

Plum Island

The nation's leading animal disease research center considers moving its facilities from a secluded island setting to mainland America.

by *Crystal Albers*

For years, the U.S. Department of Agriculture (USDA) has carefully conducted its most dangerous, sometimes secretive, animal disease research on a secluded strip of land off the New York and Connecticut coastline. Known as the Plum Island Animal Disease Center (PIADC), the aging and outdated laboratory facilities, now more than 50 years old, darken against the promise of a new state-of-the-art facility funded through the Department of Homeland Security (DHS).

Looking to expand animal disease operations and research capabilities, DHS is exploring six potential sites for the new National Bio- and Agro-Defense Facility (NBAF). In addition to Plum Island, the department is considering five other locations for NBAF, all of which are exclusively mainland — Manhattan, Kan.; Athens, Ga.; Flora, Miss.; Butner, N.C.; and San Antonio, Texas.

Plans for moving the nation's primary

animal disease research center have been met with enthusiasm by many lawmakers, business owners and academia, but some concerns regarding human and animal health have surfaced among residents in potential NBAF site communities, and the cattle industry remains divided on the subject. Some question the possibility of an accidental or intentional release of disease agents, citing a 2002 government-led foot-and-mouth disease (FMD) outbreak simulation that ended miserably and a recent agency report detailing previous facility "leaks." The controversy, however, is being met with an equal amount of enthusiasm from NBAF-backers who welcome the prospect of a one-of-a-kind research community and unrivaled animal disease research capabilities.

Island seclusion

The Plum Island center was built under the guidance of the USDA in the mid-1950s,

when outbreaks of FMD in Mexico and Canada threatened the U.S. cow herd.

At the time, FMD, also known then as hoof-and-mouth disease, was a significant threat for U.S. cattlemen who remembered too well the FMD outbreaks of 1914 and 1929. The highly contagious disease affects cloven-hoofed animals and is capable of catastrophic livestock and economic losses. During the 1914 outbreak alone, more than 172,000 cattle, sheep and swine were depopulated and the industry lost a then-whopping \$4.5 million.

The center's secluded location facilitated much of the animal disease research dedicated toward prevention of another FMD recurrence and provided a buffer of protection to the outside world. In fact, DHS Director of National Labs James Johnson says without today's biocontainment technologies available in the 1950s, developers chose the site for its isolation — located on 840 acres northeast of Long Island between Orient Point, N.Y., and Old Saybrook, Conn.

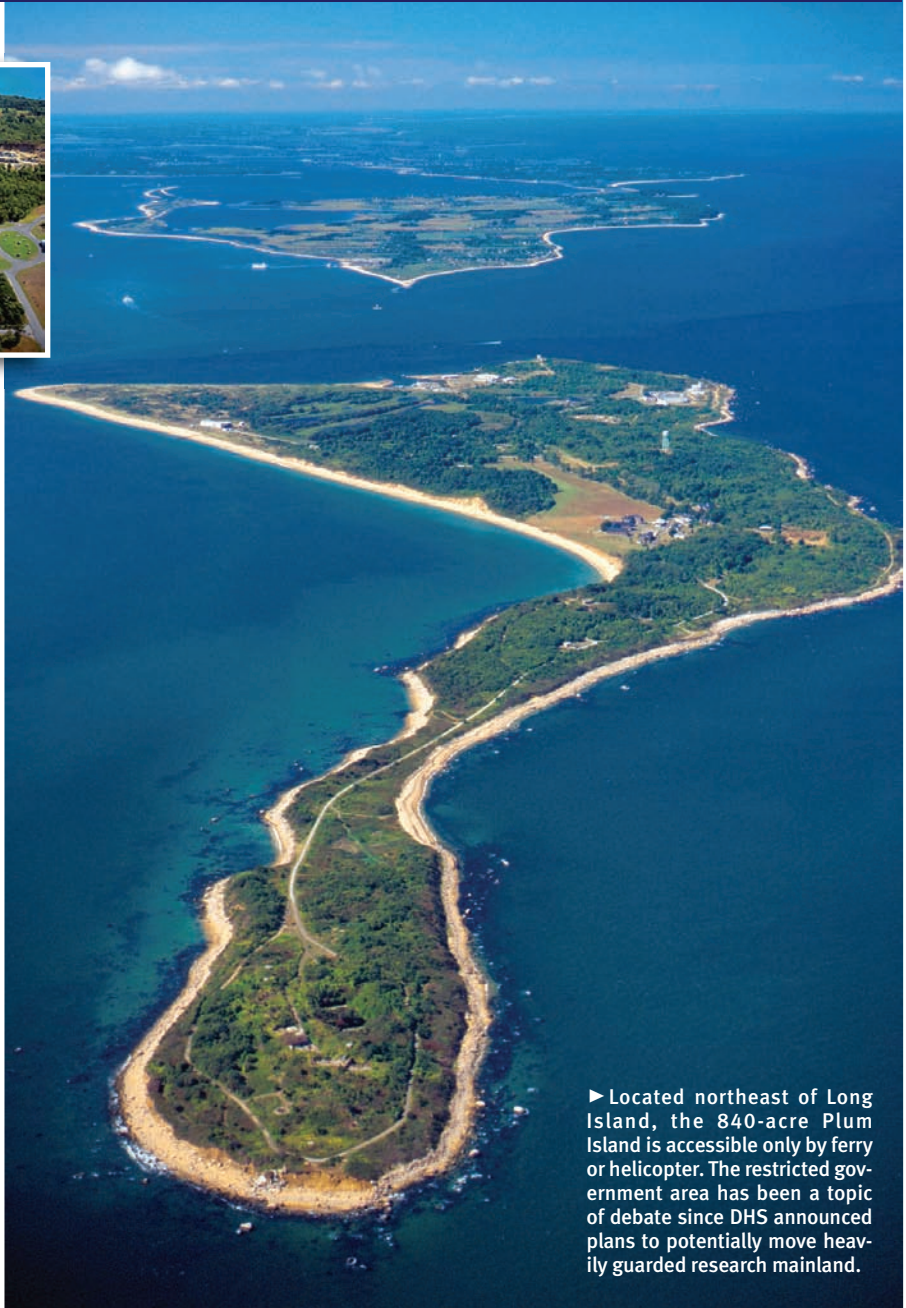
Named for the native plum trees dotting its beaches, the island is accessible only by ferry and helicopter; and it played a historically significant role in colonial military times, the Spanish-American War and World War II. Now a restricted area unavailable to the public, Plum Island accommodates just more than 300 government employees, including researchers; technicians and operations specialists; security; and other support services staff.

The PIADC serves as the nation's designated facility for studying and responding to foreign animal diseases (FADs) of livestock. It conducts bioforensics research and diagnostic testing, and formulates countermeasures — including vaccine and anti-viral development — for FMD, swine fever and other high-priority diseases. It's where the Animal and Plant Health Inspection Service (APHIS) generates much of its National Veterinary Vaccine Stockpile and maintains the North American



PHOTOS COURTESY OF DEPT. OF HOMELAND SECURITY

▶ The Plum Island Animal Disease Center was built in the mid-1950s to study and respond to foreign animal diseases including FMD. Plans for a new facility would likely move research elsewhere.



► Located northeast of Long Island, the 840-acre Plum Island is accessible only by ferry or helicopter. The restricted government area has been a topic of debate since DHS announced plans to potentially move heavily guarded research mainland.

Foot-and-Mouth Disease Vaccine Bank. The facility is also home to the Foreign Animal Disease Diagnostic Laboratory where Johnson says the PIADC identifies up to 30 foreign animal diseases and trains state, federal and academic veterinarians and pathologists to recognize animal disease in livestock.

“The USDA (APHIS) holds four to six FAD training classes per year, and participation is from the State Department, DoD (Department of Defense), USDA and state diagnostic labs,” Johnson says. “These veterinarians are trained in working with local and state veterinarians as well as the USDA APHIS in appropriate response to a potential foreign animal disease outbreak.”

PIADC currently operates at the government-designated Biosafety Level 3 (BSL-3; on a scale of four), meaning scientists there study foreign and emerging agents as well as microorganisms present in the U.S. According to DHS, the diseases studied at BSL-3 could have serious consequences for livestock but are not harmful to human beings given available protection measures.

While DHS is responsible for overseeing the facility, both DHS and USDA conduct programs there as part of an integrated agro-defense strategy.

Matter of national security

In June 2003, ownership of the PIADC was transferred from the USDA to the then newly established DHS as mandated in the Homeland Security Act of 2002. The transfer of ownership, DHS noted at the time, facilitated the department’s ability to “lead a focused research and development program to prevent, respond to and recover from the intentional introduction of animal diseases.”

Between June and October 2003, DHS conducted an in-depth assessment of the PIADC as part of a major modernization plan. At the time, DHS officials said they had no plans to upgrade biocontainment facilities to a BSL-4. Assessment findings, however, were less than stellar.

DHS concluded that the aging facility had become increasingly costly to maintain, and laboratory space could no longer support increasing research demands. In addition to agricultural and animal studies, public health threats from emerging “high-consequence” zoonotic pathogens — those that affect both animals and humans — and the development and licensure of vaccines and anti-viral therapies had reached levels demanding more laboratory space. The DHS mission, department officials stated, would require replacement of the Plum Island facility with a new one.

Thus, the department began the initial stages of designing the national facility and identifying potential locations.

By January 2007, DHS had contracted

with an Atlanta, Ga., architectural-engineering firm for the proposed conceptual design depicting a preliminary 520,000-square-foot (sq. ft.) facility.

“The NBAF would enable basic and advanced research, diagnostic testing and validation, countermeasure development, and diagnostic training for high-consequence livestock diseases with potentially devastating impacts to U.S. agriculture and public health,” Johnson says.

He estimates the NBAF will employ between 250 and 350 people, including researchers, laboratory animal technicians, animal caretakers, lab technicians, and administrative and custodial staff. Researchers will continue current BSL-3

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research, yet also accommodate BSL-4 research of foreign animal and zoonotic diseases that weren't possible at the established Plum Island location, he notes.

The BSL-4 distinction will allow research of more deadly animal pathogens for which there is no known vaccine or therapy, including zoonotic agents transmitted from animals to humans. According to DHS, the heightened designation would mean required biometric testing for lab entry and no solitary access to BSL-4-classified microorganisms. BSL-4 labs would use pressure-controlled buffers and specialized air filters, and all water and air leaving the lab would be purified. Approximately 10% of the net square footage of the facility would be dedicated to BSL-4 research.

According to DHS, no other facility in the world would have comparable capabilities to study such livestock disease threats.

Johnson says he anticipates the NBAF will initially focus research on African swine fever (ASF), classical swine fever (CSF), contagious bovine pleuropneumonia (CBPP), FMD, Japanese encephalitis (JE) and Rift Valley Fever (RVF). BSL-4 research facilities would likely focus on Hendra and Nipah viruses (see "Research to be conducted at NBAF").

"The NBAF research mission would be

based on current pathogen and disease risk assessments, subject to change as threats and risk assessments change. However, researchers at the NBAF would not study anthrax, Ebola, plague or smallpox," Johnson assures.

Ag opportunity or threat

While current employees at the Plum Island location will be offered the opportunity to transfer, Johnson says the workforce will likely be made up of mostly workers from communities near the selected site.

"We fully intend to take advantage of qualified people from local communities," Johnson said. "Based on the mix of education and skill sets required, employees will be hired on an as-needed basis."

In addition to the promise of jobs, the economic growth and prestige associated with a significantly important national animal disease lab is hard to ignore, and community leaders in and around nominated cities are clamoring for a chance to put the NBAF in their backyards.

Each state has a consortium of community and industry leaders, legislators,

farmers and ranchers, and agricultural specialists dedicated to bringing the NBAF to their location. Kansas, for example, has the Heartland BioAgro Consortium, a 45-person coalition of scientists and community and industry leaders, farmers and agricultural specialists from 15 Midwestern states led by the governor and the Kansas Bioscience

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Authority, a state-funded organization created by legislators to grow the state's bioscience industry. The task force is charged with convincing DHS to establish the NBAF in the state; educating the public; and coordinating community outreach and advocacy for the project.

Tom Thornton, Kansas Bioscience Authority president, is helping spearhead the initiative. He estimates the national lab would pump \$1.5 billion into the Kansas economy during the first 20-year period if it were established in Manhattan.

"This is a very important project intended to defend the nation," he says. "In the

Research to be conducted at the NBAF

The following diseases have been defined by the Department of Homeland Security (DHS) and the U.S. Department of Agriculture (USDA) as possibilities for study at the National Bio- and Agro-Defense Facility (NBAF):

► **Foot-and-Mouth Disease (FMD).** FMD is a viral disease of domestic and wild cloven-hoofed animals. Acute disease is characterized by fever, lameness, and vesicular lesions on the feet, tongue, mouth and teats. FMD is considered to be one of the most contagious, infectious diseases known. Cost estimates of an introduction of FMD in the U.S. are more than \$37 billion.

► **Classical Swine Fever (CSF).** Wild and domestic swine are the only known natural reservoirs of CSF. It is widespread throughout the world and has the potential to cause devastating epidemics, particularly in countries free of the disease. Any outbreak of CSF would have serious consequences for domestic and international trade of swine and swine products. Improved countermeasures are needed.

► **African Swine Fever (ASF).** Infected animals have high mortality rates. Effective countermeasures are not available for infected animals. No vaccines are available to prevent infection. No treatment exists for ASF, and countermeasures need improvements.

► **Rift Valley Fever (RVF).** The virus affects human beings and cloven-hoofed animals (sheep, goats, cattle, camels, buffalo and deer). Suitable countermeasures to respond in the U.S. do not exist. There is risk for establishment of endemic disease. RVF is ranked as a major disease of concern with USDA, DHS and other stakeholders.

► **Contagious Bovine Pleuropneumonia (CBPP).** This disease is caused by an infective microorganism (*Mycoplasma mycoides*). It primarily affects cattle, including European-bred cattle and Zebu; a related form can affect goats. It may survive for days in the environment. No treatment is available.

► **Japanese Encephalitis (JE) Virus.** JE is similar to St. Louis encephalitis virus. JE virus is amplified in the blood of domestic pigs and wild birds. The virus can infect humans, most domestic animals, birds, bats, snakes and frogs.

► **Nipah Virus.** This virus was discovered in 1999. It causes disease in swine and in humans through contact with infected animals. The mode of transmission between animals and from animals to humans is uncertain (appears to require close contact with infected tissues or body fluids). Nipah virus caused respiratory disease and encephalitis in people in Malaysia and Singapore. No drug therapies have yet been proven to be effective in treating Nipah infection, and no countermeasures exist.

► **Hendra Virus.** Formerly called equine morbillivirus, Hendra virus was first isolated in 1994. The natural reservoir for Hendra virus is still under investigation. Human beings and equines seem to be predominantly affected; caused respiratory and neurological disease in horses and humans in Australia.

Editor's Note: All diseases except Nipah and Hendra viruses would be studied in a Biosafety Level-3 (BSL-3) facility. The remaining diseases would require BSL-4 facilities.

Source: Department of Homeland Security.

opinions of homeland security experts, agriculture is the soft underbelly as it relates to terrorism, in that foreign animal diseases pose a threat to agriculture. The nation needs to spend resources to promote vaccines to protect agriculture. American agriculture needs a lab like this.”

But despite proponents’ efforts, some skepticism about moving the facility mainland remains, even in the U.S. House of Representatives, where lawmakers requested and received DHS documents in April 2008 that detailed PIADC in-laboratory accidents as well as a previously publicized 1978 release of FMD in a cattle holding pen.

In addition, a 2002 exercise titled “Crimson Sky” conducted by federal and state departments also caught the attention of lawmakers by simulating what might happen if terrorists intentionally introduced FMD in multiple locations across the country.

“Crimson Sky was a simulation run in 2002 to characterize the ability to protect against, prevent, or effectively deal with an attack on agriculture and its infrastructure,” Johnson explains. “This simulation demonstrated that a deliberately staged bioterrorism outbreak of a highly contagious animal disease presents a threat to the security and economic stability of the nation.”

The simulation was intended to demonstrate a worst-case scenario in which the country responded too slowly to an FMD outbreak, Thornton says.

Worst-case indeed, the exercise produced disturbing results, reportedly ending with fictional riots in the streets and a ditch 25 miles long to bury animal carcasses.

The PIADC also received scrutiny when Michael Carroll debuted his book *Lab 257: The Disturbing Story of the Government’s Secret Plum Island Germ Laboratory* in February 2004, which described the PIADC as a “ticking biological time bomb that none of us can ignore.”

Based on what Carroll calls countless interviews and seven years of research, the book describes virus outbreaks and asserts connections between the center and outbreaks of Lyme disease and West Nile virus. Though the book’s claims have been a source of contention, it thrust PIADC in the skeptical eye of the general public.

So, given such fears, why would NBAF planners consider moving animal disease operations mainland?

“One potential advantage of a mainland facility might be its proximity to, and its ability to attract, world-class researchers, scientists and skilled workforce with the

Potential NBAF sites

The site alternatives for the proposed National Bio- and Agro-Defense Facility (NBAF) are:

- ▶ South Milledge Avenue, Athens, Ga.
- ▶ Kansas State University campus, Manhattan, Kan.
- ▶ Flora Industrial Park, Flora, Miss.
- ▶ Plum Island, Plum Island, N.Y.
- ▶ Umstead Research Farm, Butner, N.C.
- ▶ Texas Research Park, San Antonio, Texas

Source: Department of Homeland Security.

necessary biocontainment experience,” Johnson says.

And despite claims suggesting unsafe conditions, the PIADC has yet to document any catastrophic security-related disasters.

“PIADC was located on Plum Island 50 years ago to provide a level of protection that isolation could help ensure. However, since that time, biocontainment technologies, protections and procedures have changed significantly, and it is no longer necessary to operate in isolation,” Johnson says. “In fact, other high-security research facilities in the United States such as the Centers for Disease Control and Prevention (CDC) in Atlanta, Ga., and the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) at Fort Detrick in Frederick, Md., have operated safely for years in highly populated environments.”

Site selection

Recognizing a need for public education and to put fears to rest, DHS conducted eight “scoping” meetings to measure public opinion and accept comments.

More than 1,350 people attended the meetings conducted last year; almost 300 gave oral comments at the meeting, and more than 850 written comments were received at DHS during the comment period, Johnson says.

“Two areas of concern expressed by many members of potential NBAF site communities were the placement of the facility in a densely populated area, and health risks from an accidental or intentional release, along with emergency response plans,” he says.

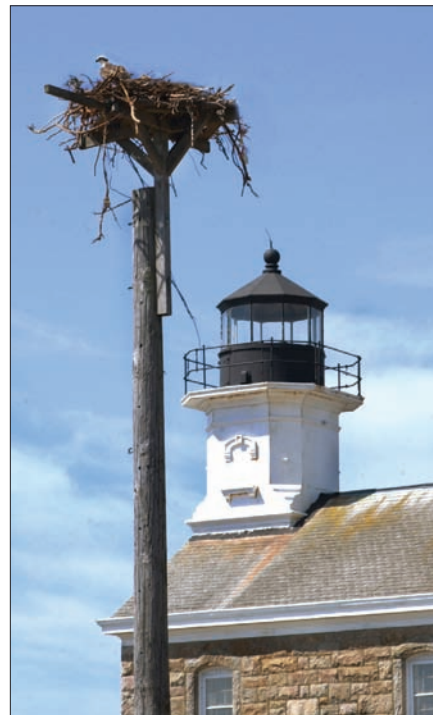
Such concerns are being considered in an Environmental Impact Study (EIS) being conducted by DHS and scheduled for release later this summer. The study is

part of an exhaustive effort to document the potential local, regional and national effects of locating the NBAF at each of the five alternative sites. The evaluation is required by the National Environmental Policy Act (NEPA) and includes analysis of land-use plans, air quality, noise environment, soil characteristics, water resources, surrounding plants and animals, public infrastructure, and waste management.

“This evaluation will be used in conjunction with other factors to assist DHS in identifying the Preferred Alternative in the NBAF Final EIS scheduled for release in fall 2008,” Johnson says. If a decision is made to build the NBAF, the announcement of the final site will be made in the Record of Decision, which will be published at least 30 days after the Final EIS.

Once the decision is made, DHS expects construction to begin as early as 2010 and take approximately four years to complete, with a goal of opening the new facility by 2014.

In the meantime, community advocates in Manhattan, Kan.; Athens, Ga.; Flora, Miss.; Butner, N.C.; and San Antonio, Texas, eagerly await final word from government leaders to determine the fates of their research communities. At press time, Johnson says a site had not yet been selected, adding, “There is no frontrunner.”



▶ A lone osprey nest overlooks a Plum Island lighthouse. This fall, DHS plans to announce the selected site for the new National Bio- and Agro-Defense Facility.