

RESUME

Colleen A. Caldwell

U.S. Geological Survey / Cooperative Research Units
New Mexico Cooperative Fish and Wildlife Research Unit
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Educational Background

Ph.D. Ecology, University of Tennessee-Knoxville, 1988
M.S. Aquatic Ecology, Texas State University, 1985
B.S. Fisheries Sciences, Texas A&M University, 1982

Professional Affiliation

2014-Present Unit Leader and Affiliate Professor, USGS/NMSU-FWCE

2006-2013 Unit Leader and Affiliate Associate Professor
U.S. Geological Survey/Biological Resources Division
New Mexico Cooperative Fish and Wildlife Research Unit
College of Agriculture, Consumer and Environmental Sciences
Department of Fish, Wildlife and Conservation Ecology

1994-2006 Assistant Unit Leader-Fisheries and Affiliate Assistant Professor

1991-1994 U.S. Department of Interior/National Biological Survey
Field Station Leader, La Crosse, Wisconsin
National Fisheries Contaminant Research Center

1989-1991 North Carolina State University, Zoology Department
Research Associate (Post-doctoral)

Background of the Federal Unit:

The New Mexico Cooperative Fish and Wildlife Research Unit (Unit), established under cooperative agreement June 1988, is one of 40 U.S. Geological Survey Cooperative Research Units located at major universities under the direction of Cooperative Research in Reston, Virginia. Operations of the New Mexico Unit are governed by a formal Cooperative Agreement among USGS, New Mexico State University, New Mexico Department of Game and Fish, Wildlife Management Institute, and the U.S. Fish and Wildlife Service. Federal Unit Scientists are expected to wear three hats: Research, Teaching, and Technical Assistance.

Evidence of Research Scholarship and Creative Activities

Peer-refereed Journal Articles

1. Alvarez, G., **C.A. Caldwell**, and C. Kruse. Effects of CFT Legumine (5% rotenone) on tadpole survival and metamorphosis of Chiricahua leopard frog (*Lithobates chiricahuensis*), northern leopard frog (*L. pipiens*), and American bullfrog (*L. catebeinanus*). Transactions of the American Fisheries Society 146:512-522.
2. Cain III, J.W., M.M. Avery, **C.A. Caldwell**, L.B. Abbot, and J.L. Holechek. In Press. Diet composition, quality, and overlap of sympatric American pronghorn and gemsbok. Wildlife Biology.
3. Galindo, R., W. D. Wilson, and **C.A. Caldwell**. 2016. Geographic distribution of genetic diversity in populations of Rio Grande chub *Gila pandora*. Conservation Genetics 17:1081-1091.
4. Todd, A. S., B. N. McGee, M. P. Zeigler, and **C.A. Caldwell**. 2016, Water and air temperature throughout the range of Rio Grande cutthroat trout in Colorado and New Mexico; 2010-2015: U.S. Geological Survey data release: ScienceBase: <http://dx.doi.org/10.5066/F73R0QZC>.
5. Whitney, J. E., R. Al-Chokhachy, D. B. Bunnell, **C.A. Caldwell**, S. J. Cooke, E. J. Eliason, M. Rogers, A. J. Lynch, and C. P. Paukert. 2016. Physiological basis of climate change impacts on North American inland fishes, Fisheries 41:332-345. DOI: 10.1080/03632415.2016.1186656
6. Chase, N., **C.A. Caldwell**, S.A. Carleton, W.R. Gould, and J.A. Hobbs. 2015. Movement patterns and dispersal potential of Pecos bluntnose shiner (*Notropis simus peconensis*) revealed using otolith microchemistry. Canadian Journal of Fisheries and Aquatic Sciences 72:1575-1583.
7. Ayre, K.K., **C.A. Caldwell**, J. Stinson, and W.G. Landis. 2014. Analysis of regional scale risk to whirling disease in populations of Colorado and Rio Grande cutthroat trout using a Bayesian network model. Journal of Risk Analysis 34:1589-1605.
8. **Caldwell, C.A.**, G.Z. Jacobi, M.S. Anderson, R.R. Parmenter, J. McGann, W.R. Gould, R. DuBey, and M.D. Jacobi. 2013. Prescription fire effects on an aquatic community of a southwest montane grassland system. North American Journal of Fisheries Management 33:1049-1062.
9. Young, K.E., L.B. Abbott, **C.A. Caldwell**, and T. S. Schrader. 2013. Estimating suitable environments for invasive plant species across large landscapes: A remote sensing strategy using Landsat 7 ETM+. International Journal of Biodiversity and Conservation 5:122-134.
10. Zeigler, M.P., S.F. Brinkman, **C.A. Caldwell**, A.S. Todd, M.S. Recsetar, and S.A. Bonar. 2013. Upper thermal tolerances of Rio Grande cutthroat trout under constant and fluctuating temperatures. Transactions of the American Fisheries Society 142:1395-1405.
11. Recsetar, M.S., M.P. Zeigler, D.L. Ward, S.A. Bonar, and **C.A. Caldwell**. 2012. Relationship between fish size and thermal tolerance. Transactions of the American Fisheries Society 141:1433-1438.
12. Zeigler, M.P., A. Todd, and **C.A. Caldwell**. 2012. Evidence of recent climate change within the historic range of Rio Grande cutthroat trout: Implications for management and future persistence. Transactions of the American Fisheries Society 141:1045-1059.
13. Sykes, C.L., **C.A. Caldwell**, and W.R. Gould. 2011. Physiological effects of potassium chloride, formalin, and handling stress on Bonytail. North American Journal of Fisheries Management 31:291-298.
14. **Caldwell, C.A.**, F.T. Barrows, M. Ulibarri, and W.R. Gould. 2010. Diet optimization of juvenile Rio Grande silvery minnow. North American Journal of Aquaculture 72:57-64.
15. Cho, S.J., **C.A. Caldwell** and W.R. Gould. 2009. Physiological stress responses of Rio Grande silvery minnow: Effects of individual and multiple physical stressors of handling, confinement, and transport. North American Journal of Fisheries Management 29:1698-1706.

16. Sanchez, B.C. and **C.A. Caldwell**. 2008. Assessment of exposure risk of polychlorinated biphenyls to interior least terns (*Sterna antillarum*). *Environmental Toxicology and Chemistry* 27:617-622.
17. DuBey, R.J., **C.A. Caldwell**, and W.R. Gould. 2007. Relative susceptibility and effects on performance of Rio Grande cutthroat trout and rainbow trout challenged with *Myxobolus cerebralis*. *Transactions of the American Fisheries Society* 136:1406-1414.
18. **Caldwell, C.A.**, P. Swartzendrubber, and E. Prestbo. 2006. Concentration and dry deposition of mercury species in arid south central New Mexico (2001-2002). *Environmental Science and Technology* 40:7535-7540.
19. DuBey, R., **C.A. Caldwell**, and W.R. Gould. 2005. Effects of temperature, photoperiod and *Myxobolus cerebralis* infection on growth, reproduction and survival of *Tubifex tubifex* lineages. *Journal of Aquatic Animal Health* 17:338-344.
20. Mitchell, S.E., **C.A. Caldwell**, G. Gonzales, W.R. Gould, and R. Arimoto. 2005. Effects of depleted uranium on survival, growth, and metamorphosis in the African clawed frog (*Xenopus laevis*). *Journal of Toxicology and Environmental Health, Part A* 68:951-965.
21. DuBey, R. and **C.A. Caldwell**. 2004. Distribution of *Tubifex tubifex* lineages and *Myxobolus cerebralis* infection in the tailwater of the San Juan River, New Mexico. *Journal of Aquatic Animal Health* 16:179-185.
22. **Caldwell, C.A.**, F.A. Fuller, W.R. Gould, P. Turner, and D. Hallford. 2004. Seasonal changes in 17- β estradiol of the Rio Grande chub (*Gila Pandora*) in south-central New Mexico. *Southwestern Naturalist* 49:311-315.
23. Kuhne, W.W., **C.A. Caldwell**, W.R. Gould, P.R. Fresquez, and S. Finger. 2002. Effects of depleted uranium on the health and survival of *Ceriodaphnia dubia* and *Hyalella azteca*. *Environmental Toxicology and Chemistry* 21:2198-2203.
24. Schmitt, C.J., **C.A. Caldwell**, B. Olsen, D. Serdar, and M. Coffey. 2002. Inhibition of erythrocyte δ -aminolevulinic acid dehydratase (ALAD) activity in fish from waters affected by lead smelters. *Environmental Monitoring and Assessment* 77:99-119.
25. Canavan, C.M., **C.A. Caldwell**, and N.S. Bloom. 2000. Discharge of methylmercury-enriched hypolimnetic water from a stratified reservoir. *Science of the Total Environment* 260:159-170.
26. **Caldwell, C.A.**, C.M. Canavan, and N.S. Bloom. 2000. Potential effects of forest fire and storm flow on total mercury and methylmercury in sediments of an arid-lands reservoir. *Science of the Total Environment* 260:125-133.
27. Sutton, R.J., **C.A. Caldwell**, and V.S. Blazer. 2000. Observations of health indices used to monitor a tailwater fishery. *North American Journal of Fisheries Management* 20:267-275.
28. **Caldwell, C.A.**, M.A. Arnold, and W.R. Gould. 1999. Mercury distribution in blood, tissues, and feathers, of double-crested cormorant nestlings from arid-lands reservoirs in south central New Mexico. *Archives of Environmental Contamination and Toxicology* 36:456-461.
29. Burden, V.M., M.B. Sandheinrich, and **C.A. Caldwell**. 1998. Effects of lead on the growth and δ -aminolevulinic acid dehydratase activity of juvenile rainbow trout, *Oncorhynchus mykiss*. *Environmental Pollution* 101:285-289.
30. **Caldwell, C.A.** 1997. Aromatic hydrocarbon pathology in fish following a large spill in the Nemadji River, Wisconsin, USA. *Bulletin of Environmental Contamination and Toxicology* 58:574-581.
31. **Caldwell, C.A.**, and J.M. Hinshaw. 1995. Tolerance of rainbow trout to dissolved oxygen supplementation and a *Yersinia ruckeri* challenge. *Journal of Aquatic Animal Health* 7:168-171.
32. **Caldwell, C.A.**, and J.M. Hinshaw. 1994. Nucleotides and the adenylate energy charge in rainbow trout (*Oncorhynchus mykiss*) subjected to a range of dissolved oxygen concentrations. *Comparative Biochemistry and Physiology B* 109:313-323.

33. **Caldwell, C.A.**, and J.M. Hinshaw. 1994. Physiological and hematological responses in rainbow trout subjected to supplemental dissolved oxygen in fish culture. *Aquaculture* 126:183-193.
34. **Caldwell, C.A.**, H.G. Kattesh, and R.J. Strange. 1990. Distribution of cortisol among its free and protein-bound fractions in rainbow trout: Evidence of control by sexual maturation. *Comparative Biochemistry and Physiology A* 99:593-595.
35. **Caldwell, C.A.**, J.M. Hinshaw, and H.G. Kattesh. 1990. Validation of a solid-phase enzyme immunoassay technique for the measure of plasma cortisol in rainbow trout. *Journal of Aquatic Animal Health* 2:228-230.
36. Carmichael, G.J., J.H. Williamson, **C.A. Caldwell**, and J.R. Tomasso. 1988. Responses of northern, Florida, and hybrid largemouth bass to low temperature and low dissolved oxygen. *The Progressive Fish Culturist* 50:225-231.
37. **Caldwell, C.**, and R.J. Strange. 1987. Physiological stress responses in wild and hatchery-reared rainbow trout. *Transactions of the American Fisheries Society* 116:574-579.
38. **Caldwell, C.A.**, and J.R. Tomasso. 1985. Stocking and handling-induced stress in red drum fingerlings. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies* 39:238-247.

List of research areas, titles and sources of grants and contracts:

2016-2019	Influence of stream temperature, intermittency, and nonnative fishes on the current and future distribution of fishes of conservation need in the Gila and Mimbres drainage basins	\$114,374
2016-2019	Natal Source and the Influence of Environmental Bottlenecks on Largemouth Bass Recruitment in Elephant Butte Reservoir	\$143,969
2015-2019	Impact of drought on southwestern cutthroat trout: Influences of changes in discharge and stream temperature on the persistence of Rio Grande cutthroat trout populations. National Climate Change and Wildlife Center (Co-PI)	\$278,878
2014-2018	Population demographics, hydrology and distribution of White Sands pupfish throughout two military installations. Department of Defense (As Co-PI, I wrote the scope of work for the contract)	\$355,600
2015-2020	Influence of fire and forest restoration on spatio-temporal distribution of fish communities and benthic aquatic macroinvertebrates in the Valles Caldera National Preserve, New Mexico (as PI, I was solely responsible for research development, writing, and obtaining the contract)	\$105,014
2014-2018	Development and validation of a molecular screening tool to identify presence of Asian fish tapeworm in imperiled southwestern native fish populations. U.S. Fish and Wildlife Service (as PI, I was solely responsible for research development, writing, and obtaining the contract)	\$150,000
2013-2016	Assessment of drought impacts on native trout in the southwestern U.S. USGS National Climate Change and Wildlife Center (Co-PI, I assisted with writing and obtaining the contract)	\$18,000
2013	Effects of piscicide Rotenone on native amphibians. New Mexico Department of Game and Fish - Share with Wildlife (as Co-PI, I shared research development, writing and obtaining the competitive grant with my graduate student and research associate)	\$10,852
2014-2015	Evaluation of intermittency of stream flow in headwater streams for Rio Grande Cutthroat trout. U.S Fish and Wildlife Service, Science Support Program (as Co-PI, I shared research development, writing and obtaining	\$5,000

	the competitive grant with my research associate and USGS colleague).	
2013-2015	Habitat and biotic surveys of McKittrick Drainage, Guadalupe Mountains National Park. National Trout Unlimited, Texas Parks and Wildlife Department (as Co-PI, I shared research development, writing and obtaining the contract with my research associate).	\$25,000
2012-2015	Seasonal ecology of Pecos pupfish throughout a remnant wetland. U.S. Fish and Wildlife Service, Science Support Program (as Co-PI, I assisted with research development, writing and obtaining the competitive grant).	\$87,000
2012-2015	Evaluation of baseflow as climate stressors in Rio Grande cutthroat trout U.S Fish and Wildlife Service, Science Support Program (as Co-PI, I shared research development, writing and obtaining the competitive grant with my research associate and USGS colleague).	\$63,433
2011-2013	Restoration of Rio Grande cutthroat trout to the Mescalero Apache tribal lands. Bureau of Indian Affairs, U.S. Fish and Wildlife Service, Western Native Trout Initiative (as PI, I was solely responsible for research development, writing, and obtaining the competitive grant).	\$105,856
2011-2013	Determining limiting factors of Pecos Bluntnose Shiner in the Farmlands Reach of the Pecos River, New Mexico. U.S. Fish and Wildlife Service, Science Support Program (as PI, I was solely responsible for research development, writing, and obtaining the competitive grant).	\$83,500
2009-2012	Population genetic assessment of Rio Grande chub. USDA Forest Service. (As PI, I was solely responsible for research development, writing, and obtaining the competitive grant).	\$47,928
2009-2011	Productivity of Pronghorn on White Sands Missile Range, New Mexico. USGS Cooperative Research Units (I obtained funding through a contract from USGS to support a graduate student left behind by the departure of a Unit scientist).	\$ 42,000
2010-2011	Influence of invasive species on White Sands pupfish and burrowing owls on Holloman Air Force Base. U.S. Department of Defense (as Co-PI, I shared equally with research development, writing and obtaining the contract).	\$100,000
2008-2011	Determining condition and productivity of desert bighorn sheep on Kofa NWR. U.S. Fish and Wildlife Service, Science Support Program, Kofa National Wildlife Refuge (The research initiative began with a Unit scientist. After his departed from the Unit, I took over the project to complete the graduate student and contractual obligations).	\$176,610
2008-2011	Effects of thermal tolerance limits on the distribution and restoration of southwestern native salmonids. U.S. Fish and Wildlife Service, Science Support Program (I was Co-PI on the competitive grant, however, the research began under my initiative).	\$ 78,725
2008-2009	Climate change within the Comanche and upper Pecos River Watersheds, current range of Rio Grande Cutthroat Trout. U.S. Fish and Wildlife Service, Region II, Climate Change Initiative (I was Co-PI on the competitive grant with my graduate student, however, the research began under my initiative).	\$ 5,000
2006-2008	Southwest regional risk assessment for whirling disease in native salmonids in arid and semi-arid lands. Whirling Disease Foundation, Coldwater Initiative (as Co-PI, I shared research development with my post-doctoral research associate, however, the research began under my initiative).	\$196,310
2005-2006	Post-wildfire effects of Gila trout populations and their habitat. T&E, Inc., Trout Unlimited, U.S. Fish and Wildlife Foundation (as Co-PI, I assisted the graduate student with writing the competitive grants).	\$17,135
2005-2009	Grazing effects on the Valles Caldera National Preserve. Valles Caldera	\$195,820

	National Trust, USDA Rocky Mountain Research Station, T&E, Inc. (as PI, I was solely responsible for writing and obtaining the contract).	
2001-2003	Ecological differentiation and survivability of <i>Tubifex tubifex</i> infested with <i>Myxobolus cerebralis</i> in the San Juan River, New Mexico Tailwater Blue Ribbon Trout Fishery. Whirling Disease Foundation, Montana State University (as Co-PI, I shared in research development, writing and obtaining the competitive grants with my post-doctoral research associate).	\$50,000
2002-2003	Distribution of Rio Grande Cutthroat trout and native fishes in two National Forests. USDA Regional Forester, T&E, Inc. (as Co-PI, I shared research development with two doctoral students; the research began under my initiative).	\$1,500
2000-2002	Air deposition of mercury and other airborne pollutants in the arid southwest. Southwest Center for Environmental Research and Policy, U.S. Environmental Protection Agency (as Co-PI, I developed research methodology with co-investigators, however, I was solely responsible for writing and obtaining the competitive grant; research began under my initiative).	\$74,998
1999-2002	The effects of depleted uranium on amphibian health. Department of Energy, Los Alamos National Laboratory (as PI, I was solely responsible for research development, writing, and obtaining the competitive grant).	\$81,000
1997-2000	Water quality survey and analysis of surface discharges at the Los Alamos National Laboratory. U.S.G.S./Biological Resources Division, Environmental and Contaminant Research Center, Columbia, MO (as PI, I was solely responsible for research development, writing, and obtaining the competitive grant).	\$145,000
1997-2005	Source, transport, and fate of mercury in south-central New Mexico. U.S. Bureau of Reclamation, Upper Colorado Region, Salt Lake City, UT (as PI, I was solely responsible for research development, writing and obtaining the contract).	\$101,000
1996-1997	Spatial distribution of total and methylmercury concentrations in Elephant Butte and Caballo reservoirs, Sierra County, New Mexico. USGS/Water Resources Division, New Mexico Water Resources Research Institute (as PI, I was solely responsible for research development, writing, and obtaining the competitive grant).	\$24,650
1995-1998	Effects of environmental contamination on the aquatic community of the San Juan River. U.S. National Biological Survey, Midwest Science Center (National Fisheries Contaminant Research Ctr.), Columbia, MO (as PI, I was solely responsible for research development, writing, and obtaining the contract).	\$40,000
1995-1997	Accumulation and food chain transfer of mercury in fish and bald eagles from Caballo Reservoir. U.S. Bureau of Reclamation, Upper Colorado Region, Salt Lake City, UT (as PI, I was solely responsible for research development, writing, and obtaining the competitive grant).	\$32,841
1995-1996	Environmental factors influencing mercury concentrations in water and sediments in Caballo Reservoir, Sierra County, New Mexico. USGS/Water Resources Division, New Mexico Water Resources Research Institute (as Co-PI, I worked equally with the graduate student in development, writing, and obtaining the competitive grants).	\$24,980
1993-1994	Assessment of reproductive fitness of walleye in Saginaw Bay, Lake Huron. U.S. Fish and Wildlife Service, Region 3, Division of Environmental Contaminants, East Lansing Field Office (as Co-PI, I worked equally with a research associate in development, writing, and obtaining the competitive grant).	\$32,500

1990-1993 Integration of biochemical indicators with physiological stress indices: \$43,211
Applications in trout aquaculture Cooperative State Research Service. U.S.
Department of Agriculture (as Co-PI, I worked equally with a research
associate in development, writing, and obtaining the competitive grant).

Outreach and Information Transfer

My research on the Valles Caldera National Preserve was highlighted in a documentary about the Science of the Valles Caldera National Preserve in 2012. The documentary aired across the U.S. on all Public Broadcasting Stations. <http://vcnpearthsystems.nmepscor.net/fire-ecology>;

See the introductory video of this award winning production online at:

<https://www.youtube.com/watch?v=0omUfbcGwec>.

Caldwell, C.A. 2008. Climate change and fisheries: Winners and losers. *Fisheries* 33(12) 618.

Published Reports (Peer-reviewed)

Zeigler, M.P. and **C.A. Caldwell**. 2017. Feasibility study: Establishing native fish fauna to McKittrick Creek, Guadalupe Mountains National Park, Texas. National Park Service Natural Resource Technical Report Series. 53 pp.

Caldwell, C.A., G. Alvarez, K.G. Boykin. 2014. Toxicity effects of piscicide CFT Legumine (5% rotenone) on *Lithobates* sp. of New Mexico. New Mexico Department of Game and Fish – Share with Wildlife (#13-516-0000-00043). 19 pp.

Zeigler, M.P., A.S. Todd, and **C.A. Caldwell**. 2013. Water temperature and baseflow discharge of Rio Grande cutthroat trout streams in Colorado and New Mexico- 2010 and 2011. U.S. Geological Survey Open-File Report 2013-1051, 18 pp. +appendices. <http://pubs.usgs.gov/of/2013/1051/>

Caldwell, C.A., T. Bigford, D. Fluharty, R.E. Gresswell, K. Hyatt, D. Inkley, D. MacDonald, M. Mullan, A. Todd, C. Deacon Williams, A. Rosenberger, and R. Valley. 2010. Background paper and American Fisheries Society Policy Statement on Climate Change and Fisheries. 43 pp. http://fisheries.org/docs/policy_statements/policy_33f.pdf

Caldwell, C.A. and K.A. Phillips. 1998. Hematological effects in rainbow trout subjected to a chronic sublethal concentration of lead. Pages 61-62 *In* Proceedings of the 3rd International Congress on the Biology of Fish: Fish Response to Toxic Environments. Baltimore, Maryland.

Caldwell, C.A. and C. M. Canavan. 1998. Spatial and temporal distribution of mercury in Caballo and Elephant Butte reservoirs, Sierra County, New Mexico. Technical Completion Report No. 306. New Mexico Water Resources Research Institute. Project No. 01345672. 48 pp.

Caldwell, C.A., C.M. Canavan, and N.S. Bloom. 1998. Effects of fire on the spatial and temporal distribution of mercury in sediments of an arid-lands reservoir in south central New Mexico. Pages 78-83 *In* Proceedings of the 43rd Annual New Mexico Water Conference. Water Challenges on the Lower Rio Grande. New Mexico Water Resources Research Institute, WRI Report No. 310, Las Cruces, New Mexico.

Technical Reports

- Alvarez, G., and **C.A. Caldwell**. 2012. Rotenone: Natural history, chemistry, environmental fate, and toxicity effects in target and non-target organisms. Report and annotated bibliography submitted to New Mexico Department of Game and Fish as a technical assistance request. 55 pp.
- Caldwell, C.A.** 2012. Production of Pacific white shrimp (*Litopenaeus vannamei*) from glandless cottonseed meal. Report submitted to Agricultural Experiment Station, College of Agriculture, Consumer, and Environmental Sciences. 10 pp.
- Guy, R.K., K.G. Boykin, **C. A. Caldwell**, K.E. Young, and A.E. Ernst. 2012. Natural resource geographic changes HAFB Review: Influences of invasive plants and shifting dunes on White Sands pupfish and burrowing owl on Holloman Air Force Base, South central New Mexico. Technical Assistance Report. New Mexico Cooperative Fish and Wildlife Research Unit. Las Cruces, New Mexico. 89 pp.
- Caldwell, C.A.**, S.J. Cho, and J. Remshardt. 2009. Effects of propagation, augmentation, and salvage activities on recovery and survival of Rio Grande silvery minnow (*Hybognathus amarus*). Research Completion Report. New Mexico Cooperative Fish and Wildlife Research Unit. 78 pp + appendices.
- Caldwell, C.A.**, and W. Landis. 2009. An ecological risk assessment for the infection of whirling disease in populations of cutthroat trout in the Southwestern United States. Research Completion Report. 63 pp + appendices.
- Anderson, M.C., **C. A. Caldwell**, and R. DuBey. 2009. Grazing effects of livestock and elk on stream morphology, aquatic macroinvertebrates, water quality, and fish populations Valles Caldera National Preserve, New Mexico. Research Completion Report. New Mexico Cooperative Fish and Wildlife Research Unit, Las Cruces, New Mexico. 189 pp + appendices.
- Young, K.E., **C. A. Caldwell**, and L.B. Abbott. 2009. Early detection of invasive plant species on Holloman Air Force Base, New Mexico. New Mexico Cooperative Fish and Wildlife Research Unit. Las Cruces, New Mexico. 89 pp.
- Young, K.E., K.G. Boykin, **C.A. Caldwell**, J. Seeger, M. Coolidge, T. Ellis, C. Aiello, E. Williams, and A. LeClerc. 2008. California spotted owl and northern goshawk surveys on the Stanislaus National Forest. New Mexico Cooperative Fish and Wildlife Research Unit, New Mexico State University, Las Cruces, New Mexico. 46 pp.
- DuBey, R., and **C.A. Caldwell**. 2006. Relative susceptibility of Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*) to experimentally induced infection with *Myxobolus cerebralis*. Research Completion Report. New Mexico Cooperative Fish and Wildlife Research Unit, Las Cruces, New Mexico. 21 pp.
- Caldwell, C.A.**, M. Ulibarri, R.T. Barrows, G.A. Kindschi. June 2005. Effects of diet on growth, survival, and performance of Rio Grande silvery minnow: Larvae through juvenile and subadult stages. U.S. Fish and Wildlife Service Leaflet. Bozeman National Fish Technology Center. 55 pp.

- Caldwell, C.A.** 2003. Hybridization potential and spawning behavior of Rio Grande silvery minnow (*Hybognathus amarus*) and plains minnow (*Hybognathus placitus*). U.S. Fish and Wildlife Service Ecological Services Office, Albuquerque, New Mexico. Final Report.
- Caldwell, C.A.**, R.A. Arimoto, P. Swartzendruber, and E.M. Prestbo. 2003. Air deposition of mercury and other airborne pollutants in the arid southwest. Southwest Center for Environmental Research and Policy. Final Report. Project Number A-00-1.
- Dubey, R., R. Calamuso, and **C. A. Caldwell**. 2003. Distribution and status of Rio Grande cutthroat trout and native species in the Carson and Santa Fe National Forests. USDA Forest Service Rocky Mountain Research Station - Technical Completion Report, Project 00-JV-11221606-163. New Mexico Cooperative Research Unit, New Mexico State University, Las Cruces, New Mexico.
- Sykes, C. and **C.A. Caldwell**. 2001. San Juan River trout fishery monitoring plan: Fish health assessment. Final report to the U.S. Bureau of Reclamation, Upper Colorado Region, Western Colorado Area Office. Cooperative Agreement No 4-FC-40-15970.
- DuBey, R. and **C. A. Caldwell**. 2002. Ecological differentiation and survivability of *Tubifex tubifex* infested with *Myxobolus cerebralis* in the San Juan River, New Mexico Tailwater Blue-ribbon Trout Fishery. Whirling Disease Initiative Final Technical Report, 2001-2002. New Mexico Cooperative Research Unit, New Mexico State University, Las Cruces, New Mexico.
- Caldwell, C.A.** 2000. Atmospheric deposition of mercury in south central New Mexico, USA. U.S. Bureau of Reclamation, El Paso, Texas. Final Report.
- Deitner, R., and **C.A. Caldwell**. 2000. Summary of the WATERQUALITY database. Submitted to the U.S. Fish and Wildlife Service, Ecological Services Division, Albuquerque, New Mexico. Final report and database (ACCESS). Final Report.
- Caldwell, C.A.** 1998. Summary Report: San Juan River winter flow test, 4 November 1996 – 2 March 2007. Navajo Unit, Colorado and New Mexico Colorado River Storage Project. Upper Colorado Region. Chapter 4: Trout Fisheries. Final Report.
- Caldwell, C.A.**, and M.A. Arnold. 1996. Bioaccumulation and distribution of mercury in the double-crested cormorant (*Phalacrocorax auritus*) from Elephant Butte, and Caballo Reservoirs, New Mexico. U.S. Bureau of Reclamation, El Paso. Final Report.
- Caldwell, C.A.** 1995. Assessment of reproductive fitness of walleye in Saginaw Bay, Lake Huron. U.S. Fish and Wildlife Service, Office of Natural Resource Damage Assessment, East Lansing, Michigan. Final Report.
- Caldwell, C.A.** 1995. Bioavailability of trace metals to green sunfish (*Lepomis cyanellus*) exposed to suspended sediments from sites on the upper Mississippi River. U.S. Fish and Wildlife Service, Rock Island Ecological Services Office, Rock Island, Illinois. Final Report.
- Caldwell, C.A.** 1994. Hepatotoxicity in fish after a chemical Spill. U.S. Fish and Wildlife Service, Research Information Bulletin:81.

Caldwell, C.A. 1993. Damage assessment of injury to natural resources in Fish Creek, Indiana. U.S. Fish and Wildlife Service, Ecological Services Office, Bloomington, Indiana. Final Report.

Caldwell, C.A. 1993. Hematopathological and histopathological responses in fish from the Nemadji River following the June 30, 1982 chemical spill. U.S. Fish and Wildlife Service Ecological Field Office, Green Bay, Wisconsin. Final Report.

Book Reviews

Caldwell, C.A. 2004. Effects of pollution on fish: Molecular effects and population responses. *Journal of Environmental Quality* 33:1584-1585.

Dissertation

Caldwell, C.A. Ph.D., Ecology, 1988. Physiological stress responses including free and protein-bound cortisol in two strains of rainbow trout. University of Tennessee – Knoxville (Advisor: R.J. Strange; other advisory committee members: J.L. Wilson, H.G. Kattesh, T. Chen, N. Greenberg).

Papers and/or Posters Presented Before Professional Societies (*student presenter)

- *Baca, A., D. Peterson, and C.A. Caldwell. 2017. Reproductive Strategies of White Sands Pupfish (*Cyprinodon tularosa*) Inhabiting Stable and Stochastic Habitats. Western Division American Fisheries Society Annual Meeting, Missoula, Montana. May 18-23, 2017. Received Best Fisheries Student Poster Award. (Contributed Poster)
- Huntsman, B.M., C.A. Caldwell, A. J. Lynch, B. J. E. Myers, and Q. Dean. 2017. Foraging ecology and production of Rio Grande cutthroat trout in the face of mounting ecological pressures. Western Division American Fisheries Society Annual Meeting, Missoula, Montana. May 18-23, 2017
- *Dean, Q., B.M. Huntsman, C.A. Caldwell, A. J. Lynch, and B. J. E. Myers. 2017. Effects of nonnative brown trout, *Salmo trutta*, on the foraging ecology of Rio Grande cutthroat trout, *Onchorhynchus clarkii virginialis*. Western Division American Fisheries Society Annual Meeting. Missoula, Montana. May 18-23, 2017
- *Falco, H., C.A. Caldwell, W. Knight, and M. Ulibarri. 2017. Reproductive potential of Rio Grande silvery minnow (*Hybognathus amarus*). 50th Joint Annual Meeting of the AZ/NM Chapter of the American Fisheries Society and the NM and AZ Chapters of the Wildlife Society. Farmington, New Mexico.
- *Baca, A., D. Peterson, and C.A. Caldwell. 2017. Reproductive Strategies of White Sands Pupfish (*Cyprinodon tularosa*) Inhabiting Stable and Stochastic Habitats. 50th Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society and the Arizona and New Mexico Chapters of the Wildlife Society, Farmington, New Mexico. February 2-4. 2017.
- *Peterson, D. and C.A. Caldwell. 2017. Why Catch-Per-Unit-Effort is Insufficient as an Index of Abundance for the White Sands Pupfish (*Cyprinodon tularosa*). 50th Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society and the Arizona and New Mexico Chapters of the Wildlife Society, Farmington, New Mexico. February 2-4. 2017. Received Best Fisheries Student Paper Award. (Contributed Oral)
- *Baca, A., D. Peterson, and C.A. Caldwell. 2016. Reproductive Strategies of White Sands Pupfish (*Cyprinodon tularosa*) Inhabiting Stable and Stochastic Habitats. Desert Fishes Council, Albuquerque, New Mexico. November 15-19. Received Best Fisheries Student Poster Award. (Contributed Poster)

- *Campbell, M.C., **C.A. Caldwell**, W. Wilson, and T.D. Lewis. 2016. Asian Tapeworm in an Endangered Southwestern Fish: Assessing Infections Using a Non-lethal Molecular Screening Tool. Desert Fishes Council, Albuquerque, New Mexico. 15-19 November.
- *Peterson, D. and **C.A. Caldwell**. 2016. Why Catch-Per-Unit-Effort is Insufficient as an Index of Abundance for the White Sands Pupfish (*Cyprinodon tularosa*). Desert Fishes Council. Albuquerque, New Mexico, 15-19 November.
- *Wallin, T. and **C.A. Caldwell**. 2016. Gila National Forest Stream Temperature and Intermittency Monitoring Network to Assess Effects of a Changing Climate for Native Fishes of Special Interest. Desert Fishes Council, Albuquerque, New Mexico. 15-19 November.
- *Alvarez, G. and **C.A. Caldwell**. 2016. CFT Legumine™ (5% rotenone) Effects on Tadpole Survival and Metamorphosis of Chiricahua Leopard Frog (*Lithobates chiricahuensis*), Northern Leopard Frog (*L. pipiens*), and American Bullfrog (*L. catesbeianus*). 49th Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society. Flagstaff, Arizona. Received Best Fisheries Student Paper Award. (Contributed Oral)
- *Peterson, D.M., T. Trantham, R. Simpson, and **C.A. Caldwell**. 2016. Effects of Tagging with Passive Integrated Transponders versus Visual Elastomer Implants on the Small-bodied White Sands Pupfish (*Cyprinodon tularosa*). 49th Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society. Flagstaff, Arizona. (Contributed Oral)
- *Campbell, M.C., T.D. Lewis, and **C.A. Caldwell**. 2015. Detection of Asian Tapeworm *Bothriocephalus acheilognathi* Utilizing a Non-lethal Molecular Screening Tool. 49th Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society. Flagstaff, Arizona. (Contributed Oral)
- *Falco, H., **C.A. Caldwell**, D. Lujan, L. McCord, W. Knight, and M. Ulibarri. 2016. Reproductive Potential of Wild Rio Grande Silvery Minnow (*Hybognathus amarus*). 49th Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society, Flagstaff, Arizona. (Contributed Oral)
- *Peterson, D., T. Trantham, R. Simpson, and **C.A. Caldwell**. 2015. Effects of passive integrated transponder and visual elastomeric tagging on survival and growth of a small-bodied southwestern pupfish (*Cyprinodon tularosa*). 47th Annual Meeting of the Desert Fishes Council. Death Valley National Park, California. 18-22 November. (Contributed Oral)
- *Alvarez, G. and **C.A. Caldwell**. 2015. Acute and Sublethal Toxicity Effects of Piscicide CFT Legumine™ (5% Rotenone) on Tadpoles of the Chiricahua leopard frog (*Lithobates chiricahuensis*). 48th Joint Annual Meeting of the Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Las Cruces, New Mexico. 5-7 February.
- *Campbell, M., T.D. Lewis, and **C.A. Caldwell**. 2015. Detection of fish Asian tapeworm *Bothriocephalus acheilognathi* utilizing a non-lethal molecular screening tool. 48th Joint Annual Meeting of the Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Las Cruces, New Mexico. 5-7 February. (Awarded best student poster)
- *Falco, H., D. Lujan, **C.A. Caldwell**, W. Knight, and M. Ulibarri. 2015. Reproductive Potential of Wild Rio Grande Silvery Minnow (*Hybognathus amarus*). 48th Joint Annual Meeting of the Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Las Cruces, New Mexico. 5-7 February.
- *Lujan, D., **C.A. Caldwell**, and M. P. Zeigler. 2015. Carbon availability within a montaine grassland stream subjected to prescribed burn and a severe wildfire. 48th Joint Annual Meeting of the Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Las Cruces, New Mexico. 5-7 February.

- *Alvarez, G., **C.A. Caldwell**, and K. Boykin. 2014. Toxicity effects of piscicide rotenone (CFT Legumine 5%) in larval northern leopard frog (*Lithobates pipiens*) and Chiricahua leopard frog (*Lithobates chiricahuensis*). 47th Joint Annual Meeting Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Pinetop, Arizona. 6-9 February.
- *Chase, N., **C.A. Caldwell**, S. Carleton, and W.R. Gould. 2014. Using otolith microchemistry to track movements of prairie stream fishes in the Pecos River, New Mexico. 47th Joint Annual Meeting Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Pinetop, Arizona. 6-9 February. (*NOTE: Chase won Best Student Paper*)
- Kalb, B. and **C.A. Caldwell**. 2014. Evidence of seasonal behavioral thermoregulation of resident rainbow trout in a small headwater stream. 47th Joint Annual Meeting Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Pinetop, Arizona. 6-9 February. (Presenter)
- Caldwell, C.A.**, M.P. Zeigler, and A. Todd. 2013. Utility of stream temperature and hydrology: Implications of climate-related vulnerabilities and persistence of Rio Grande cutthroat trout. New Mexico Academy of Sciences/New Mexico EPSCoR Annual Meeting, Albuquerque, New Mexico. 9 November. (Presenter)
- *Kalb, B., and **C.A. Caldwell**. 2013. Restoration of Rio Grande cutthroat trout to the Mescalero Apache Reservation. Report presented to the members of the Natural Resources Committee Tribal Council, Mescalero Apache Reservation, Mescalero, New Mexico. 31 May 2013.
- Jacobi, G.Z. and **C.A. Caldwell**. 2013. Community dynamics of aquatic macroinvertebrates on the Valles Caldera National Preserve. All-Hands Meeting, Southwest Jemez Mountains Collaborative Forest Landscape Restoration Project (CFLRP). Santa Fe, New Mexico. 12 April 2013. (Invited Presentation)
- *Zeigler, M.P., A.S. Todd, and **C.A. Caldwell**. 2013. Threat of climate change to the persistence of Rio Grande cutthroat trout. Rio Grande Cutthroat Trout Range-wide Meeting. Alamosa, Colorado. 7 January 2013. (Invited Presentation)
- *Zeigler, M.P., **C.A. Caldwell**, and R.R. Parmenter. 2013. Effects of the 2011 Las Conchas wildfire on fish populations and habitat in meadow streams of the Valles Caldera National Preserve, New Mexico. 46th Joint Annual Meeting Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Albuquerque, New Mexico. 7-9 February 2013. (Invited Presentation)
- *Zeigler, M.P., **C.A. Caldwell**, and A.S. Todd. 2013. Utility of stream temperature and hydrology measurements in evaluating climate related vulnerabilities of Rio Grande cutthroat trout populations, with applicability to other native southwestern salmonids. 46th Joint Annual Meeting Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Albuquerque, New Mexico. 7-9 February 2013.
- *Zeigler, M.P., **C.A. Caldwell**, and A.S. Todd. 2013. Utility of stream temperature and hydrology measurements in evaluating climate related vulnerabilities of Rio Grande cutthroat trout populations. 4th Annual Native Trout Conference. Phoenix, Arizona. 18 April 2013.
- *Avery, M.M., and **C.A. Caldwell**. 2012. Seasonal effects of forage quality and dietary composition on pronghorn in a desert environment. 2012 Western States and Provinces 25th Biennial Pronghorn Workshop. Santa Ana Pueblo, New Mexico. 10-13 December 2012.
- Guy, R., **C. Caldwell**, J. Wick, M. Mata, **K. Boykin**, A. Ernst, and T. Rogers. 2012. Status and trends of White Sands pupfish (*Cyprinodon tularosa*) throughout its range on two DoD installations. 45th Joint Annual Meeting of the Arizona and New Mexico Chapters of the Wildlife Society and the Arizona/New Mexico Chapter of AFS. Phoenix, Arizona. 4 February 2012.

- Parmenter, R.R., R.W. Oertel, T.S. Compton, S. Kindschuh, M. Peyton, W. Meyer, **C.A. Caldwell**, J. Jacobi, O. Myers, and M. Zeigler. 2012. Fire and floods in the Valles Caldera National Preserve, New Mexico: The 2011 Las Conchas Fire impacts on montane species diversity and food webs. Ecological Society of America, Portland, Oregon. August 2012.
- *Zeigler, M.P., A.S. Todd, and **C.A. Caldwell**. 2012. The potential influence of changing climate on the persistence of the Rio Grande cutthroat trout. Rio Grande Cutthroat Trout Conservation Team Meeting. Taos, New Mexico. 11 January 2012. (Invited Presentation)
- *Zeigler, M.P., **C.A. Caldwell**, and A.S. Todd. 2012. Stream temperatures and discharge within currently occupied Rio Grande cutthroat trout streams: Identifying streams at risk from climate change. 45th Joint Annual Meeting Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Phoenix, Arizona. 4 February 2012. (Poster)
- Caldwell, C.A.** 2011. Effects of climate change in aquatic systems throughout arid-lands systems. 1st Annual Conference of the New Mexico Chapter of the Wildlife Society. Albuquerque, New Mexico, 18 October 2011. (Invited Plenary Speaker)
- *Avery, M.M., and **C.A. Caldwell**. 2010. Factors influencing pronghorn in the Chihuahuan Desert of White Sands Missile Range, South-central New Mexico. 2010 Western States and Provinces 24th Biennial Pronghorn Workshop, Laramie, Wyoming. 18-21 May.
- Avery, M.M., **C.A. Caldwell**, and L. Abbott. 2011. Nutritional factors influencing pronghorn in the Chihuahuan Desert of White Sands Missile Range, South-central New Mexico. 44th Joint Annual Meeting of the Arizona and New Mexico Chapters of the Wildlife Society and the Arizona/New Mexico Chapter of the American Fisheries Society. Pinetop, Arizona. 3 February. (Presenter)
- Caldwell, C.A.**, M. Zeigler, and A. Todd. 2011. Potential influences of climate change on persistence of Rio Grande cutthroat trout. Forest Service Climate Change Adaptation Conference and Workshop, Abiquiu, New Mexico. 24 January (Invited Speaker)
- Caldwell, C.A.**, F.T. Barrows, M. Ulibarri, and W.R. Gould. 2011. Rio Grande silvery minnow propagation initiative: Diet development. Symposium Hatchery Nutrition: Feeding Fish for Tomorrow's Changing World. 141st Annual Meeting of the American Fisheries Society, Seattle, Washington. 3-6 September (Invited Speaker)
- Caldwell, C.A.** 2011. Climate change and fisheries habitat conservation: Observations and recommendations from the American Fisheries Society. Symposium National Fish Habitat Action Plan, 141st Annual Meeting of the American Fisheries Society, Seattle, Washington. 3-6 September. (Invited Speaker)
- *Zeigler, M., **C.A. Caldwell**, and A. Todd. 2011. Evidence of recent climate change within the historical range of Rio Grande cutthroat trout. 44th Joint Annual Meeting of the Arizona and New Mexico Chapters of The Wildlife Society and the Arizona/New Mexico Chapter of the American Fisheries Society, Pinetop, Arizona. 3-5 February.
- Caldwell, C.A.**, S. Cho, and J.W. Remshardt. 2010. Influence of capture, handling, and transport activities on recovery and survival of Rio Grande silvery minnow subjected to river intermittency. Joint Annual Meeting of the American Society of Limnology and Oceanography and the North American Benthological Society. Santa Fe, New Mexico. 7-11 June.
- *Recsetar, M., M. Zeigler, D. Ward, S. A. Bonar, and **C.A. Caldwell**. 2010. Testing the thermal tolerance of various life stages of fish using the critical thermal method. Arizona-New Mexico Chapter American Fisheries Society, 43rd Joint Annual Meeting. Flagstaff, Arizona. 4-6 February.
- *Zeigler, M., and **C.A. Caldwell**. 2010. Assessing the effects of climate change within the historical range of Rio Grande cutthroat trout: Current progress. Southwest Native American Fish and Wildlife Society Conference. Scottsdale, Arizona. 28 July.
- Caldwell, C.A.**, and W. Landis. 2009. Southwest regional risk assessment for whirling disease in native salmonids. 15th Annual Whirling Disease Symposium. Denver, Colorado. 4-5 February. (Invited Speaker)

- Caldwell, C.A.**, S.J. Cho, and W.R. Gould. 2009. Physiological effects of confinement and transport-induced stress in Rio Grande silvery minnow: Insight into practical management tools. Western Division Annual Meeting. Albuquerque, New Mexico. 3-7 May. (Invited Speaker)
- *Recsetar, M., M. Zeigler, S.A. Bonar, D. Ward and **C. A. Caldwell**. 2009. Testing the thermal tolerance of various life stages of fish using the critical thermal method. 41st Annual Meeting of the Desert Fishes Council. Cuatro Ciengas, Mexico. 19-22 November.
- *Recsetar, M., M. Zeigler, D. Ward, S. Bonar, and **C. A. Caldwell**. 2009. Testing the thermal tolerance of various life stages of fish using the critical thermal method. Annual Meeting of the Western Division of the American Fisheries Society. Albuquerque, New Mexico. 3-7 May.
- *Zeigler, M., A. Todd, and **C.A. Caldwell**. 2009. Recent climate change within the Pecos River and Costilla Creek Basins. New Mexico Rio Grande Cutthroat Trout Working Group. Santa Fe, New Mexico. 27 October. (Invited Presentation)
- *Zeigler, M., and **C.A. Caldwell**. 2009. Recent climate change within the Pecos and Costilla Creek basins. Rio Grande Cutthroat Trout Work Group Meeting. Santa Fe, New Mexico. 12 November.
- *Zeigler, M., and **C.A. Caldwell**. 2009. Assessment of the vulnerability of high-value Rio Grande cutthroat trout populations to climate variables. Rio Grande Cutthroat Trout Range-wide Meeting. Taos, New Mexico. 8 December. (Invited Presentation)
- *Coleman, S.M., **C.A. Caldwell**, and J.E. Brooks. 2006. Wildfire effects on a Gila trout (*Oncorhynchus gilae*) stream. 21st Annual Conference of the Southwest Region of the Native American Fish and Wildlife Society. Mescalero, New Mexico. 8 August. (Invited Presentation)
- *Coleman, S.M, **C.A. Caldwell**, and J.E. Brooks. 2006. Wildfire effects on Gila trout (*Oncorhynchus gilae*) streams. 39th Annual Meeting of the AZ/ NM Chapter of the American Fisheries Society. Flagstaff, Arizona. 4-6 February. *Won Best Student Poster*
- DuBey, R., **C.A. Caldwell**, and W.R. Gould. 2006. Relative susceptibility of Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*) to experimentally induced infection with *Myxobolus Cerebralis*. Whirling Disease Symposium 12th Annual Meeting. Denver, Colorado. 8-9 February. (Invited Presentation)
- DuBey, R., and **C.A. Caldwell**. 2006. Dynamics of whirling disease within a hypolimnion release tailwater of an arid lands reservoir. American Fisheries Society 136th Annual Meeting. Lake Placid, New York. 8-9 September.
- DuBey, R., and **C.A. Caldwell**. 2006. Southwest regional risk assessment for whirling disease in native salmonids in arid and semi-arid lands. Whirling Disease Initiative Annual Board Meeting. Lake Placid, New York. 12 September (Invited Presentation)
- DuBey, R., **C.A. Caldwell**, and W.R. Gould. 2006. Susceptibility of Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*) and rainbow trout (*O. mykiss*) to experimentally induced infection with *Myxobolus Cerebralis*. 39th Annual Meeting of the AZ/ NM Chapter of the American Fisheries Society. Flagstaff, Arizona. 4-5 February.
- *Wescott, B., R. DuBey, and **C.A. Caldwell**. 2006. Dynamics of grazing impacts on native fish assemblages in the Valles Caldera National Preserve. 39th Annual Meeting of the AZ/ NM Chapter of the American Fisheries Society. Flagstaff, Arizona. February
- Young, K.E., B. Graves, K.G. Boykin, and **C. Caldwell**. 2006. Comprehensive Wildlife Conservation Strategy for New Mexico. 39th Annual Meeting of the AZ/ NM Chapter of the American Fisheries Society. Flagstaff, Arizona. 4-5 February.
- Young, K.E., S.T. Schrader, G. Roemer, K.G. Boykin, and **C. Caldwell**. 2006. Predicting risk of occurrence: Remote sensing strategies for invasive plant species in Big Bend National Park. Natural Areas Conference. Flagstaff, Arizona. 15 August.
- Caldwell, C.A.** 2005. Captive propagation efforts of the endangered Rio Grande silvery minnow: Is recovery of the species achievable? New Mexico Branch of the American Association for Laboratory Animal Sciences. Las Cruces, New Mexico. 5 August 2005.

- *Coleman, S.M, **C.A. Caldwell**, and J.E. Brooks. 2005. Wildfire effects on Gila trout (*Oncorhynchus gilae*) streams. 37th Annual Meeting of the Desert Fishes Council. Cuatro Ciénegas, Mexico. November.
- DuBey, R., **C.A. Caldwell**, and W.R. Gould. 2005. Susceptibility of Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*) to experimentally induced infection with *Myxobolus cerebralis*. 46th Western Fish Disease Workshop, American Fisheries Society Fish Health Section, Boise, Idaho. 27-29 June.
- DuBey, R., **C.A. Caldwell**, and W.R. Gould. 2005. Susceptibility of Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*) to experimentally induced infection with *Myxobolus cerebralis*. 38th Joint Annual Meeting, Arizona/New Mexico Chapter of the American Fisheries Society and the Arizona and New Mexico Chapter of the Wildlife Society. Gallup, New Mexico. 3-5 February 2005.
- Sykes, S.L., **C.A. Caldwell**, and J.L. Landye. 2003. Effect of diet on survival and growth of larvae Rio Grande silvery minnow. 36th Joint Annual Meeting of the New Mexico and Arizona Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Gallup, New Mexico. 6-8 February.
- Caldwell, C.A.**, and C. Sykes. 2003. Hybridization potential and spawning behavior of Rio Grande silvery minnow (*Hybognathus amarus*) and plains minnow (*Hybognathus placitus*). 36th Joint Annual Meeting of the New Mexico and Arizona Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Gallup New Mexico. 6-8 February. (Presenter)
- DuBey, R., and **C. A Caldwell**. 2003. Ecological differentiation of *Tubifex tubifex* Infested with *Myxobolus cerebralis* in the San Juan River Tailwater "Blue Ribbon Trout Fishery". 9th Annual Whirling Disease Symposium. Seattle, Washington. February 2003.
- *Mitchell, S.E., **C.A. Caldwell**, G.J. Gonzales, and W.R. Gould. Feb 2003. Toxicity effects of depleted uranium on amphibian growth and development. 36th Joint Annual Meeting of the New Mexico and Arizona Chapters of The Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society. Gallup, New Mexico. 6-8 February.
- Caldwell, C.A.**, E.M. Prestbo, P. Swartzendrubber, R. Arimoto, and C. Sykes. 2002. Atmospheric deposition of mercury in southcentral New Mexico, USA. New Mexico Water Research Symposium. Socorro, New Mexico. August (Presenter)
- DuBey, R., and **C. A Caldwell**. 2002. Ecological differentiation of *Tubifex tubifex* lineage: Could lineage be a link to whirling disease transmission in salmonids? 35th Joint Annual Meeting of Arizona and New Mexico Chapters of the American Fisheries Society and The Wildlife Society, Safford, Arizona. 3-5 February.
- Sykes, C.L., and **C.A. Caldwell**. 2002. Necropsy-based fish health assessment: Evaluation of use on a wild population. 35th Joint Annual Meeting of the Arizona and New Mexico Chapters of the American Fisheries Society and The Wildlife Society, Safford, Arizona. 3-5 February.
- Everett, E., and **C.A. Caldwell**. 2002. Habitat characterization and environmental influences of the Jemez Mountains salamander (*Plethodon neomexicanus*). Jemez Mountains Biological Symposium. Santa Fe, New Mexico. 25 January. (Invited Presentation and Presenter)
- *Mitchell, S.E., **C.A. Caldwell**, G.J. Gonzales, and W.R. Gould. 2002. Toxicity effects of depleted uranium on amphibian growth and development. 35th Joint Annual Meeting of the Arizona and New Mexico Chapters of the American Fisheries Society and The Wildlife Society. Safford, Arizona. 3-5 February.
- *Mitchell, S. E., **C. A. Caldwell**, G.J. Gonzales, and W.R. Gould. 2002. Toxicity effects of depleted uranium on amphibian growth and development. New Mexico Water Research Symposium. Socorro, New Mexico. August.

- *Everett, E., and **C.A. Caldwell**. 2002. Habitat characterization and environmental influences of the Jemez Mountains salamander (*Plethodon neomexicanus*). 35th Joint Annual Meeting of the Arizona and New Mexico Chapters of the American Fisheries Society and The Wildlife Society, Safford, Arizona. 3-5 February.
- Calamusso, B., **C.A. Caldwell**, J.N. Rinne, R.N. Schmal, and D.M. Finch. 2001. Native fish conservation in the Upper Rio Grande Basin. Montana Chapter of the American Fisheries Society: Practical approaches for conserving native fishes of the west. Missoula, Montana.
- Calamusso, B., **C.A. Caldwell**, J.N. Rinne, R.N. Schmal, and D.M. Finch. 2001. Native fish conservation in the Upper Rio Grande Basin. 34th Joint Annual Meeting of the Arizona and New Mexico Chapters of The Wildlife Society and the Arizona/New Mexico Chapter of the American Fisheries Society, Gallup, New Mexico. February.
- Mitchell, S.E., **C.A. Caldwell**, G.J. Gonzales, and W.R. Gould. 2001. Toxicity effects of depleted uranium on amphibian growth and development. 8th Annual Meeting of the Wildlife Society. Reno, Nevada. 25-29 September. (Presenter)
- Caldwell, C.A.**, E. Prestbo, C. Sykes, and P. Swartzendrubber. 2001. Atmospheric deposition of mercury in south central New Mexico, USA. 6th International Conference of Mercury as a Global Pollutant. Minimata, Japan. 15-19 October.
- Caldwell, C.A.**, E. Prestbo, C. Sykes, and P. Swartzendrubber. 2001. Atmospheric deposition of mercury in south central New Mexico, USA. Promoting Policies to Implement the Vision: Demonstrations and Prototypes of Sustainable Development in the U.S.-Mexican Border Region. 17-19 October, Mexicali, Baja California, Mexico. (Invited Presentation)
- *Mitchell, S.E., **C.A. Caldwell**, G.J. Gonzales, and W.R. Gould. 2001. Toxicity effects of depleted uranium on amphibian growth and development. 22nd Annual Meeting of the Society of Environmental Toxicology and Chemistry. Baltimore, Maryland. 11-15 November.
- *Fuller, A., **C.A. Caldwell**, P. Turner, and D. Hallford. 2000. Reproductive biology of Rio Grande chub (*Gila pandora*) in a southcentral New Mexico stream. 32nd Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society and the Arizona and New Mexico Chapters of the Wildlife Society, Sierra Vista, Arizona.
- *Kuhne, W.W., **C.A. Caldwell**, W.R. Gould, and P.R. Fresquez. 2000. Effects of depleted uranium on the survival and reproduction of *Ceriodaphnia dubia* and *Hyallolella azteca*. 32nd Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society and the Arizona and New Mexico Chapters of the Wildlife Society, Sierra Vista, Arizona.
- *Podolsky, J.S., G. Gonzales, and **C.A. Caldwell**. 2000. Risk to the American peregrine falcon from organochlorine and metal contaminants at Los Alamos National Laboratory, New Mexico. 32nd Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society and the Arizona and New Mexico Chapters of the Wildlife Society, Sierra Vista, Arizona.
- Caldwell, C.A.**, C.M. Canavan, and N.S. Bloom. 1999. Effects of fire on the spatial and temporal distribution of mercury in sediments of an arid-lands reservoir in south central New Mexico. 32nd Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society and the Arizona and New Mexico Chapters of the Wildlife Society, Gallup, New Mexico. (Presenter)
- *Canavan, C.M., **C.A. Caldwell**, and N.S. Bloom. 1999. Potential effects of runoff water containing forest fire debris on total mercury and methylmercury in reservoir sediments. 5th International Conference on Mercury as a Global Pollutant. CETEM/CNPq and UFF, Rio de Janeiro, Brazil.
- *Canavan, C.M., **C.A. Caldwell**, N.S. Bloom. 1999. Transport of methylmercury enriched hypolimnetic water from a stratified reservoir. 5th International Conference on Mercury as a Global Pollutant. CETEM/CNPq and UFF, Rio de Janeiro, Brazil.
- Caldwell, C.A.** 1999. Atmospheric deposition of mercury in south central New Mexico. 20th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Philadelphia, Pennsylvania. (Presenter).

- *Kuhne, W.W., **C.A. Caldwell**, W.R. Gould, and P.R. Fresquez. 1999. Effects of depleted uranium on the survival and reproduction of *Ceriodaphnia dubia* and *Hyalloella azteca*. 20th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Philadelphia, Pennsylvania. November. NOTE: This oral presentation won Best Student Paper Award for Ms. Kuhne.
- Caldwell, C.A.**, and K.A. Phillips. 1999. Hematological effects in rainbow trout subjected to a chronic sublethal concentration of lead. University of El Paso. Department of Biology. Biology Seminar Series. April. (Invited seminar and Presenter)
- Caldwell, C.A.**, and K.A. Phillips. 1999. Hematological effects in rainbow trout subjected to a chronic sublethal concentration of lead. New Mexico State University. Department of Biology. Biology Seminar Series. February. (Invited seminar and Presenter)
- Allert, A.L., T.D. Thorn, S.E. Finger, E. Callahan, R.L. Steiner, and **C.A. Caldwell**. 1998. Physical and chemical factors affecting the aquatic community in the upper San Juan River Basin. 19th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Charlotte, North Carolina. November.
- Caldwell, C.A.**, C.M. Canavan, and N.S. Bloom. 1998. Effects of fire on the spatial and temporal distribution of mercury in sediments of an arid-lands reservoir in south central New Mexico. 19th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Charlotte, North Carolina. November. (Presenter)
- Caldwell, C.A.** and K.A. Phillips. 1998. Hematological effects in rainbow trout subjected to a chronic sublethal concentration of lead. 3rd International Congress on the Biology of Fish: Fish Response to Toxic Environments. Physiology Section of the American Fisheries Society, Baltimore, Maryland. July. (Invited Presentation and Presenter)
- Caldwell, C.A.** 1998. Fish health assessment in the San Juan River. Presented to the New Mexico State University Student Chapter of the American Fisheries Society. Las Cruces, New Mexico. May (Invited Presentation and Presenter)
- Caldwell, C.A.**, C.M. Canavan, and N.S. Bloom. 1998. Effects of fire on the spatial and temporal distribution of mercury in sediments of an arid-lands reservoir in south central New Mexico. 43rd Annual New Mexico Water Conference: Water Challenges on the Lower Rio Grande. New Mexico Water Resources Research Institute. Las Cruces, New Mexico. October (Invited Presentation and Presenter)
- *Borunda, D., **C.A. Caldwell**, and W.R. Gould. 1997. Total mercury concentration in aquatic food web components of Caballo and Elephant Butte Reservoirs (Sierra County, New Mexico). 30th Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society and the Arizona and New Mexico Chapters of the Wildlife Society, Gallup, New Mexico. February.
- *Thorn, T., and **C.A. Caldwell**. 1997. Effects of environmental contamination on the benthic invertebrate community of the San Juan River. 30th Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society and the Arizona and New Mexico Chapters of the Wildlife Society, Gallup, New Mexico. February.
- *Canavan, C.M., and **C.A. Caldwell**. 1996. Spatial distribution of total mercury and methylmercury in an arid-lands reservoir in New Mexico. 17th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Washington, DC. November.
- Caldwell, C.A.**, M.A. Arnold, and W.R. Gould. 1996. Total mercury accumulation in the double-crested cormorant from two arid-lands reservoirs in south central New Mexico. 17th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Washington, DC. November. (Presenter)
- *Phillips, K.A., **C.A. Caldwell**, and M. Sandheinrich. 1995. Stress response of lead-exposed rainbow trout (*Oncorhynchus mykiss*) during swimming performance and hypoxia challenges. Second World Congress of the Society of Environmental Toxicology and Chemistry. Vancouver, B.C., Canada. November. (Presenter)

- *Burden, V., M. Sandheinrich, and C.A. Caldwell. 1995. Assessment of whole body ALAD concentrations in juvenile rainbow trout: Methods development. World Congress of the Society of Environmental Toxicology and Chemistry. Vancouver, B.C., Canada. November.
- Caldwell, C.A., and M. Steingraeber. 1995. Aminolevulinic acid-dehydratase activity in green sunfish: An indicator of lead bioavailability in suspended sediments. World Congress of the Society of Environmental Toxicology and Chemistry. Vancouver, B.C., Canada. November (Presenter)
- Caldwell, C.A. 1994. Nucleotides and the adenylate energy charge as indicators of sublethal copper stress in rainbow trout (*Oncorhynchus mykiss*). 15th Annual Meeting of the Environmental Toxicology and Chemistry, Denver, Colorado. November. (Presenter)
- Hinshaw, J.M., C.A. Caldwell, and R. Vogt. 1991. Dissolved oxygen supplementation in fish culture: Tolerance to enteric redmouth disease in rainbow trout. World Aquaculture Conference, San Juan, Puerto Rico.
- Caldwell, C.A., J.M. Hinshaw, and R. Vogt. 1991. Dissolved oxygen supplementation in fish culture: Tolerance to enteric redmouth disease in rainbow trout. 121st Annual Meeting of the American Fisheries Society, San Antonio, Texas. (Presenter)
- Caldwell, C.A., and J.M. Hinshaw. 1991. Physiological and hematological responses to oxygen supplementation in rainbow trout: "More" is not always better. 121st Annual Meeting of the American Fisheries Society, San Antonio, Texas. (Presenter)
- *Caldwell, C.A. 1988. Physiological stress responses in trout. Annual Meeting of the Tennessee Chapter of the American Fisheries Society, Henry Horton State Park, Tennessee. (Presenter)
- *Caldwell, C.A., and R. Strange. 1987. Comparison of the physiological stress responses between wild and hatchery-reared rainbow trout. Thirteenth Annual Scientific Research Meeting, The Uplands Areas of the Southeast Region, National Park Service, Great Smoky Mountain National Park, Gatlinburg, Tennessee. (Presenter)
- *Caldwell, C.A., and J.R. Tomasso. 1985. Stocking and handling-induced stress in red drum fingerlings. Proceedings of the Annual Conference of the Southeast Association of Fish and Wildlife Agencies. Lexington, Kentucky. (Presenter)
- *Caldwell, C.A., and J.R. Tomasso. 1984. Stocking and handling-induced stress in red drum fingerlings. Texas Chapter of the American Fisheries Society, Corpus Christi, Texas. (Presenter)

Rendering Scientific Judgment

- Participated with regional Forest Service personnel in a panel discussion about adaptation to climate change. Forest Service Climate Change Adaptation Conference and Workshop, Abiquiu, New Mexico. 24 January 2011
- Served as an external reviewer on a Doctoral committee, and promotion and tenure of a faculty member in the Department of Natural Sciences, Rand Afrikaans University, South Africa, 2008
- Served as panel member to review U.S. Fish and Wildlife Service Genetic Management and Propagation Plan of the Razorback Sucker, 2008

Provided technical review and provided professional opinion to the New Mexico Department of Game and Fish regarding potential threat of contaminants in fishes to River otters within the upper Middle Rio Grande basin (2008). My analysis resulted in the decision that River otters were to be returned to the middle Rio Grande basin. See report: <http://fws-nmcfwru.nmsu.edu/fwscoop/pub.htm>

Invited expert representing both USGS and New Mexico State University to assist the New Mexico Department of Game and Fish with the investigation to state-list the headwater chub (*Gila nigra*) as either threatened or endangered. October 2006

Served as lead and coordinator in the review of the Fisheries Management Division in the New Mexico Department of Game and Fish. Organized and coordinated an in-depth review of the Fisheries Management Division at the request of the Director. Review resulted in a detailed document describing both attributes and suggestions for improvement to the Fisheries Management Division. November 2004 - February 2005

Served as a peer-reviewer on a Federal Research Grade Evaluation Panel, St. Louis, Missouri. October 2005

Served as an external reviewer for the Fish Technology Center Evaluation Program: Reviewed the Mora National Fish Hatchery and Technology Center, October 2005

Conservation Assessment on Rio Grande cutthroat trout: Peer-reviewed the Conservation Assessment for the American Fisheries Society and the U.S. Forest Service, 2002

Technical Advisory Board of the USGS-Abandoned Mine Lands Initiative. Served as a board member. The Initiative focused on providing clients/partners with information for evaluating abandoned mine lands; as a member of the Advisory Board, reviewed a USGS technical report titled “Transmittal of Work Plans for Colorado and Montana Watershed Investigations” that assessed the effects of historic mining activities on surface water quality.

Assisted Brazilian scientist with developing English transcripts for a video describing general ecology of the Pantanal for English-speaking non-scientists, February 1999

Served as Peer-reviewer of the Following Journals:

- PLOS ONE (online open access journal)
- Transactions of the American Fisheries Society
- Journal of Aquatic Animal Health
- Journal of North American Fisheries Management
- Journal of Wetlands
- Southwestern Naturalist
- The Science of the Total Environment
- Society of Environmental Toxicology and Chemistry
- Archives of Environmental Contamination and Toxicology
- Comparative Biochemistry and Physiology
- Aquaculture
- U.S.G.S. National Institutes for Water Resources Research National Competitive Grants Program
- National Sea Grant College Program, National Oceanic and Atmospheric Administration
- Canadian Journal of Fisheries and Aquatic Sciences
- Great Basin Naturalist
- Technical Reports of the Missouri Department of Conservation
- Journal of Applied Aquaculture
- Journal of Environmental Monitoring and Assessment
- 4th International Conference of on Acid Rock Drainage
- USGS Toxic Substances Hydrology Program Proceedings published as a U.S. Geological Survey
- Water Resources Investigations Report
- Wetlands, the Journal of the Society of Wetlands Scientists

Teaching Responsibility

I teach two courses, alternating each course every other year to provide additional aquatic classes to the fisheries students in the Department. Each course has a weekly laboratory experiential learning techniques (see Table).

FWCE 432/532 Environmental Biology of Fishes (4 cr) taught in even years

FWCE 434/534 Aquatic Contaminants and Toxicology (4 cr) taught in odd years

General Instruction Area - Department of Environmental Sciences has both classes cross-listed as electives for its core curriculum. Department of Chemistry and Biochemistry has Aquatic Contaminants and Toxicology cross-listed for students pursuing a Minor in Toxicology.

Self-improvement Activities Related to Teaching

I enjoy discussing and comparing teaching methods with other instructors. What tools and techniques work and how to incorporate more rigor and basic skill sets that all students should master in their college career (critical thinking, critical review of the literature, and technical writing).

Professional Service to Teaching

Development of Instructional Resources for Others - I wrote the first Graduate Handbook for the Department. There was no one source for graduate students to find the steps needed to apply to the Department and the Graduate College, and the milestones needed to obtain the degree once they entered the Department. The Handbook went from hard spiral bound to electronic and now sits on the Departmental Website.

Assistance to Other Teachers, Researchers, and Courses (Guest Lectures) - I routinely provide guest lectures to Environmental Toxicology (Chemistry & Biochemistry), Introduction to Natural Resources (FWCE), Professional Development Course (Biology)

Committee Memberships Related to Teaching at the Departmental, College, University, Regional or National Levels - I participated in annual conferences at both Regional and National levels of the American Fisheries Society where I either organized student symposia or judged student presentations. In 1996, I developed the rubric for student presentations (both poster and oral) for the Arizona/New Mexico Chapter of the American Fisheries Society, which is used at every annual meeting.

Relevant Consulting Activities

Taught fish hematology workshop (Lecture and Laboratory) to 40 fish health experts at the American Fisheries Society Fish Health Section Annual Meeting, Madison, Wisconsin (1996)

Taught fish physiology workshop (Lecture and Laboratory) to veterinarians at a week-long workshop in Duluth, Minnesota (1993)

Table. Overview of courses taught by C.A. Caldwell at New Mexico State University.

- COURSE INFORMATION -									
S/Yr	Course Title	Number	Cr	MOI¹	Aud₂	Resp³	Enrl₄	Score⁵	Score description⁶
S/17	Aquatic Contaminants and Toxicology	FWCE 434/534	4	Lec/Lab	G/U	100%	10	93	Very Commendable
S/16	Environmental Biology of Fishes	FWCE 432/532	4	Lec/Lab	G/U	100%	21	99	Very Commendable
S/15	Aquatic Contaminants and Toxicology	FWCE 434/534	4	Lec/Lab	G/U	100%	14	88	Very Commendable
S/14	Environmental Biology of Fishes	FWCE 432/532	4	Lec/Lab	G/U	100%	23	96	Very Commendable
S/12	Environmental Biology of Fishes	FWCE 432/532	4	Lec/Lab	G/U	100%	21	98	Very Commendable
S/11	Aquatic Contaminants and Toxicology	FWCE 434/534	4	Lec/Lab	G/U	100%	12	85	Very Commendable
S/10	Environmental Biology of Fishes	FWCE 432/532	4	Lec/Lab	G/U	100%	23	88	Very Commendable
S/09	Aquatic Contaminants and Toxicology	FWCE 434/534	4	Lec/Lab	G/U	100%	12	96	Very Commendable
S/8	Environmental Biology of Fishes	FWCE 432/532	4	Lec/Lab	G/U	100%	15	75	Commendable
S/06	Environmental Biology of Fishes	WLSC 432/532	4	Lec/Lab	G/U	100%	16	76	Very Commendable
S/05	Aquatic Contaminants and Toxicology	WLSC 434/534	4	Lec/Lab	G/U	100%	10	93	Very Commendable
S/04	Environmental Biology of Fishes	WLSC 432/532	4	Lec/Lab	G/U	100%	15	96	Very Commendable
S/03	Aquatic Contaminants and Toxicology	WLSC 434/534	4	Lec/Lab	G/U	100%	8	87	Very Commendable
S/02	Environmental Biology of Fishes	WLSC 432/532	4	Lec/Lab	G/U	100%	7	90	Very Commendable
S/01	Aquatic Contaminants and Toxicology	WLSC 434/534	3	Lec/Lab	G/U	100%	8	96	Very Commendable

¹ "Mode of instruction" (MOI) means lecture, laboratory, recitation, seminar, or other, as appropriate.

² "Main audience" (Aud) means the group most likely to take the course (graduate students, undergraduate majors, undergraduate non-majors or other).

³ "Responsibilities" (Resp) describes the candidate's participation in the course, e.g.:

The candidate essentially had total responsibility for the course, i.e., for the design of the syllabus, the choice of text, the great majority of lectures or other form of class leadership, grading and the writing of examinations; and/or,

The candidate had responsibilities beyond those described above, e.g., the administration of a large introductory lecture or laboratory course. Describe those responsibilities; and/or,

The candidate had shared responsibility. Describe the nature of that responsibility (e.g., taught two lecture sections for 0.5 semester; organized series of invited lectures); and/or, Other. Describe the candidate's participation.

⁴ Number of students enrolled in the class.

⁵ Evaluation score from Departmental evaluations; total is out of 100 points.

⁶ Descriptive term corresponding to evaluation score: 81-100 = Very Commendable, 61- 80 = Commendable

S/00	Environmental Biology of Fishes	WLSC 432/532	3	Lec/Lab	G/U	100%	9	85	Very Commendable
S/99	Aquatic Contaminants and Toxicology	WLSC 434/534	3	Lec/Lab	G/U	100%	13	95	Very Commendable
S/98	Environmental Biology of Fishes	WLSC 432/532	3	Lec/Lab	G/U	100%	11	93	Very Commendable
S/97	Environmental Biology of Fishes	WLSC 432/532	3	Lec/Lab	G/U	100%	6	87	Very Commendable
S/96	Aquatic Contaminants and Toxicology	WLSC 434/534	3	Lec/Lab	G/U	100%	7	69	Commendable

Special Honors, Awards, or Other Recognition of Excellence in Teaching

Outstanding Student Subunit Award, Western Division American Fisheries Society, New Mexico State University Student Sub-unit, presented at the 2010 Annual Meeting in Salt Lake City, Utah

New Mexico Branch for the Association of Laboratory Animal Sciences, Certificate of Appreciation for contributions to the Annual Meeting, August 2005

Best Student Paper Award at the 20th Annual Meeting of the Society of Environmental Toxicology and Chemistry for the paper “Effects of depleted uranium on the survival and reproduction of *Ceriodaphnia dubia* and *Hyallela azteca*. W. Kuhne received a plaque and \$1000 cash for the presentation titled: Kuhne, W.W., C.A. Caldwell, W.R. Gould, and P.R. Fresquez. 1999. 20th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Philadelphia, Pennsylvania.

Received special recognition from the NMSU Consortium for Environmental Education and Technology Development as a mentor in their Undergraduate Fellowship Program (1997-2000). I participated in the mentoring program by working with a Consortium undergraduate Fellow for three years (K. Browne).

Academic Advising

The USGS Cooperative Agreement states that Unit scientists will advise only graduate students; however, when asked, I gladly offer advice to undergraduate students regarding career choices and course work.

Undergraduate Advisees - These advisees requested that I advise and oversee their undergraduate research projects.

Haley Smith (B.S.) 2015-2017. Haley worked as a laboratory and field technician in my laboratory and specialized in benthic ecology. She conducted a research project comparing diet selection in brown trout from wildfire effected (low density) with unburned (high density) montane grassland of the Valles Caldera National Preserve. She presented her research at the Departmental series.

Quintin Dean (B.S.) 2015-2017. Quintin worked as a laboratory and field technician in my laboratory. He compared selectivity of diet items between sympatric Rio Grande cutthroat trout and brown trout. He presented his research at the Departmental seminar series and at the Regional American Fisheries Society meeting in Missoula, MT.

Hunter Falco (B.S.) 2013-2015. Hunter worked as a laboratory and field technician throughout her entire undergraduate career at NMSU. She oversaw data analysis and participated in the writing of a study to characterize the fecundity of captive Rio Grande silvery minnow.

Dominique Lujan (B.S.) 2013-2015. Dominique received a scholarship from the Natural Resource Career Track program. The purpose of the program is to introduce students to careers in natural resources. Her interests in aquatic sciences led her to selected me as her research advisor.

Chance Roberts (B.S.) 2011-2012. Chance assisted with the production of Pacific white shrimp reared using protein from glandless cottonseed meal.

Catherine Sykes (B.S.) 1996-2000. I served as her major academic advisor because Catherine wanted a woman as her advisor and mentor.

Karen Browne (B.S.) I served as her major academic and research advisor from 1998 to 2000 in the development of the MICROTOX methodology for use in aquatic toxicology. The Engineering College Consortium for Environmental Education and Technology supported Ms. Browne for three years.

Attended a workshop 2001 at NMSU “Develop a Philosophy of Teaching”. Some of the methodology I learned was placed into practice.

Former Graduate Advisees

As the major research and academic advisor, I have completed 22 graduate students. Of my former graduate students, two completed Ph.D. programs (Sanchez and Kuhne) and one completed his Veterinary Medical degree (Cho). I have a track record of completing 100% of my graduate students and all completed their degrees within a reasonable time frame (2.5 - 3.5 years for M.S. and 5.5 years for Ph.D.). All have obtained employment with either federal, state, or non-government organizations.

Campbell, M. 2016. Development and validation of a molecular screening tool to identify presence of Asian fish tapeworm *Bothriocephalus acheilognathi* in imperiled southwestern native fish populations. Masters of Science, New Mexico State University. Las Cruces, New Mexico.

Alvarez, G. 2015. CFT Legumine™ (5% Rotenone) effects on tadpole survival and metamorphosis of Chiricahua Leopard Frog (*Lithobates chiricahuensis*), Northern Leopard Frog (*L. pipiens*), and American Bullfrog (*L. catesbeianus*). Masters of Science, New Mexico State University. Las Cruces, New Mexico.

Chase, N. 2014. Causative factors limiting Pecos bluntnose shiner (*Notropis simus pecosensis*) in the Pecos River, New Mexico. Masters of Science, New Mexico State University. Las Cruces, New Mexico.

Kalb, B. 2013. A bioenergetic assessment of seasonal habitat selection and behavioral thermoregulation of rainbow trout (*Oncorhynchus mykiss*) in a southwestern headwater stream. Masters of Science, New Mexico State University. Las Cruces, New Mexico.

Galindo, R. 2012. Patterns of genetic diversity in populations of Rio Grande chub (*Gila Pandora*) in New Mexico. Masters of Science, New Mexico State University. Las Cruces, New Mexico.

Zeigler, M.P. 2012. The effects of climate change on the future persistence of Rio Grande cutthroat trout: An assessment of recent climate change, thermal limits, and current and future stream temperature trends. Masters of Science. New Mexico State University. Las Cruces, New Mexico.

Avery, M.M. 2012. Seasonal effects of forage quantity, quality and dietary composition of pronghorn (*Antilocapra americana*) in a semi-arid environment. Masters of Science, New Mexico State

- University. Las Cruces, New Mexico.
- Anderson, M.C. 2009. Livestock and elk grazing effects on stream morphology, brown trout population dynamics, movement, and growth rate, Valles Caldera National Preserve, New Mexico. Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Cho, S.J. 2008. Physiological stress responses of Rio Grande silvery minnow (*Hybognathus amarus*): Effects of individual and multiple physical stressors of handling, confinement, and transport. Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Coleman, S. 2008. Post-wildfire effects in a Gila trout (*Oncorhynchus gilae*) trout stream. Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- DuBey, R. 2006. Ecological differentiation and survivability of *Tubifex tubifex* infested with *Myxobolus cerebralis* in the San Juan River, New Mexico. Doctoral Degree, Biology, New Mexico State University. Las Cruces, New Mexico.
- Sanchez, B. 2005. Ecotoxicological effects of polychlorinated biphenyl contamination in a food web at the Bitter Lake National Wildlife Refuge. Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Mitchell, S. 2003. The effects of depleted uranium on the health and development of amphibia. Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Everett, E. 2003. Habitat characterization and environmental influences of the Jemez Mountains salamander (*Plethodon neomexicanus*). Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Podolsky, J.S. 2000. Organic and metal contaminants in a food chain of the American peregrine falcon (*Falco peregrinus*) at the Los Alamos National Laboratory. Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Kuhne, W.W. 2000. The effects of depleted uranium on the health and survival of *Ceriodaphnia dubia* and *Hyallela azteca*. Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Canavan, C.M. 1998. Seasonal variability in total mercury and methylmercury at Elephant Butte and Caballo reservoirs, Sierra County, New Mexico. Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Thorn, T.D. 1997. Physical and chemical habitat factors affecting the composition of macroinvertebrate communities in the San Juan River, New Mexico. Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Borunda, D. 1997. Total mercury concentrations in aquatic food web components of Caballo and Elephant Butte reservoirs (Sierra County, NM). Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Phillips, K.A. 1997. The stress response of rainbow trout (*Oncorhynchus mykiss*) exposed to lead. Masters of Science, University of Wisconsin. La Crosse, Wisconsin.
- Arnold, M.A. 1996. Bioaccumulation and distribution of mercury in double-crested cormorants (*Phalacrocorax auritus*) from Elephant Butte and Caballo reservoirs, Sierra County, New Mexico. Masters of Science, New Mexico State University. Las Cruces, New Mexico.
- Burden, V.M. 1995. Effects of lead on the swimming behavior, growth, and aminolevulinic acid dehydratase (ALA-D) activity of juvenile rainbow trout, *Oncorhynchus mykiss*. Masters of Science, University of Wisconsin. La Crosse, Wisconsin.

Current Graduate Students:

- Damon Peterson: Ecology of White Sands pupfish (*Cyprinodon tularosa*) (tentative title). Anticipated completion of Ph.D. Department of Biology Spring 2018.

Lauren Kremer: Influence of wildfire on benthic invertebrate community on the Valles Caldera National Preserve. Anticipated completion of Masters of Science degree Spring 2019.

Tyler Wallin: Influence of stream temperature, intermittency, and nonnative fishes on the current and future distribution of native fishes in the Gila and Mimbres drainages. Anticipated completion of Masters of Science degree Spring 2019.

Alex Vaisvil: Natal Source and the Influence of Environmental Bottlenecks on Largemouth Bass Recruitment in Elephant Butte Reservoir. Anticipated completion of Masters of Science degree Spring 2019.

Lauren Flynn: Impacts of Drought on Southwestern Cutthroat Trout: Influences of Changes in Discharge and Stream Temperature on the Persistence of Rio Grande Cutthroat Trout Populations. Anticipated completion of Masters of Science degree Spring 2020.

Post-doctoral Research Associates:

Brock Huntsman, Ph.D. Dr. Huntsman joined my laboratory February 2016 to investigate the effects that a warming climate is having on native Rio Grande cutthroat trout.

Robert DuBey, Ph.D. Dr. DuBey worked in my laboratory from 2006 to 2009 to investigate the effects of whirling disease in native southwestern fishes.

Yong Jiu Chen, Ph.D. Dr. Chen worked in my laboratory from 2005 to 2007 to investigate genetic diversity of endangered fishes subjected to intensive captive propagation.

Gerard Zegers, Ph.D. Dr. Zegers worked in my laboratory from 2007 to 2009 to investigate rapid response genetic analysis and genetic management for intensive propagation and recovery of endangered cyprinids.

Former Graduate Student Committees (I was not primary academic or research advisor):

Shafer, N. 2012. Non-thesis option in the Department of Biology.

Recsetar, M. 2011. Thermal tolerance of fishes suing critical thermal maxima. Master of Science, University of Arizona.

Joos, C. 2007. Shrub encroachment and condition of wintering sage sparrows in southern New Mexico. Master of Science, New Mexico State University.

Haan, S. 2005. Habitat characteristics, population demographics, and conspecific interactions of the Sacramento Mountain Salamander, *Aneides hardii*. Master of Science, New Mexico State University.

Paroz, Y. 2005. Population dynamics and landscape scale habitat associations of Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*). Master of Science, New Mexico State University.

Umanzor, S. 2008. Phylogenetic reanalysis of chromodorididae (Molluska: Nudibranchia) using a combined approach. Master of Science, New Mexico State University.

- Cook, B.A. 2005. Environmental education activity programs, New Mexico Chihuahuan Desert Nature Park. Master of Science, New Mexico State University.
- Shemai, B. 2004. Native Rio Grande cutthroat trout restoration and indirect effects on benthic macroinvertebrate community structure in a cold water trout stream. Master of Science, New Mexico State University.
- Haan, S. 2004. Habitat characteristics, population demographics, and conspecific interactions of the Sacramento Mountain Salamander, *Aneides hardii*. Master of Science, New Mexico State University.
- Foster-Keeler, C. 2003. Genetics of Rio Grande cutthroat trout. Doctoral-Department of Biology, New Mexico State University.
- Lopez, V. 2001. Channelpathies in hearing defects. Master of Science, New Mexico State University.
- Fuller, A. 2000. Reproductive biology of Rio Grande chub (*Gila pandora*) in a southcentral New Mexico stream. Master of Science, New Mexico State University.
- Cicero, S. 1999. Development and myelination of the post-saccular anterior branch of the eighth cranial nerve in *Xenopus laevis*. Master of Science, New Mexico State University.

International-student Advisees

- Cho, S. J. 2008. Physiological stress responses of Rio Grande silvery minnow (*Hybognathus amarus*): Effects of individual and multiple physical stressors of handling, confinement, and transport. Master of Science, New Mexico State University. Las Cruces, New Mexico.

Student Clubs

- 2016-Present: Faculty co-advisor of the NMSU Graduate Student Organization, Department of Fish, Wildlife and Conservation Ecology.
- 1994-Present: Faculty co-advisor of the NMSU Student Sub-unit of the American Fisheries Society. As co-advisor, I assist with updating bylaws, annual re-chartering of the club, assist with fund-raising events on and off-campus, and professional development opportunities through attendance to annual meetings of the AZ/NM Chapter of the American Fisheries Society.
- 2012-Present: Faculty advisor of the Sportsman Bass Fishing Club. As the advisor, I assist with updating bylaws, and approving on and off-campus fund raising and professional development opportunities and ensure grades are maintained at or above 2.5 overall GPA to participate in regional and national fishing tournaments. The club is currently rated 6 out of 50 University Bass Fishing Clubs in the Nation.

Host Department: Fish, Wildlife and Conservation Ecology

- 2003-Present Member and rotating Chair of the Space, Computing and Facilities Committee; as member of the committee, we have completed a number of projects that benefit the Department including cleaning and renovating Departmental Conference Room to include telecommunication equipment (large TV monitor and phone conferencing system), locating and renovating permanent storage (total 3,000 sq ft) for Departmental faculty and Unit staff (Quonset Hut, Cropping Storage Facility)
- 2011 Funds were obtained from Facilities and Services to install emergency alarm and back-up system in the event a loss of air pressure or water pressure from the well.
- 1994-Present I oversee the maintenance and upkeep of the living fish collection. This consists of 6-8 aquaria containing live fishes representative of various continents, and a native fish community. In addition, I oversee the maintenance of the Departmental aquaria. One of the first things a visitor should see when passing through the Departmental office door is a native fishes exhibit.
- 2011 Obtained funds from the University Building Maintenance and Renewal (approximately \$26,000) to replace all air lines in the Fisheries Research Laboratory with stainless steel pipe. Two commercial-grade air compressors were installed. I schedule routine maintenance of the air compressors.
- 2003 Directed the revision and replenishing of the teaching/research fish specimens.
- 2002 Obtained funding (approximately \$20,000) from the College of Agriculture and Home Economics to drill the new deep well for the Fisheries Research Laboratory in Knox 144.
- 1999 Obtained funds from the University Building Maintenance and Renewal (\$4,500) to revamp the Department's Environmental Chamber (which up until this time was used for storage of equipment); also received funds to install a chemical fume hood in Room 143A of Knox Hall.
- 1998-2003 Member and Chair (2000, 2003), Graduate Curriculum Committee; Accomplishments included development of standardized admission and progress review processes, departmental policy statement on graduate admissions and progress and on graduate student/advisor relations, development of departmental graduate student handbook.
- 1998 Obtained University Building Maintenance and Renewal grant (\$8,500) to add an in-line air filter to the air system used to aerate the laboratory's fish tanks. Air to fish tanks had been coming from Central Plant which contained oil.
- 1998 Member, Department Head Search Committee
- 1996 Obtained funds (\$11,000) from the University Building Renewal funds to renovate Knox 144 (Fisheries Research Laboratory). The Laboratory was renovated to add floor drains, renovate the deep-well, replace water storage tanks in the basement and deliver air from the Central Plant.

1994-Present Conducted and/or assisted Departmental Safety Officer with organizing laboratory safety procedures and guidelines. Work on a continual basis with the University Safety Office to ensure prompt removal of hazardous chemical waste generated by laboratories in the Department.

1994-1995 Member, Department Research Outcomes Committee

College 2011-2012 I oversaw the production of Pacific white shrimp in my laboratory using an experimental diet of glandless cottonseed meal. The research resulted in a 10 page report to the Agricultural Experiment Station describing the utility of rearing shrimp using cottonseed meal. The work funded summer stipend for an undergraduate student (Chance Roberts).

University 2014-Present Institutional Animal Care and Use Committee, Board Member (Science Representative)

Community

1996, 1999, 2014 Judge, Regional Science Fair at NMSU; 1999 Volunteer in assisting in fund raising for El Caldito soup kitchen; 1995-1999 Created quilts for terminally ill infants and children in Las Cruces.

2008- Present My staff and students continue to work with Las Cruces Public School District to provide hands-on demonstration projects aimed at elementary-level children to educate them about ecology and conservation of aquatic systems. The work has been highlighted in the Las Cruces Sun News and NMSU News Bureau.

State

1999, 2002 Co-taught one day Fish Health Assessment workshop to University students and employees and personnel of the New Mexico Department of Game and Fish. A second full-day workshop was taught to the Arizona/New Mexico American Fisheries Society members as a continuing education class.

2011-2012 Trout Unlimited, Gila-Rio Grande Chapter: Assisted local Trout Unlimited Chapter with two-year survey of a stream (Agua Chiquita) within the Lincoln National Forest to assess suitability of the stream for reintroduction of fishes. Funding was from a national funding program (Embrace-A-Stream).

2010-2013 I assisted the New Mexico Department of Game and Fish and U.S. Fish and Wildlife Service with annual surveys of White Sands pupfish populations throughout its range on two military installations. I convinced the biologists to incorporate into the annual surveys temperature monitoring of the streams. I assist with retrieval, analysis and reporting of the temperature data each year.

Profession

American Fisheries Society:

Parent Society - Resource Policy Committee, Member and Chair of Sub-committee for the development of the Policy Statement and Review Paper (2008-Present)

Award of Excellence Committee, Member (2010-Present)

Physiology Section (Founder and President, 1992; Membership Chair 1992-1998; Newsletter Editor 1996-1999)

Member, National Meeting Oversight Committee
 Western Division - Eugene Maughan Scholarship Committee (2009-Present)
 Arizona/New Mexico Chapter (Secretary/Treasurer, 1995; President Elect, 1996; President 1997;
 Past President 1998, Newsletter Editor 1997-1999; Developed criteria for Evaluating Student
 Oral and Poster Presentations; Organizer of the Fisheries Technical Sessions of the 1996
 Regional Meeting; Program Editor for the 1999 Regional Meeting; Registration Chair of the
 2005 Regional Meetings; Committee Chair of Chapter Bylaws 2003-Present
 Associate Editor, Transactions of the American Fisheries Society (1997-1999)
 Chair, Program Committee, 2009 Western Division Annual Meeting, Albuquerque
 Chair, Program Committee, 131st Annual National Meeting, Phoenix, Arizona (2001) (as Chair of
 the Program for the 131st Annual Meeting, I participated in three previous annual meetings
 (1998 Hartford, CT; 1999 Charlotte, NC; 2000 St. Louis, MO)
 Faculty advisor to the New Mexico Student Chapter of the American Fisheries Society (1994-
 2011, rotated off until 2014)
 American Institute of Fishery Research Biologists:
 Member, Hubbs Student Research Scholarship Committee (2008-Present)
 Southwest Division Representative (2011-Present)

Trout Unlimited, Gila/Rio Grande Chapter: Board of Directors (2011-Present)

Special Honors, Awards, or Other Recognition of Excellence in Service

2016 Cooperative Research Units awarded the New Mexico Cooperative Fish and Wildlife Research
 Unit the 2016 Outstanding Science Award
 2016 New Mexico State University Graduate Research Student Award for Outstanding
 Achievement in Science (awarded to my graduate student Meredith Campbell)
 2016 Western Division of the American Fisheries Society - Eugene Maughan Scholarship for
 Outstanding Graduate (awarded to my graduate student Meredith Campbell)
 2015 U.S. Geological Survey Performance Award
 2015 Best Student Paper Award at the 48th Joint Annual Meeting of the American Fisheries Society
 AZ/NM Chapter (my student: Guillermo Alvarez received award)
 2014 Best Student Poster Award at the 47th Joint Annual Meeting of the American Fisheries Society
 AZ/NM Chapter (my graduate student: Meredith Campbell received award)
 2013 Best Student Paper Award at the 46th Joint Annual Meeting of the American Fisheries Society
 AZ/NM Chapter (my graduate student: Nathan Chase received award)
 2013 U.S. Geological Survey Performance Award
 2011 U.S. Geological Survey Promotion to GS-14
 2011 Distinguished Service Award, American Fisheries Society for work on the Society's
 publication and adopted policy of climate change in North American fisheries. While it was a
 group effort, I was solely responsible for the organization, majority of the writing, editing, and
 seeing it to completion.
 2011 U.S. Geological Survey STAR Award
 2010 Outstanding Student Sub-unit Award, Western Division, American Fisheries Society, New
 Mexico State University Student Sub-unit, presented at the 2010 Annual Meeting in Salt Lake
 City, Utah
 2009 U.S. Geological Survey STAR Award
 2008 U.S. Geological Survey STAR Award
 2005 New Mexico Branch for the Association of Laboratory Animal Sciences, Certificate of
 Appreciation for contributions made to the Annual Meeting
 2004 U.S. Geological Survey STAR Award for performance associated with assuming the Unit

Leader (Acting) Role

- 2004 Promoted to the Rank of Fellow, American Institute of Research Fishery Biologists
- 2004 Promoted to Associate Professor, New Mexico State University
- 2004 Professional of the Year Award, Arizona/New Mexico Chapter of the American Fisheries Society
- 2001 Chair of the Technical Program for the 131st Annual Parent Society Meeting in Phoenix, Arizona 2001; Received special recognition for service to AFS, August 2001
- 2000 Received special recognition from the Consortium for Environmental Education and Technology Development as a mentor in their Undergraduate Fellowship Program (1997-2000) Participated in the mentoring program by working with a Consortium undergraduate Fellow for three years (K. Browne)
- 1999 Best Student Paper Award at the 20th Annual Meeting of the Society of Environmental Toxicology and Chemistry
- 1999 Associate Editor, Transactions of the American Fisheries Society (1997-1999); Received special recognition for service to AFS
- 1998 Arizona/New Mexico Chapter of the American Fisheries Society: Elected as the following officers: Secretary/Treasurer, 1995; President Elect, 1996; President 1997; Past President 1998; Received special recognition for service to the Chapter
- 1993 Physiology Section of the American Fisheries Society- Special Recognition as Founder of the Physiology Section