Measuring the Abundance and Distribution of Green Sturgeon

Ethan Mora: Graduate Group in Ecology, University of California, Davis
eamora@ucdavis.edu

With Direct Assistance From:
US Army Corps of Engineers
National Marine Fisheries Service
California Department of Water Resources
Yurok Tribal Fisheries
Oregon Department of Fish and Wildlife
Measuring the Abundance and Distribution of Green Sturgeon

• Distribution
  – Identify locations where Green Sturgeon congregate during their spawning period and measure the relative use rates of these locations.
  – Measure the suite of velocities, depths and substrates where Green Sturgeon are known to congregate/spawn.
  – Using 2D Flow models, determine where those conditions exist between Daguerre Point and Englebright dams on the Yuba River.

• Abundance
  – Estimate the annual run size of SDPS and NDPS Green Sturgeon
  – Estimate the number of adults in the SDPS and NDPS
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Green Sturgeon Geography

- Umpqua River
- Rogue River
- Klamath River
- Eel River
- Sacramento River
- Feather River
- San Joaquin River
Green Sturgeon Geography

Umpqua River
Rogue River
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Green Sturgeon Geography

Movement and habitat use of green sturgeon *Acipenser mediocris* in the Rogue River, Oregon, USA

By D. L. Erickson\(^1\), J. A. North\(^2\), J. E. Hightower\(^3\), J. Weber\(^4\) and L. Lauck\(^5\)

Summary

Green sturgeon (*Acipenser mediocris*) movement patterns and habitat use within the Rogue River, Oregon were evaluated using radio telemetry. Nineteen specimens ranging from 154 to 225 cm total length were caught by gill netting and tagged with radio transmitters during May-July 2000. One tagged green sturgeon was verified as a female near spawning condition. Individual green sturgeons spent more than 6 months in fresh water and traveled as far as river kilometer (rkm) 39.5. Green sturgeon preferred specific holding sites within the Rogue River during summer and autumn months. These sites were typically deep (>5 m) low-gradient reaches or off-channel coves. Home ranges within holding sites were restricted. All tagged individuals emigrated from the system to the sea during the autumn and winter, when water temperatures dropped below 10°C and flows increased. This species is extremely vulnerable to habitat alterations and overfishing because it spawns in only a few North American rivers and individuals reside within extremely small areas for extended periods of time.
Green Sturgeon Geography

Movement and habitat use of green sturgeon *Acipenser medirostris* in the Rogue River, Oregon, USA

By D. L. Erickson¹, J. A. North², J. E. Hightower³, J. Weber⁴ and L. Lauck⁵

Summary

Green sturgeon (*Acipenser medirostris*) movement patterns and habitat use within the Rogue River, Oregon were evaluated using radio telemetry. Nineteen specimens ranging from 154 to 225 cm total length were caught by gill netting and tagged with radio transmitters during May–July 2000. One tagged green sturgeon was verified as a female near spawning condition. Individual green sturgeons spent more than 6 months in fresh water and traveled as far as river kilometer (rkm) 39.5. Green sturgeon preferred specific holding sites within the Rogue River during summer and autumn months. These sites were typically deep (> 5 m) low-gradient reaches or off-channel coves. Home ranges within holding sites were restricted. All tagged individuals emigrated from the system to the sea during the autumn and winter, when water temperatures dropped below 10°C and flows increased. This species is extremely vulnerable to habitat alterations and overfishing because it spawns in only a few North American rivers and individuals reside within extremely small areas for extended periods of time.
Site Visits:
Minimum 3 Transects at Every Unit
Red Numbers Indicate Occupancy Rates
(Point estimates only. They do not contain detection probability).

Unit 112 Cow Creek: N=9 56%
Unit 98 No Name: N=6 33%
Units 81 & 82 Above China Rapids: N=14 64%
Unit 77 Below China Rapids: N=10 70%
Unit 67 Red Bluff: N=13 69%
Unit 59 Below Red Bluff: N=7 29%
Unit 50 Antelope Creek N=16 100%
Unit 33-36 Deer Creek N=14 67%
Unit 13 & 14 GCID N=12 83%
Unit 77 Below China Rapids
Unit 77 Below China Rapids

Velocity (m/s)
- 0.00 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 0.60
- 0.60 - 0.70
- 0.70 - 0.80
- 0.80 - 0.90
- 0.90 - 1.00
- 1.00 - 1.10
Unit 50 Antelope Creek
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  – Estimate the number of adults in the SDPS and NDPS
\[\hat{D}_i = \frac{\bar{s}}{\bar{a}} \]
\[\hat{S}_i = A \hat{D} \]
\[\hat{V}(\hat{D}) = \frac{\left(\frac{1}{n} \sum \left(\frac{a_i}{\bar{a}}\right)^2 (\hat{D}_i - \hat{D})^2\right)}{(n - 1)} \]
\[\hat{V}(\hat{S}) = A^2 \hat{V}(\hat{D}) \]
### Number of Detected Sturgeon in the Sacramento River

Not an estimate of Green Sturgeon abundance! Yet

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Conclusions

• It is likely that the of Green Sturgeon congregate in core areas during their spawning migrations. This makes them susceptible to correlated catastrophic risk. (Poaching, Toxin Spills, etc)

• Annual run size of Green Sturgeon = f(number of detected sturgeon [from previous slide], proportion that are White Sturgeon, proportion not in units during survey, proportion in river during survey)...