

Work Contact Information

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Robert W. Van Kirk
Associate Professor of Mathematics
Affiliate Faculty in Geosciences
Idaho State University
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EDUCATION

Ph.D. in Mathematics, University of Utah, Salt Lake City, UT, 1995

Emphasis Areas: applied mathematics, numerical analysis, mathematical biology
Dissertation Title: *Integro-difference Models of Biological Growth and Dispersal*
Advisor: Mark A. Lewis

M.S. in Environmental Systems, Humboldt State University, Arcata, CA, 1990

Emphasis Areas: mathematical modeling, population dynamics, conservation biology
Thesis Title: *Black-footed Ferret Population Dynamics: Use of Simulation Modeling to Investigate the Effects of Stochasticity, Habitat Geometry and Dispersal*
Advisor: Roland H. Lamberson

Graduate study in mathematics and meteorology, Colorado State Univ., Ft. Collins, CO, 1985-86

B.A. in Mathematics, *magna cum laude*, Humboldt State University, 1984

Emphasis Area: applied mathematics

RESEARCH AND TEACHING POSITIONS

Associate Professor of Mathematics, Idaho State University, 2005-present

Visiting Scholar, Idaho Water Resources Research Institute, University of Idaho, 2005-2006

Assistant Professor of Mathematics, Idaho State University, 2000-2005

Adjunct Assistant Professor of Mathematics, Idaho State University, 1999-2000

Independent Scientific Consultant, 1998-1999

Visiting Instructor in Mathematics, Humboldt State University, 1998

Research Director, Henry's Fork Foundation, Ashton, ID, 1994-1998

Lecturer in Mathematics, Humboldt State University, 1990-1991

Instructor of Mathematics, College of the Redwoods, Eureka, CA, 1990-1991

PEER-REVIEWED PUBLICATIONS

Van Kirk, R.W. and S.L. Naman. *In press*. Relative effects of water use and climate on base-flow trends in the lower Klamath Basin. *Journal of the American Water Resources Association*.

Johnson, B.G., G.L. Thackray and R.W. Van Kirk. 2007. The effect of topography, latitude, and lithology on rock glacier distribution in the Lemhi Range, central Idaho, USA. *Geomorphology* 91:38-50.

Van Kirk, R.W. and S.L. Hill. 2007. Demographic model predicts trout population response to selenium based on individual-level toxicity. *Ecological Modelling* 206:407-420.

Van Kirk, R. W. and L. Benjamin. 2001. Status and conservation of salmonids in relation to hydrologic integrity in the Greater Yellowstone Ecosystem. *Western North American Naturalist* 61:359-374.

Jaeger, M. E., R. W. Van Kirk and T. Kellogg. 2000. Distribution and status of Yellowstone cutthroat trout in the Henry's Fork watershed. *Intermountain Journal of Sciences* 6:197-216.

Van Kirk, R. W. 2000. Henry's Fork aquatic resources bibliography. *Intermountain Journal of*

Sciences 6:312-332.

- Van Kirk, R. W. and L. Benjamin. 2000. Physical and human geography of the Henry's Fork watershed. *Intermountain Journal of Sciences* 6:106-118.
- Van Kirk, R. W. and M. Gamblin. 2000. History of fisheries management in the upper Henry's Fork watershed. *Intermountain Journal of Sciences* 6:263-284.
- Van Kirk, R. W. and R. Martin. 2000. Interactions among aquatic vegetation, waterfowl, flows and the fishery below Island Park Dam. *Intermountain Journal of Sciences* 6:249-262.
- Gregory, J. S., S. S. Beesley and R. W. Van Kirk. 2000. Effect of springtime water temperature on the time of emergence and size of *Pteronarcys californica* in the Henrys Fork catchment, Idaho, USA. *Freshwater Biology* 45:77-83.
- Benjamin, L. and R. W. Van Kirk. 1999. Assessing instream flow and reservoir operations on an eastern Idaho river. *Journal of the American Water Resources Association* 35:899-909.
- Van Kirk, R. W. and M. A. Lewis. 1999. Edge permeability and population persistence in isolated habitat patches. *Natural Resource Modeling* 12:37-64.
- Van Kirk, R. W. and C. B. Griffin. 1997. Building a collaborative process for restoration: Henrys Fork of Idaho and Wyoming. In J.E. Williams, M.P. Dombeck, W. Elmore and C.A. Wood, eds. *Watershed Restoration: Principles and Practices*. American Fisheries Society, Bethesda, MD, pp. 253-276.
- Van Kirk, R. W. and M. A. Lewis. 1997. Integrodifference models for population persistence. *Bulletin of Mathematical Biology* 59:107-137.

TECHNICAL REPORTS, EDITED COLLECTIONS, AND ABSTRACTS

- Van Kirk, R.W. and S.W. Naman. 2007. Separating effects of water-use and climatic changes on base flow in the lower Klamath Basin. Report to U.S. Fish and Wildlife Service, Arcata, CA. 31 pp.
- Van Kirk, R. W., J. M. Capurso and M.A. Novak, editors. 2006. Exploring differences between fine-spotted and large-spotted Yellowstone cutthroat trout. Symposium Proceedings, Idaho Chapter American Fisheries Society, Boise, ID.
- Van Kirk, R.W. and S.L. Hill. 2006. Modeling predicts trout population response to selenium based on individual-level toxicity. Report to Greater Yellowstone Coalition, Idaho Falls, ID. 24 pp.
- Van Kirk, R. and A. Jenkins. 2005. Hydrologic alteration in the upper Teton watershed and its implications for cutthroat trout restoration. Report to Friends of the Teton River, Driggs, ID. 72 pp.
- Van Kirk, R. and B. Burnett. 2004. Hydrologic alteration and its ecological effects in the Henry's Fork watershed upstream of St. Anthony. Report to Henry's Fork Watershed Council, Ashton, ID, and other organizations. 66 pp.
- Moller, S. and R. Van Kirk. 2003. Hydrologic alteration and its effect on trout recruitment in the South Fork Snake River. Report to Idaho Department of Fish and Game, Idaho Falls, ID. Department of Mathematics, 92 pp.
- Van Kirk, R. W., J. M. Capurso and B. L. Gamett, editors. 2003. The Sinks symposium: exploring the origin and management of fishes in the Sinks drainages of southeast Idaho. Symposium Proceedings, Idaho Chapter American Fisheries Society, Boise, ID.
- Van Kirk, R. W. and B. L. Gamett. 2003. Geography and fishes of the Sinks Drainages of southeastern Idaho (abstract). *Intermountain Journal of Sciences* 9:147.

- Gregory, J. and R. Van Kirk, editors. 2002. Henry's Fork of the Snake River Subbasin Summary (Draft). Northwest Power Planning Council (now Northwest Power and Conservation Council), Portland, OR. 148 pp. plus appendices.
- Van Kirk, R., L. Benjamin and D. Patla. 2000. Riparian area assessment and amphibian status in the watersheds of the Greater Yellowstone Ecosystem. Greater Yellowstone Coalition, Bozeman, MT. 102 pp.
- Van Kirk, R. 1999. Status of fisheries and aquatic habitats in the Greater Yellowstone Ecosystem. Greater Yellowstone Coalition, Bozeman, MT. 36 pp.
- Van Kirk, R. 1999. Angler effort, catch and attitudes on Henry's Lake Outlet. Report to The Nature Conservancy, Eastern Idaho Field Office, Idaho Falls, ID. 32 pp.
- Van Kirk, R. and S. Beesley. 1999. Downstream migration of rainbow trout in the Buffalo River during 1997 and 1998. Report to Idaho Fish and Wildlife Foundation, Boise, ID. 31 pp.
- Van Kirk, R., S. Beesley, J. Didier, D. Hanson and D. Hayes. 1999. Angler effort and catch and floater use in Box Canyon. Report to Idaho Fish and Wildlife Foundation, Boise, ID. 24 pp.
- Van Kirk, R. and K. Giese. 1999. Angler effort and catch on the Buffalo River during 1998 and effects of the Buffalo River fish ladder on the Box Canyon rainbow trout population. Report to Idaho Fish and Wildlife Foundation. 19 pp.
- Van Kirk, R., D. Hanson, G. Peracca, K. Giese and A. Kitching. 1999. Angler attitudes on the Mack's Inn reach of the Henry's Fork of the Snake River. Report to Idaho Fish and Wildlife Foundation. 17 pp.
- Van Kirk, R., L. Albano, J. Didier and D. Hayes. 1997. Angler effort and catch on the Buffalo River, 1996 and 1997. Henry's Fork Foundation, Ashton, ID. 16 pp.
- Van Kirk, R., A. Frazier, B. Smith and A. Mali. 1997. Floater use and attitudes on the Big Springs Water Trail and use of Wood Road 16 on the Targhee National Forest. Henry's Fork Foundation, Ashton, ID. 17 pp.

CONFERENCE AND PROFESSIONAL SOCIETY MEETING PRESENTATIONS

- Van Kirk, R. and S. Hill. Demographic model predicts trout population response to individual-level toxicity. Lemley Intermountain Conference on the Environment, September 2007, Pocatello, ID.
- Van Kirk, R. and S. Naman. Statistical detection of stream flow changes due to climatic and water use factors in the lower Klamath Basin. American Fisheries Society, September 2007, San Francisco, CA.
- Van Kirk, R. Changes in hydrologic regimes in the Portneuf River due to water use and climate change. Portneuf Watershed Symposium, June 2007, Pocatello, ID.
- Van Kirk, R. and S. Hill. Modeled response of Yellowstone cutthroat trout populations to chronic selenium exposure. Idaho Chapter American Fisheries Society, February 2007, Boise, ID.
- Van Kirk, R. Effects of flow alterations associated with dams and diversions. Invited plenary address, Idaho Chapter American Fisheries Society, February 2007, Boise, ID.
- Johnson, B., G., Thackray, G. D. and R. W. Van Kirk. The effects of topography, latitude, and lithology on the distribution of rock glaciers in the Lemhi Range, Central Idaho. Geological Society of America, October 2006, Philadelphia, PA.
- Bayrd, G. B. and R. W. Van Kirk. Effects of geology and modern water management on channel characteristics. Geological Society of America, October 2006, Philadelphia, PA.

- Van Kirk, R. Greater Yellowstone: Headwaters of a continent. Greater Yellowstone Power of Place Conference, May 2006, Jackson Lake Lodge, WY.
- Bayrd, G. B. and R. W. Van Kirk. Effects of geology and modern water management on hydrology and fluvial geomorphology in the Henry's Fork Watershed, eastern Idaho and western Wyoming. Rocky Mountain Section Geological Society of America, May 2006, Gunnison, CO.
- Johnson, B., G., Thackray, G. D. and R. W. Van Kirk. The effects of topography, latitude, and lithology on the distribution of rock glaciers in the Lemhi Range, Central Idaho. Rocky Mountain Section Geological Society of America, May 2006, Gunnison, CO.
- Colyer, R., R. Van Kirk, K. Peterson, M. Koenig and K. Keetch. Modeled hydrology predicts trout species composition of upper Teton River tributaries. Idaho Chapter American Fisheries Society, February 2006, Idaho Falls, ID.
- Van Kirk, R. and B. Burnett. Effects of anthropogenic hydrologic alteration on fluvial and riparian geomorphology in the Henry's Fork Snake River watershed, Idaho. Geological Society of America, October 2005, Salt Lake City, UT.
- Lifton, Z., G. Thackray, N. Glenn, P. Link and R. Van Kirk. Bedrock strength controls on the valley morphometry of Big Creek, Idaho and Valley Counties, Central Idaho. Geological Society of America, October 2005, Salt Lake City, UT.
- Van Kirk, R., S. Moller, W. Schrader and A. Jenkins. Hydrologic regime as a factor in displacement of native cutthroat trout by nonnative rainbow trout in the upper Snake River basin (poster). American Fisheries Society, September 2005, Anchorage, AK.
- Van Kirk, R. Using the TI-83 graphing calculator to explore single-species population models. Intermountain Section Mathematical Association of America, March 2005, Pocatello, ID.
- Van Kirk, R. and A. Jenkins. Hydrologic regime as a factor in displacement of Yellowstone cutthroat trout by rainbow trout in the Teton River and other upper Snake River basin streams. Idaho Chapter American Fisheries Society, February 2005, Boise, ID.
- Fredericks, J., B. Schrader and R. Van Kirk. A collaborative, multi-faceted approach to Yellowstone cutthroat trout conservation in the South Fork of the Snake River, Idaho. Wild Trout VIII, September 2004, Yellowstone National Park, WY.
- Van Kirk, R. and L. Benjamin. Watershed-scale patterns in native trout abundance and hydrologic integrity in the Greater Yellowstone Ecosystem. Western Division American Fisheries Society, March 2004, Salt Lake City, UT.
- Burnett, B. and R. Van Kirk. Quantitative methodology for assessing hydrologic alteration at the watershed scale. Western Division American Fisheries Society, March 2004, Salt Lake City, UT.
- Moller, S., R. Van Kirk and W. Schrader. Hydrologic alteration and its effect on trout recruitment in the South Fork Snake River. Western Division American Fisheries Society, March 2004, Salt Lake City, UT.
- Van Kirk, R., S. Moller and W. Schrader. Hydrologic alteration and its effect on trout recruitment in the South Fork Snake River. Idaho Chapter American Fisheries Society, February 2004, Moscow, ID.
- Van Kirk, R. Using a historical perspective to analyze human aspects of fisheries management: Examples from the Henry's Fork. Idaho Chapter American Fisheries Society, March 2002, Pocatello, ID.
- Van Kirk, R. The Henry's Fork Watershed Council: Facilitating collaborative, science-based natural resource management. Centennial Science and Society Symposium, February 2002,

- Idaho State University, Pocatello, ID.
- Patla, D.B, C. R. Peterson and R. W. Van Kirk. Distribution and status of amphibians of the Greater Yellowstone Ecosystem (poster). Society for Conservation Biology, June 2000, Missoula, MT.
- Van Kirk, R. Salmonid fishes of the Greater Yellowstone Ecosystem. Southeast Idaho Watershed Conference, October 1999, Pocatello, ID.
- Van Kirk, R. Ecological integrity and conservation of salmonid communities and aquatic habitat in the Greater Yellowstone Ecosystem. Fifth Biennial Scientific Conference on the Greater Yellowstone Ecosystem, October 1999, Yellowstone National Park, WY.
- Van Kirk, R. and R. Martin. Interactions among waterfowl herbivory, aquatic vegetation, fisheries and flows below Island Park Dam, Idaho. 17th Trumpeter Swan Society Conference, September 1999, Idaho Falls, ID.
- Van Kirk, R. Collaboration, Science and Restoration in the Henrys Fork Watershed. American Fisheries Society, August 1998, Hartford, CT.
- Van Kirk, R., D. Delany, J. Griffith, M. Gamblin and J. Gregory. Status of Yellowstone cutthroat trout in the upper Henrys Fork watershed, Idaho (poster). Wild Trout VI, August 1997, Bozeman, MT.
- Van Kirk, R. Restoration of the Henrys Fork Watershed, Idaho: A cooperative effort led by citizens. American Fisheries Society, August 1996, Dearborn, MI.
- Van Kirk, R. Restoration of the Henrys Fork Watershed, Idaho: A cooperative effort led by citizens. Western Regional Instream Flow Conference III, November 1995, Park City, UT.
- Van Kirk, R. Ecosystem management: new roles for research institutions, agencies and citizen groups. Idaho Chapter American Fisheries Society, March 1995, Boise, ID.
- Van Kirk, R. Black-footed ferret population dynamics. Symposium on Population Biology, Pacific Div. American Association for the Advancement of Science, June 1989, Chico, CA.
- Van Kirk, R. and M. Butler. Black-footed ferret population dynamics. Humboldt Conference on Environmental Systems and Natural Resources, February 1989, Arcata, CA.

GRADUATE THESES SUPERVISED

- Reusch, J. Expected completion: 2008. Effects of irrigation and climate change on hydrologic regimes in the Portneuf watershed, Idaho. M.S., Dept. of Mathematics, Idaho State Univ.
- Bayrd, G. B. 2006. The influences of geology and water management on hydrology and fluvial geomorphology in the Henry's Fork of the Snake River, eastern Idaho and western Wyoming. M.S. Thesis, Department of Geosciences, Idaho State University.

EXTERNAL GRANTS AND CONTRACTS RECEIVED

- Evaluation of effectiveness of water and fisheries management actions in reversing decline of native cutthroat trout in the South Fork Snake River. Idaho Department of Fish and Game, \$9,502 to Idaho State University, 2007-2008.
- Predictive modeling of cutthroat and rainbow trout population interactions in the South Fork Snake River. Idaho Department of Fish and Game, \$12,014 to Idaho State University, Dr. Laurie Battle, Co-PI, 2007-2008.
- Coupling management of water quality and quantity: How do hydrology and biological activity interact to control nutrient concentration and export in an impaired Intermountain watershed?

Inland Northwest Research Alliance, \$62,500 to Idaho State University, Dr. Amy Marcarelli and Dr. Colden Baxter, Co-PIs, 2007-2009.

Hydrologic Alteration in the Klamath River Basin. U.S. Fish and Wildlife Service, \$16,500 to Idaho State University, 2006-2007.

Potential Population-level Effects of a Proposed Fish-tissue Selenium Concentration Criterion on Yellowstone Cutthroat Trout. Greater Yellowstone Coalition, \$8,867 to Idaho State University, 2006.

Integrating mathematics into interdisciplinary water resources research and education in the upper Snake River basin. National Science Foundation, \$62,900 to Idaho State University, 2005-2006.

Effects of geology and water management on hydrologic regimes and fluvial processes in the Henry's Fork watershed. Multiple sources, \$14,702 to Idaho State University, 2005-2006.

Teton River hydrologic analysis. Friends of the Teton River, \$10,765 to Idaho State University, 2004-2005.

Teton River fishery juvenile trout abundance and survival assessment. Idaho Department of Fish and Game, \$5,500 to Idaho State University, 2003-2005

A watershed perspective on hydrologic alteration in the Henry's Fork. Multiple sources, \$17,093 (including match) to Idaho State University, 2003-2004

South Fork Snake River hydrologic regime and fish population analysis. Idaho Department of Fish and Game, \$22,642 to Idaho State University, 2002-2004

Intermediate Algebra learning software development. Quant Systems, Inc., Charleston, S.C, \$6,775.00 to Idaho State University, 2002

Restructuring Math 107 at Idaho State University. Idaho State Board of Education Technology Incentive Grant, \$167,116 to Idaho State University, Dr. Dennis Stowe and Dr. Terry Lay, Co-PIs, 2001-2002

Aquatic Resources of the Henry's Fork Watershed Special Issue. Multiple sources, \$11,211 to Intermountain Journal of Sciences, 1999-2000.

Sheridan Creek Restoration. U.S. Environmental Protection Agency Nonpoint Source Management Grant, \$258,000 to Henry's Fork Watershed Council, 1998-2001

AWARDS AND HONORS

Sabbatical leave from Idaho State University to Idaho Water Resources Research Institute, Idaho Falls, ID, Academic Year 2005-2006

Conservation Award, Henry's Fork Foundation, June 2005

Best Professional Paper, Idaho Chapter American Fisheries Society Annual Meeting, Moscow, ID, February 2004

Award of Merit for service to Idaho Chapter American Fisheries Society, 2004

Graduate Research Fellowship, University of Utah, 1994

Outstanding Teaching Award, Mathematics Department, University of Utah, 1992

First Prize for Student Papers presented at Symposium on Population Biology, Pacific Division American Association for the Advancement of Science, Chico, CA, June 1989

EXTERNAL PROFESSIONAL SERVICE

Symposium co-organizer and moderator (with M. Novak and J. Capurso), Exploring differences between fine-spotted and large-spotted Yellowstone cutthroat trout. Idaho Chapter American Fisheries Society, Idaho Falls, ID, February 2006

Secretary/Treasurer, Idaho Chapter American Fisheries Society, 2002-2003
Symposium co-organizer and moderator (with D. Baumann), Henry's Fork Watershed Council Water Management Forum. Henry's Fork Watershed Council, Rexburg, ID, May 2002
Symposium co-organizer, program chair and moderator (with B. Gamett and J. Capurso), The sinks symposium: Exploring the origin and management of fishes in the sinks drainages of southeast Idaho. Idaho Chapter American Fisheries Society, Pocatello, ID, February 2002
Guest Editor, *Intermountain Journal of Sciences*, Special issue: Aquatic resources of the Henry's Fork Watershed, 1999-2000
Journal Referee (average two manuscript reviews per year)
Ecological Modelling
Global Ecology and Biogeography
Journal of the American Water Resources Association
Journal of Biological Dynamics
Journal of Theoretical Biology
Natural Resource Modeling
Numerical Methods for Partial Differential Equations
The American Naturalist
Reviewer - Grant Applications (average two grant application reviews per year)
Idaho National Engineering and Environmental Laboratory
National Fish and Wildlife Foundation
Reviewer – Books, Monographs and Book Chapters
American Fisheries Society
Hawkes Publishing
University of California Press
Member, Natural Resource Management Committees
Henry's Fork Drought Management Planning Committee, 2003-present
Henry's Fork Watershed Council Steering Committee, 2002-present
South Fork Snake River Research and Management Group, 2001-present
Friends of the Teton River Research Committee, 2001-present
Trumpeter Swan Implementation Plan, Henry's Fork Flow Subcommittee, 2001
Henry's Fork Watershed Council Native Trout Conservation Subcommittee, 1997-present
Henry's Fork Watershed Council Water Quality Subcommittee, 1997-99
Island Park Hydroelectric Project Advisory Committee, 1995-98
U.S. Bureau of Land Management Upper Snake Resource Advisory Council, 1995-97
Idaho Forest, Wildlife and Range Policy Analysis Group Advisory Committee, 1995-97

DEPARTMENTAL, COLLEGE, AND UNIVERSITY SERVICE

University Curriculum Council, current
University Graduate Council, spring semester 2007
Chair, Department of Mathematics Graduate Committee, 2006-present
Ad hoc departmental committee to establish new minor and major in statistics, 2006-2007
University Undergraduate Research Committee, 2003-2005 (chair, 2004-2005)
Engineering and Applied Science Ph.D. program committee, 2003-2005
Chair, departmental calculus curriculum review and revision committee, 2002-2003
Co-Advisor, Mathematics/CS Club and Mathematical Modeling Contest Teams, 2002-2005
Search committees at department and university levels

Promotion, tenure, and sabbatical review committees at department and college levels
Member of graduate thesis/dissertation committee for more than 20 M.S., Ph.D., and D.A.
students in biology, geology, engineering, and mathematics at Idaho State University,
University of Idaho, and Utah State University.

INVITED SEMINAR AND COLLOQUIUM PRESENTATIONS

Brigham Young University-Idaho Department of Mathematics
Draper Museum of Natural History, Cody, WY
Humboldt State University Department of Fisheries
Humboldt State University Department of Mathematics
Idaho State University Department of Biological Sciences
Idaho State University Department of Geosciences
Idaho State University Department of Mathematics
University of California-Davis Department of Environmental Science and Policy
University of California-Davis Department of Fish, Wildlife and Conservation Biology
Idaho Water Resources Research Institute, University of Idaho, Hydrology Seminar Series
Utah State University Department of Aquatic, Watershed and Earth Resources

COURSES TAUGHT

Pre-algebra and Arithmetic
Beginning Algebra
Intermediate Algebra
Mathematics and Modern Society: Mathematics and Water Management (honors)*
College Algebra
Trigonometry
Precalculus
Calculus I, II and III
Applied Calculus
Introduction to Linear Algebra
Geometry for Elementary School Teachers
Elementary Statistics
Elementary Analysis
Ordinary Differential Equations
Partial Differential Equations (400/500 level)
Quantitative Hydrogeology (team-taught, 400/500 level)*
Mathematical Methods in Hydrogeology (400/500 level short course for working professionals)*
Water Resources of Idaho (400/500 level)*
Spatial Population Modeling (graduate)*
Methods of Applied Mathematics (graduate)
Differential Equations (ODE and PDE, graduate)

*Indicates special courses that I have developed and offered outside of my regular teaching duties (e.g., through a proposal to the university honors program, while on sabbatical leave, during the summer, etc.). In each case, I developed course materials based primarily on my research and management experience rather than on standard syllabi or texts.

PROFESSIONAL SOCIETY MEMBERSHIPS

American Fisheries Society

American Mathematical Society

American Water Resources Association

Geological Society of America

Sigma Xi