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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.

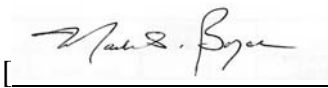
### **III. CONCLUSION**

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	WL762 - Quantitative Ecology	3	10
1999	Spr	WL353/553 - Wildlife Pop Dynamics	3	30
1998	Spr	WL353/553 - 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).

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- 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.
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### **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.