UC Agriculture & Natural Resources
Proceedings of the Vertebrate Pest Conference

Title
Wildlife Services 2011 Research Needs Assessment

Permalink
https://escholarship.org/uc/item/4d99h4rp

Journal
Proceedings of the Vertebrate Pest Conference, 25(25)

ISSN
0507-6773

Authors
Tobin, Mark E.
Shwiff, Stephanie A.
McConnell, John E.
et al.

Publication Date
2012

DOI
10.5070/V425110539

Wildlife Services 2011 Research Needs Assessment

Mark E. Tobin and **Stephanie A. Shwiff**
USDA APHIS Wildlife Services, National Wildlife Research Center, Fort Collins, Colorado
John E. McConnell
USDA APHIS Wildlife Services, Raleigh, North Carolina
Gary A. Littauer
USDA APHIS Wildlife Services, Fort Collins, Colorado

ABSTRACT: The mission of U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) is to provide federal leadership and expertise in managing problems caused by wildlife. Approximately every 5 years, WS conducts a research needs assessment (RNA) to help to align research priorities at the National Wildlife Research Center (NWRC, the research arm of the WS program) with WS program and customer needs. In 2011, the WS Deputy Administrator solicited input from employees throughout the WS program and representatives from other federal agencies, all 50 state wildlife agencies, various livestock and agricultural commodity groups, and non-governmental organizations. Eighty-six federal employees from 36 states and the District of Columbia and 31 non-federal employees from 20 states responded to the RNA survey. Aviation safety, zoonotic diseases, livestock predation, and to a lesser degree protecting threatened and endangered (T&E) species and reducing crop depredations, were projected to be major areas of concern during the next 5 years. Invasive species, specifically feral swine, were one of the most frequently identified areas where research is needed. Development of nonlethal control methods and economic assessments were given a high priority. Many respondents wanted economic justification for their organizations or programs. Protection of aquaculture, property, and human safety, and development of vaccines and repellents were more localized concerns. Predation on livestock (especially cattle and sheep) and big game, waterfowl, and upland birds was a much bigger concern in the Western Region (WR) than the Eastern Region (ER). A higher percentage of WR respondents also anticipated being more involved in conflicts involving birds. Cormorants, beavers, deer, and especially vultures were of higher concern in the ER. State agency and private stakeholders most frequently identified either wildlife transmission of diseases or livestock depredation as their highest area of concern. State agency and private stakeholders most often identified development of more effective management techniques as their highest research priority. All respondents expressed a need for better economic information about the extent and nature of various human-wildlife conflicts. The results of this RNA, along with guidance from Congress and the WS Deputy Administrator and stakeholder input, will help establish WS research priorities.

KEY WORDS: human-wildlife conflicts, research needs, USDA, wildlife damage, Wildlife Services, wildlife management

INTRODUCTION

Wildlife Services (WS) is a national program in the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS). Its mission is to provide federal leadership and expertise in managing problems caused by wildlife. In support of this mission, the WS National Wildlife Research Center (NWRC) applies scientific expertise to develop practical methods for resolving these problems and maintaining the quality of environments shared with wildlife.

Research priorities at the NWRC are established with guidance from Congress and the WS Deputy Administrator, together with stakeholder input and the results a research needs assessment (RNA) that is conducted about every 5 years (Packham and Connolly 1992; Bruggers et al. 1996, 2002; Clark et al. 2007). These RNAs help to align NWRC research with WS program and customer needs. This paper reports on the results of the 2011 WS RNA.

METHODS

The WS Deputy Administrator solicited participation in the 2011 RNA from throughout the WS program, in-cluding the Directors of the WS NWRC, the WS Eastern Region (ER) (Figure 1), the WS Western Region (WR), and the WS Operational Support Staff; the coordinators of the WS Rabies, Wildlife Disease, Aviation Safety, and Airport Wildlife Hazards National Programs; WS State Directors; and NWRC research scientists. The WS Deputy Administrator also requested participation of representatives from other APHIS programs: Veterinary Services, Plant Protection and Quarantine, Animal Care, International Services, Legislative and Public Affairs, and Biotechnology and Regulatory Services. In addition, the survey was distributed to representatives from the U.S. Fish and Wildlife Service and the U.S. Geological Survey, branch chiefs of fish and wildlife agencies for all 50 states, and non-federal stakeholders representing various livestock and agricultural commodity groups, universities, and non-government organizations. All respondents were asked to complete the RNA on-line via SurveyMonkey®.

The survey included multiple-choice questions about the respondents (employer, principal job, and region of the country), the projected likely importance of different areas of human-wildlife conflict (highly, moderately, or minimally important) during the next 5 years; the likely

WILDLIFE SERVICES
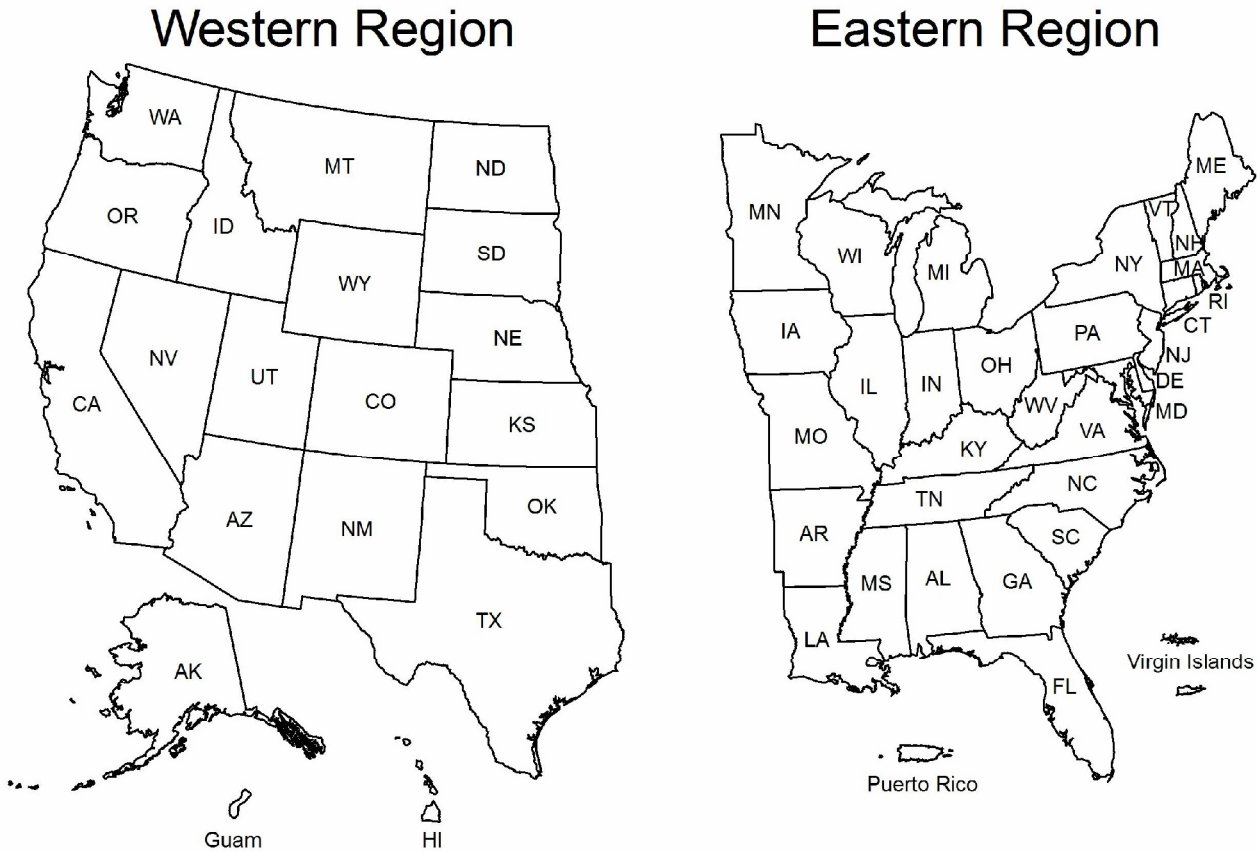
Western Region

Eastern Region

Figure 1. Eastern and Western Regions of the WS program.

need (high, moderate, or minimal) for research during the next 5 years to develop, improve, and/or evaluate various methods, tools, or information for managing human-wildlife conflicts; and the level of importance of various NWRC services (extremely important, moderately important, or not important). Participants also were asked to provide a written description of their top 3 research needs /priorities for the next 5 years; non-federal respondents were asked to list only their top research priority. Written responses were categorized with regard to general conflict area, species/species group, and research need. Due to slightly different formatting, the surveys for internal federal and external non-federal respondents were analyzed separately, and only the written responses of non-federal respondents are reported here.

RESULTS
Demographics of Respondents

Eighty-six federal employees from 36 states and the District of Columbia responded to the RNA survey. Eighty-three of the federal respondents (97%) were employed by WS, and one each worked for APHIS Veterinary Services, the U.S. Department of Defense, and the U.S. Geological Survey. The WS respondents included 36 from the ER, 20 from the WR, and 22 from the

NWRC. The WS respondents included 33 State Directors, 20 NWRC research scientists, 15 biologists, 4 Assistant State Directors, 9 managers/executives, 1 District Supervisor, and 1 biological technician.

Thirty-one non-federal employees from 20 states responded to the external survey. Seventeen (55%) were employed by state fish and wildlife agencies, and 14 (45%) worked for private farms or ranches, universities, or non-government organizations. Twenty-seven of the non-federal respondents (87%) were managers and executives, and 4 (13%) were biologists or research scientists. Non-federal survey responses were received from Arizona, Arkansas, California, Colorado, Georgia, Idaho, Louisiana, Michigan, Minnesota, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio, South Carolina, Texas, Washington State, West Virginia, and Wyoming,

Importance of Human-Wildlife Conflict Areas

Seventy-one percent and 67%, respectively, of all federal respondents indicated that predation on cattle and sheep would be either moderately or highly important during the next 5 years. Fifty percent or more of all federal respondents indicated that predation on goats, poultry, swine, or furbearers would be moderately or highly
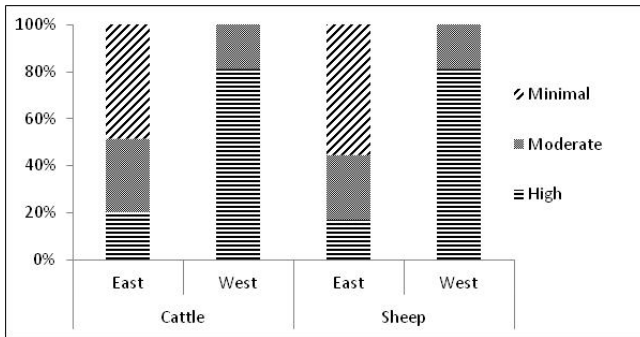
Figure 2. Percentage of WS respondents in the each of the Eastern and Western Regions who indicated that the importance of predation on cattle and sheep likely would be high, moderate or minimal over the next 5 years.
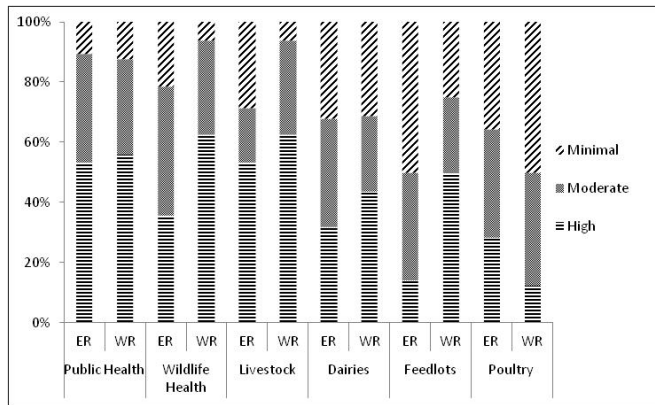

Figure 3. Percentage of WS respondents in the each of the Eastern and Western Regions who indicated that the importance of various wildlife disease issues likely would be high, moderate or minimal over the next 5 years.
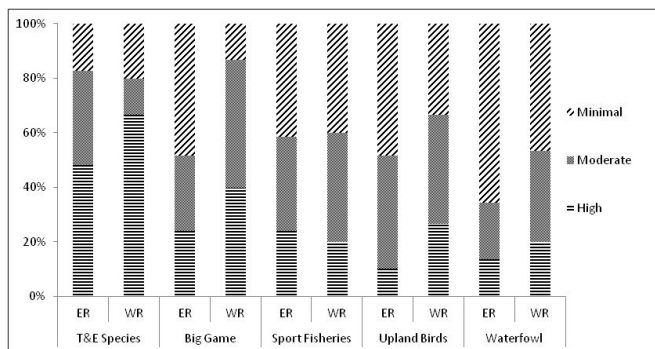

Figure 4. Percentage of WS respondents in the each of the Eastern and Western Regions who indicated that the importance of wildlife impacts on other wildlife likely would be high, moderate or minimal over the next 5 years.

important. Responses of WS employees differed between the WR and ER (hereafter, all references to differences between the WR and ER refer to only WS employees). All respondents in the WR indicated that predation on cattle and sheep likely will be moderately to highly important during the next 5 years, compared to 52% and 45%, respectively, of respondents in the ER who felt similarly (Figure 2). Seventy percent of WR respondents al-

so felt that predation on goats likely will be moderately or highly important, compared to only 45% of respondents in the ER. Predation on poultry and swine, although ranked lower in both regions, also was of greater concern in the WR than the ER.

A majority of all federal respondents indicated wildlife diseases likely would have a moderate or high impact in each of a broad range of areas (public health, wildlife health, livestock, dairies, feedlots, and poultry) during the next five years. There was broad agreement between respondents in the WR and ER (Figure 3). Ninety percent and 87% of respondents in the WR and ER, respectively, thought that impacts of wildlife diseases on public health likely will be moderately or highly important during the next 5 years. Ninety-four percent of WR respondents felt that impacts of wildlife on both the health of other wildlife and on livestock diseases likely will be moderately or highly important, compared to 79% and 72%, respectively, of respondents in the ER who felt similarly. Approximately 68% of all WS respondents felt that the transmission of diseases at dairies was a moderately or highly important issue. Wildlife transmission of diseases at feedlots was a greater concern in the WR (65%) than the ER (50%). Concern about the impact of wildlife on the spread of diseases at poultry facilities was greater in the ER (65%) than the WR (51%).

A majority of all federal respondents also indicated that wildlife likely would have a moderate or high impact on T&E species, big game, sport fisheries, upland birds, and waterfowl. The biggest area of concern was impacts on T&E species (58% of federal respondents thought that such impacts would be highly important). In WS, impacts on threatened and endangered (T&E) species were a big concern for both regions, with an average of 81% predicting that this issue is likely to be moderately to highly important during the next 5 years (Figure 4). Eighty-seven percent of respondents in the WR indicated that impacts of wildlife on big game species likely will be a moderately to highly important issue, compared to 52% of respondents in the ER. Impacts of wildlife on sport fisheries were of comparable concern in the two regions, while concern about the impact of wildlife on upland birds and on waterfowl was predicted to be a bigger issue in the WR.

Grain and cereal crops were the agricultural commodities of most widespread concern with regard to wildlife depredations. Seventy-five percent of federal respondents (WR 73%, ER 72%, Figure 5) indicated wildlife impacts on grains and cereals likely will be moderately or highly important during the next 5 years. Although wildlife impacts on forestry ranked somewhat lower overall, 80% and 75% of WS respondents in the WR and ER, respectively, felt that this will be a moderately or highly important problem. Of all respondents, 58% (WR 60%, ER 59%) thought that wildlife impacts on fruits also will be moderately or highly important. Fewer than 50% of respondents in each of the regions indicated that wildlife impacts on vegetables, aquaculture, seeds, and nuts were likely to be moderately or highly important.

An overwhelming percentage of all federal respondents indicated that aviation-wildlife strike hazards (93%), wildlife damage to property (92%), and nuisance wildlife
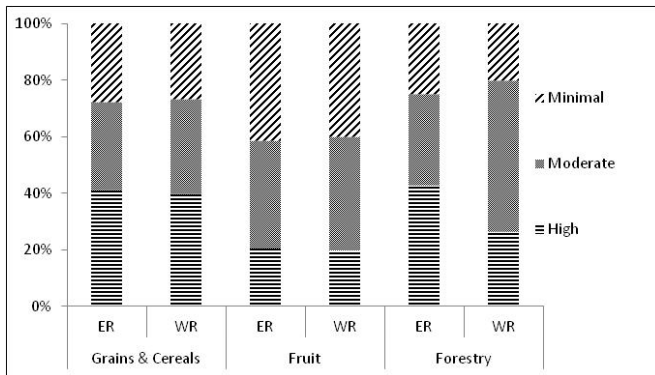
Figure 5. Percentage of WS respondents in the each of the Eastern and Western Regions who indicated that the importance of wildlife damage to various crops and other agricultural commodities likely would be high, moderate or minimal over the next 5 years.
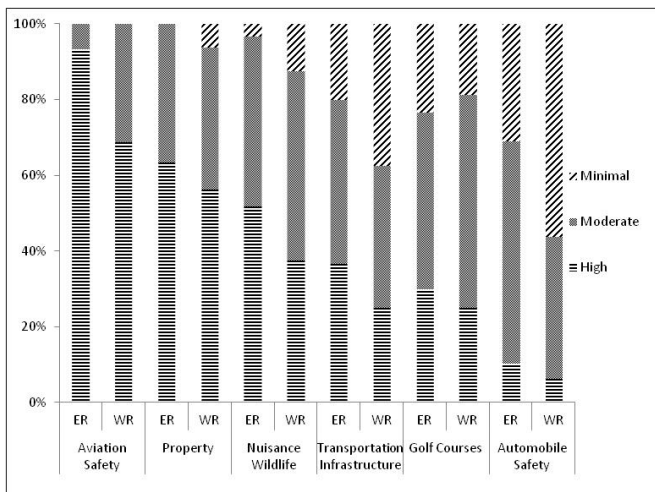

Figure 6. Federal respondents' projections in the each of the Eastern and Western Regions of the importance of wildlife impacts on various miscellaneous areas of human safety and property over the next 5 years.

problems (95%) likely all will be moderately or highly important issues in their respective states or regions during the next 5 years. This includes 100% of WS Operations respondents in both the WR and the ER with respect to aviation-wildlife strike hazards, and 100% of WS Operations respondents in the ER with respect to wildlife damage to property (Figure 6). Likely impacts of wildlife on transportation infrastructure and on automobile safety were of greater concern to respondents in the ER (80% and 69%, respectively) than in the WR (63% and 44%, respectively).

Research Needs

The research need most commonly cited by federal respondents was to develop new or more effective methods or tools to mitigate wildlife hazards on and around airports, followed by mitigating threats of zoonotic diseases, reducing predation on livestock, protecting T&E species,

Table 1. Percentage of federal respondents (n=82) who provided a written response to this question who listed various types of wildlife conflicts as one of their top 3 research priorities.

Problem area	% of respondents
Aviation safety	18
Disease	12
Livestock predation	11
Threatened & Endangered species	8
Crop depredations	7
Habitat/natural resources	5
Invasive species	5
Aquaculture	2
Human safety	2
Dairies/feedlots	1
Urban problems	1
Big game	1
Forestry	1

Table 2. Percentage of non-federal respondents (n=22) who listed various types of wildlife conflicts as their top research priority.

Problem area	% of respondents
Invasive species	27
Disease	23
Livestock predation	18
Crop protection	9
Habitat protection	4
Aquaculture	4
Forestry	4

Table 3. Percentage of federal respondents (n=82) who listed various wildlife species or species groups among their top 3 research priorities.

Species /species group	% of respondents
Feral swine	29
Coyotes/canids	28
Beavers/nutria	16
Blackbirds/starlings	12
Crows/ravens	7
Geese	7
Birds (misc.)	6
Vultures	6
Snakes/herps	6
Bears	4
Raptors	4
Deer	2
Cormorants	2

reducing crop depredations, protecting habitats and natural resources, and stopping the spread of invasive species (Table 1). The area most frequently cited by non-federal respondents was controlling invasive species, followed by zoonotic diseases and livestock predation (Table 2).

When asked to list their top three species or species groups with regard to needed research to develop better methods or information to reduce wildlife-human con-

flicts, federal respondents most often listed feral swine (*Sus scrofa*), followed closely by coyotes (*Canus latrans*) or other canid species (Table 3). Beavers/nutria and blackbirds/starlings also ranked high. Feral swine and coyotes/canids also topped the list of non-federal respondents (Table 4).

In their written answers, respondents described a variety of research needs with regard to tools and methods for managing wildlife-human conflicts. Federal respondents most often cited a need for new or better lethal tools, followed closely by development of repellents or other nonlethal methods, economic analysis to determine the impacts of conflicts and/or the benefits and costs of management, and development of better management techniques in general (Table 5). Research on methods to assess ecological impacts, gather ecological information, or monitor wildlife populations also ranked high. Nonfederal respondents most frequently expressed a need for alternative or better management techniques in general (Table 6).

Because of differences in format between the federal and non-federal surveys, only the federal responses will be discussed for the multiple-choice sections of the survey. Respondents specified several research needs related to wildlife diseases (Figure 7). An average of 70% of respondents in both regions indicated a moderate or high need for development of field diagnostic tests. Sixty-nine percent of respondents (WR 80%, ER 53%) also indicated a moderate or high need for more information about disease ecology. Sixty-eight percent of respondents (WR 81%, ER 57%) expressed a moderate or high need for more information about the economic impacts of wildlife diseases or the benefits and costs of management actions. Other research needs related to information on epidemiology (64% of all respondents expressed a moderate or high need) and the development of surveillance strategies (63% of all respondents expressed a moderate or high need).

The top research need related to predation in both the WR and the ER was for information about the economic impact of predators or the costs and benefits of predator management (WR 100%, ER 73%) (Figure 8). Ninety-four percent of respondents in the WR also indicated a moderate or high need for new or improved lethal toxicants and for the evaluation or improvement of shooting with night vision (Figure 9). Eighty-one percent of respondents from the WR expressed a moderate or high need for improved scare devices (Figure 8), traps or trapping methods, and trap monitors (Figure 9). In the ER, 72% of respondents indicated a moderate or high need for better fencing or exclusion devices, 70% for improved toxicants, and 70% for more effective scare devices (Figure 8).

Respondents indicated a moderate or high need for research related to birds, including a need for better exclusion devices (78% of all federal respondents, including 81% of WS employees in the WR and 83% of WS employees in the ER), scare devices (76% of respondents, including 81% in the WR and 86% in the ER), better economic information (75% of respondents, including 94% in the WR and 73% in the ER), repellents (71% of respondents, including 63% in the WR and 77% in the

Table 4. Percentage of non-federal respondents (n=22) who listed various wildlife species or species groups as their top research priority.

Species/species group	% of respondents
Feral swine	18
Coyotes/canids	18
Bears	9
Deer	9
Cormorants	9
Beavers	4
Blackbirds	4
Moose	4
Rabbits	4
Rodents	4
Skunks	4

Table 5. Percentage of federal respondents (n=82) who listed various control methods/tools among their top 3 research priorities.

Research priority	% of respondents
Lethal control methods	29
Repellents/nonlethal methods	27
Economics	24
Management techniques	23
Impact assessments	23
Ecological information	16
Population monitoring / dynamics	15
Vaccine development	5
Reproductive inhibition	5
Bait delivery methods	1
Genetics	1

Table 6. Percentage of non-federal respondents (n=22) who listed various control methods/tools as their top research priority.

Research priority	% of respondents
Management techniques	45
Impact assessments	14
Lethal methods	14
Vaccines	9
Economics	4
Repellents/nonlethal methods	4

ER), and toxicants (67% of respondents, including 81% in the WR and 70% in the ER).

Respondents indicated a moderate or high need for research related to invasive species, including the development of new or more effective toxicants (78%), better economic information (77%), and development of exclusion devices (60%).

Research related to deer (*Odocoileus* spp.) was a higher priority in the ER than in the WR, including research to develop better exclusion devices (WR 65%, ER 80%), to analyze the economics involving the impact and management of deer (WR 33%, ER 67%), to develop better scare devices (WR 33%, ER 70%), and to develop
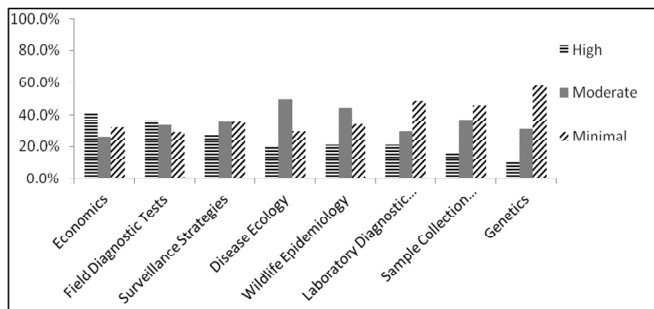
Figure 7. Percentage of federal respondents who indicated that the need for research involving various aspects of wildlife diseases likely would be high, moderate or minimal over the next 5 years.
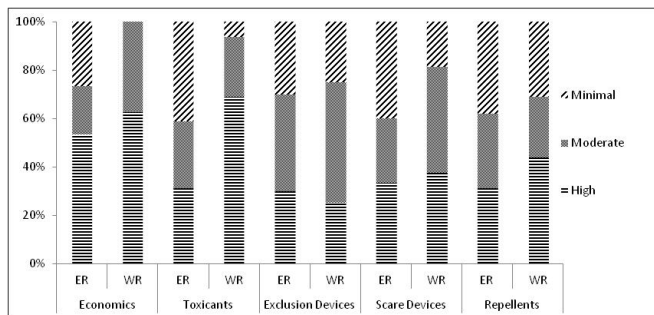

Figure 8. Percentage of WS respondents in the each of the Eastern and Western Regions who indicated that the need for research involving various aspects of predator management likely would be high, moderate or minimal over the next 5 years.
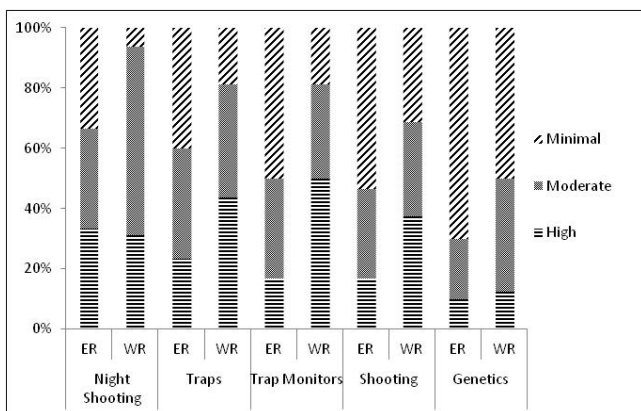

Figure 9. Percentage of WS respondents in the each of the Eastern and Western Regions who indicated that the need for research involving various aspects of predator management likely would be high, moderate or minimal over the next 5 years.

more effective repellents (WR 33%, ER 63%).

Research involving rodents was a low priority for most respondents in both regions. However, the highest needs expressed were for more effective rodent toxicants (WR 63%, ER 46%), more information about the economics of rodent impacts and control (WR 63%, ER

46%), better repellents (WR 50%, ER 41%), and more effective exclusion devices (WR 50%, ER 52%).

Many respondents indicated a need for a better understanding of the demographics and movements of various species. Eighty percent of respondents (WR 93%, ER 67%) identified the need for better demographic information, and 75% (WR 80%, ER 67%) indicated a moderate or high need for better information about the movements of various animals.

NWRC Services and Consultations

Respondents gave a high rating to a variety of services and consultations provided by NWRC to the WS program and the general public (Table 7). More than 90% of respondents indicated that analyses involving cost-effective management and economic impacts of wildlife damages were highly or moderately important. Various library services, immobilization and euthanasia training, and assistance with pesticide registration were also rated as moderately or highly important. A majority of respondents also expressed a moderate or high need for a variety of consultation services provided by NWRC (Table 8).

Table 7. Percentage of federal respondents who rated various NWRC services as moderately or highly important.

NWRC Service	% of Respondents
Cost-effective management	96
Economic impact	93
Library-general assistance	76
Immobilization & euthanasia training	69
Library-literature searches	68
Pesticide registration assistance	67
Disease diagnostics	66
Library-reprint requests	61
Library-photographic images	61
Genetic analyses	52
Analytical chemistry	47
Disease diagnostics	39

Table 8. Percentage of federal respondents who rated various NWRC consultation services as moderately or highly important.

NWRC Consultation	% of Respondents
Effectiveness of management methods	86
NEPA-basic ecological information	74
Statistical advice	71
Risk assessments	70
Disease sampling strategies	69
Management plans	64
Disease surveillance plans	64
NEPA-Quality Assurance	63

SUMMARY

Invasive species, specifically feral swine, were one of the most frequently identified areas where research is needed. Predation was also a major topic of interest, especially in the WR. Development of nonlethal control methods and economic assessments were given a high priority. Responses gathered in the comments section of the survey confirmed that many respondents wanted proof that their organizations or programs are economically justified. Research needs related to aquaculture, human health and safety, property damage, development of vaccines, and repellents were based on more localized concerns.

Several regional differences were apparent in the results. Predation on livestock (especially cattle and sheep) and big game, waterfowl, and upland birds was a much bigger concern in the WR than the ER. A higher percentage of WR respondents also anticipated being involved in conflicts involving birds. Cormorants (*Phalacrocorax auritus*), beavers (*Castor canadensis*), deer, and especially vultures (*Coragyps atratus*, *Cathartes aura*) were of higher concern in the ER.

State agency and private stakeholders most frequently identified either wildlife transmission of diseases or livestock depredation as their highest area of concern. State agency and private stakeholders most often identified their highest research priority as a general need for more effective management techniques. All respondents expressed a need for better economic information about the extent and nature of various human-wildlife conflicts and the benefits and costs of management actions.

Wildlife-human conflicts are varied and dynamic, and the development of effective tools and information for managing such conflicts must be flexible and responsive to stakeholder needs. The NWRC works closely with both internal and external stakeholders to keep abreast of evolving research needs and to guide its research prioritization process. The results of this RNA, along with guidance from Congress and the WS Deputy Administrator and stakeholder input, will help allocate NWRC resources to specific research projects that address the most pressing needs of its stakeholders.

ACKNOWLEDGEMENTS

LITERATURE CITED

BRUGGERS, R. L., R. OWENS, W. H. CLAY, R. REYNOLDS, and C. SMITH. 1996. Research needs assessment. USDA/ Animal Damage Control Program methods development. U.S. Department of Agriculture, Wildlife Services, National Wildlife Research Center, Unpubl. Rept. 4 pp + app.

BRUGGERS, R. L., R. OWENS, and T. HOFFMAN. 2002. Wildlife damage management research needs: Prceptions of scientists, wildlife managers, and stakeholders of the USDA/ Wildlife Services program. Intl. Biodeter. Biodegrad. 49: 213-223.

CLARK, L., D. NELSON, and K. GUSTAD. 2007. USDA/APHIS/ Wildlife Services Research Needs Assessment 2006. U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services. Unpubl. Rept. 18 pp. + app.

PACKHAM, C. J., and G. E. CONNOLLY. 1992. Control methods research priorities for Animal Damage Control. Proc. Vertebr. Pest Conf. 15:12-16.