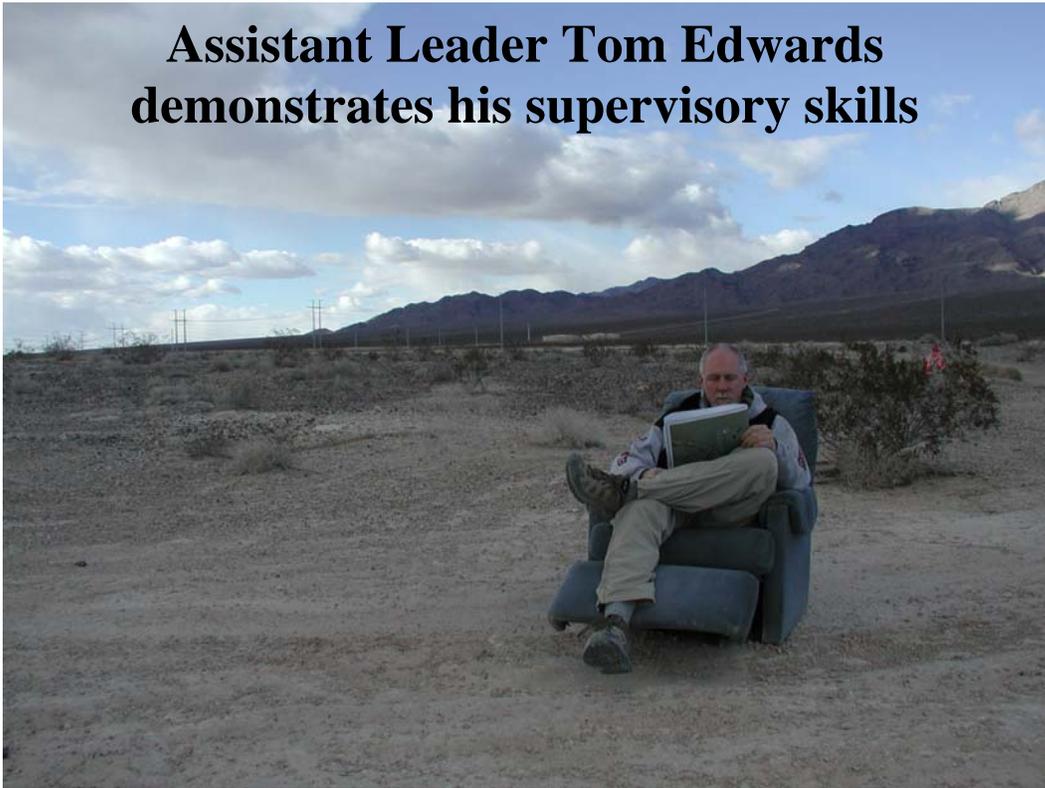

2007 ANNUAL REPORT
USGS Biological Resources Division
Utah Cooperative Fish and Wildlife Research Unit
College of Natural Resources
Utah State University, Logan UT 84322-5290
<http://coopunits.org/cooptor/coopunits.html>

**Assistant Leader Tom Edwards
demonstrates his supervisory skills**



2008 Coordinating Meeting
College of Natural Resources
Utah State University
16 April 2008



Utah State
UNIVERSITY

Cooperators:
USGS Biological Resources
Utah Division of Wildlife Resources
CNR Utah State University
Wildlife Management Institute
U. S. Fish & Wildlife Service

2008 AGENDA
Annual Coordinating Committee Meeting
Utah Cooperative Fish and Wildlife Research Unit
College of Natural Resources
Dean's Conference Room
Utah State University, Logan, UT

Rotating Chair: 1992:USU, 1993:NBS, 1994:UDWR, 1995:WMI, 1996:USU, 1997:USGS, 1998:UDWR, 1999:WMI, 2000:USU, 2001:USGS, 2002:UDWR, 2003:WMI, 2004:USU, 2005:USGS, 2006:UDWR, 2007:WMI, 2008:USU, 2009:USGS, 2010:UDWR

4/15/08 Evening Social: T. Edwards @ 6:00 P.M. 798 Juniper Dr., Logan UT

Wednesday, 16 April 2008

Theme: INITIATIVES AND ACCOMPLISHMENTS—WHERE DO WE STAND

- | | |
|-------------|---|
| 8:00-9:00 | Continental Breakfast |
| 9:15-9:30 | Introductions |
| 9:30-9:45 | Unit Fiscal Health – <i>J. A. Bissonette</i> |
| 9:45-10:15 | CRU Status - <i>Bern Shanks</i> and <i>Kevin Whalen</i> --CRU Program |
| 10:15-11:00 | Summary of Unit Research (<i>J. Bissonette, T. Edwards, P. Budy</i>) |
| 11:00-12:00 | INITIATIVES |
| | ○ State-wide monitoring vision (WAP & UPCD) - <i>T. C. Edwards/ F. Howe</i> |
| | ○ State-wide monitoring (WVCs) - <i>J. A. Bissonette/Anis Aoude</i> |
| | ○ Aquatic monitoring - <i>Phaedra Budy</i> |
| 12:00-1:30 | Catered Lunch CNR Dean's Conference Room |
| 1:30-3:00 | INITIATIVES-continued |
| | ○ Student Agency Internships - <i>F. Howe/B. Baldwin</i> |
| | ○ USU Education Initiatives - <i>Dean Frazer, Assoc Dean Messner, Dept. Heads</i> |
| 3:00-4:00 | Action Items |
| 4:00-4:30 | Comments and Wrap Up |
| | <i>Director & UDWR personnel, Dean Nat Frazer, Department Heads: Chris Luecke, Johan du Toit, Joe Tainter</i> |
| ~4:30 | Departure |

All breaks are open. There will be refreshments throughout the day.

2007 ANNUAL REPORT
USGS Biological Resources Division
Utah Cooperative Fish and Wildlife Research Unit
College of Natural Resources
Utah State University, Logan UT 84322-5290



bunnies, chukars, and salmonids

2007 Research Activities of the Unit Staff

John A. Bissonette
Thomas C. Edwards, Jr.
Phaedra E. Budy

Personnel

Cooperators – Coordinating Committee

United States Geological Survey

Bern Shanks
Western Supervisor
U.S.D.I. Cooperative Research Units
909 First Avenue-Eighth Floor
Seattle, Washington 98104
bernard_shanks@usgs.gov
206-220-4610
Fax: 206-220-4624

Utah Division of Wildlife Resources

James Karpowitz, Director
Utah Division of Wildlife Resources
1594 West North Temple
Salt Lake City, UT 84114-6301
robinthomas@utah.gov
801-538-4705
Fax 801-538-4709

Utah State University

Nat Frazer
Dean
College of Natural Resources
Utah State University
Logan, UT 84322-5200
nat.frazer@usu.edu
797-2452
Fax:435-797-2443

Wildlife Management Institute

Len Carpenter
SW Field Director
4015 Cheney Drive
Fort Collins, CO. 80526
lenc@verinet.com
970- 223-1099

Utah Cooperative Fish and Wildlife Unit Staff

John A. Bissonette
Leader & Professor
Wildland Resources Department
john.bissonette@usu.edu

Thomas C. Edwards, Jr.
Assistant Leader Wildlife & Professor
Wildland Resources Department
t.edwards@nr.usu.edu

Phaedra E. Budy
Assistant Leader Fisheries & Associate Professor
Watershed Sciences Department
phaedra.budy@usu.edu

Shauna Leavitt
Staff Assistant
Utah Cooperative Fish and Wildlife Research Unit
sleavitt@cc.usu.edu

Esther Biesinger
Cecelia Melder
Business Center, College of Natural Resources
busctr@cc.usu.edu

Unit Research Staff and Students

Research Associates:

	
Patricia Cramer, Ph.D.	Gary Thiede, M.S.

Graduate Students by Degree Program:

	
Justin Bingham, M.S.	Jared Bottcher, M.S.
	
Tracy Bowerman, M.S.	Kirk Dahle, M.S.



Andy Dean, M.S.



Jacob Gibson, M.S.



Randy Larsen, Ph.D.



Andy Leidolf, Ph.D.



Ben Nadolski, M.S.



Russell Norvell, Ph.D.



Carrie O'Brien, M.S.



Julie Ripplinger, M.S.



Sara Seidel, M.S.



Hillary White, M.S.



Tammy Wilson, Ph.D.



Jeremiah Wood, M.S.

Mission Statement
Utah Cooperative Fish and Wildlife Research Unit
2007

The major limiting influences upon fishery and wildlife resources in the Intermountain West are terrestrial habitat degradation and loss and watershed and water issues. Loss of winter range for big game, degradation and impacts on riparian areas by agricultural practices, impacts on wildlife rangeland habitat by practices such as sagebrush removal and the planting of cattle forage, as well as change of reservoir and riverine habitat through activities associated with hydroelectric and water delivery systems are the major factors that have and will continue to affect natural resource management in Utah in years to come. Rapid population growth in the state has exacerbated the pressures on both the terrestrial and aquatic resource. Given these trends and the expertise of Unit personnel, the primary mission of the Unit is to address food web and habitat related problems relating to the fishery and wildlife resources of Utah and the Intermountain West.

Cooperating Faculty in the Department, College, and University are, and will continue to be, integrated into Unit research to apply diverse expertise to all facets of a research problem. In addition to the more traditional fields of biological endeavor, expertise in geographical information systems, expert systems, artificial intelligence, sociological science, survey methodology, chemical and contaminant analysis, and computer modeling and methodology, as well as other pertinent fields, can be brought to bear on resource problems. The primary motivation of the Unit is to solve pressing resource problems. Technical expertise of the Unit staff includes: larger scale dynamics, geographical information system and habitat restoration methodology, terrestrial habitat analysis, population management and assessment, aquatic habitat ecology, fish population dynamics, aquatic food web dynamics, and quantitative study design. Our research activities focus on landscape-level habitat studies, ecological modeling of lake, reservoir, and riverine systems, and avian and terrestrial ecology. Future research directions of the Unit will continue to involve endangered fish and wildlife species, sustainable game and sport fish management, terrestrial and aquatic riparian studies, migratory non-game bird research, and geographical information system methodology, and landscape-level studies involving modeling for future scenarios.

Graduate level courses being taught by unit personnel at Utah State University include Design and Analysis of Ecological Research (emphasizes the research process), Topics in Spatial Ecology (emphasizes space from an ecological as well as statistical perspective), Assessment of Fish and Wildlife Populations (emphasizes sampling design and estimation of abundance and survival), and Landscape Ecology (emphasizes the conceptual background of large scale ecology). Unit personnel are involved in continuing education/professional advancement short courses for agency personnel. The Unit is committed to academic pursuit of cooperator interests, and in particular, the needs of the Utah Division of Wildlife Resources. Yet, the strength of the Unit is directly related to its ability to attract outside funds. Research done in the state and region with non-cooperator funds provides added benefits to cooperators. This Unit has and will continue to address resource issues associated with its expertise to the benefit of Utah and the resource management community. Our primary objective is quality science.

**U.S. GEOLOGICAL SURVEY
UTAH COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT
2007
PRODUCTIVITY SUMMARY**

PUBLISHED

**2 BOOKS, 1 BOOK CHAPTER
23 PEER-REVIEWED PAPERS
7 TECHNICAL PUBLICATIONS
2 PUBLIC RELATIONS PUBLICATIONS**

STUDENTS

**2 THESES AND DISSERTATIONS COMPLETED
18 ACTIVE UNIT-DIRECTED STUDENTS**

SEMINARS AND PRESENTATIONS

**21 INVITED
17 CONTRIBUTED**

USGS Utah Cooperative Fish and Wildlife Research Unit
Productivity FY 2007
1 January 2007 to 31 December 2007

PUBLICATIONS

Books and Chapters in Books

- Bissonette, J. A., and I. Storch, eds. 2007. Temporal dimensions of Landscape Ecology: Wildlife Responses to Variable Resources. Springer-Verlag, New York and Heidelberg.
- Bissonette, J. A. 2007. Resource acquisition and animal response in dynamic landscapes: Keeping the books. Pages 13-29 *in*: J. A. Bissonette, and I. Storch, eds. 2007 Temporal Dimensions of Landscape Ecology: Wildlife Responses to Variable Resources. Springer-Verlag, New York and Heidelberg.
- Edwards, T. C., Jr., and D. R. Cutler. 2008 The analysis of ecological data using R. In press, Chapman/CRC Press, Boca Raton, Florida, USA.

Peer- Reviewed Papers

- Al-Chokhachy, R., and P. Budy. 2007. An assessment of the transferability of bull trout microhabitat relationships across three streams in eastern Oregon. *North American Journal of Fisheries Management* 27:1068-1081.
- Bissonette, J. A., and W. Adair. 2008. Restoring habitat permeability to roaded landscapes with isometrically-scaled wildlife crossings. *Biological Conservation* 141:482-488.
- Bissonette J. A., and C. Kassar. 2008. Location of deer-vehicle collisions are unrelated to traffic volume or posted speed limits. *Human Wildlife Conflicts* 2(1):122-130.
- Bissonette, J., and C. Kassar. 2008. Assessment of costs associated with deer-vehicle collisions: Human death and injury, vehicle damage, and deer loss. *Human Wildlife Conflicts* 2(1):17-27
- Bissonette, J. A., and P. C. Cramer. 2007. North American decision guidelines for mitigating roads for wildlife. Page 422 *in* Proceedings of the 2007 International Conference on Ecology and Transportation, C. L. Irwin, D. Nelson, and K. P. McDermott (eds), Center for Transportation and the Environment, North Carolina State University, Raleigh NC.
- Budy, P., G. P. Thiede, and P. McHugh. 2007. A quantification of survival, site-fidelity, abundance, and trend for an important population of endemic cutthroat trout. *North American Journal of Fisheries Management* 27: 593-604.
- Budy, P., and H. Schaller. 2007. Evaluating tributary restoration potential for Pacific Salmon recovery. *Ecological Applications* 17:1068-4086.
- Cramer, P. C. and J. A. Bissonette. 2007. Integrating Wildlife Crossings into transportation plans and projects in North America. Pages 328-334 *in* Proceedings of the 2007 International Conference on Ecology and Transportation, C. L. Irwin, D. Nelson, and K. P. McDermott (eds), Center for Transportation and the Environment, North Carolina State University, Raleigh NC.
- Cutler, D. R., T. C. Edwards, Jr., K. H. Beard, A. Cutler, K. T. Hess, J. Gibson, and J. J. Lawler. 2007. Random Forests for classification in ecology. *Ecology* 88:2783-2792.
- Edwards, T.C., Jr., D. R. Cutler, and K. H. Beard. 2008. Using statistical models to predict the risk of occurrence of invasive plants in national parks. Pages XX *in* B. Welch, editor. Tools for prioritizing, predicting and managing invasive plants on public lands. In Press. USGS Report Series.

- Grilo, C., J. A. Bissonette, and M. Santos-Reis. 2008. Response of carnivores to existing highway culverts and underpasses: Implications for road planning and mitigation. *Biodiversity and Conservation*. Online: DOI 10.1007/s10531-008-9374-8
- Grilo, C., C. Silva, C. Baltazar, L. Gomes, J. A. Bissonette & M. Santos-Reis. 2007. Patterns of carnivore road casualties in southern Portugal. Pages 556-561 in *Proceedings of the 2007 International Conference on Ecology and Transportation*, C. L. Irwin, D. Nelson, and K. P. McDermott (eds), Center for Transportation and the Environment, North Carolina State University Raleigh NC.
- Homel, K. and P. Budy. 2008. Temporal and spatial variability in the migration patterns of juvenile and subadult bull trout (*Salvelinus confluentus*) in Northeast Oregon. *Transactions of the American Fisheries Society*. *Accepted November 5, 2007*.
- Homel, K., P. Budy, M. E. Pfreder, T. A. Whitesel, and K. Mock. 2008. Evaluating genetic structure among resident and migratory forms of bull trout (*Salvelinus confluentus*) in Northeast Oregon. *Ecology of Freshwater Fish*. *Accepted January 17, 2008*.
- Johnson, J. A., B. A. Andres, and J. A. Bissonette. 2008. Birds of the major mainland rivers of southeast Alaska. Gen. Tech. Rep. PNW-GTR-739. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 87 p.
- McHugh, P., P. Budy, G. P. Thiede, and E. VanDyke. 2008. Trophic relationships of nonnative brown trout, *Salmo trutta*, and native Bonneville cutthroat trout, *Oncorhynchus clarkii utah*, in a northern Utah, U.S.A. river. *Environmental Biology of Fishes* 81(1):63-75.
- Rosa, S., and J. A. Bissonette. 2007. Roads and desert small mammal communities: Positive interaction? Pages 562-566 in *Proceedings of the 2007 International Conference on Ecology and Transportation*, C. L. Irwin, D. Nelson, and K. P. McDermott (eds), Center for Transportation and the Environment, North Carolina State University, Raleigh NC.
- Vatland, S., P. Budy, and G. P. Thiede. 2008. An approach to modeling striped bass and threadfin shad predator-prey dynamics in Lake Powell, Utah-Arizona. *Special American Fisheries Symposium Series*. *In press, accepted February 13, 2006*.
- Vatland, S., and P. Budy. 2007. Predicting the invasion success of an introduced omnivore in a large, heterogeneous reservoir. *Canadian Journal of Fisheries and Aquatic Sciences* 64:1329-1345.
- Wood, J. R. & P. Budy. *In press*. The role of environmental factors in determining the spawning density and distribution of brown trout along an elevational gradient. In: *Sustaining wild trout in a changing world*. *Proceedings of Wild Trout IX*, 9-12 October 2007, West Yellowstone, Montana. pp.xx .
- Zarnetske, P. L., T. C. Edwards, Jr., and G. G. Moisen. 2007. Habitat classification modelling with incomplete data: pushing the habitat envelope. *Ecological Applications* 17:1714-1726.
- Zimmermann, N. E., Moisen, G. G., Edwards, T. C., Jr., Frescino, T. S., and J. A. Blackard. 2007. Testing the partial contributions of remotely-sensed and topo-climatic predictors for tree species modelling in Utah. *Journal of Applied Ecology* 44:1057-1067.
- Zimmermann, N. E., R. A. Washington-Allen, R. D. Ramsey, M. E. Schaeppman, L. Mathys, B. Kötz, M. Kneubuehler, and T. C. Edwards, Jr. 2007. Modern remote sensing for environmental monitoring of landscape states and trajectories. Pages 65-91 in F. Kienast, O. Wildi, and S. Ghosh, (eds.). *A changing world: challenges for landscape research*. Springer, Dordrecht, The Netherlands.

Technical Reports

- Bissonette, J. A., 2007. Evaluation of the use and effectiveness of wildlife crossings. Final Report prepared for the National Cooperative Highway Research Program, Transportation Research Board, National Research Council, National Academy of Science. 275 pp.
- Budy, P., P. McHugh, E. Hansen, J. Wood, and G. P. Thiede. 2007. Logan River whirling disease study: factors affecting trout population dynamics, abundance, and distribution in the Logan River, Utah. Grant Number XIII. Project F-47-R. 2006 Annual Report to Utah Division of Wildlife Resources. UCFWRU 2007(2):1-46 pages.
- Budy, P., E. Hansen, and G. P. Thiede. 2007. Spawn Creek whirling disease study: evaluating the effectiveness of passive stream restoration for improving native fish health and reducing the impact of whirling disease. Grant Number XIII. Project F-47-R. 2005 Annual Report to Utah Division of Wildlife Resources. UCFWRU 2007(3):1-46.
- Budy, P., B. Nadolski, and G. P. Thiede. 2007. Factors affecting trout population dynamics, abundance, and distribution in the Mill Creek drainage, Utah. Grant Number XV. Project F-47-R. 2005 Annual Report to Utah Division of Wildlife Resources. UCFWRU 2007(4):1-39.
- Budy, P., K. Dahle, and G. P. Thiede. 2007. An evaluation of the fish community of Cutler Reservoir and the Bear River above the reservoir with consideration of the potential for future fisheries enhancement. 2006 Annual Report to the Utah Department of Environmental Quality, Division of Water Quality. 75 pages.
- Budy, P., R. Al-Chokhachy, and G. P. Thiede. 2007. Bull trout population assessment in northeastern Oregon: a template for recovery planning. 2006 Annual Progress Report to the US Fish and Wildlife Service. UCFWRU 2007(1):1-83.
- Edwards, T. C., Jr., D. R. Cutler, K. H. Beard, and J. Gibson. 2007. Predicting invasive plant species occurrences in national parks: a process for prioritizing prevention. Final Project Report USGS Utah Cooperative Fish and Wildlife Research Unit, Utah State University, Logan, UT 84322-5290 USA. UCFWRU 2007(5):1-39.

Public Relations Publications

- Leavitt, Shauna L. 2007. Highway Mortality: Making Road Systems More Permeable for Wildlife. Mule Deer Foundation Magazine. 14: 44-51
- Leavitt, Shauna L. 2007. Restoring Sagebrush Steppe. People, Land & Water.
http://www.peoplelandandwater.gov/usgs/usgs_11-14-07_restoring-sagebrush-steppe.cfm

GRADUATE STUDENTS DIRECTED

Theses and Dissertation Completed

- Birchell, Garn. 2007. The effects of non-native Colorado River cutthroat trout following the removal of invasive brook trout from a small headwater stream in Utah. Utah State University. P. Budy, advisor
- Hansen, Eriek. 2007. Evaluating the effectiveness of passive stream restoration for improving native fish health and reducing the impacts of whirling disease. Utah State University. P. Budy, Advisor

Active Graduate Research Projects

J. A. Bissonette

- Andreas Leidolf, Ph.D. Candidate. Synthesis of the effects of fire disturbances on avian species
- Carrie O'Brien, M.S. Candidate. Small mammals in Gabon

Hillary White, M.S. Candidate. Developing Riparian Bird Habitat Association Models and Management Guidelines

Randy Larsen, Ph.D. Candidate. Water Ecology of Chukars (*Alectoris chukar*): Implications for Species Management in Arid Environments

Justin Bingham, M.S. Candidate. Lead Pellet Ingestion by Chukars in the West Desert of Utah: Investigating soil, search images, and Toxicology

T. C. Edwards

Jacob Gibson. M.S. Candidate. Landscape-level stressors in the Upper Colorado River ecosystem

Julie Ripplinger. M.S. Candidate. Legacy effects in sagebrush steppe: The key to understanding the future

Amy Croft. Ph.D. Candidate, Co-Chair. Modelling effects of urban disturbance fronts on endangered plant species in the Las Vegas metropolitan area

Tammy L. Wilson. Ph.D. Candidate. Effects of anthropogenic disturbance on habitat use of pygmy rabbits: The role of legacy effects

Russel E. Norvell. Ph.D. Candidate. Disturbance effects on avifauna community structure in shrubsteppe environments

P. Budy

Dahle, Kirk S. M.S. Candidate. Understanding the abiotic and biotic factors that determine fish abundance and diversity along the gradient of a highly altered stream ecosystem.

Nadolski, Benjamin. M.S, Candidate. Evaluating the factors determining the extent and abundance of exotic brook trout in a native cutthroat trout system.

Wood, Jeremiah. M.S. Candidate. What controls the upper distribution of exotic brown trout: a focus on spawning and early life history with implications on native trout conservation.

Seidel, Sara. M.S. Candidate. Spawning ecology and early-life history of imperiled, endemic cutthroat trout.

Botcher, Jared. M.S. Candidate. Habitat needs, movement patterns, and vital rates of endemic fishes in the tributaries to the Green River, UT.

Bowerman, Tracy. Ph.D. Candidate. Understanding the effects of land use and natural variation in habitat on early life-history of threatend bull trout.

Dean, Andy. M.S. Candidate. Comparative survival of triploid brook trout and food web interactions in high Uintah lakes.

PRESENTATIONS

Invited

Budy, P. Trout Unlimited- Cache Anglers. Annual presentation on the ecology of Logan River native trout, 2007.

Bissonette, J. A., and P. C. Cramer. 2007. Mule deer mortalities in SE Idaho. Invited talk presented at the Symposium on Big-Game Highway Mortality, Idaho State University, 24 March 2007.

Bissonette, J. A. 2007. Landscape permeability in roaded landscapes: The role of allometrically-spaced wildlife crossings. Brigham Young University 21 September 2007.

Cramer, P. C. 2007. Transportation ecology: current and future directions of the science of wildlife and roads. Invited Seminar, Road Ecology Center, University of California, Davis. May 2007.

<http://roadecology.ucdavis.edu/vistingscholarmay8.html>

Cramer, P. C., J. A. Bissonette, N. Newhouse, T. Kinley, S. Jacobson, K. Knapp, B. Persaud, C. Lyon and A. Clevenger. 2007. A wildlife crossing decision tool to mitigate transportation

- corridors for wildlife. Presentation to the Transportation Research Board Annual Meeting, Washington, D.C. January, 2007.
- Cramer, P. C., and J. A. Bissonette. 2007. Overview of NCHRP Project 25-27: Evaluation of the use and effectiveness of wildlife crossings. Invited presentation to the Transportation Research Board Annual Meeting, Washington, D.C. January, 2007.
- Cramer, P. C., and J. A. Bissonette. 2007. Priorities for safely accommodating wildlife movement within transportation systems. Invited presentation to the Transportation Research Board Annual Meeting, Washington, D.C. January, 2007.
- Cramer, P. C., J. A. Bissonette. 2007. The state of the science and practice for mitigating roads for wildlife in North America. Keynote speaker at Caltrans Road Ecology Meeting, University of California, Davis. February 2007.
- Cramer, P. C., J. A. Bissonette. 2007. Wildlife crossings: Current and future directions. Invited speaker at Caltrans Road Ecology Meeting, University of California, Davis. February 2007.
- Cramer, P. C., J. A. Bissonette. 2007. Wildlife crossings and transportation planning in the United States. Invited seminar speaker to Utah State University Department of Landscape Architecture. February, 2007.
- Cramer, P. C., J. A. Bissonette. 2007. Wildlife crossings and transportation planning in the U.S. Invited keynote speaker. Toronto Zoo Roads and Ecopassages Forum, Toronto, Ontario, Canada. March 2007.
- Cramer, P. C., J. A. Bissonette. 2007. The state of the practice of wildlife crossings. Invited keynote speaker. Toronto Zoo Roads and Ecopassages Forum, Toronto, Ontario, Canada. March 2007.
- Cramer, P. C. and J.A. Bissonette. 2007. Wildlife and transportation planning: The new paradigm. Invited Keynote Speaker for Idaho Transportation Department Streamside Chat Workshop, Rigby Idaho, June 2007.
- Cramer, P. C. 2007. How to keep wildlife off the road and moving. Invited Keynote Speaker at the Deer-Vehicle Crash Symposium, Schenectady, New York, October, 2007.
- Cramer, P. C. 2007. Wildlife, roads, and wildlife crossings in Utah. Invited Keynote Speaker at the 2007 Utah Department of Transportation Engineer's Conference. November, 2007.
- Edwards, T.C., Jr. 2007. Spatially explicit conservation modelling: From the ecological to the cultural landscape. Invited paper, Swiss Federal Research Lab WSL, Birmensdorf, Switzerland, March 2007.
- Edwards, T. C., Jr. 2007. Lies, damn lies, and statistics: The fine art of species distribution models. Invited paper, Wageningen University and Research Centre - Alterra, Wageningen, The Netherlands, March 2007.
- Edwards, T. C., Jr. 2007. Species habitat models for conservation: Models, models, everywhere, and not a thought to think. Plenary Speaker at special symposium on Canada's Species at Risk Act: The Identification of Critical Habitat, The Sixth International Science and the Management of Protected Areas (SAMPAA), Wolfville, Nova Scotia, Canada, May 2007.
- Edwards, T.C., Jr. 2007. Landscape classification models in ecology: Effects of sample design on model accuracy and prediction. Invited paper, University of Lausanne, Lausanne, Switzerland. June 2007.
- Edwards, T. C., Jr., G. Busch, R. J. Lillholm, and R. E Toth. 2007. Alternative future growth scenarios for Utah's Wasatch Front: Assessing the impacts of development on the loss of prime agricultural lands. Invited paper, The International Association of Landscape Ecology World Congress 2007, Wageningen, The Netherlands, July 2007.
- Edwards, T. C., Jr., G. G. Moisen, J. L. Lawler, T. Frescino, R. Schultz, and P. Zarnetske. 2007. Challenges in the use of extant data for modelling wildlife habitats: The USDA forest

inventory and analysis experience. Invited paper, The Wildlife Society 14th Annual Conference, Tucson, Arizona, September 2007.

Contributed

- Al-Chokhachy, R., P. Budy, and G. P. Thiede. 2007. The importance of Pacific salmon to resident salmonids in a changing environment. Oregon AFS, Eugene, OR. February 2007. Poster presentation.
- Al-Chokhachy, R. and P. Budy. 2007. Monitoring bull trout population trends using PIT-tags, passive instream antennae, and Pradel mark-recapture models. American Fisheries Society, Oregon Chapter Annual Meeting, Eugene, OR. February 2007.
- Bowerman, T., P. Budy, and H. Schaller. 2008 Use of predictive models to assess the importance of riverscape connectivity on the distribution of an imperiled fish species. American Fisheries Society, Western Chapter, Portland, Oregon Utah, May 2008.
- Budy, P., G. P. Thiede, and P. McHugh. 2007. Evaluating the combined effects of environmental variation and biotic interactions on the abundance and distribution of exotic brown trout (*Salmo trutta*). American Fisheries Society, San Francisco, CA. September 2007.
- Cramer, P. C., and J. A. Bissonette. NCHRP 25-27 Update: Evaluation of the use and effectiveness of Wildlife Crossings in North America. Presented at the AASHTO Standing Committee on Highways Technical Meeting, Phoenix AZ, May 2007
- Cramer, P. C. and J. A. Bissonette. 2007. Integrating Wildlife Crossings into Transportation Plans in Projects in North America. Presented at the International Conference on Ecology and Transportation (ICOET), Little Rock, AR. 21 May 2007.
- Cramer, P. C., and J. A. Bissonette. 2007. How do we make the roaded landscape more permeable for wildlife. Presented at the Annual Meeting of TWS, Tucson AZ, Sept.
- Dahle, K.D., P. Budy, and G.P., Thiede. 2007. Predicting the growth potential of a warm water sport fishery: a spatially explicit bioenergetics approach. American Fisheries Society, Bonneville Chapter Annual Meeting. Logan, Utah, March 2007.
- Grilo, C., C. Silva, C. Baltazar, L. Gomes, J. A. Bissonette & M. Santos-Reis. 2007. Patterns of carnivore road casualties in southern Portugal. Presented at the International Conference on Ecology and Transportation (ICOET), Little Rock, AR. 23 May 2007.
- Grilo, C., J. A. Bissonette, and M. Santos-Reis. 2007. Effects of road mortality on mustelids in southern Portugal: Sensitivities and management implications. Presented at the 25th Mustelid Colloquium, Prague Czech Republic, October 2007.
- Hansen, E. S., P. Budy, G. P. Thiede. 2007. Using passive restoration to reduce the impact of whirling disease. American Fisheries Society, Oregon Chapter 43rd Annual Meeting “Big fish over big dams: Complexities, controversies, opportunities”. Eugene, Oregon, February 2007.
- Hansen, E. S., P. Budy, G. P. Thiede. 2007. Examining the potential of riparian restoration as a means to minimize the impact of whirling disease. American Fisheries Society, Utah Chapter Annual Meeting “Fish management, A united approach”. Logan, Utah, March 2007.
- Miller, S.W., P.E. Budy, and J. C. Schmidt. 2008. Testing the field of dreams hypothesis: Applications of meta-analysis to river restoration. North American Benthological Society, Salt Lake City, Utah, May 2008.
- Rosa, S., and J. A. Bissonette. 2007. Roads and desert small mammal communities: Positive interaction? Presented at the International Conference on Ecology and Transportation (ICOET), Little Rock, AR. 23 May 2007.

- Wilson, T. L., and T. C. Edwards, Jr. Evaluating habitat use and connectivity using occupancy and density indices. Poster presented at the 2007 US International Association of Landscape Ecology, Tucson, Arizona, USA, April 2007.
- Wood, J. R., P. Budy, G. P. Thiede. 2007. The spawning ecology and early life stage survival of brown trout in a native cutthroat trout stream. American Fisheries Society, Utah Chapter Annual Meeting. Logan, Utah, March 2007.
- Wood, J. R. and P. Budy. 2007. The role of environmental factors in determining the spawning density and distribution of brown trout along an elevational gradient. American Fisheries Society, 137th Annual Meeting. San Francisco, September 2007.

TEACHING

Classes

J. A. Bissonette

WILD 6710-7710, Wildlife Ecology (Spring 2007, 7 students)

T. C. Edwards

WILD 6500, Biometry: Design and Analysis of Ecological Research (Fall 2007, 18 Students)

Short Courses, Workshops, Outreach, and Distance Education

J. A. Bissonette

Landscape Ecology Workshop, University of Freiburg, Freiburg Germany (November 2007, 20 students)

T. C. Edwards

Predicting the likelihood of nesting habitat for the northern goshawk: the case of the missing absence. Invited short course presentation (distance education), U.S. Geological Survey and Bureau of Land Management, Portland, Oregon, USA, 12/7/07.

Species distribution models in conservation I: the statistics that build them. Invited short course presentation (distance education), U.S. Fish and Wildlife Service, 11/7/07.

P. Budy

Bioenergetics in fisheries: Concepts and applications. Continuing Education Short Course for Utah Chapter of American Fisheries Society. March 19, 2007.

Trout Unlimited- Cache Anglers. Annual presentation on the ecology of Logan River native trout, 2003, 2004, 2005, 2006 and 2007.

Principles of Stream Restoration – Part I, Utah State University, Department of Watershed Sciences. Co-taught with J. Schmidt, M. Kondolf, and P. Wilcox. 5-day short course. 2007.

RECOGNITION AND AWARDS

Leaders:

JAB, TCE, and PEB were all recipients of a Star Award based on performance from the National Cooperative Research Units, U.S. Department of Interior, 2007.

Phaedra Budy. 1007. Scientist of the Year by the Utah Chapter American Fisheries Society

Students and Faculty Collaborators:

- Nadolski, B., P. Budy, and G. P. Thiede. 2007. Factors influencing brook trout and Bonneville cutthroat trout distribution in the Mill Creek drainage, Utah. Annual Meeting Utah Chapter American Fisheries Society, Logan, Utah March 20, 2007. Student Oral Presentation Award (\$250).
- Wood, J. R., P. Budy, G. P. Thiede. 2007. The spawning ecology and early life stage survival of brown trout in a native cutthroat trout stream. Utah Chapter American Fisheries Society Annual Meeting. Logan, Utah, March 21, 2007. Best Student Oral Presentation Award (\$250).
- Botcher, J. 2007. Habitat requirements, vital rates, and movement patterns of 3 endemic fishes in San Rafael River, Utah. Utah Chapter American Fisheries Society Chapter Annual Meeting. Logan, Utah, March 21, 2007. Best Student Poster
- Messmer, T. 2007.
E.G. Peterson Extension Award, Utah State University.
Lifetime Fellow – The Wildlife Society, Associate Editor, Journal of Wildlife Management
- Wilson, Tammy. Chosen as the Stokes-Leopold Scholar for the 2008-09 Academic Year in CNR

PROFESSIONAL SERVICE***J. A. Bissonette:***

Reviewed for: Acta Theriologica, American Midland Naturalist, Biological Conservation, Cooperative Grants Program-US Civilian Research and Development Foundation, Conservation Biology, Environmental Management, Journal of Mammalogy, Landscape and Urban Planning, National Science Foundation, Chapter on wolf recovery for edited book, Journal of Wildlife Management, Journal of Applied Ecology, Landscape Ecology

Member, Community/University Research Initiative (CURI) Grant Central Review Committee, February 2007

Editorial Board, European Journal of Wildlife Research, 2003-present

T. C. Edwards

Reviewed for: Conservation Biology, Ecology, Ecological Monographs, Ecological Applications, Landscape Ecology, Ecological Modelling, Environmental Management, Biological Conservation, Journal of Vegetation Science, Trends in Ecology and Evolution, Diversity and Distributions, Ecography

Member, Utah Partners in Conservation and Development Science Committee (Appointed 2004)

Member, Utah Partners in Flight (2002-current)

Editorial Board, Journal of Applied Vegetation Science (2006-current)

Assistant Treasurer, Cooper Ornithological Society (2003-current)

P. Budy:

Reviewed for: Canadian Journal of Fisheries and Aquatic Sciences, Transactions of the American Fisheries Society, Ecology of Freshwater Fish, Fish Biology.

Member, USU, Watershed Sciences, Wetland Scientist Faculty Search Committee (2007)

Member, USU, College of Natural Resources, WATS representative, College Seminar Committee (2007)

Member, USFWS Bull Trout Research, Monitoring, and Evaluation Technical Team, 2003-2008.
Associate Editor, North American Journal of Fisheries Management

RESEARCH

Ongoing, Completed, and New Starts

J. A. Bissonette

- 2007-2008 Phase 3: Evaluation of the Use and Effectiveness of Wildlife Crossings (PI)- National Academy of Sciences, TRB, NCHRP, \$75,000 NEW START
- 2007-2009 Lead Pellet Ingestion by Chukars in the West Desert-(\$ sources same as below) NEW START
- 2006-2008 Water Ecology of Chukars (*Alectoris chukar*): Implications for Species Management in Arid Environments.- Utah Division of Wildlife Resources, Utah Habitat Council, Utah Chukar Foundation, Water for Wildlife Foundation, Sportsman for Habitat, Nevada Chukar Foundation, Carson Valley Chukar Club, Pheasants Forever, Salt Lake County Fish and Game Association, Pershing County Chukars Unlimited, Utah State Parks, BYU, USU Quinney Foundation, \$489,361 ONGOING
- 2006-2008 Riparian Bird Habitat Models and Habitat Guidelines (Co-PI with Mary Conner) - Utah Division of Wildlife Resources \$94,000 ONGOING
- 2004-2007 Evaluation of the Use and Effectiveness of Wildlife Crossings (PI) - National Academy of Sciences, TRB, NCHRP, \$559,000 COMPLETED
- 2004-2006 Vegetation Exclosures (PI) -Bureau of Land Management, Forest Service, Utah Division of Wildlife Resources, \$56,00 COMPLETED
- 2003-2006 Biophysical Gradients in Sagebrush Shrub Steppe (PI) - Forest Service \$145,538 COMPLETED
- 2004-2006 Highway Effects in Small Mammal Communities and Effectiveness of a Deer-Vehicle Collision Strategy (PI) - Bureau of Land Management, Utah Department of Transportation, Utah Division of Wildlife Resources, \$123,695 COMPLETED

T. C. Edwards

- 2007-2012 ECOCHANGE: Challenges in assessing and forecasting biodiversity and ecosystem changes in Europe (Co-PI) -European Union - (funded through Swiss Federal Research Lab WSL, Birmensdorf, Switzerland, \$7,000,000€(\$513,170€WSL) NEW START
- 2007-2009 Upper Colorado River Ecosystem: the identification and modelling of anthropogenic stressor effects on an ecosystem (PI) - US Fish and Wildlife Service, \$120,000 NEW START
- 2006-2008 The Las Vegas Valley boundary disposal area: evaluating alternative land-use planning scenarios and potential relationships with measures of disturbance and area ecological integrity (Co-PI) - Bureau of Land Management, \$750,000 ONGOING
- 2005-2007 Predicting invasive plant species occurrences in National Parks: a spatially explicit process for prioritizing prevention (PI) - National Park Service and U.S. Geological Survey, \$98,500 COMPLETED
- 2004-2009 Integrated resource assessment, inventory and monitoring of wildlife responses to manipulation of the shrubsteppe environment (PI) - Utah Division of Wildlife

Resources and Federal Partners, \$1,120,000, - Natural Resources Conservation Service, \$1,100,000, - S. E. J. Quinney Foundation, \$180,000 ONGOING
 2004-2006 Habitat modelling of management indicator species on forest lands in the Intermountain West: a role for the Forest Service Forest Inventory and Analysis data (PI) - USDA Forest Service, \$100,000 COMPLETED

P. Budy

2008-2009. Comparative survival of triploid brook trout and food web interactions in high Uintah lakes. (PI) - UDWR, \$64,227. ONGOING.
 2001-2006 Limiting factors affecting trout population dynamics, abundance, and distribution in the Logan River, Utah. Four primary components:
 1) Population dynamics and disease: Utah Division of Wildlife Resources, (PI) - UDWR, \$358,742. ONGOING
 2) Species interactions. (PI) - Utah State University, Community-University Research Initiative (CURI), and the Quinney Foundation, \$53,510. COMPLETED
 3) Anthropogenic impacts: Co-P.Is: M. Vinson and J. Schmidt, Utah State University, Water Initiative, \$42,919. ONGOING
 4) Passive stream restoration. (PI) - USU Research Funds, UDWR, Trout Unlimited, Embrace-A-Stream, and EPA CWA 319 Grant, \$98,963 (does not include fencing). ONGOING
 2002-2008 Bull trout population assessment and life history characteristics in association with habitat quality and land use: template for recovery planning. (PI) - US Fish and Wildlife Service (USFWS), \$846,623. ONGOING
 2006-2008 Southwest regional risk assessment for whirling disease in native salmonids in arid and semi-arid lands: Arizona, Colorado, New Mexico, and Utah. (PI) : Budy and 5 others, -Administered through U.S. Geological Survey, New Mexico Cooperative Fish and Wildlife Research Unit. Whirling Disease Initiative, \$196,310. ONGOING
 2005-2007 Understanding the abiotic and biotic factors that determine fish abundance and diversity along the gradient of a highly altered stream ecosystem: the Bear River and Cutler Reservoir, Utah.
 -Utah Division of Water Quality (UDWQ), \$109,463. COMPLETED
 2005-2007 Determining the factors affecting trout population dynamics, abundance, and distribution in the Mill Creek drainage, Utah.
 -UDWR, \$97,306. COMPLETED