

Ecology and habitat use of juvenile lake sturgeon (*Acipenser fulvescens*) downstream of a hydroelectric generating station on the Winnipeg River, Manitoba

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Research Objectives

➤ Research objectives include:

- juvenile habitat use
- juvenile feeding
- juvenile population parameters (i.e., abundance, growth, year class strength)



Study Area



Lake Winnipeg

Winnipeg

Lake of the Woods

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Study Area



Pointe du Bois GS

Slave Falls GS



Seven Sisters Falls GS

Pinawa MB

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Study Area

Slave
Falls
GS

Scotts Rapids

Numao Lake

Nutimik Lake

Sturgeon Falls

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Methodology

➤ capture, mark, recapture

- abundance
- condition factor
- year class strength
- distribution
- survival rate
- growth rate
- movement



Methodology

- gill nets (1 – 4.25 inch) were set in different combinations of depth, water velocity, and substrate type during spring, summer and fall of 2006.



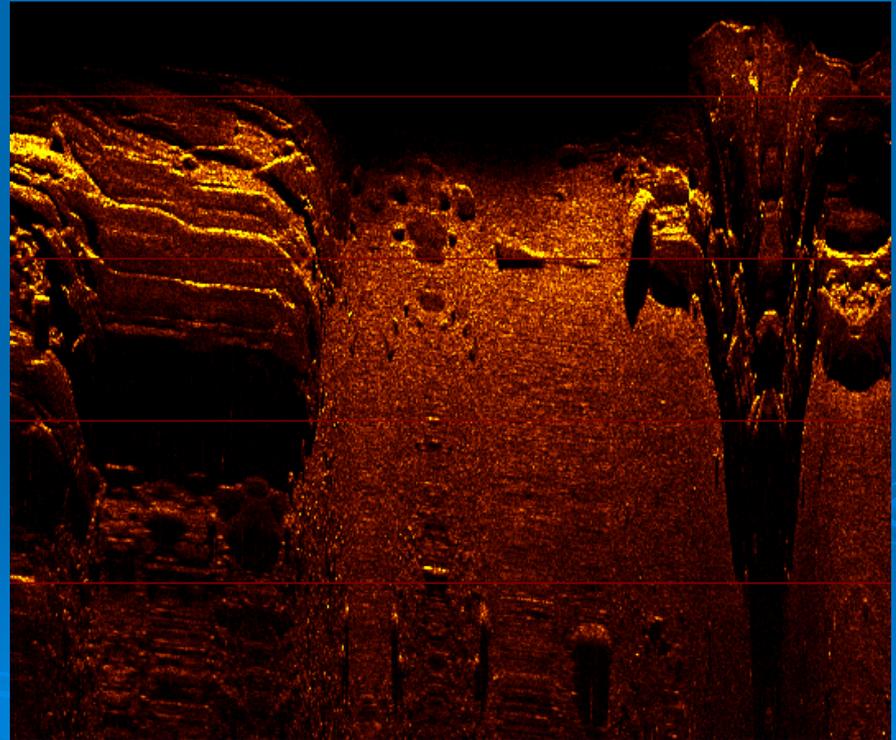
Methodology

- captured fish were tagged with Floy and/or PIT tags.



Methodology

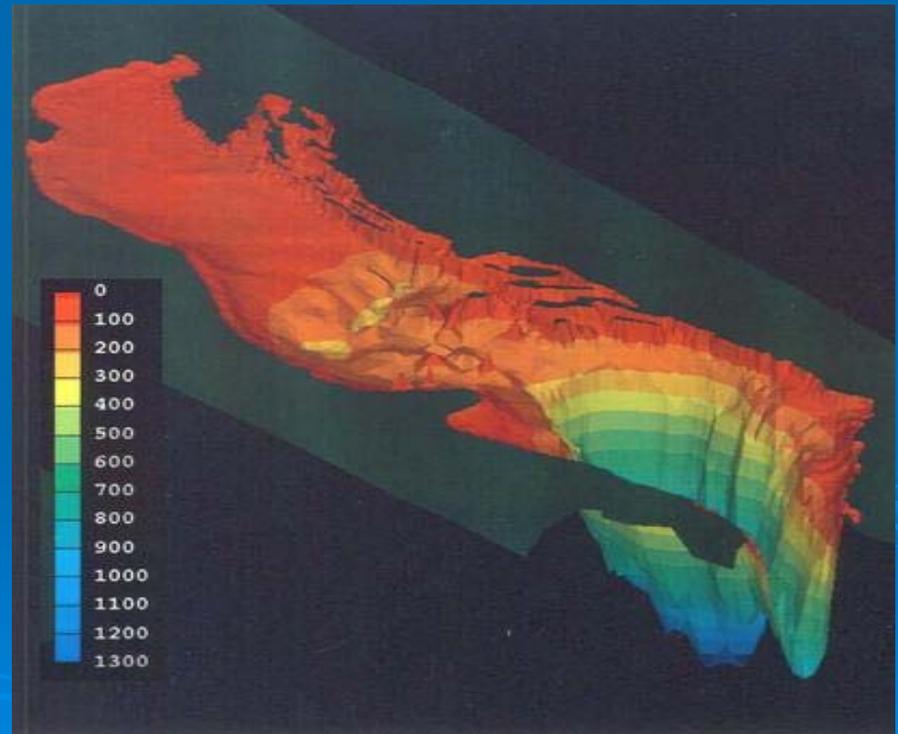
- habitat assessment
 - side scan sonar



Methodology

➤ habitat assessment

- side scan sonar
- depth sonar



Methodology

➤ habitat assessment

- side scan sonar
- depth sonar
- underwater video



Methodology

➤ habitat assessment

- side scan sonar
- depth sonar
- underwater video
- bottom grabs



Methodology

- habitat assessment:
 - side scan sonar
 - depth sonar
 - underwater video
 - bottom grabs
 - multi-parameter data-logging sonde



Methodology

- fish behaviour and feeding ecology
 - underwater video



Methodology

- fish behaviour and feeding ecology
 - underwater video
 - gut contents



Results - Abundance

- juvenile fish are very abundant downstream of Slave Falls Generating Station
- numbers remain high all the way to the outlet of Nutimik Lake (14 km)

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Abundance

- 2,352 juveniles < 50 cm FL
 - 2,103 tagged (PIT or floy)
 - 161 recaptured
 - 104 were < 25 cm FL



Abundance

- high CPUE and low recapture rate indicates large numbers of juvenile fish are present



Summer Habitat Use

- during late spring and summer juveniles were most abundant in habitat that:
 - had a detectable current (5 to 20 cm/s)
 - had a flat, sand/gravel bottom
 - **was deep (20 - 27 m)**
- were not found in:
 - **water depths < 10 m**



Fall Habitat Use

- during fall juveniles were most abundant in habitat that
 - had a slower water velocity (3 to 8 cm/s)
 - had a flat, sand/gravel bottom
 - was moderately deep (14 - 18 m)
- during late fall (H_2O temp: 2-3°C) CPUE remained high in moderately deep areas (14 – 18 m)

Other Species

- very few other species were found in areas with high numbers of lake sturgeon
- in areas where sturgeon were not abundant (or were absent), other fish species (sauger, walleye, pike, burbot, sucker, whitefish) were common

Size Distribution

relatively few fish
< 30 cm long

reasonable numbers
of fish < 30 cm long

many
juvenile
fish < 50
cm long

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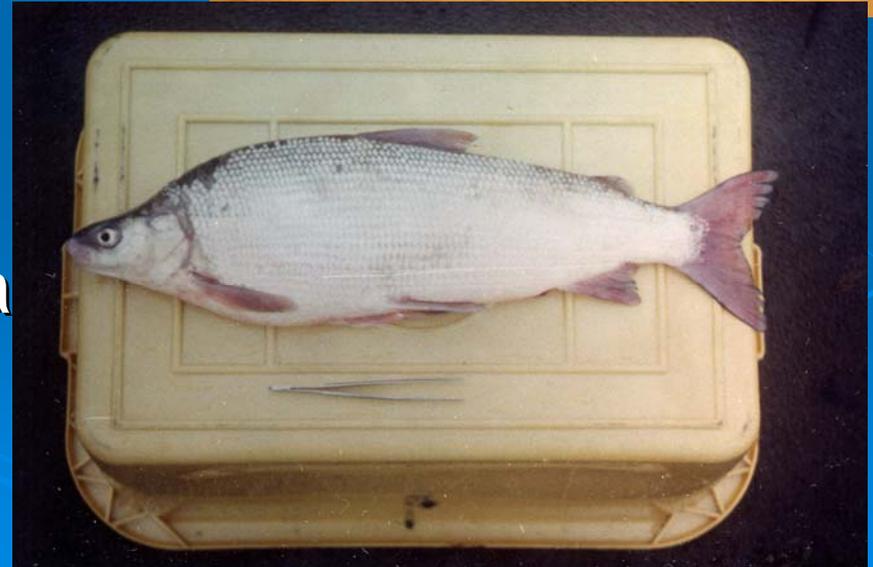
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Downstream Findings

- areas further downstream in the reservoir had very few juvenile sturgeon despite having similar habitat characteristics as the upper reaches of the reservoir.
- however, other fish species were captured in these areas



Feeding

- areas frequented by juveniles are also inhabited by clams, crayfish and small darters/sculpin
- large amounts of invertebrate drift are also present, particularly during the spring
- juvenile stomachs contained Dipteran larvae in spring but diet was more diverse later in the year
- feeding rate appeared to diminish in the fall.

Age Classes

- age classes appear to be distinguishable by fish size
- year class strength appears to be strong



Age-0 Fish

- preliminary age analyses indicates that age 0 fish were not captured.
- ecology of age-0 fish in this system remains unknown.



Growth

- fish grew between 2 and 5 cm from May to Oct/Nov
- age 1 sturgeon measured 180 – 230 mm after second summer



Summary and Implications

- habitat downstream of hydroelectric generating stations can contain suitable spawning and nursery habitat for lake sturgeon
- juvenile lake sturgeon preferred the deepest available areas with current during summer, but moved to slightly shallower and lower velocity areas during fall

Summary and Implications

- juvenile growth appeared to be relatively slow
- age-0 fish were likely absent from the catch, meaning that they:
 - inhabited different areas in the river and/or
 - were not vulnerable to our gear
- juvenile lake sturgeon appeared to segregate themselves from other sympatric species

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A photograph showing a person's hand holding a small, dark, elongated object, possibly a piece of wood or a small animal, on a large, light-colored log. The person is wearing a plaid shirt and green pants. The background is a forest floor with dry leaves and twigs.

Questions?