

Molly R. Stephens

Department of Animal Science
University of California, Davis
One Shields Avenue
Davis, CA 95616

Voice: (530) 754-4155
Fax: (530) 752-0175
mrstephens@ucdavis.edu
<http://genome-lab.ucdavis.edu>

EDUCATION

- Ph.D., Ecology, University of California, Davis 2007
Dissertation Title: Systematics, Genetics, and Conservation of Golden Trout.
Advisor: Dr. Bernie May
- M.A., Biology, Sonoma State University, Rohnert Park, California 2001
Thesis: Phylogeography of the *Bufo boreas* (Anura, Bufonidae) species complex and the biogeography of California.
Advisor, Dr. Derek Girman
- B.S., Biology, Westmont College, Santa Barbara, California 1997

RESEARCH AND RELATED EXPERIENCE

- Assistant Project Scientist, UC Davis Department of Animal Science** 2010-present
- Conduct genetic research related to salmonid reintroduction to the San Joaquin River, including: genetic assessment/monitoring of restoration populations, hatchery and genetic management plans, and basic genetic research to inform species management
 - Genetic research and management plans for native Kern River Basin golden trout
 - Supervise undergraduate researchers and technicians
- Postdoctoral Researcher, UC Davis Department of Animal Science** 2007-2010
- Conducted molecular genetic research on native salmonid and amphibian species
 - Supervised undergraduate researchers and technicians in data collection and laboratory practice
- Graduate Student Researcher, UC Davis Department of Animal Science** 2001-2007
- Conducted molecular genetic research on a variety of freshwater trout and toad species, generating and analyzing the following data types: Single Nucleotide Polymorphisms, microsatellite and minisatellite DNA, DNA sequence, Amplified Fragment Length Polymorphism
 - Directed and supervised undergraduate research assistants and technicians in laboratory projects
- Research Assistant, Sonoma State University Department of Biology** 2000-2001
- Conducted molecular genetic research on Malagasy ant systematics and population genetics
 - Managed Sonoma State University DNA sequencing facility
- Biological Science Technician, USDA Forest Service** 1999, 2000
- Led aquatics survey crew in conducting amphibian, reptile, and fish surveys, sensitive aquatic species monitoring, and Stream Condition Inventories for watersheds on Sierra National Forest
 - Compiled, organized, and summarized field data for all herpetofauna and fish surveys conducted over 12 years on Sierra National Forest
- Research Intern, Santa Barbara Zoological Garden** 1997
- Synthesized primary literature information on amphibian anatomy, behavior, management, and specific life history of the Malagasy Tomato Frog; formulated a comprehensive report on this endangered species' status and appropriate zoo husbandry, management, and conservation strategies
- Vertebrate Zoology Intern, Santa Barbara Museum of Natural History** 1995
- Worked with Paul Collins, Senior Associate Curator, to incorporate new specimens into main museum collection and update species and subspecies identifications for vertebrate collections

TEACHING AND RELATED EXPERIENCE

Guest Lecturer, Ecological Genetics, UCD	2010
• Lecture topic: Hybridization and Wildlife Conservation.	
Co-Instructor, Molecular Methods in Conservation Genetics, UCD	2008
• Course objective: provide working knowledge of common molecular techniques used in the fields of conservation and population genetics. Objectives achieved through lecture, lab demonstration, and student discussions to understand the conceptual basis behind lab techniques and laboratory exercises.	
Seminar in College Teaching, UCD	2007
• Completed certificate-based seminar course designed to give preparation for teaching college-level courses; reviewed lecture style, learning goals, student learning styles, course design strategies, learning assessment, course management, student diversity, and application of technology to enhance student learning	
Guest Lecturer, Wildlife Ecology, UCD	2006
• Lecture topic: Hybridization and Conservation.	
Guest Lecturer, Seminar in Evolution, State University of New York, Oswego	2006
• Lecture topic: Hybridization and Evolution: the roles of genetic research and human values in golden trout management and restoration.	
Guest Lecturer, Undergraduate Student Seminar in Evolution and Ecology, UCD	2006
• Lecture topic: Using Genetic Tools in Conservation.	
Guest Lecturer, Undergraduate Student Seminar in Evolution and Ecology, UCD	2005
• Lecture topic: Using Genetic Tools in Conservation.	
Guest Lecturer, Ecology 290 Graduate Seminar, Population Genetic Analysis, UCD	2004
• Lecture topic: Ordination analysis of genetic data.	
Guest Speaker, Pioneer Elementary School	2003
• Co-taught two sessions on endangered species and conservation to 4 th and 5 th grade school children as part of an outreach program for the National Center for Ecological Analysis and Synthesis.	
Guest Lecturer, Ecology 290 Seminar, Detection of Genomic Variation, UCD	2002
• Lecture topic: Analysis of Molecular Genetic Data, a description of different approaches to the analysis of allozyme, AFLP, RFLP, Minisatellite, Microsatellite, and DNA sequence data.	
Teaching Associate, Sonoma State University Department of Biology	2000
• Instructed undergraduate students (both biology majors and non-majors) in introductory lab setting on use of equipment, general principles in biology, and applied concepts in genetics, evolution, and ecology	

GRANTS AWARDED

\$89,045	Hatchery and Genetic Management Plan for Kern River Rainbow Trout Upper Kern Basin Fishery Resources Enhancement Trust. P.I.s B. May, M. Stephens, and P.B. Erickson	2012-2013
\$50,000	California Golden Trout Genetic Management Plan. US Fish and Wildlife Service. P.I.s B. May and M. Stephens.	2009-2012
\$58,000	Genetic analysis of threatened trout populations: Phase V. California Dept. of Fish and Game. P.I.s B. May and M. Stephens.	2010-2011
\$86,365	Genetic analysis of threatened trout populations: Phase IV. California Dept. of Fish and Game. P.I.s B. May and M. Stephens.	2010-2011
\$220,000	Genetic analysis of threatened trout populations: Phase III. California Dept. of Fish and Game. P.I.s B. May and M. Stephens.	2010-2011
\$2,039,692	San Joaquin River Restoration Program. Co-PIs J. Israel, M. Baerwald, M.	2009-2011

	Stephens, and B. May.	
\$72,600	Genetic Analysis of California Native Trout – Phase II California Department of Fish and Game. P.I.s B. May and M. Stephens.	2008-2009
\$54,074	Aquatic Restoration in Upper Kern River of Sequoia National Park. Co-PIs M. Stephens and B. May.	2008-2009
\$83,907	Genetic Assessment of Kern River Rainbow Trout, Year 2. Upper Kern Basin Fishery Resources Enhancement Trust. Co-PIs M. Stephens and B. May	2007-2008
\$81,093	Genetic Assessment of Kern River Rainbow Trout, Year 1. Upper Kern Basin Fishery Resources Enhancement Trust. Co-PIs M. Stephens and B. May.	2007-2009
\$721,269	Genetic analysis of threatened trout populations. California Department of Fish and Game. M. Stephens, contributing author, primary researcher and principle author of reports. PI B. May.	2005-08
\$63,000	Conservation Genetic research on Yosemite and western toads. U.S. Forest Service Fish and Habitat Relations Grant. Co-author. PI B. May.	2003-07
\$46,000	Genetic monitoring of introgression of rainbow trout genes into California golden trout. U.S. Fish and Wildlife Service species pre-listing grant. Principal writer. PI B. May.	2004-05
\$199,500	Genetic analysis of threatened trout populations. California Department of Fish and Game. Contributing author. PI B. May.	2004-05

AWARDS AND HONORS

\$400	James E. Wright Graduate Award, American Fisheries Society	2006
\$18,000	John Muir Institute for the Environment, Fellowship	2004
\$1,500	Golden West Women Flyfishers Scholarship	2003
\$1,000	Jastro Shields, UCD	2003
\$39,000	Block Grants, Graduate Group in Ecology, UCD	2001-2006
\$9,000	Cole Fellowship, Dept. of Animal Science, UCD	2002,2004,2005
\$1,200	Graduate Student Equity Fellowship, SSU	2001
\$500	Student Research Grant, Dept. of Biology, SSU	2000
\$600	Sigma Xi Graduate Student Research Award	2000
	Outstanding Graduate Student Research Award, Dept. of Biology, SSU	2000
\$1,200	Graduate Student Equity Fellowship, SSU	1999
\$2,100	Graduate Student Tuition Waiver, SSU	1999
\$500	Student Research Grant, Dept. of Biology, SSU	1999

PUBLICATIONS

- Finger, A.J., E.C. Anderson, **Molly R. Stephens**, and B.P. May. 2011. Application of a method for estimating effective population size and admixture using diagnostic single nucleotide polymorphisms (SNPs): implications for conservation of threatened Paiute cutthroat trout (*Oncorhynchus clarkii seleniris*) in Silver King Creek, California. *Canadian Journal of Fisheries and Aquatic Sciences*. 68(8): 1369-1386.
- Finger, A.J., **M.R. Stephens**, N.W. Clipperton and B. May. 2009. Six diagnostic SNP markers for detecting introgression between cutthroat and rainbow trout. *Molecular Ecology Resources*. 9:759-763.

- Stephens, M.R.**, N.W. Clipperton, and B.P. May. 2009. Subspecies-informative TaqMan probes for evaluating introgression between native golden trout and introduced rainbow trout. *Molecular Ecology Resources*. 9:339-343.
- Sprowles, A.E., **M.R. Stephens**, N.W. Clipperton, and B.P. May. 2006. Fishing for SNPs: a targeted locus approach for Single Nucleotide Polymorphism discovery in rainbow trout. *Transactions of the American Fisheries Society* 135:1698-1721.
- Cordes, J.F., **M.R. Stephens**, M.A. Blumberg, and B.P. May. 2006. Identifying introgressive hybridization in native populations of California golden trout based on molecular markers. *Transactions of the American Fisheries Society* 134:110-128.
- Teglas, M.B., B.P. May, P.R. Crosbie, **M.R. Stephens**, and W.M. Boyce. 2005. Genetic structure of the tick *Ornithodoros coriaceus* (Acari: Argasidae) in California, Nevada and Oregon. *Journal of Medical Entomology* 42(3):247-253.

MANUSCRIPTS SUBMITTED OR IN PREPARATION

- Stephens, M.R.**, A.E. Sprowles, J.K. Pedroia, and B.P. May. *In internal review*. Evolutionary relationships among native California rainbow, golden, and redband trout (*Oncorhynchus mykiss* spp.).
- Cordes, J.F., **M.R. Stephens**, and B.P. May. *In internal review*. Introgressive hybridization of California golden trout *Oncorhynchus mykiss aguabonita* in the South Fork Kern River and transplanted populations.
- Stephens, M.R.**, D.J. Girman, and H.B. Shaffer. *In internal review*. Phylogeography of the *Anaxyrus boreas* (Anura, Bufonidae) species complex and the biogeography of California.
- Stephens, M.R.**, N.W. Clipperton, and B.P. May. *In prep*. Single nucleotide polymorphism markers improve hybridization assessment for native California golden trout.
- Stephens, M.R.**, N.W. Clipperton, A.J. Finger, and B.P. May. *In prep*. Conservation genetic status of native Little Kern golden trout using SNP and microsatellite markers.
- Stephens, M. R.** Historical roots of the golden trout ecological crisis. *In prep*.

TECHNICAL REPORTS AND LIMITED DISTRIBUTION

- Stephens, M.R.** and B.P. May. 2011. Genetic Analysis of California Native Trout (Phase 4: out-of-basin transplanted golden trout): Final Report to California Department of Fish and Game. Genomic Variation Laboratory, UC Davis.
- Stephens, M.R.**, R.E. Simmons, A.J. Finger, and B.P. May. Genetic Analysis of California Native Trout (Phase 3, redband, cutthroat and golden trout): Final Report to California Department of Fish and Game. (Agreement# P0981009). Genomic Variation Laboratory, UC Davis. 47 pp.
- Baerwald, M.R., **M.R. Stephens**, K.S. Bork, M.H. Meek, K.M. Tomalty, and B.P. May. Spring-run Chinook salmon genetic management plan. Report to California Department of Fish and Game - San Joaquin River Restoration Program. (Agreement #P0740017). Genomic Variation Laboratory, UC Davis. 124 pp.
- Stephens, M.R.** and B.P. May. 2010. Genetic Analysis of California Native Trout (Phase 2, Little Kern golden trout): Final Report to CDFG (California Department of Fish and Game (Agreement #P0781013). Genomic Variation Laboratory, UC Davis. July 10, 2010. 23 pp.
- Deiner, K.L., **Stephens, M.R.** and B.P. May. 2010. Aquatic Restoration in Upper Kern River of Sequoia National Park: Final report to the Kern Community Foundation. (Contract # 08-004094). Genomic Variation Laboratory, UC Davis, April 13, 2010. 27 pp.

- P.B. Erickson, P.B., **M.R. Stephens** and B.P. May. 2010. Genetic Assessment of Kern River Rainbow Trout: Final Report to the Kern Community Foundation. (Contract # 07-000717). Genomic Variation Laboratory, UC Davis, February 2010. 16 pp.
- Simmons, R.E., **Stephens, M.R.** and B.P. May. 2008. Native Trout Genetics Report: for work completed through May 2008 with 2007-08 SFRA funding (Contract: P0480052). Genomic Variation Laboratory, UC Davis May 29, 2008. 12 pp.
- Finger, A.J., **M.R. Stephens**, and B.P. May. 2008. Paiute cutthroat trout genetics report: for work completed through 5/30/2008 (Contract: P0480052). Genomic Variation Laboratory, UC Davis, September 1, 2008. 26 pp.
- Stephens, M.R.** and B.P. May. 2007. Final Report: Genetic analysis of California golden trout. California Department of Fish and Game. Contract #P0480052. Genomic Variation Laboratory, UC Davis. September 20, 2007. 49 pp.
- Stephens, M.R.** and B.P. May. 2006. Genetic analysis of California golden trout and Little Kern golden trout. Interim Report to the California Department of Fish and Game, Sport Fish Restoration Act funding. Genomic Variation Laboratory, UC Davis. 44 pp.
- Stephens, M.R.** A.E. Spowles, N.W. Clipperton, and B.P. May. 2006. Genetic monitoring of introgression of rainbow trout genes into California golden trout (*Oncorhynchus mykiss aguabonita*). Final Report to the U.S. Fish and Wildlife Service. 8 pp.
- Stephens, M.R.**, A.E. Spowles, N.W. Clipperton, J.K. Pedroia, and B.P. May. July, 2005. Conservation genetic analysis of golden trout: systematic relationships of Kern Basin golden trout and molecular marker development for evaluating introgression with introduced rainbow trout. Final Report to the California Department of Fish and Game and U.S. Fish and Wildlife Service. 24 pp.
- Cordes, J.F., **M.R. Stephens**, B.P. May. 2003. Genetic diversity and hybridization in California golden trout from the South Fork Kern River and various transplanted populations. Report to the California Department of Fish and Game Threatened Trout Committee. 65 pp.
- Leyse, K.E., A.J. Lind, W.K. Savage, H.B. Shaffer, and **M.R. Stephens**, University of California, Davis. May 2003. Tissue Collection Protocol for Genetic Research. 9 pp.

INVITED TALKS

- Stephens, M.R.** and R.E. Schwartz. Restoration of native California fish species: genetic perspectives on golden trout and Sacramento perch. June 2006. Society for Conservation Biology Short Course in Restoration Genetics, San Jose, CA.
- Stephens, M.R.** and B.P. May. March 2006. Single nucleotide polymorphism marker application to introgression in California golden trout. California Golden Trout Coordination Meeting, Rancho Cordova, CA.
- Stephens, M.R.**, A.J. Finger N.W. Clipperton, and B.P. May. December 2005. Genetic update on AFLP, microsatellite, and SNP marker studies of Little Kern golden trout. Little Kern golden trout interagency meeting, Porterville, CA.
- Stephens, M.R.**, A.E. Spowles, J.K. Pedroia, N.W. Clipperton, J.L. Petersen, and B.P. May. March 2005. Molecular marker development and application to hybrid detection for California Golden Trout. California Golden Trout Coordination Meeting, Rancho Cordova, CA.
- Stephens, M.R.** May 2005. Perspectives on Graduate School and Ecological Research. The Wildlife Society, Davis Chapter.
- Stephens, M.R.** August 2004. Hybridization and Conservation: the roles of genetic research and human values in golden trout management and restoration. Meeting of the Kaweah Flyfishers, Visalia, CA.

PRESENTATIONS

- K.M.H. Tomalty, **M.R. Stephens**, N.A. Fangue, M.H. Meek, B.P. May and M.R. Baerwald. 2012. "Transcriptome Response to Acute Thermal Stress in Juvenile Chinook Salmon." Plant and Animal Genomics, January 2012.
- M.H. Meek, K.S. Bork, M.R. Baerwald, **M.R. Stephens**, K.M. Tomalty, and B.P. May. 2011. "Hatchery and Genetic Management of Salmon Re-Introduction in the San Joaquin River, CA." American Fisheries Society Meeting, Seattle, WA.
- Stephens, M.R.** 2011. "California golden trout UC Davis genetics update." Presentation to the California Golden Trout Coordination Meeting, Rancho Cordova, CA. March 16, 2011.
- Stephens, M.R.** 2011. California Golden trout and other native trout genetics. 2011. Presentation to the Department of Fish and Game, Annual Threatened Trout meeting. Davis, CA. April 2011.
- Stephens, M.R.** and B.P. May. April 2008. AFS 2008. The value of genetic management plans in recovery and preservation of native trout species. California Nevada Chapter American Fisheries Society, Lake Tahoe, CA.
- P.B. Erickson, **M.R. Stephens**, and B.P. May. April, 2008. The search for the Kern River rainbow trout using genetic markers. California Nevada Chapter American Fisheries Society, Lake Tahoe, CA. Poster.
- Stephens, M.R.**, N.W. Clipperton, A.J. Finger, and B.P. May. September, 2007. Putting the 'gold' back into golden trout: genetic assessment of hybridization with non-native rainbow trout. American Fisheries Society, San Francisco, CA
- Stephens, M.R.**, A.E. Sprowles, J.K. Pedroia, and B.P. May. September, 2007. Genetic relationships among California's native trout. American Fisheries Society, San Francisco, CA.
- Stephens, M.R.**, N. W. Clipperton, A.J. Finger, and B.P. May. September, 2007. SNP-based assessments of hybridization: implications for the conservation of endemic golden trout, *Oncorhynchus mykiss aguabonita* and *O. m. whitei*. Six Decades of Fishery Genetics, Seattle, WA.
- Stephens, M.R.**, N.W. Clipperton, A.J. Finger, and B.P. May. September 2006. Single nucleotide polymorphism marker application to introgression in native California trout species. American Fisheries Society, Lake Placid, NY.
- Stephens, M.R.**, N.W. Clipperton, A.J. Finger, and B.P. May. June 2006. SNPs and hybridization: development, application, and long-term monitoring. Coastwide Salmonid Genetics Meeting, Santa Cruz, CA.
- Stephens, M.R.**, N.W. Clipperton, A.J. Finger, and B.P. May. April 2006. Comparative genetic analysis of introgression in native golden trout species using SNPs and microsatellite markers. Threatened Trout Meeting, California Department of Fish and Game. Davis, CA.
- Stephens, M.R.**, A.E. Sprowles, N.W. Clipperton, J.K. Pedroia, and B.P. May. April 2005. Trout subspecies relationships and molecular marker development for native trout. Threatened Trout Meeting, California Department of Fish and Game. Davis, CA.
- A.E. Sprowles, **M.R. Stephens**, N.W. Clipperton, J.K. Pedroia, J.L. Petersen, and B.P. May. April 2005. Development of SNP Markers for California golden, redband, and other trouts. American Fisheries Society, Genetics Section SNP Workshop: Developing Cooperative Databases for Pacific Salmon. Anchorage, AK.
- B.P. May, J.K. Pedroia, A.E. Sprowles, and **M.R. Stephens**. April 2004. Molecular marker development. Threatened Trout Meeting, California Department of Fish and Game. Davis, CA.

J.F. Cordes, **M.R. Stephens**, and B.P. May. September 2003. Prioritizing Management Efforts for Hybrid Elimination and Restoration of California Golden Trout. American Fisheries Society. Quebec City, Canada.

Stephens, M.R. May 2003. Molecular genetic tissue sample collection training. USDA Forest Service, Pineridge Ranger District, Prather, CA. *Oral presentation and field training session.*

Stephens, M.R. and D.J. Girman. January 2002. Conservation Genetics of western and Yosemite toads. Declining Amphibian Populations Task Force Meeting, San Diego, CA. *Poster.*

Stephens, M.R. and D.J. Girman. August 2001. Population genetics of the western toad and the biogeography of California. Society for the Study of Evolution. University of Tennessee, Knoxville.

Stephens, M.R. and D.J. Girman. March 2001. Conservation genetics of the western toad and the Biogeography of California. Bay Area Conservation Biology Symposium, University of California, Davis.

Stephens, M.R. and D.J. Girman. June 2000. Phylogeography of the western toad (*Bufo boreas*). American Society of Ichthyologists and Herpetologists. La Paz, Baja California Sur, Mexico. *Poster.*

PROFESSIONAL SERVICE

San Joaquin River Restoration Program Genetic Subgroup member

San Joaquin River Restoration Program Conservation Subgroup member

Coastwide Salmonid Genetics 2012 Meeting planning committee

Journal Reviewer: Molecular Ecology, Minnesota Sea Grant proposal review, Transactions of the American Fisheries Society, Molecular Ecology Resources

Admissions Committee, Graduate Group in Ecology, 2006

Student Planning Committee, American Fisheries Society 137th Annual Meeting, San Francisco, CA (2007)

Co-chair (March 2005), Conservation Genetics and Management Session: Meeting of the minds: bringing together managers and geneticists for conservation planning. California Nevada Chapter, American Fisheries Society, Sacramento, CA.

Co-chair, Conservation Biology Seminar Series (Winter Quarter, 2005), Conservation in the Anthropocene: The science, policy, and philosophy of conservation in an age of human influence.

President (2004-2005), **Secretary** (2003-2004), **Society for Conservation Biology, Davis chapter**; Bay Area Conservation Biology Symposium program committee chair (2008)

PROFESSIONAL AFFILIATIONS

-American Fisheries Society
-American Society of Ichthyologists and Herpetologists
-Association for Women in Science

-Partners in Amphibian and Reptile Conservation
-Phi Sigma
-Society for Conservation Biology
-AAAS

SPECIAL SKILLS

Supervisory:

- Supervised support staff and students in field, laboratory, and classroom settings.

Fieldwork:

- Genetic sample collection
- Amphibian identification and survey methodology
- Fish and amphibian genetic sample collection
- Stream survey, stream classification (Rosgen) and stream condition inventory (SCI) protocols

Laboratory Techniques:

- DNA extraction
- Polymerase chain reaction and qPCR and SNP genotyping
- Florescent staining and imaging of gels
- Genotyping microsatellite and minisatellite DNA loci using manual and automated PAGE
- Genotyping allozyme loci using starch gel electrophoresis
- Restriction methods: AFLP, SSCP, RFLP
- DNA Sequencing

Data analysis and presentation:

- Genotyping microsatellite data
- Microsatellite primer and multiplex design
- DNA sequence analysis using DNASTAR and Sequencher Genecodes Software
- Population genetics software (e.g., GENEPOP, FSTAT, TFGA, Arlequin, STRUCTURE, and others)
- Phylogenetics software (e.g., MrBayes, PHYLIP, PAUP* and others)
- ArcView GIS mapping
- Presentation software (PowerPoint)
- Web design using Microsoft Front Page and Word
- Graphic design (Adobe Photoshop, Microsoft PictureIt Publisher)

REFERENCES

- Dr. Bernie May, Ph.D. thesis advisor 530-754-8123 bpmay@ucdavis.edu
Adjunct Professor, Department of Animal Science, UC Davis
- Dr. Peter Moyle 530-752-6355 pumoyle@ucdavis.edu
Professor, Wildlife Fish and Conservation Biology, UC Davis
- Dr. Holly Ernest DVM, PhD 530-754-8245 hbernest@ucdavis.edu
Associate Director, Veterinary Genetics Laboratory Wildlife and Ecology Unit; Asst. Professor,
Wildlife Genetics, Department of Population Health and Reproduction, School of Veterinary Medicine,
UC Davis
- Dr. Derek Girman, M.A. thesis advisor 707-664-3055 girman@sonoma.edu
Associate Professor, Department of Biology, Sonoma State University

Additional references available upon request