Using Models for Tag-Recapture Data to Assess Growth of Bluegill and Largemouth Bass in Inch Lake, Wisconsin

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Study Site – Inch Lake (Bayfield County, WI)

- A 31-acre soft-water seepage lake managed with no-harvest and artificial-lures-only regulations.
- Fish community consists of primarily Bluegill (*Lepomis macrochirus*), Largemouth Bass (*Micropterus salmoides*), and Bluntnose Minnow (*Pimephales notatus*).

Objective

- Explore three models (Faben's von Bertalanffy, Gompertz, and inverse logistic) to describe growth of tagged Bluegill and Largemouth Bass in Inch Lake.

Methods

- Fish were sampled with fyke nets and by angling in May and June of 2006-2016.
- Bluegill ≥ 150 mm and Largemouth Bass ≥ 200 mm were given individually numbered Floy tags.
- 184 Bluegill and 143 Largemouth Bass were recaptured one year after being tagged.
- The three growth models were fit to change in length, length-at-tagging, and time-at-large data.
- Akaike's Information Criterion (AIC) was used to determine the model most supported by the data.

Results –Bluegill (Figure 1-Left)

- Faben's was the most supported model (AIC weight=0.94), which suggests a linear decrease in relative growth rate with increasing length-at-tagging.
- Average annual growth increments were above the average for northern Wisconsin lakes for fish < 200 mm and near this average for fish > 200 mm.
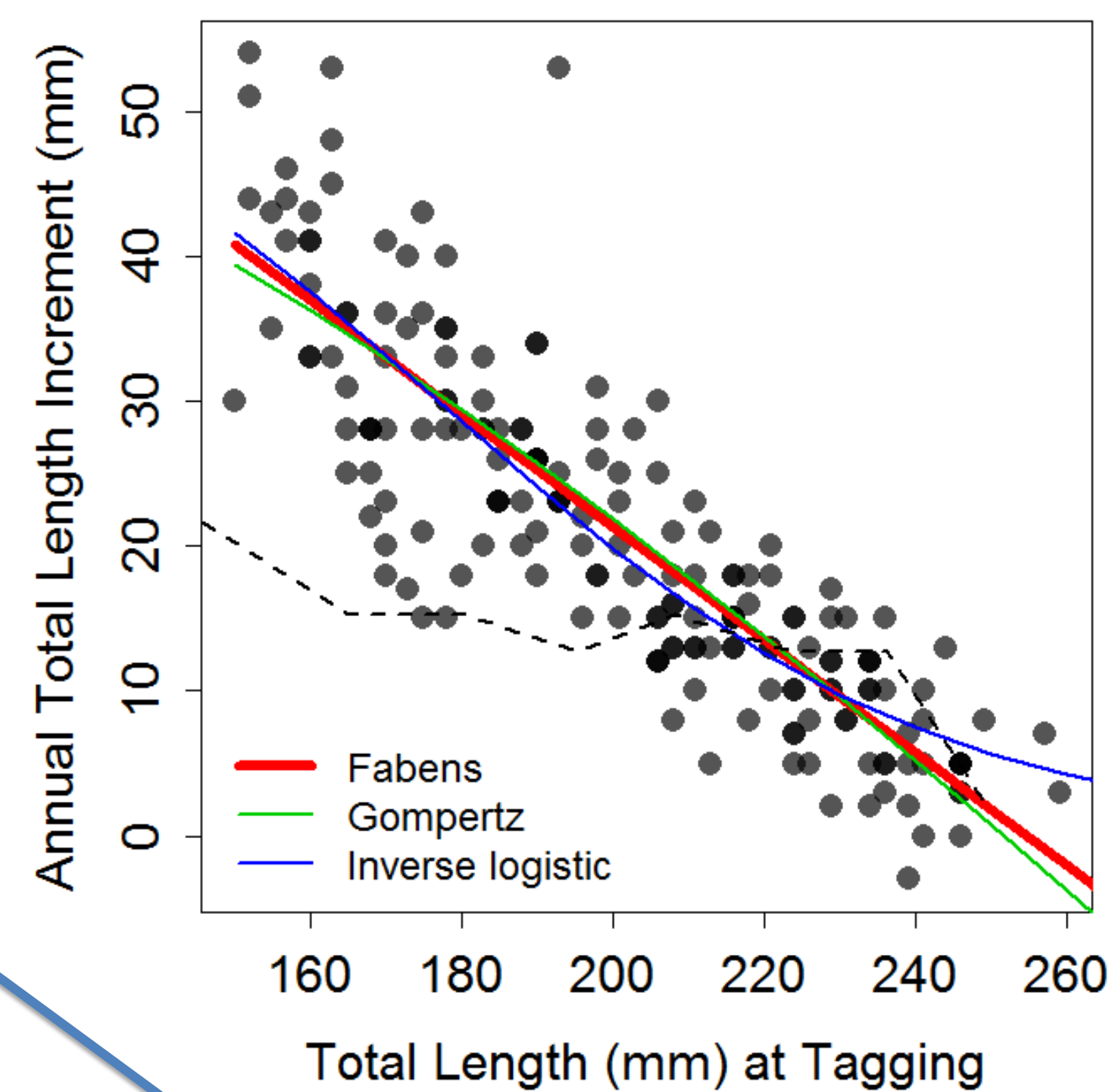
Results –Largemouth Bass (Figure 1-Right)

- Inverse logistic was the most supported model (AIC weight=1), which suggests that the relative growth rate initially decreases with increasing length-at-tagging but then stabilizes at a low rate.
- Average annual growth increments were below the average for northern Wisconsin lakes for all observed lengths and were generally less than 10 mm for fish > 300 mm.

Conclusions

- Low population sizes due to high predation by Largemouth Bass may explain the relatively good growth of Bluegill in Inch Lake.
- High competition for a limited food supply may explain the relatively poor growth of Largemouth Bass in Inch Lake.

Management Recommendation

- Continue to monitor these populations to determine long-term population responses to no-harvest regulations.
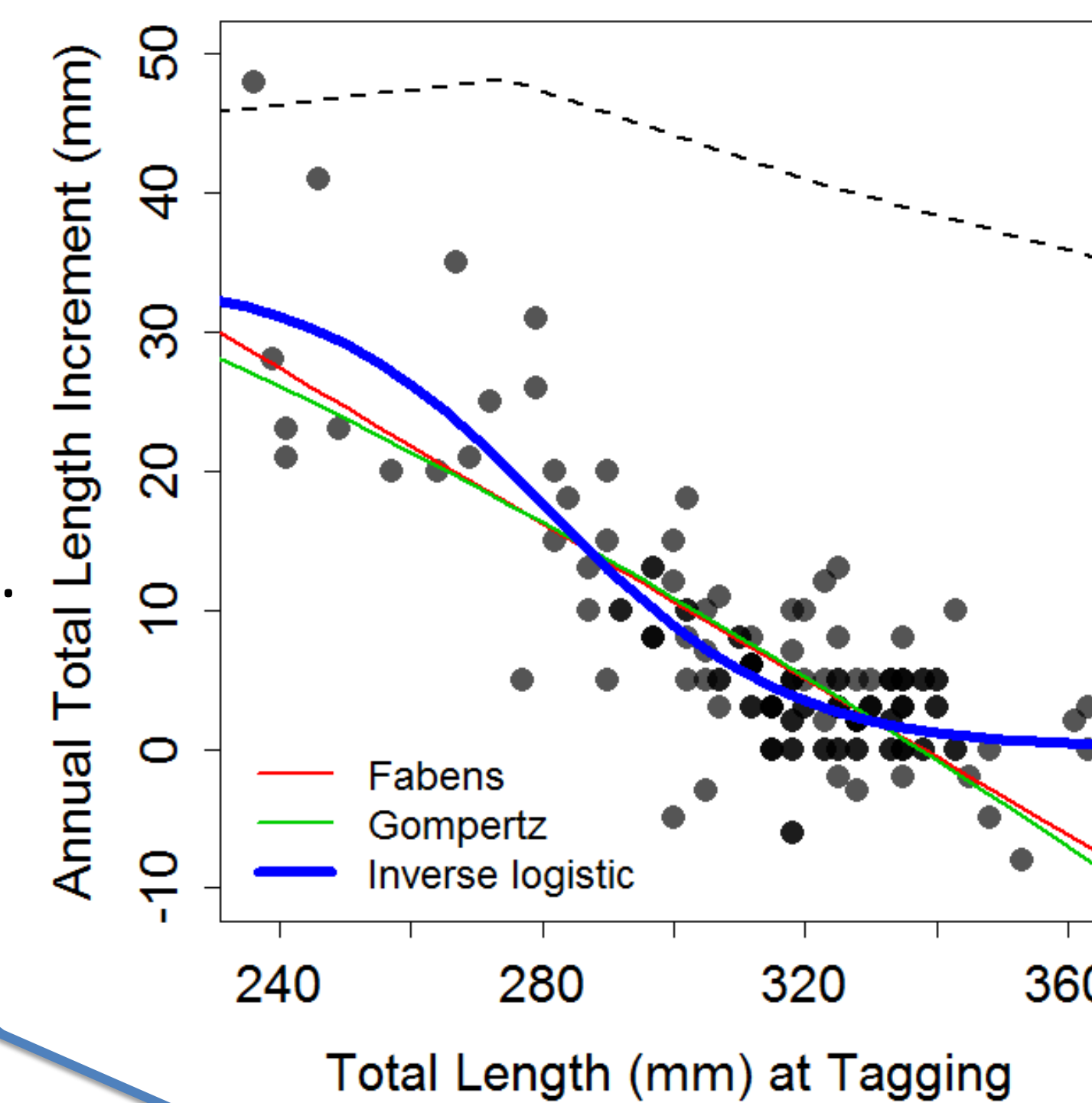

Figure 1. Annual growth increment versus total length at tagging for Inch Lake Bluegill (Left) and Largemouth Bass (Right). The most supported model is emphasized with a thick line. The dashed black line represents averages from many populations in northern Wisconsin lakes.