# Quantifying catch-and-release mortality in a southern Muskellunge fishery

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#### Introduction

- Why VA Muskellunge?
  - Representative of southern Muskellunge population
  - Important recreational fishery





- What is C&R mortality?
  - Physiological stress from angling leading to delayed mortality postrelease

#### Study Site

- Upper James River
  - 1015 tagged (adj. catch ~72%)
  - Between Bedford Hydropower project dam and Coleman Falls dam





- Why?
  - Access
  - Less fishing effort
    - In lower reach specifically
    - Control fish
  - Between dams
    - Limited probability of emigration

#### Collection

- VDGIF winter Muskellunge electrofishing survey
  - Late February through early March
  - Scan for PIT tags
  - Hold in live well for surgery
  - *N* = 45 in 2020; *N* = 45 in 2021







## Surgery

- Electro-sedation
  - Smith-root electroimmobilization gloves
- Implant ATS F1235B
  - No trailing whip
- Floy tag FT-4 lock-on loop tag
  - Distinguishable from VDGIF dart tags







## Angling

- Muskellunge-specific gear
- Attempt to angle ½ radio tagged Muskellunge
  - June to August





#### • Handling

- Angler designed procedures
- Data collected
  - TL, GPS, temp, angled and handled time
  - Reflex Action Mortality Predictor ("RAMP")

## Tracking

- ATS R2000 receiving unit with 3 element Yagi antenna
- Attempt to locate all tagged individuals once weekly
  - Track 2-3 times per week total
- After an individual has been angled
  - ~Daily for 3-4 days
- Mortality = no upriver movement over 2 weeks
  - Attempt to visually verify survival/mortality



### Analyses

#### • Logistic regression

- Response:
  - Mortality (binomial)
- Potential variables:
  - Sex
  - Hook location
  - Total length
  - "RAMP"
  - Water temperature
  - Angling duration
  - Handling duration
  - Cumulative temperature of nearest tributary 72h post-release



#### Extension of project

- 4-year PIT tag and tag-return study
  - Growth
  - Abundance
  - Exploitation
    - Probability of being angled





#### • Synthesis

- Mortality & exploitation
- Population-level effects of C&R

#### Acknowledgements







#### DEPARTMENT OF GAME & INLAND FISHERIES CONSERVE, CONNECT, PROTECT.



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## Questions?