Brook Trout Movement and Habitat Use in the Little Plover River, Wisconsin

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Background

❖ Brook Trout

- Important apex predator, sportfish, & indicator species in WI
- Sensitive to water quality, groundwater, introduced species, climate change, and development
- System specific migrations & habitat use

❖ Little Plover River

- 2nd order, Class 1 trout stream, Springville Pond (18 ac impoundment)
- Issues with extreme low flows & fish kills
- Restoration efforts: pumping, riparian, & brush bundles
- Ongoing Brook Trout studies: PIT antennas & redd surveys
  - Unknown: fine-scale habitat use, home ranges, unmonitored areas

Objectives

- Determine if Brook Trout:
  - Home range and spatial distribution varied among individuals
  - Used restored habitat or Springville Pond
  - Used particular cover or substrates at higher rates

Methods

- Backpack and barge electrofishing, June - October 2020
- Brook Trout (>230 mm; n=30) surgically implanted with F1580 ATS radio transmitter (3.6 g, ≈ 441 days)
- Weekly tracking June - December 2020
- Recorded location, cover, and substate
- Minimum home range computed via 'riverdist' in Program R
- Descriptive statistics of habitat use
- Spatial distribution plotted in ArcMap 10.8

Results

- 20 Brook Trout available for tracking
  - Tag loss / mortality rate of 37%, higher in summer
- Home ranges averaged 1266.37 m (26 – 3855 m) from July - November 2020 (Figure 1)
  - Larger home ranges associated with spawning movements

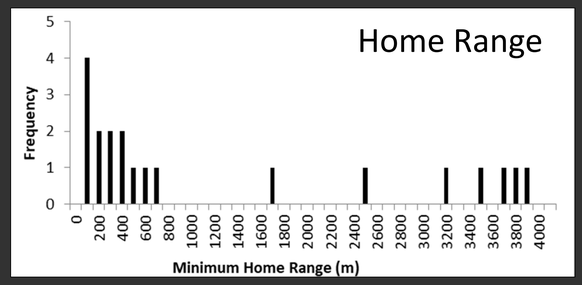

Figure 1. Home range of radio-telemetered Brook Trout (n=20) from July - November 2020

- Individuals located throughout river, including restored reaches with brush bundles & small upstream reaches (Figure 2)
- Springville Pond was drained & could not be evaluated

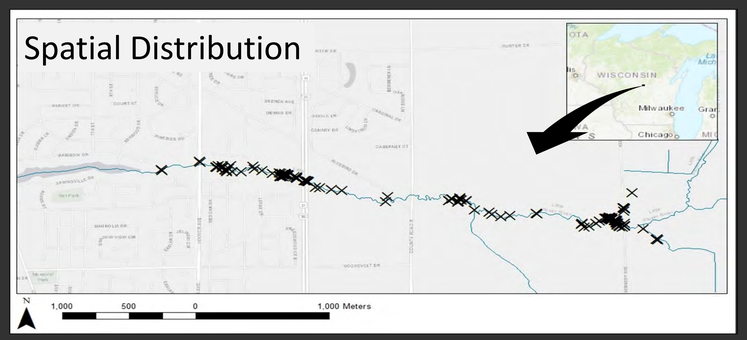

Figure 2. Spatial distribution of all radio-telemetered Brook Trout (n=20 individuals and 154 locations) from July - December of 2020.

- Individuals displayed varying movement patterns (Figure 3)
- All individuals initially located in immediate vicinity of tagging location with some showing distinct spawning migration (#661)
- Extensive use of agricultural drainage ditch (#330)

Figure 3. Examples of radio-telemetered Brook Trout movements from July – December 2020

Results - Continued

- Predominate habitat use was wood for cover & sand for substrates, but gravel did increase during fall (Figure 4)
  - Cover: 64% wood, 31% Vegetation, 5% Rock
  - Substrate: 77% Sand, 20% Silt, 3% gravel

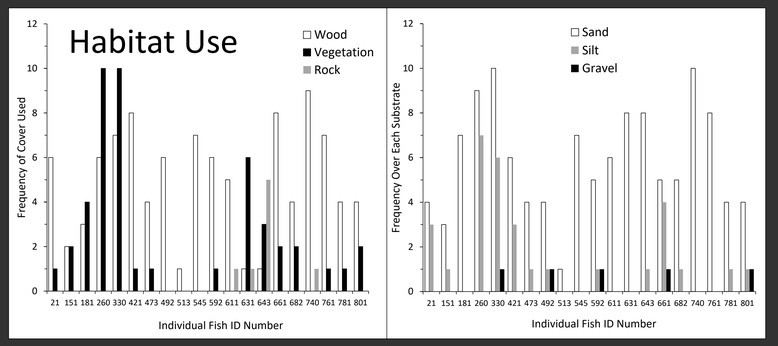

Figure 4. Frequency of observed cover and substrate use of radio-telemetered Brook Trout (n=20 individual and 154 locations) from September - December 2020

Discussion

- Brook trout home ranges were variable, with small & large movement patterns during spawning migrations (0-3000 m)
- Brook Trout use of stream was variable, including small reaches
- Future habitat work should be geared towards entire system – including connected agricultural ditches and unnamed reaches
- Brook Trout extensively used wood, comparable to other studies
  - Habitat availability study needed to evaluate selection
- To reduce tag loss/mortality, avoid tagging in summer periods, consider different transmitter or ensure <2% body weight
  - Evidence of snagging of trailing antenna in debris, resulting in tag loss/damage to suture site/mortality for some individuals
  - Transmitters (n = 3) on shore likely due to predators/scavengers
- Springville Pond drained during study, need remains for evaluation of salmonid use of downstream impoundment in a small river

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