

WILLIAM W. MERCER  
United States Attorney for the District of Montana  
MARK SMITH, Assistant U.S. Attorney  
2929 3<sup>rd</sup> Ave. North, Suite 400  
Billings, MT 59101  
Tel. (406) 657-6101/ Fax (406) 657-6989

RONALD J. TENPAS  
Assistant Attorney General  
Environment & Natural Resources Division

JEAN E. WILLIAMS, Section Chief  
LISA L. RUSSELL, Assistant Section Chief  
KRISTEN L. GUSTAFSON, Senior Trial Attorney  
United States Department of Justice  
Environment & Natural Resources Division  
Wildlife & Marine Resources Section  
Ben Franklin Station, P.O. Box 7369  
Washington, D.C. 20044-7369  
Tel. (202) 305-0211/ Fax (202) 305-0275  
Kristen.Gustafson@usdoj.gov

Attorneys for Federal Defendants

**UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF MONTANA  
MISSOULA DIVISION**

DEFENDERS OF WILDLIFE, NATURAL )  
RESOURCES DEFENSE COUNCIL, )  
SIERRA CLUB, HUMANE SOCIETY OF THE )  
UNITED STATES, CENTER FOR BIOLOGICAL )  
DIVERSITY, JACKSON HOLE )  
CONSERVATION ALLIANCE, FRIENDS OF )  
THE CLEARWATER, ALLIANCE FOR THE )  
WILD ROCKIES, OREGON WILD, CASCADIA )  
WILDLANDS PROJECT, WESTERN )  
WATERSHEDS PROJECT, and WILDLANDS )  
PROJECT, )

Case No. cv-08-56-M-DWM

Plaintiffs, )

DECLARATION OF )  
MARK S. BOYCE, PH.D. )

v. )

H. DALE HALL, U.S. Fish and Wildlife Service )  
Director; DIRK KEMPTHORNE, Secretary of the )  
Interior; and the UNITED STATES FISH AND )  
WILDLIFE SERVICE, )

Defendants. )

\_\_\_\_\_ )

I, Mark S. Boyce, Professor of Biological Sciences at the University of Alberta, Edmonton, Alberta, Canada, do hereby declare as follows:

**I. Academic and Professional Background**

1. I hold a Ph.D. in Wildlife Ecology (Yale University, 1977) and work as a Professor of Biological Sciences and occupy an endowed chair at the University of Alberta. I have done so since 1999. I specialize in the ecology, conservation and management of species at risk, and in wildlife management. In this context, I undertake or have undertaken a variety of tasks. For example:
  - I conduct research on quantitative methods for evaluating population viability of threatened and endangered species. I have published several review papers on population viability analysis. By “viability” I mean long-term persistence of populations of wildlife species.
  - I have conducted research on wolves and their prey in Yellowstone National Park and adjacent areas of Idaho, Wyoming, and Montana. I used computer simulation to anticipate the effects of wolves on wild ungulate populations prior to wolf recovery. Then subsequent to wolf reintroduction, I have conducted research showing that our original projections correctly anticipated the dynamics of wolf and ungulate populations in the Greater Yellowstone Ecosystem. All of this research has been published in the peer-reviewed scientific literature.
  - I have been funded by the Natural Sciences and Engineering Research Council of Canada (NSERC), the Alberta Conservation Association, the Camp Fire Conservation Fund, the National Science Foundation, and the National Geographic Society to evaluate the population dynamics and predator-prey relationships of wolves in western North America.
  - I currently supervise 12 graduate students, most of whom are working on various aspects of population and habitat ecology for birds and mammals in Alberta, including one student currently studying wolves in southwestern Alberta immediately north of the border with the United States. I have supervised research of 5 post-graduate students

working on wolves and wolf recovery in the northern Rocky Mountains of the United States.

- I teach an undergraduate course in population ecology and a graduate-level course in habitat ecology at the University of Alberta
  - I conduct research on several species of large mammalian predators in western North America including wolves, grizzly bears, black bears, cougars, and lynx. In addition I conduct research on the prey of these predators including elk, moose, white-tailed deer, mule deer, caribou, bighorn sheep, and bison.
2. Prior to moving to Alberta in 1999, I was the Vallier Chair of Ecology and Wisconsin Distinguished Professor at the University of Wisconsin, 1993-1999, and before that I was Professor of Zoology and Physiology at the University of Wyoming. For four years, 1989-1993, I served as Director of the University of Wyoming-National Park Service Research Center in Grand Teton National Park. I hold the B.S. degree in Fish and Wildlife Biology from Iowa State University, M.S. degree in Wildlife Management from the University of Alaska, and both the M.Phil. and Ph.D. degrees in wildlife ecology from Yale University. I was a NATO Postdoctoral Fellow at the University of Oxford.
  3. Currently I am Professor of Biological Sciences at the University of Alberta where I hold the Alberta Conservation Association Chair in Fisheries and Wildlife. This is an endowed chair with funding from the Alberta Conservation Association which is a Delegated Administrative Organization in Alberta that manages revenues from the sale of hunting and fishing licenses in the province.
  4. I am a member in good standing of 18 professional organizations including The Wildlife Society (Certified Wildlife Biologist), the Ecological Society of America, the Society for Conservation Biology, the American Society of Mammalogists (life member), the American Society of Naturalists, the British Ecological Society, and the Canadian Society for Ecology and Evolution. I have served as Editor in Chief of the *Journal of Wildlife Management* and as editor of *Ecology* and *Ecological Monographs*. I am currently on the editorial board of *Environmental Conservation*.

5. In 2008 I was awarded the William Rowan Distinguished Service Award by the Alberta Chapter of The Wildlife Society.
6. The purpose of this declaration is to respond to Plaintiffs' allegations of irreparable injury in their Memorandum in Support of Motion for Preliminary Injunction. My declaration addresses Plaintiffs' assertions that delisting irreparably harms wolf packs, the NRM wolf population, and the ability of members of Plaintiff organizations to view and enjoy wolves in the wild. I also served as a scientific reviewer of the delisting proposal as published in the *Federal Register*, and supported the conclusion by the U.S. Fish and Wildlife Service that the wolf should be delisted in the northern Rocky Mountains with management authority returned to the states.

## **II. DISCUSSION**

7. I disagree with the Plaintiffs' allegations of harm to wolf populations resulting from the delisting of the Rocky Mountain wolf at this time, and I believe that there is a very high probability of long-term persistence of wolves while being managed by the individual states according to their approved management plans.
8. I agree that killing wolves harms individual wolves. I also agree that if breeding members of a pack are killed, this can temporarily disrupt the social structure of that pack. But from a conservation perspective, these facts essentially have no bearing on threats to the extinction of the northern Rocky Mountain wolf population, and these facts do not constitute irreparable harm from the perspective of wildlife management. Ultimately it is the viability of the wolf population, not the individuals or packs, that is important for the future conservation of wolves in North America.
9. Since their reintroduction to Yellowstone National Park and central Idaho in 1995, the NRM wolf population has increased by approximately 24% per year despite poaching and removal of wolves that were depredateing livestock.
10. Given this observed 24% rate of increase, up to at least an additional 24% of the population (on top of the number of wolves already being removed annually by poaching and

depredation control) could be taken from the population annually with no decrease at all in the population of wolves.

11. Individual wolves may be killed without risking extinction of the population of wolves. Sustainable harvests of wolves have been demonstrated in many populations in Canada and Alaska, confirming that removals of 40% or more of the population can be sustainable.
12. Wolves have high reproductive capacity. Like dogs, wolves have litters of puppies, typically with 5-9 pups in a litter. Most often we see a single litter per pack each year but when prey are abundant, as in Yellowstone National Park, multiple litters can be produced within a pack of wolves.
13. Sustainable harvests are possible because of an ecological process known as density dependence. This means that if population density is reduced by harvesting wolves, the surviving wolves have more prey per remaining wolf (i.e., per capita) and are able to achieve increased survival and reproductive rates. This density-dependent survival and reproduction permits sustainable harvests while maintaining a viable population of wolves. This is a general principle in population biology.
14. Because of density dependence and high reproductive rates, wolf populations can sustain removals of up to 40% or more of the population annually. These sustainable harvest rates are higher than can be sustained by deer and elk populations primarily because wolves have a large litter size. Certainly such sustainable harvests do not constitute irreparable harm to wolf populations.
15. We have considerable experience managing wolf populations in Canada, and this experience can serve as a useful guide for management in Idaho, Montana, and Wyoming. In Alberta, for example, the provincial government estimates a current population of 7,000 wolves. Wolf harvest is by hunting and legal trapping on registered traplines where 400-800 wolves are removed each year, or about 10% of the population. This low harvest rate occurs even though there is no bag limit during the harvest season on the number of wolves that may be

killed by hunters or trappers. Although the number of wolves killed by hunters and trappers is unregulated, this harvest does not limit the population of wolves.

16. These removals by hunting and trapping are insufficient to reduce depredation problems by wolves killing livestock and threatened woodland caribou, such that the Alberta provincial government has killed an additional 60-130 wolves annually (including 2008) to reduce these depredations. To achieve these desired control removals the Alberta Department of Sustainable Resource Development has used aerial gunning from helicopter and poisoning wolves with strychnine baits. These methods of aerial gunning and strychnine poisoning are deemed necessary by the Alberta provincial government because killing by hunting and trapping has been insufficient to reduce wolf numbers.

17. In areas where wolf hunting and trapping is allowed wolves become wary and more difficult to kill. This wariness makes it more difficult for removals by hunters and trappers to have a substantive effect on wolf populations.

18. Management plans by the states of Idaho, Montana, and Wyoming provide sufficient limitations on the take and methods of take of wolves to ensure the long-term persistence of this species in the northern Rocky Mountains of the United States. These states have highly successful longstanding wildlife management programs that are fully capable of managing wolf populations to ensure that killing of wolves is not excessive such that it would harm the population of wolves.

### **III. CONCLUSION**

19. Based on my professional experience of over 20 years conducting research on wolf predation, wolf habitats, and wolf populations, I cannot accept the claims of the Plaintiffs that the population of wolves in the northern Rocky Mountains of the United States will be harmed by delisting of the species. The wolf population in Idaho, Montana, and Wyoming far exceeds the target for delisting that was identified at the time that the reintroduction of wolves was proposed. Indeed, the reintroduction of wolves to the northern Rocky Mountains

of the United States has been remarkably successful. Therefore the decision to delist the species was credible and appropriate relative to the conservation objective of restoring a viable population of wolves in these states.

Pursuant to 28 U.S.C. § 1746, I hereby declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge information and belief.

Executed on May 7, 2008 at Las Vegas, Nevada.

By: 

Mark S. Boyce

## CURRICULUM VITAE

**NAME** Mark S. Boyce

### **EDUCATION**

1977 Ph.D., Yale University, New Haven, Connecticut.  
1975 M.Phil., Yale University, New Haven, Connecticut.  
1974 M.S., University of Alaska, Fairbanks.  
1972 B.S., Iowa State University, Ames.

### **ACADEMIC POSITIONS**

**Professor, and Alberta Conservation Association Chair in Fisheries and Wildlife**, 1999-present, Department of Biological Sciences, University of Alberta, Edmonton.

**Vallier Chair of Ecology, and Wisconsin Distinguished Professor (UW-System)**, 1993-1999, College of Natural Resources, University of Wisconsin, Stevens Point.

**Adjunct Professor**, 1996-present, Department of Ecology, Evolution and Behavior, University of Minnesota, St. Paul.

**Professor**, 1987-1993, Department of Zoology and Physiology, University of Wyoming, Laramie.

**Visiting Professor**, 1991-1992, Centre for Theoretical Studies and Centre for Ecological Sciences, Indian Institute of Science, Bangalore, India.

**Chair**, 1987-1989, Wildlife and Fisheries Biology and Management Curriculum, University of Wyoming.

**Associate Department Head**, 1983-84, Department of Zoology and Physiology, University of Wyoming.

**Associate Professor**, 1981-1987, Department of Zoology and Physiology, University of Wyoming.

**Visiting Professor**, 1984-1985, Department of Mathematics, University of Wyoming.

**Postdoctoral Research Fellow**, 1982-1983, Animal Ecology Research Group, Department of Zoology, University of Oxford.

**Assistant Professor**, 1977-1981, Department of Zoology and Physiology, University of Wyoming.



**Instructor**, 1976-77, Department of Zoology and Physiology, University of Wyoming.

### **SABBATICALS**

2003-04, University of British Columbia, Vancouver.

1991-92, American Institute of Indian Studies/Fulbright Fellowship, Centre for Ecological Sciences and Centre for Theoretical Studies, Indian Institute of Science, Bangalore, INDIA.

1982-83, NATO Postdoctoral Fellowship, Department of Zoology, University of Oxford, Oxford, UNITED KINGDOM.

### **OTHER POSITIONS**

1989-1993, Director, UW-National Park Service Research Center, University of Wyoming.

### **HONORS AND AWARDS**

**William Rowan Distinguished Service Award**, 2008, The Wildlife Society.

**International Conservationist of the Year**, 2007, Safari Club International Foundation, Washington, D.C.

**Erskine Fellowship**, 1999, Canterbury University, Christchurch, New Zealand.

**Phi Kappa Phi**, 1998, University of Wisconsin-Stevens Point.

**University Scholar Award**, 1996, University of Wisconsin-Stevens Point.

**Chancellor's Merit Award**, 1996, University of Wisconsin-Stevens Point.

**Honorary Membership**, 1994, The Game Conservancy (U.K.).

**Faculty Scholar Award**, 1994, Sigma Xi-University of Wisconsin-Stevens Point Chapter.

**Distinguished Professorship**, 1993, 1999 University of Wisconsin System, Madison.

**Vallier Chair of Ecology**, 1993, University of Wisconsin-Stevens Point.

**Outstanding Research Merit Award**, 1993, College of Arts and Sciences, University of Wyoming.

**Fulbright Scholar to India**, 1992, U.S. Educational Foundation in India, Bangalore.

**Senior Research Fellow**, 1991-92, American Institute of Indian Studies, Bangalore.

**Certificate of Appreciation**, 1990, Interagency Spotted Owl Scientific Committee, Portland, OR.

**Creative Programming Award**, 1990, for "Examining the Greater Yellowstone Ecosystem," 23 January 1990, National University Continuing Education Association, New Orleans, LA.

**NSF Workshop Participant**, 1988, Mathematical Modeling in Biological Resource Management, University of Montana, Missoula, MT.

**Mary Cady Tew Memorial Fund Award**, 1988, to assist with publication *Evolution of Life Histories of Mammals*, Yale University Press, New Haven, CT.

**Kuehn Professorship Award**, 1984-85, College of Arts and Sciences, University of Wyoming.

**N.A.T.O. Postdoctoral Fellowship**, 1982-83, National Science Foundation, University of Oxford, United Kingdom.

**Academy Exchange to Poland**, 1982, National Academy of Sciences, Jagiellonian University, Krakow, Poland.

**American Society of Naturalists**, 1980, elected to membership.

**Frederick W. Vanderbilt Fellowship**, 1976, Yale University, New Haven, CT.

**Outstanding Achievement Award**, 1974, University of Alaska, Fairbanks.

**TEACHING** (last 5 yrs)

<u>Year</u>	<u>Term</u>	<u>Course No./Title</u>	<u>Cr. Hrs.</u>	<u>Enrollment</u>
2008	Winter	Biol 331 Population Ecology	3	55
2007	Winter	Biol 331 Population Ecology	3	58
2006	Winter	Biol 331 Population Ecology	3	60
2005	Winter	Biol 331 Population Ecology	3	71
2003	Winter	Biol 331 Population Ecology	3	72
2002	Winter	Biol 331 Population Ecology	3	61
2001	Fall	Biol 633 Statistical Ecology	1	3
2001	Winter	Biol 564 Models in Ecology	3	10
2000	Winter	Biol 633 Statistical Ecology	1	1
1999	Spr	WLDL762 - Quantitative Ecology	3	10
1999	Spr	WLDL353/553 - Wildlife Pop Dynamics	3	30
1998	Spr	WLDL353/553 - Wildlife Pop Dynamics	3	23
1998	Spr	Seminar: Wildl. Research in N. America	1	4

**GRADUATE STUDENT SUPERVISION:**

**Current Graduate Advisees:**

- Cristescu, B. 2010. Movements and habitat selection by grizzly bears in response to industrial development in western Alberta. Ph.D. thesis, University of Alberta (in progress).
- Vors, L. S. 2009. Population dynamics of arctic caribou herds in North America. Ph.D. thesis, University of Alberta (in progress).
- Morehouse, A. 2009. Movement models for wolves in southwestern Alberta. M.Sc. thesis, University of Alberta (in progress).
- Erickson, M. 2009. Habitat factors associated with the decline of Western Grebes in Alberta. M.Sc. thesis, University of Alberta (in progress).
- Bacon, M. 2009. Cougar ecology and prey selection in the Cypress Hills Interprovincial Park. M.Sc. thesis, University of Alberta (in progress).
- Northrup, J. 2009. Grizzly bear movements in response to roads in southwestern Alberta. M.Sc. thesis, University of Alberta (in progress).
- Van Moortner, B. 2009. Habitat selection by roe deer in France. Ph.D. thesis, Universite Lyon, France (in progress) Co-supervised by Jean-Michel Gaillard.
- Chetkiewicz, C. L. 2008. Corridors for large mammals in the Bow Valley and Crowsnest Pass, Alberta. Ph.D. dissertation, Univ. Alberta (in progress).
- Desjardins, C. 2008. Otter habitats and population monitoring in Alberta. M.Sc. thesis, Univ. Alberta (in progress).

- Knopff, K. 2009. Cougar population ecology in western Alberta. Ph.D. thesis, Univ. Alberta (in progress).
- Pitt, J. 2009. Access management and elk movement in SW Alberta. Ph.D. thesis, Univ. Alberta (in progress).
- Robichaud, C. 2008. Ecological responses to wolf control to support the Little Smoky caribou herd in western Alberta. M.Sc. thesis, Univ. Alberta (in progress).
- Yates, G. 2009. Lynx population ecology in Alberta. Ph.D. thesis, Univ. Alberta (in progress).

### **Graduate Degrees Supervised:**

- Czetwertynski, S. 2008. Consequences of spring black bear harvests in Alberta. Ph.D. dissertation, Univ. Alberta. Co-supervised with F. K. A. Schmiegelow.
- McLash, T. 2008. Landscape influence on the distribution and abundance of ring-necked pheasants in Alberta. M.Sc. thesis, Univ. Alberta.
- Varley, N. 2007. Yellowstone's trophic cascade resulting from wolf recovery. Ph.D. thesis, Univ. Alberta.
- Carpenter, J. 2006. West Nile virus in greater sage-grouse influence on conservation in Alberta. M.Sc. thesis, Univ. Alberta.
- Shier, C. 2006. Mink and muskrat interactions across Canada. M.Sc. thesis, Univ. Alberta.
- Roever, C. 2006. Grizzly bear response to roads and landscape change. M.Sc. thesis, Univ. Alberta.
- Mullen, S. 2006. Furbearer harvests and landscape change in the Rocky Mountain foothills of Alberta. M.Sc. thesis, Univ. Alberta.
- Beyer, H. 2006. Wolves, elk and willow on Yellowstone National Park's northern range. M.Sc. thesis, Univ. Alberta.
- Ciarniello, L. 2005. Demography and habitat selection by grizzly bears (*Ursus arctos*) in central British Columbia. Ph.D. dissertation, Univ. Alberta.
- Aldridge, C. 2005. Habitat-based population viability analysis for sage grouse in Alberta. Ph.D. dissertation, Univ. Alberta.
- Nielsen, S. E. 2004. Cumulative effects of resource development on grizzly bears in the central east slopes of Alberta. Ph.D. dissertation, Univ. Alberta.
- Hurlburt, D. 2004. Persistence of the moth – yucca mutualism at the northern edge of range. Ph.D. thesis, Univ. Alberta.
- Smith, K. G. 2004. Woodland caribou demography and persistence relative to landscape change in West-central Alberta. M.Sc. Thesis, University of Alberta.
- Ripley, T. 2003. Metapopulation models for bull trout in Alberta. M.Sc. thesis, Univ. Alberta.
- Mao, J. 2003. Distributional response of elk to wolves in Yellowstone National Park. M.Sc. Thesis, University of Alberta.
- Erb, J. 2000. Population fluctuations in mammals. Ph.D. dissertation, University of Wyoming, Laramie.
- Keen, L. 2000. Small mammal population ecology in Hiawatha National Forest, Michigan. M.S. thesis, University of Wisconsin, Stevens Point.
- Kneeland, Mary. 1999. Ruffed grouse population ecology and habitat selection at Sandhill Wildlife Management Area, Wisconsin. M.S. Thesis, Univ. Wisconsin, Stevens Point.
- Anderson, S. 1999. Restoration of elk into Wisconsin. M.S. Thesis, Univ. Wisc.-Stevens Point.

- Niemuth, N. 1995. Landscape ecology in the pine barrens of NW Wisconsin. Ph.D. dissertation, University of Wyoming, Laramie.
- White, P. A. 1995. Effect of parasites on sage grouse (*Centrocercus urophasianus*) mate selection. Ph.D. dissertation, University of Wyoming, Laramie.
- Nations, C. 1994. Population dynamics of California Gulls. M. S. thesis, University of Wyoming.
- Fernandes, C. I. 1993. Effects of fire and habitat use by Asian elephants (*Elaphus maximus*) in Nagarhole National Park, South India. M. S. thesis, University of Wyoming, Laramie.
- Holz, B. 1993. Landscape ecology of large ungulates on the Red Desert in southwestern Wyoming. M. S., University of Wyoming.
- Niemuth, N. D. 1992. Effects of nest predation on breeding biology of Sage Grouse (*Centrocercus urophasianus*). M. S. thesis, University of Wyoming.
- Spurrier, M. F. 1989. Mate choice in captive Sage Grouse. M.S. thesis, University of Wyoming.
- Johnson, L. L. 1989. Field investigations of the lek mating system in Sage Grouse. M. S. thesis, University of Wyoming.
- Johnson, G. D. 1987. Effects of rangeland grasshopper control on Sage Grouse in Wyoming. M. S. thesis, University of Wyoming, Laramie.
- Meyer, J. S. 1986. Variability and bias in estimating cladoceran population growth rates. Ph.D. dissertation, University of Wyoming, Laramie. 146pp.
- Walker, D. 1986. Studies on the late Pleistocene mammalian fauna of Wyoming. Ph.D. dissertation, University of Wyoming, Laramie.
- Guenzel, R. 1986. Pronghorn ecology in south-central Wyoming. M.S. thesis, Univ. Wyo.
- Hayden, S. L. 1984. Winter food habits and ecology of Golden and Bald Eagles in northeastern Wyoming. M. S. thesis, University of Wyoming, Laramie.
- Zeveloff, S. I. 1981. Patterns in mating systems, body size, and species diversity of mammals. Ph.D. dissertation, University of Wyoming, Laramie.
- Postovit, B. C. 1981. Suggestions for Sage Grouse habitat reclamation on surface mines in northeastern Wyoming. M.S. thesis, University of Wyoming, Laramie.
- Sauer, J. R. 1980. The population ecology of wapiti in northeastern Wyoming. M.S. thesis, University of Wyoming, Laramie. 43pp.
- Rothenmaier, D. 1979. Sage Grouse reproductive ecology. M.S. thesis, Univ. Wyo. 97pp.
- Pelton, V. 1978. Dependency of avian clutch size variability upon environmental fluctuations. M.S. thesis, University of Wyoming, Laramie.

#### **POSTDOCTORAL STUDENTS/RESEARCH ASSOCIATES:**

- Dr. Cailin Xu, 2003-2007, Killam Postdoctoral Fellow.
- Dr. Michael Proctor, 2004-2006, Alberta Ingenuity Postdoctoral Scholar.
- Dr. Scott Nielsen, 2004-2006, NSERC-CRD supported Postdoc.
- Dr. Susan Lingle, 2003-2005, Alberta Ingenuity Postdoctoral Scholar (joint with the University of Lethbridge, Lethbridge, Alberta).
- Dr. Christopher Johnson, 2000-2003, NSERC Postdoctoral Fellowship.
- Dr. Daniel Fortin, 2001-2003, NSF Postdoc.
- Dr. Christopher Nice, 1998-99, University of Wisconsin Consortium Grant.

Dr. Jennifer A. Brown, 1995-96, National Fish and Wildlife Foundation supported postdoctoral.  
Dr. Cormack C. Gates, 1992-93, Visiting Scholar.  
Dr. Jean-Michel Gaillard, 1990-91, NSF/CNRS Postdoctoral Fellowship.

### **CONTRACTS & GRANTS (since 2000)**

#### **Funded Projects as PI**

- 2008-2013 Access management for conservation of elk, wolves, and grizzly bears in Alberta. NSERC CRD grant, \$1,650,000 (pending).
- 2008-2010 Lynx cycles and barriers: evaluating dispersal versus climate change in flatlining populations. NSERC Strategic Supplemental Project Grant, \$199,998.
- 2008-2009 The role of behavioural adaptation in safeguarding a species: grizzly bear response to encroaching development in the foothills of Alberta. Alberta Conservation Association, Grant Eligible Conservation Fund, \$30,000.
- 2008-2009 Effects of access management on elk in southwestern Alberta. Alberta Conservation Association, Grant Eligible Conservation Fund, \$28,700.
- 2008-2009 Effects of roads and road access management on grizzly bear habitat use and movement. Alberta Conservation Association, Grant Eligible Conservation Fund, \$24,200.
- 2006-2007 Cougar predation on wild ungulates. Hunting Heritage Fund, Northern Alberta Chapter of Safari Club International, \$2,500.
- 2005-2007 Cougar predation on wild ungulates. Calgary Zoo, \$3,000.
- 2006-2011 Access management and movements of elk and grizzly bears in SW Alberta. Shell Canada, \$500,000.
- 2006-2007 Effects of wolves and hunting on elk populations in Yellowstone National Park, Camp Fire Conservation Fund, Camp Fire Club of America (New York), \$32,930.
- 2006-2008 Waterbird distribution modelling, Ducks Unlimited, \$27,750.
- 2005-2007 Cougar predation on multiple prey in western Alberta. Alberta Professional Outfitters Society, \$5,000.
- 2005-2009 Cougar predation on multiple prey in western Alberta. Alberta Conservation Association, Grant Eligible Conservation Fund, \$90,016.
- 2005-2007 Cougar predation on multiple prey in western Alberta. Y2Y and Alberta Wilderness Association, \$15,731.
- 2005-2007 Cougar predation on multiple prey in western Alberta. Foundation for North American Wild Sheep, \$14,000.
- 2006-2008 Cougar predation on multiple prey in western Alberta. Grand Slam Club, \$30,000.
- 2006-2009 Cougar predation on multiple prey in western Alberta. Northern Alberta Chapter of Safari Club International, \$10,000.
- 2005-2006 Cougar predation on multiple prey in western Alberta. Rocky Fish and Game Association, \$6,000.
- 2005-2006 Harvest models for big game quota allocation in Alberta. Sherwood Park Fish and Game, Alberta Professional Outfitters Society, and Northern Alberta Chapter of Safari Club International, \$9,000.
- 2004-2006 Roads and grizzly bears in western Alberta. Foothills Model Forest, \$33,000.

- 2004-2009 Population dynamics emerging from habitat models, NSERC Discovery Grant, \$287,500.
- 2005-2006 West Nile virus and sage-grouse conservation in Alberta. World Wildlife Fund Canada, \$10,000.
- 2005-2006 West Nile virus and sage-grouse conservation in Alberta. Alberta Sport, Recreation, Parks & Wildlife Foundation, Ministry of Community Development, \$5,000.
- 2005-2006 West Nile virus and sage-grouse conservation in Alberta. Telus Conservation Fund, \$5,000.
- 2004-2006 Effects of baited spring black bear hunting in Alberta, Pope and Young Club, \$8,000.
- 2004-2005 Effects of baited spring black bear hunting in Alberta, Safari Club International, \$8,000.
- 2004-2005 Industrial development and marten trapping. Alberta Conservation Association, Grant-Eligible Conservation Fund, \$12,835.
- 2004 West Nile virus and sage-grouse conservation in Alberta. Alberta Sustainable Resource Development, \$32,500.
- 2002-2004 Fragmentation of habitats and movements of large carnivores, Wildlife Habitat Canada, \$10,000.
- 2002-2004 Fragmentation of habitats and movements of large carnivores, Alberta Conservation Association, Grant-Eligible Conservation Fund, \$51,240.
- 2002-2004 Habitat-based population viability analysis for sage grouse, Alberta Conservation Association, Grant-Eligible Conservation Fund, \$40,000.
- 2002-2004 Habitat-based population viability analysis for sage-grouse, Ducks Unlimited, \$16,000.
- 2002-2004 Population model for wolf recovery in Yellowstone National Park, U.S. Department of Interior, National Park Service, \$21,588.
- 2002-2005 Black bear demography and behaviour, Alberta Conservation Association, Grant-Eligible Conservation Fund, \$90,000.
- 2002-2005 Black bear demography and behaviour, Sustainable Forest Management Network, National Centres of Excellence, \$127,500.
- 2002-2005 Black bear demography and behaviour in response to baited spring bear hunting in Alberta, Rocky Mountain Elk Foundation, \$35,000.
- 2002 Conservation of large carnivores in the Rocky Mountains, Boone and Crockett Club, \$8,000.00.
- 2002 Baited black bear hunting in Alberta, Safari Club International, \$10,852.
- 2002 Baited black bear hunting in Alberta, Safari Club International-Tuscon, Arizona Chapter, \$2,324.
- 2001-2002 Baited black bear hunting in Alberta, Central Washington Chapter of Safari Club International, \$2,299.
- 2002 Boreal grizzly bear project, Alberta Conservation Association, \$9,500.
- 2001-2005 Habitat-based PVA for sage-grouse, Alberta Environment/Sustainable Resource Development, \$46,000.
- 2001-2002 Habitat-based PVA for sage-grouse, Canadian Wildlife Federation, \$5,000.
- 2001-2002 Landscape ecology of grizzly bears in the Parsnip River area, British Columbia Ministry of Forests, \$40,000.

- 2001-2002 Grizzly bear habitats in Crowsnest Pass, Alberta Environment, \$20,000.
- 2001 Publication of grizzly bear monograph, Yellowstone Park Foundation, \$7,140.
- 2001-2002 Developing models to identify corridors for large carnivores in the Canadian Rocky Mountains, Wilburforce Foundation, \$61,948.
- 2001-2005 Developing models to identify corridors for large carnivores in the Canadian Rocky Mountains, Wildlife Conservation Society, \$112,097.
- 2001-2002 Conservation of large carnivores in fragmented landscapes, Alberta Sport, Recreation, Parks and Wildlife Foundation, Ministry of Community Development, \$4,000.
- 2001-2004 Developing a habitat-based PVA model for Sage Grouse in SE Alberta, World Wildlife Fund Canada, \$55,000.
- 2001-2002 Habitat for sage grouse in Alberta, Alberta Sport, Recreation, Parks & Wildlife Foundation, Ministry of Community Development, \$5,000.
- 2001-2005 Black bear demography and behaviour, Alberta Pacific, \$170,600.
- 2001-2003 Cumulative effects analysis models, Cumulative Effects Assessment Agency, \$27,537.
- 2000-2005 Effects of spring black bear hunting in Alberta, Alberta Professional Outfitters' Society, \$127,125.
- 2001-2002 Effects of spring black bear hunting in Alberta, Alberta Conservation Association, \$30,000.
- 2001-2002 Habitat-based population viability analysis for sage-grouse, Ducks Unlimited, \$5,000.
- 2001-2002 Effects of spring black bear hunting in Alberta, Alberta Bowhunter's Association, \$12,000.
- 2001-2002 Effects of spring black bear hunting in Alberta, Foundation for North American Wild Sheep, \$12,000.
- 2001-2002 Effects of spring black bear hunting in Alberta, Northwest Ohio Chapter, Safari Club International, \$400.
- 2001-2002 Effects of spring black bear hunting in Alberta, Central Washington Chapter, Safari Club International, \$1,500.
- 2001-2002 Effects of spring black bear hunting in Alberta, Calgary Archers, \$4,000.
- 2001-2002 Effects of spring black bear hunting in Alberta, Sherwood Park Fish & Game Association, \$700.
- 2001-2003 Grizzly bear habitat in Crowsnest Pass, Alberta Sustainable Resource Development, \$20,000.
- 2000-2002 Elk distribution response to wolf recovery in Yellowstone National Park, Yellowstone Park Foundation, \$34,367.
- 2000-2001 Sage grouse habitat experiment, Alberta Environment, Natural Resources Service, \$19,000.
- 2001-2002 Sage grouse habitat experiment, Alberta Conservation Association, \$10,000.
- 2001 Effects of baited spring black bear hunting in Alberta, Michigan Chapter of Safari Club International, \$7,778.
- 2001 Effects of baited spring black bear hunting in Alberta, Idaho Chapter of Safari Club International, \$780.

- 2001 Effects of baited spring black bear hunting in Alberta, Stevens Point, Wisconsin Chapter of Safari Club International, \$775.
- 2001 Effects of baited spring black bear hunting in Alberta, Flint, Michigan Chapter of Safari Club International, \$765.
- 2001 Effects of baited spring black bear hunting in Alberta, Safari Club International Foundation, \$7,618.
- 2001 Effects of baited spring black bear hunting in Alberta, Alberta Chapter Safari Club International, \$10,000.
- 2001 Effects of baited spring black bear hunting in Alberta, Safari Club International, \$13,559.
- 2001 Effects of baited spring black bear hunting in Alberta, Foundation for North American Wild Sheep, \$4,000.
- 2000-2004 Habitat-based population viability analysis, NSERC, \$178,000.
- 2000 Publication costs for bear monograph, Yellowstone Park Foundation, \$6,944.

### **Funded Projects as CoPI**

- 2002-2007 Wolf-elk dynamics, with E. Merrill and J. Fryxell, NSERC CRO, \$1,200,000.
- 2001-2004 Grizzly Bear Management and Conservation: Understanding the Links Between Population, Behaviour, Habitat, and Landscape Structure with Geospatial Tools, with S. Franklin and G. Stenhouse, NSERC CRD, \$118,000.
- 2001-2003 Biotelemetry analysis system, with E. Merrill and S. Lele, Alberta Innovation and Science (ISRIP), \$201,197.
- 2000-2001 Biotelemetry analysis systems for cumulative effects assessment, Canadian Foundation for Innovation, \$340,000.
- 2000-2001 Biotelemetry analysis systems for cumulative effects assessment, IIPP, \$35,000.
- 2000 Development of proposal for funding to the Canadian Foundation for Innovation, Western Economic Diversification Canada, \$6,750.
- 2000-2004 Elk movement patterns in heterogeneous environments, with P. Turchin, M. Turner, J. Fryxell, and E. H. Merrill, National Science Foundation, US\$2,834,000.
- 2000-2002 Elk habitat ecology on Alberta's Central East Slopes, with E. H. Merrill, Alberta Conservation Association, \$237,500.
- 2000-2002 Elk habitat ecology on Alberta's Central East Slopes, with E. H. Merrill, SunPine Forest Products, \$193,332.
- 2000-2005 Elk habitat ecology on Alberta's Central East Slopes, with E. H. Merrill, Rocky Mountain Elk Foundation, \$217,750.
- 2000-2005 Elk habitat ecology on Alberta's Central East Slopes, with E. H. Merrill, Weyerhaeuser Canada, \$168,000.
- 2000-2004 Top-down consequences of wolf recovery in Yellowstone National Park, with R. O. Peterson, L. D. Mech, and E. H. Merrill, Yellowstone Park Foundation, Canon Foundation, US\$150,000.

### **PUBLICATIONS IN PROGRESS**

#### **In Preparation:**



- Foote, L., and M. S. Boyce. 2010. *African Game Trails Revisited: Roosevelt's Vision for Emerging Conservation Paradigms*. Yale University Press (in preparation).
- Boyce, M. S., and B. F. J. Manly. 2009. *Animal Population Ecology: Principles for Conservation Biology*. Prentice-Hall, Englewood Cliffs, NJ. (under contract).
- Boyce, M. S., H. Viljugrein, V. C. Radeloff, N. D. Niemuth, M. Choisy, R. M. Gorham, and D. J. Mladenoff. 2008. Low landscape diversity destabilizes jack-pine budworm populations. *Ecol. Letters* (under revision).
- Choisy, M., M. S. Boyce, N. D. Niemuth, V. Radeloff, and D. J. Mladenoff. 2008. Birds and jack pine budworm in the northwestern pine barrens of Wisconsin. *Can. J. Zool.* (manuscript).
- Kneeland, M. C., M. S. Boyce, and J. F. Kubisiak. 2008. Habitat ecology of a cyclic ruffed grouse population. *Can. J. Zool.* (under revision).
- Kneeland, M. C., M. S. Boyce, and J. F. Kubisiak. 2008. Seasonal habitat selection of ruffed grouse during breeding and dispersal. *Wildl. Soc. Bull.* (under revision).
- Mullen, S. M., and M. S. Boyce. 2008. Fur harvests and landscape change in west-central Alberta. *J. Wildl. Manage.* (submitted).
- Beyer, H.L., D. Fortin, J. D. Forester, E. H. Merrill, D. W. Smith, and M. S. Boyce. 2008. Elk movement models support a trophic cascade hypothesis in Yellowstone National Park. *Journal of Animal Ecology* (submitted).
- Forester, J. D., M. G. Turner, D. Fortin, D. P. Anderson., H. L. Beyer, D. W. Smith, and M. S. Boyce. 2008. Multi-scale habitat selection by elk: generalizing from individuals to populations. *Ecol. Appl.* (manuscript).
- Ciarniello, L., M. S. Boyce, D. R. Seip, and D. C. Heard. 2008. Grizzly bear population ecology: comparison of a wilderness versus heavily roaded landscape. *Can. J. Zool.* (submitted).
- Millsbaugh, J. J., J. R. Skalski, R. L. Townsend, D. R. Diefenbach, M. S. Boyce, L. P. Hansen, K. Kammermeyer. 2008. An evaluation of SAK model performance. *J. Wildl. Manage.* (submitted).

## **PUBLISHED WORKS**

### **Books:**

- Boyce, M. S., and A. Haney. 1997. *Ecosystem Management: Applications for Sustainable Forest and Wildlife Resources*. Yale University Press, New Haven, Conn. 361pp. [paperback edition, 1999].

Thorne, E. T., M. S. Boyce, P. Nicoletti, and T. J. Kreeger (eds.). 1997. *Brucellosis, Bison, elk, and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring the Solutions*. Wyoming Game and Fish Department, Cheyenne, Wyo. 219pp.

Keiter, R. B., and M. S. Boyce. 1991. *The Greater Yellowstone Ecosystem: Redefining America's Wilderness Heritage*. Yale University Press, New Haven, Conn. 425pp. [see review: *Science* 255:1148-1149; paperback edition in 1994].

Boyce, M. S. 1989. *The Jackson Elk Herd: Intensive Wildlife Management in North America*. Cambridge University Press, Cambridge, U.K., 305 pp.

Boyce, M. S., ed. 1988. *Evolution of Life Histories of Mammals*. Yale Univ. Press, New Haven, CT., 373 pp. [see reviews: *Science* 246:391; *Trends Ecol. Evol.* 4(10):307-308; *Q. Rev. Biol.* 65:80].

Boyce, M. S., and L. D. Hayden-Wing. 1979. *North American Elk: Ecology, Behavior and Management*. Univ. Wyoming, Laramie, 294pp. [reprinted, 1980].

#### **Scientific Articles:**

Bush, K. L., B. J. Moynahan, B. L. Walker, H. S. Sauls, A. M. Battazzo, C. L. Aldridge, K. E. Doherty, J. Tack, J. Carlson, D. Eslinger, J. Nicholson, M. S. Boyce, D. E. Naugle, C. A. Paszkowski, and D. W. Coltman. 2008. Living on the northern edge: using greater sage-grouse (*Centrocercus urophasianus*) to examine the impact of range periphery and fragmentation on population structure and genetic diversity. *Mol. Ecol.* (in press).

Aldridge, C. L., S. E. Nielsen, H. L. Beyer, M. S. Boyce, J. W. Connelly, S. T. Knick, and M. A. Schroeder. 2008. Range-wide patterns of greater sage-grouse persistence. *Div. & Distr.* (in press).

Nielsen, S. E., G. B. Stenhouse, H. L. Beyer, F. Huettmann, and M. S. Boyce. 2008. Can natural disturbance-based forestry rescue a declining population of grizzly bears? *Biol. Conserv.* (in press).

Boyce, M. S., E. H. Merrill, and A. R. E. Sinclair. 2008. Managing wildlife in ecosystem context. In: *The Guide to Ecology*. Princeton University Press, Princeton, New Jersey, USA. (in press).

Knopff, K. H., M. G. Jalkotzy, and M. S. Boyce. 2008. The status, management, and conservation of cougar in Canada. In S. Negri and M. Hornocker (eds.) *Cougar: ecology and management*. University of Chicago Press, Chicago, Ill. (in press).

Boyce, M. S., and R. L. Byrne. 2007. Managing predator-prey systems: summary discussion. *Trans. N. Am. Wildl. Nat. Resour. Conf.* **72**: (in press).

- Knopff, K., and M. S. Boyce. 2007. Prey specialization by individual cougars (*Puma concolor*) in multi-prey systems. *Trans. N. Amer. Wildl. Nat. Resour. Conf.* **72**: (in press).
- Webb, S. M., D. J. Davidson, and M. S. Boyce. 2008. Trapper attitudes and industrial development on registered traplines in west-central Alberta. *Human Dimen. Wildl.* **13**:115-126.
- Found, C., S. M. Webb, and M. S. Boyce. 2008. Selection of lake habitats by waterbirds in the boreal transition zone of northeastern Alberta. *Can. J. Zool.* **86**: 277–286. doi: 10.1139/z07-137
- Morris, W. F., C. A. Pfister, S. D. Tuljapurkar, C. V. Haridas, C. Boggs, M. S. Boyce, E. Bruna, D. R. Church, T. Coulson, D. F. Doak, S. Forsyth, J.-M. Gaillard, C. Horvitz, S. Kalisz, B. Kendall, T. Knight, C. Lee, and E. Menges. 2008. Longevity can buffer plant and animal populations against changing climatic variability. *Ecology* **89**:19–25.
- Wiens, T., B. Dale, M. S. Boyce, and P. Kershaw. 2008. Three way *k*-fold cross-validation of logistic regression models. *Ecol. Modelling* **212**:244–255.
- McLoughlin, P. D., J.-M. Gaillard, M. S. Boyce, C. Bonenfant, F. Messier, P. Duncan, D. Delorme, B. Van Moorter, S. Saïd, and F. Klein. 2007. Lifetime reproductive success and composition of the home range in a large herbivore. *Ecology* **88**: 3192–3201.
- Beyer, H. L., E. H. Merrill, N. Varley, and M. S. Boyce. 2007. Willow on Yellowstone's northern range: evidence for a trophic cascade? *Ecol. Appl.* **17**: 1563–1571.
- Boyce, M. S., S. P. Rushton, and T. Lynam. 2007. Does modelling have a role in conservation? Pages 134-144 in D. W. Macdonald and K. Service (editors), *Key Topics in Conservation Biology*. Oxford University Press, Oxford, U.K.
- Ciarniello, L., M. S. Boyce, D. R. Seip, and D. C. Heard. 2007. Grizzly-bear habitat selection is scale dependent. *Ecol. Appl.* **17**:1424–1440.
- Ciarniello, L., M. S. Boyce, D. Heard, and D. Seip. 2007. Components of grizzly bear habitat selection: density, habitats, roads, and mortality risk. *J. Wildl. Manage.* **71**:1446–1457.
- Kauffman, M. J., N. Varley, D. W. Smith, D. R. Stahler, D. R. MacNulty, and M. S. Boyce. 2007. Landscape heterogeneity shapes predation in a newly restored predator–prey system. *Ecol. Lett.* **10**:690-700.
- Czetwertynski, S. M., M. S. Boyce, and F. Schmiegelow. 2007. Effects of hunting on demographic parameters of American black bears. *Ursus* **18**:1–18.

- Forester, J. D., A. R. Ives, M. G. Turner, D. P. Anderson, D. Fortin, H. L. Beyer, D. W. Smith, and M. S. Boyce. 2007. State-space models link elk movement to landscape characteristics in Yellowstone National Park. *Ecol. Monogr.* **77**:285–299.
- Frair, J. L., E. H. Merrill, J. R. Allen, and M. S. Boyce. 2007. Know thy enemy: experience affects translocation success in risky landscapes. *J. Wildl. Manage.* **71**:541–554.
- Aldridge, C. L., and M. S. Boyce. 2007. Linking occurrence and fitness to persistence: a habitat-based approach for endangered greater sage-grouse. *Ecol. Appl.* **17**:508–526.
- Proctor, M., J. Boulager, B. N. McLellan, G. C. White, M. S. Boyce, D. Garshelis, C. Apps, R. Mace, and S. Miller. 2007. *Monitoring grizzly bear population trends in forested environments*. Radium 2006 Workshop Report, Radium, B.C.
- Boyce, M. S. 2006. Scale and resource selection functions. *Div. & Distr.* **12**:269–276.
- Boyce, M. S., C. V. Haridas, and C. Lee. 2006. Demography in an increasingly variable world. *Trends Ecol. Evol.* **21**:141–148.
- Chetkiewicz, C.-L., C. C. St. Clair, and M. S. Boyce. 2006. Corridors for conservation: structure versus function. *Ann. Rev. Ecol. Evol. Syst.* **37**:317–42.
- Johnson, C. J., S. E. Nielsen, E. H. Merrill, T. L. McDonald, and M. S. Boyce. 2006. Resource selection functions based on use-availability data: theoretical motivation and evaluation methods. *J. Wildl. Manage.* **70**:347–357.
- Munro, R. H. M., S. E. Nielsen, M. H. Price, G. B. Stenhouse, and M. S. Boyce. 2006. Seasonal and diel patterns of grizzly bear diet and activity in west-central Alberta. *J. Mammal.* **87**:1112–1121.
- Pearce, J. L., and M. S. Boyce. 2006. Modelling distribution and abundance with presence-only data. *J. Appl. Ecol.* **43**:405–412.
- McLoughlin, P., M. S. Boyce, T. Coulson, and T. Clutton-Brock. 2006. Lifetime reproductive success and density-dependent, multi-variable resource selection. *Proc. Royal Soc. B* **273**: 1449–1454.
- Nielsen, S. E., M. S. Boyce, and G. Stenhouse. 2006. A habitat-based framework for grizzly bear conservation in Alberta. *Biol. Conserv.* **130**:217–229.
- Varley, N., and M. S. Boyce. 2006. Adaptive management for reintroductions: updating a wolf recovery model for Yellowstone National Park. *Ecol. Modelling* **193**:315–339.
- Aldridge, C., and M. S. Boyce. 2006. Silver sagebrush community associations in Southeastern Alberta, Canada. *Rangeland Ecol. Manage.* **59**:107–108.

- Boyce, M. S. 2005. Wolves are consummate predators. *Q. Rev. Biol.* **80**:87–92.
- Boyce, M. S., S. Lele, and B. W. Johns. 2005. Whooping crane recruitment enhanced by egg removal. *Biol. Conserv.* **126**:395–401.
- Boyce, M. S., L. L. Irwin, and R. Barker. 2005. Demographic meta-analysis: synthesizing vital rates for spotted owls. *J. Appl. Ecol.* **42**: 38–49.
- Mao, J. S., M. S. Boyce, D. W. Smith, F. J. Singer, D. J. Vales, J. M. Vore, and E. H. Merrill. 2005. Habitat selection by elk before and after wolf reintroduction in Yellowstone National Park. *J. Wildl. Manage.* **69**:1691–1707.
- Johnson, C. J., M. S. Boyce, R. L. Case, H. D. Cluff, R. J. Gau, A. Gunn, and R. Mulders. 2005. Cumulative effects of human developments on Arctic wildlife. *Wildl. Monogr.* **160**:1–36.
- Ripley, T., G. Scrimgeour, and M. S. Boyce. 2005. Bull trout (*Salvelinus confluentus*) distribution and abundance influenced by cumulative industrial developments in a Canadian boreal forest watershed. *Can. J. Fish. Aquat. Sci.* **62**:2431–2442.
- Fortin, D., J. M. Morales, and M. S. Boyce. 2005. Elk winter foraging at fine scales in Yellowstone National Park. *Oecologia* **145**:335–343.
- Naugle, D. E., C. L. Aldridge, B. L. Walker, K. E. Doherty, M. R. Matchett, J. McIntosh, T. E. Cornish, and M. S. Boyce. 2005. West Nile virus and sage-grouse: What more have we learned? *Wildl. Soc. Bull.* **33**:616–623.
- McDonald, L. L., J. R. Alldredge, M. S. Boyce, and W. P. Erickson. 2005. Measuring availability and vertebrate use of terrestrial habitats and foods. Pages 465–488 in C. Braun, editor. *Techniques for Wildlife Investigations and Management*, 6<sup>th</sup> edition. The Wildlife Society, Washington, D.C.
- Xu, C., M. S. Boyce, and D. J. Daley. 2005. Harvesting in seasonal environments. *J. Math. Biol.* **50**: 663–682.
- Anderson, D. P., J. D. Forester, M. G. Turner, J. L. Frair, E. H. Merrill, D. Fortin, J. S. Mao, and M. S. Boyce. 2005. Factors influencing seasonal home-range sizes in elk (*Cervus elaphus*) in North American landscapes. *Landsc. Ecol.* **20**:257–271.
- Anderson, D. P., M. G. Turner, J. D. Forester, J. Zhu, M. S. Boyce, H. Beyer, and L. Stowell. 2005. Scale-dependent summer resource selection by reintroduced elk in Wisconsin, USA. *J. Wildl. Manage.* **69**:298–310.
- Ciarniello, L., M. S. Boyce, D. Seip, and D. C. Heard. 2005. Denning behaviour and den site selection of grizzly bears along the Parsnip River, British Columbia, Canada. *Ursus* **16**:47–58.

- Johnson, C. J., and M. S. Boyce. 2005. A quantitative approach for regional environmental assessment: application of a habitat-based population viability analysis to wildlife of the Canadian central Arctic. *Can. Envir. Assess. Agency, Res. & Develop. Monogr. Ser.* Electronic publication: [http://www.ceaa-acee.gc.ca/015/001/028/index\\_e.htm](http://www.ceaa-acee.gc.ca/015/001/028/index_e.htm)
- Fortin, D., H. Beyer, M. S. Boyce, D. W. Smith, and J. S. Mao. 2005. Wolves influence elk movements: behavior shapes a trophic cascade in Yellowstone National Park. *Ecology* **86**: 1320–1330.
- Nielsen, S. E., C. J. Johnson, D. C. Heard, and M. S. Boyce. 2005. Can models of presence-absence be used to scale abundance? Two case studies considering extremes in life history. *Ecography* **28**:197–208.
- Xu, C., and M. S. Boyce. 2005. Predator-prey dynamics: periodic forcing in functional response vs. intrinsic growth of prey. *Natl. Conf. Nonlin. Syst. & Dyn.* **2**:33–36.
- Xu, C., M. S. Boyce, M. Gadgil, and V. Nanjundiah. 2005. Forecasting spatially structured populations: the role of dispersal and scale. *J. Theor. Biol.* **233**:177–189.
- Xu, C., and M. S. Boyce. 2005. Dynamic complexities in a mutual interference host-parasitoid model. *Chaos, Solitons & Fractals* **24**:175–182.
- Stenhouse, G. B., M. S. Boyce, and J. Boulanger. 2005. *Report on grizzly bear assessment of allocation*. Report to the Minister, Sustainable Resource Development, Province of Alberta. Edmonton, Alberta, Canada.
- Boyce, M. S. 2004. Realities of Nature. Pages 217–220 In: M. L. Taper and S. R. Lele, eds. *The Nature of Scientific Evidence*. University of Chicago Press, Chicago.
- Boyce, M. S. 2004. Reproductive science and integrated conservation (book review). *Q. Rev. Biol.* **79**:104.
- Boyce, M. S. 2004. Rhinos in the terai of Nepal (book review). *Ecology* **85**:1765–1766.
- Boyce, M. S. 2004. Resource selection by animals: statistical design and analysis for field studies (book review). *Environ. Conserv.* **31**(1):85–86.
- Boyce, M. S. 2004. *Wildlife Research Needs in Alberta: A Report to the Alberta Conservation Association*. Technical report (T-2004-001) produced by Alberta Conservation Association, Red Deer. 84pp.
- Boyce, M. S. 2004. Public grassland trade violates three laws. *Wild Lands Advocate* **12**(3): 12–13.

- Johnson, C. J., M. S. Boyce, C. C. Schwartz, and M. A. Haroldson. 2004. Modeling survival: application of the multiplicative hazards model to Yellowstone grizzly bear. *J. Wildl. Manage.* **68**:966–978.
- Johnson, C. J., M. S. Boyce, R. Mulders, A. Gunn, R. J. Gau, H. D. Cluff, and R. L. Case. 2004. Quantifying patch distribution at multiple spatial scales: applications to habitat models. *Landsc. Ecol.* **19**:869–882.
- Gau, R. J., R. Mulders, L. M. Ciarniello, D. C. Heard, C. B. Chetkiewicz, M. Boyce, R. Munro, G. Stenhouse, B. Chruszcz, M. L. Gibeau, B. Milakovic, and K. L. Parker. 2004. Uncontrolled field performance of Televilt GPS-Simplex™ collars on grizzly bears in western and northern Canada. *Wildl. Soc. Bull.* **32**:693–701.
- Nielsen, S. E., M. S. Boyce, and G. B. Stenhouse. 2004. Grizzly bears and forestry I: Selection of clearcuts by grizzly bears in west-central Alberta, Canada. *Forest Ecol. and Manage.* **199**:51–65.
- Nielsen, S. E., R. H. M. Munro, E. Bainbridge, M. S. Boyce, and G. B. Stenhouse. 2004. Grizzly bears and forestry II: Distribution of grizzly bear foods in clearcuts in west-central Alberta, Canada. *Forest Ecol. and Manage.* **199**:67–82.
- Fortin, D., M. S. Boyce, E. H. Merrill, and J. Fryxell. 2004. Foraging costs of vigilance in large mammalian herbivores. *Oikos* **107**:172–180.
- Visscher, D., H. Beyer, J. Frair, D. Fortin, E. H. Merrill, M. S. Boyce, and J. Allen. 2004. Vegetation map and dynamics of elk forage for the Central East Slopes Elk and Wolf Study. Project Completion Report, University of Alberta, Edmonton. 60pp.
- Nielsen, S. E., S. Herrero, M. S. Boyce, B. Benn, R. D. Mace, M. L. Gibeau, and S. Jevons. 2004. Modelling the spatial distribution of human-caused grizzly bear mortalities in the Central Rockies Ecosystem of Canada. *Biol. Conserv.* **120**:101–113.
- Niemuth, N., and M. S. Boyce. 2004. Influence of landscape composition on sharp-tailed grouse lek location and attendance in Wisconsin pine barrens. *Écoscience* **11**:209–217.
- Naugle, D. E., C. L. Aldridge, B. L. Walker, T. E. Cornish, B. J. Moynahan, M. J. Holloran, K. Brown, G. D. Johnson, E. T. Schmidtman, R. T. Mayer, C. Y. Kato, M. R. Matchett, T. J. Christiansen, W. E. Cook, T. Creekmore, R. D. Falise, E. T. Rinkes, and M. S. Boyce. 2004. West Nile virus: pending crisis for Greater Sage-Grouse. *Ecol. Lett.* **7**:704–713.
- Fortin, D., M. S. Boyce, and E. H. Merrill. 2004. Multi-tasking by mammalian herbivores: overlapping processes during foraging. *Ecology* **85**:2312–2322.
- Frair, J. L., S. E. Nielsen, E. H. Merrill, S. Lele, M. S. Boyce, R. H.M. Munro, G. B. Stenhouse, and H. L. Beyer. 2004. Removing habitat-induced, GPS-collar bias from inferences of habitat selection. *J. Appl. Ecol.* **41**:201–212 .

- Johnson, C. J., D. R. Seip, and M. S. Boyce. 2004. A quantitative approach to conservation planning: Using resource selection functions to map the distribution of mountain caribou at multiple spatial scales. *J. Appl. Ecol.* **41**:238–251.
- Radeloff, V. C., D. J. Mladenoff, R. P. Guries, and M. S. Boyce. 2004. Spatial patterns of cone serotiny in *Pinus banksiana* in relation to fire disturbance. *For. Ecol. & Manage.* **189**:133–141.
- Aldridge, C. L., M. S. Boyce, and R. K. Baydack. 2004. Adaptive management of prairie grouse: how do we get there? *Wildl. Soc. Bull.* **32**: 92–103.
- Boyce, M. S., J. S. Mao, E. H. Merrill, D. Fortin, M. G. Turner, J. Fryxell, and P. Turchin. 2003. Scale and heterogeneity in habitat selection by elk in Yellowstone National Park. *Écoscience* **10**: 421–431.
- Boyce, M. S., and J. S. Waller. 2003. Grizzly bears for the Bitterroots: predicting potential abundance and distribution. *Wildl. Soc. Bull.* **31**:670–683.
- Gau, R. J., R. Mulders, L. M. Ciarniello, D. C. Heard, C. Chetkiewicz, M. S. Boyce, R. Munro, and G. Stenhouse. 2003. Uncontrolled field performance of Televilt GPS-Simplex collars on grizzly bears in western and northern Canada. *Western Black Bear Workshop* 8:(in press).
- Nielsen, S. E., M. S. Boyce, G. B. Stenhouse, and R. H. M. Munro. 2003. Development and testing of phenologically driven grizzly bear habitat models. *EcoScience* **10**:1–10.
- Boyce, M. S. 2003. Forest-wildlife management. Pages 313-327 In: *Forest Ecosystem Science and Management*, 3<sup>rd</sup> Edition (R. A. Young and R. L. Giese, eds.). John Wiley, New York.
- Chetkiewicz, C., and M. S. Boyce. 2002. Carnivores and corridors in the Crowsnest Pass. Alberta Sustainable Resource Development, Fish and Wildlife Division, *Alberta Species at Risk Report* no. 50. Edmonton, Alta.
- Radeloff, V. C., D. J. Mladenoff, and M. S. Boyce. 2002. Satellite monitoring of landscape changes caused by insect outbreaks in the northwest Wisconsin pine barrens. Pages 55–57 In: *Proc. 1999 Pine Barrens Research Forum*, Brookhaven National Laboratory, Upton, New York.
- Nielsen, S. E., M. S. Boyce, G. B. Stenhouse, and R. H. M. Munro. 2002. Modeling grizzly bear habitats in the Yellowhead ecosystem of Alberta: taking autocorrelation seriously. *Ursus* **13**:45–56.



- Boyce, M. S., P. R. Vernier, S. E. Nielsen, and F. K. A. Schmiegelow. 2002. Evaluating resource selection functions. *Ecol. Modelling* **157**:281–300.
- Boyce, M. S. 2002. Wolves and human communities (book review). *Q. Rev. Biol.* **77**:216.
- Boyce, M. S., E. M. Kirsch, and C. Servheen. 2002. Bet-hedging applications for conservation. *J. Biosci.* **27**:385–392.
- Boyce, M. S. 2002. Population cycles in ecosystem context (book review). *Ecology* **83**:2064–2065.
- Boyce, M. S. 2002. Reconciling the small population and declining population paradigms. Pages 41-49 In: *Population Viability Analysis*, (S. Beissinger and D. R. McCullough, eds.). University of Chicago Press.
- Boyce, M. S. 2002. Statistics as viewed by biologists. *J. Agr. Biol. Environ. Stat.* **7**:306–312.
- Boyce, M. S., P. J. Hudson, and E. Ranta. 2002. International review of Swedish wildlife research 1997-2001. Report 5179, Swedish Environmental Protection Agency, Stockholm.
- Brown, J. A., and M. S. Boyce. 2001. A survey design for monitoring butterflies. *Statistica* **61**:291–299.
- Haydon, D.T., N. C. Stenseth, M. S. Boyce, and P. C. Greenwood. 2001. Phase coupling and synchrony in the spatio-temporal dynamics of muskrat and mink populations across Canada. *Proc. National Academy of Sciences, USA* **98**(23):13149–13154.
- Viljugrein, H., O. Chr. Lingjærde, N. Chr. Stenseth, and M. S. Boyce. 2001. Spatio-temporal patterns of mink and muskrat in Canada during a quarter century. *J. Anim. Ecol.* **70**:671–682.
- Erb, J. D., M. S. Boyce, and N. Chr. Stenseth. 2001. Spatial variation in mink and muskrat interactions in Canada. *Oikos* **93**:365–375.
- MacKenzie, D. I., and M. S. Boyce. 2001. Estimating closed population size using negative binomial models. *Western Black Bear Workshop* **7**:21–23.
- Boyce, M. S., D. I. MacKenzie, B. F. J. Manly, M. Haroldson, and D. Moody. 2001. Negative binomial models for abundance estimation of multiple closed populations. *J. Wildl. Manage.* **65**(3):498–509.
- Erb, J. D., M. S. Boyce, and N. Chr. Stenseth. 2001. Population dynamics of large and small mammals. *Oikos* **92**:3–12.

- Boyce, M. S. 2001. Greater Yellowstone predators: a summary. Pages 37–40 In: *Greater Yellowstone Predators: Ecology and Conservation in a Changing Landscape*, (A. P. Curlee, A. M. Gillesberg, and D. Casey, eds.). Northern Rockies Conservation Cooperative, Jackson, Wyoming.
- Boyce, M. S. 2001. Population viability analysis: development, interpretation, and application. Pages 123–136 In: *Modeling in natural resource management: development, interpretation and application*, (T. M. Shenk and A. B. Franklin, eds.). Island Press, Washington, D. C.
- Boyce, M. S., B. M. Blanchard, R. R. Knight, and C. Servheen. 2001. Population viability for grizzly bears: a critical review. *Internat. Assoc. for Bear Res. and Manage., Monogr. Ser.* No. 4.
- Niemuth, N. D., and M. S. Boyce. 2000. Enhanced avian diversity in Wisconsin pine barrens through aggregated timber harvest. *Trans. N. Am. Wildl. Nat. Resour. Conf.* **65**:184–199.
- Radeloff, V. C., D. J. Mladenoff, and M. S. Boyce. 2000. The changing relation of landscape pattern to jack pine budworm populations during an outbreak. *Oikos* **90**:417–430.
- Radeloff, V. C., D. J. Mladenoff, and M. S. Boyce. 2000. A historical perspective and future outlook on landscape scale restoration in the northwest Wisconsin pine barrens. *Restoration Ecology* **8**:119–126.
- Boyce, M. S. 2000. Whaling models for conservation. Pages 109–126 In: *Quantitative Methods for Conservation Biology*, ch. 8 (S. Ferson and M. Burgman, eds.). Springer-Verlag, New York.
- Boyce, M. S. 2000. Modeling predator-prey dynamics. Pages 253–287 In: *Research Techniques in Animal Ecology: Controversies and Consequences*. (L. Boitani and T. K. Fuller, eds.). Columbia Univ. Press, New York, N.Y.
- Radeloff, V. C., D. J. Mladenoff, and M. S. Boyce. 2000. Effects of interacting disturbances on landscape patterns: budworm defoliation and salvage logging. *Ecol. Appl.* **10**:233–247.
- Erb, J. D., M. S. Boyce, and N. C. Stenseth. 2000. Geographic variation in the dynamics of muskrat populations in Canada. *Can. J. Zool.* **78**:1009–1016.
- Boyce, M. S. 2000. Metapopulation analysis for the Bitterroot population. Pages 6-242 to 6-246 In: C. Servheen. *Grizzly bear recovery in the Bitterroot ecosystem*. Final Environmental Impact Statement. Appendix 21C. U.S. Fish & Wildlife Service, Missoula, Montana, USA.
- Boyce, M. S., and L. L. McDonald. 2000. Description of methodology utilized for Bitterroot population analysis presented in Appendix 21B. Pages 6-221 to 6-230 In: C. Servheen.

*Grizzly bear recovery in the Bitterroot ecosystem*. Final Environmental Impact Statement. Appendix 21A. U.S. Fish & Wildlife Service, Missoula, Montana, USA.

- Boyce, M. S., and J. Waller. 2000. The application of resource selection functions analysis to estimate the number of grizzly bears that could be supported by habitats in the Bitterroot ecosystem. Pages 6-231 to 6-241 In: C. Servheen. *Grizzly bear recovery in the Bitterroot ecosystem*. Final Environmental Impact Statement. Appendix 21B. U.S. Fish & Wildlife Service, Missoula, Montana, USA.
- Boyce, M. S., A. R. E Sinclair, and G. C. White. 1999. Seasonal compensation of predation and harvesting. *Oikos* **87**:419–426.
- Boyce, M. S., L. L. McDonald, and B. F. J. Manly. 1999. Reply to Mysterud and Ims. *Trends in Ecol. and Evol.* **14**:490.
- Kirsch, E. M., and M. S. Boyce. 1999. Bet hedging for least tern conservation. Pages 42–43 in K. F. Higgins, M. R. Brashier, and C. D. Kruse, eds. Proceedings, piping plovers and least terns of the Great Plains and nearby. South Dakota State University, Brookings.
- Boyce, M. S., and E. M. Anderson. 1999. Evaluating the role of carnivores in the Greater Yellowstone Ecosystem. Pages 265–283 In: *Carnivores in Ecosystems*, (T. W. Clark, C. P. Curlee, S. C. Minta, and P. M. Kareiva, eds.). Yale Univ. Press, New Haven, Conn.
- Radeloff, V. C., D. J. Mladenoff, H. S. He, and M. S. Boyce. 1999. Forest landscape change: The northwest Wisconsin Pine Barrens before European settlement and today. *Can. J. For. Res.* **29**:1649–1659.
- Noon, B. R., R. H. Lamberson, M. S. Boyce, and L. L. Irwin. 1999. Population viability analysis: a primer on its principal technical concepts. Pages 87–134 in N. C. Johnson, A. J. Malk, W. T. Sexton, and R. C. Szaro, eds. *Ecological Stewardship: A Common Reference for Ecosystem Management*. Vol. 2. Elsevier Science, New York.
- Boyce, M. S., and L. L. McDonald. 1999. Relating populations to habitats using resource selection functions. *Trends Ecol. Evol.* **14**:268–272.
- Radeloff, V. C., D. J. Mladenoff, and M. S. Boyce. 1999. Detecting jack pine budworm defoliation using spectral mixture analysis: separating effects from determinants. *Remote Sensing of Environment* **69**:156–169.
- Erb, J. D., and M. S. Boyce. 1999. Distribution of population declines in large mammals. *Conserv. Biol.* **13**:199–201.
- Niemuth, N. D., and M. S. Boyce. 1998. Disturbance in Wisconsin pine barrens: implications for management. *Trans. Wisc. Acad. Sci. Arts & Letters* **86**:167–176.

- Radeloff, V. C., D. J. Mladenoff, K. L. Manies, and M. S. Boyce. 1998. Analyzing forest landscape restoration potential: pre-settlement and current distribution of oak in the northwest Wisconsin pine barrens. *Trans. Wisc. Acad. Sci. Arts & Letters* **86**:189–206.
- Boyce, M. S. 1998. Ecological-process management and ungulates: Yellowstone's conservation paradigm. *Wildl. Soc. Bull.* **26**:391–398.
- Meyer, J. S., L. L. Irwin, and M. S. Boyce. 1998. Influence of habitat abundance and fragmentation on spotted owls in western Oregon. *Wildl. Monogr.* No. 139.
- Brown, J. A., and M. S. Boyce. 1998. Line transect sampling of Karner blue butterflies. *Environ. Ecol. Statistics* **5**(1):81–91.
- Radeloff, V. C., D. J. Mladenoff, and M. S. Boyce. 1998. Jack pine budworm defoliation monitoring and modeling using spectral mixture analysis. *Proc. Intern. Symp. Remote Sensing of Environ.* **27**:644–647.
- Boyce, M. S. 1998. New research and adaptive management of Pacific Northwest Forests. Testimony before the Committee on Resources, U.S. House of Representatives, Washington, D.C. ([www.house.gov/resources/105cong/forests/98mar19/boyce.htm](http://www.house.gov/resources/105cong/forests/98mar19/boyce.htm))
- Niemuth, N., and M. S. Boyce. 1997. Edge-related nest losses in Wisconsin pine barrens. *J. Wildl. Manage.* **61**:1234–1238.
- Boyce, M. S. 1997. The Greater Yellowstone Ecosystem. Pages 631–638 In: *Principles of Conservation Biology*, second edition (G. Meffe and R. Carroll, eds.). Sinauer, Sunderland, Mass.
- Cheville, N. F., M. Meagher, T. J. Roffe, F. Enright, and M. S. Boyce. 1997. Future brucellosis research needs for the Greater Yellowstone area. Pages 101–119 In: *Brucellosis, Bison, Elk and Cattle in the Greater Yellowstone Area: Defining the Problem, Exploring Solutions*, (Thorne, E. T., M. S. Boyce, P. Nicoletti, and T. J. Kreeger, eds). Wyoming Game and Fish Department, Cheyenne.
- Boyce, M. S. 1997. Reconstructing biology: genetics and ecology in the New World Order (book review). *Q. Rev. Biol.* **72**:313–314.
- Boyce, M. S. 1997. Review essay: The grizzly bears of Yellowstone. *Yellowstone Science* **5**(1):18–20.
- Boyce, M. S. 1997. The importance of science for sound management in national parks. Testimony before the Committee on Resources, U.S. House of Representatives, Washington, D.C. ([www.uwsp.edu/admin/chancellor/comm/1996/testimony.htm](http://www.uwsp.edu/admin/chancellor/comm/1996/testimony.htm)).

- Nations, C., and M. S. Boyce. 1997. Stochastic demography for conservation biology. Pages 451–469 In: *Structured Population Models in Marine, Terrestrial, and Freshwater Systems*, (S. Tuljapurkar and H. Caswell, eds.), Chapman and Hall, New York, N.Y.
- Boyce, M. S. 1997. Population viability analysis: Adaptive management for threatened and endangered species. Pages 226–236 In: *Ecosystem Management: Applications for Sustainable Forest and Wildlife Resources* (M. S. Boyce and A. Haney, eds.), Yale University Press, New Haven, Conn.
- Haney, A., and M. S. Boyce. 1997. Introduction to ecosystem management. Pages 1–17 In: *Ecosystem Management: Applications for Sustainable Forest and Wildlife Resources* (M. S. Boyce and A. Haney, eds.), Yale University Press, New Haven, Conn.
- Boyce, M. S., and N. F. Payne. 1997. Applied disequilibriums: Riparian habitat management for wildlife. Pages 133–146 In: *Ecosystem Management: Applications for Sustainable Forest and Wildlife Resources* (M. S. Boyce and A. Haney, eds.), Yale University Press, New Haven, Conn.
- Boyce, M. S. 1997. Greater Yellowstone ecosystem. Website publication from symposium on *Ecosystem management: for a world we can live in*. School of Natural Resources and Environment, Univ. Michigan, Ann Arbor ([www.snre.umich.edu/ecomgt/boyce.html](http://www.snre.umich.edu/ecomgt/boyce.html)).
- Boyce, M. S. 1996. RAMAS/GIS: linking landscape data with population viability analysis. (software review). *Q. Rev. Biol.* **71**:167–168.
- Boyce, M. S. 1996. The Aldo Starker Leopold Memorial Lecture. If I were superintendent . . . Pages 201–208 In: *Ecological Implications of Fire in Greater Yellowstone*, (J. Greenlee, ed.). Internat. Assoc. of Wildland Fire, Fairfield, Wash.
- Brown, J. A., and M. S. Boyce. 1996. *Monitoring of Karner blue butterflies (Lycaeides melissa samuelis) for the proposed Habitat Conservation Plan, Wisconsin*. National Fish and Wildlife Foundation, Washington, D.C. 78pp.
- Niemuth, N., and M. S. Boyce. 1995. Spatial and temporal patterns of predation of simulated sage grouse nests at high and low nest densities: An experimental study. *Can. J. Zool.* **73**:819–825.
- Boyce, M. S. 1995. Book review: *Bison--Mating and conservation in small populations*. *Q. Rev. Biol.* **70**:231.
- Boyce, M. S. 1995. Anticipating consequences of wolves in Yellowstone: Model validation. Pages 199–209 In: *Ecology and Conservation of Wolves in a Changing World*, (L. Carbyn, S. Fritts, and D. Seip, eds.). Canadian Circumpolar Institute, Edmonton, Alberta, Canada.

- Boyce, M. S. 1995. Population estimation. Pages 263-275 In: *The Development of International Principles and Practices of Wildlife Research and Management: Asian and American Approaches*, (S. H. Berwick and V. B. Saharia, eds.). Oxford Univ. Press, Delhi, India.
- Boyce, M. S. 1995. Population dynamics. Pages 277-290 In: *The Development of International Principles and Practices of Wildlife Research and Management: Asian and American Approaches*, (S. H. Berwick and V. B. Saharia, eds.). Oxford Univ. Press, Delhi, India.
- Boyce, M. S. 1995. A global perspective on the selection of nature reserves. Pages 473-481 In: *The Development of International Principles and Practices of Wildlife Research and Management: Asian and American Approaches*, (S. H. Berwick and V. B. Saharia, eds.). Oxford Univ. Press, Delhi, India.
- Spurrier, M. S., M. S. Boyce, and B. F. J. Manly. 1994. Lekking behavior in captive Sage Grouse *Centrocercus urophasianus*. *Anim. Behav.* **47**:303-310.
- Boyce, M. S. 1994. Brucellosis and the future of Greater Yellowstone. *Yellowstone Science* 3(1):15-16.
- Boyce, M. S. 1994. The Greater Yellowstone Ecosystem. Pages 521-527 In: *Principles of Conservation Biology*, (G. Meffe and R. Carroll, eds.). Sinauer, Sunderland, MA.
- Meyer, J. S., and M. S. Boyce. 1994. Life historical consequences of pesticides and other insults to vital rates. Pages 349-363 In: *Wildlife Toxicology and Population Modeling: Integrated Studies of Agroecosystems*. (R. J. Kendall and T. E. Lacher, eds.) Lewis Publishers, Washington, D.C.
- Boyce, M. S. 1994. Biodiversity at risk: Deforestation. Pages 151-161 In: *Biological Diversity: Problems and Challenges* (S. K. Majumdar, F. J. Brenner, J. E. Lovich, J. F. Schalles, and E. W. Miller, eds.), Ch.13. Pennsylvania Academy of Science, Easton, PA.
- Boyce, M. S. 1994. Population viability analysis exemplified by models for the northern spotted owl. Pages 3-18 In: *Statistics in Ecology and Environmental Monitoring*, (D. J. Fletcher and B. F. J. Manly, eds.). Otago Conference Series No. 2, Univ. Otago Press, Dunedin, New Zealand.
- Boyce, M. S., J. S. Meyer, and L. L. Irwin. 1994. Habitat-based PVA for the northern spotted owl. Pages 63-85 In: *Statistics in Ecology and Environmental Monitoring*, (D. J. Fletcher and B. F. J. Manly, eds.). Otago Conference Series No. 2, Univ. Otago Press, Dunedin, New Zealand.

- Boyce, M. S., J. M. Cushing, R. McKelvey, R. A. Myers, A. Starfield, G. L. Swartzmann, and B. L. Taylor. 1994. *Report of the NMFS Review of the IWC Revised Management Procedure for Commercial Whaling*. Document IWC/46/24, Report of the Scientific Committee, International Whaling Commission, Cambridge, United Kingdom. 19pp.
- Liou, L., T. Price, M. S. Boyce, and C. M. Perrins. 1993. Fluctuating environments and clutch size evolution in Great Tits. *Am. Nat.* **141**:507-516.
- Boyce, M. S. 1993. Book review: *An Environmental Profile of the Greater Yellowstone Ecosystem*. *Yellowstone Science* **1**(4):17.
- Boyce, M. S., and E. H. Merrill. 1993. Book review: Wildlife-habitat relationships. *Q. Rev. Biol.* **68**:303.
- Boyce, M. S. 1993. Population viability analysis: Adaptive management for threatened and endangered species. *Trans. N. Am. Wildl. Nat. Res. Conf.* **58**:520-527.
- Boyce, M. S. 1993. Predicting the consequences of wolf recovery to ungulates in Yellowstone National Park. Pages 234-269 In: *Ecological Issues on Reintroducing Wolves into Yellowstone National Park*, (R. S. Cook, ed.). Scientific Monograph NPS/NRYELL/NRSM-93/22, U.S. Department of the Interior, National Park Service, U.S. Government Printing Office.
- Menkens, G. E., Jr., and M. S. Boyce. 1993. Comments on the use of time-specific and cohort life tables. *Ecology* **74**:2164-2168.
- Merrill, E. H., M. K. Bramble-Brodahl, R. W. Marris, and M. S. Boyce. 1993. Estimation of green herbaceous phytomass from Landsat MSS data in Yellowstone National Park. *J. Range Manage.* **46**:151-156.
- Boyce, M. S. 1992. Population viability analysis. *Ann. Rev. Ecol. Syst.* **23**:481-506.
- Boyce, M. S. 1992. Intervention versus natural regulation philosophies for managing wildlife in national parks. *Oecologia Montana* **1**:49-50.
- Boyce, M. S. 1992. Wolf recovery for Yellowstone National Park: A simulation model. Pages 123-138 In: *Wildlife 2001: Populations*. (D. R. McCullough and R. H. Barrett, ed.), Elsevier Applied Science, London, U.K. 1163pp.
- Boyce, M. S., L. H. Metzgar, and J. T. Peters. 1992. Bighorn sheep and horses on the Bighorn Canyon National Recreation Area: Wilderness or pasture? Pages 51-67 In: *Wilderness Issues in the Arid Lands of the Western United States*, (S. I. Zeweloff, and C. M. McKell, eds.) Univ. New Mexico Press, Albuquerque, 145pp.

- Boyce, M. S., and J.-M. Gaillard. 1992. Wolf recovery in Yellowstone, Jackson Hole and the North Fork of the Shoshone River: A computer simulation model. Pages 4.71-4.115 In: *Wolves for Yellowstone?* Vol. 4. Report to the United States Congress, Yellowstone National Park, Mammoth, WY.
- Boyce, M. S. 1992. Management by the Wyoming Game and Fish Department. Pages 96-105 In: *Deer Management*, (Noriyuki Ohtaishi, ed.). Hokkaido University, Sapporo, Japan. 182pp. (in Japanese).
- Boyce, M. S. 1992. Management of elk in Grand Teton National Park. Public interests in elk management. Pages 106-107 In: *Deer Management*, (Noriyuki Ohtaishi, ed.). Hokkaido University, Sapporo, Japan. 182pp. (in Japanese).
- Boyce, M. S. 1992. S.L.O.S.S. is not resolved. Pages 533-535 In: *Global Trends in Wildlife Management*, Vol. 2. (B. Bobek, K. Perzanowski, and W. L. Regelin, eds.). Swiat Press, Krakow, Poland. 621pp.
- Boyce, M. S. 1991. Migratory behavior and management of elk (*Cervus elaphus*). *Appl. Anim. Behav. Sci.* **29**:239-250.
- Boyce, M. S. 1991. Natural regulation or the control of nature? Pages 183-208 In: *The Greater Yellowstone Ecosystem: Redefining America's Wilderness Heritage* (R. B. Keiter and M. S. Boyce, eds.), Yale University Press, New Haven, CT. 425pp.
- Boyce, M. S. 1991. Simulation modelling and mathematics in wildlife management and conservation. Pages 116-119 In: *Wildlife Conservation: Present Trends and Perspectives for the 21st Century*, (N. Maruyama et al., eds). Japan Wildlife Research Center, Tokyo. 244pp.
- Boyce, M. S., and E. H. Merrill. 1991. Effects of the 1988 fires on ungulates in Yellowstone National Park. *Proc. Tall Timbers Fire Ecol. Conf.* **17**:121-132.
- Johnson, G. D., and M. S. Boyce. 1991. Survival, growth, and reproduction of captive-reared Sage Grouse. *Wildl. Soc. Bull.* **19**:88-93.
- Johnson, L. L., and M. S. Boyce. 1991. Female choice of males with low parasite loads in Sage Grouse. Pages 377-388 In: *Bird-Parasite Interactions: Ecology, Evolution and Behavior*, (J. E. Loye and M. Zuk, eds.), Oxford University Press, Oxford, U.K.
- Keiter, R. B., and M. S. Boyce. 1991. Greater Yellowstone's future: Ecosystem management in a wilderness environment. Pages 379-412 In: *The Greater Yellowstone Ecosystem: Redefining America's Wilderness Heritage*, (R. B. Keiter and M. S. Boyce, eds.), Yale University Press, New Haven, CT. 425pp.



- Merrill, E. H., and M. S. Boyce. 1991. Summer range and elk population dynamics in Yellowstone National Park. Pages 263-273 In: *The Greater Yellowstone Ecosystem: Redefining America's Wilderness Heritage*, (R. B. Keiter and M. S. Boyce, eds.), Yale University Press, New Haven, CT. 425pp.
- Spurrier, M. F., M. S. Boyce, and B. F. J. Manly. 1991. Effects of parasites on mate choice by captive Sage Grouse, *Centrocercus urophasianus*. Pages 389-398 In: *Bird-Parasite Interactions: Ecology, Evolution and Behavior*, (J. E. Loye, and M. Zuk, eds.), Oxford University Press, Oxford, U.K.
- Boyce, M. S. 1990. The Red Queen visits sage grouse leks. *Amer. Zool.* 30:263-270.
- Johnson, G. D., and M. S. Boyce. 1990. Feeding trials with insects in the diet of Sage Grouse chicks. *J. Wildl. Manage.* 54:89-91.
- Boyce, M. S. 1990. Wolf recovery for Yellowstone National Park: A simulation model. Pages 3.3-3.58 In: *Wolves for Yellowstone?* Vol. 2. Report to the United States Congress, Yellowstone National Park, Mammoth, WY. 630pp.
- Boyce, M. S., and L. L. Irwin. 1990. Viable populations of Spotted Owls for management of old growth forests in the Pacific Northwest. Pages 133-135 In: *Ecosystem Management: Rare Species and Significant Habitats*, (R. S. Mitchell, C. J. Sheviak, and D. J. Leopold, eds.), Proc. 15th Ann. Natural Areas Conf., New York State Museum Bull, 471.
- Boyce, M. S. 1990. Elk winter feeding dampens population fluctuations at the National Elk Refuge. *West. States and Prov. Elk Workshop Proc.* 1988:18-25.
- Boyce, M. S. 1990. The Yellowstone Primer (book review). *Restor. & Manage. Notes* 8:59-60.
- Boyce, M. S. 1989. Bet hedging of avian life histories. *Acta Congressus Internationalis Ornithologici* 19(2):2131-2139.
- Boyce, M. S. 1988. Evolution of life histories: Theory and patterns from mammals. Pages 3-31 In: *Evolution of Life Histories of Mammals*, (M. S. Boyce, ed.), Yale University Press, New Haven, CT. 373pp.
- Zeveloff, S. I., and M. S. Boyce. 1988. Body size patterns in North American mammal faunas. Pages 123-147 In: *Evolution of Life Histories of Mammals*, (M.S. Boyce ed.), Yale University Press, New Haven, CT. 373pp.
- Boyce, M. S. 1988. European mice and voles. *Evolution* 42:1119-1120.
- Boyce, M. S., and C. M. Perrins. 1987. Optimizing Great Tit clutch size in a fluctuating environment. *Ecology* 68:142-153.

- Boyce, M. S. 1987. Time-series analysis and forecasting of the Aransas/Wood Buffalo Whooping Crane population. *Proc. Int. Crane Workshop* 4:1-9.
- Zeveloff, S. I., and M. S. Boyce. 1987. Human infants redux. *Human Evolution* 2(5):475-476.
- Meyer, J. S., C. G. Ingersoll, L. L. McDonald, and M. S. Boyce. 1986. Estimating uncertainty in population growth rates: Jackknife vs. bootstrap techniques. *Ecology* 67:1156-1166.
- Stromberg, M. R., and M. S. Boyce. 1986. Systematics and conservation of the swift fox. *Biol. Conserv.* 35:97-110.
- Zeveloff, S. I., and M. S. Boyce. 1986. Maternal investment in mammals. *Nature* 321:537-8.
- Boyce, M. S., and R. S. Miller. 1985. Ten-year periodicity in Whooping Crane census. *Auk* 102:658-660.
- Lindstedt, S. L., and M. S. Boyce. 1985. Seasonality, fasting endurance and body size in mammals. *Am. Nat.* 125:873-878.
- Bobek, B., M. S. Boyce, and M. Kosobucka. 1984. Factors affecting red deer (*Cervus elaphus*) population density in Southeastern Poland. *J. Applied Ecol.* 21:881-890.
- Boyce, M. S. 1984. Restitution of *r*- and *K*-selection as a model of density-dependent natural selection. *Ann. Rev. Ecol. Syst.* 15:427-47.
- Walker, D. N., and M. S. Boyce. 1984. Book review: North American bison. Their classification and evolution. *Zooarcheol. Res. News*, 3(1):8-11.
- Boyce, M. S. 1984. The Arctic Skua. *Ibis* 126:110-111.
- Boyce, M. S., K. Reed, and J. V. Cheeran. 1983. Grooming of chital by langur in Kanha National Park, India. *J. Bombay Nat. Hist. Soc.* 80:209-210.
- Sauer, J. R., and M. S. Boyce. 1983. Density-dependence and survival of elk in Northwestern Wyoming. *J. Wildl. Manage.* 47:31-37.
- Zeveloff, S. I., and M. S. Boyce. 1982. Why human neonates are so altricial. *Am. Nat.* 120:537-542.
- Boyce, M. S., and J. Tate, Jr. 1982. Pronghorn (*Antilocapra americana*) demography and hunting quotas in the Powder River Basin, Wyoming. *Proc. Int. Congr. Game Biol.* 14:101-106.

- Boyce, M. S., and D. J. Daley. 1982. Some consequences of seasonality in population models. Pages 99-102 In: R. Lamberson, ed., *Mathematical models of renewable resources*, Humboldt State Univ., Math. Modeling Group, Arcata, CA., 107pp.
- Boyce, M. S. 1981. Beaver life history responses to exploitation. *J. Appl. Ecol.* **18**:749-753.
- Boyce, M. S. 1981. Habitat ecology of an unexploited beaver population in interior Alaska. Pages 155-186 In: *Worldwide Furbearer Conference Proceedings*, Vol. 1, (J. A. Chapman and D. Pursley, eds.), University of Maryland, Frostburg, Maryland.
- Boyce, M. S. 1981. Robust canonical correlation of sage grouse habitat, Pages 152-159 In: *The Use of Multivariate Statistics in Studies of Wildlife Habitat*, (D. Capen, ed.), Rocky Mtn. Forest and Range Exp. Sta., Fort Collins, CO., 249pp.
- Boyce, M. S. 1981. Socio-political conflicts in wildlife management on coal leases in northeastern Wyoming. Pages 221-232 In: *Land and Water Issues Related to Energy Development*, (P. J. Rand, ed.), Ann Arbor Science, Ann Arbor, MI. 469pp.
- Zeveloff, S. I., and M. S. Boyce. 1980. Parental investment and mating systems in mammals. *Evolution* **34**:973-982.
- Meinke, D. K., K. Padian, J. Kappelman, M. S. Boyce, J. R. Bolt, R. E. DeMar, and P. A. Johnston. 1980. Growth rings in dinosaur teeth. *Nature* **288**:193-195.
- Boyce, M. S., and D. J. Daley. 1980. Population tracking of fluctuating environments and natural selection for tracking ability. *Am. Nat.* **115**:480-491.
- Colenso, B. E., M. S. Boyce, and J. Tate, Jr. 1980. Developing criteria for reclamation of sage grouse habitat on a surface coal mine in northeastern Wyoming. *Proc. Symp. Surface Mining Hydrol. Sediment. Reclam.*, Lexington, Kentucky, pp. 27-31.
- Boyce, M. S. 1979. Seasonality and patterns of natural selection for life histories. *Am. Nat.* **114**:569-583.
- Tate, J., Jr., M. S. Boyce, and T. R. Smith. 1979. Response of sage grouse to artificially created display ground. Pages 459-463 In: *The Mitigation Symposium*, (G. A. Swanson, ed.), General Tech. Rept. RM-65. Rocky Mtn. Forest and Range Exper. Station, Fort Collins, CO. 696pp
- Sauer, J. R., and M. S. Boyce. 1979. Time-series analysis of the National Elk Refuge census. Pages 9-12 In: *North American Elk: Ecology, Behavior and Management*, (M. S. Boyce, and L. D. Hayden-Wing, eds.), Univ. Wyoming, Laramie. 294pp.
- Boyce, M. S. 1979. Population projections with fluctuating fertility and survivorship schedules. *Proc. Summer Computer Simulation Conf.* 10:385-388.

- Boyce, M. S., and J. Tate, Jr. 1979. A bibliography on the sage grouse (*Centrocercus urophasianus*). *Univ. Wyo. Agr. Exper. Sta., Science Monogr.* 38, 12pp.
- Zeveloff, S. I., and M. S. Boyce. 1979. Parental investment and mating systems of mammals. *J. Colo-Wyo. Acad. Sci.* **11**(1):79.
- Boyce, M. S. 1978. Climatic variability and body size variation in the muskrats (*Ondatra zibethicus*) of North America. *Oecologia* **36**:1-19.
- Boyce, M. S. 1977. Population growth with stochastic fluctuations in the life table. *Theor. Popul. Biol.* **12**:366-373.
- Boyce, M. S., and J. J. Boyce. 1976. Pleistocene extinctions. *Science* **191**:102.
- Menzel, B., and M. S. Boyce. 1973. First record of the Pearl Dace, *Semotilus margarita* (Cope), from Iowa. *Iowa State J. Res.* **47**(4):245-248.

### **Popular Articles:**

- Yates, G., and M. S. Boyce. 2007. How far do Alberta lynx prowl? Genes tell secrets of dispersal. *Alberta Trapper* 18:
- Czetwertynski, S., and M. Boyce. 2007. Effects of spring baited hunting on black bears in Alberta. *Alberta Trapper* 17:33-35.
- Boyce, M. S. 2006. Alberta monitors its wolves south of the border. *Alberta Trapper* 17:30-31.
- Barnes, R., and M. S. Boyce. 2000. An East African response! *Edmonton Stamp Club Bulletin* 89(10):12.
- Boyce, M. S. 1997. Too many elk in Yellowstone? Let wolves and winter decide. *Bugle* 14(5):85-89.

## **PROFESSIONAL AFFILIATIONS AND ACTIVITIES**

### **Memberships in professional societies**

- Alberta Fish and Game Association (Sherwood Park).  
Alberta Trapper's Association.  
American Society of Mammalogists (life member).  
American Society of Naturalists (elected 1980).  
British Ecological Society.  
Canadian Nature Federation.  
Canadian Society for Ecology and Evolution.

Ducks Unlimited.  
Ecological Society of America.  
Foundation for North American Wild Sheep (life member, 2003).  
Gamma Sigma Delta (honorary).  
Phi Kappa Phi (honorary).  
Rocky Mountain Elk Foundation.  
Safari Club International (parent organization & secretary, Northern Alberta Chapter).  
Sigma Xi (associate member 1975, full member 1978, Univ. Alberta Chapter 2000).  
Society for Conservation Biology.  
The Game Conservancy (U.K., honorary member).  
The Wildlife Society (Certified Wildlife Biologist, 2000).  
Willmore Wilderness Foundation (life member, 2007).

### **Grant review panels**

Grant Eligible Conservation Fund, Alberta Conservation Association, 2002-2004, 2006-2007.  
National Science Foundation, N.A.T.O. Postdoctoral Program Review Panel, 1983, 1985.  
Coordinator for Steering Committee, University of Wyoming-National Park Service Research Center, 1989-91.

**Editor-in-Chief:** *Journal of Wildlife Management*, 1995-1997.

**Editor:** *Ecology and Ecological Monographs*, 2001-2006.

**Associate Editor:** *I.M.A. Journal of Mathematics Applied in Medicine and Biology*, 1983-1994.

**Consulting Editor:** *Wildlife Monographs*, 1989-present.

**Editorial Board:** *Environmental Conservation*, 2007-present.

### **Grant Refereeing**

Alberta Conservation Association, Biodiversity Grants, 1999-2004, 2007.  
Australian Research Council, Research Grants Committee, 1996.  
Canadian Circumpolar Institute, Univ. Alberta, 1999-2004, 2006.  
FCAR, Fonds pour la Formation de Chercheurs et l'Aide à la Recherche, Quebec, 2001.  
Foundation for Research, Science & Technology, New Zealand, 1995, 1996, 1997.  
National Geographic Society, Washington, D.C., 1995.  
National Science Foundation, Applied Mathematics, 1994.  
Natural Environment Research Council, United Kingdom, 1994.  
National Science Foundation, Visiting Professorships for Women, 1991.  
National Geographic Society, 1990.  
National Science Foundation, Biological Research Resources Program, 1990.  
National Science Foundation, International Program, 1990.  
National Science Foundation, Population Biology Program, 1977-1996, 2000-2001.

National Science Foundation, Animal Behavior Program, 1990.  
National Science Foundation, Ecosystems Program, 1980-81, 1990, 1996.  
National Science Foundation, Ecology Program, 1981-1990, 1994, 2002.  
National Science Foundation, International Exchange Program, 1986.  
National Science Foundation, Long Term Studies in Environmental Biology, 1994.  
National Science Foundation, Museum Facilities Program, 1994.  
Natural Sciences and Engineering Research Council of Canada, Postdoctoral Program, 1984, 1987, 2007; Discovery Grants Program, 2000-2007.  
U.S. Binational Science Foundation, Israel, 1994, 1997.

### **Manuscript Refereeing**

**Reviewer:** *Acta Oecologica, American Naturalist, Auk, Behavioral and Brain Sciences, Behavioral Ecology and Sociobiology, Behavioural Processes, Biodiversity and Conservation, Biological Conservation, Biology Letters, BioScience, Canadian Field-Naturalist, Canadian Journal of Forest Research, Canadian Journal of Zoology, Condor, Conservation Biology, Ecological Applications, Ecology, Ecology Letters, Ecological Monographs, Écoscience, Evolution, Evolutionary Theory, Forest Ecology and Management, Functional Ecology, Great Basin Naturalist, IMA Journal of Mathematics Applied in Biology and Medicine, Journal of Animal Ecology, Journal of Applied Ecology, Journal of Avian Biology, Journal of Biosciences, Journal of Hydrology, Journal of Range Management, Journal of Mammalogy, Journal of Raptor Research, Journal of the Royal Society (London), Journal of Theoretical Biology, Journal of Wildlife Management, Journal of Wildlife Research, Journal of Zoology, Limnology and Oceanography, Marine Mammal Science, Nature, Oecologia, Oecologia Montana, Ornis Scandinavica, Prairie Naturalist, Proceedings of the National Academy of Sciences USA, Proceedings of the Royal Society B, PLoS Biology, Quarterly Review of Biology, Restoration & Management Notes, Science, Southwest Naturalist, Theoretical Population Biology, Ursus, Wildlife Monographs, Wildlife Society Bulletin, Wilson Bulletin.*

**Book Reviewer:** Academic Press, Cambridge University Press, Chapman and Hall, Harper & Row, Macmillan, Island Press, National Park Service Monograph Series, Oxford University Press, University of Chicago Press, Yale University Press.

### **PROFESSIONAL SERVICES** (last 5 yrs)

Society for Conservation Biology, Chair, Local Organizing Committee, 2010 Annual Conference. March 2008-present.  
Workshop on statistics of aerial survey, Alberta Conservation Association, Blairmore, 2008.  
Workshop on habitat selection models, Idaho Dept Fish and Game, McCall, ID, July 2007.  
Workshop on aerial ungulate survey, Alberta Conservation Association, Edmonton, May 2007.  
Secretary, Board of Directors, Northern Alberta Chapter, Safari Club International, May 2007-present.  
Review Panel on ungulate management in the face of predation, Idaho Dept Fish and Game, McCall, ID, July 2006.

Review panel for the SAK model used by the Wisconsin Department of Natural Resources for managing white-tailed deer, Wisconsin Cooperative Wildlife Research Unit, Madison, Wisconsin, 2005-2006.

Organized symposium on "Habitat Selection and Fitness" for annual meeting of the Ecological Society of America, Montreal, Quebec, 2005.

Session Chair, "Modeling: Movement, Populations and Communities," Ecological Society of American annual meeting, Montreal, Quebec (August 2005).

Workshop on study design, Alberta Conservation Association, Edmonton, 2006.

Workshop on habitat modelling, Alberta Conservation Association, Edmonton, 2005.

Session Chair and Keynote Address, National Conference on Nonlinear Systems and Dynamics, Aligarh Muslim University, Aligarh, Uttar Pradesh, India, February 2005.

Grizzly Bear Recovery Team, Alberta Ministry of Sustainable Resource Development, 2002-2006.

Grizzly Bear hunting allocation review committee, Alberta Ministry of Sustainable Resource Development, 2002-2006.

Alberta Conservation Association, Board of Directors, 2002-2007.

Chair, Operation Standards Review Committee, Board of Directors, Alberta Conservation Association, 2002-present.

Director, Alberta Trappers Association, Edmonton Local. 2004-2005.

Past President, Alberta Chapter of The Wildlife Society, 2004-2005.

President, Alberta Chapter of The Wildlife Society, 2003-2004.

President-elect, Alberta Chapter of The Wildlife Society, 2002-2003.

Evaluation of fish and wildlife research priorities in Alberta, 2002.

Panel to evaluate wolf population viability in Sweden, May 2002.

Workshop on scientific writing for ACA staff, 2002 April 15-16.

Elk harvest management panel, Washington Department of Wildlife, 2001.

2001 Review of Wildlife Management in Sweden, Government of Sweden, February.

Marbled Murrelet Endangered Species Committee, BC Ministry of Environment, Lands and Parks, 2001.

Sage Grouse Recovery Panel, Scientific Research Committee, Alberta Sustainable Resource Development, 2001-present.

Presented 1-day workshops on population estimation for ACA and SRD biologists, University of Alberta, 2001 Feb 9, March 16.

Organized round-table discussion on cumulative effects with Gary Mar, Alberta Minister of Environment, University of Alberta, 15 May 2000.

Organized a large conference celebrating 50 years since the publication of *A Sand County Almanac* by Aldo Leopold for the Wisconsin Academy of Sciences, Arts and Letters, 1998.

Testimony on the Impact and Status of the Northern Spotted Owl on National Forests before the House Resources Committee, US House of Representatives, 19 March 1998.

Testimony on science in the national parks before the House Resources Committee, US House of Representatives, 27 February 1997.

Vice President for Sciences, Wisconsin Academy of Sciences, Arts and Letters, 1997-2000.

President, Wisconsin Chapter of The Wildlife Society, 1998-1999.

President, UW-Stevens Point Chapter of Sigma Xi, the Scientific Research Society, 1996-97.

**PAPERS PRESENTED/SYMPOSIA/INVITED LECTURES/PROFESSIONAL MEETINGS/WORKSHOPS** (last 6 yrs)

- 2007, "Detecting trend in grizzly bear populations based on radiotelemetry data," International Association of Bear Research and Management, Monterray, Mexico.
- 2007, "Building models of habitat using GIS," International summer school, Bialawieza Forest, Poland.
- 2007, "Modelling spatial distribution of weeds," Conference on modelling weeds, Canterbury University, New Zealand.
- 2007, "Access management for wildlife management in Alberta," Partners in Conservation conference, Alberta Conservation Association, Sherwood Park, Alberta.
- 2006, "Fundamental Equations of Ecology," Dept. Seminar, Univ. California, Berkeley, December
- 2006, "Fundamental Equations of Ecology," Dept. Seminar, Imperial College Silwood Park, UK, May
- 2006, "Fundamental Equations of Ecology," Dept. Seminar, Biology, Univ. Calgary, March
- 2006, "Fundamental Equations of Ecology," Dept Seminar, Texas A & M University, March
- 2005, "Empirical measurement and analysis of movement: technological advances," Habitat selection and fitness symposium, Ecological Society of American annual meeting, Montreal, Quebec (w/E. H. Merrill; August).
- 2005, "Estimating resource use along animal paths: a diffusion model approach," Ecological Society of American annual meeting, Montreal, Quebec (w/H. Beyer; August).
- 2005, "Elk winter foraging at fine scales in Yellowstone National Park," Ecological Society of American annual meeting, Montreal, Quebec (w/D. Fortin; August).
- 2005, "Interaction between mink and muskrat populations in Canada," Ecological Society of American annual meeting, Montreal, Quebec (w/C. Shier; August).
- 2005, "The science of conservation in Alberta," Department of Biological Sciences, University of Alberta (May 13).
- 2005, "RSFs: the fundamental equations of ecology," Ecology Seminar, Department of Biological Sciences, University of Alberta (April 8).
- 2005, "Landscapes of death: a requiem for Alberta's grizzly bears," Environmental Research and Studies Centre, University of Alberta, Edmonton (Feb 10).
- 2005, "Science as a way of knowing," Partners in Conservation Conference, Alberta Conservation Association, Calgary (Jan 27).
- 2002, "RSF models for habitat selection," Universite Lyon (Oct).
- 2002, "Parasites and lek behaviour in the Greater Sage-Grouse," Distinguished Speaker Series, Lethbridge University, Lethbridge, Alberta (Sept 30).
- 2002, "Scale and heterogeneity in resource selection by elk in Yellowstone," Plenary presentation, International Deer Biology Congress, Quebec City (Aug 30).
- 2002, "Resource selection functions with applications for cumulative effects assessment and PVA," Dept Mathematics, Canterbury University, Christchurch, New Zealand (May 28).
- 2002, "Update on black bear research project," Alberta Fish and Game Association, Edmonton (February).



- 2001, "Anticipating extinction: statistical rigour of habitat-based viability analysis," Laboratoire d'Ecologie, University Pierre et Marie Curie, Paris (October 1).
- 2001, "Predator-prey models implications for predator control," Idaho Department of Fish and Game, Boise, Idaho (March 14).
- 2001, "S.M.A.R.T. priorities for fisheries and wildlife research in Alberta," Partners in Conservation Conference, Nisku, Alberta (February 10).
- 2000, "Modeling grizzly bear habitats using resource selection functions and spatial survival models," Interagency Grizzly Bear Study Team, Bozeman, Montana (December 14).
- 2000, "Using Models to Understand Predator-Prey Interactions: Habitat Selection Altered by Risk of Predation," Carnivores 2000 Conference, Denver (November 15).
- 2000, "Statistics used by biologists," Annual Meeting of the American Statistical Association, Indianapolis, Indiana (August 13).
- 2000, "Ecology of muskrats and mink in North America," Departmental Seminar, Department of Biology, University of Oslo (May).
- 2000, "The fundamental issue of forecasting the future: viability and conservation," Conservation Biology Symposium, University of Texas, Austin (7 April).
- 2000, "Setting fisheries and wildlife research priorities in Alberta," Annual Meeting of the Natural Resources Service, Edmonton, Alberta (3 April).
- 2000, "Grizzly bear population viability in Yellowstone National Park," Wildlife Conservation Research Unit, University of Oxford (9 February).
- 2000, "Modelling the effects of hunting in seasonal environments," Hunting as sustainable resource utilisation: experiences and challenges. Trondheim, Norway (14-16 Feb).
- 2000, "Anticipating extinction: how to know what the future portends for biodiversity," Environmental Research and Studies Centre, Univ. Alberta (9 March).
- 2000, "Research Needs for the 21<sup>st</sup> Century--Overlapping land-use practices: challenges in wildlife conservation," Plenary Address, Alberta Chapter of The Wildlife Society Annual Meeting, Lethbridge (10 March).

#### **Contributed Papers** (recent)

- 2004, "Les conséquences écologiques d'un chevauchement d'activités durant l'approvisionnement des mammifères herbivores." 29th Annual Meeting, Société Québécoise pour l'Étude Biologique du Comportement, Université de Sherbrooke (w/ D. Fortin and E. H. Merrill, Nov 13)
- 2003, "An Assessment of Boyce's Yellowstone Recovery Model: 8 Years Post-Wolf." 15<sup>th</sup> Annual North American Interagency Wolf Conference, Chico Hot Springs, Pray Montana. (w/ N. Varley, Apr. 8).
- 2003, "Habitat selection by elk following wolf reintroduction in Yellowstone National Park. 15<sup>th</sup> Annual North American Interagency Wolf Conference, Chico Hot Springs, Pray Montana. (w/ J. Mao, Apr. 8).
- 2002, "Costs of vigilance on foraging elk in Yellowstone National Park." 5<sup>th</sup> International Deer Biology Congress. Québec City, Québec. (w/ D. Fortin & E. H. Merrill, Aug 30).
- 2002, "Foraging constraints on vigilance in mammalian herbivores." Ecological Society of America 87<sup>th</sup> Annual Meeting. Tucson, Arizona. (w/D. Fortin & E. H. Merrill).

- 2002, "The Adaptive Management Experiment (AME) Team: A Collaborative Approach to Sustainable Forest Management," Research Application Showcase, Conference on Advances in Forest Management: From Knowledge to Practice (with S. Boutin, M. Carlson & E. Dzus). November.
- 2002, "Biased movements near roads," International Deer Biology Conference, Quebec City, Quebec. (with J. Frair & E. Merrill). August.
- 2002, "Evaluating resource selection functions," The Wildlife Society Annual Conference, Bismarck, North Dakota. September.
- 2002, "Egg removal enhances colt recruitment in Whooping Cranes," Annual Meeting of the American Society of Naturalists, Banff, Alberta (with S. Lele, B. Johns), July 14.
- 2001, "Habitat selection by Yellowhead grizzly bears," The Wildlife Society 8th Annual Conference, Reno, Nevada (with S. Nielsen, G. Stenhouse, R. H. M. Munro), Sept 27.
- 2001, "Habitat selection by elk following wolf reintroduction in Yellowstone National Park," The Wildlife Society 8th Annual Conference, Reno, Nevada (with J. Mao, F. J. Singer, D. J. Vales, D. W. Smith), Sept 28.
- 2001, "Resource selection in mountain and plateau grizzly bears along the Parsnip River, British Columbia," The Wildlife Society 8th Annual Conference, Reno, Nevada (with L. Ciarniello, D. Heard, D. Seip), Sept 28.
- 2001, "Incorporating habitat-biased locational error into habitat-use models," The Wildlife Society 8th Annual Conference, Reno, Nevada (with J. Frair, E. Merrill, S. Lele, G. Stenhouse, R. Munro, S. Nielsen), Sept 29.
- 2001, "Demography and simulated trend of a Cape mountain zebra population," The Wildlife Society 8th Annual Conference, Reno, Nevada (with W. G. Dorgeloh, M. C. Andersen), Sept 28.
- 2001, "Resource selection of grizzly bears in the Yellowhead ecosystem of Alberta, Canada," International Conference on Bear Research and Management, Jackson, Wyoming (with S. E. Nielsen, G. B. Stenhouse, R. H. M. Munro), May 22.
- 2001, "Resource selection in mountain and plateau grizzly bears along the Parsnip River, British Columbia," International Conference on Bear Research and Management, Jackson, Wyoming (with L. Ciarniello, D. Seip, D. Heard), May 25.
- 2001, "Habitat use and cumulative effects concerns for grizzly bears in the tundra of the Northwest Territories, Canada," International Conference on Bear Research and Management, Jackson, Wyoming (with R. Case, D. Cluff, R. Gau, R. Mulders), May 25.
- 2001, "The influence of habitat quality and human activity on grizzly bear home range size," International Conference on Bear Research and Management, Jackson, Wyoming (with R. H. M. Munro, S. E. Nielsen, G. B. Stenhouse), May 24.
- 2000, "Grizzly bear habitats in the Bitterroot," The Wildlife Society Annual Meeting, Nashville, Tennessee, September.
- 2000, "Grizzly bear population for the Bitterroot," Society for Conservation Biology Annual Meeting, Missoula, Montana, 10 June.
- 2000, "Cumulative counts for estimating bear population size," Western Black Bear Workshop, Coos Bay, Ore. (with D. MacKenzie), 3 May.
- 2000, "Enhanced Avian diversity in Wisconsin pine barrens through large-block timber harvest: a simulation," North American Wildlife and Natural Resources Conference, Chicago (with Neal Niemuth), 27 March.

2000, "Cumulative effects analysis for elk," Poster presentation, PTAC Environmental Conference, Calgary (with E. Merrill), 20 January.

**PUBLIC SERVICE/POPULAR PRESENTATIONS** (recent)

- 2008, "Wolves, lions, and money," British Columbia Trappers Association, Keynote Address, Vanderhoof, BC (March).
- 2007, "Modelling the harvest of moose in Alberta," Foundation for North American Wild Sheep, Red Deer, Alberta (February).
- 2003, "Effects of baited spring black bear hunting in Alberta," Foundation for North American Wild Sheep, Red Deer, Alberta (February).
- 2002, "ACA Chair research and a report on the black bear study," Alberta Fish & Game Annual Convention, Edmonton, Alberta (February 22).
- 2002, "Access management experiment for black bears in NE Alberta," St. Paul Fish and Game Club (April 3).
- 2002, "Conservation and science in Alberta," Sigma Xi banquet speech, Edmonton (March).
- 2001, "ACA Chair research projects in Alberta," Sherwood Park Fish & Game (October).
- 2001, "ACA Chair activities," Outdoor Writers Council, Edmonton (March).
- 2001, "Research projects supported by the ACA Chair," Partners in Conservation Conference, ACA, Nisku, Alberta (February 10).
- 2001, "Research projects supported by the ACA Chair," Edmonton Trout Fishing Club, Edmonton (January).
- 2000, "Research priorities for fisheries and wildlife in Alberta," Presentation to the Board, Alberta Conservation Association, October.
- 2000, "Research programmes of the ACA Chair in Fisheries & Wildlife, Alberta Trappers Association, Rocky Mountain Local, Withrow, Alberta (8 July).
- 2000, "Wolf recovery in Yellowstone using Alberta's wolves," Edmonton Rotary Club, July.
- 2000, "Beaver population ecology in Alaska," Alberta Trappers Association, Edmonton Local, (28 May).
- 2000, "Top-down versus bottom-up regulation of ungulate populations," Whitecourt Fish & Game Association, Whitecourt, Alberta (7 June).
- 2000, "Grizzly bear population viability," Sarcee Fish and Game Association, Calgary (9 May).
- 2000, "Fisheries and wildlife research prioritization in Alberta," Annual Meeting of the Federation of Alberta Naturalists, Medicine Hat (15 April).
- 2000, "The ACA Chair in Fisheries and Wildlife at the University of Alberta," Edmonton Fish and Game Association, Edmonton (11 April).
- 2000, "University Connection: The ACA Chair in Fisheries and Wildlife," Annual Meeting, Alberta Fish and Game Association, Red Deer (25 February).

**COMMITTEES** (recent)

- 2004-2007, Wisconsin Distinguished Professor review committee, University of Wisconsin System, Madison.
- 2004-present, Meanook Field Station Steering Committee, Department of Biological Sciences, University of Alberta.

2004-present, CCIC new building committee, Faculty of Science, University of Alberta.  
2002-present, Proposed Alberta Ingenuity Centre of Excellence, Department of Biological Sciences, University of Alberta.  
2001-2003, Adjunct Professors Committee, Department of Biological Sciences, University of Alberta.  
2001 Chair of Examining Committee for Cameron S. Gillies, Ph.D. candidate, Department of Biological Sciences, Univ. Alberta, 2001 December 6.  
2001 Rapporteur, Ph.D. defence for Olivier Renault, Universite Paris VI, 2001 October 2.  
2000 Merit evaluation committee, Dept Biological Sciences, Univ. Alberta.  
2000 Search committee, fisheries biologist, Dept Biological Sciences, Univ. Alberta.  
2000 External Examiner, Ph.D. Defence for Phillip McLoughlin, Department of Biology, University of Saskatchewan, Saskatoon, 2000 August 30.  
2000 Doctoral Program Committee, Ph.D., Ramona Maraj, Faculty of Environmental Design, University of Calgary, 2000-present.  
Olaus Murie Award Selection Committee, Rocky Mountain Elk Foundation, Missoula, Mont., 1999-2001.  
2000 Doctoral Examination Committee for Terry Osko, Renewable Resources, Univ. Alberta.  
1983-present LaVon Tostenson Memorial Scholarship Selection Committee, Iowa State University.

#### **OTHER ACTIVITIES/ACCOMPLISHMENTS**

##### Consultant

Review of listing petition for Greater Sage-Grouse in the United States. Hayden-Wing Consultants, Laramie, Wyoming.

##### Consultant

Review of population status of the Mountain Plover in North America. Hayden-Wing Consultants, Laramie, Wyoming.

##### Consultant

Design of a harvesting strategy for elk in Washington. Washington Department of Wildlife, 2001-2001.

##### Expert Testimony

Spotted Owl hearings in Portland 1989; Seattle 1991.

Declaration filed, December 2000.

##### Consultant

Nantucket Land Bank, 1995.

##### Consultant

Tundra Swan population ecology. Legal proceedings: U.S. v. Asarco, et al., Civ. No. 96-0122-N-EJL (D. Idaho), 1999-2000. Deposition before the U.S. Justice Department, 19 January 2000.