

**Report for 2005MT54B: STUDENT FELLOWSHIP:
Movement, habitat use, and food habits of sauger and
walleye: an investigation of resource overlap in the
middle Missouri River, Montana**

Publications

- Dissertations:
 - Bellgraph, Brian, 2006, M.S., "Competition potential between sauger and walleye in non-native sympatry: historical trends and resource overlap in the middle Missouri River, Montana," Ecology Department, Montana State University, Bozeman, Montana, 95 pages.

Report Follows

Final Report
Montana Water Center Fellowship
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Summary of Project Findings:

Sauger *Sander canadensis* populations throughout Montana and North America have exhibited declines over the past few decades. Sauger population abundance declined in the middle Missouri and Yellowstone rivers of Montana in the mid-1980s following a period of drought. Higher flows resulted in a rebound of the lower Yellowstone River population; however, the middle Missouri River population has remained at low abundance. Various factors may contribute to the reduced population abundance of sauger in the middle Missouri River, including interspecific competition with walleye *Sander vitreus*. Historical trend data of sauger and walleye were assessed to determine long-term trends of sauger and walleye fitness. To assess competition potential, seasonal migrations, habitat use, and diets of both species were compared in the middle Missouri River. Trophic position of sauger was also compared between the middle Missouri and Yellowstone rivers to evaluate the trophic status of sauger in sympatry and allopatry with walleye. Sauger and walleye were tracked using radio telemetry to establish and compare seasonal migrations. Habitat use was compared at three hierarchical scales, diets were collected on fish sampled using electrofishing, and diet overlap was calculated. Trophic position was calculated using stable isotope analysis. Historical trend data indicated that sauger and walleye are currently at low abundance and sauger had low relative weights, which is likely due to low prey availability. Prior to the presumed spawning period, 96% of the sauger and 57% of the walleye migrated downstream as far as 273 km. After spawning, both species returned to previously-occupied river reaches and demonstrated site fidelity during the non-migratory season. Habitat use and selection by sauger and walleye were similar at all three hierarchical scales. Diet overlap was high during the spring [0.72 (SE=0.003)] and summer [0.95 (SE=0.0008)] and moderate during autumn [0.49 (SE=0.003)]. Sauger trophic position differed statistically between the middle Missouri and Yellowstone rivers; however, the biological consequences of the difference are uncertain. Overall, resource overlap of sauger and walleye in the middle Missouri River, Montana suggests that competition potential between these species is high, which may preclude the recovery of native sauger populations if resources are limiting.