

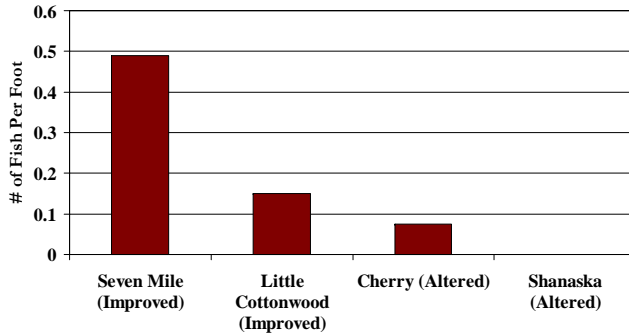
Conclusion

- Alterations of habitat have negative effects on stream ecosystems, including their population size and diversity.
- Stream habitat improvements, including watershed and instream work, showed positive effects on stream communities including their population size and diversity. Watershed work included riparian improvements and water quality monitoring stations. Instream habitat improvements included stream structures and bank stabilization.



Can habitat alteration have a negative effect on fish populations in stream ecosystems?

Yes – Seven Mile Creek and Little Cottonwood River, both of which have had habitat improvements, have a higher catch per unit effort (number of fish per foot) than the altered Cherry and Shanaska Creeks.



The two improved streams had a significantly higher catch per unit effort than the altered streams (ANOVA, $p < 0.05$)

Introduction

- Stream alterations seem to have an effect on the biodiversity of streams. Alterations can include the clearing of riparian zones, substituting agriculture crops for native flora, impounding streams, and the channelizing of streams for navigation/irrigation/drainage reasons.
- Fish can be used as indicators to determine quality of water and habitat, due to their high visibility and longer lives.
- I hypothesized that improved streams will have a wider range and number of fish than the impacted streams.

Effects of Habitat Alteration on Fish Populations and Diversity in Southern Minnesota Streams



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Streams with Altered Habitat

Cherry Creek



Shanaska Creek



Streams with Improved Habitat

Seven Mile Creek



Little Cottonwood Creek



Methods

- Marked sample stations at 4 streams in Minnesota River watershed, including two improved streams (Seven Mile and Little Cottonwood) and two altered streams (Cherry and Shanaska). Measured stations to 625 feet, and took QHEI Habitat Assessment Score in order to quantify habitat quality.
- Electrofished stations with backpack shocker at 250 volts (75 pulses/sec). Caught and recorded fish to species, and then released.



Implications

- Stream ecosystems should be conserved, as quality fisheries are valuable for many reasons including both economic and non-economic. Biodiversity is high in quality stream ecosystems.



Can habitat alteration have a negative effect on fish diversity in stream ecosystems?

Yes – Seven Mile Creek and Little Cottonwood River, both of which have had habitat improvements, have more species of equal abundance than the altered Cherry and Shanaska Creeks (higher Shannon-Weaver scores). Seven Mile and Little Cottonwood also had a higher total number of fish species than both Cherry and Shanaska.

Stream	Shannon – Weaver	Fish Species
Seven Mile (Improved)	1.459 species of equal abundance (H = 0.164)	Blacknosed Dace, Brown Trout, Central Mudminnow, Creek Chub, Brook Stickleback, Sand Shiner
Little Cottonwood (Improved)	4.227 species of equal abundance (H = 0.626)	Bluntnosed Minnow, Brown Bullhead, Creek Chub, Fathead Minnow, Quillback, White Sucker, Common Shiner, Orangespotted Sunfish, Green Sunfish, Short-nosed Gar
Cherry (Impacted)	1.227 species of equal abundance (H = 0.089)	Fathead Minnow, Black Bullhead, Walleye
Shanaska (Impacted)	0 species of equal abundance (H = 0.000)	None caught/seen

Resources

- Brown-Nicollet-Cottonwood Water Quality Board Watersheds. Website found at: <http://mrbc.mnsu.edu/org/bnc/index2.html>
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