were fitted with Vemco model V 16-6X
- Ping rate between 60-90 sec with a battery life of 10 years.



# Methodology Contd.

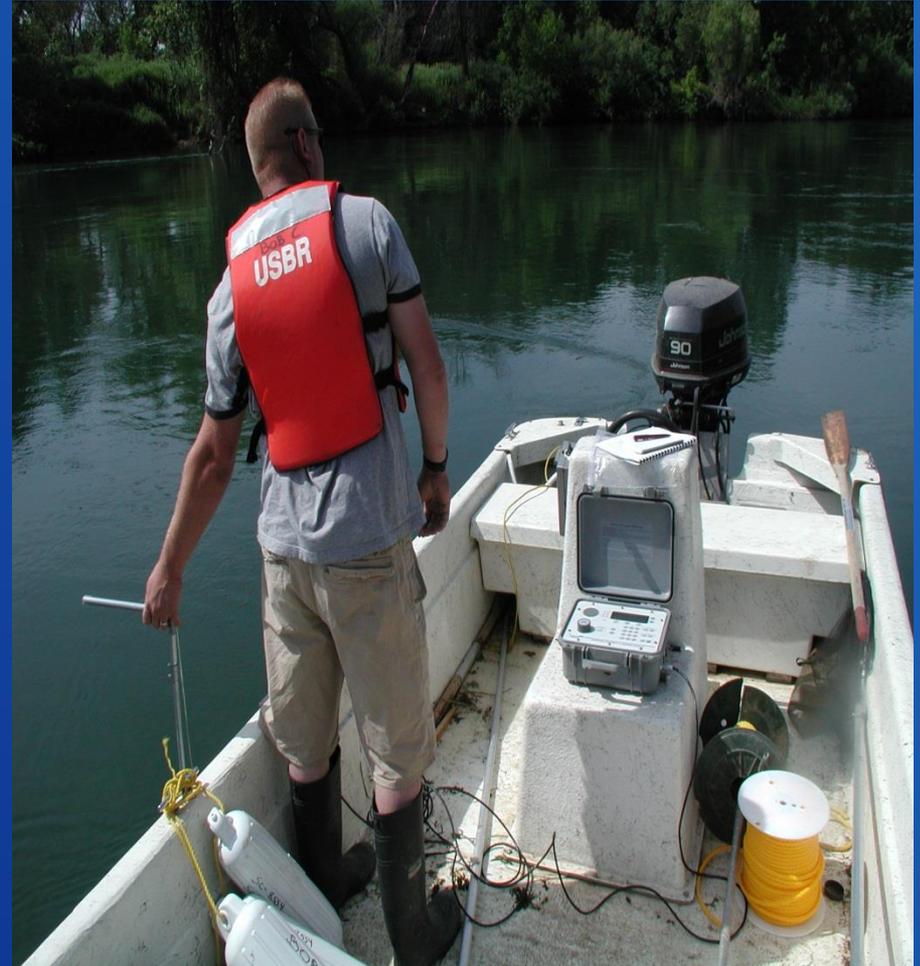
- Adults were also implanted with a Full Duplex (FDX) PIT tag
- Tag placement behind left nape and anterior to dorsal fin above lateral scutes



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# Methodology Contd.

- Mobile acoustic scans were conducted once or twice daily at RM 207



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# Results

- From July thru Oct in 2009, 2010 and 2011 a total of 32 adult green sturgeon were tagged in Middle Sacramento River (RM 207).



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# Results Contd.

## 2009 (Dry WY)

- 20 adult green sturgeon caught and tagged
- Highest CPUE in October



# Results Contd.

**2009**

- **Emigration occurred during nocturnal hours between RM 203-209**
- **Site fidelity occurred primarily at RM 207**

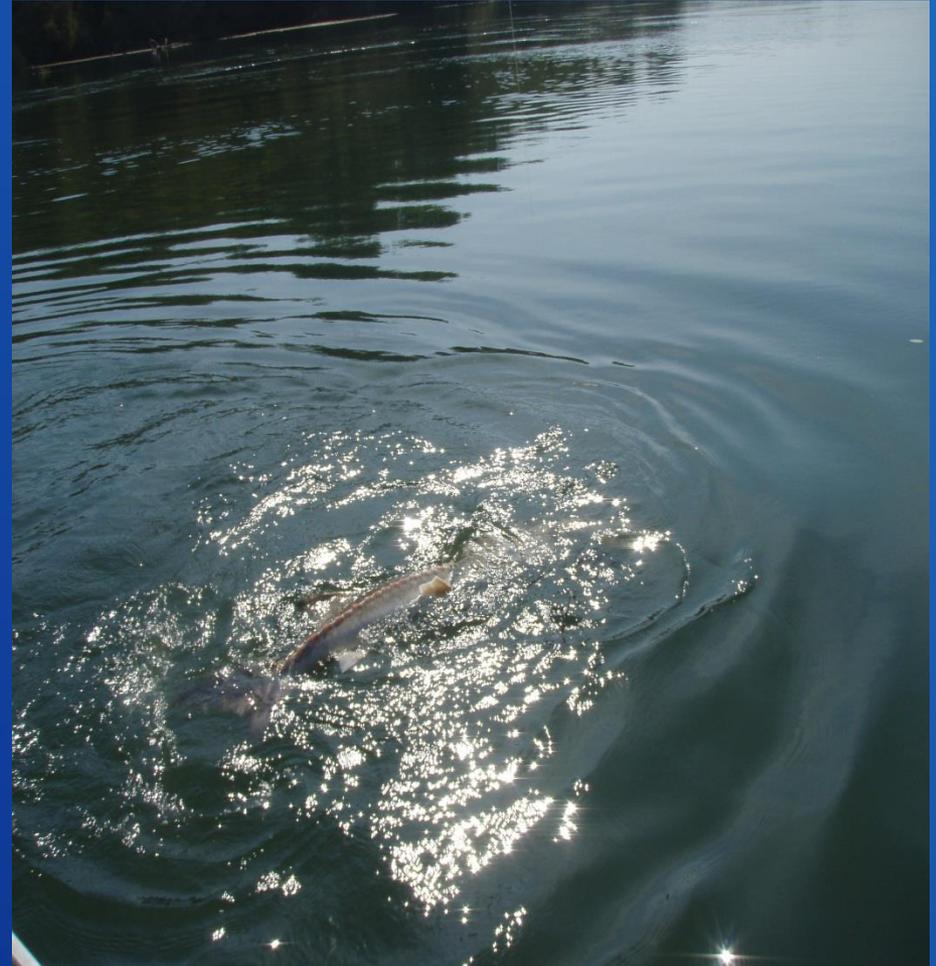


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# Results Contd.

## 2009

- Out migration from the Sac. River began in Oct with majority leaving in in middle Jan.
- Flows ~ 5,619 cfs
- Temp ~ 52.1 F
- ~90% (n=18) migrated to the Pacific Ocean within 45 days.
- Two possibly poached

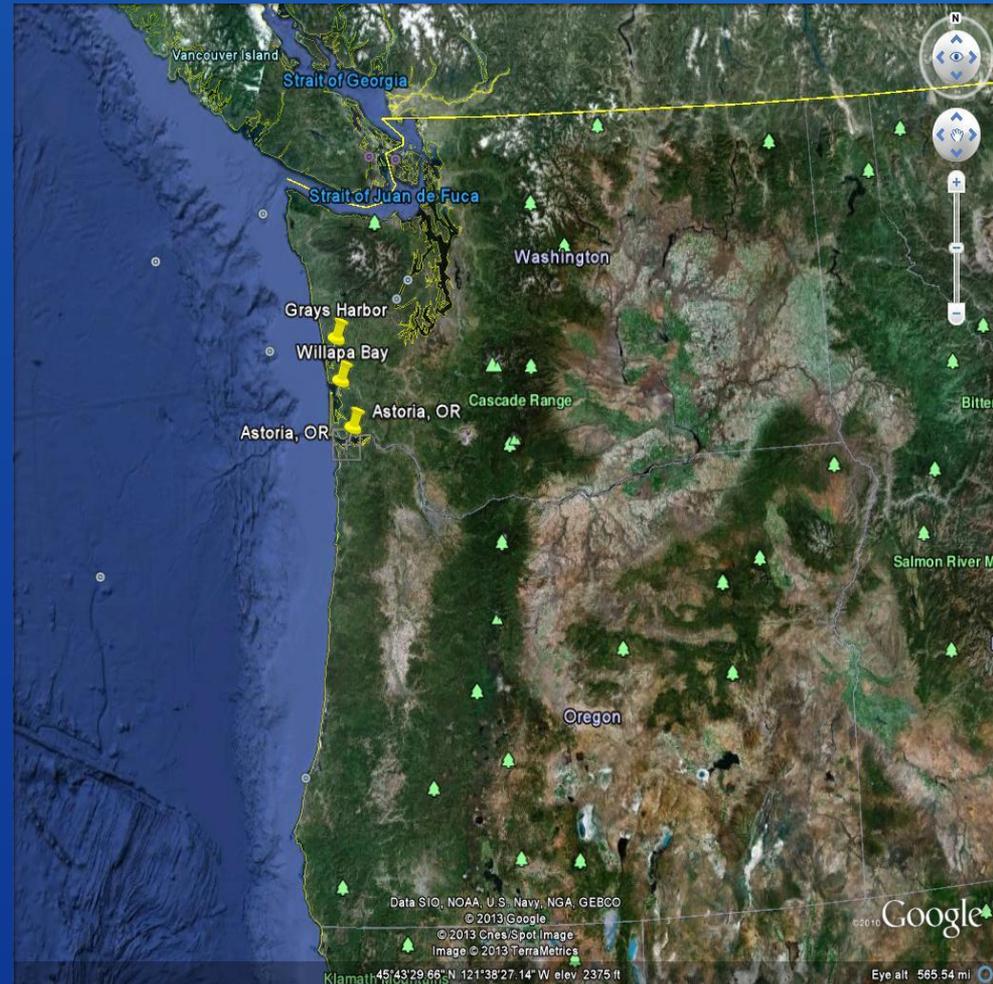


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# Results Contd.

**2009**

- Two thirds (n=12) of the 18 migrated to Willapa Bay and Grays Harbor, WA
- 2 migrated to Columbia River (Astoria, OR)
- Remaining 4 in the Pacific Ocean



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# Results Contd.

**2010 (Below Normal WY)**

- **10 adult green sturgeon tagged**
- **Highest CPUE IN July**



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# Results Contd.

**2010**

- **Emigration occurred during nocturnal hours between RM 203-209**
- **Site fidelity occurred primarily at RM 207**



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# Results Contd.

**2010**

- Majority of out migration occurred from Oct. and lasted until Dec. (n=8) or 80%
- Flows ~7,411 cfs
- Temp ~ 52.1F
- 20%, (n=2) migrated outward within 2 weeks of tagging \*



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# Results Contd.

**2010**

- **Migration to the Pacific Ocean occurred within 30 days.**
- **80% (n=8) migrated to Grays Harbor**
- **1 was detected in Astoria, OR**
- **1 tag malfunction\***

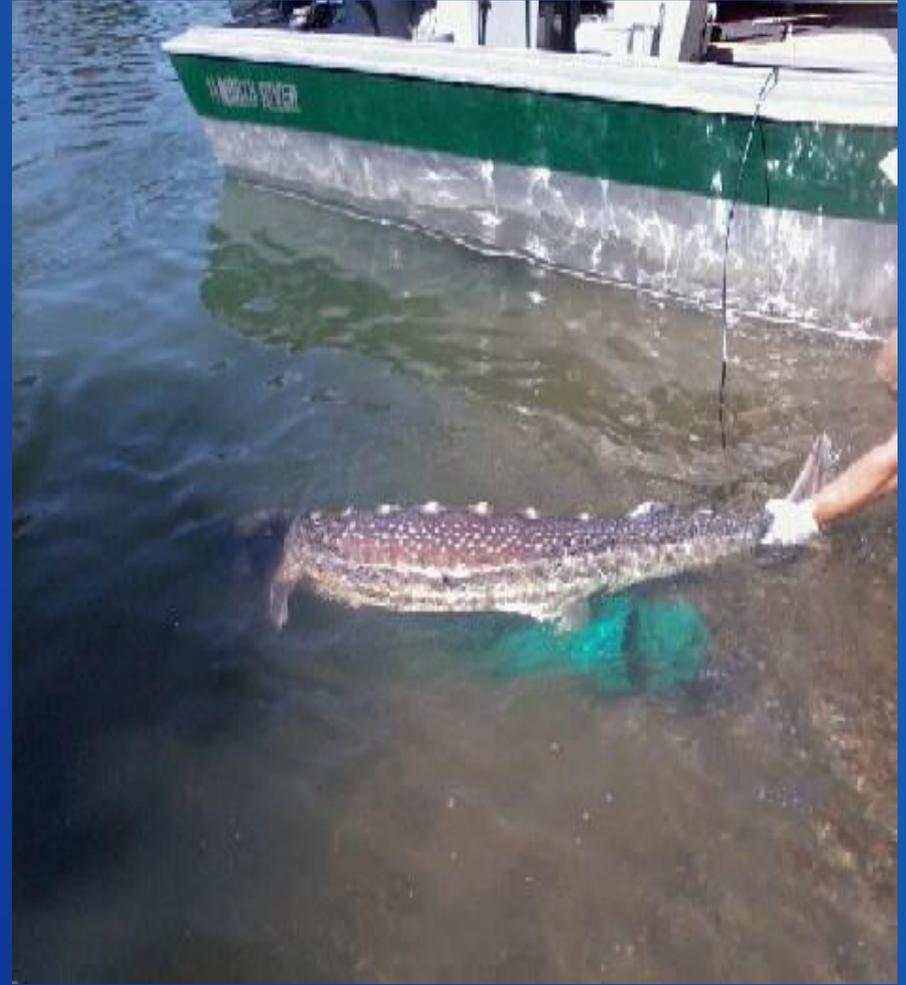


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# Results Contd.

## 2011 (Normal WY)

- 2 adult green sturgeon
- Both caught and tagged on Sept. 21
- Largest known caught and tagged green at 8' 2"

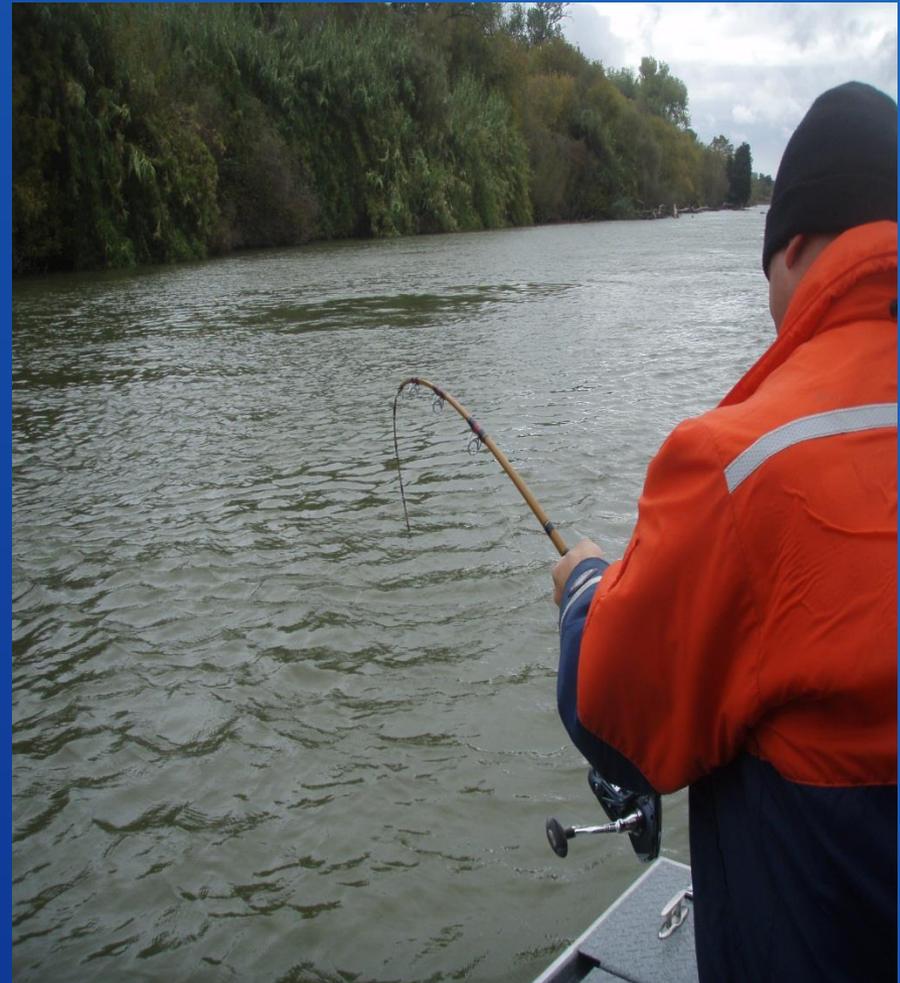


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# Results Contd.

**2011**

- **Emigration occurred during nocturnal hours between RM 203-209**
- **Shorter periods of emigration occurring**
- **Site fidelity occurred primarily at RM 207**



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# Results Contd.

**2011**

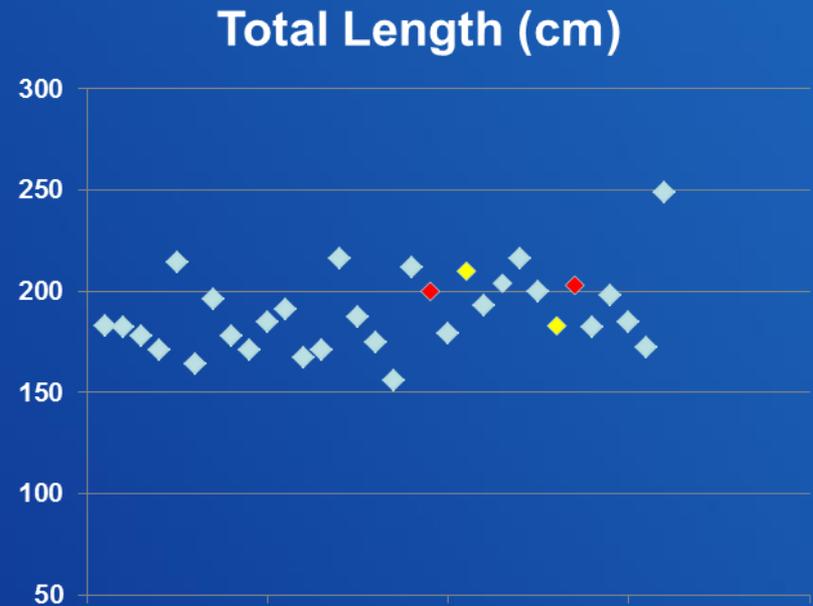
- **Out migration occurring in January**
- **Flows ~7,281**
- **Temp ~ 49.5 F**
- **Within 30 days both adults migrated to the Pacific Ocean**



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# Results Contd.

- Total catch consisted of
- 2 males
- 2 females
- 28 unknown



# Conclusion

- **Emigration primarily occurred between 1000-0400hrs**
- **Migration timing between Oct-Jan regardless of water year type (Dry, Below Normal, Wet)**
- **Flows ranged ~ 5,619-7,411 cfs with temperatures ranging from ~ 48 - 52.1 F when outmigration occurred**
- **30 tagged adults migrated back to the ocean with twenty migrating to Grays Harbor, WA**

# Acknowledgements

- DWR
- PSMFC
- CDFW
- USFWS
- UC Davis
- NMFS



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# Questions ?



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