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Reports Included

- US Department of Agriculture Strategic Plan for Pollinator Recovery, 2008
- US Department of Agriculture Agricultural Research Service Review of the Facility Requirements and Relocation for the Arthropod-Borne Animal Diseases Research Laboratory, Laramie, Wyoming, 2009
- US Department Of Agriculture Agricultural Research Service Review of Program Feasibility for The Agricultural Research Service at Arkansas State University in Jonesboro, Arkansas, 2009
- US Department Of Agriculture Agricultural Research Service Review of the Facility Requirements of the Agricultural Research Service in Logan, Utah
- U.S. Department of Agriculture Agricultural Research Service Viral Hemorrhagic Septicemia, 2008

United States Department of Agriculture

Research, Education and Economics
Agricultural Research Service

January 6, 2010

This is in response to your recent Freedom of Information Act (FOIA) request submitted to Courtney Wilkerson, Department FOIA Office, for reports produced for congress by the U.S. Department of Agriculture. Your request was forwarded to this office for Research, Education, and Economic (REE) documents.

Enclosed are reports produced during the last three years by the REE agencies, including the Agricultural Research Service, National Agricultural Statistics Service, and National Institute of Food and Agriculture (formerly Cooperative State, Research, Education, and Extension Service). We are currently compiling the reports produced by the Economic Research Service and hope to provide the documents to you by January 11.

We hope this information is helpful. If you have any questions, you can contact me at 301-504-1655 or stasia.hutchison@ars.usda.gov.

Sincerely,

STASIA A.M. HUTCHISON
Freedom of Information
Act Coordinator

Enclosures
Reports

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U.S. DEPARTMENT OF AGRICULTURE
STRATEGIC PLAN FOR POLLINATOR RECOVERY

INTRODUCTION

Senate Report No. 110-134, accompanying the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Bill for fiscal year (FY) 2008 contained the following directive:

> "The Committee is extremely concerned by widespread reports of Colony Collapse Disorder [CCD] and other threats to bee colonies and other pollinators that could seriously disrupt food production with implications for national security. While the President's budget did not expressly request funding for this research, the Committee believes that such oversight was due to the recent development of CCD and related threats. The Committee does believe that this research is consistent with the ARS goal of protecting the Nation's food supply and natural resources. The Committee also believes that the Department is aware of this serious threat and would have included funds in the budget if it had been aware of the problem in advance of formulation of the fiscal year 2008 budget. Therefore, the Committee recommends $1,500,000 for CCD and related pollinator threats to be directed to the best suited locations. In addition, due to the seriousness posed by CCD, the Committee directs the Secretary to provide a report within 30 days of enactment regarding the use of these funds and an overall strategy by the Department for protecting pollinator species in this country."

This report outlines the intramural and extramural research supported by the Department of Agriculture (USDA) and other locations to combat threats to pollinators, particularly CCD of honey bees, which could seriously impact the Nation's food security. Although much of USDA's work focuses on protecting the health of honey bees, the Administration also seeks to develop and promote the use of other pollinators to supplement honey bees.

BACKGROUND

Bees and other pollinators play an essential role in the reproduction of a multitude of crop, forest, and rangeland plant species. When visiting plants in search of nectar or pollen to feed their colony, bees carry pollen from flower to flower, facilitating the reproduction of the plants. The commercial production of more than 90 crops, including almond, apple, citrus, cherry, blueberry, and squash, as well as numerous seed crops, such as alfalfa, is achieved through bee pollination. Honey bee pollination is responsible for $15 billion in added crop value to 130 crops, particularly specialty crops, such as almonds and other nuts, berries, fruits, and vegetables.

Honey bees are not the only species of bee needed for pollination. Other bee species make a significant contribution to crop quality and yield. For example, the alfalfa leafcutting bee, alkali bee, and blue orchard bee are intensively managed for the pollination of certain crops, such as alfalfa and tree fruits. Wild native bees provide free pollination services worth an estimated

$2 to $3 billion per year in the United States. Worldwide, wild pollinators contribute greatly to natural ecosystem services by pollination of food and fiber crops which create the biomass to enhance water filtration, carbon sequestration, and flood control.

During the winter of 2006 to 2007, beekeepers in the United States were alarmed to find their honey bee colonies were dying from unexplained causes, with reported losses of 30 to 90 percent in some beekeeping operations. This suggested that increased stress or some new, unidentified agent was responsible. This unexplained cause of death has been given the name Colony Collapse Disorder, or CCD. Subsequent investigations suggested that these outbreaks of unexplained colony collapse have been occurring for at least 2 years.

DISCUSSION

FUNDING

In light of the increasing threats to U.S. crop pollination, USDA is carrying out significant research and mitigative efforts through a number of agencies including ARS, Agricultural Marketing Service (AMS), Cooperative State Research, Education, and Extension Service (CSREES), Economic Research Service (ERS), Forest Service (FS), National Agricultural Statistics Service (NASS), Natural Resources Conservation Service (NRCS), and the Risk Management Agency (RMA). Coordination is facilitated by the USDA Pollinator Protection Committee.

In FY 2007, ARS' honey bee research budget was $7.7 million, and focusing on controlling the varroa mite and microbial pathogens and on improving honey bee nutrition. Additional funds (approximately $5 million over the next 5 years) are now being redirected within the ARS Integrated Pest Management program on a full scale areawide project devoted to honey bee nutrition and health. ARS FY 2008 funding for pollinators, directed to honey bee (including CCD) and related pollinator threats, is $9.3 million. In the FY 2009 budget, ARS has requested an additional $780,000 for CCD research with these funds. ARS will conduct new research to determine the role of pathogens and other stress factors implicated in CCD and develop the means to mitigate their effects.

Between FY 2000 and FY 2006, CSREES spent an annual average of $1.7 million on honey bee and pollinator research. Roughly one third to one half of this funding was spent on research of honey bee health. Using FY 2007 funds, the National Research Initiative (NRI) committed $2.6 million to support research on honey bee health and pollinator decline. CSREES will commit an additional $4 million between FY 2008 and FY 2012 for a 4-year NRI Coordinated Agricultural Project for research aimed at improving the health and protection of honey bees. This research is expected to address genomics, breeding, pathology, immunology, and applied ecology with a goal of determining the causes behind CCD.

In addition, CSREES funded two seed grants for CCD research, totaling $112,000, with the University of Illinois and Pennsylvania State University, from the FY 2006 Critical and Emerging Issues Program. In FY 2008, CSREES awarded three additional grants, totaling approximately $270,000, to Clemson University and Pennsylvania State University for research

to examine the relationship between miticide and pesticide use and CCD. Land Grant University Experiment Stations have committed to support a new Multi-State Rapid Response Research project administered by the North Central region through the Hatch Multi-State Research allocation. This project, funded by participating State allocations to Hatch Multi-State research, began in FY 2006 and currently includes scientists from 21 States. Also, extension specialists are active in every State and many have specific responsibilities to apiculture. Their activities are supported by Federal Smith-Lever appropriations to States for the Cooperative Extension System.

RESEARCH ON HONEY BEES

The honey bee industry and pollinators as a whole have suffered several major setbacks during the last two decades. The causes are:

- CCD – High, unexplained bee mortality, characterized by the sudden loss of a colony's adult bee population.
- Bee pests and pathogens – Various pests and pathogens, particularly parasitic mites, which have decimated honey bee populations throughout the country, have created instability in the supply of bees rented for pollination and greatly increased the costs of managing and renting bees for pollination. Individually, or in combination, these pests and pathogens may play a role in CCD.
- Africanized honey bees – A highly defensive race of bees that has moved into regions critical to the sustainability of U.S. beekeeping industry. If the germplasm of these Africanized bees becomes common in the commercial population, colonies will become less manageable, significantly increasing liability issues for both beekeepers and growers.

A key component of pollinator protection involves research to develop methods to protect the health of honey bee colonies. Intramural research is being conducted by ARS, and extramural research funded by CSREES is being performed at several universities across the Nation. ARS has four laboratories dedicated to honey bee research, each with a unique research role:

- Baton Rouge, Louisiana (bee breeding);
- Beltsville, Maryland (bee pests and diseases);
- Tucson, Arizona (diets, pollination, and Africanized bees); and
- Weslaco, Texas (integrated pest management).

Much of the USDA-funded research is focusing on aspects of CCD, but research covers other factors affecting bee health, such as the spread of Africanized honey bees.

In response to the threat of CCD, USDA, other Federal agencies, and land grant universities formed a steering committee and participated with a separate CCD working team in early 2007 to assess the nature and extent of the problem and to identify possible causes. At a major workshop in April 2007, with more than 80 Federal and university scientists and bee industry and grower representatives in attendance, participants identified knowledge gaps and research priorities and the CCD Steering Committee developed a comprehensive action plan. The CCD Action Plan is available on the ARS Web site at www.ars.usda.gov/is/br/ccd/ccd_actionplan.pdf.

The current strategy for addressing the CCD crisis involves four main components: data collection; analysis of samples; hypothesis-driven research; and mitigation and preventative action.

For the first component, ERS has initiated several data collection and research activities during FY 2007 in response to concerns about the economic impacts of CCD. ERS, in collaboration with NASS, expanded the 2007 Agricultural Resource Management Survey (ARMS) to include the first ever collection of data on the extent of specialty crop acreage requiring pollination services as well as the level of pollination fees paid by these producers. ERS also signed a cooperative agreement with two Land-Grant Institutions to analyze the possible economic impacts of shocks to pollination markets and related agricultural markets for individual fruit, vegetable, and tree nut crops, with special attention to the impacts of CCD on pollination fees in the Washington, Oregon, and California region. NASS will continue to survey beekeepers to gather statistics on honey-producing bee colonies, yield per colony, total honey production, average price per pound, and production value to determine the number of bees owned, total colonies sold, and honey collected. Findings are published in NASS' annual *Honey* report.

As for sample analysis, AMS' National Science Laboratory (NSL) has analyzed about 300 CCD samples for 171 pesticide compounds from in-hive miticide application and external pesticide application. AMS has identified over 40 pesticides present in hive products such as pollen, wax, royal jelly, bee bread, bees, and brood, the in-hive miticides coumaphos and fluavalinate being the most prominent. In addition, honey has been added to the USDA Pesticide Data Program commodity collection schedule (October 1, 2007) and will undergo multi-residue testing by NSL for at least one year. This work is part of an ongoing national study to determine the role of pesticide application, a common control method for varroa mites and other bee and crop pests.

RMA is providing risk management strategies and insurance programs to beekeepers. RMA will implement two new pilot programs for the 2009 crop year that will provide beekeepers with risk-based insurance programs, using rainfall and vegetative indices, to insure honey production. These programs, which were approved by the Federal Crop Insurance Board of Directors in July 2007, will be offered in select counties in 11 States throughout the Nation.

The largest and most important component in addressing CCD is research which focuses on four primary categories of suspects: varroa mites, viruses and other pathogens, migratory stresses, and pesticides. Research within and outside ARS focuses on determining whether stressors within these candidate categories are contributing causes of CCD – either individually, in combination, or synergistically.

Suspect 1: Varroa Mites and Other Pests

The varroa mite, which parasitizes honey bees and transmits bee viruses that may be associated with CCD, has caused devastating losses to honey bee populations throughout the country. Despite considerable efforts at both State and Federal levels, effective, safe, and sustainable controls have not been found. These mites have developed resistance to pesticides, with control failures well documented. To combat this problem, varroa mite-resistant strains of honey bees have been developed. However, resistant stocks lack other important bee stock characteristics, and are not yet fully adopted commercially. In

addition to mites, the small hive beetle is stressing bee colonies in the southern United States.

Both ARS and CSREES-funded scientists are conducting research on bee pests, targeting the varroa mite. This work is focused on three major areas: breeding for resistance; developing new miticides and other control methods; and developing traps based on newly isolated semiochemicals and mite exclusion methods. In the first area, ARS researchers in Baton Rouge have identified a trait known as varroa sensitive hygiene (VSH) behavior, which is correlated to significantly greater levels of resistance to varroa mites in honey bees. These researchers are currently working to breed bees with the VSH trait and other inherited varroa suppressing traits to broaden bees' resistance to mites. CSREES-funded researchers and extension agents at the University of Minnesota have introduced hygienic as well as suppressed reproductive traits into honey bees. These lines also successfully combat the varroa mite and several bee diseases (*e.g.*, American foulbrood and chalkbrood) in commercial hives. A Web-based course has been developed to teach beekeepers principles of developing mite- and disease-resistant healthy bees. CSREES' NRI is funding Purdue University to identify genes important to grooming behavior that makes bees more resistant to varroa mites. This project will provide resources for the research community in the form of known chromosomal regions that influence behavior and probes to identify singlenucleotide polymorphisms.

Researchers in Weslaco, Texas, and Tucson, Arizona, are developing, testing, and honing several new mite control methods, including Hivastan, a recently approved mite control compound; beta plant acids; and several fungal pathogens, including *Hirsutella thompsonii, Metarhizium anisopliae,* and *Beauveria bassiana.* Work continues in testing and optimizing these control methods. Finally, ARS researchers have developed a trap to protect honey bees from the small hive beetle and are working to adapt the device for use in controlling the varroa mite as well. Research will continue on other pests, such as the tracheal mite and small hive beetle, to reduce bee stress and determine the pests' contributions, if any, to CCD.

Suspect 2: Viruses and Other Pathogens

In addition to bee pests, a number of pathogens (i.e., viruses, bacteria, and fungi, including microsporidia) are causing extensive bee mortality. Current pathogen suspects include the single celled organism *Nosema ceranae* (a microsporidian parasite related to fungi), which was responsible for large bee die-offs in Spain. *Nosema apis*, a related organism, has been associated with previous instances of bee die-off since the 1970s in the United States. Pennsylvania State University researchers have shown that fungal pathogens (*Aspergillus* spp.) are infecting bees at high levels in CCD-affected hives. Further research is needed to conclusively demonstrate whether pathogens are involved with CCD, and if immune suppression is associated with this disorder.

Scientists are conducting extensive studies on bee pathogens. To date, a consortium of researchers at Columbia University, Pennsylvania State University, and ARS scientists in Beltsville, Maryland, have studied a virus that may be a cause of CCD – the Israeli Acute Paralysis Virus (IAPV). Although the research does not identify IAPV as the cause of

CCD, it indicates a strong correlation between the virus and the disorder. Research continues on investigating the linkage between IAPV and CCD, alone and in combination with other suspected causes. To mitigate virus problems, ARS is focusing on improving virus detection with molecular probes.

Researchers (i.e., ARS, Department of Defense, the University of California at San Francisco, and the University of Montana) have complementary projects to develop diagnostic probes for viruses and other pathogens, particularly the microsporidian, *Nosema ceranae*, and to determine their pathology. Archival bee specimens are also being studied to determine when these pathogens entered the country, information which is critical to APHIS' regulatory decision-making. In addition, the scientists are conducting genomics research to determine the effects of pathogens, such as the American foulbrood bacterium and chalkbrood fungus, on bee health to be able to incorporate this information into resistance programs.

Suspect 3: Migratory Stress (Transportation)
ARS is carrying out significant research to document the impact of the transportation of bee colonies and determine its relationship to CCD. Much of the work on migratory stress is being carried out through the ARS Areawide Project on Honey Bee Health. The areawide project has several aspects: examine the effects of supplemental protein and sugar feeding on colony health; develop more resistant bee lines; investigate the effects of transporting bees on their health; and develop better control methods for the varroa mite. The complete areawide project is being funded at $665,000 in FY 2008 and will continue for at least 4 additional years at approximately $1,000,000 per year. Ultimately, the goal of the migratory stress portion of the project aims to develop a set of best management practices for migratory beekeepers that will reduce stress on their bee colonies, thereby enabling bees to ward off threats.

One recent accomplishment in this area is the development of Megabee ™, or the Tucson Bee Diet, a supplemental protein diet that is comparable to naturally collected pollen in its attractiveness to bees, consumption rates, and stimulating colony growth. Developed by ARS researchers in collaboration with a private company, and co-funded by CSREES' Small Business Innovation Research Program (SBIR), the diet is an important component in addressing the impact of poor nutrition on colony health triggered by insufficient amounts of pollen in the hive during transport.

Suspect 4: Pesticides
Using the recently sequenced honey bee genome, researchers discovered that honey bees may have few detoxifying enzymes, making them especially susceptible to pesticides. Although no pattern of pesticide exposure correlated with bee death has yet been confirmed by USDA, bees from colonies associated with CCD will continue to be analyzed for exposure to pesticides and diseases in an attempt to identify potential causes of CCD. In accordance with the CCD Action Plan, extensive analysis of bee samples for pesticides is being carried out at Pennsylvania State University and the Pennsylvania Department of Agriculture, in cooperation with the AMS laboratories. In addition, researchers at Clemson University and the University of Georgia will assess sublethal

effects of miticide use inside the hive on honey bee health and colony productivity. Future ARS research will include developing alternative pest control methods to reduce bee exposure to pesticides.

University of Illinois researchers have developed a honey bee microarray, a tool to identify the variants of genes present in bees. Efforts are underway by University of Illinois and ARS researchers to identify genes important to bee susceptibility to pesticides, diseases, and pests, such as the varroa mite. This research is expected to develop molecular tools for monitoring bees' exposure to these threats.

In addition to ARS' research specific to CCD, the Agency conducts other research to improve the pollination services provided by honey bees. Included in this work is the effort to address the intrusion of Africanized honey bees, which out compete European honey bees and threaten to make honey bee colonies less manageable. Using the recently sequenced honey bee genome, researchers are working to develop a more accurate Africanized honey bee identification technique, which will allow researchers to compare and contrast the characteristics of European honey bees and Africanized honey bees more effectively. To help maintain manageable honey bee colonies in areas where the Africanized honey bee have spread, ARS bee researchers are identifying strategies for re-queening Africanized colonies with European queens. CSREES-funded researchers at Purdue University are using molecular tools to map the genes associated with aggressive behaviors in the Africanized honey bee. The researchers have also discovered potent alarm pheromone strains of the Africanized honey bee in Mexico. Plans are underway to develop diagnostic tests to detect whether these traits are also present in Africanized honey bees in the United States.

RESEARCH ON OTHER POLLINATORS

In addition to honey bees, many species of native bees provide excellent natural pollination services to gardens and small orchards. Many of these pollinators are critical for the effective pollination of crops as diverse as alfalfa, almonds, tomatoes, sunflowers, tree fruits, berries, squash, and melons.

In 2007 CSREES 1890 Capacity Building Grant program funded a $247,000 research project at Virginia State University to incorporate sustainable populations of blue orchard bees with honey bees in orchards. Funding is expected to continue at this level through FY 2010. An ecosystem approach will be used to enhance pollinator diversity in limited resource eastern orchards through the development of a sustainable and low cost management system for the eastern subspecies of the blue orchard bee.

CSREES' NRI funded the University of Illinois to conduct a large-scale DNA analysis study of bumble bees. This research has resolved phylogenetic relationships between several species of bumble bees in the United States and throughout the world. In addition, it has helped to narrow the search for which bumble bee species, important to agricultural crop pollination, are on the decline in the United States. Collaborative studies between researchers in Illinois and ARSI Pollinating Insects Biology, Management, and Systematics Research Unit in Logan, Utah, are currently underway to determine the importance of several pathogens affecting bumble bees.

ARS conducts research on the study, development, and preservation of other pollen bees (*i.e.*, bees that are not honey bees, mainly wild bees, solitary bees, and bumble bees) at its Logan, Utah, laboratory. Included is research to address several issues of concern to pollen bees as recognized by a 2006 report by the National Research Council of the National Academies of Science. The focus of this research centers on three objectives specific to these pollinators:

- Pollination management systems improvement;
- Pathogen control methods; and
- Bee identification and biodiversity.

ARS accomplishments in improving pollination management systems include the development of the blue orchard bee for pollination of almonds, the development of the alkali bee for alfalfa seed production, and the *Osmia* bees for berry pollination. Researchers have also conducted collaborative research on pollinator management at the farm-field scale to evaluate the economics of using alkali bees for pollination, determine the appropriate number of leafcutting bees to release in fields, and evaluate chalkbrood control measures. ARS is working with California growers to refine and expand the use of blue orchard bees as an almond pollinator, and with researchers at Montana State University and the University of Idaho to identify pesticides that are safe for alfalfa leafcutting bees. ARS scientists also serve as advisors to extension personnel on this matter.

In the area of developing pathogen controls for non-honey bee pollinators, ARS has discovered that the fungicide iprodione is both effective at controlling chalkbrood and of low toxicity to the bee larvae.

In its efforts to develop identification tools, ARS scientists recently completed an in-depth survey of pollinator diversity and native plants that provides land managers information they can use to conserve rare bee species. With the hiring of a new bumble bee specialist, ARS, working with the University of Illinois, has developed molecular tools to identify bumble bees. The researchers analyzed the DNA sequences on 90 percent of the world's bumble bee species to help with species identification. Using these methods, scientists have determined several key species that are now in decline in the United States.

In collaboration with the U.S. Fish and Wildlife Service's Patuxent Wildlife Refuge, ARS has also developed a Web-accessible guide to bees of the Eastern United States that allows nonspecialists to accurately identify bees. This collaboration has also resulted in a guide to several bees that show promise as crop pollinators, including *Megachilidae*, a family of bees that includes the alfalfa leafcutting bee and blue orchard bee.

ARS also maintains the U.S. Pollinating Insects Collection in Logan, Utah, which includes nearly one million specimens, including approximately 4,000 different bee species from the United States. This collection is used by bee experts around the world to help identify known and unknown species, and to assist in developing new taxonomic keys.

The FS and NRCS are working in several ways to address pollinator decline. Both agencies are developing guidance in the form of brochures, Web modules, and other documents to increase awareness of the status of pollinators and the need to manage them, as well as to provide public and private land managers with information on pollinator-friendly management practices. NRCS continues its development of a pollinator module as part of its PLANTS database to identify the common pollinators of specific plants, as well as the plants that specific pollinators commonly pollinate. In addition, the FS will assist in monitoring pollinator populations. Monitoring will focus on fast growing areas, regions with a diversity of pollinator dependent crops, conserved areas, and areas that act as reservoirs for pollinators, such as sand dunes and vegetated sands. Key pollinators to be considered include bumble bees, cavity nesting bees (such as mason bees, alkali bees, and certain squash bees), insectivorous bats and hummingbirds, and monarch butterflies. These efforts will assist with the identification of key pollinator species and ultimately help reverse the decline in many of these populations.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

REVIEW OF THE FACILITY REQUIREMENTS AND RELOCATION FOR THE ARTHROPOD-BORNE ANIMAL DISEASES RESEARCH LABORATORY, LARAMIE, WYOMING

INTRODUCTION

The explanatory statement accompanying the FY 2009 Omnibus Appropriations Act contained the following directive:

> "The fiscal year 2009 budget request proposed to relocate the Arthropod-Borne Animal Diseases Research Laboratory (ABADRL) from its current location in Laramie, Wyoming. Before deciding whether it is appropriate to relocate the lab, ARS is directed to provide a report to the Committees describing the current status of the laboratory's facilities and research. Additionally, the agency shall assess no fewer than two locations that could serve as the new location of ABADRL. When selecting the locations to assess, ARS should consider the facilities, capacity, expertise, and synergies relevant to fulfilling and expediting the ABADRL mission that are offered by each potential location. The report should include a comparative cost analysis."

The Agricultural Research Service (ARS) has prepared this report, which addresses research programs, facility needs, and associated costs at Laramie, Wyoming and at four other potential sites: Ames, Iowa; Manhattan, Kansas; Moscow, Idaho; and Fort Collins, Colorado.

ARS continues to recommend moving ABADRL to the USDA National Centers for Animal Health in Ames, Iowa. This report does not constitute a recommendation for funding.

DISCUSSION

ABADRL Research and Program Requirements

The Arthropod-Borne Animal Diseases Research Laboratory (ABADRL) in Laramie (co-located with the University of Wyoming) conducts research on the diagnosis and control of livestock diseases that are transmitted by arthropods. Arthropods are a group of organisms that include blood feeding insects and ticks. Severe insect infestation and feeding on animals can cause debilitation; the greatest danger is transmission of pathogens that cause infectious diseases, some of which also are zoonotic, i.e., affect humans and cause a public health hazard, such as West Nile Virus. Because of the risk to animal and human populations, work on such diseases must be done in secure biocontainment facilities. Arthropod-borne pathogens, both those already present and

those that might be introduced into the U.S. can also cause significant economic loss through direct damage and disruption of trade.

Presently, there are seven ARS scientists at ABADRL with expertise in veterinary medicine, virology, immunology, entomology, and molecular biology supported by 17 technicians and other staff. The current ARS appropriated program funding is $3.3 million.

ABADRL Current Facilities

ABADRL is comprised of four operational components (18,300 gross square feet) in a variety of leased facilities and land in two locations about three miles apart. The four components consist of:

- Leased laboratory Biosafety Level-2 (BSL-2) and office space, located on the University of Wyoming (UW) campus.
- A insectary on UW property (an insectary is an essential part of the ABADRL program, producing large numbers of arthropods under study).
- Leased building designed as a Biosafety Level-3 (BSL-3) Ag laboratory and holding rooms for infected rodents and arthropods (the "Round Building"), located on UW land about three miles from the main campus. This building fails to meet structural requirements for BSL-3 containment and was downgraded to BSL-2 in January, 2007.
- An ARS-owned building on leased land designed as a BSL-3 Ag large animal isolation building (one of only three in ARS), adjacent to the Round Building. Due to infrastructure degradation, this building was downgraded and functions as BSL-2 space. This building cannot be used in the summer months due to lack of air conditioning.

ABADRL's facilities in Laramie no longer provide adequate biological containment to perform the laboratory's mission, a situation that significantly impedes progress toward solving national livestock disease problems. Biocontainment is the provision of a barrier to contain/prevent the movement of pathogens. At BSL-2, barriers prevent the movement of moderate risk pathogens into the environment through contact. BSL-3 provides additional protection by preventing the movement of pathogens in the airstream, usually by filters and negative air pressure.

As shown in the table below, ABADRL needs facilities totaling 30,700 gross square feet. A current assessment indicates, that with $2 million in renovations, ABADRL can still only realize 70 percent of its research program requirements. A new facility on land purchased by ARS to replace ABADRL's facilities to meet all program requirements would cost $39.6 million based on a 2005 estimate.

ABADRL Space Requirements

Type of Space	Requirement (gross sq ft)
BSL3 Rift Valley Fever (RVF) Suite	1,800
BSL3 Suite Other Agents	2,050
BSL3 Ag Facility	2,650
BSL3 Large Animal	2,250
BSL2 Space	21,950
Total above	30,700

Alternative Sites for ABADRL

National Centers for Animal Health (NCAH), Ames, Iowa

The NCAH (an ARS/APHIS facility and program complex) has undergone major new construction and expansion over the last several years at a cost of $462 million. This modern, world class animal health facility complex provides in excess of one million square feet of laboratory office and animal research space. The USDA NCAH consists of the ARS National Animal Disease Center and APHIS' Center for Veterinary Biologics and National Veterinary Services Laboratory. Researchers and staff have extensive and productive collaborative relationships with nearby Iowa State University's relevant departments, including entomology and the veterinary school. The NCAH is USDA's foremost location for livestock animal health research, diagnostic, and training in the country.

Collocated with the Animal and Plant Health Inspection Service's (APHIS) Center for Veterinary Biologics and the National Veterinary Services Laboratories, the 400 acre NCAH campus now has new, state-of-the-art facilities which include: the Combined Laboratory Facility (a full-service BSL-2; and a BSL-3 laboratory and small animal, training, and office building); BSL-3Ag large animal space in Building 9; and BSL-2 large animal space in the Low Containment Animal Research Barn. Of particular interest to ABADRL is the availability of dedicated BSL-3 insectary space adjacent to the BSL-3 small animal space.

ABADRL could realize all of its research program requirements at NCAH for initial moving and facility adjustments at an estimated cost of $970,000. Yearly operating costs of the space to be occupied at Ames would be approximately $866,000 in addition to its current appropriation.

Kansas State University (KSU), Manhattan, Kansas

KSU is the principal agricultural research and teaching institution in Kansas. A significant part of the University's efforts are dedicated to livestock. The resident National Agricultural Biosecurity Center (NABC) provides many infrastructure and collaborative benefits to ABADRL. There is a demonstrated KSU/community commitment to making ABADRL an integral part of the campus. An existing productive

relationship between the University and industry would complement ABADRL's existing program strengths. However, KSU facilities lack low containment (BSL-2) large animal space and a required insectary.

ABADRL could realize about 90 percent of its program requirements at KSU for an initial move and facility adjustments at an estimated cost in excess of $1 million. Yearly facility operating costs are estimated at $547,150.

University of Idaho (UI), Moscow, Idaho

UI cooperates with many organizations relevant to ABADRL's research mission. In addition, the College of Agricultural and Life Sciences at the University operates five satellite campuses collocated with ARS locations. The ARS Animal Disease Research Unit (ADRU) is based at Washington State University (WSU) in Pullman. UI and WSU are only nine miles apart and have a cooperative relationship; the UI location would give ABADRL full access to the benefits of ADRU, the WSU veterinary school, etc. ADRU has a similar mission to that of ABADRL, creating many opportunities for interaction.

About 80 percent of ABADRL's program requirements could be realized at UI in Moscow, with an initial move and facility renovation/construction at an estimated cost in excess of $1 million. Existing UI facilities are available for use by ABADRL at no cost, however, BSL-3 space (laboratory and small animal facilities) is less than desired, and BSL-3 Ag space (large animal facilities) is currently lacking.

Colorado State University, Fort Collins, Colorado

Colorado State University is a national center for research on arthropod-borne pathogens and pathogens requiring containment. The University's Harper Complex consists of excellent facilities housing ABADRL mission enhancing collaborators. The University also offers potential synergies from staffs located at the James L. Voss Veterinary Teaching Hospital, the Pathology Building, the Microbiology Building, and the Painter Center for Animal Research. The College of Agriculture performs studies in animal science. In addition, two Federal facilities (the CDC Division of Vector-Borne Infectious Diseases, and the APHIS National Wildlife Research Center) offer opportunities for partnership with major ABADRL and ARS stakeholders.

Using existing available facilities and leasing from local collaborators, ABADRL could realize 80 percent of its research program requirements at Fort Collins. The one time estimated cost of moving and facility renovation/construction would be in excess of $1 million. Facility operating costs are estimated from $360,000 to $476,000 annually. The main drawbacks of this site are the relative expense of leasing arrangements, and lack of necessary BSL-3 large animal facilities.

SUMMARY

In the FY 2009 Omnibus Appropriations Act, ARS was directed to review the Arthropod-Borne Animal Diseases Research Laboratory's (ABADRL) program requirements and assess at least two other locations where the laboratory could be located. In response to

the directive, ARS reviewed ABADRL's current site at Laramie, Wyoming, and evaluated other sites at Manhattan, Kansas; Moscow, Idaho; Fort Collins, Colorado; and Ames, Iowa.

ABADRL is currently co-located with the University of Wyoming in Laramie. ABADRL's existing facilities support only 70 percent of the laboratory's research mission. In addition, this site lacks adequate biological containment and the potential for collaborative research. Other potential sites evaluated but considered inadequate at this time are: Kansas State University, Manhattan, Kansas -- lacks low containment space (BSL-2) for livestock research, and can support only 90 percent of ABADRL's mission; University of Idaho, Moscow, Idaho -- lacks biological containment, and can support only 80 percent of ABADRL's mission; and Colorado State University, Fort Collins, could support 80 percent (lack of necessary BLS-3 large animal facilities) of the mission.

ARS' FY 2009 Budget proposed ABADRL's relocation to the National Centers for Animal Health (NCAH) in Ames, Iowa. NCAH is an ideal site for ABADRL's relocation. NCAH has undergone recent major construction and has new, state-of-the-art biocontainment facilities which meet ABADRL's needs. In addition, the joint ARS/APHIS NCAH facility, and the nearby Iowa State University provide the potential for extensive collaborative relationships.

ARS reaffirms its FY 2009 Budget proposal to relocate ABADRL to the National Center for Animal Health in Ames, Iowa.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

REVIEW OF PROGRAM FEASIBILITY FOR THE AGRICULTURAL RESEARCH SERVICE AT ARKANSAS STATE UNIVERSITY IN JONESBORO, ARKANSAS

The Conference Report accompanying the Fiscal Year 2009 Omnibus Bill (Public Law No. 111-8) contained the following directive:

> "ARS is directed to submit a report to the Committees by May 1, 2009, that analyzes the feasibility, requirements, and cost for conducting water quality and quantity research at Arkansas State University."

In response to this direction, the following feasibility study is submitted to House and Senate Appropriations Subcommittees on Agriculture, Rural Development, Food and Drug Administration and Related Agencies. This document does not make a recommendation and is not a request for funding.

RESEARCH NEEDS AND RELEVANT ARS PROGRAMS

Water quality and quantity is a regional issue in the Lower Mississippi River Basin (Arkansas, Mississippi, Louisiana, and southeastern Missouri). Irrigated acreage in this area covers more than 6.5 million acres. Current and emergent issues related to water include regional ground water shortages resulting from the depletion of aquifers; agricultural non-point source nutrient and sediment loads contributing to hypoxia ("dead zone") in the Gulf of Mexico; changes in production systems related to shifts from food to bio-energy feed-stocks; and potential changes in water availability related to global climate change. These challenges have potential to disrupt the economic and social infrastructure of the region. For example, current cropping practices in Arkansas predominantly include rotations of rice and soybeans, which are grown on over 4 million acres with an annual production value of $2 billion. Most irrigation water is derived from wells drilled into alluvial aquifers, which are rapidly depleting in some zones. The current system is not sustainable. On-farm research could to develop water-efficient irrigation, drainage and water reuse strategies that extend water resources and protect regional watershed water quality while sustaining profitability for the grower. These strategies need to be economical and appropriate for the humid and semi-humid regions of the Lower Mississippi River Basin.

ARS conducts research in irrigation and drainage water management systems as part of its national research program on water availability and watershed management, including research to develop irrigation scheduling tools for humid and sub-humid regions. ARS conducts this national research program at locations in 21 States. Although current ARS research in Arkansas does not include this particular topic, water and irrigation research in Arkansas would be fully within the scope of ARS' mission and existing national activities.

ASSESSMENT OF POTENTIAL PARTNERSHIP WITH ARKANSAS STATE UNIVERSITY

Arkansas State University (ASU) in Jonesboro has characteristics of other universities that already are partners in ARS research. The ASU College of Agriculture and Technology offers bachelor's, master's, and doctoral degree programs, including a doctoral program in environmental sciences. The university has satellite campuses, technical institutes, and instructional sites at several locations around the state, and offers degrees and courses through partnerships with local community colleges. Current enrollment for the Jonesboro campus stands at about 12,000, and the system has an enrollment of greater than 17,000.

Currently, ARS researchers (Oxford, Mississippi) cooperate with ASU faculty in the study of the effectiveness of edge-of-field wetlands and grass waterways to ameliorate nutrients in drainage water. Another ASU collaboration with ARS personnel (Columbia, Missouri) focused on controlled water irrigation systems in rice. ASU researchers also have professional linkages with ARS scientists at Beltsville, Maryland and West Lafayette, Indiana.

Other ARS natural resources partnerships in Arkansas currently include collaborations with the University of Arkansas; Grand Prairie Irrigation District; Arkansas Soil and Water Conservation Commission, Little Rock; U.S. Army Corps of Engineers; USDA Natural Resources Conservation Service; National Water Management Center, Little Rock; and the U.S. Geological Survey, Little Rock.

Thus, the university's size, degree programs, research activities, and location are generally comparable with other universities and agencies with which ARS routinely partners to accomplish research.

OPTIONS

Option 1: Continuation of existing collaborations with ASU; no new funding or staffing. Outcomes: No new research on water availability and watershed management. Aquifers within the region are depleting and are expected to result in the loss of agricultural production or the need to develop water supply infrastructures. Unless measures are taken to reverse current trends, loss of farm land is anticipated with economic and social impacts on agribusiness and employment.

Option 2: New agricultural water management research conducted on site in Arkansas by one ARS Research Associate; requires approximately $250,000 per year. Outcomes: ARS establishes a new research effort in the area of water quality and water quantity directed toward sustainable irrigation and drainage practices in the humid/semi-humid region of the Lower Mississippi River Basin. The research would be conducted by a series of individuals, one at any given time, appointed as a Research Associate (a postdoctoral researcher on a temporary appointment, typically two to four years in duration). This research would be coordinated with university, federal, state, and local (water district) cooperators. The Research Associate would rely on ASU support for office and laboratory facilities and would be organizationally linked for

scientific and technical leadership with a nearby parent ARS laboratory (e.g., Oxford, Mississippi; Columbia, Missouri; Stuttgart, Arkansas). The Research Associate would receive supervisory and administrative support from that location. The Research Associate would also depend upon field research support and substantial, in-kind scientific and technical support from cooperators. Anticipated research accomplishments would provide information that supports current regional, state and local efforts to address regional groundwater problems.

Option 3: New research conducted by one career Research Scientist; requires approximately $500,000 per year. Outcomes: ARS establishes a new long-term research project in the area of water quality and water quantity directed toward sustainable irrigation and drainage practices in the humid/semi-humid region of the Lower Mississippi River Basin. The research would be conducted by a scientist hired permanently by ARS for research conducted at ASU. Resources also would permit hiring permanent or temporary technicians typical of ARS research conducted by such scientists. Scientific effort would directed be toward developing ground water budgets through hydrologic studies, evaluation of current farming practices, and water savings through implementation of new and existing water-saving and ground-water recharge practices. Scientific effort would be directed to providing solutions through both direct research and cooperative research efforts with university, federal, state, and local (water district) cooperators. Scientist would rely on university (ASU) support for office and laboratory facilities and administrative support from an ARS Location (e.g., Oxford, MS; Columbia, MO; Stuttgart, AR). Scientist would have independent technical support but would depend upon field research support and substantial, in-kind scientific and technical support from cooperators. Anticipated research accomplishments would provide information that supports current regional, state and local efforts to address regional groundwater problems. The program could be expanded into additional areas of research, e.g., development and adaptation of agricultural and drainage management systems to mitigate losses of nutrients and pesticides that contribute to poor water quality and Gulf hypoxia; development of diverse, new water-conserving cropping options to produce bio-fuel feedstock crops. A program with multiple thrusts would require multiple permanent ARS scientists assigned to this program and location, at $500,000 per scientist per year; or some combination of permanent scientists and Research Associates as described above, with commensurate resources.

SUMMARY

This report responds to the Fiscal Year 2009 Omnibus Bill, in which Congress directs ARS to submit a report that analyzes the feasibility, requirements, and cost for conducting water quality and quantity research at Arkansas State University. The options described herein, describing potential research programs at different levels of scientific effort and the fiscal and staffing resources required to implement them, are neither recommendations nor requests for funding.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

REVIEW OF THE FACILITY REQUIREMENTS OF THE AGRICULTURAL RESEARCH SERVICE IN LOGAN, UTAH

INTRODUCTION

The Agricultural Research Service (ARS) has prepared this report which addresses the Agency's research program and facility needs of the Forage and Range Research Laboratory and the Pollinating Insect - Biology, Management, and Systematics Research Laboratory located in Logan, Utah. This report includes the feasibility requirements and scope of the proposed project; details on building size, cost, associated facilities; scientific capacity, and other requirements; and current and planned program and resource requirements as requested.

ARS RESEARCH

Forage and Range Research Laboratory

The mission of the Forage and Range Research Laboratory at Logan, Utah is focused on broadening the biodiversity of forage germplasm and providing an array of improved plant materials for upgrading both semiarid and irrigated private and public lands in the western United States. The objective of the Laboratory is to provide land managers with the resources necessary to ensure healthy and sustainable rangelands and pastures. These lands must preserve many of the Nation's natural resources, including soils, plants, and animals, and meet the Nation's wildlife, grazing, and recreational needs.

The Laboratory develops new plant materials through basic and applied use of plant genetics, molecular biology, plant ecology, and physiology. Plant breeding efforts are focused on genetic improvement of grasses, legumes and forbs for semiarid rangelands and irrigated pastures of the western US. Twelve research scientists and support staff provide a critical mass of scientific expertise necessary to effectively carry out the Laboratory's mission.

The Laboratory has developed and released 45 new cultivars, varieties, and germplasms for use on rangelands and pastures. The Laboratory has collected and preserved important germplasm for use in breeding rangeland and pasture species. Over 5,000 foreign and 2,500 North American collections of grasses (some legumes and forbs), and a core collection of forage have been assembled and entered into the Germplasm Resources Information Network.

Pollinating Insect – Biology, Management, and Systematics Research Laboratory

The mission of the Pollinating Insect – Biology, Management, and Systematics Research Laboratory at Logan, Utah is to improve both the quality and yield of insect-pollinated crops in

the U.S. by increasing the availability of agriculturally important bee pollinators. Pollinators are a critical component of crop production. Effective pollination is essential for crops as diverse as alfalfa seed, almonds, tomatoes, sunflowers, tree fruits, berries, squash, cucumbers, and melons. Non-Apis pollinators and wild native bees are estimated to provide free pollination services worth $3 billion per year in the U.S. Research emphasis includes the development and improvement of management systems for bee populations, biological studies of bees, plant-pollination systems, and bee biosystematics.

The Pollination Laboratory is the only ARS facility developing alternative species of bees for crop pollination. The Research Unit consists of 5 scientists, 7 technicians, and various temporary appointments and students. This Unit was instrumental in the development of the alfalfa leafcutting bee for seed production (providing up to a 10-fold increase in seed yields); developed the blue orchard bee for pollination of tree fruits and nuts, including almonds; and developed successful disease control strategies for managed non-Apis bees, such as for chalkbrood in the alfalfa leafcutting bee. A national concern has recently arisen regarding the decline of native pollinators in the U.S., and in response, the Unit has been conducting biological surveys of native bee pollinators, producing an authoritative list of bee species (and their host plants) for North America, identifying approximately 6000 species of bees, with 3800 occurring in the U.S. This information is critical for identifying where the problems in bee decline are likely to occur, and for identifying potential new pollinators for agriculture.

There is a longstanding collaborative relationship between ARS and Utah State University (USU) that began in the 1930's. USU provides laboratory space and land for research programs. There are a number of collaborative research agreements with USU involving various departments and faculty.

In addition to ARS scientists and support staff, USU has 22 students and cooperative scientists working in the ARS facilities. The ARS/USU agricultural and biology research partnership is an extremely strong Federal/State partnership. Producers, commodity groups, and consumers have depended on and supported this partnership to find solutions through collaborative research to critical agricultural production and environmental problems. Current Federal research funding at this location is $5.4 million.

ARS FACILITIES

The Forage and Range Research Laboratory is located on the USU campus and is on 0.93 acres of land that is owned by ARS. The existing facilities consist of 20,400 gross square feet (GSF) of laboratory/office space; 12,500 GSF of greenhouse space; and 6,500 GSF of headhouse space. These facilities, built over 40 years ago, are not energy efficient and have inadequate space for the current scientific staff.

The Pollinating Insect – Biology, Management, and Systematics Research Laboratory is located in USU owned space. The space consists of 1,800 GSF of office space located on the main USU campus. In addition, ARS is located on 4,500 GSF of lab/office space; 3,800 GSF of greenhouse space; and 1,200 GSF of greenhouse space located approximately one mile north of the main USU campus. The program is dispersed in two separate facilities which are neither state-of-the-

art, nor energy efficient. There is inadequate space for the current scientific staff.

As directed, ARS has evaluated and identified three options to address the needs of ARS' Forage and Range Research Laboratory, and the Pollinating Insect – Biology, Management, and Systematics Research Laboratory. A fourth option addresses only the short term needs of the Forage and Range Research Laboratory. The options are not prioritized. One of these options addresses a replacement facility that would be located on the USU campus, herein referred to as the "Quad" site. Several alternatives to providing the needed greenhouse and headhouse space are presented with this option. The proposed "Quad" site is approximately 50,000 square feet. The site would be shared with a planned USU facility. The proposed footprint of the ARS facility is 18,000 – 20,000 GSF.

A Security Risk Assessment will be performed as part of the Program of Requirements to determine the impact of setback requirements and the methods of mitigating the security risk based on the identified threat. This may significantly affect the project cost and/or the ability of constructing on the "Quad" site.

Options to Address Facility and Program Needs (not in priority order):

Option 1

Construct a new 57,500 GSF laboratory/office building on property leased from USU on the "Quad" site. The proposed new facilities would also include 30,000 GSF of greenhouse space and 15,000 GSF of headhouse space located on a separate site. The planned laboratory would house a total of 23 scientists. Under this option there are several alternatives to providing the needed greenhouse and headhouse space.

Alternative 1 is to construct approximately 10,000 GSF of greenhouse space on the roof of the laboratory building and approximately 5,000 GSF of headhouse space in the basement of the laboratory building. Additional land on the USU campus will be required to accommodate the remaining 20,000 GSF of greenhouse space and 10,000 GSF of headhouse space. This alternative also includes approximately 10,000 GSF of underground parking at the "Quad" site. The existing Forage and Range Laboratories would be abandoned. The estimated total project cost for this alternative is $57.1 million, of which $2.5 million is required for the planning and conceptual design of the facilities and $54.6 million for design completion and construction (escalated to the midpoint of construction, 1st quarter of fiscal year (FY) 2011).

Alternative 2 is to construct the 30,000 GSF of greenhouse space and 15,000 GSF of headhouse space on the existing Forage and Range site on the USU campus. The existing Forage and Range laboratories and greenhouses would be demolished. No underground parking would be provided with the laboratory at the "Quad" site. The estimated total project cost for this alternative is $54.3 million, of which $2.5 million is required for the planning and conceptual design of the facilities and $51.8 million for design completion and construction (escalated to the midpoint of construction, 1st quarter of FY 2011).

Alternative 3 is to construct the 30,000 GSF of greenhouse space and 15,000 of headhouse space on an undetermined site on the USU campus. The existing Forage and Range Laboratories would be abandoned. The estimated total project cost for this alternative is $53.6 million, of which $2.5 million is required for the planning and conceptual design of the facilities and $51.1 million for design completion and construction (escalated to the midpoint of construction, 1st quarter of FY 2011).

Option 2

Gut and rebuild the existing ARS Forage and Range Facilities (modernization of 20,400 GSF laboratory/office space, 12,500 GSF greenhouse space, 6,500 GSF headhouse space). Additional land on the USU campus will be required to accommodate the total research needs at Logan (37,100 GSF laboratory/office space, 17,500 GSF greenhouse space, 8,500 GSF headhouse space). The estimated total project cost for Option 2 is $50.9 million, of which $2.5 million is required for the planning and conceptual design of the facilities and $48.4 million for design completion and construction (escalated to the midpoint of construction, 1st quarter of FY 2011).

Option 3

Update the existing ARS Forage and Range Facilities (20,400 GSF laboratory/office space, 12,500 GSF greenhouse space, 6,500 GSF headhouse space) to meet minimum building and safety codes. This option does not provide for state-of-the-art, energy efficient space accommodations for the ARS Forage and Range Laboratory or the Pollinating Insect – Biology, Management, and Systematics Research Laboratory which is currently housed in leased space. The estimated total project cost for Option 3 is $3.4 million, of which $400,000 is required for the planning and conceptual design of the facilities and $3.0 million for construction (escalated to the midpoint of construction, 1st quarter of FY 2011).

Option 4

Construct a new 52,900 GSF laboratory/office building, with 30,000 GSF of greenhouse space, 15,000 of headhouse space, and 10,000 GSF of surface parking, on an undetermined site on the USU campus. The existing Forage and Range Laboratories would be abandoned. The estimated total project cost for Option 4 is $48.3 million, of which $2.5 million is required for the planning and conceptual design of the facilities and $45.8 million for design completion and construction (escalated to the midpoint of construction, 1st quarter of FY 2011).

SUMMARY

This report describes current ARS program research activities and costs associated with a facility replacement of ARS' Forage and Range Research Laboratory and Pollinating Insect - Biology, Management, and Systematics Research Laboratory, located in Logan, Utah. Currently there are 17 ARS scientists and 35 support staff conducting research at the two laboratories. USU has an additional 22 students and cooperative scientists. Producers, commodity groups, and consumers have depended on and supported this partnership to find solutions through collaborative research

to critical agricultural production and environmental problems. Current Federal research funding at this location is $5.4 million. ARS has evaluated and identified several options to address the needs of ARS' Forage and Range Research Laboratory, and the Pollinating Insect - Biology, Management, and Systematics Research Laboratory.

Should the Department choose to fund a replacement facility in the future, ARS would proceed to initiate an expanded study to investigate potential site constraints. This expanded study would provide ARS with the detailed information necessary to make program/cost decisions as to the best site location for the facilities. The Program of Requirements and conceptual design (i.e., approximately 35 percent design completion) would start soon thereafter. This conceptual design would then form the basis of a design-build or construction manager-at-risk procurement, once the balance of appropriations for construction was received.

ARS does not recommend any action in response to this report, nor does it recommend any funding for this project. Specific future budget requests will be based on an overall review of all ARS and Department of Agriculture needs within Administration priorities and within the total available resources.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

VIRAL HEMORRHAGIC SEPTICEMIA

INTRODUCTION

Senate Report No. 110-134, accompanying the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Bill for fiscal year (FY) 2008 contained the following directive:

> "The Committee is aware of the presence of VHS in the Great Lakes and the threat it poses to aquatic species and to interstate and international commerce. The Secretary is directed to provide a report on steps taken by ARS to control and eradicate this disease from American and international waters."

BACKGROUND

Viral Hemorrhagic Septicemia (VHS) is considered by many nations and international organizations to be one of the most serious viral pathogens of finfish. Beginning in 2005, reports from the Great Lakes region indicated that VHS had been isolated from fish populations that had experienced very large die-offs. By the end of 2007, VHS had been isolated from more than 25 species of fish in Lakes Michigan, Huron, St. Clair, Erie, and Ontario, and the Saint Lawrence River, and from inland lakes in New York, Michigan and Wisconsin. The Great Lakes strain of VHS appears to have an exceptionally broad host range; significant mortality has occurred in muskellunge, freshwater drum, yellow perch, round goby, emerald shiners and gizzard shad.

Fisheries managers in the United States and Canada are very concerned about the spread of the highly virulent strain of VHS from the Great Lakes region into new populations of native freshwater fish or into new geographic areas. Furthermore, the introduction of VHS into the aquaculture industry could cause additional trade restrictions as well as direct losses from disease. Regulatory agencies in the United States and Canada have placed restrictions on the movement of fish or fish products that could pose a risk for the spread of VHS to regions outside of its known geographic range. These restrictions include requirements for viral examinations by standard methods.

DISCUSSION

The Agricultural Research Service (ARS) is presently not conducting any research on VHS. Other USDA agencies, including the Animal and Plant Health Inspection Service and the Cooperative State Research, Education, and Extension Service are currently carrying out some surveillance, education, and research programs on VHS.

SUMMARY

VHS is considered by many scientists and external organizations to be one of the most serious viral pathogens of finfish. Since 2005, there have been large die-offs from wild populations in the Great Lakes region. Fishery managers in the United States and Canada fear that the virus could spread into new populations or regions, and spread into the aquaculture industry.

Presently, ARS is not conducting any VHS research.