

KEVIN JOHN ROE

Associate Professor
Department of Natural Resource Ecology & Management
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EDUCATION

Ph.D. (1999) The University of Alabama, Tuscaloosa, Biology
Advisor: Dr. Charles Lydeard

M.S. (1994) University of Georgia, Athens, Zoology
Advisor: Dr. Joshua Laerm

B.S. (1988) University of Georgia, Athens, Zoology
Advisor: Dr. Grace Thomas

PROFESSIONAL EXPERIENCE

Associate Professor (2015 – present)

Natural Resource Ecology and Management (85%), Ecology, Evolution and Organismal Biology (15%), Iowa State University; Ecology and Evolutionary Biology Interdepartmental Program Affiliation, Interdepartmental Genetics and Genomics Graduate Program Affiliation.

Supervisor: Dr. Steven Dinsmore

Duties: My appointment is 45% research, 45% teaching, and 10% institutional service. I conduct applied and basic research in the field of conservation genetics, teach core courses in the Biology undergraduate program and the Animal Ecology major, and provide service to the department, college, and university as well as the broader scientific community.

Adjunct Assistant Professor (2005 – 2015)

Natural Resource Ecology and Management, Iowa State University

Research Associate (2003 – present)

Malacology Department, The Academy of Natural Sciences, Philadelphia, Pennsylvania

Curator of Mollusks Delaware Museum of Natural History, Wilmington, Delaware (2003 - 2005)

Duties: Conduct research on mollusks, enhance the holdings of the museum through research and acquisition of additional materials, interact with the public and potential donors during outreach events.

Postdoctoral Research Associate (2001 – 2003)

Biology Department, St. Louis University, St. Louis, Missouri

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Duties: Conduct research on the molecular phylogenetic systematics of the Order Petromyzontiformes, train and mentor graduate and undergraduate students, publish research findings.

Postdoctoral Research Associate (1999 – 2001)

Department of Biological Sciences, University of Alabama, Tuscaloosa, Alabama

Duties: Conduct research on the molecular phylogenetic systematics of the Family Centrarchidae, train and mentor graduate and undergraduate students, publish research findings.

Graduate Research Assistant/Fellow (1994 – 1999)

Department of Biological Sciences, University of Alabama

Graduate Teaching Assistant (1990 – 1994)

Department of Zoology, University of Georgia

RESEARCH ACTIVITIES

Peer-Reviewed Articles and Chapters Published since ISU Appointment, 2015 (9) (*ISU graduate or **visiting graduate mentee)

32) Simpson, N, AP Bybel, MJ Weber, CL Pierce, **KJ Roe** (2019) Occurrence, Abundance, and Associations of Topeka Shiners (*Notropis topeka*) in Restored and Unrestored Oxbows in Iowa and Minnesota, USA. *Aquatic Conservation: Marine and Freshwater Ecosystems* 2019: 1-14.

[Impact factor = 2.988] Role: 25% design, 0% analyses, 10% writing. Co-PI on proposal that supported research. Contributed to the design and execution, edited several drafts. Significance: This paper tests a variety of ecological variables to determine features that are associated with the occurrence and abundance of Topeka shiners in off-channel habitats.

31) Peterson, DAM, D Andersen, LA Biederman, TM Ditonto, and **KJ Roe** (2019) Mitigating implicit gender bias in student evaluations of teaching. *PLoS ONE*

[Impact factor = 2.766] Role: 20% design, 20% analyses, 20% writing. Significance: This paper represents an attempt to determine if the gender bias in student evaluations of instructors can be ameliorated by including a statement concerning gender bias in the evaluation materials.

30) R-W Wu**, X-J Liu, S Wang, **KJ Roe**, S Ouyang, and X-P Wu. (2019) Analysis of mitochondrial genomes resolves the phylogenetic position of Chinese freshwater mussels (Bivalvia: Unionidae). *ZooKeys* 812: 23-46.

[Impact factor = 0.938] Role: 25% design, 10% analyses, 10% writing. Contributed to the design and execution, edited several drafts. Significance: This paper represents one of a few papers to use molecular phylogenetics to understand the evolutionary relationships of freshwater mussels in a poorly understood but hyper-diverse area of the world. In it we revise the classification of several genera, and lay a framework for future studies.

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- 29) Zambory, C*, H Ellis, C Pierce, **KJ Roe**, MJ Webber, K Schilling, NC Young. (2019) The Development of a GIS Methodology to Identify Oxbows and Former Stream Meanders from LiDAR-Derived Digital Elevation Models. *Remote Sensing* 11, 12; doi:10.3390/rs11010012
[Impact factor = 3.244] Role: 25% design, 0% analyses, 10% writing.
Co-PI on proposal that supported research. Contributed to the design and execution, edited several drafts.
Significance: This paper presents a GIS model to aid land managers in identifying landscape features that may be critical for a number of aquatic species including the federally endangered Topeka Shiner.
- 28) Wu, R-W**, Y-T Liu, S Wang, X-J Liu, Zanatta, DT, **KJ Roe**, X-P Wu. (2018) Testing the utility of DNA barcodes and a preliminary phylogenetic framework for Chinese freshwater mussels (Bivalvia:Unionidae) from the middle and lower Yangtze River. *PLoS ONE* 13(8): e0200956
[Impact factor = 2.766] Role: 25% design, 10% analyses, 30% writing. Substantial role in organization and writing of manuscript.
Significance: This paper evaluates the use of DNA barcodes for recognizing species of Chinese freshwater mussels. We also use the resulting genetic data to construct phylogenetic hypotheses for relationships within several Chinese genera for the first time.
- 27) Chong, JP*, **KJ Roe**. (2017) A comparison of population structure and gene flow patterns between and endangered freshwater mussel, its common relative and their shared host. *Conservation Genetics* DOI: 10.1007/s10592-017-1015-x
[Impact factor = 2.040] Role: 50% design, 20% analyses, 40% writing. Major role in conceptualization, execution and sample collection. Assisted with analysis, Substantial role in writing of manuscript.
Significance: This paper represents the first time the population genetic structure of two freshwater mussels and their fish host were estimated from the same collection locations. Our results reveal differences in the structure of mussels and host fish that reflect ecological differences in these taxa.
- 26) McMurray, SE, **KJ Roe**. (2017) Considerations for the Controlled Propagation, Augmentation, and Reintroduction of Freshwater Mussels (Mollusca: Bivalvia: Unionoida). *Freshwater Mollusk Biology and Conservation* 20: 1-12.
[Impact factor = N/A] Role: 45% design, 50% analyses, 50% writing. Significant role in conceptualization, wrote 50% of manuscript, editing of manuscript.
Significance: This paper describes a series of steps that must be taken and considerations before initiating a program to artificially propagate and reintroduce freshwater mussels. This field represents an area in which I am expanding my research.
- 25) Araujo R, S Schneider, **KJ Roe**, K Erpenbeck, and A Machordom. (2016) The origin and phylogeny of Margaritiferidae (Bivalvia: Unionoida). A synthesis of molecular and fossil data. *Zoologica Scripta*, DOI: 10.1111/zsc.12217
[Impact factor = 3.057] Role: 30% design, 10% analyses, 40% writing. Initiated collaborative relationship, assisted with sample collection, data generation, substantial effort in writing and editing of manuscript.
Significance: This paper is a global analysis of the phylogenetic relationships within the freshwater mussel family Margaritiferidae and is one of the first of any study of freshwater mussels to include fossil and recent data.

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- 24) Chong, JP*, JL Harris, **KJ Roe**. (2016) Incongruence between mtDNA and nuclear data in the freshwater mussel genus *Cyprogenia* (Bivalvia: Unionidae) and its impact on species delineation. *Ecology and Evolution*, DOI: 10.1002/ece3.2071
[Impact factor = 2.537] Role: 50% design, 10% analyses, 40% writing. Assisted with sample collection, analysis of data, writing and editing of manuscript.
Significance: This paper resolves confounding patterns of genetic relationships observed in this genus and provides additional data to support a mechanism that created the observed incongruence.
- 23) **Roe, KJ** and SL Boyer. (2015) A comparison of genetic diversity between sympatric populations of the endangered winged-mapleleaf (*Quadrula fragosa*) and the pimpleback (*Amphinaias pustulosa*) in the St. Croix River, USA. *Bulletin of the American Malacological Society*.33(1):1-9.
[Impact factor = 1.22] Role: 80% design, 100% analyses, 75% writing. Generation and analysis of data, writing and editing of manuscript.
Significance: This is the first paper to compares the genetic diversity of an endangered freshwater mussel species and its close relative from the same collecting locations. The data collected reveals that differences in genetic diversity and effective population sizes between these species and proposes explanations for the observed differences.

Peer-Reviewed Articles and Chapters Published prior to ISU Appointment, 1997-2014 (22)

- 22) **Roe, KJ**. (2013) Molecular phylogenetics and zoogeography of the freshwater mussel genus *Ptychobranchnus* (Bivalvia: Unionidae). *Bulletin of the American Malacological Society*. 31(2):257-265.
[Impact factor = 1.22] Role: 100% design, 100% analyses, 100% writing. Generation and analysis of data, writing and editing of manuscript.
- 21) Randklev, CR, MS Johnson, ET Tsakiris, S Rogers-Oetker, **KJ Roe**, JL Harris, S McMurray, C Robertson, J Groce, and N Wilkins. (2012) False spike, *Quadrula mitchelli* (Bivalvia: Unionidae), is not extinct: first account of a live population in over 30 years. *Bulletin of the American Malacological Society* 30: 327-328.
[Impact factor = 1.22] Role: 10% design, 10% analyses, 10% writing. Assisted with fieldwork, conceptual development, and writing of manuscript.
- 20) O'Bryhim, J, JP Chong, SL Lance, KL Jones and **KJ Roe**. (2012) Development and characterization of sixteen microsatellite markers for the federally endangered species: *Leptodea leptodon* (Bivalvia: Unionidae) using paired-end Illumina shotgun sequencing. *Conservation Genetics Resources*.4:787-789.
[Impact factor = 0.742] Role: 80% design, 50% analyses, 75% writing. Lead in conceptual development, analysis of data, and writing of manuscript.
- 19) von Rintelen, K, TJ Page, Y Cai, **KJ Roe**, B Stelbrink, BR Kuhajda, T Iliffe, J Hughes, T von Rintelen. (2011) Drawn to the dark side: a molecular phylogeny of freshwater shrimps (Crustacea: Decapoda: Caridea: Atyidae) reveals frequent cave invasions and challenges current taxonomic hypotheses. *Molecular Phylogenetics and Evolution* 63:82-96.
[Impact factor = 3.61] Role: 30% design, 10% analyses, 30% writing. Generation and analysis of data, and writing of manuscript.

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- 18) Bagley, J, RL Mayden, **KJ Roe**, WE Holznagel, PH Harris. (2011) Congeneric phylogeographical sampling reveals polyphyly, challenges species' limits within black basses (Centrarchidae: *Micropterus*). *Biological Journal of the Linnean Society* 104:346-363.
[Impact factor = 2.19] Role: 10% design, 10% analyses, 10% writing. Generation and analysis of data, and editing of manuscript.
- 17) Hemmingsen, AH, **KJ Roe**, and JM Serb. (2009) Development and characterization of eleven microsatellite markers for the endangered winged-mapleleaf, *Quadrula fragosa* (Bivalvia, Unionidae). *Molecular Ecology Resources* 9:1460-1466.
[Impact factor = 3.1] Role: 10% design, 50% analyses, 50% writing. Analysis of data, writing and editing of manuscript.
- 16) **Roe, KJ**, RL Mayden, and PM Harris. (2008) Systematics and zoogeography of the Rockbasses (Centrarchidae: *Ambloplites*). *Copeia* 2008:858-867.
[Impact factor = 1.1] Role: 100% design, 100% analyses, 75% writing. Generation and analysis of data, writing and editing of manuscript.
- 15) Bogan, AE and **KJ Roe**. (2008) Freshwater bivalve (Unioniformes) diversity, systematics, and evolution: status and future directions. *Journal of the North American Benthological Society* 27:349-370.
[Impact factor = 2.8] Role: 50% design, 50% analyses, 50% writing. Writing and editing of manuscript.
- 14) Harris, P M, **KJ Roe**, and RL Mayden. (2005) Phylogenetic relationships of the sunfish genus *Lepomis* (Actinopterygii: Centrarchidae): alternative hypotheses derived from complete mitochondrial Cytochrome *b* gene sequences. *Copeia* 2002: 897-905.
[Impact factor = 1.1] Role: 10% design, 10% analyses, 25% writing. Generation of data and editing of manuscript.
- 13) Campbell, DC, JM Serb, JE Buhay, **KJ Roe**, RL Minton, and C Lydeard. (2005) Phylogeny of North American amblemines: prodigious polyphyly proves pervasive. *Invertebrate Zoology*. 124:131-164.
[Impact factor = 1.32] Role: 50% design, 10% analyses, 10% writing. Generation of data and editing of manuscript.
- 12) **Roe, KJ** and P Hartfield. (2005) *Hamiota*, a new genus of freshwater mussel (Bivalvia: Unionidae) from the southeastern United States. *The Nautilus* 119:1-10.
[Impact factor = 0.57] Role: 80% design, 100% analyses, 75% writing. Writing and editing of manuscript.
- 11) **Roe, KJ**, PM Harris, and RL Mayden. (2002) Phylogenetic relationships of the genera of North American sunfishes and basses (Percoidei: Centrarchidae) as evidenced by the mitochondrial cytochrome *b* gene. *Copeia* 2002(4): 897-905.
[Impact factor = 1.1] Role: 80% design, 100% analyses, 75% writing. Generation of data, writing and editing of manuscript.
- 10) **Roe, KJ**, P Hartfield and C Lydeard. (2001) Molecular systematics of the threatened and endangered superconglutinate producing mussels of the genus *Lampsilis* (Bivalvia: Unionidae) *Molecular Ecology* 10: 2225-2234.
[Impact factor = 5.52] Role: 80% design, 100% analyses, 75% writing. Generation of data, writing and editing of manuscript.

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- 9) **Roe, KJ** and C Lydeard. (1999) Species delineation and the identification of evolutionary significant units: Lessons from the freshwater mussel genus *Potamilus* (Bivalvia: Unionidae). *Journal of Shellfish Research*, 17:1359-1363.
[Impact factor = .79] Role: 100% design, 100% analyses, 100% writing. Generation of data, writing and editing of manuscript.
- 8) **Roe, KJ** and C Lydeard. (1998) Molecular systematics of the freshwater mussel genus *Potamilus* (Bivalvia: Unionidae). *Malacologia* 39:195-205.
[Impact factor = 1.43] Role: 100% design, 100% analyses, 100% writing. Generation of data, writing and editing of manuscript.
- 7) Lydeard, C and **KJ Roe**. (1998) Phylogenetic systematics: The missing ingredient in the conservation of freshwater unionid bivalves. *Fisheries* 23:16-17.
[Impact factor = 2.37] Role: 50% design, 50% analyses, 50% writing. Writing and editing of manuscript.
- 6) **Roe, KJ**, AM Simons, and P Hartfield. (1997) Identification of a fish host of the inflated heelsplitter *Potamilus inflatus* (Bivalvia: Unionidae) with a description of its glochidium. *American Midland Naturalist*, 138:48-54.
[Impact factor = .619] Role: 50% design, 50% analyses, 50% writing. Data collection, analysis, and writing and editing of manuscript.
- 5) Laerm, J, EJ Reitz, and **KJ Roe**. (1993) Records of the Elk, *Cervus elaphus* Erxleben (Mammalia: Cervidae) in Georgia and adjacent regions of the southeastern United States. *Georgia Journal of Science* 51:141-149.
Role: 30% design, 100% analyses, 30% writing. Data collection, analysis, and writing and editing of manuscript.

Books, monographs and proceedings (4)

- 4) Lang, NJ, **KJ Roe**, CB Renaud, HS Gill, IC Potter, J Freyhof, AM Naseka, P Cochran, HE Perez, and E Habit. (2009) Novel Relationships among Lampreys (Petromyzontiformes) Revealed by a Taxonomically Comprehensive Molecular Data Set. *In: Biology, Management, and Conservation of Lampreys in North America*. L. Brown, S. Chase, M. Mesa, R. Beamish, and P. Moyle (eds.) *American Fisheries Society Symposium*. 72.
Role: 50% design, 10% analyses, 25% writing. Generation of data, editing of manuscript.
- 3) **Roe, KJ** and WR Hoeh. (2003) Systematics of Freshwater Mussels (Bivalvia: Unionoida). *In: C. Lyderard and D. Lindberg (Eds.) Molecular Systematics and Phylogeography of Mollusks*. p. 93-122. Smithsonian Institution Press, Washington, D.C.
Role: 50% design, 50% analyses, 50% writing. Wrote and edited manuscript.
- 2) **Roe, KJ** (2000) The utility of DNA sequences to aid in the identification of rare or problematic species of freshwater mussels. *In: Proceedings of the Freshwater Mollusk Conservation Society*. Tankersley, RA, Warmolts, DI, Watters, GT, Armitage, BJ, Johnson, PD and Butler RS (Eds.) Ohio Biological Survey, Columbus, Ohio.
Role: 100% design, 100% analyses, 100% writing. Generation of data, writing and editing of manuscript.
- 1) Lydeard, C and **KJ Roe**. (1997) The phylogenetic utility of the mitochondrial cytochrome *b* gene for inferring relationships of actinopterygian fishes. *In: Molecular Systematics of Fishes*. C Stepien and T Kocher (Eds.) Academic Press, San Diego.

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Role: 30% design, 50% analyses, 50% writing. Data generation, writing and editing of manuscript.

Manuscripts in review (5)

- 5) Bybell, AP, NT Simpson, MJ Weber, CL Pierce, and **KJ Roe**. (2020) Rangewide population structure and gene flow of the Topeka shiner (*Notropis topeka*). Submitted to *Conservation Genetics*
Role: 50% design, 50% analyses, 50% writing. Data generation, writing and editing of manuscript.
- 4) Kim, KS, **KJ Roe**. (2020) Genome-wide ddRAD-Seq reveals species relationships and fine-scale population genetic structure in freshwater mussels (*Cyprogenia* spp.). Submitted to *Scientific Reports*
Role: 50% design, 50% analyses, 50% writing. Data generation, writing and editing of manuscript.
- 3) Schwarz, S, **KJ Roe**. (2020) Historical and contemporary gene flow in the Sheepnose mussel (*Plethobasus cyphus*) and their implications for conservation. Submitted to *Conservation Genetics*
Role: 50% design, 50% analyses, 50% writing. Data generation, writing and editing of manuscript.
- 2) Simpson, NT, AP Bybell, MJ Weber, CL Pierce, **KJ Roe**. (2020) Occurrence, Abundance, and Associations of Topeka Shiners (*Notropis topeka*) in Restored and Unrestored Oxbows in Iowa and Minnesota, USA. Submitted to *Freshwater Conservation*
Role: 30% design, 10% analyses, 10% writing. Data generation, writing and editing of manuscript.
- 1) Chong JP, **KJ Roe**. (2020) Assessing sperm and zygote-mediated gene flow in freshwater mussels (Bivalvia: Unionidae). Submitted to *Molecular Ecology*
Role: 50% design, 50% analyses, 50% writing. Data generation, writing and editing of manuscript.

Research Presentations since ISU Appointment, 2015 (24)

(*ISU graduate student mentee)

Invited presentations (2)

- 1) **Roe, KJ**. 2019. Representation and the adaptive potential of species. Conservation Genetics and USFWS Species Status Assessment Workshop. San Antonio, Texas
- 2) **Roe, KJ**. 2016. Phylogenetics and species delineation. Population Genetics and Freshwater Mollusk Conservation Workshop. National Conservation Training Center, Shepherdstown, WV.

Contributed Talks and Posters (24)

- 3) **Roe, KJ** and KS Kim. 2019. Genome-wide ddRad seq data disentangles species relationships and reveals fine-scale population genetic structure in freshwater mussels (*Cyprogenia* spp.) in North America. Freshwater Mollusk Conservation Society Meeting, San Antonio, Texas.

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- 4) **Roe, KJ** and S. Schwarz*. 2019. Historic and contemporary gene flow in the sheepnose mussel (*Plethobasus cyphus*) and their implications for conservation. Freshwater Mollusk Conservation Society Meeting, San Antonio, Texas.
- 5) **Roe, KJ** and KS Kim. 2018. Genome-wide ddRad seq data disentangles species relationships and reveals fine-scale population genetic structure in freshwater mussels (*Cyprogenia* spp.) in North America. 1st Freshwater Mollusk Conservation Society Meeting in Europe, Verbania, Italy.
- 6) Simpson, NT, AP Bybel*, MJ Weber, CL Pierce, and **KJ Roe**. 2018. Occurrence and abundance of Topeka Shiners in unrestored and restored oxbows in Iowa and Minnesota. Iowa Water Conference, Ames, IA.
- 7) Bybel, AP*, NT Simpson, CL Pierce, MJ Weber, and **KJ Roe**. 2018. Genetic analysis of Topeka Shiner utilization of oxbows in Iowa and Minnesota. Iowa Water Conference, Ames, IA.
- 8) C.L. Zambory*, H. Ellis, C.L. Pierce, **K.J. Roe**, and M.J. Weber. 2018. Integrating LiDAR Landscape Analysis and Species Distribution Models to Prioritize Areas for Off-Channel Restoration. Iowa Water Conference, Ames, IA.
- 9) Bybel, AP*, **KJ Roe**, CL Pierce, and MJ Weber. 2018. Genetic analysis of Topeka Shiner utilization of oxbows in Iowa and Minnesota. Iowa Chapter of the American Fisheries Society, Rathbun, IA.
- 10) Simpson, NT, AP Bybel*, MJ Weber, CL Pierce, and **KJ Roe**. 2018. Occurrence, abundance, and habitat use of Topeka Shiners in restored and unrestored oxbows in Iowa and Minnesota. Iowa Chapter of the American Fisheries Society, Rathbun, IA.
- 11) C.L. Zambory*, H. Ellis, C.L. Pierce, **K.J. Roe**, and M.J. Weber. 2018. Integrating LiDAR Landscape Analysis and Species Distribution Models to Prioritize Areas for Off-Channel Restoration. American Fisheries Society, Rathbun, Iowa.
- 12) Bybel, AP*, NT Simpson, CL Pierce, MJ Weber, and **KJ Roe**. 2018. Genetic analysis of Topeka Shiner utilization of oxbows in Iowa and Minnesota. 78th Midwest Fish and Wildlife Conference, Milwaukee, WI.
- 13) Simpson, NT, AP Bybel*, MJ Weber, CL Pierce, and KJ Roe. 2018. Occurrence and abundance of Topeka Shiners in unrestored and restored oxbows in Iowa and Minnesota. 78th Midwest Fish and Wildlife Conference, Milwaukee, WI.
- 14) Zambory C*, H. Ellis, CL Pierce, KJ Roe, and MJ Weber. 2018. Integrating LiDAR landscape analysis and species distribution models to prioritize areas for oxbow restoration. 78th Midwest Fish and Wildlife Conference, Milwaukee, WI.
- 15) Chong, JP* and **KJ Roe**. 2017. Assessing the contributions of sperm and glochidia to gene flow in freshwater mussels (*Bivalvia*: Unionidae). Freshwater Mollusk Conservation Society, Cleveland, OH.
- 16) Zambory C*, H. Ellis, CL Pierce, **KJ Roe**, and MJ Weber. 2017. Off-channel mapping for identifying and prioritizing Topeka Shiner restoration sites. Society for Conservation GIS Annual Meeting, Monterey, CA.

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- 17) Zambory C*, H. Ellis, CL Pierce, **KJ Roe**, and MJ Weber. 2017. The creation of Iowa's own Watershed Health Assessment Framework to guide oxbow restoration for the conservation of the Topeka Shiner. Iowa Chapter of the American Fisheries Society Annual Meeting, Ames, IA.
- 18) Zambory C*, H Ellis, CL Pierce, **KJ Roe**, and MJ Weber. 2017. The use of landscape variable associations with Topeka Shiner occupation of off-channel habitats to prioritize potential restoration sites. Iowa Chapter of the American Fisheries Society Annual Meeting, Ames, IA.
- 19) Simpson, NT, MJ Weber, CL Pierce, and **KJ Roe**. 2017. Status and habitat use of the Topeka Shiner in the Boone River watershed, Iowa. Iowa Chapter of the American Fisheries Society Annual Meeting, Ames, IA.
- 20) Bybel, AP*, **KJ Roe**, CL Pierce, and MJ Weber. 2017. Status Update and Genetic Analysis of Topeka Shiners in Three Basins in Iowa and Minnesota. American Fisheries Society, Ames, IA.
- 21) Bybel, AP*, **KJ Roe**, CL Pierce, and MJ Weber. 2016. Habitat Associations of Topeka shiners in Two Basins in Iowa and Minnesota. Midwest Fish and Wildlife Conference.
- 22) Simpson, N, MJ Weber, CL Pierce, and **KJ Roe**. 2016. Status and Habitat Use of the Topeka Shiner in the Boone River Watershed, Iowa. Midwest Fish and Wildlife Conference.
- 23) Mahguib J* and **Roe KJ**. 2015. Population genetics and phylogenetic placement of the federally endangered Iowa Pleistocene snail *Discus macclintocki* (Mollusca: Gastropoda). (Poster). American Malacological Society, Pellston, MI.
- 24) Chong, JP* and **Roe, KJ**. 2015. Comparing the gene flow pattern of the endangered scaleshell *Leptodea leptodon* with widely distributed fragile papershell *Leptodea fragilis* and their host fish. American Malacological Society, Pellston, MI.
- 25) Chong, JP* and **Roe, KJ**. 2015. Using genetic structure of a common freshwater mussel species (*Leptodea fragilis*) to examine the impact of host dispersal on an endangered mussel species (*Leptodea leptodon*). Freshwater Mollusk Conservation Society, St. Charles, Missouri. Freshwater Mollusk Conservation Society, St. Charles, MO.
- 26) **Roe, KJ**. and MJ Weber. 2015. Suicidal tendencies? Evidence for "suicidal reproduction" in female scaleshell mussel. (*Leptodea leptodon*) (Bivalvia: Unionidae). Freshwater Mollusk Conservation Society, St. Charles, Missouri. Freshwater Mollusk Conservation Society, St. Charles, MO.

Research Presentations prior to ISU Appointment, 2015

Invited Talks (13)

- 1) **Roe, KJ**. 2014. A comparison of genetic diversity between sympatric populations of the endangered winged-mapleleaf (*Quadrula fragosa*) and its common congener the pimpleback (*Quadrula pustulosa*) in the St. Croix River, USA. Mollusca 2014, Mexico City, MX.
- 2) **Roe, KJ**. 2010. Conservation genetics of the federally threatened Louisiana pearlshell mussel (*Margaritifera hembeli*). University of Northern Iowa, Cedar Falls, IA.

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- 3) **Roe, KJ.** 2009. Conservation genetics of the federally threatened Louisiana pearlshell mussel (*Margaritifera hembeli*). Macalaster College, St. Paul, MN.
- 4) **Roe, KJ.** 2008. The utility of non-destructive methods of DNA acquisition for conservation genetic studies of freshwater mussels. Society for Conservation Biology, Chattanooga, TN
- 5) **Roe, KJ.** 2008. An introduction to landsnail identification, terminology, and literature with an overview of North American diversity and systematic relationships. American Malacological Society, Carbondale, IL.
- 6) **Roe, KJ.** 2007. Genetic issues in the conservation of benthic freshwater organisms. North American Benthological Society. Columbia, SC.
- 7) **Roe, KJ.** 2007. Freshwater bivalves (Unioniformes) diversity, systematics and evolution: Status and future directions. Plenary Presentation, Freshwater Mollusk Conservation Society, Little Rock, AR.
- 8) **Roe, KJ.** 2004. An Introduction to Phylogenetic Analysis Using DNA sequences. Conservation Genetics Workshop on Imperiled Freshwater Mollusks and Fishes. National Conservation Training Center, Shepherdstown, WV.
- 9) **Roe, KJ.** 2004. Systematics, Biogeography and Host-Parasite Evolution in Freshwater Mussels (Bivalvia: Unionidae) and Black Basses (Centrarchidae). Department of Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C.
- 10) **Roe, KJ.** 2002. Historical biogeography in the Central Highlands region of North America: A comparison of the ability of analytical methods to resolve conflicting data. American Malacological Society, Charleston SC.
- 11) **Roe, KJ.** 2001. Systematics and biogeography of freshwater mussels and a phylogenetic perspective on host-parasite associations and the evolution of lures in North American members of the freshwater mussel tribe Lampsilini (Bivalvia: Unionidae). Department of Fisheries and Wildlife Conservation, University of Minnesota, Minneapolis/St. Paul, MN.
- 12) **Roe, KJ.** 1999. Molecular systematics and evolution of North American freshwater mussels (Bivalvia: Unionidae). Department of Biological Sciences, Indiana State University, Lafayette, IN.
- 13) **Roe, KJ.** 1997. Species delineation and the identification of evolutionarily significant units in the freshwater mussel genus *Potamilus* (Bivalvia: Unionidae). National Shellfisheries Association, Ft. Walton, FL.

Contributed Talks (24)

- 14) **Roe, KJ.** 2013. A comparison of genetic diversity between sympatric populations of the endangered winged mapleleaf (*Quadrula fragosa*) and the not-so-endangered pimpleback (*Quadrula pustulosa*) in the St. Croix River, USA. Freshwater Mollusk Conservation Society, Guntersville, AL.
- 15) Chong, JP*, Harris, JH, **Roe, KJ.** 2013. Using molecular data to aid delineation of two species in the freshwater mussel genus *Cyprogenia* (Bivalvia: Unionidae). Freshwater Mollusk Conservation Society, Guntersville, AL.

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- 16) **Roe, KJ.** 2011. Genetic structure and intra specific phylogeography of the sheepnose mussel (*Plethobasus cyphus*). Freshwater Mollusk Conservation Society, Louisville KY
- 17) **Roe, KJ.** 2010. Conservation genetics of the federally threatened Louisiana pearlshell mussel (*Margaritifera hembeli*). World Congress of Malacology, Phuket, Thailand.
- 18) **Roe, KJ.** 2009 Conservation genetics of the federally threatened Louisiana pearlshell mussel (*Margaritifera hembeli*). Freshwater Mussel Conservation Society, Baltimore, MD.
- 19) **Roe, KJ.** 2008 The utility of non-destructive methods of DNA acquisition for conservation genetic studies of freshwater mussels. American Malacological Society, Carbondale, IL.
- 20) **Roe, KJ.** 2007 Taxonomy and phylogenetic relationships of Nicaraguan freshwater mussels (Bivalvia: Unionidae). World Congress of Malacology, Antwerp, Belgium.
- 21) **Roe, KJ.** 2006 Testing the hypothesis of Pleistocene speciation in rock basses (*Ambloplites*: Centrachidae). Natural Resource Ecology and Management, Iowa State University, Ames IA.
- 22) **Roe, KJ.** 2006 Taxonomic revision of endemic Niaraguan freshwater mussels (Bivalvia: Unionidae) Part II. American Malacological Society, Seattle, WA.
- 23) **Roe, KJ.** 2005 Taxonomic revision of endemic Niaraguan freshwater mussels (Bivalvia: Unionidae). American Malacological Society, Asilomar, Pacific Grove, CA.
- 24) **Roe, KJ.** 2005 Conchological and genetic variation in the kidneyshell (*Ptychobranchus fasciolaris*) (Rafinesque, 1820). Freshwater Mollusk Conservation Society, St. Paul, MN.
- 25) **Roe, KJ.** 2004. Systematics, Biogeography and Host-Parasite Evolution in Freshwater Mussels (Bivalvia: Unionidae) and Black Basses (Centrarchidae). Conservation Genetics Workshop on Imperiled Freshwater Mollusks and Fishes. National Conservation Training Center, Shepherdstown, WV.
- 26) **Roe, KJ.** 2003 Aquatic biodiversity in Alabama and Cuba: An exploration of ancient connections as evidenced by freshwater cave shrimps of the family Atyidae (Crustacea: Decapoda). Alabama-Cuba Initiative, Tuscaloosa, AL.
- 27) **Roe, KJ.** 2003. A test of the satellite species hypothesis and the evolution of parasitism/non-parasitism in the lamprey genus *Ichthyomyzon* (Petromyzontiformes: Petromyzontidae). Society for the Study of Evolution, Chico, CA.
- 28) **Roe, KJ.** 2003. An overview of the freshwater mollusk collections curated at the Delaware Museum of Natural History. Freshwater Mollusk Conservation Society, Durham, NC.
- 29) **2001 Roe, KJ.** Molecular phylogenetics and biogeography of the freshwater mussel genus *Ptychobranchus* (Bivalvia: Unionidae). Freshwater Mollusk Conservation Society, Pittsburgh, PA.
- 30) **Roe, KJ.** 2001. A phylogenetic perspective on host-parasite associations and the evolution of lures in North American members of the freshwater mussel tribe Lampsilini (Bivalvia: Unionidae). Freshwater Mollusk Conservation Society, Pittsburgh, PA.

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- 31) **Roe, KJ.** 2000. Phylogenetic relationships of sunfishes and basses, Family Centrarchidae, as evidenced by mitochondrial DNA sequences. American Society of Ichthyologists & Herpetologists, La Paz, Baja California Sur, MX.
- 32) **Roe, KJ.** 2000. Phylogenetic relationships of sunfishes and basses, Family Centrarchidae, as evidenced by mitochondrial DNA sequences. Association of Southeastern Biologists, Chattanooga, TN.
- 33) **Roe, KJ.** 1999. The utility of a molecular genetic database to aid the identification of rare or problematic species for conservation purposes. Freshwater Mollusk Conservation Society, Chattanooga, TN.
- 34) **Roe, KJ.** 1998. Molecular systematics of the superconglutinate producing mussels of the genus *Lampsilis* (Bivalvia: Unionidae). World Congress of Malacology, Washington, D.C.
- 35) **Roe, KJ.** 1997. A preliminary assessment of the generic relationships of the Lampsilini (Bivalvia: Unionidae) based on a portion of the 16S rRNA gene. American Malacological Union, Santa Barbara, CA.
- 36) **Roe, KJ.** 1996. Molecular systematics of the genus *Potamilus* (Bivalvia: Unionidae) with comments on the evolution of glochidial characters. American Malacological Union, Chicago, IL.
- 37) **Roe, KJ.** 1995. Molecular systematics of the Middle American cichlid fish genus *Cichlasoma* (*Amphilophus*). American Society of Ichthyologists and Herpetologists, Edmonton, Alberta, Canada.

Grant Funding since ISU appointment (\$1,048,923.00)

Project Title	Agency	Duration	Amount
Understanding the current population genetic structure and levels of genetic diversity within populations of <i>Potamilus metnecktayi</i> (Salina mucket), <i>Truncilla cognata</i> (Mexican Fawnsfoot), and <i>Truncilla macrodon</i> (Texas Fawnsfoot). Co-PIs, Roe KJ., Randklev, C., Johnson, N., Smith, C.	U.S. Fish and Wildlife Service	2019 - 2022	\$109,000
Role: Co-PI [50% project design; 50% writing of proposal].			
An index of oxbow restoration quality for Topeka Shiners based on the fish assemblage. Co-PIs, Pierce C., Roe KJ, Weber MJ.	IA Soybean Association	2018-2021	\$143,864
Role: Co-PI [25% project design; 30% writing of proposal].			
Development of a genetic focused guidance	U.S. Fish	2018-2021	\$91,250.00

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document on captive propagation and case study using a rare central Texas mussel, <i>Lampsilis bracteata</i> (Texas Fatmucket). Co-PIs, Randklev, C., Roe KJ.	and Wildlife Service			
Role: Co-PI [50% project design; 50% writing of proposal].				
Evaluating restored mussel population genetics and survivorship. Co-PIs, Roe KJ, Pierce, C.	Iowa DNR	2018-2020	\$264,998.00	
Role: Co-PI [50% project design; 50% writing of proposal].				
2017 Genetic Identification of hybrid striped bass.	Iowa DNR	2017-2018	\$9,125.00	
Role: PI [100% project design; 100% writing of proposal].				
Habitat Improvement Projects for Stream Fish Species of Greatest Conservation Need. Co-PIs, Pierce C., Roe KJ, Weber MJ.	State Wildlife Grant – Competitive.	2015-2018	\$496,419.00 (\$228,144 to ISU).	
Role: Co-PI [33% project design; 33% writing of proposal].				
Genetic characterization of Winged-mapleleaf (<i>Quadrula fragosa</i>) mussels from the St. Croix River.	USFWS	2015-2018	\$13,300.00	
Role: PI [100% project design; 100% writing of proposal].				
Use of genetic analysis for the identification of Asian carp reproduction in the Upper Mississippi River basin. Co-PI with MJ Weber	USFWS	2015-2017	\$24,000.00	
Role: PI [50% project design; 50% writing of proposal].				
Genetic identification of hybrid striped bass.	Iowa DNR	2015-2016	\$5,967.00	
Role: PI [100% project design; 100% writing of proposal].				

Proposals not Funded since ISU Appointment, 2015 (\$2,444,336.00)

Project Title	Agency	Year Submitted	Amount
Population Genetic Structure of the Rabbitsfoot (<i>Theiladerma cylindrica</i> (Say, 1817)) Co-PIs, Roe KJ, McMurray, S., Inoue, K.	U.S. Fish and Wildlife Service	2019	\$163,000
Role: Co-PI [75% project design; 75% writing of proposal].			
Evaluating potential interactions	South Dakota Game,	2018	\$1,022,543.00

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among native Walleye and Sauger and introduced Smallmouth Bass in South Dakota. Co-PIs, Roe KJ, Weber MJ.	Fish and Parks		
Role: Co-PI [50% project design; 50% writing of proposal].			
PIRS Seed Grant: Does macro-organismal diversity influence ecosystem function by mediating microbial diversity? Co-PI's KJ Roe and G Wilkinson.	Iowa State University	2018	\$46,503.00
Role: Co-PI [50% project design; 50% writing of proposal].			
CSBR: Securing Iowa's biodiversity legacy through development of the Iowa State University vertebrate natural history collections. KJ Roe	NSF	2017	\$482,208.00
Role: PI [100% project design; 100% writing of proposal].			
Linking Nutrient reduction and Topeka shiner conservation in oxbow wetlands. Co-PIs, Weber MJ, Pierce C, and Roe KJ	US EPA	2017	\$340,380.00
Role: PI [33% project design; 33% writing of proposal].			
Abandoned quarries as population sources: implications for oxbow restoration to conserve Topeka shiners along a critical habitat stream in west central Iowa. Co-PIs, Pierce C, Weber MJ, and Roe KJ.	USFWS and USGS Science Support Partnership.	2016	\$149,624.00
Role: PI [33% project design; 33% writing of proposal].			
Ability of oxbow wetlands to sequester agriculturally derived nutrients while providing critical habitat to the endangered Topeka shiner: a balance of anthropocentric and ecological services. Co-PIs, Weber MJ, Roe KJ, and Pierce C	Leopold Center for Sustainable Agriculture	2016	\$166,893.00
Role: PI [33% project design; 33% writing of proposal].			
Linking nutrient reduction and Topeka shiner conservation in the Plains Prairie Pothole Co-PI's Pierce, C, MJ Weber, KJ Roe, A Kenney, and K. McPeck.	USFWS Landscape Conservation Cooperative	2015	\$236,185.00
Role: PI [33% project design; 33% writing of proposal].			

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TEACHING ACTIVITIES (Since 2015) Courses Taught, Undergraduate (3)

1) Fish Biology, AECL 321 (2015–present; 3 credits; role is 100%). This course imparts an understanding of the diversity of fishes and the physiological challenges they have overcome to allow them to exist and thrive under a variety of conditions. Students work both in the classroom and in the field during lab periods, developing technical understanding and critical thinking skills, working both individually and in groups.

2) Genetics for Natural Resource Managers, NREM 315 (2015–present; 3 credits; role is 50%). This course presents basic genetic concepts by using recent publications from the primary literature as a framework to instill an understanding of the material. Students work individually and in groups to make connections between the lectures on various topics and the real-world application of those topics in the published literature. Students demonstrate their progress at the end of the semester in a group presentation of their paper to the class.

3) Introductory Biology, Biol 211 (2015–present; 3 credits; role is 100%). This course provides students with an introduction to of the origins and diversity of life, inheritance, population genetics, natural selection and evolution, and ecology. Although primarily lecture based, I use a variety of techniques to educate and instill interest in the various topics. For example, I may bring in snack- foods derived from a member of the organismal group being discussed to share with the students, or demonstrate a particular process (mitosis) by having students act as chromosomes during cell division.

Courses Taught, Graduate (3)

1) EEB 698 Water use in the West (Fall 2017; 1 credit; role is 100%). This graduate seminar was an exploration of the history of and attitudes about water use in the USA facilitated through a reading of "Cadillac Desert: The American West and Its Disappearing Water."

2) EEB 698/NREM 505 The Endangered Species Act: why it matters, how it works, and why it's controversial. (Spring 2019; 1 credit; role is 50%) This graduate seminar investigates the history and impact of the Endangered Species Act through structured readings and case studies.

3) EEB 585 Ecology and Evolution in the Desert Southwest. (Spring 2019; 2 credits; role is 50%) This graduate course combines in class meetings consisting of presentations by the graduate students on the geology, and biotic and cultural diversity of the Sonoran Desert. The class culminates in a field trip to the Sonoran Desert where students will participate in a long-term research project and explore the various aspects of the region.

STUDENT MENTORING Undergraduate Students

Research Mentor

Since current appointment (8)

2020 – present	Toni Sleugh, McNair Scholar
2019 – 2019	Ashley Brown, Undergraduate Research Assistant
2019 – 2020	Austin Waters, Undergraduate Research Assistant

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2018 – 2019	Juan Carlos Mungaray, Undergraduate Research Assistant
2017 – 2019	Ailish Wasserman, Undergraduate Research Assistant
2017 – present	Dylan Powell, Undergraduate Research Assistant
2017 – 2018	Madison Perry, Undergraduate Research Assistant
2016 – 2018	Jared Riemenschneider, Undergraduate Research Assistant
2016 – 2017	Cole Wesselman, Undergraduate Research Assistant
2014 – 2017	Mitchell Atneosen, Undergraduate Research Assistant

Prior to current appointment (9)

2013 – 2014	Jamie Gray, ISU Undergraduate Research Assistant
2013 – 2014	Morgan Sexton, ISU Undergraduate Research Assistant
2012 – 2013	Issac Jepsen, ISU Freshman Honors student
2012 – 2013	Sara Studemann, ISU Freshman Honors student
2010 – 2011	Kim Sorsby, ISU Freshman Honors student
2008 – 2009	Sara Anderson, ISU Freshman Honors student
2007 – 2009	Ryann Cressey, ISU Undergraduate student
2007 – 2007	Kattie Fetterman, ISU Freshman Honors student
2006 – 2007	Stephen Robinson, ISU Undergraduate student

Undergraduate Academic Advisees (10)

Fisheries and Aquatic Biology

2014 – 2015	Matthew Vanyo
2014 – 2016	Makayla Mcgrew
2014 – 2016	Andrew Paulsen
2014 – 2017	Jed Siegwarth
2015 – 2017	Marco Benitez
2017 – 2019	Thomas Hansen
2017 – 2019	Jordan Vetter
2018 – 2019	Matthew Ellis
2018 – 2019	David Livingston
2018 – 2019	Taylor Frederickson

Graduate Students (4)

Academic Advisor, ISU (5)

- 1) Jer Pin Chong (Ph.D. Ecology and Evolutionary Biology program, 2011 – 2016).
Dissertation title: Genetic variation in freshwater mussels (*Bivalvia: Unionidae*) and its implications for species delineation and conservation.
- 2) Jermaine Mahguib (Ph.D. Ecology, Evolution, and Organismal Biology, 2014 – present).
Dissertation title: Population genomics and phylogeography of the terrestrial snail *Webhelix multilineata*.
- 3) Sara Schwarz (M.S. Natural Resource Ecology and Management, 2016 – 2018) Thesis title: Conservation implications of historical and contemporary gene flow in the sheepnose mussel (*Plethobasus cyphus*).

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- 4) Alex Bybel (M.S. Natural Resource Ecology and Management, 2016 – 2018) Thesis title: Genetic Diversity and Population Structure of Topeka Shiners (*Notropis topeka*).
- 5) Katelyn Miller (M.S. Natural Resource Ecology and Management, 2019 – present) Thesis title: TBD

Academic Co-Advisor, ISU (2)

1. Courtney Zambory (M.S. Natural Resource Ecology and Management, 2016 – 2018) Thesis title: Geospatial Methods for Aquatic Conservation: Topeka Shiner Restoration Site Selection and the Development of an Iowa Watershed Health Assessment.
2. Ruiwen Wu (Ph.D. Graduate Fellow, Nanchang University, 2018 - 2019) Dissertation title: Phylogenetic systematics of Chinese freshwater mussels.

POS Committee (7)

1. Jose Lopez, EEB, (Ph.D 2018 - present)
2. Caleb Krueger, EEB, (Ph.D 2017 – present)
3. Nick Simpson NREM, Fisheries, (M.S. 2016 – 2018)
4. Jessica Judson EEB, (Ph.D. 2014 - present)
5. Finn Piatscheck EEB, (Ph.D. 2014 - 2018)
6. Nick Davis – EEB, (Ph.D. 2104 – 2018)
7. Clare Adams – EEB, (M.S. 2017)

Postdoctoral Researchers (2)

1. Ken Wray, Ph.D. (2016 – 2017 Post-Doctoral Fellow)
2. Carol L. Chaffee, Ph.D. (2013 – 2014 HHMI Post-Doctoral Fellow)

Visting Scholars (1)

Dr. Jiayan Xie, Ph.D. Associate Professor Wuhan Polytechnic University (Scholarship to visit ISU 2019-2020)

SERVICE

Iowa State University Service

Standing Committees/Positions:

Iowa State University

- Resources, Policy and Administration (RPA) Council 2019- present
 - CALS Representative

Department of Natural Resource Ecology and Management (NREM)

- Curriculum Committees, NREM and Fisheries and Aquatic Biology 2016 - present
- Library Liaison 2016 - present
- Faculty Senator 2016 – present

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- CALS Caucus 2016 - present

Ecology and Evolutionary Biology (EEB)

- Curriculum Committee, 2015 – present, Chair, 2017 – present
- Supervisory Committee, 2017 – present

Ad Hoc Committees

Department of Natural Resource Ecology and Management (NREM)

- Natural History Collections (chair) 2016- present

Professional Service

- Managing Editor, American Malacological Bulletin, 2015 - present
- Reviewed manuscripts for Smithsonian Institution Press, *Biodiversity and Conservation*, *Copeia*, the journal of American Society of Ichthyologists and Herpetologists, *Environmental Practice*, *Freshwater Biology*, *Marine Biology*, *Molecular Ecology*, *Molecular Biology and Evolution*, *Molecular Phylogenetics and Evolution*, *Journal of Molluscan Studies*, *Walkeriana*, and *Zootaxa*.
- Panelist and *Ad Hoc* Reviewer - National Science Foundation
- Chair, Land snail sub-committee, Iowa DNR Wildlife Action Plan, 2008 – present
- Co-chair, Mussel sub-committee, Iowa DNR Wildlife Action Plan, 2008 – present
- Chair, Genetics Committee. Freshwater Mollusk Conservation Society, 2016 – present
- Chair, Distribution/Status Committee. Freshwater Mollusk Conservation Society, 2002 – 2006

Professional affiliations

American Malacological Society
Malacological Society of London
Association of Systematic Biologists
Freshwater Mollusk Conservation Society