

# Implementation of Recommendations for Using Geographic Information Systems in APHIS

***Recommendation 1: GIS should be recognized as an important methodology in the way APHIS does business.***

## Implementation Plan

### a. Methods to achieve greater recognition of GIS

1. Conduct pilot or demonstration projects designed to showcase the effectiveness of GIS techniques as applied to APHIS' programs.
2. Supervisors need to be made aware of the advantages of GIS methods to support decision making.
3. Present to managers information on the rapid growth of the GIS in industry, governmental agencies, educational institutions, and international organizations.
4. Create new GIS positions in APHIS that are staffed with personnel who have knowledge and experience in using GIS techniques.
5. Develop simple access systems for managers and technical staff to obtain basic geographic data for their specific area of interest.

### b. Building a base of support for GIS

1. Staff in local offices and at field sites need to have a basic understanding of GIS and techniques of working with spatial information.
2. Collection of spatial data needs to become part of routine operations at local offices and field sites.
3. Supervisors need to have the opportunity to compare normal operational information presented in traditional tabular and customized geographic formats.

***Recommendation 2: GIS methods should become an integral part of all levels of APHIS operations.***

Implementation Plan

1. Demonstrate success in using GIS applications in routine operations within program areas.
2. Staff at all levels should have opportunities to be involved with GIS, including specialized training.
3. Administrators should have rapid access to spatial data for the area that they supervise.
4. The precision of spatial data needed by field operations staff should be based on specific technical needs of the mission, project, or investigation.
5. Long-term budgetary planning and support are needed to implement and to maintain GIS initiatives within APHIS units. Costs for start-up, software upgrades, equipment replacement, and GIS personnel need to be supported. In addition, managers need to know that the major expense of GIS is in building the spatial databases and not with equipment purchases.
6. Create a GIS liaison position with the Information Technology community. A liaison person in ITc is needed to improve communication between GIS users and the procurement process.

***Recommendation 3: APHIS leaders should allocate specific resources to support GIS efforts at all levels within program units.***

Implementation Plan

1. Uniform acceptance of GIS methods and support of its operational uses is needed within those APHIS units who are likely to benefit from this technology. The strong base of support for GIS by Veterinary Services' managers in Veterinary Services is a good example of how to achieve greater acceptance. Managers need to remove barriers to GIS software acquisition.
2. A GIS infrastructure in APHIS needs to be defined. Specific roles of managers, operational staff, and GIS staff need to be determined. The type of products to be produced and their use needs to be established early in the implementation process.

3. Levels of GIS need to be understood by managers and users. For example, desktop mapping applications are part of the GIS process, as a means of entering spatial information into the system. However, advanced systems are needed to develop, process, edit, and analyze spatial data. Each level of GIS requires different resources.

***Recommendation 4: A set of guidelines should be established for the proper use of GIS procedures.***

Implementation Plan

1. Informational documents, or fact sheets, should be developed to share experiences and lessons learned in applying GIS methods to APHIS programs.
2. Formal training in the application GIS principles to APHIS' programs is essential, as well as training in the use of specialized GIS software. Training on GIS principles may be accomplished by current APHIS staff, while software training may be given by either current GIS staff, or provided by GIS software vendors.
3. The type of information that needs to be understood by GIS users and managers includes: (a) data types, sources, and quality; (b) precision, scale and resolution; and, (c) formats for data exchange.

***Recommendation 5: A GIS data network should be established within APHIS to include field locations, state-level offices, regional hubs, and national centers.***

Implementation Plan

1. A GIS resource network is needed to enhance communication about GIS, to exchange information about approaches to solving spatial problems, to share data, and to resolve issues of common interest.
2. Issues needing common agreement are: (a) metadata standards, (b) acceptable levels of scale and accuracy, (c) data transfer standards, and (d) confidentiality of information.
3. Consideration should be given to extending a proposed APHIS GIS data network to include other government agencies, universities, agricultural industries, and producers.
4. A GIS, or spatial data, network should be incorporated into surveillance plans, disease tracking systems, and emergency management operations.

5. An APHIS network server should be established in a central location to provide common spatial data files and summary information about GIS methods being used in other units.

***Recommendation 6: One or more centralized, national-level, GIS facilities should be established to provide commonly-used geographic data, to archive spatial data from field sources, to conduct advanced spatial analyses, to offer technical assistance, and to provide training.***

#### Implementation plan

1. A centralized, national-level, GIS facility is needed to provide program support and continuity for all APHIS units. A perfect example of the “One APHIS” concept is the shared use of GIS resources throughout the agency. Therefore, APHIS should formally recognize and establish one or more centralized GIS facilities to lead APHIS in supporting the spatial data needs of all operational units.
2. The establishment of a central GIS facility should be based on advanced technical capabilities and not on distinctions between plant or animal agriculture. Therefore, a GIS center should be able to support the GIS and spatial analysis needs of AC, IS, PPQ, VS, and WS.
3. It is proposed that the GIS section in the Centers for Epidemiology and Animal Health (CEAH) located in Fort Collins, Colorado, serve as a GIS center for all of APHIS. A second center, organized similarly to the one in CEAH, should be established at the Center for Plant Health Science and Technology (CPHST), in Raleigh, North Carolina. After the establishment and formal recognition of the two APHIS centers, a third center should be established in Riverdale, Maryland, for the purpose of communicating spatial analysis data to program managers, commodity analysts, trade economists, and staff supervisors.

***Recommendation 7: APHIS should adopt a geographic data transfer standard to facilitate the exchange of spatial data among APHIS units and to avoid implementing hardware and software standards.***

#### Implementation Plan

1. The first step is to survey GIS users in APHIS to determine the range of data formats that are being used.

2. A suggested common standard for GPS data is decimal degrees, North American datum 1983, with attributes stored in a \*.DBF file format.
3. Recordable CD-ROM disks should be used to transfer large files.
4. The Wide Area Network being developed by ITC should be used to transfer spatial data and analysis results between GIS centers, APHIS headquarters, regional hubs, state or area offices, and ports or field sites.
5. CEAH and CPHST should serve as the spatial data creation and manipulation centers for APHIS.
6. CEAH and CPHST should set the minimum technical specifications for a common computer platform to be used in desktop GIS applications. They should not set absolute standards, which should be determined by the nature of the work being performed.
7. CEAH should produce a newsletter, or an electronic mail posting, that describes new information about data sources, GIS and spatial analysis techniques, status of projects, and general information that would be valuable to GIS users.

***Recommendation 8: In an emergency, a GIS database management system (GIS-DBMS) should serve as the centralized system for data collection, analysis, and reports.***

#### Implementation Plan

1. Emergency programs, in those APHIS units that have such operations, should be included as part of the GIS spatial data network as quickly as possible.
2. Managers of emergency operations should avoid establishing quasi-GIS center just for the purpose of making maps. The GIS section at CEAH should work directly with the information systems staff of the READEO in performing the GIS and spatial analysis work.
3. It is recommended that high-end spatial data products be disseminated from CEAH to take advantage of their facilities and expertise. At the same time, production of spatial data products at lower levels in the agency should continue to be encouraged. However, the end product that is shared throughout APHIS should be of the highest quality possible.
4. CEAH should act as the center for translating or converting data from disparate sources into a standard data exchange format.

***Recommendation 9: In an emergency, two or more people knowledgeable in emergency GIS procedures, with the proper equipment, should be placed on site as quickly as possible.***

Implementation Plan

1. In the case of Veterinary Services, the guidelines for Foreign Animal Disease Diagnosticians (FADD) should be updated to include GIS analysts and GIS specialists.
2. The emergency GIS staff should be on-call 24 hours per day, 365 days a year, and the staff should be ready to be deployed to an emergency site within 24 hours of receiving notification.
3. Emergency GIS staff should be knowledgeable of computer hardware and networks, in addition to special GIS software and sets of spatial data.
4. Emergency program managers and the GIS staff assigned to work in emergency situations should work together to develop a plan of action, including a set of standard operating procedures to implement in an animal or plant emergency.
5. Foreign Animal Disease Diagnosticians need to have a working knowledge of how to properly use GPS receivers under a variety of field conditions.

***Recommendation 10: A set of guidelines should be established for the use of global positioning system (GPS) methods by APHIS staff.***

Implementation Plan

Establish an APHIS team, knowledgeable in the technical and practical aspects of GPS) to develop guidelines by February 1, 1999. The team should include GIS analysts, GIS specialists, and field staff. The guidelines should include:

1. Information and recommendations on the selection of GPS units that are appropriate to the spatial data needs of APHIS programs.
2. GPS data collection should be linked to the data structure of geographic information systems developed by APHIS units.
3. GPS user's training should be provided to ensure that receivers are be used properly and that data are being collected with acceptable levels of accuracy needed for GIS operations.

4. GPS users need to understand how satellite ranging methods fit into operational cartography and when it is appropriate to differentially correct positional data.

***Recommendation 11: Spatial data collected by APHIS program units should contain accompanying information regarding the data's sources, scale, projection, datum, accuracy, processing, and quality.***

Implementation Plan

1. Guidelines for minimum and recommended information about data (metadata) should be developed by the APHIS GIS Coordination Committee.
2. Metadata should be incorporated with, or attached to, project data files.
3. Adoption of minimal standards for metadata should be at a level compatible with metadata guidelines used by other federal agencies.

***Recommendation 12: A user-support group should be formed within APHIS and that meetings of GIS users should be held periodically to discuss technical approaches, analytical concepts, and specific GIS applications being used in different APHIS program areas.***

Implementation Plan

1. Identify one person from each APHIS program area, including one alternate, to serve as a GIS representative. Each APHIS unit may have more than one program area using GIS and every program area should be represented.
2. Communication among representatives of the APHIS GIS coordinating committee should include a quarterly conference call, or other means of sharing information.
3. Annual or semi-annual meetings should be held by APHIS users of GIS methods.
4. The APHIS GIS list server needs to be used on a more regular basis as a source of information.
5. A GIS newsletter, or similar document describing new techniques, should be prepared and distributed regularly by the GIS section at CEAH.

6. Develop an Intranet home page with links to vendors, data warehouses, conference calendars, summaries of APHIS GIS projects, and an e-mail directory of APHIS GIS users.