

U.S. Fish and Wildlife Service
Ecological Services
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Colorado State University
Fort Collins, CO 80523-1474
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Re: Expert opinions and comments concerning entrainment of green lineage Cutthroat Trout in connection with the Moffat Collection System Project

Dear U.S. Fish and Wildlife Service,

I was asked to provide a review of entrainment of green lineage Cutthroat Trout in water diversions associated with the Moffat Collection System Project as presented in the U.S. Fish and Wildlife Service's ("Service") June 17, 2016 Biological Opinion. I will begin with a brief summary of my scientific qualifications followed by my comments on the entrainment issue. It is my professional opinion that currently available information is inadequate to estimate entrainment accurately and reach a decision on the project that protects green lineage Cutthroat Trout in the affected streams in the manner required by the Endangered Species Act (ESA).

Summary of Expertise

I am a Professor in the Department of Fish, Wildlife and Conservation Biology at Colorado State University. I have been on the faculty there since 1992. I have more than 20 years of experience teaching courses in fish biology, conservation and management at Colorado State University. My teaching experience includes Fish Biology and Diversity (FW 300), and Ichthyology Laboratory (FW 301), which I have taught since 1994. I have taught Fishery Science (FW 401), the capstone course in fish population dynamics and management for the department's Fisheries and Aquatic Sciences students since 1992. I conduct scientific research on aquatic ecosystem conservation and management, river and lake food webs, fisheries management, water quality, and lake and reservoir ecology and management. Fish population dynamics has been an organizing concept throughout my career, and many of my studies have required quantitative fish abundance estimates. I have been involved with a number of fish entrainment issues including entrainment of kokanee salmon in releases from Blue Mesa Reservoir, losses of kokanee salmon in irrigation diversions on the Gunnison River, and emigration of nonnative fish via entrainment in reservoir releases across the Upper Colorado River Basin. My research is often funded by federal and state government agencies, included the Service.

Expert Opinion and Comments

Water projects are commonly cited in the declines of ESA-listed fishes in the Western United States (Nehlsen et al. 1991; Moore et al. 1996; Simpson and Ostrand 2012). More specifically, entrainment in water diversions is a threat to many fish populations (Moyle

and Israel 2005), including salmonids, across western North America (Post et al. 2006; Harnish 2007; Carlson and Rahel 2007; Gale et al 2008; Roberts and Rahel 2008; Walters et al. 2012; Pierce et al. 2014). Thus, it is reasonable to expect that increased water diversions as part of the Moffat Collection System Project pose a threat to ESA-listed green lineage Cutthroat Trout. As I outline below, I believe that this issue is not adequately addressed in the Service's 2016 Biological Opinion in connection with the project.

My review and comments are restricted to a discrete set of questions related to the loss of green lineage Cutthroat Trout in stream diversions related to the Moffat Collection System Project. I did not evaluate other potential impacts of the project, nor current mitigation plans described in the Biological Opinion (USFWS 2016). Specifically, I address: 1) adequacy of existing data for use in models that estimate entrainment losses and population impacts, 2) assumptions of these models that were used to quantify entrainment losses, and 3) implications of uncertainty in entrainment for protection of green lineage Cutthroat Trout.

Adequacy of existing data

Estimates of future "take" of green lineage Cutthroat Trout in diversions, as well as an assessment of the population implications of such losses, require information on 1) the abundance of the populations, and 2) the probability that individuals will be entrained in diversion flows. A simplistic estimate of take would be the product of these two numbers. Unfortunately, in this case, reliable data are not currently available for even this inadequate model, much less more complex and realistic ones that would provide statistically accurate predictive value.

Wild fish abundance is notoriously difficult to estimate with accuracy and precision. Statistical estimators using rigorous depletion or mark-recapture techniques are required for credible estimates of abundance and associated uncertainty (White et al. 1982). Spatio-temporal variation and individual heterogeneity in capture probability make total catch or catch per unit effort estimates of absolute abundance unreliable. Even with appropriate methods, confidence limits of +/- 50% are common e.g., (Rosenberger and Dunham 2005). With small populations, precision is especially important because true abundance could be close to or below the minimum viable population size.

Fish density estimates for Bobtail Creek during 1984-2003 presented in Table 1 of the Biological Opinion (186-21,083 fish/ha) are so variable that they appear to be erroneous, or at least hard to interpret, and certainly not the basis for estimating an expected value for population size to be used to estimate the absolute number of fish entrained. Long-term variability in abundance estimates also makes it difficult to assess the representativeness of more recent "abundance estimates" (38-116 fish) used in GEI's entrainment models, but those more recent estimates suggest very small population sizes that Hirsch et al. (2013) would classify as at moderate to high risk from a population viability standpoint. The Biological Opinion acknowledges that warmer and drier conditions in the future could amplify the impacts of increased water diversions which could result in further losses to already small and vulnerable populations.

The probability that individuals will be entrained in diversion flows should be highly variable across time and among individuals in the population, and yet these factors are not included in the models relied on by the Service in the Biological Opinion. Entrainment requires fish to move into proximity of the diversion structure, and stream fish movements are known to be highly variable across seasons (Schlosser 1995; Peterson and Fausch 2003). For example, many species of fish, including salmonids, exhibit increased movement during spawning. Stream fish movement also varies across years due to hydrologic and climatic variation that affects environmental conditions such as food availability and local habitat suitability (Schlosser 1995). While these factors do make measuring entrainment more time-intensive, direct measures are not difficult to obtain and such measures are routinely gathered in much more challenging systems, all across the globe.

Population impacts of entrainment losses depend on the fish sizes/ages that are lost, but local data are lacking and studies in the region disagree about what sizes of trout are most likely to be entrained in water diversions (Carlson and Rahel 2007). Thus, given our current state of knowledge, it is very difficult to mechanistically incorporate heterogeneity in entrainment probability into models, or forecast how this factor will affect population viability. In short, it is my professional opinion that the Service's conclusion that the diversions analyzed in the Biological Opinion (2016) will not jeopardize these populations of Cutthroat Trout is arbitrary and cannot be verified with reasonable scientific certainty based on the outdated and variable population estimates set forth in the Biological Opinion.

Entrainment models

In the absence of specific information on movement or entrainment rates in this system, GEI (2015) used three alternative models to estimate take. Each of the models makes different but very simplistic assumptions about fish movement, and do not consider age or size structure effects. While using a set of alternative models is a reasonable approach in the face of tremendous uncertainty, conclusions from this approach should be viewed as preliminary hypotheses to be tested with new data rather than estimates of take sufficient for decision making that could adversely affect a species of already low abundance. Further, all three models do not incorporate potentially important factors discussed above (abundance uncertainty, temporal variation, size/age heterogeneity) that also need to be evaluated with data before forecasts about losses of green lineage Cutthroat Trout can be made with confidence.

Implications

Ongoing nonnative fish management (barriers, chemical treatments) and habitat improvement projects in the basin should benefit green lineage fish. However, the potential benefits of recovery efforts may be undermined if these isolated populations—which the Service has deemed “core conservation populations” in the Biological Opinion—are depleted or extirpated due to entrainment in water diversions of the Moffat Project. While water diversion structures of the Moffat Project can serve as barriers to invasion by nonnative fish from downstream, they also isolate headwater stream populations of green lineage Cutthroat Trout. This isolation increases their vulnerability

to loss of genetic variability and eventual extirpation, particularly when effective population sizes are small (Fausch et al. 2009; Cook et al. 2010). Small populations are less resilient to even low entrainment rates because these losses may drive them below a minimum viable population size. Finally, small, isolated populations are more susceptible to stochastic disasters such as wildfires (Brown et al. 2001; Roberts et al. 2013), which will likely become more frequent in the future.

Given that entrainment is known to occur and will almost certainly increase with increased diversions, and given the risk that entrainment losses represent to green lineage fish in the Project area, it is very odd that the installation of screens is not discussed in the Biological Opinion. I believe that installing screens on the diversion structures to alleviate entrainment risk and to obviate the need to measure entrainment rates would be a sensible solution to protect these ESA-listed fish. Thus, it would have been reasonable for the Service to adopt the well-established method of screening these diversions to minimize the level of entrainment in these streams.

Conclusions

Water diversions are a well-known threat to fish populations. Entrainment of green lineage Cutthroat Trout is known to occur in Moffat Project diversions, but the extent or impact to populations have not been adequately studied. Further, predicting entrainment and its impact are hampered by uncertain trout abundance estimates and unknown entrainment probabilities in these particular streams. Therefore, it is my professional opinion that currently available information is inadequate to reach a well-informed decision on the project that protects green lineage Cutthroat Trout in the affected streams in the manner required by the ESA, which directs the Service to ensure that water diversions and other actions will avoid jeopardizing the species' survival and recovery prospects. To protect green lineage fish, I suggest that the Service simply require the project proponent to screen the diversions to prevent (or at least reduce) entrainment, or at minimum conduct a rigorous entrainment rate study to determine whether the actual effects of these water diversions affirm the modeling estimates of take set forth in the Biological Opinion.

Respectfully,

Dr. Brett M. Johnson, Ph.D.

References

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- Carlson, A. J. and F. J. Rahel. 2007. A basinwide perspective on entrainment of fish in irrigation canals. *Transactions of the American Fisheries Society* 136:1335-1343.

- Cook, N., F. J. Rahel, and W. A. Hubert. 2010. Persistence of Colorado River Cutthroat Trout populations in isolated headwater streams in Wyoming. *Transactions of the American Fisheries Society* 139:1500–1510.
- Fausch, K. D., B. E. Rieman, J. B. Dunham, M. K. Young, and D. P. Peterson. 2009. Invasion versus isolation: trade-offs in managing native salmonids with barriers to upstream movement. *Conservation Biology* 23:859-870.
- Gale, S. B., A. V. Zale, and C. G. Clancy. 2008. Effectiveness of fish screens to prevent entrainment of Westslope Cutthroat Trout into irrigation canals. *North American Journal of Fisheries Management* 28:1541-155.
- GEI (GEI Consultants, Inc.). 2015. Memo to Rena Brand, U.S. Army Corps of Engineers. from Don Conklin, Ashley Ficke, and Grant De Jong. GEI Consultants, Inc., Regarding Estimates of "Take" of Cutthroat Trout in Bobtail and Steelman creeks at Denver Water Diversion. May 22.
- Harnish, R. A. 2007. Fish screen efficiency and effects of screened and unscreened irrigation canals on the downstream movement of westslope cutthroat trout juveniles in Skalkaho Creek, Montana. MS thesis, Montana State University, Bozeman.
- Hirsch, C. L., M. R. Dare, and S. E. Albeke. 2013. Range-wide status of Colorado River Cutthroat Trout (*Oncorhynchus clarkii pleuriticus*): 2010. Colorado River Cutthroat Trout Conservation Team Report. Colorado Parks and Wildlife, Fort Collins.
- Moore, M. R., A. Mulville, and M. Weinberg. 1996. Water allocation in the American West: endangered fish versus irrigated agriculture. *Natural Resources Journal* 36(2):319-357.
- Moyle, P. B. and J. A. Israel. 2005. Untested assumptions: effectiveness of screening diversions for conservation of fish populations. *Fisheries* 30:20-28.
- Nehlsen, W., J. E. Williams, and J. A. Lichatowich. 1991. Pacific salmon at the crossroads: stocks at risk from California, Oregon, Idaho, and Washington. *Fisheries* 16(2):4-21.
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- Pierce, R., C. Podner, T. Wendt, R. Shields, and K. Carim. 2014. Westslope Cutthroat Trout movements through restored habitat and Coanda Diversions in the Nevada Spring Creek Complex, Blackfoot Basin, Montana. *Transactions of the American Fisheries Society* 143:230-239.
- Post, J. R., B. T. van Poorten, T. Rhodes, P. Askey, and A. Paul. 2006. Fish entrainment into irrigation canals: an analytical approach and application to the Bow River, Alberta, Canada. *North American Journal of Fisheries Management* 26:875-887.
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Simpson, W. G., and K. G. Ostrand. 2012. Effects of entrainment and bypass at screened irrigation canals on juvenile Steelhead. *Transactions of the American Fisheries Society* 141:599-609.

USFWS (United States Fish and Wildlife Service). 2016. Biological opinion concerning the Corps of Engineers' proposed issuance of a Clean Water Act Section 404 Individual Permit to Denver Water for the proposed Moffat Collection Project. Ecological Services, Denver, Colorado.

Walters, A. W., D. M. Holzer, J. R. Faulkner, C. D. Warren, P. D. Murphy, and M. M. McClure. 2012. Quantifying cumulative entrainment effects for Chinook Salmon in a heavily irrigated watershed. *Transactions of the American Fisheries Society* 141:1180-1190.

White, G. C., D. R. Anderson, K. P. Burnham, and D. L. Otis. 1982. Capture-recapture and removal methods for sampling closed populations. Los Alamos National Laboratory Report LA-8787-NERP, Los Alamos, New Mexico.

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22 August 2018

CONTACT INFORMATION

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EDUCATION

Ph.D. 1993. Zoology. University of Wisconsin, Madison, WI
M.S. 1986. Zoology. The Ohio State University, Columbus, OH
B.S. 1983. Zoology. University of Wisconsin, Madison, WI

APPOINTMENTS

2004- Professor, Department of Fish, Wildlife and Conservation Biology, and Graduate Degree Program in Ecology, Colorado State University
2007 Visiting Professor, Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Berlin, Germany
1998-2004 Associate Professor, Department of Fishery and Wildlife Biology, and Graduate Degree Program in Ecology, Colorado State University
1992-1998 Assistant Professor, Department of Fishery and Wildlife Biology, and Graduate Degree Program in Ecology, Colorado State University
1987-1992 Fisheries Manager, Wisconsin Department of Natural Resources
1986-1987 Research Associate, University of Wisconsin – Stevens Point

RESEARCH INTERESTS

Conservation and management of aquatic ecosystems; food webs; fishery management; limnology; contaminants and water quality; introduced species; reservoir ecology and management.

AWARDS AND HONORS

2014 Outstanding Mentor Award. Colorado-Wyoming Chapter, American Fisheries Society (AFS)
2012 Best Article Nominee. Lake and Reservoir Management (Johnson and Martinez 2012)
2006 Award of Excellence. Study Sphere (Electronic Fish ID Flashcards)
2006 Best Professional Paper. Colorado-Wyoming Chapter, AFS
2005 Provost's N. Preston Davis Award for Instructional Innovation. Colorado State University
2002 Certified Fisheries Professional. American Fisheries Society
2001 Most Significant Paper. North American Journal of Fisheries Management
2001 Favorite Professor. College Student Council, Dept. of Fishery & Wildlife Biology
1999 Interdisciplinary Water Research Award. The Water Center, CSU
1998 Certificate of Appreciation. Colorado-Wyoming and Bonneville Chapters of the AFS
1997 Best Poster. Colorado-Wyoming Chapter, AFS
1997 Investing in Instruction Grant. Office of Instructional Services, CSU
1996 Faculty Development Grant. College of Natural Resources, CSU
1996 Investing in Instruction Grant. Office of Instructional Services, CSU
1993 Faculty Development Grant. College of Natural Resources, CSU
1992 Best Student Poster (coauthor). North American Lake Management Society
1990 Best Student Paper, Honorable Mention, Midwest Fish and Wildlife Conference
1989 Southern District Fish Manager of the Year. Wisconsin Department of Natural Resources
1989 Best Student Paper. Midwest Fish and Wildlife Conference
1987 Best Paper. Midwest Fish and Wildlife Conference

- 1985 Best Student Paper. National Meeting, American Fisheries Society
1985 Tuition Scholarship. Hydroacoustics Short Course, BioSonics, Inc., Seattle, WA

SERVICE

University

Committee Chair: FWCB Search Committee, instructor (2017); FWCB Search Committee, faculty position in stream fish conservation ecology (2016); FWCB Scholarship Committee (2014-2017); FWCB Mentoring and Reappointment Committee (2010, 2012, 2014, 2017); Fisheries and Aquatic Sciences Concentration (2011-2012 AY); FWCB Ad Hoc Committee on Outcomes Assessment (2003-2010; plan was cited for numerous “Best Practices”); Fishery Biology Major (2001-2007); FWCB Graduate Affairs Committee (2005); FWCB Ad Hoc Curriculum Committee (1999).

Committee Member: FWCB Mentoring and Reappointment Committee (2005, 2007-2009, 2011, 2013, 2015, 2016, 2018); University Discipline Appeals Panel (2015-2018); WCNR Scholarship Committee (1997-1998; 2014-2017); FWCB Scholarship Committee (1995-2003, 2010-2011); FWCB Graduate Affairs Committee (1995-2007); FWCB Search Committee, FW300/301 Instructor Position (2009); FWCB Search Committee, Wildlife Biology Faculty Position (2002); FWCB Search Committee, Fish Culture/Fish Biology Faculty Position (1999); CCHE Program of Excellence Committee (1997-2000); University Committee on Instructional Development (1995-1997).

Webmaster: Department of Fishery and Wildlife Biology, CSU (1996-2003)

Executive Committee: Graduate Degree Program in Ecology, CSU (1995-1996)

Faculty Advisor: CSU Fly Fishing Club (2016-)

Professional

External Reviewer for Tenure and Promotion: University of Florida, Kansas State University, Michigan State University, University of Nevada-Reno, South Dakota State University, Southern Illinois University, University of Washington, Washington State University.

Invited Technical Expert: water quality, food webs; Northern Water Conservancy District (2014-2015); Walleye management; Cherry Creek Basin Water Quality Authority (2013-2015); fish predation; Sacramento-San Joaquin River Delta Predation State of Science Panel, Delta Science Program and California Department of Fish and Wildlife (2013); recreational fisheries management; Food and Agriculture Organization of the United Nations (2010-2012); Glen Canyon Dam Temperature Control Device Risk Analysis Review Panel (chair), U.S. Bureau of Reclamation, Denver, CO (2011); Gunnison River Temperature Modeling Study, Upper Colorado River; Science Plan, Grand Canyon Monitoring & Research Center, Flagstaff, AZ (1999); Glen Canyon Dam Modification Environmental Assessment, U.S. Bureau of Reclamation, Denver, CO (1999).

Scientific Advisor: Emerging Young Research Group on Social-Ecology of Fisheries Research (Besatzfisch-Projekt, Berlin, Germany, 2011-2014); World Recreational Fishing Conference, Campinas, Brazil (2014); World Recreational Fishing Conference, Berlin, Germany (2011)

Associate Editor: North American Journal of Fisheries Management (1998-1999)

Peer Reviewer (research proposals): Alaska Sea Grant, Cooperative Marine Education and Research Program, Great Lakes Fishery Commission, National Science Foundation, Natural Sciences and Engineering Research Council of Canada, Nevada Agricultural Experiment Station, U.S. Civilian Research & Development Foundation for the Independent States of the Former Soviet Union, Wisconsin Sea Grant.

Peer Reviewer (manuscripts): Annales Zoologici Fennici, Archiv für Hydrobiologie, Biological Invasions Records, Canadian Journal of Fisheries and Aquatic Sciences, Ecological Applications, Ecology of Freshwater Fish, Fish and Fisheries, Fisheries, Fisheries Management and Ecology, Hydrobiologia, Journal of Environmental Management, Journal of Fish Biology, Journal of Great Lakes Research, Journal of Plankton Research, Lake and Reservoir Management, North American Journal of Fisheries Management, Southwestern Naturalist, Transactions of the American Fisheries Society.

Committee Chair: Continuing Education Committee, CO-WY American Fisheries Society (2004-2005, 2006-2007); Education Subcommittee, Board of Professional Certification Board, American Fisheries Society (2003-2004); AFS

Web Advisory Board, American Fisheries Society (1998-2000); Megatrends Session (co-chair): CO/WY American Fisheries Society annual meeting, Laramie, WY (1993).

Committee Member: Illegal Stocking Task Force (founding member), CO-WY Chapter American Fisheries Society (2007-2010); Education Subcommittee, Board of Professional Certification, American Fisheries Society (2001-2002); Eugene Maughan Graduate Student Scholarship Committee, Western Division, American Fisheries Society (1998 – 2003); Excellence in Fisheries Education Committee: American Fisheries Society (1998 – 2001); Continuing Education Committee, CO-WY Chapter American Fisheries Society (2005-2006)

Hiring Panelist: Aquatic Wildlife Researcher examination, CO Division of Wildlife (2007); Wildlife Manager III examination, CO Division of Wildlife (2005).

Liaison: CO-WY American Fisheries Society, CO-WY AFS Memorial Scholarship (2003 – 2016)

Presentation Awards Judge: variety of regional and national meetings (1994, 1995, 1996, 1997, 1998, 1999, 2010, 2011, 2018).

PROFESSIONAL ORGANIZATIONS

American Fisheries Society
Ecological Society of America
North American Lake Management Society
Colorado Lake and Reservoir Management Association
Union of Concerned Scientists
Nature Conservancy
Trout Unlimited

TEACHING EXPERIENCE

University courses

- 1992- **Fishery Science** (FW 401, 3 credits): Theory, philosophy, and applications for study and management of fish and fishery resources.
- 1994- **Fish Biology and Diversity** (FW 300, formerly Ichthyology, 2 credits): Anatomy, taxonomy, evolution, physiology, ecology, zoogeography and conservation of fishes.
Ichthyology Laboratory (FW 301, 2 credits until 2012 then 1 credit): Anatomy, taxonomy and ecology of North American freshwater fishes
- 2007- **Supervised College Teaching** (FW 684, 1-3 credits): supervised and mentored more than 20 graduate teaching assistants since 2007
- 1994- **Supervised College Teaching** (FW 384, 1-2 credits): supervised and mentored more than 50 undergraduate teaching assistants helping with Ichthyology Laboratory since 1994
- 1994- **Guest lectures and optional field trips** (>75): Introduction to Wildlife Biology (FW 100, FWCC 104), Environmental Conservation (NR 120), First Year Seminar (FW180), Wildlife Conservation (FW 200), Ecology (BY 220), Ichthyology (FW 300), Wild Vertebrate Management (FW360), Fish Ecology (FW 400), Sustainability of Natural Resources (NR 425), Nonpoint Source Pollution (CB 405), Community and Ecosystem Ecology (EY 501), Surface Water Quality Modeling (CE 581), Population and Community Ecology (EY 600), Graduate Orientation Seminar (FW 696).
- 1995, 2002 **Fisheries Ecology** (FW 540, 3 credits; team taught): Population, community and ecosystem management of fishes and other aquatic organisms in freshwater habitats.
- 2001 **First Year Seminar** (FW 192, 2 credits): Lead instructor for a course designed to introduce new students to University life and Fishery Biology and Wildlife Biology majors.
- 1996-2005 **Graduate Seminars** (FW 561AV, EY 592; team taught): Conservation Genetics, Regulated Rivers, Experimentation in Ecology, Trophic Ecology

Workshops

1994-2018 **Wildlife Management Short Course**, presenter, Colorado State University

- 2015 **Buffalo Bill Reservoir Predation Modeling Workshop**, instructor, Wyoming Game and Fish Department, Lander, WY.
- 2003 **New Approaches to Reservoir Research and Management**, co-instructor, Colorado-Wyoming and Bonneville Chapters, American Fisheries Society, Grand Junction, CO
- 1999 **Zooplankton Essentials for Fish Biologists**, co-instructor, Colorado-Wyoming Chapter, American Fisheries Society, Fort Collins, CO
- 1998 **New Approaches to Reservoir Research and Management**, co-instructor, Colorado-Wyoming and Bonneville Chapters, American Fisheries Society, Grand Junction, CO
- 1998 **USA-ROC Wildlife Conservation Workshop**, presenter, National Taiwan University, Taipei, Taiwan
- 1994 **Fish Abundance Estimation**, co-instructor, Colorado Division of Wildlife, Wyoming Game and Fish, CSU Pingree Park Campus, CO
- 1989-1992 **Bioenergetics Modeling**, co-instructor, Colorado Division of Wildlife, Wyoming Game and Fish, University of Wyoming, Ft. Collins, CO; co-instructor Wisconsin Department of Natural Resources, Madison, WI; Massachusetts Department of Natural Resources and University of Massachusetts, Amherst, MA; South Dakota State University, Brookings, SD; Minnesota AFS and Department of Natural Resources, Bemidji, MN
- 1989 **Graphics software and slide production**, instructor, Wisconsin Dept. of Natural Resources, Madison, WI

REFEREED PUBLICATIONS (*students and postdocs italicized*)

Hansen, A. G., J. S. Thompson, L. N. Hargis, D. Brauch, and **B. M. Johnson**. In review. Predatory threat of illegally introduced Yellow Perch in a salmonid dominated reservoir food web. Transactions of the American Fisheries Society.

Johnson, B. M., and P. J. Martinez. In review. Lake Trout (*Salvelinus namaycush*, Walbaum). Fishes of Colorado, Colorado Parks and Wildlife, Denver.

Johnson, B. M., and P. J. Martinez. In review. Kokanee (*Oncorhynchus nerka*, Walbaum). Fishes of Colorado, Colorado Parks and Wildlife, Denver.

Woodling, J., and **B. M. Johnson**. In review. Arctic Char (*Salvelinus alpinus*, L.). Fishes of Colorado, Colorado Parks and Wildlife, Denver.

Christianson, K. R., **B. M. Johnson**, M. B. Hooten and J. J. Roberts. In revision. Estimating lake-climate responses from sparse data: an application to high elevation lakes. Limnology and Oceanography (May 2018).

(69) **Johnson, B. M.**, W. M. Pate, and D. B. Silver. In press. Invasion success and population characteristics of the opossum shrimp, *Mysis diluviana*, in Wyoming, USA. Aquatic Invasions.

(68) **Johnson, B. M.**, W. M. Pate, and A. G. Hansen. 2017. Energy density and dry matter content in fish: new observations and an evaluation of some empirical models. Transactions of the American Fisheries Society 146: 1262-1278. doi.org/10.1080/00028487.2017.1360392

(67) *Johnson, C. F.*, **B. M. Johnson**, T. E. Neebling and J. C. Burckhardt. 2017. Walleye introduction eliminates predation refuge for adfluvial Cutthroat and Rainbow Trout. Transactions of the American Fisheries Society 146:252-267. doi.org/10.1080/00028487.2016.1254114

(66) *Wolff, B. A.*, **B. M. Johnson** and J. M. Lepak. 2017. Changes in sport fish mercury from food-web shifts suggest potential decoupling from atmospheric deposition in two Colorado reservoirs. Archives of Environmental Contamination and Toxicology 72:167-177. doi: 10.1007/s00244-016-0353-x

(65) Arlinghaus, R., J. Alós, B. Beardmore, K. Daedlow, M. Dorow, M. Fujitani, D. Hühn, W. Haider, L. M. Hunt, **B. M. Johnson**, F. Johnston, T. Kleforth, S. Matsumura, C. Monk, T. Pagel, J. R. Post, T. Rapp, C. Riepe, H. Ward, and C.

Wolter. 2017. Understanding and managing freshwater recreational fisheries as complex adaptive social-ecological systems. *Reviews in Fisheries Science and Aquaculture* 25:1-41.

(64) Carim, K. J., K. R. Christianson, K. M. McKelvey, W. M. Pate, D. B. Silver, **B. M. Johnson**, B. T. Galloway, M. K. Young, and M. K. Schwartz. 2016. Environmental DNA marker development with sparse biological information: A case study on Opossum Shrimp (*Mysis diluviana*). *PLoS ONE* 11(8): e0161664. doi:10.1371/journal.pone.0161664

(63) Silver, D. B., **B. M. Johnson**, W. M. Pate, K. R. Christianson, J. Tipton, J. Sherwood, B. Smith, and Y. Hao. 2016. Effect of net size on estimates of abundance, size, age, and sex ratio of *Mysis diluviana*. *Journal of Great Lakes Research* 42:731-737.

(62) Wolf, J. M., **B. M. Johnson**, D. B. Silver, W. M. Pate, and K. R. Christianson. 2016. Freezing and fractionation: effects of preservation on carbon and nitrogen stable isotope values of some limnetic organisms. *Rapid Communications in Mass Spectrometry* 30:562-568.

(61) Arlinghaus, R, K. Lorenzen, **B. M. Johnson**, S. J. Cooke, and I. G. Cowx. 2016. Management of freshwater fisheries: addressing habitat, people and fish. Pages 557-579 in J.F. Craig, editor. *Freshwater fisheries ecology*. Blackwell Science, UK.

(60) Cooke, S. J., R. Arlinghaus, **B. M. Johnson**, and I. G. Cowx. 2016. Recreational fisheries in inland waters. Pages 449-465 in J. F. Craig, editor. *Freshwater fisheries ecology*. Blackwell Science, UK.

(59) **Johnson, B. M.**, J. Lepak and B. A. Wolff. 2015. Effects of prey assemblage on mercury bioaccumulation in a piscivorous sport fish. *Science of the Total Environment* 506-507: 330-337.

(58) Pate, W. M., **B. M. Johnson**, J. Lepak, and D. Brauch. 2014. Managing for coexistence of kokanee and trophy Lake Trout in a montane reservoir. *North American Journal of Fisheries Management* 34:908-922.

(57) Wolff, B. A., **B. M. Johnson**, and C. M. Landress. 2013. Classification of hatchery and wild fish using natural geochemical signatures in otoliths, fin rays, and scales of an endangered catostomid. *Canadian Journal of Fisheries and Aquatic Sciences* 70:1775-1784.

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(4) **Johnson, B. M.** 1994. Ecological effects of reservoir operations on Blue Mesa Reservoir. Progress Report, U.S. Bureau of Reclamation, Grand Junction, Colorado, 54 pages.

(3) Goettl, J. P. Jr., and **B. M. Johnson**. 1994. Forage fish studies. Federal Aid Project F-53-R, Final Report. Colorado Division of Wildlife, Fort Collins, Colorado, 91 pages.

(2) Clements, W. H., **B. M. Johnson**, H. Bestgen, and M. S. Pearson. 1994. Effects of sediment contaminants on macroinvertebrate and fish assemblages in lower lakes at Rocky Mountain Arsenal. Progress Report, U.S. Fish and Wildlife Service, Rocky Mountain Arsenal, Commerce City, Colorado, 16 pages.

(1) Vogelsang, M. T., **B. M. Johnson**, and R. S. Stewart. 1993. Ecology of fishes in the Madison lakes. Progress Report (1990-1992), Wisconsin Department of Natural Resources, Madison.

PROFESSIONAL PRESENTATIONS (*invited; students and postdocs *italicized*)

Christianson, K. R., **B. M. Johnson**, M. Hooten, and J. Roberts. 2018. Using sparse data to estimate lake warming in

the Southern Rocky Mountains. Oral presentation at Association for the Sciences of Limnology and Oceanography Annual Meeting, Victoria, B.C.

B. M. Johnson, D. B. Silver, W. M. Pate, and *K. R. Christianson*. 2017. *Mysis diluviana* responses to climate and dam operations in three mesotrophic reservoirs. Oral presentation, North American Lake Management Society Annual Meeting, Denver, CO.

Christianson, K. R., B. M. Johnson, and D. B. Silver. 2017. Drought May Compound Effects of Climate Warming on High Elevation Lakes. Poster presentation at North American Lake Management Society Annual Meeting, Denver, CO.

Christianson, K. R., B. M. Johnson, and D. B. Silver. 2017. Drought May Compound Effects of Climate Warming on High Elevation Lakes. Oral presentation at Western Division, American Fisheries Society Annual Meeting, Missoula, MT.

B. M. Johnson, D. B. Silver, W. M. Pate, and *K. R. Christianson*. 2017. *Mysis diluviana* responses to severe drought in three montane reservoirs. Oral presentation at Western Division, American Fisheries Society Annual Meeting, Missoula, MT. (invited)

Christianson, K. R., B. M. Johnson, and D. B. Silver. 2017. Climate effects on high elevation lakes: the influence of lake specific parameters. Oral presentation and Hydrology Days, Colorado State University.

Barby, C., K. R. Christianson, and **B. M. Johnson**. 2017. Utility of Landsat 8 to detect water clarity in lakes. Poster presentation at the Undergraduate Research Symposium, Colorado State University.

Christianson, K. R., B. M. Johnson, D. B. Silver, B. Pate, B. Galloway, K. Carim. 2016. Detecting *Mysis diluviana* using environmental DNA (eDNA)". Colorado-Wyoming Chapter, American Fisheries Society, Laramie, WY. (best poster award)

Johnson, B. M., D. Silver, W. Pate, and *K. Christianson*. 2015. High elevation lake food webs and climate change. CPW Senior Aquatic Staff, Fort Collins, CO.

Johnson, B. M., D. Silver, W. Pate, B. Galloway, and *K. Christianson*. 2015. High elevation lake food webs and climate change. Denver Water, Denver, CO.

Pate, W.M., **B. M. Johnson**, D. Silver, and *K. Christianson*. 2015. Effect of net size on estimates of abundance, size, age and sex ratio of *Mysis diluviana*. University of Vermont, Burlington, VT.

Christianson, K., B. Pate, D. Silver, and **B. M. Johnson**. 2015. Detection of *Mysis diluviana* using environmental DNA (eDNA). University of Vermont, Burlington, VT.

D. Silver, B. Pate, **B. M. Johnson**, and *K. Christianson*. 2015. *Mysis diluviana* life stages and demographics. University of Vermont, Burlington, VT.

Johnson, B. M., D. Silver, W. Pate, and *K. Christianson*. 2015. Freezing and fractionation: effects of preservation on carbon and nitrogen signatures of some limnetic organisms. University of Vermont, Burlington, VT.

Johnson, B. M., and D. Silver. 2015. Update on Dillon Reservoir research studies, Dillon Reservoir Recreation Committee, Frisco, CO.

***Johnson, B. M.**, B. Wolff, J. Lepak. 2015. Reducing mercury bioaccumulation in Horsetooth Reservoir via fishery management. Northern Colorado Water Conservancy District, Annual Stakeholders Meeting, Berthoud, CO.

Johnson, B. M. 2014. Effects of water clarity and other factors on aquatic life of Grand Lake, Colorado. Three Lakes Technical Committee, Golden, CO.

Wolff, B., J. Lepak, and **B. Johnson**. 2014. Update on mercury management project. Colorado Department of Public

Health and Environment, U.S. Environmental Protection Agency, Denver, CO.

Arlinghaus, R., S. Cooke, and **B. Johnson**. 2014. An overview on the FAO Technical Guidelines for Responsible Fisheries: Recreational Fisheries, World Recreational Fishing Conference, Campinas, Brazil.

Johnson, C. F., B. M. Johnson, T. Neebling, J. Burckhardt. 2014. Quantifying piscivory in Buffalo Bill Reservoir: are the wild Oncorhynchus fisheries sustainable? American Fisheries Society, Montreal, Quebec, Canada.

Johnson, B. M. 2014. Food web and water quality at Cherry Creek Reservoir, Cherry Creek Basin Water Quality Authority Stakeholders meeting, Denver, CO.

Johnson, B. M. 2014. Environmental conditions for Walleye in Cherry Creek Reservoir, Colorado Division of Parks and Wildlife, Denver, CO.

Johnson, B. M., and D. Silver. 2014. Update on Dillon Reservoir research studies, Dillon Reservoir Recreation Committee, Frisco, CO.

Johnson, C. F., B. M. Johnson, T. Neebling, J. Burckhardt. 2014. Non-native predators in Buffalo Bill Reservoir. How are they impacting wild trout stocks? U.S. Bureau of Reclamation, Casper, WY.

***Johnson, B. M.** 2014. Effects of water clarity and other factors on aquatic life of Grand Lake, Colorado. Grand Lake Water Clarity Standard Stakeholder Meeting, Denver, CO.

Johnson, B. M., D. Olsen, and D. Silver. 2014. Introduction of Arctic Char in Colorado: Outcomes and management possibilities. Fisheries Society of the British Isles, Hull, England.

Olsen, D., B. M. Johnson, J. Lepak, and D. Silver. 2014. The Arctic Char of Dillon Reservoir, Colorado: An assessment of their current status and analysis of future management possibilities. Colorado Division of Parks and Wildlife, Hot Sulphur Springs, CO.

Johnson, C. F., B. M. Johnson, T. Neebling, J. Burckhardt. 2014. Non-Native Predators in Buffalo Bill Reservoir. How are they impacting wild trout stocks? Trout Unlimited, West Denver Chapter, Denver, CO.

Johnson, C. F., B. M. Johnson, T. Neebling, J. Burckhardt. 2014. Non-Native Predators in Buffalo Bill Reservoir. How are they impacting wild trout stocks? Trout Unlimited, East Yellowstone Chapter, Cody, WY.

Pate, B., B. Wolff, *D. Olsen,* and **B. M. Johnson**. 2014. Counting calories in your fish: why and how? CO/WY Chapter, American Fisheries Society, Laramie, WY.

Johnson, C. F., B. M. Johnson, J. Burckhardt, T. Neebling, and J. Lepak. 2014. Use of Summer Profundal Index Netting to estimate Lake Trout abundance in Wyoming and Colorado waters. CO/WY Chapter, American Fisheries Society, Laramie, WY.

Wolff, B. A., B. M. Johnson and J. Lepak. 2014. Hg contamination in CO: influence of deposition, bioaccumulation and food web structure on sport fish Hg concentrations. Colorado Department of Public Health and Environment, and U.S. EPA. Denver, CO.

Pate, W. M., B. M. Johnson, J. Lepak, D. Brauch. 2013. Management strategies for multi-use recreational fisheries: coexistence of Lake Trout and Kokanee in western waters. International Kokanee Workshop, Fort Collins, CO.

Olsen, D., B. M. Johnson, and D. Silver. 2013. The Arctic char of Dillon Reservoir, CO: An assessment of their current status and analysis of future management possibilities. West Denver Trout Unlimited Meeting, Golden, CO.

Johnson, C. F., B. M. Johnson, T. Neebling, J. Burckhardt. * 2013. Piscivory in Buffalo Bill Reservoir: Are the Wild Oncorhynchus fisheries sustainable? Colorado/Wyoming Chapter American Fisheries Society Annual Meeting, Fort Collins, CO.

Wolff, B. A., J. Lepak and **B. M. Johnson***. Characterizing bioaccumulation of mercury in sport fish from Colorado

reservoirs. Northern Water Conservancy District Stakeholders Meeting, Berthoud, CO.

Johnson, B. M. 2013. Fishing is Fun! Cub Scout Pack 98, Fort Collins, CO.

Pate, W. M., B. M. Johnson, J. Lepak, D. Brauch. 2013. Management strategies for multi-use recreational fisheries: coexistence of Lake Trout and Kokanee in western water. Western Division of the American Fisheries Society annual meeting, Boise, ID.

Olsen, D., B. M. Johnson, D. Silver. 2013. The Arctic char Salvelinus alpinus of Dillon Reservoir, Colorado: an evaluation of their present status and future management possibilities. Western Division of the American Fisheries Society annual meeting, Boise, ID.

Fialko, K., B. Pate and B. Johnson. 2013. Exceptional energy density of sport fish in a western U.S. reservoir: implications for predictive methods. CSU Celebrate Undergraduate Research and Creativity Symposium, Fort Collins, CO.

Christianson, K., D. Olsen, and B. Johnson. 2013. Response of benthic macroinvertebrates to the exclusion of predators in Dillon Reservoir, CO. CSU Celebrate Undergraduate Research and Creativity Symposium, Fort Collins, CO.

Olson, C., D. Olsen, and B. Johnson. 2013. A Trophic Analysis of the Fish Assemblage in a Montane Reservoir. CSU Celebrate Undergraduate Research and Creativity Symposium, Fort Collins, CO.

Lutackas, Loretta. 2013. Ocean Acidification: The Effects of Runoff on Carbon Sequestration and Marine Organisms. CSU Celebrate Undergraduate Research and Creativity Symposium, Fort Collins, CO.

Johnson, C. F., B. M. Johnson, J. Burckhardt, and T. Neebling. (2013). Vulnerability of wild trout to nonnative piscivores in Buffalo Bill Reservoir, Wyoming. Cutthroat Chapter, Colorado Trout Unlimited, Littleton, CO.

Wolff, B. A., B. M. Johnson, and P.J. Martinez. 2012. Emigration risk of nonnative fish in Upper Colorado River Basin reservoirs. Annual Upper Colorado River Basin Endangered Fish Recovery Program Researcher's Meeting, Grand Junction, CO.

Wolff, B. A., B. M. Johnson. 2012. Discrimination of wild and hatchery June suckers Chasmistes liorus in Utah Lake, Utah using natural geochemical markers in otoliths and fin rays. Annual Meeting, Western Division of American Fisheries Society, Jackson, WY.

Wolff, B. A., and B. M. Johnson. 2012. Discrimination of wild and hatchery June sucker using natural geochemical markers in fish hard parts. Annual June Sucker Recovery and Implementation Program Meeting, Salt Lake City, UT.

Pate, W., B. M. Johnson, J. Lepak, D. Brauch. 2012. Boom-and-bust Lake Trout-Kokanee fisheries: turning runaway consumption into sustainable fisheries for both species. Annual Meeting, Western Division of American Fisheries Society, Jackson, WY.

Wolff, B. A., and B. M. Johnson. 2012. Origins of endangered June sucker (Chasmistes liorus) revealed through natural geochemical markers. American Fisheries Society Colorado/Wyoming Colorado State University Sub-unit Meeting, Fort Collins, CO.

Johnson, C. F., B. M. Johnson, T. Neebling, J. Burckhardt. 2012. Piscivory in Buffalo Bill Reservoir: Are the Wild trout fisheries sustainable? Bureau of Reclamation/Wyoming Game and Fish Department coordination meeting, Casper, WY.

***Johnson, B. M.** 2011. Illegal stocking: socioeconomic, ecological, and human health implications. World Recreational Fishing Conference, Berlin, Germany.

Wolff, B. A., B. M. Johnson, P.J. Martinez, and D.L. Winkelman. 2011. Strontium isotope ratios ($^{87}\text{Sr}:^{86}\text{Sr}$) as tracers of origins and movements of nonnative piscivores in the Upper Colorado River Basin. Nonnative Fish Workshop,

Grand Junction, CO.

Fialko, K., W. Pate, and B. Johnson. 2011. Tracking trophic interactions in Blue Mesa Reservoir, Colorado across a large temporal scale (poster). Highest Honors, Celebrate Undergraduate Research and Creativity Symposium, CSU, Fort Collins, CO.

Wolff, B. A., B.M. Johnson, P.J. Martinez, and D.L. Winkelman. 2011. Tracing origins of invasive piscivores using strontium isotope ratios ($^{87}\text{Sr}/^{86}\text{Sr}$) in otoliths. National meeting of the American Fisheries Society, Seattle, WA.

Johnson, B. M., B. A. Wolff, and P. J. Martinez. 2011. Emigration risk of nonnative fish in Upper Colorado River Basin reservoirs. Upper Colorado River Basin Endangered Fish Recovery Program Researcher's Meeting, Moab, UT.

Wolff, B. A., B. M. Johnson, P. J. Martinez, and D. L. Winkelman. 2010. Strontium isotope ratios ($^{87}\text{Sr}:$ ^{86}Sr) as tracers of origins and movements of nonnative piscivores in the Upper Colorado River Basin. Annual Upper Colorado River Basin Endangered Fish Recovery Program Researcher's Meeting, Grand Junction, CO.

Johnson, B. M., B. A. Wolff, and P. J. Martinez. 2010. Natural tracers in otoliths: from proof of concept to management applications. Nonnative Fish Workshop, Grand Junction, CO.

Wolff, B. A., B. M. Johnson, P. J. Martinez. 2010. Fingerprinting origins of nonnative piscivores using otolith microchemistry. Nonnative Fish Workshop, Grand Junction, CO.

Johnson, B. M. 2010. "Illegal Stocking of Aquatic Organisms": a new website and outreach tool. (poster) TWS&AFS Meeting: Species Introductions & Re-introductions: Opportunities & Challenges, Starkville, MS.

Wolff, B. A. and B. M. Johnson. 2010. "Tracing the origins and movements of invasive fishes in the Upper Colorado River Basin". Rocky Mountain Flycasters Chapter of Trout Unlimited, Fort Collins, CO.

Fialko, K., J. Lepak, and B. Johnson. 2010. A comparison of chronometric structures for aging Walleye: peculiar bias in spine derived ages from a Front Range reservoir. 2009-2010 Celebrate Undergraduate Research & Creativity Symposium, CSU, Fort Collins, CO.

***Johnson, B. M., B. A. Wolff, D. L. Winkelman and P. J. Martinez.** 2009. Use of naturally occurring isotopes for tracing origins and movements of invasive fish. Annual Upper Colorado River Basin Endangered Fish Recovery Program Researcher's Meeting, Grand Junction, CO.

Johnson, B. M., B. A. Wolff, P. J. Martinez, and D. L. Winkelman. 2009. Basin-wide examination of trace element chemistry of nonnative fish otoliths. Annual Upper Colorado River Basin Endangered Fish Recovery Program Researcher's Meeting, Grand Junction, CO.

Johnson, B. M. 2009. "Illegal stocking of aquatic organisms": a new website and outreach tool. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Fort Collins, CO.

Wolff, B. A., B. M. Johnson, D. L. Winkelman, and P.J. Martinez. 2009. Strontium isotopes can trace origins and movements of nonnative piscivores in the Yampa River basin. Colorado State University Subunit of the American Fisheries Society, Fort Collins, CO.

Lepak, J. M., B. M. Johnson, and N. Vieira. 2009. Factors affecting bioaccumulation of mercury in sport fish in Colorado reservoirs. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Fort Collins, CO.

***Johnson, B. M.** 2007. Projected impacts of an illegal, angler-introduced piscivore. Progress in Understanding the Impacts and Dynamics of Recreational Fisheries: Theory and Empirical Findings. Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Berlin, Germany.

Johnson, B. M. 2007. Illegal introductions of nonnative fishes: Are we doing all we can to stem the tide? Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Fort Collins, CO.

Gibson-Reinemer, D., B. M. Johnson, D.L. Winkelman, and P.J. Martinez. 2007. Otolith microchemistry for fish folks: pitfalls and payoffs. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Fort Collins, CO.

Gibson-Reinemer, D., B. M. Johnson, D. L. Winkelman, and P.J. Martinez, and A. Koenig 2007. A method to identify hatchery of origin in rainbow trout: implications for disease transmission. Whirling Disease Symposium, Denver, CO.

Gibson-Reinemer, D., B. M. Johnson, P. J. Martinez, and D. L. Winkelman. 2006. Tracking origins and movement of stocked trout using otolith microchemistry. National Meeting, American Fisheries Society, Lake Placid, NY.

Gibson-Reinemer, D., B. M. Johnson, P. J. Martinez, and D. L. Winkelman. 2006. Tracking Sources of Stocked Rainbow Trout in Colorado. West Denver Chapter of Trout Unlimited, Denver, CO.

Gibson-Reinemer, D., B. M. Johnson, P. J. Martinez, and D. L. Winkelman. 2006. Forensic Applications of Otolith Microchemistry: Tracking Sources of Stocked Rainbow Trout in Colorado. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Cheyenne, WY.

Gibson-Reinemer, D., B. M. Johnson, P. J. Martinez, and D. L. Winkelman. 2006. Forensic Applications of Otolith Microchemistry: Tracking Sources of Stocked Rainbow Trout in Colorado. Whirling Disease Symposium, Denver, CO.

Johnson, B. M. 2006. Extended Drawdown of Horsetooth Reservoir: Analogue for Severe Drought? Annual Meeting, Colorado Lake and Reservoir Management Association, Lakewood, CO.

Johnson, B. M. 2006. No detectable adverse effects of increased spring releases on a Large, Coldwater Reservoir in Colorado (poster). Annual Meeting, Colorado Lake and Reservoir Management Association, Lakewood, CO.

***Johnson, B. M.** 2006. Resistance and Resilience of Reservoirs: Effects of Climate and Water Management. Invited Scientist Seminar Series, Graduate Program of Hydrologic Sciences, University of Nevada-Reno, Reno, NV.

***Johnson, B. M.** 2006. Trophic Roles and Provenance of Nonnative Fishes in the Upper Colorado River Basin. Ecology Seminar Series, University of Nevada-Reno, Reno NV.

Johnson, B. M. 2006. Extended Drawdown of Horsetooth Reservoir: Analogue for Severe Drought? Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Cheyenne, WY. (Best Professional Paper Award)

Johnson, B. M. 2006. No detectable adverse effects of increased spring releases on a large, coldwater reservoir in Colorado (poster). Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Cheyenne, WY.

Johnson, B. M. and N. Nomanbhoy. 2005. A PDA-based field guide to Colorado fishes. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Fort Collins, CO.

Johnson, B., D. Gibson-Reinemer, P. Martinez, and D. Winkelman. 2005. Forensic applications of otolith microchemistry for tracking sources of stocked whirling diseased trout. Whirling Disease Symposium, Denver, CO.

Gibson-Reinemer, D., B. M. Johnson, P. J. Martinez, D. L. Winkelman, and G. W. Whitledge. 2005. Forensic applications of otolith microchemistry for tracking sources of stocked whirling diseased trout. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Fort Collins, CO.

Whitledge, G. W., B. M. Johnson, P. J. Martinez, and A.M. Martinez. 2005. Environmental history of centrarchids in the Colorado River: insights from otolith Sr:Ca and hydrogen isotope analyses. 135th Annual Meeting of the American Fisheries Society, Anchorage, AK.

Whitledge, G.W., B. M. Johnson, P. J. Martinez, and A. M. Martinez. 2005. Identification of non-native centrarchid origins in the Upper Colorado River using otolith microchemistry and stable hydrogen isotope analysis. Colorado-Wyoming Chapter of the American Fisheries Society Annual Meeting, Fort Collins, CO.

Whitledge, G. W., B. M. Johnson, P. J. Martinez, and A. M. Martinez. 2005. Sources of non-native centrarchids in the Grand Valley reach of the Colorado River: insights from otolith microchemistry and stable isotope analysis. 26th Annual Upper Colorado River Basin Endangered Fish Recovery Program Researcher's Meeting, Grand

Junction, CO.

Martinez, P., D. Brauch, B. Atkinson, K. Rogers, and **B. Johnson**. 2005. Kokanee and Lake Trout in Blue Mesa and Granby reservoirs Colorado: implications for ongoing Kokanee egg production. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Fort Collins, CO. (March)

***Johnson, B. M.** 2004. Trophic roles and provenance of non-native fishes in the Upper Colorado River Basin. USGS Lake Superior Biological Laboratory, Ashland, WI.

***Johnson, B. M.** 2004. Trophic roles and provenance of non-native fishes in the Upper Colorado River Basin. Newton Bobb Lecture Series, Northland College, Ashland, WI.

Whitledge, G. W., B. M. Johnson, P.J. Martinez, and A.M. Martinez. 2004. Microchemical and isotopic indicators of non-native fish provenance in the Colorado River. 134th Annual Meeting of the American Fisheries Society, Madison, WI.

Whitledge, G. W., B. M. Johnson, P.J. Martinez, and A.M. Martinez. 2004. Elemental and stable isotope markers of non-native fish provenance in the upper Colorado River basin. 25th Annual Upper Colorado River Basin Endangered Fish Recovery Program Researcher's Meeting, Moab, UT.

Martinez, P. J., **B. M. Johnson**, J. Hawkins, and K. Bestgen. 2004. Examining predation demand by nonnative piscivores and its utility in evaluating and prescribing nonnative fish control strategies. Upper Basin of the Colorado River Researchers' Meeting, Moab, UT.

P. J. Martinez, K. Rogers, *H. Crockett*, **B. M. Johnson**, and *J. M. Hardiman*. 2004. Discerning prey- and piscivore-sized targets in hydroacoustic surveys of pelagic salmonids in Colorado reservoirs. Annual Meeting, Western Division of the American Fisheries Society, Salt Lake City, UT.

Crockett, H. J., B. M. Johnson, J. M. Hardiman, P. J. Martinez, and K. Rogers. 2004. Annual Meeting, Western of the Division American Fisheries Society, Salt Lake City, UT.

Johnson, B. M. 2003. Ecology and management of reservoirs and their fisheries. Habitat Management Workshop, Natural Resource Conservation Service, Ridgway State Park, Ridgway, CO.

***Johnson, B. M.** 2003. Effects of drought on water quality of Colorado reservoirs. Assessing the Impacts of Prolonged Severe Drought on Aquatic Ecosystems and Water Quality of the South Platte River Basin. Fort Collins, CO.

Koski, M. L. and B. M. Johnson. 2003. Interactive effects of climate change and eutrophication on growth of a coldwater planktivore. Ecological Society of America, Savannah, GA.

Hardiman, J., H. Crockett, B. Johnson and P.J. Martinez. 2003. Energetic constraints, predation risk, and seasonal distribution of young-of-the-year Kokanee in a large reservoir. Annual Meeting, Colorado-Wyoming, Bonneville Chapters of the American Fisheries Society, Grand Junction, CO.

Brauch, D., P. Martinez, *H. Crockett, J. Hardiman*, and **B. Johnson**. 2003. Perpetuation of angling opportunity and Kokanee egg production at Colorado's Blue Mesa Reservoir: is Lake Trout predation a threat? Annual Meeting, Colorado-Wyoming and Bonneville Chapters of the American Fisheries Society, Grand Junction, CO.

H. Crockett, D. Brauch, P. Martinez, J. Hardiman, and B. Johnson. 2003. Comparison of Lake Trout abundance estimates from hydroacoustics and mark-recapture. Annual Meeting, Colorado-Wyoming and Bonneville Chapters of the American Fisheries Society, Grand Junction, CO.

P. Martinez, K. Rogers, *H. Crockett, B. Johnson*, and J. Hardiman. 2003. Discerning prey- and piscivore-sized targets in hydroacoustic surveys of pelagic salmonids in Colorado Reservoirs. Annual Meeting, Colorado-Wyoming and Bonneville Chapters of the American Fisheries Society, Grand Junction, CO.

Koski, M. L. and B. M. Johnson. 2003. Interactive effects of climate change and eutrophication on growth of a

coldwater planktivore. Front Range Student Ecology Symposium, Colorado State University, Fort Collins, CO. (Best Presentation in Modeling Session)

Koski, M. L. and **B. M. Johnson**. 2002. Modeling the interactive effects of eutrophication and climate change on Kokanee (*Oncorhynchus nerka*) foraging behavior (poster). Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Laramie, WY. (Best Poster Award)

Lafrancois, B. Moraska, K. R. Nydick, J. S. Baron, and **B. M. Johnson**. 2002. Interactive effects of nutrients and pH on plankton and epilithon of two mountain lakes. National Meeting, Ecological Society of America, Tucson, AZ.

Lafrancois, B. Moraska, K. R. Nydick, J. S. Baron, and **B. M. Johnson**. 2002. Algal and invertebrate responses to nitrogen deposition in Rocky Mountain lakes. Department of Ecology, Evolution, and Behavior at University of Minnesota, St. Paul, MN.

Lafrancois, B. Moraska, K. R. Nydick, J. S. Baron, and **B. M. Johnson**. 2002. Nitrogen deposition and lakes of Rocky Mountain National Park: effects on algae and invertebrates. Rocky Mountain National Park Research Conference, Estes Park, CO.

Nydick, K. R., B. M. Lafrancois, J. S. Baron, and **B. M. Johnson**. 2002. Nitrogen cycling and biological alkalinity production following nutrient and acid additions to mountain lakes. National Meeting, Ecological Society of America, Tucson, AZ.

Hardiman, J., and **B. M. Johnson**. 2002. Seasonal distribution and scope for growth of young-of-year Kokanee in a large mesotrophic reservoir. Annual Meeting, Western Division of the American Fisheries Society, Spokane, WA.

Koski, M. J. and **B. M. Johnson**. 2002. Modeling the interactive effects of eutrophication and climate change on Kokanee (*Oncorhynchus nerka*) foraging behavior. Front Range Ecology Symposium, CSU, Fort Collins, CO.

Koski, M. J. and **B. M. Johnson**. 2001. Modeling the interactive effects of eutrophication and climate change on Kokanee (*Oncorhynchus nerka*) foraging and growth (poster). Student Water Symposium, Colorado State University, Fort Collins, CO. (Best Poster Award)

Lafrancois, B. Moraska, K. R. Nydick, J. S. Baron, and **B. M. Johnson**. 2001. Simulation of increased N deposition to small mountain lakes, Snowy Range, Wyoming. National Meeting, Ecological Society of America, Madison, WI.

Nydick, K., B. Moraska, J. Baron, J. Sickman, and **B. Johnson**. 2001. Sensitivity of western mountain lake biology to N deposition. National Meeting, Ecological Society of America, Madison, WI.

Lathrop, R., **B. Johnson**, T. Johnson, M. Vogelsang, S. Carpenter, T. Hrabik, J. Kitchell, J. Magnuson. L. Rudstam, and R. Stewart. 2001. Multiple trophic level responses to a planktivore die-off and sustained piscivore stocking in eutrophic Lake Mendota. National Meeting, Ecological Society of America, Madison, WI.

Nydick, K., B. Moraska, J. Baron, **B. Johnson**. 2001. Mesocosm experiments to determine if subtle nitrogen additions can alter primary production in small mountain lakes, Snowy Range, WY. National Meeting, American Society of Limnology and Oceanography, Albuquerque, NM.

Nydick, K., B. Moraska, J. Baron, **B. Johnson**. 2001. Simulation of N deposition to small mountain lakes, Snowy Range, WY. Front Range Student Ecology Symposium, Fort Collins, CO.

Saito, L., **B. Johnson**, J. Bartholow, and B. Hanna. 2001. Assessing effects of reservoir operations on the upstream ecosystem using food web-energy transfer and water quality models. Colorado State University Hydrology Days, Fort Collins, CO.

***Johnson, B. M.** 2000. Biotic influences on water quality. Annual Meeting, Colorado Lake and Reservoir Management Association, Morrison, CO.

***Johnson, B. M.** 2000. Predicting effects of new dam operations on reservoir ecosystems. Washington Department of Fish and Game, Olympia, WA.

- ***Johnson, B. M.** 2000. Predicting effects of new dam operations on reservoir ecosystems. United States Geological Survey Columbia River Research Laboratory, Cook, WA.
- ***Johnson, B. M.** 2000. Refinement of Kokanee salmon functional response for use in bioenergetics modeling. 26th Annual International Kokanee Workshop, Coeur d'Alene, ID.
- Moraska, B. M., D. M. Carlisle, K. R. Nydick, B. M. Johnson,* and J. S. Baron. 2000. Relationships between benthic invertebrates and environmental gradients in Colorado mountain lakes. National Meeting, North American Benthological Society, Keystone, CO.
- Nydick, K., B. Moraska, J. Baron, B. Johnson.* 2000. Nutrient limitation experiments in subalpine lakes of the Loch Vale Watershed, Rocky Mountain National Park. National Meeting, North American Benthological Society, Keystone, CO.
- Koski, M. L.* and **B. M. Johnson.** 2000. Foraging ecology of Kokanee salmon (*Oncorhynchus nerka*): effects of prey density and light. National Meeting, Ecological Society of America, Snowbird, UT.
- Koski, M. L.* and **B. M. Johnson.** 2000. Foraging ecology of Kokanee salmon (*Oncorhynchus nerka*): effects of prey density and light. Front Range Student Ecology Symposium, Colorado State University, Fort Collins, CO.
- Koski, M. L.* and **B. M. Johnson.** 2000. Foraging ecology of Kokanee salmon: effects of prey density and light. Graduate Student Council Graduate Research and Creativity Symposium, Colorado State University, Fort Collins, CO.
- Lathrop, R., **B. M. Johnson,** T. B. Johnson, M. T. Vogelsang, T.R. Hrabik, J. F. Kitchell, and S. R. Carpenter. 2000. Lake Mendota biomanipulation project 1987-1998, Biomanipulation Workshop, Germany.
- Lathrop, R., **B. M. Johnson,** T. B. Johnson, M. T. Vogelsang, T.R. Hrabik, J. F. Kitchell, and S. R. Carpenter. 2000. Lake Mendota biomanipulation project 1987-1998. American Society of Limnology and Oceanography, Copenhagen, Denmark.
- Saito, L., M. Anderson* and **B. M. Johnson.** 2000. Understanding the relative importance of reservoir operations and climate on reservoir thermal conditions. Colorado State University Hydrology Days, Fort Collins, CO.
- Koski, M. L.* and **B. M. Johnson.** 1999. Quantifying a planktivore's functional response for use in bioenergetics modeling. Front Range Student Ecology Symposium, Colorado State University, Fort Collins, CO.
- Koski, M. L.* and **B. M. Johnson.** 1999. Quantifying a planktivore's functional response for use in bioenergetics modeling (poster). Graduate Research and Creativity Symposium, Colorado State University, Fort Collins, CO.
- Koski, M. L.* and **B. M. Johnson.** 1999. Refinement of Kokanee salmon (*Oncorhynchus nerka*) functional response for use in bioenergetics modeling (poster). Student Water Symposium, Colorado State University, Fort Collins, CO.
- Koski, M.* and **B. M. Johnson.** 1999. Refinement of Kokanee salmon (*Oncorhynchus nerka*) functional response for use in bioenergetics modeling. Midwest Fish and Wildlife Conference, Chicago, IL.
- Saito, L., R. B. Hanna, J. Bartholow,* and **B. Johnson.** 1999. Modeling the effects of Shasta temperature control device operations with CE-QUAL-W2. Interagency Ecological Program Annual Workshop & Bay/Delta Modeling Forum Annual Meeting & Workshop, Pacific Grove, CA.
- Saito, L., R. B. Hanna, J. Bartholow,* and **B. Johnson.** 1999. Stable isotope analysis for structuring an aquatic food web model. Interagency Ecological Program Annual Workshop & Bay/Delta Modeling Forum Annual Meeting & Workshop, Pacific Grove, CA.
- Saito, L., R. B. Hanna, J. Bartholow,* and **B. Johnson.** 1999. Linking hydrodynamic and ecological models at Shasta Lake. American Society of Civil Engineers Water Resources Planning and Management Conference, Tempe, AZ
- Baron, J. S., T. Minear, H. M. Rueth, *K. R. Nydick, B. M. Moraska, B. Johnson,* E. J. Allstott. 1999. Ecosystem responses to nitrogen deposition in the Colorado Front Range. American Geophysical Union Fall Meeting, San

Francisco, CA.

Baron, J. S., A. Wolfe, K. R. Nydick, B. M. Moraska, **B. Johnson**, and T. Minear. 1999. Ecosystem responses to elevated nitrogen deposition in the Colorado Front Range. National Meeting, American Society for Limnology and Oceanography, Santa Fe, NM.

***Johnson, B. M.** and P. J. Martinez. 1998. Piscivore-prey "balance" in coldwater reservoirs of differing productivity. National Meeting, American Fisheries Society, Hartford, CT.

***Johnson, B. M.** 1998. Harvest regulations for recreational fishing and hunting. 1998 USA-ROC Workshop on Wildlife Conservation Techniques, National Taiwan University, Taipei, Taiwan.

***Johnson, B. M.** 1998. Effects of dam operations on reservoir food web interactions. Departmental Seminar, Department of Fisheries and Wildlife, Utah State University, Logan, UT.

Moraska, B, K. Nydick, B. Johnson, J. Baron, T. Minear, M. McCall, and A. Ramey. 1998. Patterns of nitrogen deposition and alpine lake biota. Colorado State University Student Water Symposium, Fort Collins, CO.

Nydick, K. R., B. Moraska, J. S. Baron, B. Johnson, T. Minear, and E. J. Allstott. Nitrogen deposition in alpine lakes: spatial patterns. Colorado State University Student Water Symposium, Fort Collins, CO.

Graeb, B., N. MacRury, and B. M. Johnson. 1998. Effects of prey base and feeding guild on dietary exposure to contaminants. Front Range Student Ecology Symposium, Fort Collins, CO.

Graeb, B., N. MacRury, and B. M. Johnson. 1998. Effects of prey base and feeding guild on dietary exposure to contaminants. Rocky Mountain Chapter, Society for Environmental Toxicology and Chemistry, Fort Collins, CO.

Graeb, B., N. MacRury, and B. M. Johnson. 1998. Effects of prey base and feeding guild on dietary exposure to contaminants. Annual Meeting, Colorado-Wyoming and Bonneville Chapters of the American Fisheries Society, Grand Junction, CO.

Baron, J.S., A. Wolfe, **B. Johnson**, and M. Bashkin. 1998. Human-caused disturbances in Colorado's alpine lakes. North American Lake Management Society, 18th International Symposium, Banff, Alberta, Canada.

Saito, L., B. Johnson, J. Bartholow and B. Hanna. 1998. Interdisciplinary water resources: linking engineering and ecology in reservoir modeling. Colorado State University Water Symposium, Fort Collins, CO.

***Johnson, B. M., J. D. Stockwell**, and D. G. Fontane. 1997. Ecosystem responses to new dam operations in a large montane reservoir. National Meeting, North American Lake Management Society, Houston, TX.

Johnson, B. M., J. D. Stockwell, and D. G. Fontane. 1997. Modeling ecosystem responses to reservoir reoperation. National Meeting, American Society of Limnology and Oceanography, Santa Fe, NM.

Johnson, B. M., J. D. Stockwell, and D. G. Fontane. 1997. Modeling ecosystem responses to reservoir reoperation (poster). Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Cheyenne, WY. (Best Poster Award)

MacRury, N. and **B. M. Johnson.** 1997. Parasite and contaminant influences on bioenergetics and feeding behavior of largemouth bass. National Meeting, Society of Environmental Toxicology and Chemistry, San Francisco, CA.

Stockwell, J. D. and **B. M. Johnson.** 1997. Forecasting changes in behavior and predation risk of a vertically migrating planktivore. National Meeting, American Fisheries Society, Monterey, CA.

Stockwell, J. D. and **B. M. Johnson.** 1997. Modeling planktivorous fish responses to natural and human-induced alteration of thermal habitat. National Meeting, American Society of Limnology and Oceanography, Santa Fe, NM.

MacRury, N. and **B. M. Johnson.** 1997. Parasite and contaminant influences on bioenergetics of largemouth bass at Rocky Mountain Arsenal. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Cheyenne, WY.

- Stockwell, J. D.* and **B. M. Johnson**. 1997. Modeling Kokanee responses to climate and dam reoperation in Blue Mesa Reservoir. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Cheyenne, WY.
- Stockwell, J. D.* and **B. M. Johnson**. 1997. A combined foraging and vertical migration model for Kokanee salmon - how can it be applied to mysids? International Mysid Ecology Workshop, Cornell University, Ithaca, NY.
- *Johnson, B. M.**, K. Wilson, R. S. Stewart, and M. Vogelsang. 1996. Assessing effectiveness and sustainability of a Walleye enhancement program. National Meeting, American Fisheries Society, Dearborn, MI.
- Stockwell, J. D.* and **B. M. Johnson**. 1996. Refinement and calibration of an ecologically realistic bioenergetics model for Kokanee salmon (*Oncorhynchus nerka*). Midwest Fish and Wildlife Conference, Omaha, NE.
- Johnson, B. M.**, M. Vogelsang, and R. S. Stewart. 1995. Effectiveness of stocking and harvest regulations to enhance a Walleye population for biomanipulation. 2nd International Percid Symposium, Vaasa, Finland.
- Martinez, P. J. and **B. M. Johnson**. 1995. Trophic economics: food for thought, macs, pike, etc. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Casper, WY.
- Martinez, P. J. and **B. M. Johnson**. 1995. Projections of Lake Trout predation demand derived from hydroacoustic surveys in reservoirs of varying productivity. Annual Meeting, Colorado-Wyoming Chapter of the American Fisheries Society, Casper, WY.
- Yule, D., R. Whaley, S. Flickinger and **B. M. Johnson**. 1995. Assessment of rainbow trout vulnerability to Walleye predation. Annual Meeting, Colorado-Wyoming Chapter American Fisheries Society, Casper, WY.
- Swift, S. M.*, **B. M. Johnson**, and R. M. Muth. 1995. Influence of anthropogenic stress on Rio Grande sucker (*Catostomus plebeius*) food selection and condition. Annual Meeting, Desert Fishes Council, Reno, NV.
- *Johnson, B. M.** and P.J. Martinez. 1993. Sport fishery harvest regulations: linking direct and indirect effects. National Meeting, American Fisheries Society, Portland, OR.
- *Johnson, B. M.** 1993. Departmental Seminar, University of Wyoming, Laramie, WY.
- Carpenter, S. R., S. Hubler, **B. M. Johnson**, T. Johnson, J. Kitchell, R. Lathrop, L. Rudstam, and P. A. Soranno. 1993. Biomanipulation of Lake Mendota: responses of algae and anglers. Annual Meeting, American Society of Limnology and Oceanography, Alberta, Canada.
- Carpenter, S. R., A. Munoz-del-Rio, S. Newman, P. W. Rasmussen, and **B. M. Johnson**. 1993. Interactions of anglers and Walleyes in Escanaba Lake, Wisconsin. National Meeting, Ecological Society of America, Madison, WI.
- *Johnson, B. M.**, S. J. Gilbert, and R. S. Stewart. 1992. Stock enhancement to augment recruitment in freshwater: lessons and opportunities. National Meeting, American Society of Limnology and Oceanography, Santa Fe, NM.
- *Johnson, B. M.** 1992. Fishery management problems and solutions on Lake Mendota, Wisconsin, Colorado State University Student Chapter AFS, Fort Collins, CO.
- *Johnson, B. M.** 1992. Walleyes and Water Quality: Biomanipulation on Lake Mendota, Wisconsin, Research Seminar, U.S. Bureau of Reclamation, Denver, CO.
- Soranno, P. A., T. B. Johnson, R. C. Lathrop, **B. M. Johnson**, S. R. Carpenter, and J.F. Kitchell. 1992. Lake Mendota biomanipulation project: 1987-1990. National Meeting, North American Lake Management Society, Cincinnati, OH.
- *Johnson, B. M.**, S. J. Gilbert, and R. S. Stewart. 1991. What we've learned from the Lake Mendota Project. Statewide Fisheries Management Meeting, Wisconsin Department of Natural Resources, Lake Geneva, WI.
- *Johnson, B. M.**, S. J. Gilbert, and R. S. Stewart. 1990. The Lake Mendota biomanipulation. Statewide Water Resources Management Meeting, Wisconsin Department of Natural Resources, Waupaca, WI.
- Johnson, B.M.**, S. J. Gilbert, and R. S. Stewart. 1990. Modeling the consumption of planktivorous fishes by stocked piscivores: forecasts and observations. Annual Meeting, Wisconsin, Iowa Chapters of the American Fisheries

Society, Prairie du Chien, WI.

***Johnson, B. M.**, S. J. Gilbert, and R. S. Stewart. 1990. Piscivores, their prey, and the Lake Mendota fishery. Lake Mendota Project Symposium, Madison, WI.

Johnson, B. M., S. J. Gilbert, R. S. Stewart. 1990. Rehabilitating a Walleye population by stocking: assessment techniques and constraints on recruitment. Midwest Fish and Wildlife Conference, Minneapolis, MN.

***Johnson, B. M.**, S. J. Gilbert, R. S. Stewart. 1989. An evaluation of the 15-inch size limit on Walleyes in Lake Mendota. Wisconsin Department of Natural Resources Statewide Fisheries Management Meeting, Fond du Lac, WI.

Johnson, B. M., S. J. Gilbert, R. S. Stewart. 1988. Modeling the consumption of planktivorous fishes by stocked piscivores: forecasts and observations. Midwest Fish and Wildlife Conference, Springfield, IL.

Johnson, B. M., S. J. Gilbert, R. S. Stewart, and M.D. Staggs. 1987. Integrating trophic relationships into the development of harvest regulations for piscivorous gamefish. Midwest Fish & Wildlife Conference, Milwaukee, WI.

Johnson, B. M., R. A. Stein, and R. F. Carline. 1985. An evaluation of quadrat rotenone to assess the abundance of forage fishes in the littoral zone. National Meeting, American Fisheries Society, Sun Valley, ID.

GRANTS AND CONTRACTS

Years	Sponsor and project title	Role	Amount
2018-2020	CPW: Triploid Walleye: a new frontier for managing coolwater predators in the West	Co-PI	\$182,000
2018	Private donor, "Mysis investigations"	PI	\$130,000
2017	Private donor, "Mysis investigations"	PI	\$150,000
2016	Private donor, "Mysis investigations"	PI	\$140,000
2015	Private donor, "Mysis investigations"	PI	\$135,000
2015-2017	National Science Foundation IGERT, CSU I-WATER Fellowship to Kyle Christianson	Advisor	\$93,000
2014	Private donor, "Mysis investigations"	PI	\$115,000
2013-2014	Northern Colorado Water Conservancy District, "Effects of water clarity and other factors on aquatic life of Grand Lake, Colorado"	PI	\$65,142
2013	Private Donor, "Trophic ecology at Dillon Reservoir"	PI	\$51,000
2012-2015	Colorado Dept. of Public Health and Environment, "Characterizing Bioaccumulation of Mercury in Sport Fish: Informing TMDL Development and Modeling Mitigation Strategies in Front Range Reservoirs"	PI	\$286,365
2012-2015	Wyoming Game and Fish "Quantifying Piscivory in Buffalo Bill Reservoir: Are the wild <i>Oncorhynchus</i> fisheries sustainable?"	PI	\$161,160
2012	Private donor. Lodging, iPads for creel and economic surveys	PI	\$39,489
2012	U.S. Fish and Wildlife Service Upper Colorado River Recovery Program. "Chemically Fingerprinting Nonnative Fishes in	PI	\$6,100

Years	Sponsor and project title	Role	Amount
	Reservoirs"		
2012	National Park Service. Lake Trout diet and stable isotope analysis	PI	\$10,000
2011	June Sucker Recovery Program.	PI	\$49,000
2011	Private donor. Research to Maximize the Sport Fishery Potential at Dillon Reservoir	PI	\$135,668
2011	National Park Service. Lake Trout diet and stable isotope analysis	PI	\$10,000
2010	Private donor. Research to Maximize the Sport Fishery Potential at Dillon Reservoir	PI	\$15,467
2010	Colorado Division of Wildlife. In kind contribution: Hotsy hot water pressure washer for Fisheries Program	PI	\$4,995
2009-2010	National Park Service. Evaluate Lake Trout suppression strategies"	PI	\$20,000
2009-2012	Colorado Division of Wildlife. "Evaluate Lake Trout suppression strategies"	PI	\$141,000
2009-2010	Colorado Department of Public Health and Environment. "Bioaccumulation of mercury in aquatic food webs: Integrating research and management towards remediation"	PI	\$25,488
2008	U.S. Fish and Wildlife Service Upper Colorado River Recovery Program. "Chemically Fingerprinting Nonnative Fishes in Reservoirs"	PI	\$29,680
2007-2011	Colorado Division of Wildlife. "Management of mercury bioaccumulation in Colorado reservoirs"	PI	\$185,000
2007-2009	Colorado Division of Wildlife. "Analysis & Publications"	PI	\$92,566
2007	U.S. Fish and Wildlife Service Upper Colorado River Recovery Program. "Chemically Fingerprinting Nonnative Fishes in Reservoirs"	PI	\$42,821
2006	U.S. Fish and Wildlife Service Upper Colorado River Recovery Program. "Chemically Fingerprinting Nonnative Fishes in Reservoirs"	PI	\$20,557
2006-2007	Colorado Division of Wildlife. "Regional growth and diet of Walleyes"	PI	\$2,400
2006-2007	Colorado Division of Wildlife. "Isotopic, elemental and bioenergetics studies",	PI	\$46,172
2005-2006	Colorado Division of Wildlife. "Stable isotopes and statistics"	PI	\$38,900
2004-2006	Whirling Disease Initiative. "Forensic applications of otolith microchemistry for tracking sources of illegally stocked whirling disease positive trout"	Co-PI	\$114,659
2004-2005	Colorado Division of Wildlife. "Stable isotopes and statistics"	PI	\$25,000
2003-	U.S. Bureau of Reclamation. "Ecosystem monitoring during	PI	\$44,950

Years	Sponsor and project title	Role	Amount
2004	Horsetooth Reservoir refilling"		
2003-2005	U.S. Fish and Wildlife Service Upper Colorado River Endangered Fish Recovery Program. "Provenance and trophic roles of nonnative fishes"	PI	\$185,000
2002-2004	Colorado Division of Wildlife. "Stable isotopes and statistics"	PI	\$42,600
1998-2002	U.S. Geological Survey. "Air quality effects", (with Dr. Jill Baron)	Co-PI	\$174,000
1993-2003	U.S. Bureau of Reclamation. "Ecological effects of reservoir operations on Blue Mesa Reservoir"	PI	\$594,234
2000-2001	National Park Service. "Kokanee in Blue Mesa Reservoir: causes for their decline and strategies for recovery"	PI	\$40,000
2000-2001	Colorado Division of Wildlife. "Sonar, telemetry, isotopes, statistics "	PI	\$12,000
1999-2000	North Front Range Water Quality Planning Association. "Top-down influences on water quality in Front Range reservoirs"	PI	\$6,500
1999-2000	Colorado Division of Wildlife. "Trophic interactions in Colorado reservoirs"	PI	\$18,000
1998-1999	U.S. Geological Survey. "Lake Shasta food web analysis using bioenergetics, stable isotope analysis and trophic models"	Co-PI	\$11,000
1998-1999	North Front Range Water Quality Planning Association. "Top-down influences on water quality in Front Range reservoirs"	PI	\$2,000
1998-1999	Colorado Division of Wildlife. "Trophic interactions in Colorado reservoirs- bioenergetics"	PI	\$49,350
1998-1999	Colorado Division of Wildlife. "Age and growth of Rio Grande sucker"	PI	\$5,000
1994-1997	U.S. Fish and Wildlife Service. "Effects of sediment contaminants on macroinvertebrate and fish assemblages in lower lakes at Rocky Mountain Arsenal", (with Dr. W. H. Clements)	Co-PI	\$355,000
1996-1997	Colorado Division of Wildlife. "Trophic interactions in Colorado reservoirs- bioenergetics"	PI	\$20,084
1996-1997	Colorado Division of Wildlife. "Rio Grande sucker in Colorado: status and ecology", (with Dr. R. T. Muth)	Co-PI	\$31,847
1996-1997	Colorado Division of Wildlife. "Hydroacoustic biomass estimates in coldwater reservoirs"	PI	\$11,390
1995-1996	Colorado Division of Wildlife. "Trophic interactions in Colorado reservoirs- bioenergetics"	PI	\$12,226
1995-1996	Colorado Division of Wildlife. "Rio Grande sucker in Colorado: status and ecology", (with Dr. R. T. Muth)	Co-PI	\$25,779

Years	Sponsor and project title	Role	Amount
1995-1996	Colorado Division of Wildlife. "Hydroacoustic biomass estimates in coldwater reservoirs"	PI	\$23,736
1994-1995	Colorado Division of Wildlife. "Trophic interactions in Colorado reservoirs- bioenergetics"	PI	\$12,129
1994-1995	Colorado Division of Wildlife. "Rio Grande sucker in Colorado: status and ecology", (with Dr. R. T. Muth)	Co-PI	\$6,730
1994-1995	Colorado Division of Wildlife. "Hydroacoustic biomass estimates in coldwater reservoirs"	PI	\$16,993
1993-1994	Colorado Division of Wildlife. "Trophic interactions in Colorado reservoirs- bioenergetics"	PI	\$16,185

MENTORING

Graduate Students (current position)

1. **Collin Farrell, M.S.**, expected 2020. "Triploid Walleye: a new frontier for managing coolwater predators in the West".
2. **Kyle Christianson, Ph.D.**, expected 2018. "Effects of climate change on thermal regimes and trophic interactions in high elevation lakes". Department of Fish, Wildlife and Conservation Biology.
3. **Clark Johnson, M.S.**, 2015. "Illegal Walleye introduction may destabilize a wild Lake Trout—Cutthroat Trout fishery in a Wyoming reservoir". Department of Fish, Wildlife and Conservation Biology.
4. **Devin Olsen, M.S.**, 2014. "Arctic char (*Salvelinus alpinus*) can enhance fisheries in reservoirs with trophic constraints". M.S. Department of Fish, Wildlife and Conservation Biology. (Research biologist, KFS Consultants)
5. **William Pate, M.S.**, 2013. "Management strategies for multi-use recreational fisheries: coexistence of Kokanee and Lake Trout in western waters". Department of Fish, Wildlife and Conservation Biology. (Research Associate, CSU)
6. **Brian Wolff, M.S.**, 2011. "Origins and movements of invasive piscivores determined from natural isotopic markers in otoliths". Department of Fish, Wildlife and Conservation Biology. (Ph.D. student, CSU)
7. **Daniel Gibson-Reinemer, M.S.**, 2008. "Elemental signatures in otoliths of hatchery trout: distinctiveness and utility for detecting origins and movement". Department of Fish, Wildlife and Conservation Biology. (Postdoctoral Research Associate, Illinois Natural History Survey)
8. **Phillip Brinkley, M.S.**, withdrew 01/2008. Department of Fish, Wildlife and Conservation Biology.
9. **Marci Koski, Ph.D.**, 2004. "Predicting the effects of environmental change on the behavior, growth, and predation risk of juvenile Kokanee salmon". Graduate Degree Program in Ecology. (Biologist, Ecological Services, U.S. Fish and Wildlife Service)
10. **Jill Hardiman, M.S.**, 2004. "Predation risk and limnological conditions drive seasonal distribution of young—of-year Kokanee in a Colorado reservoir. Department of Fishery and Wildlife Biology. (Assistant Science Coordinator, Northwest Climate Science Center)
11. **Harry Crockett, M.S.**, 2004. "Assessment of Lake Trout abundance and ecology in a Colorado reservoir using hydroacoustic and mark-recapture techniques". Graduate Degree Program in Ecology. (Administrator, Colorado Division of Wildlife)
12. **Brenda Moraska Lafrancois, Ph.D.**, 2002. "Algal and invertebrate responses to atmospheric nitrogen deposition in Rocky Mountain lakes". Graduate Degree Program in Ecology (co-advised). (Research Administrator, National Park Service)
13. **Koren Nydick, PhD.**, 2002. "Mountain lake responses to elevated nitrogen deposition". Graduate Degree

- Program in Ecology (co-advised). (Director, Mountain Studies Institute, Silverton, CO)
14. **Marci Koski, M.S.**, 2000. "Graduate Degree Program in Ecology. (Biologist, Ecological Services, U.S. Fish and Wildlife Service)
 15. **Stephen Johnson, M.S.**, 1998. "Acoustic target strength estimates of Opossum shrimp (*Mysis relicta*) using a split-beam echosounder". Department of Fishery and Wildlife Biology.
 16. **Nicole MacRury, M.S.**, 1997. "Influence of parasites and organochlorines on bioenergetics and feeding behavior of largemouth bass". Department of Fishery and Wildlife Biology. (Aquatic Researcher, Colorado Division of Wildlife)
 17. **Susan Swift-Miller, M.S.**, 1996. "Ecology and conservation of Rio Grande sucker Catostomus plebeius". Department of Fishery and Wildlife Biology. (U.S. Forest Service, Monte Vista, CO)
 18. **Michael Wise, M.S.**, 1996. "Daphnia sampling efficiency and the relative influence of Kokanee predation on Daphnia population dynamics in Blue Mesa Reservoir, Colorado". Department of Fishery and Wildlife Biology.

Postdoctoral Researchers

1. **Dr. Jesse Lepak**, 2008-2010. (Aquatic Research Biologist, Colorado Division of Wildlife)
2. **Dr. Gregory Whitley**, 2003-2004. (Associate Prof., Dept. of Zoology, S. Illinois University)
3. **Dr. Laurel Saito**, 2000. (Professor, Dept. of Environ. & Resource Sciences Univ. of Nevada-Reno)
4. **Dr. Jason D. Stockwell**, 1996-1998. (Associate Prof.; Director, Rubenstein Ecosystem Science Lab)

Undergraduate assistants, volunteers

1. Joe Pitti, BS Fish, Wildlife and Conservation Biology, expected 2021
2. James Grinolds, BS Fish, Wildlife and Conservation Biology, expected 2019
3. Krista Harrington, BS Fish, Wildlife and Conservation Biology, expected 2017
4. Meaghan Rupprecht, BS Fish, Wildlife and Conservation Biology, expected 2017
5. Will Lennon, BS Fish, Wildlife and Conservation Biology, expected 2020
6. Brenden Sucher, BS Fish, Wildlife and Conservation Biology, expected 2017
7. Casey Barby, BS Fish, Wildlife and Conservation Biology, expected 2017
8. Orion McComas, BS Fish, Wildlife and Conservation Biology, expected 2016
9. Katie Rohwer, BS Fish, Wildlife and Conservation Biology, expected 2016
10. Marshall Wolf, BS Ecosystem Science and Sustainability, 2015
11. Josh Martinez, BS Fish, Wildlife and Conservation Biology, withdrew
12. Andy Oringer, BS Environmental and Natural Resource Economics, 2015
13. Will Radigan, BS Fish, Wildlife and Conservation Biology, 2014
14. Brian Metzger, BS Fish, Wildlife and Conservation Biology, 2014
15. Jacob Hayungs, BS Fish, Wildlife and Conservation Biology, 2014 (AK Fish and Game)
16. Nathan Jensen, BS Fish, Wildlife and Conservation Biology, 2014
17. Elizabeth Dowling, BS Fish, Wildlife and Conservation Biology, 2014
18. Ann Bishop, BS Natural Resources Management, 2013
19. Brittany Woodward, BS Fish, Wildlife and Conservation Biology, 2013
20. Cody Olson, BS Zoology, 2013 (MS program, Cal State)
21. Dan Cammack, BS Fish, Wildlife and Conservation Biology, 2013
22. Megan Weber, BS Fish, Wildlife and Conservation Biology, 2013
23. Anna Perez-Umphrey, BS Fish, Wildlife and Conservation Biology, 2013
24. Katie Fialko, BS Natural Resources Management, 2013
25. Clancy Jandreau, BS Fish, Wildlife and Conservation Biology, 2013
26. Matt Webb, BS Fish, Wildlife and Conservation Biology, 2012
27. Ryan Sanderson, BS Fish, Wildlife and Conservation Biology
28. Jared Milhaus, BS Fish, Wildlife and Conservation Biology

29. Nate Cathcart, BS Fishery Biology, 2011 (MS program, Kansas State University)
30. Will Stacy, BS Wildlife Biology, 2010 (Illinois Natural History Survey)
31. Stacie Grannum, BS Biomedical Sciences, 2010 (Veterinary Medicine program, CSU)
32. Theresa Connelly, BS Equine Science, 2010
33. Bill Pate, BS Fishery Biology, 2009 (Research Associate, Colorado State University)
34. Eric Gardunio, BS Fishery Biology, 2008 (MS program, Colorado State University)
35. Benjamin Felt, BS Fishery Biology, 2007 (MS program, Michigan State University)
36. Adam Thompson, BS Fishery Biology, 2007 (MS program, Ohio State University)
37. Scott Murdock, BS Fishery Biology, 2007 (District Wildlife Manager, CO Parks & Wildlife)
38. Michael Dodrill, BS Fishery Biology, 2007 (Colorado Division of Wildlife, Monte Vista, CO)
39. Kelli Rehder, MS Geosciences (ARCADIS U.S., Inc., Highlands Ranch, CO)
40. Joel Wixson, BS Fishery Biology, 2005 (Oregon Department of Fish and Wildlife)
41. Mario Sullivan, BS Fishery Biology, 2004 (MS program, Western Kentucky University)
42. Brian Wolff, BS Fishery Biology, 2005 (Aquatic Biologist, Downtown Aquarium, Denver)
43. Randy Oplinger, BS Fishery Biology, 2004 (MS program, University of Illinois)
44. Alissa Gigliotti, BS Fishery Biology, 2002 (Colorado Division of Wildlife)
45. Sean Tackley, BS Wildlife Biology 2002
46. Josh Hobgood, BS Fishery Biology, 2001 (Public school teacher)
47. Brian Graeb, BS Fishery Biology 1999 (MS program, University of Illinois)
48. Robert Dabkowski, BS Fishery Biology 1999
49. Dave Shuler, BS Fishery Biology 1999
50. Tim Sundlov, BS Fishery Biology 1999
51. Shawndra Mahorter, BS Wildlife Biology 1998
52. Krista Bonfantine, BS Biological Science 1997
53. Lance Clarke, 2nd BS Fishery Biology 1997
54. Jason Garner, BS Zoology 1997
55. Rob Bringuel, BS Wildlife Biology 1997
56. Dana Pittman, BS Wildlife Biology 1996
57. Adam Craig, BS Wildlife Biology 1996
58. Glenn Szerlong, BS Fishery Biology 1996

AWARDS TO MY STUDENTS

<u>Year</u>	<u>Award</u>	<u>Student</u>
2017	Robert Behnke/Rocky Mountain Flycasters Scholarship	Kyle Christianson
2016	Best Student Poster, CO/WY American Fisheries Society	Kyle Christianson
2015	NSF I-WATER Fellowship, Colorado State University	Kyle Christianson
2014	Robert Behnke/Rocky Mountain Flycasters Scholarship	Clark Johnson
2013	Cutthroat Chapter Trout Unlimited Scholarship	Clark Johnson
2013	West Denver Chapter Trout Unlimited Scholarship	Clark Johnson
2013	Best Student Presentation, CO/WY American Fisheries Society	Devin Olsen
2013	High Honors, CSU Celebrate Undergraduate Research & Creativity Symposium	Cody Olson
2012	Warner College of Natural Resources Graduate Fellowship,	Clark Johnson
2012	Robert Behnke/Rocky Mountain Flycasters Scholarship	Devin Olsen
2012	West Denver Chapter Trout Unlimited Scholarship	Devin Olsen
2012	Cutthroat Chapter Trout Unlimited Scholarship	Devin Olsen
2011	Highest Honors, CSU Celebrate Undergraduate Research & Creativity Symposium	Katie Fialko
2010	Robert Behnke/Rocky Mountain Flycasters Scholarship	Brian Wolff
2008	Hill Memorial Fellowship, College of Natural Resources	Brian Wolff

2005	West Denver Chapter Trout Unlimited Scholarship	Dan Gibson-Reinemer
2003	Best Presentation, Front Range Student Ecology Symposium	Marci Koski
2002	Best Poster Award, CO/WY American Fisheries Society	Marci Koski
2001	Best Poster Award, 5th Annual CSU Student Water Symposium	Marci Koski
2001	West Denver Chapter Trout Unlimited Scholarship	Jill Hardiman
2001	Gilbert Memorial Scholarship, CSU Dep. of Fishery & Wildlife Biology	Jill Hardiman
2000	USDA National Needs Water Science Fellowship	Marci Koski
2000	Anderson Memorial Scholarship, CSU College of Natural Resources	Marci Koski
2000	Gilbert Memorial Scholarship, CSU Dep. of Fishery & Wildlife Biology	Jill Hardiman
1999	Anderson Memorial Scholarship, CSU College of Natural Resources	Brenda Moraska
1999	Canon Fellowship	Koren Nydick
1999	Best Poster, CSU Student Water Symposium	Koren Nydick
1998	University Graduate Fellowship Award, CSU Graduate School	Brenda Moraska
1997	Honorable Mention, Best Paper, CSU Student Ecology Symposium	Nicole MacRury
1997	Society for Environmental Toxicology and Chemistry Travel Award	Nicole MacRury
1996	Special Graduate Fellowship, CSU Graduate School	Nicole MacRury
1996	Best Paper Award, CSU Graduate Student Ecology Symposium	Nicole MacRury
1996	Best Student Poster Award, CO/WY American Fisheries Society	S. Swift, S. Johnson
1995	Graduate Fellowship, CSU Graduate School	Sue Swift
1995	Special Scholarship, CSU College of Natural Resources	Mike Wise
1994	Diversity Scholarship, Colorado Division of Wildlife	Sue Swift
1994	Graduate Fellowship, CSU Graduate School	Mike Wise

PROFESSIONAL DEVELOPMENT

Training

2018	Data analysis using R, CO-WY AFS
2017	Digital Measures, CSU
2017	Data analysis using R, CSU
2017	Environmental DNA (eDNA) sampling for freshwater species, CO/WY/UT AFS
2016	IACUC Training: Animal Care and Use, CSU
2015	University Discipline Appeals Committee training, CSU
2015	Search Chair training, CSU
2014	Students At Risk training, CSU
2011	United Nations employee security training, UN FAO
2009	Preventing sexual harassment, CSU
2008	Responsible conduct of research, CSU RICRO
2007	Backpack electrofishing short course, NW Environmental Training Center
2006	Statistical power analysis workshop, CSU
2004	Mobile Computing, CSU Professional Development Institute
2003	Hydroacoustics for Mobile Surveys workshop, CDOW, Grand Junction
2002	Information-Theoretic Methods workshop, CSU
2002	Acquisition Card (ACard) training, CSU
2002	Search Committee Chair training, CSU
2002	Undergraduate Advising information session, CSU
2001	Open water SCUBA refresher course, (SSI)
2001	Hydroacoustics for Mobile Surveys short course, Dutch John, UT
2000-	Hazardous Waste, Environmental Health Services, CSU
present	

Professional conferences

2018	CO/WY Chapter of the American Fisheries Society	Laramie, WY
2017	North American Lake Management Society	Denver, CO
2017	Western Division of the American Fisheries Society	Missoula, MT
2017	CO/WY/UT Chapters of the American Fisheries Society	Grand Junction, CO
2016	CO/WY Chapter of the American Fisheries Society	Laramie, WY
2015	CO/WY Chapter of the American Fisheries Society	Fort Collins, CO
2014	CO/WY Chapter of the American Fisheries Society	Laramie, WY
2013	CO/WY Chapter of the American Fisheries Society	Fort Collins, CO
2011	32 nd Annual Upper Colorado River Basin Researchers' Meeting	Moab, UT
2011	CO/WY Chapter of the American Fisheries Society	Fort Collins, CO
2011	World Recreational Fishing Conference	Berlin, Germany
2010	31 th Annual Upper Colorado River Basin Researchers' Meeting	Grand Junction, CO
2010	CO/WY Chapter of the American Fisheries Society	Laramie, WY
2009	30 th Annual Upper Colorado River Basin Researchers' Meeting	Grand Junction, CO
2009	CO/WY Chapter of the American Fisheries Society	Loveland, CO
2008	29 th Annual Upper Colorado River Basin Researchers' Meeting	Moab, UT
2008	CO/WY Chapter of the American Fisheries Society	Cheyenne, WY
2007	28 th Annual Upper Colorado River Basin Researchers' Meeting	Grand Junction, CO
2007	CDOW Statewide Kokanee and reservoir management meeting	Fort Collins, CO
2007	CO/WY Chapter of the American Fisheries Society	Fort Collins, CO
2006	CO/WY Chapter of the American Fisheries Society	Cheyenne, WY
2006	Colorado Lake and Reservoir Management Association	Lakewood, CO
2005	CO/WY Chapter of the American Fisheries Society	Fort Collins, CO
2005	26 th Annual Upper Colorado River Basin Researchers' meeting	Grand Junction, CO
2005	Whirling Disease Symposium	Denver, CO
2004	Upper Colorado River Basin Researchers' meeting	Moab, UT
2004	CO/WY Chapter of the American Fisheries Society	
2003	CO/WY, Bonneville Chapters, American Fisheries Society	Grand Junction, CO
2002	CO/WY Chapter of the American Fisheries Society	Laramie, WY
2001	CO/WY Chapter of the American Fisheries Society	Cheyenne, WY
2001	Ecological Society of America	Madison, WI
2000	International Kokanee Salmon Workshop	Coeur d'Alene, ID
2000	Colorado Lake and Reservoir Management Association	Morrison, CO
1999	National Meeting of the American Fisheries Society	Charlotte, NC
1999	CO/WY Chapter of the American Fisheries Society	Cheyenne, WY
1998	USA-ROC Workshop on Wildlife Conservation Techniques	Taipei, Taiwan
1998	CO/WY, Bonneville Chapters, American Fisheries Society	Grand Junction, CO
1998	International Kokanee Salmon Workshop	Kalispel, MT
1998	National Meeting of the American Fisheries Society	Hartford, CT
1997	North American Lake Management Society	Houston, TX
1997	National Meeting of the American Fisheries Society	Monterey, CA
1997	American Society of Limnology and Oceanography	Sante Fe, NM
1997	CO/WY Chapter of the American Fisheries Society	Cheyenne, WY
1996	National Meeting of the American Fisheries Society	Dearborn, MI
1995	International Percid Symposium	Vaasa, Finland
1994	CO/WY Chapter of the American Fisheries Society	Fort Collins, CO
1993	CO/WY Chapter of the American Fisheries Society	Laramie, WY

1993	International Kokanee Salmon Workshop	Spokane, WA
1993	Ecological Society of America	Madison, WI
1993	National Meeting of the American Fisheries Society	Portland, OR
1992	American Society of Limnology and Oceanography	Sante Fe, NM
1991	Western Division of the American Fisheries Society	Fort Collins, CO
1991	WDNR Statewide Fisheries Management Meeting	Lake Geneva, WI
1991	WDNR Statewide Water Resources Meeting	Waupaca, WI
1990	Midwest Fish and Wildlife Conference	Minneapolis, MN
1990	National Meeting of American Fisheries Society	Pittsburgh, PA
1990	Lake Mendota Symposium	Madison, WI
1990	WI/IA Chapters of the American Fisheries Society	Prairie du Chien, WI
1989	Midwest Fish and Wildlife Conference	Springfield, IL
1989	WDNR Statewide Fisheries Management Meeting	Fond du Lac, WI
1988	WDNR Statewide Fisheries Management Meeting	La Crosse, WI
1987	Midwest Fish and Wildlife Conference	Milwaukee, WI
1987	WDNR Statewide Fisheries Management Meeting	Stevens Point, WI
1987	Wisconsin Chapter of the American Fisheries Society	Stevens Point, WI
1986	National Meeting of the American Fisheries Society	Providence, RI
1985	National Meeting of the American Fisheries Society	Sun Valley, ID
1985	Ecological and Evolutionary Ethology of Fishes	Guelph, Ontario
1985	Midwest Ecology Conference	Hickory Corners, MI
1985	Ohio Chapter of American Fisheries Society	Columbus, OH
1984	National Meeting of American Fisheries Society	Ithaca, NY
1984	Graduate Student Symposium on Ecology	Columbus, OH
1984	Ohio Chapter of American Fisheries Society	Columbus, OH
1983	Midwest Population Biology Conference	Champaign, IL