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Agriculture and Food Research Initiative
Competitive Programs Unit
National Institute of Food and Agriculture
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The Wildlife Society appreciates the opportunity to respond to the request for public comment on the development of the Agriculture and Food Research Initiative (AFRI) program solicitations for Fiscal Year 2011 (FR Docket No. NIFA-2010-0001).

The Wildlife Society was founded in 1937 and is a non-profit scientific and educational association of over 9,100 professional wildlife biologists and managers, dedicated to excellence in wildlife stewardship through science and education. Our mission is to represent and serve wildlife professionals—the scientists, technicians, and practitioners actively working to study, manage, and conserve native and desired non-native wildlife and their habitats worldwide.

The relationship between natural and agricultural resources is inextricably complex. Agricultural lands and the natural areas surrounding them exist in a constant state of flux: agriculture is dependent upon natural capitol to help produce the maximum product yield, while natural capitol must adapt to changes in the environment posed by agriculture—which may increase the economic value of the land, but may also render it unable to provide sustainable benefits. The chemicals that farmers use on crops, the patterns in which they till the soil, and the frequency of water source use all have the potential to cause severe consequences on wildlife and other natural resources. However, when agricultural goals, wildlife management, and landscape conservation plans act in concert, together they have the potential provide great benefits to society; for example, many partnerships exist which serve to provide the public access to hunting, hiking, and other recreational opportunities on agricultural or forested lands. Such partnerships not only benefit society, but also add value to our environment and have long-lasting impacts upon the health of our nation.

Appropriately, AFRI recognizes this complex relationship between agriculture and natural resources in its FY 2010 Request for Applications (RFA). As stated in the RFA, the purpose of AFRI is to "support research, education, and extension as well as integrated programs by awarding grants that address all components of agriculture," including not only traditional agricultural topics, but also other related topics such as forestry, renewable energy, and rural communities. Additionally, the RFA goes on to note that AFRI is one of the National Institute for Food and Agriculture's (NIFA's) major programs through which to address some of the critical societal challenges that were laid out in the "New Biology for the 21st Century" report.

The New Biology report outlines four grand challenges, all of which would provide great benefits to society if solutions were found, and three of which specifically deal with sustainability and biodiversity. These include the challenges of: generating sustainable food plants; sustaining ecosystem function and biodiversity in the face of change; and, expanding sustainable alternatives to fossil fuels. However, despite AFRI purported mission to address these challenges, there is strikingly little attention given to sustainability and biodiversity science within the FY2010 RFA. Below we provide several suggestions for improvement in the FY2011 RFA.

Animal Health and Production: Animal Health (AHPAH)

In the AHPAH section, the RFA notes: "new and improved animal disease prevention, control, and mitigation strategies are needed to address current losses and prepare for future threats." It goes on to highlight the fact that current knowledge gaps exist in these areas, which seriously impede efforts to reduce significantly the incidence of animal diseases that are currently present in the US.

One of these knowledge gaps exists in the science of wildlife-domestic transmission of wildlife diseases. Global climate change is bringing about changes in the disease patterns of humans, domesticated animals, and wildlife everywhere. Wildlife-agricultural disease interfaces occur across a wide variety of species and segments of the agriculture industry, allowing for the transmission of a multitude of disease agents. As diseases rapidly spread into new areas and have the opportunity to causes illness in new hosts, prevention and treatment strategies are often not keeping pace. However, it is critical that they do so because the importance of these interactions will continue to increase as we globalize, modify landscapes, and prepare for threats of agroterrorism. In fact, five of the six disease pathogens identified by the U.S. government as Category A bioweapons are pathogenic to wildlife, can be spread by wildlife, may affect wildlife populations, and have been targeted for surveillance by the Department of Defense.[1] The USDA must also lead in this effort, by providing timely data on disease in wildlife and domestic animal populations in order to protect agricultural interests and bolster national security.

The existing Program Area Priorities within the AHPAH section are too narrow and will not lead to the filling of all of these existing knowledge gaps. In addition to the existing six priorities, we recommend the addition of the following species and associated diseases, which are increasingly posing serious threats both to wildlife and the agriculture industry:

- *Elk and bison*: brucellosis, *Brucella abortus* (the potential for transmission to livestock)
- *Cattle:* tuberculosis, *Mycobacterium bovis* (transmission to white-tailed deer and humans)
- *White-tailed deer*: potential for interfaces with cattle and the captive cervid industry
- *Poultry*: avian influenza and avian cholera (transmission from waterfowl)
- *Foot and mouth disease*: transmission between numerous wild and domestic animal vectors

We also recommend developing a program area priority, or expanding upon the existing priorities in order to include diseases of destructive potential; this would include study of the transmission and propagation in wildlife and domestic livestock of anthrax, ebola, tularemia, botulism, and plague.

Renewable Energy, Natural Resources, and Environment (RENRE)

In the FY2010 RFA, there are only two program areas under the RENRE title: *Microbial Communities in Soil* and *Agricultural Water Science.* Given the abundant overlap between agricultural and natural resource management issues, it seems that this section of the RFA is grossly underdeveloped. There are myriad ways in which agriculture and natural resources come into conflict, or alternatively work to complement each other. Agriculture reshapes landscapes, creating new habitats, agriculture produces biofuels, allowing for a clean energy future, and agriculture introduces chemicals into the environment, causing potentially deleterious effects on humans and wildlife. As we head forward into a world increasingly facing the effects of climate change and unfettered population growth, it will be necessary to have the science to support decisions about how agricultural practices can aid in climate mitigation and ecological sustainability.

We recommend augmentation of the program areas within this subsection. Specifically, we recommend the addition of the following two new program areas:

C. Agricultural Ecosystems. Habitat fragmentation has existed as long as there has been agriculture, however, it has never had such an impact on natural habitats as it does with modern-day industrial agriculture. Fragmentation, whether from agriculture, urban sprawl, or industrial development, reduces the total area in a landscape that is available as wildlife habitat, increasing the lineage of landscape edges, causing increased isolation of patches, and modifying natural disturbance regimes. Moreover, these impacts do not have a straightforward relationship to the extent of original habitat, and their effects are likely compounded by other factors which are not yet understood. Science has shown that there are thresholds where local extinction for a species may be inevitable even though only a small amount of original habitat has been lost[2]. The science also suggests that habitat fragmentation is a serious threat to biological diversity, and many scientists believe that habitat fragmentation may be the primary cause of the current extinction crisis. While agriculture is not the sole cause of habitat fragmentation, it is important to recognize that it plays a key role in altering landscapes. Therefore, we recommend the addition of a section on landscape ecology.

Program Area Priorities

1. *Habitat fragmentation and edge effects* threaten global biodiversity. Develop the science on agricultural landscapes by investigating how agricultural fields affect movement of wildlife. Study ways to mitigate these effects, including development of appropriate habitat corridors and cover, and investigate types of plantings that will reduce edge effects. Pursue investigations into types of crop plants and patterns of planting that can sustain wildlife species.

2. *Invasive species* may originate from agricultural stocks. Using genomic and molecular methods, investigate the potential for genes from engineered agriculture to move into native species. Study how the action of pesticides on weeds affects their spread into wildlife habitats. Investigate the links between crop species and invasives they may host and enable to spread into the larger environment.
3. *Conflicts between natural resource use and agriculture* affect many sectors of society and the environment. Understand the potential for all aspects of agriculture to affect wildlife and habitats, including, but not limited to issues of habitat fragmentation and invasive species, and also including effects of agricultural runoff and applied chemicals on wildlife, effects on recreation use of habitats, diminished social value of altered ecosystems, wildlife damage to crops, and potential effects of conflict between farmers and users of wildlife resources.

D. Biofuels. Biofuels hold great promise for a future of clean energy and energy independence. However, the unintended consequence of crop-based biofuels may be the loss of wildlife habitat, particularly that of grassland birds, which are dwindling as their native grasslands are being replanted with biofuel crops such as corn, wheat, and switchgrass. Recent research has shown that the ongoing conversion of grasslands to corn for ethanol production is posing a very real threat to the wildlife; however, simple solutions may exist, such as using diverse native prairie plants to produce bioenergy instead of a single agricultural crop like corn[3], or controlling the height at which crops are harvested so that they can be used as alternative habitats[4]. Additionally, the energy and emissions that result directly from biofuel production may be contributing to climate change, but may also be able to play a role in mitigation strategies if crops can be planted to minimize carbon dioxide productions and maximize intake.

Biofuels are playing an increasingly important role in our economy and our environment, and as populations and demand for energy grow, the need for biofuels is only going to increase. Scientific research at USDA must be at the forefront of biofuel research and must play a role in filling in the huge gaps in knowledge that still exist as to what crops, harvesting methods, and planting patterns pose the least harm to wildlife and provide the greatest means for supporting climate mitigation measures. In order to increase the scientific capacity for biofuel research within NIFA, we recommend the addition of a section on biofuels and the environment.

Program Area Priorities

1. *Best practices* may enable support of wildlife. Using modeling and experimental methods, determine crop types, crop rotation patterns, planting patterns, crop irrigation methods, and crop harvesting practices that provide the most benefits to wildlife and habitats.
2. *Climate mitigation measures* may emerge from the biofuel sector. Conduct life cycle analyses of biofuel crops to study environmental impacts. Investigate the potential for biofuels to provide ground cover, retain topsoil, and create alternative habitats for wildlife.

Finally, within subsection *b. Agricultural Water Science*, *Program Area Priority 2* we recommend adding a mission to understand the effects of agricultural drainage water on wildlife.

Studying the effects of agricultural drainage on wildlife is an active area of restoration work particularly within the U.S. Fish and Wildlife Service. More science is needed to support the development of Environmental Impact Statements and related reports on this subject.

Thank you for considering the views of wildlife professionals. We hope these comments can be of use to you, and welcome any questions you may have. Please contact Jenna Jadin (301-897-9770 x309 or jenna@wildlife.org) to let us know if we can be of any more assistance.

Sincerely,

Michael Hutchins, Ph.D.
Executive Director and CEO

References

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3. Fargione, J.E., Cooper, T.R., Flaspohler, D.J., Hill, J., Lehman, C., McCoy, T., McLeod, S., Nelson, E.J., Oberhauser, K.S., D. Tilman. 2009. Bioenergy and Wildlife: Threats and Opportunities for Grassland Conservation. BioScience 59(9):767-777.

4. Roth, A.M., Sample, D.W., Ribic, C.A., Paine, L., Undersander, D.J., Bartlet, G.A. 2005. Grassland bird response to harvesting switchgrass as a biomass energy crop. Biomass and Bioenergy 28(5): 490-498.