The U. S. Department of Agriculture

Strategic Spectrum Plan 2008-2009

November 2007

Improving Spectrum Management for the 21st Century

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EXECUTIVE SUMMARY

"It's hard to communicate our rural realities with someone who has not been here to experience it… we need the radios."
- Utah Wildlife Services Specialist

On behalf of the Secretary of the United States Department of Agriculture (USDA), the Office of the Chief Information Officer (OCIO) is pleased to submit the second biennial *USDA Strategic Spectrum Plan: FY2008-2009* to the Department of Commerce, National Telecommunications and Information Administration in response to the November 30, 2004 Presidential Determination: *Improving Spectrum Management for the 21st Century*[1]. This plan updates USDA's progress towards more efficiently and effectively using and managing the federally assigned radio spectrum that supports Government-owned and managed radio systems based on the goals and objectives set out in the previous *USDA Strategic Spectrum Plan: FY2005-2007*. The content contains invaluable contributions from radio and spectrum managers throughout the Department. It is the work performed daily by these professionals that enables USDA to continue to produce this "living document".

[1] *Presidential Determination: Improving Spectrum Management for the 21st Century, The White House, November 30, 2004.*

For a brief description of radio spectrum, Appendix A, *Spectrum Overview*, provides a synopsis of radio frequency spectrum: what it is, how it is used, and how is it regulated.

1.1 SPECTRUM POLICY REFORM INITIATIVE BACKGROUND

In May 2003 President Bush established the Spectrum Policy Initiative to "promote the development and implementation of a United States spectrum policy for the 21st century that will foster economic growth; promote our national and homeland security; maintain U.S. global leadership in communications technology; and satisfy other vital U.S. needs in areas such as public safety, scientific research, Federal transportation infrastructure, and law enforcement."[2]

As one of 12 Federal departments and executive offices that utilize Federal Government spectrum, USDA was a contributing member of a Federal Government Spectrum Task Force. Established at the direction of the President, the Task Force prepared a report containing recommendations on policy reform that would result in more efficient use of federal radio spectrum. USDA submitted comments to the Task Force, some of which were accepted and incorporated into the final report submitted to the President.

"This initiative will foster economic growth; promote our national and homeland security; maintain U.S. global leadership in communications technology; and satisfy other vital U.S. needs in areas such as public safety, scientific research,…"

- President George W. Bush, November 2004

After receiving the federal Task Force report the President issued a second memorandum on November 30, 2004 directing the Federal agencies to implement twenty-four recommendations contained in the two reports[3]. One specific recommendation required each Department to develop an individual strategic spectrum plan for submission to the Department of Commerce by November of 2005. In turn, the Department of Commerce was tasked with the responsibility to consolidate those submissions into a comprehensive Federal plan, which is due to the President six months after receipt of the agency spectrum plans.

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[2] *Presidential Memo: Spectrum Policy for the 21st Century, The White House [press release], June 5, 2003*

[3] *Spectrum Policy for the 21st Century- The President's Spectrum Policy Initiative, Reports 1 and 2. June 2004. Those two reports can be found at www.ntia.doc.gov.*

1.2 APPROACH FOR DEVELOPING THE USDA FY2008-2009 STRATEGIC SPECTRUM PLAN

In the *USDA Strategic Spectrum Plan: FY2005-2007* USDA reported that nine agencies and staff offices currently used radio spectrum. In December of 2007 that number was reduced to eight agencies after the Grain Inspection, Packers & Stockyards Administration made the decision to replace Federal spectrum dependent systems with commercial wireless services. The remaining eight agencies that use Federal spectrum are the:

- Animal and Plant Health Inspection Service;
- Agricultural Research Service;
- Departmental Administration;
- Farm Services Agency;
- Forest Service;
- Food Safety and Inspection Service;
- Natural Resources Conservation Service; and
- Office of the Inspector General.

Spectrum Liaison Officers from each of the eight agencies and staff offices provided updates to this report. Agency Spectrum Liaison Officers are designated by management to represent the agency in all matters pertaining to radio program frequency management, budget planning, and strategic planning.

This updated version of the *USDA Strategic Spectrum Plan: FY2008-2009* includes supplemental information to operational requirements submitted by agency representatives in the *USDA Strategic Spectrum Plan: FY2005-2007*. Spectrum Liaison Officers mapped descriptions of systems, the bandwidth and frequencies, user communities, and the general geographic coverage to previously documented operational uses in Appendix C.

1.3 OVERVIEW

The USDA has operations in all 50 states and Puerto Rico. The majority of USDA radio systems use Land Mobile Radio (LMR) in the 162-174 MHz and 406-420 MHz band. They operate in both analog and digital voice systems that use 12.5 MHz channel bandwidth.

The USDA performs unique and varied business functions. USDA mission-related operations such as firefighting, law enforcement, search and rescue, water supply forecasting, pest eradication, personal safety, remote engineering, studying ecosystems, managing wildlife threats, monitoring crop productivity

and efficiency, weather monitoring, and maintaining the US natural resource inventory, simply cannot be accomplished without the continued use of federally allocated spectrum.

USDA maintains a presence in some of the most remote locations in the country fulfilling its role as a steward over vast stretches of land, which is largely uninhabited by humans, yet critical to preserving our country's delicate ecological systems.

USDA field representatives work in locations where the public switched telephone network and commercial wireless services are unavailable or impractical. Government-owned radios and the federally assigned spectrum they use are frequently the only affordable options to ensure the safety of USDA employees performing business functions in secluded areas. Government-owned radios are often the only tools on which USDA field workers can depend as communications lifeline back to civilization.

USDA field representatives work in locations where the public switched telephone network and commercial wireless services are unavailable or impractical.

As an intangible asset, spectrum is often taken for granted. However USDA considers spectrum the most important communication tool for its mobile workforce, responsible for safeguarding many of the Nation's ecosystems and agriculture assets. Without spectrum, USDA's stewardship of the country's vast natural resources would become much less effective, if not impossible.

USDA performs a role in all fifteen Emergency Support Functions (ESF) found in the National Response Framework, successor to the National Response Plan.

The Framework, which focuses on response and short-term recovery, articulates the doctrine, principles and architecture by which our nation prepares for and responds to all-hazard disasters across all levels of government and all sectors of communities. Should communications infrastructure fail during the course of a major incident or event, radio communications serves as a backup.

The USDA is the ESF Coordinator and Primary Agency for ESF #4, which provides Federal support for the detection and suppression of wildland, rural, and urban fires resulting from, or occurring coincidentally with, an incident requiring a coordinated Federal response for assistance.

The Department is also the ESF Coordinator, Primary Agency and Support Agency for ESF #11, which supports State, tribal, and local authorities and other Federal agency efforts to address: (1) provision of nutrition assistance; (2) control and eradication of an outbreak of a highly contagious or economically devastating animal/zoonotic disease, highly infective exotic plant pest, or economically devastating plant pest infestation; (3) assurance of the safety and security of the commercial food supply (under Department of Agriculture (USDA) jurisdictions and authorities); (4) and the protection of natural and cultural resources and historic properties (NCH) resources when activated by the Secretary for incidents requiring a coordinated Federal response. Commercial communications services are not always available in remote locations where it may become necessary to perform mission essential functions.

The Forest Service is a Primary Agency for ESF #14, which provides a mechanism for coordinating Federal support to State, tribal, regional, and local governments, nongovernmental organizations, and the private sector to enable community recovery from the long-term consequences of extraordinary disasters that in some cases may include damage to commercial telecommunications infrastructure.

USDA has been very active in its role as a Support Agency for ESF #2. In 2006 USDA partnered with the National Communications System to provide a back-up cache of mobile radio equipment for use in conjunction with National Security/Emergency preparedness events out of its National Interagency Fire Center in Boise, Idaho. USDA furnishes the NCS with mobile, easy-to-transport kits that contain radio equipment and portable infrastructure.

Additionally, USDA serves as a support agency for the remaining emergency support functions. Beyond the NRF, the USDA Forest Service regularly performs joint operations with state and local public safety agencies under its firefighting and emergency response missions, and maintains cooperative agreements for mutual aid.

BACKGROUND

1.4 THE PRESIDENT'S INITIATIVE

In June 2003[4], President Bush established an Initiative: *Improving Spectrum Management for the 21st Century,* with the primary goals of developing improvements to the Nation's current spectrum management system, and responding to the rapid development and deployment of advanced technology and services. Throughout its first year, the initiative established a number of committees, conferences, public fora, and research efforts to study current policy, processes and practices for spectrum administration and discover new, improved, and more effective ways of managing the Nation's electromagnetic spectrum. The Department of Commerce and its National Telecommunications and Information Administration (NTIA) were given the primary responsibility to coordinate these activities. The principal goals of the Initiative were to:

- Develop a means to address the critical spectrum needs of national security, homeland security, and public safety
- Facilitate a modernized and improved spectrum management system
- Create incentives for more efficient and beneficial use of spectrum and to provide a higher degree of predictability and certainty for incumbent users, and
- Develop tools to streamline the deployment of new services and technologies, while preserving national security, homeland security, and public safety, and encouraging scientific research.

Initiative progress and recommendations were documented in two reports. The first report[5], *Recommendations of the Federal Government Spectrum Task Force*, and the second report[6], *Recommendations from State and Local Governments and Private Sector Responders,* contained opinions from a variety of government officials and experts at all levels of government, industry, academia, and the public in general. The recommendations from the two reports were designed to "foster economic growth; ensure our national and homeland security; maintain U.S. global leadership in communications technology development and services; and satisfy other U.S. needs in areas such as public safety, scientific research, federal

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[4] *Presidential Memorandum on Spectrum Policy, Spectrum Policy for the 21st Century, The White House, June 3, 2003.*

[5] *Spectrum Policy for the 21st Century – The President's Spectrum Policy Initiative: Report 1: Recommendations of the Federal Government Spectrum Task Force, U.S. Department of Commerce, June 2004.*

[6] *Spectrum Policy for the 21st Century – The President's Spectrum Policy Initiative: Report 2: Recommendations from State and Local Governments and Private Sector Responders, U.S. Department of Commerce, June 2004.*

transportation infrastructure, and law enforcement."[7] Ten major recommendations were presented within the two reports.

The Department of Commerce went to extensive measures to ensure public review of both reports. Subsequently, the White House announced a Presidential Determination issued in November 2004[8] directing executive departments to implement the various recommendations of the two reports. Specifically, each department was tasked to provide agency-specific strategic spectrum plans (agency plans) to the Secretary of Commerce that included, at a minimum:

- Spectrum requirements, including bandwidth and frequency location for future technologies or services;
- Planned uses of new technologies or expanded services requiring spectrum over a period of time agreed to by the selected agencies; and
- Spectrum efficient approaches to meeting identified spectrum requirements.

The heads of the departments are required to update their agency plans biennially and implement a formal process to evaluate their proposed needs for spectrum, including an analysis and assessment of the options available to obtain the associated communications services that are most spectrum-efficient and the effective alternatives available to meet the agency mission requirements.

1.5 USDA'S CONTRIBUTION TO THE DEVELOPMENT OF RADIO[9]

USDA has a rich history of using telecommunications to aid in accomplishing its mission. During the early days of telegraph, telephones, pigeons, mirrors and balloons, the Forest Service found the means to ensure that vital communications associated with its roles and responsibilities for the protection of US forests and wild lands were delivered. Private telephone lines were erected across vast expanses so that fire watches and forest rangers could perform their jobs more effectively. Pigeons and balloons were employed in areas where telephone wires could not be, and aircraft of WWI vintage were flown on aerial fire patrols as early as 1919.

The successful use of radio at the Vermont State Forestry Department in June of 1909 proved that radio could effectively be used to supplement other means of

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7 *Fact Sheet on Recommendations to Improve Spectrum Management, The White House, June 2003.*

8 *Presidential Determination: Improving Spectrum Management for the 21st Century, The White House, November 30, 2004.*

9 *Gray, Gary, Radio for the Fireline: A History of Electronic Communication in the Forest Service, 1905-1975, U. S. Department of Agriculture, Forest Service FS-369, March 1982.*

communications, without having to install miles of wire. A similar use of radio within the USDA Forest Service began in 1916, when Ranger William R. Warner teamed with a high school student, Ray Potter, to construct the first Forest Service radio system in eastern Arizona and western New Mexico. This early experiment was successful enough to convince the Forest Service to do further tests, but wireline communications continued to remain the primary means of communications for a period of time afterward. In the meantime, wireless sets were installed on Forest Service aerial patrols and proved invaluable to their success in spotting and reporting wildfires.

Additional experiments with radio were conducted by the Forest Service throughout the early 1900s, further proving radio's usefulness and flexibility, but the findings were not convincing enough to replace the telephone system. Radio technology was still an expensive and relatively unproven tool for foresters.

Not until 1931 did the Forest Service officially approve further development in the use of radio as a primary means of communications. An Inspector named Dwight L. Beatty, whose interest in radio pushed him to experiment with the technology, gained the approval of the Forest Service and the Interdepartmental Radio Advisory Committee, a committee formed in 1923 to regulate the use of radio in the federal government. He received permission to use specific frequencies (3114, 3172, 3250, and 3286 kHz) for further radio use within the Forest Service.

Many of the innovations in mobile communications that we take for granted today were initiated by USDA rangers and firefighters over the past one hundred years.

Throughout the years that followed, the Forest Service continued to develop, with the cooperation of the military and industry, improved technology to enable rangers and firefighters to perform their duties in a safer, more effective manner. Since those early years, USDA has been at the forefront of innovation for the development and deployment of rugged, reliable portable radio communications and continues to effectively serve the needs of its personnel in the most remote and inhospitable lands in the country. These contributions led to many of the current developments in radio technology.

1.6 THE DEPARTMENT'S CURRENT ORGANIZATION AND MISSION

When President Lincoln established USDA in 1862, USDA's mission was relatively simple: "To Develop and Promote Agriculture in the U.S.". Then, the country was predominantly an agrarian society. More than half of the population consisted of farmers. Today, farmers represent a much smaller percentage of the population, but crop production represents a growing percentage of the US Gross Domestic Product (GDP). In economic terms, farming

accounts for nearly 1% of our GDP[10] making the Agriculture Sector a major GDP product category.

USDA as a Protector and Provider[11]

USDA continues Lincoln's legacy by serving all Americans and directly supporting America's farmers and ranchers. USDA's current organization chart is presented on the next page in Figure 1.6.0.

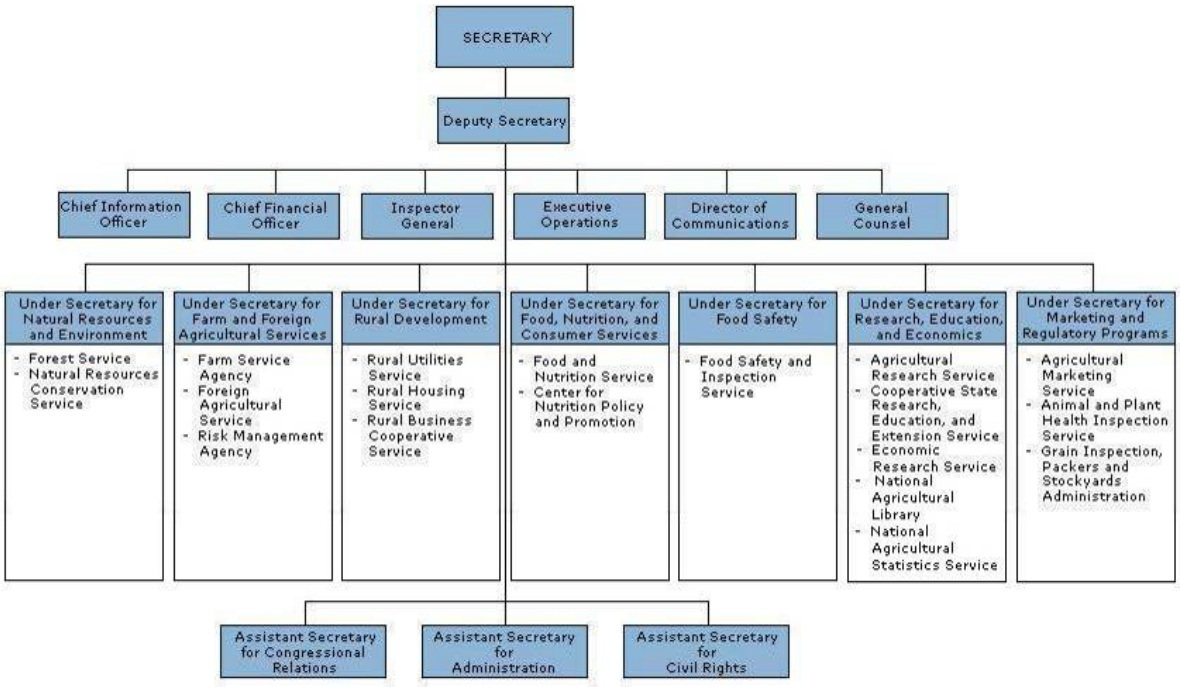

Figure 1.6.0. USDA Organizational Diagram

USDA's role has evolved as: US food production and agricultural products have increasingly entered a global world market; issues surrounding the protection of the Nation's delicate ecosystems have continued to surface; and, the digital divide has deepened. Today USDA has seven well-defined mission areas:

- Farm and Foreign Agricultural Services
- Food, Nutrition and Consumer Services
- Food Safety

10 *http://www.cia.gov World Fact Book*

11 *This background, organization, and mission areas were taken from the USDA Website at www.usda.gov.*

- Marketing and Regulatory Programs
- Natural Resources and Environment
- Research, Education, and Economics
- Rural Development

USDA's mission areas have developed programs in recent years to:

- Lead the Federal anti-hunger effort with the Food Stamp, School Lunch, School Breakfast, and the WIC Programs.
- Serve as the steward of our nation's 192 million acres of national forests and rangelands.
- Manage the country's largest conservation agency, encouraging voluntary efforts to protect soil, water, and wildlife on the 70 percent of America's lands that are in private hands.
- Brings housing, modern telecommunications, and safe drinking water to rural America.
- Ensure the safety of meat, poultry, and egg products.
- Conduct research in everything from human nutrition to new crop technologies that allow us to grow more food and fiber using less water and pesticides.
- Encourage open markets for U.S. agricultural products and provide food aid to needy people overseas.

The following sections provide a brief overview of each individual mission area.

Farm and Foreign Agricultural Services

Farm and Foreign Agricultural Services helps to keep America's farmers and ranchers in business as they face uncertainties associated with weather and market conditions. They deliver commodity, credit, conservation, disaster, and emergency assistance programs that help improve the stability and strength of the agricultural economy. These services are performed by:

- Farm Service Agency (FSA)
- Foreign Agricultural Service (FAS)
- Risk Management Agency (RMA)

Food, Nutrition and Consumer Services

Food, Nutrition and Consumer Services works to harness the Nation's agricultural abundance to end hunger and improve health in the United States.

Its agencies administer federal domestic nutrition assistance programs and the Center for Nutrition Policy and Promotion, which links scientific research to the nutrition needs of consumers through science-based dietary guidance, nutrition policy coordination, and nutrition education.

- Center for Nutrition Policy and Promotion (CNPP)
- Food and Nutrition Service (FNS)

Food Safety

Food Safety ensures that the Nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and properly labeled, and packaged. This mission area also plays a key role in the President's Council on Food Safety and has been instrumental in coordinating a national food safety strategic plan among various partner agencies including the Department of Health and Human Services and the Environmental Protection Agency.

Marketing and Regulatory Programs

Marketing and Regulatory Programs facilitates domestic and international marketing of U.S. agricultural products and ensures the health and care of animals and plants. MRP agencies are active participants in setting national and international standards.

- Agricultural Marketing Service (AMS)
- Animal and Plant Health Inspection Service (APHIS)
- Grain Inspection, Packers, and Stockyards Administration (GIPSA)

Natural Resources and Environment

Natural Resources and Environment ensures the health of the land through sustainable management. Its agencies work to prevent damage to natural resources and the environment, restore the resource base, and promote good land management.

- Forest Service (FS)
- Natural Resources Conservation Service (NRCS)

Research, Education and Economics

Research, Education and Economics is dedicated to the creation of a safe, sustainable, competitive U.S. food and fiber system, as well as strong communities, families, and youth through integrated research, analysis, and education.

- Agricultural Research Service (ARS)
- Cooperative State Research, Education, and Extension Service (CSREES)
- Economic Research Service (ERS)
- National Agricultural Library (NAL) National Agricultural Statistics Service (NASS)

Rural Development (RD)

Rural Development is committed to helping improve the economy and quality of life in all of rural America by providing financial programs to support essential public facilities and services as water and sewer systems, housing, health clinics, emergency service facilities and electric and telephone service. Rural Development promotes economic development by providing loans to businesses through banks and community-managed lending pools, while also assisting communities to participate in community empowerment programs.

Office of the Chief Information Officer (OCIO) Radio Program Oversight

While the spectrum management role within USDA is delegated to the Forest Service, OCIO maintains oversight of the radio program through the Associate Chief Information Officer for Policy.

1.7 USDA'S STRATEGIC PLAN

Goals and Objectives

As the Nation has grown and the agricultural business sector and natural resources management are becoming more complex, the importance of detailed, accurate strategic planning is increasingly important, as reflected in the *USDA Strategic Plan for FY 2005 – 2010* USDA mission and vision statements:

Mission Statement

We provide leadership on food, agriculture, natural resources, and related issues based on sound public policy, the best available science, and efficient management.

Vision Statement

To be a dynamic organization that is able to enhance agricultural trade, improve farm economies and quality of life in rural America, protect the Nation's food supply, improve the Nation's nutrition, and protect and enhance the Nation's natural resource base and environment.

The current strategic plan identifies a number of departmental goals and objectives introduced in Table 1.7.0 below that relate to USDA's general mission areas. Those goals and objectives are further delineated into actionable strategies that define the specific steps necessary to accomplish each goal.

Table 1.7.0. USDA Strategic Goals and Objectives

Strategic Goals	Objectives
Goal 1: Enhance International Competitiveness of American Agriculture	Objective 1.1: Expand and maintain international marketing opportunities
	Objective 1.2: Support international economic development and trade capacity building
	Objective 1.3: Improved Sanitary and Phytosanitary (SPS) system to facilitate agricultural trade
Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies	Objective 2.1: Expand domestic market opportunities
	Objective 2.2: Increase the efficiency of domestic agricultural production and marketing systems
	Objective 2.3: Provide risk management and financial tools to farmers and ranchers
Goal 3: Support Increased Economic Opportunities and Improved Quality of Life in Rural America	Objective 3.1: Expand economic opportunities by using USDA financial resources to leverage private sector resources and create opportunities for growth
	Objective 3.2: Improve the quality of life through USDA financing of quality housing, modern utilities, and needed community facilities
Goal 4: Enhance Protection and Safety of the Nation's Agriculture and Food Supply	Objective 4.1: Reduce the incidence of food borne illnesses related to meat, poultry, and egg products in the U.S.
	Objective 4.2: Reduce the number and severity of agricultural pest and disease outbreaks
Goal 5: Improve the Nation's Nutrition and Health	Objective 5.1: Ensure access to nutritious foods

Strategic Goals	Objectives
	Objective 5.2: Promote healthier eating habits and lifestyles
	Objective 5.3: Improve nutrition assistance program management and customer service
Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment	Objective 6.1: Protect watershed health to ensure clean and abundant water
	Objective 6.2: Enhance soil quality to maintain productive working cropland
	Objective 6.3: Protect forests and grasslands
	Objective 6.4: Protect and enhance wildlife habitat to benefit desired, at-risk and declining species

These six strategic goals mirror the Department's commitment to provide a high degree of public service, cutting edge science, and a dedication to management excellence.

1.8 OFFICE OF THE CHIEF INFORMATION OFFICER STRATEGIC PLAN

The Chief Information Officer (CIO) reports directly to the Secretary of Agriculture. Under the Information Technology Management Reform Act (ITMRA) of 1996, also known as the Clinger-Cohen Act (CCA), the CIO has primary responsibility for:

- Supervising and coordinating the design, development or acquisition, maintenance, use and disposal of Information Technology (IT) by the United States Department of Agriculture (USDA) agencies.
- Monitoring the performance of USDA's IT programs and activities.
- Ensuring that USDA information management is consistent with the principles of the Paperwork Reduction Act (PRA) and with information security and privacy requirements.

The USDA Office of the Chief Information Officer's mission and vision statements are as follows:

Mission Statement

We provide the information technology leadership and governance that enables the programs and operations of the Department to deliver their respective missions in an efficient, effective, and secure manner through the use of information technology solutions and services

Vision Statement

To be a catalyst for change and world class leader in delivering technology solutions and services that directly contribute to mission accomplishment; and an essential partner in business transformation, resulting in excellent customer service, strong partnership, secure infrastructures, and cost efficient performance.

Table 1.8.1 describes four key goals found in the Office of the Chief Information Officer (OCIO) Information Technology Strategic Plan: Version 1.0.

Table 1.8.0. OCIO Strategic Goals and Objectives

Strategic Goals	Objectives
Goal 1: Strategy and Business Alignment - Ensure technology is aligned with the Department's goals and objectives, and supports the Department's ability to meet its mission.	Objective 1.1: Continue Alignment of IT with USDA's Strategic Plan.
	Objective 1.2: Position and Utilize the EA as a Management and Governance Tool.
Goal 2: IT Organization and Skills - Align the IT organization with the needs of the business while promoting employee learning and satisfaction.	Objective 2.1: Ensure consistency in skill levels and service delivery.
	Objective 2.2: Become a center of excellence and employer of choice
	Objective 2.3: Emphasize customer-focused support
	Objective 2.4: Implement Department efforts to streamline and cut costs
	Objective 2.5: Close employee skill gaps
Goal 3: IT Management and Governance - Ensure that budgeted dollars contribute to operational improvements and are spent to support the strategic direction of the Department	Objective 3.1: Tie performance to budget and investment decisions and track, measure and manage performance
	Objective 3.2: Better manage IT-related contracts to maximize value and performance
	Objective 3.3: Continue to improve IT portfolio

Strategic Goals	Objectives
	management
	Objective 3.4: Develop effective and efficient IT reporting processes
Goal 4: Technology and Architecture - Offer a broad spectrum of services, products, and telecommunications technologies	Objective 4.1: Expand Enterprise Architecture
	Objective 4.2: Align infrastructure to directly support strategic business goals
	Objective 4.3: Sustain a robust Information security management program
	Objective 4.4: Participate in government-wide IT solutions and initiatives that support USDA strategic goals

USDA SPECTRUM REQUIREMENTS

1.9 INTRODUCTION

The majority of the Department of Agriculture's (USDA) radio requirements are for conventional land mobile radio systems. These requirements are concentrated in three bands, 162-174 MHz, 406.1-420 MHz, and 1756-1850 MHz. There is also a small but growing requirement in the 30-50 MHz band. Several agencies within the USDA rely heavily on land mobile radio systems to accomplish their missions. The USDA has almost 80,000 radio devices and infrastructure components supporting its varied missions. More than 60,000 radios, consisting of repeater stations, base stations, mobiles and portables, are in the 162-174 MHz band. These systems also support communications with the approximate 800 contracted and owned aircraft flying between 50,000 and 100,000 hours each year. All of these requirements are supported by Channel Allotments that include 64 allotments in the VHF band, 56 allotments in the UHF band, and 69 in the HF band.

1.10 USDA AGENCIES AND OFFICES THAT DEPEND ON FEDERALLY ALLOCATED SPECTRUM

This section of the report describes the eight USDA agencies and staff offices that use federally allocated spectrum to perform their missions and business functions, and provides a brief synopsis of the spectrum required by each. The tables found Appendix C match business functions with radio systems and the spectrum required to support those systems.

1.10.1 Agricultural Research Service (ARS)

ARS Mission Statement:

ARS conducts research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to:

- *Ensure high-quality, safe food, and other agricultural products*
- *Assess the nutritional needs of Americans*
- *Sustain a competitive agricultural economy*
- *Enhance the natural resource base and the environment, and*
- *Provide economic opportunities for rural citizens, communities, and society as a whole.*

ARS Vision Statement:

Leading the Nation towards a better future through agricultural research and information.

ARS is USDA's principal in-house research agency leading America towards a better future through agricultural research and information.

ARS scientists and researchers find answers to serious farm and food related issues such as:

- Protecting crops and livestock from pests and disease,
- Improving the quality and safety of agricultural products,
- Determining the best nutrition for people from infancy to old age,
- Sustaining our soil and other natural resources,
- Ensuring profitability for farmers and processors,
- Keeping costs down for consumers, and
- Providing research support to other federal agencies.

Lasting solutions to these problems are unlikely to have a fast turnaround return-on-investment that might otherwise convince private industry to do the research. ARS staff members pursue scientific solutions that result in the transfer of their findings to society in the form of useful technology and knowledge. ARS

scientists frequently collaborate with research partners from universities, companies, other organizations and other countries.

ARS research is organized into 21 National Programs. These programs serve to bring coordination, communication, and empowerment to the more than 1200 research projects carried out by ARS. The National Programs, focusing on the relevance, impact, and quality of ARS research fall into the following categories:

- Nutrition, Food Safety/Quality
- Animal Production and Protection
- Natural Resources and Sustainable Agricultural Systems
- Crop Production and Protection

ARS Radio Program:

ARS has mobile and fixed radio systems located at ARS research facilities throughout the country where they support farm and agricultural research and scientific exploration. ARS uses the 162-174 MHz and 406.1-420 MHz bands at 12.5 kHz channel spacing for voice communications, hydrologic systems on farms, water well and piping systems, telemetry systems for research data collection, control and security, aerial applications, facility maintenance and operations, GPS telemetry, irrigation system control, data collection, weather systems, personnel safety and administration. Currently, the ARS radio inventory includes: 326 Telemetry Radio Modems, 627 portables, 18 repeaters, 61 base stations, 347 mobiles, 41 DGPS units, and an unknown number of GPS collars for livestock tracking (frequencies shared by a Memorandum of Understanding (MOU) with U.S. Fish and Wildlife Service).

The Radio Program within ARS consists primarily of the following:

- *Mobile Radio Systems*: Repeaters, portable handsets, base stations, and mobile units are used by facilities operations, security and key location personnel, maintenance crews, and emergency response teams. Most communications are ground-to-ground; however, air-to-ground transmissions support aerial application technology.

- *Global Positioning Systems*: GPS is used to collect centimeter-level horizontal and vertical data in real-time to develop digital elevation models and determine the location of soil and crop parameters in support of a variety of agricultural research projects including crop research, soil erosion, water quality and precision farming. Also, GPS collars issued by the Fish and Wildlife Service are used to monitor cattle distribution and behavioral responses to management perturbations on range lands.

- *Irrigation Systems*: Radios are used as communications links to centrally control the water supply for sensitive plant research.

- *Telemetry Systems*: Radios are used to collect research data from isolated sites, which monitor rainfall, water stage, soil moisture and other hydrologic parameters. The data is used to quantify, understand, and model the effects of changing climate, land use and management practices on the hydrologic cycle, carbon cycle, and soil erosion process and watershed resources.

The ARS radio program deploys mobile and fixed radio equipment at ARS research facilities throughout the country, and primarily supports agency employees within the United States. There are however, a few locations where contractors who provide facility maintenance, security, etc. are issued radios.

While ARS has considered sharing spectrum, agency personnel are concerned about assuring continuous delivery of high quality research data without interference, and are hesitant to introduce potential vulnerabilities into their systems. Some field locations indicate that, their systems will be used for Continuity of Operations (COOP).

Commercial Services:

ARS uses commercial mobile radio services (CMRS) to support business functions at their Beltsville Agricultural Research Center to supplement federal land mobile radio systems. While ARS found the CMRS service to be cost effective and widely available, gaps in coverage would not allow complete replacement of their LMR systems. Cellular telephone coverage is spotty in some of the more remote areas where it is needed. Some field offices have investigated spread spectrum and satellite voice services, but to date, nothing has surpassed the current radio system reliability.

ARS uses commercial satellite services for data applications. ARGOS satellite services are described on the ARGOS, Inc. Website as follows:

> The Argos system has been operational since 1978. It was established under an agreement (Memorandum of Understanding) between the National Oceanic and Atmospheric Administration (NOAA, USA), the National Aeronautics and Space Administration (NASA, USA) and the French Space Agency (CNES).
>
> Argos is operated and managed by Collecte, Localisation, Satellites (CLS), a CNES subsidiary in Toulouse, France and Service Argos, Inc., a CLS North American subsidiary, in Largo, Maryland, near Washington, DC, USA.

> Argos lets you locate any platform equipped with a suitable transmitter, anywhere in the world, to within 150 to 1000 meters (using Doppler effect). You can also collect data from sensors connected to the transmitter. Over 10 thousand Argos transmitters are now operating around the world.[12]

The ARGOS frequency band is 401.650 MHz and the bandwidth is 24KHz.

Agency Function(s), program(s), and missions supported by commercial systems include animal production and protection and Continuity of Operations (COOP) communications.

Piscivorous birds (especially double-crested cormorants, American white pelicans, egrets, herons, anhinga, storks, and diving ducks) and other vertebrate predators (notably mammals, turtles, and snakes) can cause significant direct and indirect losses to the agriculture industry. Commercial wireless services are used for tracking migratory birds and mammals to analyze travel and nesting patterns.

Bird depredation research at the ARS Stuttgart National Aquaculture Research Center (Arkansas) focuses on developing cost-efficient methods to minimize bird depredation within the aquaculture industry and to resolve fish-eating bird problems with alternative solutions that minimize human-bird conflicts. Commercial wireless services are used to gather data and monitor the effectiveness of alternative solutions.

The ARGOS satellite is used to monitor bird numbers by air and ground within the catfish production areas of southeastern Arkansas. Satellite data output allows subject matter experts develop and refine bird management plans.

In addition, the ARGOS Office of Homeland Security has approximately 25 Intelsat satellite phones with Iridium service that are being deployed to COOP members for use in emergencies/crises.

Strategic plan:

The ARS Strategic Plan does not directly address spectrum management.

Figure 1.10.0 is an ARS organization chart that shows where the spectrum management function is located. Figure 1.10.1 shows key staff positions and their respective reporting structure including the radio program within the ARS Office of the Chief Information Officer (OCIO).

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[12] *http://www.argosinc.com/system_overview.htm*

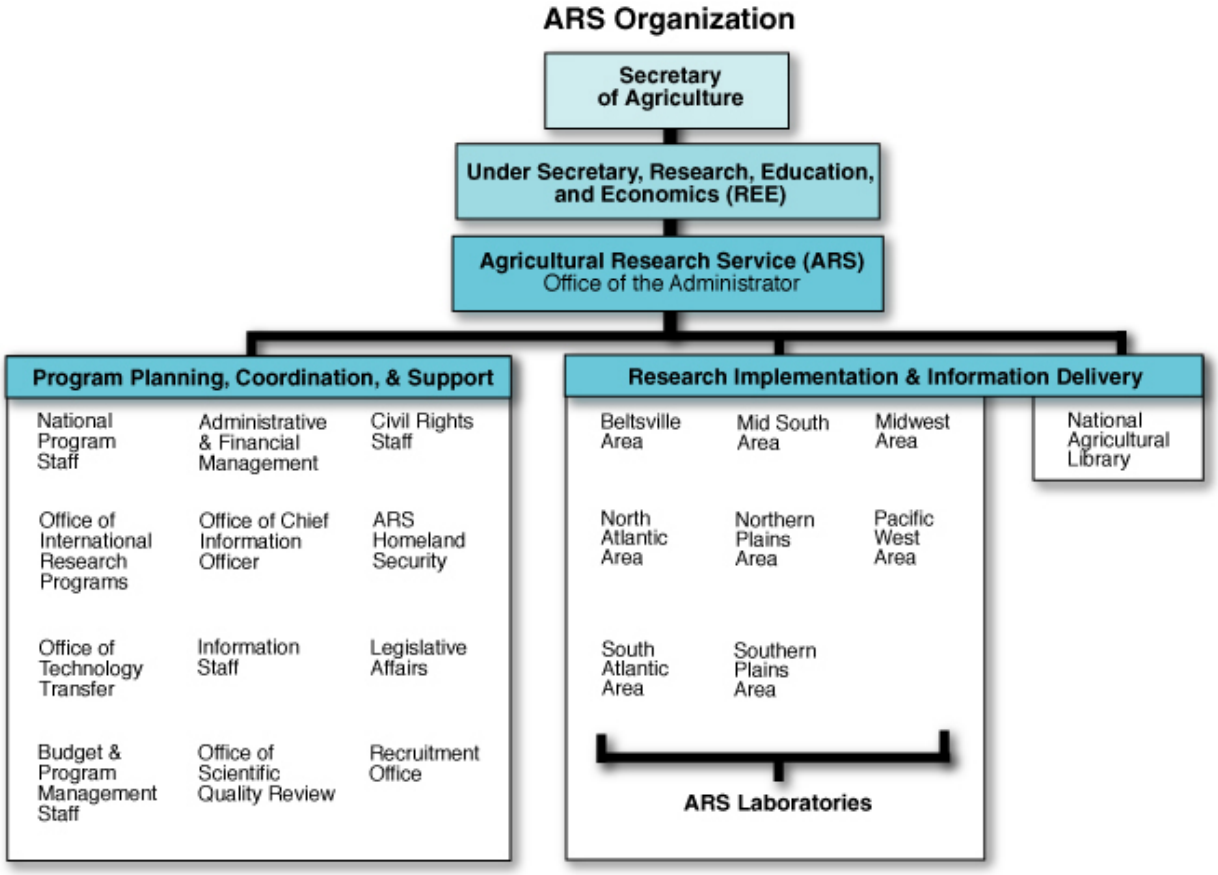

Figure 1.10.0. ARS Organization.

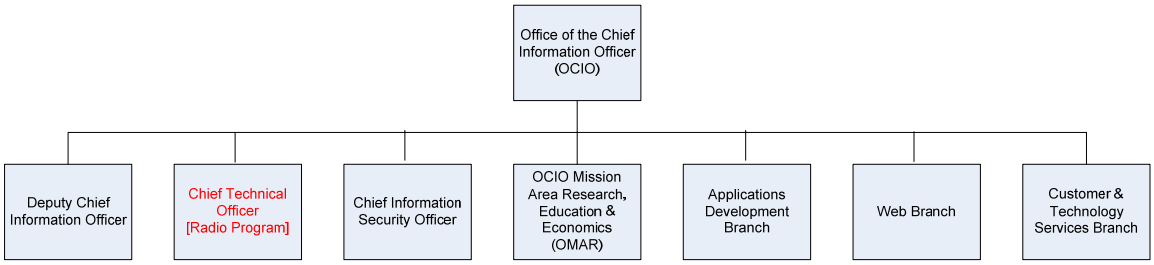

Figure 1.10.1. ARS OCIO functions, including the radio program.

The flow chart in Figure 1.10.2 illustrates how the spectrum management process within ARS works.

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1.10.2 Animal and Plant Health Inspection Service (APHIS)

APHIS Mission Statement:

To protect the health and value of U.S. agricultural, natural and other resources.

APHIS Vision Statement:

APHIS builds and maintains a world-class system that safeguards the health of animals, plants and ecosystems in the United States and fosters safe agricultural trade worldwide, resulting in abundant and affordable agricultural products for U.S. consumers and the rest of the world.

Figure 1.10.3 illustrates the agency's integrated mission across multiple disciplines and stakeholders.

APHIS' Mission:

To protect the health and value of American agriculture and natural resources

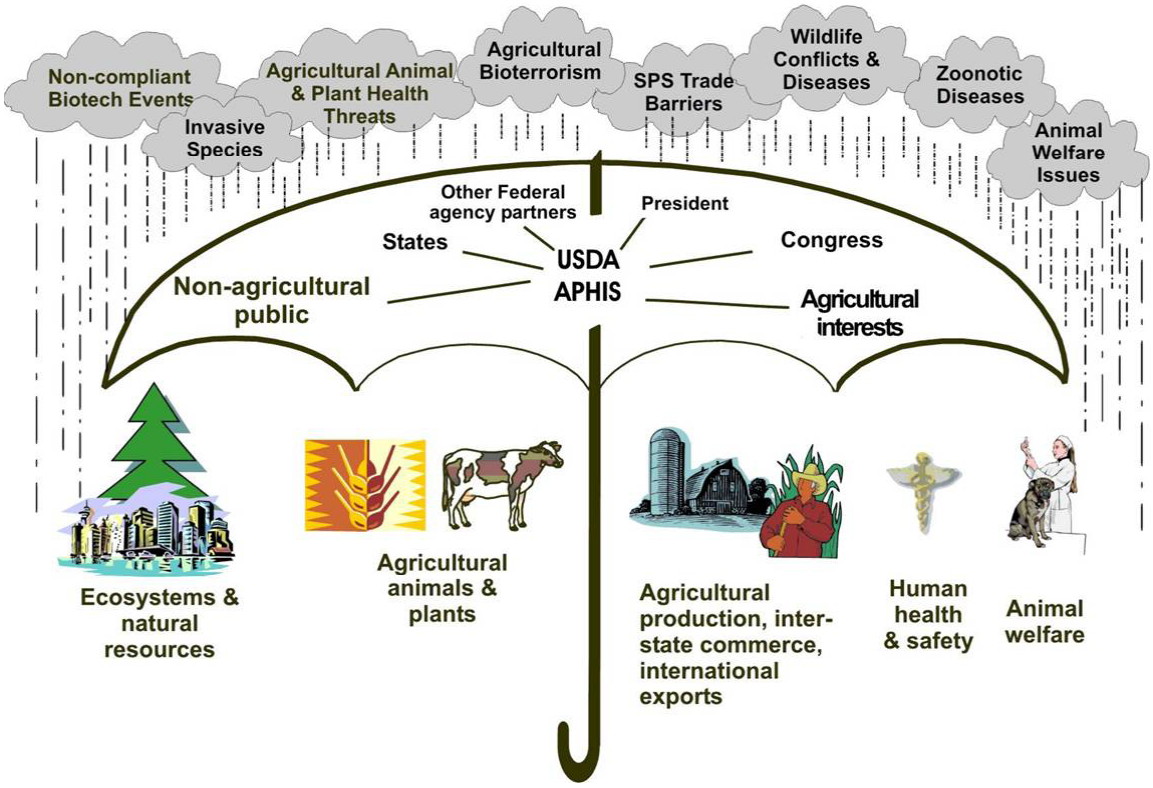

Figure 1.10.2. APHIS integrates multiple disciplines and stakeholders to perform its mission.

APHIS protects and promotes agricultural health by administering the Animal Welfare Act and carrying out wildlife damage management activities. The Animal and Plant Health Inspection Service (APHIS) is responsible for protecting and promoting U.S. agricultural health, administering the Animal Welfare Act, and carrying out wildlife damage management activities.

The APHIS mission is an integral part of U.S. Department of Agriculture's (USDA) efforts to provide the Nation with safe and affordable food. APHIS performs vital operational functions that protect America's animal and plant food resources from agricultural pests and diseases. Without communications between field workers and their local or district offices, APHIS employees would be ineffective in their jobs to prevent threats to our food supply, resulting in serious economic impacts. For example, if Mediterranean fruit fly and Asian long horned beetle, two major agricultural pests, were left unchecked by APHIS, the agriculture business sector could suffer losses of several billion dollars annually in this country. And, if APHIS was not on the job as the first line of defense, 24 hours a day, 7 days a week, animal diseases like foot-and-mouth disease and

bovine spongiform encephalopathy (mad cow disease) could devastate our livestock industry and our food supply. Plant and animal pests and diseases could also cost billions of dollars in trade. APHIS has aggressively and successfully worked to prevent and respond to these situations.

In recent years, because of its technical expertise and good leadership in assessing and regulating the risks associated with agricultural imports, APHIS has assumed a broader role in the global agricultural arena. America's agricultural exports, worth over $50 billion annually, are protected from unjustified trade restrictions.

Congress has expanded APHIS' protective role to include wildlife damage management, the welfare of animals, human health and safety, and ecosystems vulnerable to invasive pests and pathogens. In carrying out its diverse protection responsibilities, APHIS makes every effort to address the needs of all those involved in the U.S. agricultural sector.

Today, Federal frequencies assigned to APHIS support over 2,000 program personnel across the country involved in wildlife disease monitoring, protecting citizens from wildlife related incidents such as mountain lion attacks, respond to citizen requests to control wildlife damage, overseeing field personnel, personnel protection, and controlling or eradicating insect infestation.

The Animal Plant and Health Inspection Service (APHIS) Plant Protection and Quarantine (PPQ) program reports that Federally assigned radio frequencies have been used to support the private sector to assist with pest eradication. Specifically, a Boll Weevil eradication program that has saved the US Economy (in the Southeast alone) over $80 Million and a permanent stream of benefits estimated at $120 Billion over time as a result of the increased production. These benefits to the agricultural industry would not have been possible without frequencies offered by the USDA's Animal and Plant Health Inspection Service in conjunction with the use of some All-Government-Assigned (AGA) frequencies throughout Texas, New Mexico, Arizona, and California. The AGA frequencies are 30-watt frequencies, shared by any government or government approved user, and offer no priority use.

The following excerpt from Agricultural Research, February, 2003 edition provides evidence of the devastation the boll weevil has inflicted on just one U.S. state and the economic impact of a successful eradication program.

What a Difference No Boll Weevil Makes

The year before boll weevils marched into Georgia in 1915, the state produced 2.8 million bales of cotton. Less than 10 years later, Georgia's annual cotton production had fallen to 600,000 bales. By 1983, Georgia cotton production was down to 112,000 bales harvested from 115,000 acres.

But in 1987, Georgia began a boll weevil eradication program. A decade later, in 2000, cotton production in Georgia had rebounded to 1.66 million bales. In this one state alone, the cotton industry, including farms, gins, warehouses, cottonseed oil mills, and textile mills, provides 53,000 jobs and has an overall economic impact of more than $3 billion each year.[13]

The Boll Weevil Eradication Foundation was established to help coordinate eradication efforts including communications support among interested parties. Boll Weevil eradication requires radios for a number of varied activities. One of the most important is setting traps in fields where cellular coverage is not an option. This reduces the amount of pesticide needed to curb the population before it reaches critical mass and spreads to adjacent fields. Other activities involve radio communications with aircraft that apply pesticides.

Federal frequencies were used by state and private industry personnel initially in California and Arizona prior to 1988 for Boll Weevil eradication, at a time when cellular telephones had not been widely adopted and were not available in remote locations. USDA provided the Foundation with four pairs of federal radio frequencies after members were unable to locate FCC frequencies at an affordable cost. At the time, farmers and private industry occupied most of the commercially available frequencies. This minor investment in federal frequencies was critical to eradicating these pests, resulting in widespread crop recovery.

Then, in 2004 and 2005 USDA granted Foundation participants in Texas and the Southeast several hundred thousand dollars for radios because the federal government was required to migrate their systems to more efficient narrowband radios. The existing radios used by the Boll Weevil Eradication Foundation on

[13] *Coppedge, James, Faust, Robert M. (2003, February). We don't cotton to boll weevil 'round here anymore – Boll weevil eradication.* Agricultural Research: News and Events.. *US Agricultural Research Service.*

the federal frequencies supporting the Foundation were not technically capable of operating in a narrowband environment, and could not be upgraded.

Radios are often used seasonally by APHIS employees in response to the unpredictable behavior of grasshoppers or crickets. AHPIS plant protection and quarantine experts describe a circumstance where they were called in to eradicate a huge band of crickets that had overtaken a town and were literally peeling paint off of houses and buildings. Crickets have been treated in situations where they were found to have banded in masses of 3-4 feet wide and a mile long denuding fields with devastating effects. The insects are relentless, building spontaneous chains across rivers and flotillas to navigate waterways. Emergency response efforts involve multiple personnel spread out to coordinate the dissemination of ground bait and aerial treatment. Early detection and treatment at hatch sites is a very effective tool to reduce the impact of this pest. Survey and detection is performed in rural areas that seldom have cell coverage. Detection activities are performed at high elevations, posing greater than normal safety risks to ground personnel. Individuals traveling alone conduct many of the surveys, and communications equipment becomes a safety line. Federal frequencies allow radio users to coordinate localized treatment on an ad hoc basis by deploying portable repeaters along with mobile and portable radios to control very localized infestations. Radios are also mounted in all terrain vehicles because ground access is very limited in the spring due to wet and muddy conditions.

When Mediterranean Fruit Flies threaten to impact California and Florida fruit exports, the first thing on the ground with the response team is the mobile repeater along with portable and mobile radios. These portable radio systems support the rapid delineation of the infestation and a subsequent quarantine that can reduce economic impact. Rapid response can make the difference between short and less costly treatment and a protracted and very costly program.
APHIS systems are used throughout the continental United States, US properties and overseas. In the US, the APHIS radio program specifically supports the APHIS Emergency Operations Centers (AEOC), the Enterprise Services Division (ESD), Investigative Enforcement Services (IES), the Plant Protection and Quarantine (PPQ) business unit, Veterinary Services (VS), and Wildlife Services

(WS). International operations are normally conducted through US Embassies that help manage frequency use.

APHIS Radio Program:

The agency's strategic vision for spectrum management is to maximize frequency utilization of the spectrum by sharing resources with other Federal and Non-government agencies and using new technologies (Project 25 Conventional or Trucking, SDR, etc.) that enhance spectrum conservation.

APHIS radio systems use Land Mobile Radio (LMR) in the 162-174 MHz and 406-420 MHz band. They operate in both analog and digital mode, using both voice and data.

Using frequencies assigned by NTIA, APHIS uses repeaters, base stations, mobile units and portable handsets in a variety of configurations to meet the operational needs of the user community (state offices, district offices, and personnel at various locations in the field). With advances in technology, APHIS is currently involved in prototyping Radio over Internet Protocol (RoIP) connectivity that enables a radio user in the field to transmit information to one or more Emergency Operations Centers (EOC) located in Riverdale, MD, Raleigh, NC, Minneapolis, MN or Fort Collins, CO. Commercial satellite services provide wireless transmission paths to one or more ground stations where they interface into the APHIS IP network.

The primary radio users in APHIS are the Investigative and Enforcement Service (IES), Plant Protection and Quarantine (PPQ), Veterinary Services (VS), Wildlife Services (WS), and MRP Business Services.

In Hawaii APHIS currently has access to a total of six radio frequencies: One (1) standard talk around (radio to radio freq.); three (3) aerial gunning (air to ground frequencies.) and two (2) repeater pairs. Regarding the three air to ground frequencies, all three are necessary in case of common interference occurrences. Specialists are able to quickly switch over to one of the other available frequencies. APHIS has approval from the State to install portable type repeaters on select Island mountain tops. Lack of funding to support the cost of the portable repeaters has slowed the process of purchase.

The APHIS radio inventory consists of approximately 5600 assets. It includes 187 fixed repeaters, 3 transportable repeaters, 200 base stations, 2137 mobiles, and 1360 portables. In addition, to support their Emergency Response program, APHIS has established eight Emergency Deployable Radio Kits, each consisting of 2 trailer/shelter/tower combos with repeater, 4 base stations, 30 mobiles, 60

portables and a variety of accessory equipment. APHIS shares systems with the Department of the Interior (DOI) bureaus, specifically, USFWS. When other DOI bureaus transition their repeater sites to operate in a 'multimode' configuration APHIS will undertake further coordination to access those sites/equipment using the digital mode of operation. APHIS made the decision in 1998 to procure new radios using the Project 25 digital radio equipment. P-25 utilizes state of the art technology, provides a platform for forward migration to 6.25 kHz bandwidth utilization, while allowing for backward compatibility to older analog wideband or narrowband legacy radios still in use by some federal agencies and non-government entities.

APHIS is a 'first response' agency, thus is intimately involved in public safety, resource management, incident response participation and protection of personnel and property. Mission requirements for access, availability and reliability are difficult for commercial service providers to meet.

Over the course of the past year, APHIS has considered alternate technologies with the following results:

- Radio Trunk Systems
  - Cost prohibitive, limited frequency availability and area coverage.
  - High potential for system congestion based on high channel loading.

- Commercial Services
  - On-Demand Satellite Services
    - Although capable of passing high speed voice and data to multiple sites as backup to existing networks, this service is limited primarily to fixed sites.
  - Satellite Telephone
    - Significant costs incurred to procure equipment.
    - Phones have analog voice w/limited, if any, data capability.
    - System security is expensive and difficult to use.

  - Cellular Phone Systems
    - Generally limited or no coverage in rural areas where there is no subscriber base.
    - Limited to no bridging or conference capability.
    - Constant need to redial due to busy signals, etc.
    - Takes an excessive amount of time to connect and pass traffic to personnel.

APHIS is waiting for the final decision regarding north/south border sharing to determine the impact to agency radio users.

Currently, radio does not support COOP communications in APHIS despite the fact that the agency has requested funding every year since 1998 to develop a robust emergency deployable radio cache.

APHIS makes use of the NTIA *Spectrum 21* frequency management software to conduct interference analysis studies and nominate frequencies contained in the USDA allotment plan.

Future Spectrum Requirements:

APHIS does not anticipate any reduction in spectrum requirements for the foreseeable future. To conserve existing spectrum, APHIS seeks to share resources wherever possible and without restrictions to use. It will continue to share radio systems and spectrum with other Federal agencies and/or non-Federal entities where practical and where digital repeaters are operating in the multi-mode configuration. In border areas or outside US&P, APHIS will coordinate with the NTIA and partners on a case by case basis to make arrangements to share spectrum. The agency will invest in P-25 Phase II (TDMA), and Software Defined Radio (SDR) technology. APHIS will continue to purchase commercial services where applicable and affordable.

Current Use of Commercial Spectrum-Dependent Licensed Systems:

Cellular carriers are slowly expanding their network footprints beyond the urban areas where subscriber bases are concentrated, however they are still not expanding rapidly enough to replace radio use in many remote locations served by APHIS field personnel. Radio and cellular systems can compliment one another in some cases, and APHIS would be interested in testing interoperable gateways to extend coverage if wireless carriers made them available.

The agency functions, programs, and missions supported by commercial systems are primarily Seasonal Outbreak Deployments supported by satellite or cellular services that transmit IP traffic to emergency operations centers.

Commercial Services:

APHIS makes extensive use of commercial mobile satellite services to provide ubiquitous coverage in remote areas for multiple mission functions where the expense of establishing and maintaining an LMR system in remote areas is simply not economically feasible. It should be noted that while satellite phones support the communications needed for safety of life, they do not provide interoperability with other USDA personnel.

Future Systems:

APHIS plans to use the AgioSat Commercial Satellite for emergency operations command use and briefcase combination/laptop/phone units for individuals. One prototype unit is currently in use supporting Plant, Protection and Quarantine (PPQ) Eastern Regional deployments.

Evaluation of New Technologies:

APHIS is exploring Software Defined Radios (SDR), multi-band radios capable of operating across multiple frequencies using new waveform technology. APHIS' interest in a SDR is to use it as a command radio for joint incident command (IC) activities without installing large volumes of infrastructure. SDR radios would enable a broad range of participants to use different frequency bands to communicate.

APHIS is evaluating Radio over Internet Protocol (RoIP) for real-time Emergency Operations Center communications. Currently, decision are delayed anywhere from 12 to 96 hours, which is often too long for field personnel in critical situations.

APHIS anticipates that obtaining funding for new technologies will remain a challenge. Radio use within APHIS is not currently a priority, thus has not improved over the past 3-5 years.

Strategic and Capital Planning:

Radio procurements are generally made with end-of-year (EOY) funds. Consequently radio investments do not appear in agency strategic and capital plans.

Recommended Actions for NTIA:

APHIS encourages the NTIA to remove restrictions on government and non-government frequencies that currently cannot be used except for operations other than emergencies or mutual aid.

Process:

APHIS follows a formal radio frequency assignment as presented in Figure 1.10.4.

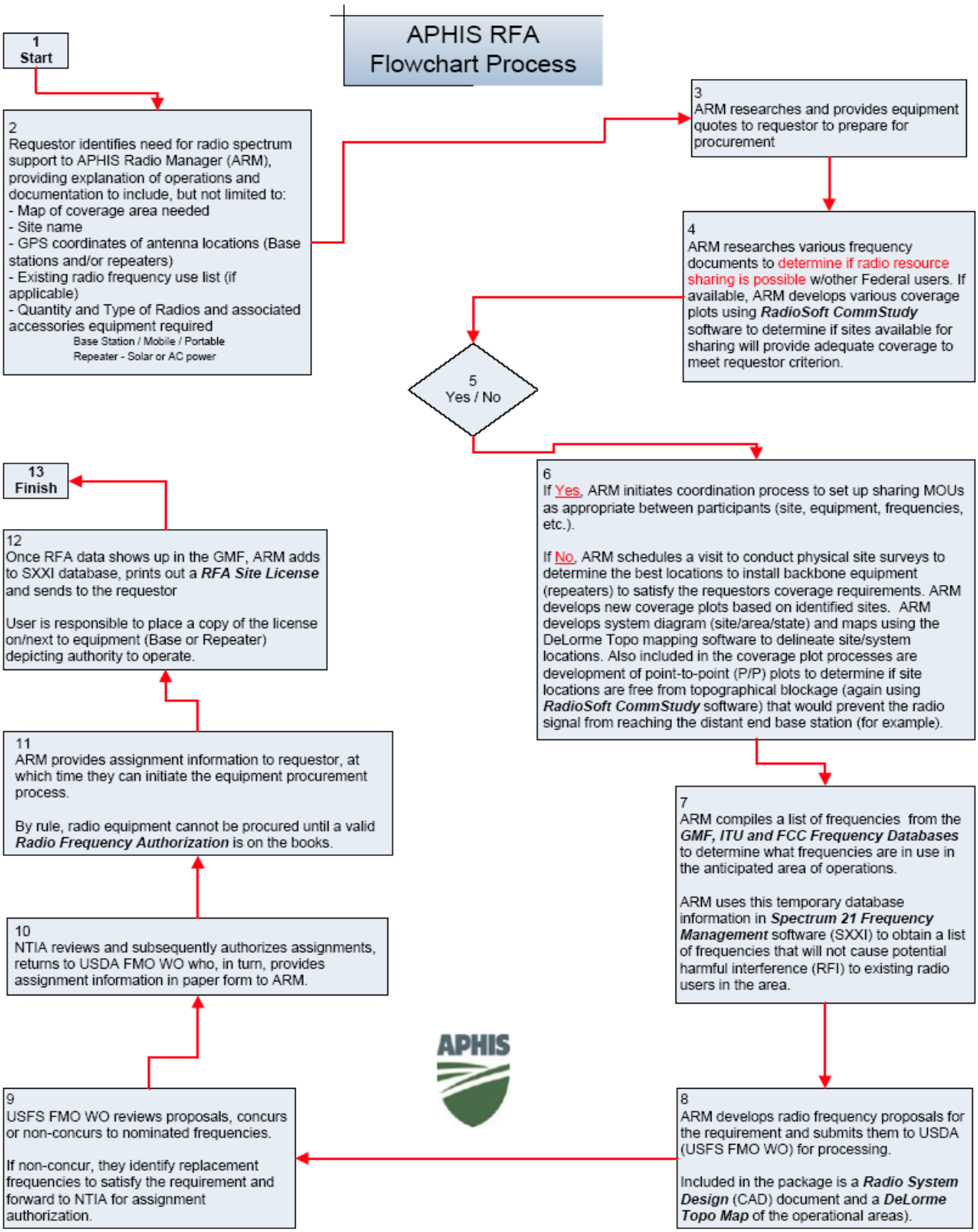

Figure 1.10.3. APHIS radio frequency assignment process.

Organization:

Although the radio management function does not appear in the APHIS Office of the Chief Information Officer (OCIO) organization chart that appears in Figure 1.10.5 the role is performed in the Technology Management Branch.

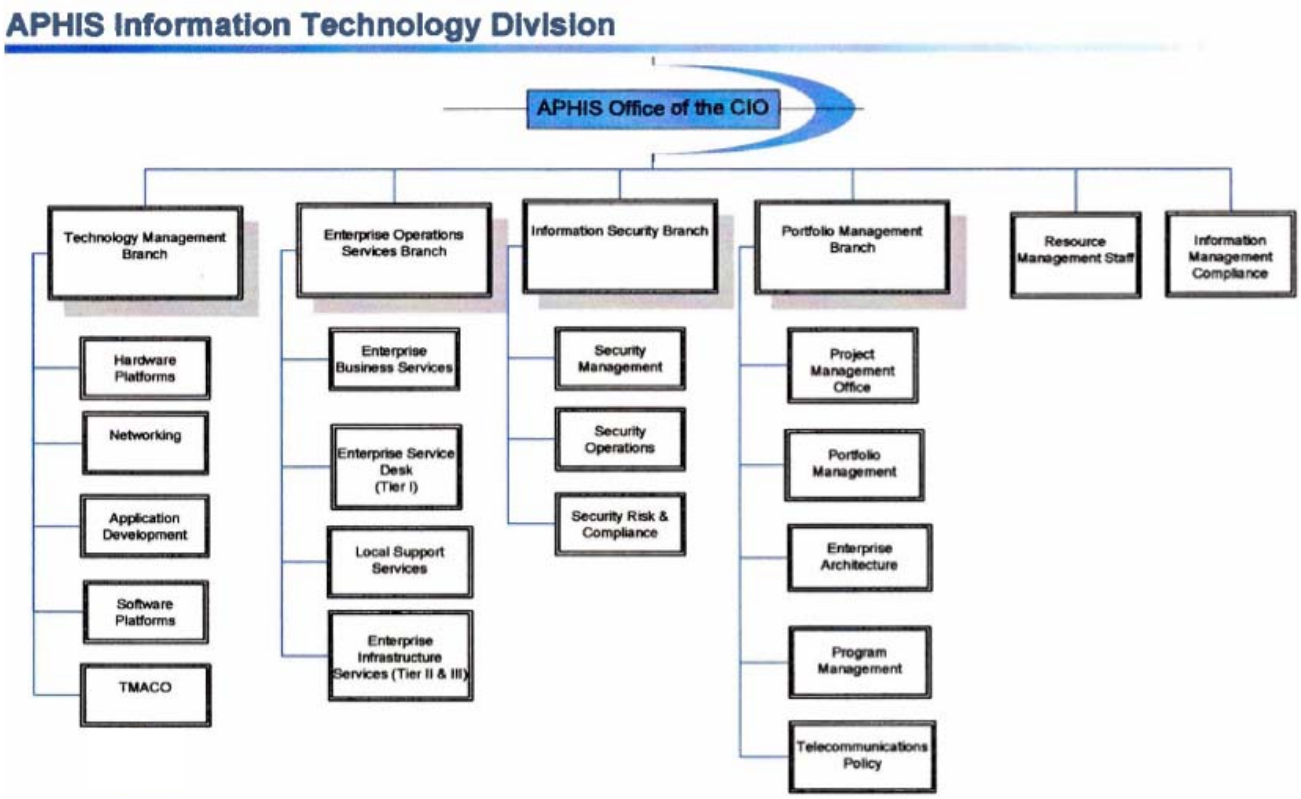

Figure 1.10.4. Radio management is performed in the APHIS Technology Management Branch.

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1.10.3 Farm Service Agency (FSA)

The Farm Service Agency (FSA) administers and manages farm commodity, credit, conservation, environmental, disaster and loan programs as laid out by Congress through a network of federal, state and county offices.

FSA Mission Statement

Equitably serving all farmers, ranchers, and agricultural partners by delivering effective, efficient agricultural programs for all Americans.

FSA Vision Statement

A market oriented, economically viable and environmentally sound American Agriculture delivering an abundant, safe, and affordable food and fiber supply while sustaining quality agricultural communities.

FSA aids farmers and ranchers through its efforts to conserve resources, and provide credit and relief from disaster effects.

The Farm Service Agency was established when the Department was reorganized in 1994, incorporating programs from several agencies. Its mission is to stabilize farm income, help farmers conserve land and water resources, provide credit to new or disadvantaged farmers and ranchers, and help farm operations recover from the effects of disaster. The agency provides price support and disaster assistance, and oversees conservation programs, commodities operations, and environmental compliance programs.

FSA Radio Program:

FSA limits Federal spectrum usage to two portable radio systems, one in Washington, DC and the other in Kansas City, plus a radio telemetry system in Utica, Nebraska. The Kansas City and Washington headquarters offices use spectrum as required.

The Utica radio telemetry system is the only radio system operated on a day-to-day basis. The radio telemetry system functions as a remotely operated control

system in support of a hazardous waste remediation project in Utica, Nebraska. The system controls the operation of spray irrigation systems specifically designed to treat contaminated groundwater and discharge the treated effluent to a wetland basin. The telemetry system links spray rigs to a nearby metrological station and allows the treatment system to operate only under certain prescribed weather parameters (i.e., wind speed and direction, temperature, relative humidity)

The radio telemetry system operates in support of the FSA Conservation and Environmental Programs Division (CEPD) Hazardous Waste Management Program. The mission of this program is to investigate, evaluate, and where required remediate groundwater aquifers that have been contaminated due to past actions of the USDA Commodity Credit Corporation (CCC). For several decades the CCC operated grain storage facilities as part of commodity price support programs. Grain stored at these facilities was routinely fumigated using compounds containing carbon tetrachloride which has subsequently been classified as a probable carcinogen. FSA oversees an active and ongoing CCC program to take the necessary actions at these sites.

Use of this system is limited to those responsible for the operation and maintenance of the remediation system. The coverage of this system is limited to the immediate Utica area.

Transmitting Station

Loc. 40^0 53'51" N, 97^0 20'38" W NAD 83)
Elev. 475.49 meters amsl
Coaxial antenna
0 dB gain
Ht. 8 meters
Non-directional (ND)
Frequency 406.225 MHz

Transmitter location same as above

Receiving Station (first of two)

Loc. 40^0 54'26" N, 97^0 20'52" W
Elev. 480.97 meters amsl
Yagi antenna
3 dB gain
Ht. 4 meters
Orientation 161^0 from N

Frequency 415.225 MHz

Receiving Station (second of two)

Loc. 40^0 55′02″ N, 97^0 20′53″ W
Elev. 477.32 meters amsl
Yagi antenna
3 dB gain
Ht. 4 meters
Orientation 170^0 from N
Frequency 415.225 MHz

A commercial off-the-shelf system was installed at the Utica site.

FSA has made no changes to spectrum management and use since the 2005 Agency Plan submission and does not anticipate any changes to current spectrum use.

The FSA spectrum management function is located in the Conservation and Environmental Program Division. There is one (1) staff position performing spectrum management as a collateral duty.

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1.10.4 Food Safety and Inspection Service (FSIS)

FSIS Mission Statement

FSIS ensures that the Nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labeled and packaged, as required by the Federal Meat Inspection Act, the Poultry Products Inspection Act, and the Egg Products Inspection Act.

FSIS Vision

- *To improve the management and effectiveness of our regulatory programs,*

- *To ensure that policy decisions are based on science,*
- *To improve coordination of food safety activities with other public health agencies,*
- *To enhance public education, and*
- *To protect FSIS regulated products from intentional contamination.*

FSIS protects the public's health through ensuring to the greatest extent possible the safety of meat, poultry, and egg products, both domestic and imported.

FSIS enhances public health and well being by protecting the public from food borne illness and ensuring that the nation's meat, poultry and egg products are safe, wholesome, and correctly packaged. The Food Safety and Inspection Service (FSIS) is the public health agency in the U.S. Department of Agriculture responsible for ensuring that the nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labeled and packaged.

In addition, FSIS ensures that products imported from other countries are produced by a system that is equivalent to that employed by FSIS. FSIS is committed to improving public health through food safety. USDA's Office of Food Safety is committed to improve food safety for American families and plays a key role in the President's Council on Food Safety. The agency has been instrumental in coordinating a national food safety strategic plan among various partner agencies including the Department of Health and Human Services and the Environmental Protection Agency.

FSIS Radio Program:

FSIS fields conventional land mobile radio systems to assist state programs. The bureau operates a small transportable land mobile radio system in the VHF and UHF bands to support nationwide surveillance and investigation communications. It consists of only 14 portables, four mobiles, and two mobile repeaters that are transported to investigation and surveillance sites. The system is predominantly a simplex, mobile-to-mobile operation with limited repeater operations. The system is in need of replacement with state of the art narrowband radios that are interoperable with other federal, State, and local law enforcement agencies. The predominant impediment to improving the radio operation is lack of funding.

Current Spectrum Use for Federal agency systems:

The small transportable land mobile radio system supports nationwide surveillance and investigation communications and state programs on a nationwide basis. It can also be used for Continuity of Operations (COOP) communications if needed.

The system currently operates in the VHF 169-174 MHz band, however, FSIS is coordinating with the Forest Service to obtain new assignments as the agency is in the process of replacement of their old equipment to meet narrowband requirements.

Commercial services:

Commercial services are used as alternative technology where possible.

Future Spectrum Requirements:

FSIS plans to keep the current systems. There is no immediate plan to expand. Without this mobile system, the Food Safety and Inspection Service's ability to conduct nationwide surveillance and investigation communications would be adversely impacted. The agency would require significant additional funds to contract out for these communications services or purchase commercial wireless encrypted services.

New Technologies for Agency Spectrum Dependent Systems:

FSIS is evaluating BK/Radio D Series digital portable DPHX5102X radios. Digital portable radios will enhance FSIS communications and nationwide surveillance operations and investigations. It has been a challenge to obtain the organizational support to fund and deploy these new radios.

Organization:

The spectrum management function falls under the Food Safety and Inspection Service, Office of the Chief Information Officer, Computer and Networking Support Division, Telecommunications Branch. The Telecommunications Branch works directly with that program regarding frequency assignments. Since FSIS only has one program that uses radio frequencies, agency requirements are incorporated into the Forest Service strategic planning processes. Figure 1.10.6 illustrates where the Computer and Networking Support Division is situated in FSIS.

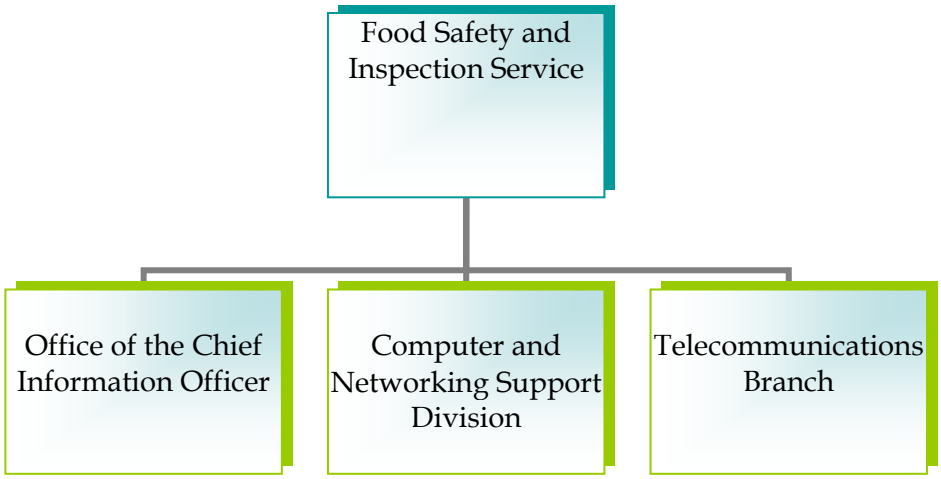

Figure 1.10.5. The FSIS radio management function is located in the Computer Networking Support Division.

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Rick.Utt@USDA.gov

1.10.5 Forest Service (FS)

FS Mission Statement

To sustain the health, diversity and productivity of the nation's forests and grasslands to meet the needs of present and future generations.

FS Values

The Forest Service

- *Cares for the Nation's forest and grassland ecosystems.*
- *Values the varied skills and contributions of a diverse workforce.*
- *Strives for accountability by every employee for the efficient management of the capital resources he or she uses.*

- *Is responsive to national and local interests.*
- *Is focused on the needs of future generations.*

The Forest Service sustains the health, diversity and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.

Established in 1905, the United States Department of Agriculture Forest Service is the largest forestry research organization in the world, and provides technical and financial assistance to state and private forestry agencies. It manages national forests for the sustained yield of water, forage, wildlife, wood, and recreation.

Forest Service managers enable citizens to share and enjoy the forest, while conserving the environment for generations yet to come. The Forest Service motto, "Caring for the Land and Serving People," captures the spirit of their mission, which focuses on five main activities:

- Protection and management of natural resources on National Forest System lands.
- Research on all aspects of forestry, rangeland management, and forest resource utilization.
- Community assistance and cooperation with State and local governments, forest industries, and private landowners to help protect and manage non-Federal forest and associated range and watershed lands to improve conditions in rural areas.
- Achieving and supporting an effective workforce that reflects the full range of diversity of the American people.
- International assistance in formulating policy and coordinating U.S. support for the protection and sound management of the world's forest resources.

<u>FS Radio Program:</u>

The Forest Service has an extensive radio program to support its broad mission. Wildland fire fighting and law enforcement are the two Forest Service business

functions that most depend on the radio program, however, other programs within the Forest Service also utilize radios for employee safety and cost effective operations. These include engineering, timber, recreation, wildlife tracking and management, and data collection from and inspection of remote weather stations, snow pillows and stream flows.

The Forest Service (FS) uses more than 85% of the Department's overall radio resources in support of its mission to protect and manage over approximately 192 million acres of public land. This includes 155 national forests, wilderness areas, national grasslands, national primitive areas, national scenic and research areas, national wild and scenic rivers, national recreation areas, national game refuge and wildlife preserves, national monument areas, national historic areas, and national volcanic monument areas.

Over 60,000 Forest Service radios support incident communications such as wildlife firefighting, law enforcement, and emergency disaster response (earthquakes, volcanic eruptions, hurricanes, etc.). On average, the FS manages radio frequencies for the operations of the approximately 500 contract helicopters involved in wild land firefighting. Law enforcement activities in drug control alone require communications support for an average of 300,000 petty offense violations and over 2000 arrests annually. Other system uses include administrative and operational activities associated with timber production, watershed and water supply, wildlife and grassland conservation, and forest research.

An additional 6,500 additional pieces of radio equipment are devoted to the support of other agricultural, hydrologic, and research activities. The increasing communications needs of the Natural Resources Conservation Service (NRCS), the Animal and Plant Health Inspection Service (APHIS), and other USDA agencies have resulted in a rapid increase in the numbers of radios. Examples are the NRCS Meteor Burst Hydrologic system in the West and APHIS' border, airport, and port inspection, animal disease control, and plant protection and quarantine activities.

Recreation Management requires radio communications to coordinate support for over 330 million visitor days per year involving 5,885 campgrounds, 328 swimming developments, 1,222 boating sites, 250 winter sports sites, 124,600 miles of rivers, and 369,000 miles of roads.

Law Enforcement communications supports investigation and enforcement of wild land arson, archeological theft, timber theft, illegal drug activities, and access and control of wildfire areas. Of special interest is the "urban" environment of some national forests during recreation season. There is a

substantial requirement in law enforcement support of vehicle traffic, personal property theft, and domestic violence.

Incident Support communications supports incidents such as wildfires, earthquakes, hurricanes, volcanic eruptions, oil spills, and nuclear disasters. In 1996 alone, over 6,000 radios were issued at an average of seven times each.

Aviation communications support coordinates aircraft operations for fire management and suppression. This includes an owned fleet of 42-fixed wing (air tankers, lead planes, air attack, smokejumper, infrared scan) and one rotary. A contracted fleet - 39 fixed wing aircraft (air tankers, air attack, and smokejumpers) and 505 rotary wing aircraft. Most are used in support of wild land firefighting; however, some are also used to transport personnel and equipment to support other incidents.

In many such cases, through co-operative agreements the Forest Service shares its communications assets with state and local agencies in these areas to conduct search and rescue or provide emergency medical aid when that agency has no communications in the area.

The Forest Service workforce is very mobile, especially for fire support, where employees regularly move from unit to unit. What this means is that an employee in Oregon may be in California, Arizona or Colorado tomorrow on a fire assignment. This is also true of employees in other program areas as well.

Given this requirement and the fact that frequencies assigned are not the same in different areas of the country, Forest Service personnel require the use of radios

that can be programmed in the field. Another specific agency requirement for their portable radios is that they must operate on alkaline batteries with an acceptable battery life if chargers or power sources are unavailable to recharge them.

The law enforcement and investigative segment of the organization has a need to operate in an encrypted mode. This requirement has increased in recent years as more organized drug operations have moved into our National Forests.

They use a simple repeater technology to extend the range of mobile and portable radios. There is some use of digital encrypted system by law enforcement. In both Fire and Law Enforcement, spectrum is shared between government and non-government users. This sharing allows coordination between users and dispatch service. Systems are also shared between the Department of the Interior and the Forest Service.

Commercial power is not available at many Forest Service fixed radio electronic sites. These sites are generally very remote and powered by solar energy. As a result Forest Service uses radios designed for low current operations. Forest Service actively works to implement cost effective sites with the lowest possible visual impact, making the use of trunked radio systems impractical.
The Forest Service's radio requirements involve primarily conventional land mobile radio systems. These requirements are concentrated mainly in three bands, 162-174 MHz, 406.1-420 MHz, and 1710-1850 MHz. There is also a small but growing requirement in the 30-50 MHz band. Forest Service has more than 70,000 radios supporting its varied missions. More than 60,000 radios consisting of repeater stations, base stations, mobiles and portables, are in the 162-174 MHz band. These systems also support communications with the approximate 800 contracted and owned aircraft flying between 50,000 and 100,000 hours each year. Current inventory of FS radio equipment includes: 47,391 portable radios, 21,193 mobile radios, 2,378 repeaters, 617 cross band base stations, 717 licensed and part 15 microwave terminals and 865 other types of radios for an agency total of 75,630.

The Forest Service has had a stable infrastructure to support FM land mobile communications for a number of years. The agency has installed and maintained

radio systems in National Forests since the early 1900s[9]. All National Forests have extensive FM land mobile radio systems to assure the safety of Forest employees and visitors. There is very little new system expansion required in these systems. Future radio procurements are for maintenance and system redesign. Maintenance replacements are scheduled for 10-15 years dictated by service life, availability of repair parts, and obsolescence. Prior to replacement, systems are reviewed to determine whether technical alternatives are available to provide better or more cost-effective system coverage, such as commercial system support, or sharing radio resources with other agencies.

Since the land the Forest Service protects is predominantly very rural with very low population densities where commercial systems are not available the Forest Service often shares its systems with other government agencies. In fact, USDA, along with other agencies, is working with the Department of State to establish radio spectrum sharing arrangements with both Mexico and Canada.

NIFC, NIICD, and the National Fire Cache:

Fire Camp

The USDA is primarily responsible for Emergency Support Function (ESF) #2 in the Federal Response Framework (FRF). ESF #2 performs firefighting functions for emergency response when needed. The Forest Service provides primary detection and suppression of wild land, rural, and urban fires resulting from or occurring coincidentally with major disasters or emergencies requiring federal response. The National Interagency Fire Center (NIFC) in Boise, Idaho, is where Forest Service helps to manage and maintain a National Incident Radio Support Cache and a National Fire Supplies and Equipment Cache. These caches of radios and equipment are available and regularly used in support of the FRP. The Forest Service has secondary support functions in six additional ESFs. Radio communications are required to perform each of these functions.

The Forest Service also supports ESF #2, the communications support function that provides radio communications systems support for firefighters, law enforcement officers, and disaster response operations. This includes the additional radio systems required for the establishment of a Disaster Field Office (DFO) radio net. NIFC also makes considerable use of other federal, State, and local spectrum to complement its assets during major wildfires.

Efforts to assist in the aftermath of Hurricane Katrina serve as examples of Forest Service's role in response to a natural disaster. A press release described the activities of Forest Service and interior agency partners as follows:

National Interagency Fire Center Provides Response Teams, Crews to Assist FEMA in Hurricane Efforts

Boise – The National Interagency Fire Center is joining in the massive response effort in the wake of this week's Hurricane Katrina. As of today, more than 1,000 people, Management, National Park Service, representing Department of the Interior agencies, including the Bureau of Land Bureau of Indian Affairs, and the U.S. Fish and Wildlife Service, along with the U.S.D.A. Forest Service and the National Association of State Foresters, have been mobilized to support the relief effort.

"Although wild land fire is our primary focus, we are organized to respond to all types of emergencies and we have the expertise needed to manage large, complex incidents," said Phil Street, fire director for the U.S. Fish and Wildlife Service and spokesman for the National Multi-Agency Coordinating group.

Incident Management Teams, hand crews, logistics specialists, and other support personnel are responding to assist FEMA at sites from Georgia to Florida, Louisiana, Alabama, and Mississippi. "We are participating at all levels of the incident response," Street said. "We have crews there with skilled sawyers to help remove damaged and fallen trees, along with management and logistics teams to manage staging areas for distributing supplies, and more. We also have planning teams in place that are assisting with long-term recovery planning."

Wildfire suppression is built on a three-tiered system of support - the local area, one of the 11 geographic areas, and finally, the national level. When a fire is reported, the local agency and its firefighting partners respond. If the fire continues to grow, the agency can ask for help from its geographic area. When a geographic area has exhausted all its resources, it can turn to NICC at the

National Interagency Fire Center (NIFC) for help in locating what is needed, from air tankers to radios to firefighting crews to incident management teams.
In collaboration with the NIFC, the Forest Service has a variety of programs to help State and rural firefighters enhance their departments with equipment, training and communications.

More on the NIFC can be found at:

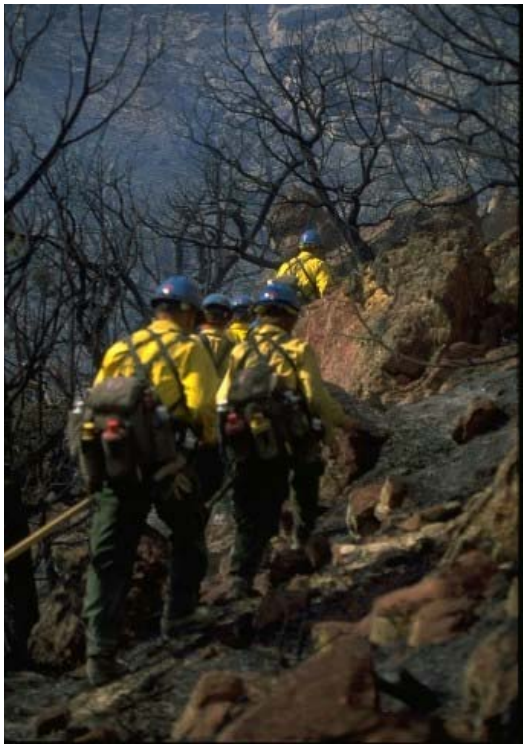
http://www.nifc.gov/nicc/administrative/nmac/radio_com/radio_rpt.html

National Multi-Agency Coordination Group (NMAC):

The NMAC is comprised of representatives from the Bureau of Land Management, Bureau of Indian Affairs, National Park Service, Forest Service, U.S. Fish and Wildlife Service, Federal Emergency Management Administration, and the National Association of State Foresters.

The NMAC group at NIFC prioritizes and allocates resources when there are critical shortages of national resources such as smokejumpers, air tankers or Type 1 Incident Management Teams (IMTs).

The FS utilizes the 406.1-420 MHz band to a lesser degree than the 162-174 MHz band however; it still plays a major part in USDA's activities. The NIFC maintains portable system caches in this band for short-range communications at fire camps and for operations bases at other incidents. Equipment in this band is also used for interconnecting repeaters, base stations, or telephone lines where wire line circuits or microwave are not cost effective.



In fighting wildfires NIFC has organized its spectrum assets to support this critical public safety function and maintains the National Incident Radio Support Cache channeling plan. The cache primarily contains frequency agile radios, which allow the Communications Unit to add or change frequencies as needed.

In most incidents, many of the local Land Management agency's frequencies play a role in the communications plan. During extremely large incidents, additional frequencies may be temporarily assigned to aid firefighters throughout the course of the incident and are released once operations are ceased.

In many instances the Communications Unit and Incident Command may both be unaware that unapproved frequencies are in use. Unassigned frequencies are mostly used on an “ad hoc” basis as "squad" or "crew" frequencies. These are usually frequencies used by the unit at home. i.e.: A Hotshot crew from the Coconino National Forest, may be using the Coconino National Forest simplex frequency to coordinate internally, even though they are fighting a fire in Utah. This can lead to problems, as many frequencies are re-used by completely different agencies in other areas. e.g.: BLM units from Idaho use frequencies that are used by the FBI most everywhere else in the nation.

During the past several years, NIFC has engaged in a number of incidents that have taxed USDA’s spectrum assets. However, the NIFC satisfied the need for additional temporary frequencies taking action in a timely and efficient manner. These incidents included:

- 2002, Biscuit Fire Complex, Southern Oregon, Northern California. NIFC frequencies were over-extended. NIFC requested and obtained temporary frequencies from NTIA (through FS and Interior) and the FAA.

- 2003, Montana, 55 major fires in and the Missoula and Kalispell area. NIFC frequencies were over-extended. NIFC requested and obtained temporary frequencies from NTIA (through FS and Interior) and the FAA.

- 2004, Alaska, Washington, and Arizona major fires, Florida, Georgia, and Alabama hurricanes. NIFC frequencies were over-extended, requested and obtained temporary frequencies from NTIA (through FS and Interior) and the FAA.

- 2005, Arizona, Nevada, and Utah major fires. NIFC frequencies were over-extended, requested and obtained temporary frequencies from NTIA (through FS and Interior) and the FAA.

National Interagency Incident Communications Division (NIICD):

In order to more effectively manage interagency emergency communications USDA Forest Service participates in a partnership with Department of Interior agencies in the National Interagency Incident Communications Division (NIICD) of the National Interagency Fire Center. NIICD equipment and personnel have been utilized for hurricanes, floods, earthquakes, volcanic eruptions and oil spills, as well as other natural disasters where Federal assistance is required.

During emergencies, a Communications Duty Officer (CDO) maintains the capability to respond with frequencies, equipment, and personnel to any type of natural or man made incident regardless of the agency involved. The CDO coordinates frequencies with the USDA Forest Service, Department of the Interior, and Federal Aviation Administration Frequency Managers. Priorities for response are established by the NIICD Division Chief based on direction from the National Interagency Fire Center's Governing Board in coordination with the National Interagency Coordination Center (NICC). Non-emergency support includes providing temporary frequencies & coordination to the field.

NIICD's engineering staff is currently involved with the Department of the Interior (DOI)/Government-wide Digital Narrowband Radio Contract. Efforts include serving as the interagency fire technical representative to DOI's contracting committee and functioning as fire's technical expert on EIA/TIA-102 (APCO Project 25) digital technologies. The branch engineer is also a member of the Telecommunications Industry Association (TIA's) Land Mobile Radio Committee (TR8) for digital radio and the Interoperability Working Group.

Increased sharing with federal or state and local agencies.

USDA has been sharing spectrum with other federal, state, local and tribal agencies for many years. In fact, representatives of NIFC believe they have maximized sharing opportunities by establishing Memorandums of Understanding at every level of the government throughout the country. NIFC representatives recently indicated that sharing today goes beyond government agencies. Increasingly, federal personnel are sharing frequencies with contractors and local cooperators who support the firefighting effort.

Sharing spectrum and radios with federal, state, local and industry partners is the single best short-term approach for USDA to achieve spectrum efficiency today. In many remote parts of the country, USDA's spectrum dependent radio infrastructure is the only telecommunications technology available for shared use when fighting wild land fires. Where cooperators are unable to furnish their own radios with USDA assigned frequencies, USDA distributes radios from a national cache, which are returned and refurbished after each incident.

USDA is committed to working closely with the Department of Interior (DOI) to improve radio support services and frequency management; and integrate business processes and policies. USDA and DOI personnel share field offices, and some firefighters work for both organizations. The Chief Information Officers of both agencies met with radio managers and firefighters at the jointly run National Interagency Fire Center located in Boise, Idaho in late August to

identify what issues need to be addressed in order to improve information technology support for wild land firefighting operations.

Internally, USDA bureau Chief Information Officers (CIOs) have met to discuss the shared use of the National Interagency Fire Center (NIFC) radio cache for mission critical operations. For example, the CIO of the Forest Service met with the CIO of the Animal and Plant Health Inspection Service (APHIS) about utilizing NIFC radio resources for intermittent animal or insect quarantine and eradication efforts. Currently APHIS maintains a radio system. An arrangement that would allow APHIS to move its mission critical radio traffic to NIFC systems could enable APHIS to reduce the size of its national radio system footprint to support routine operations only.

Future plans:

Within the next few years the Forest Service plans to deploy next-generation Radio Control over Internet Protocol (RCoIP) systems to replace radio links using the 1710-1755 MHz auctioned by the FCC. The displaced infrastructure was made up of microwave systems primarily used to carry radio control signals. The USDA Forest Service plans to install alternative replacement systems that will continue to perform radio control functions. These Radio over Internet Protocol (RoIP) systems will eventually interface with the Forest Service's and USDA's corporate networks and a variety of software applications. They will be based on standard Internet interfaces allowing for seamless interoperability with other systems that are Internet capable. In addition to seamless interface and the ability to add additional systems easily, the new technology allows systems to provide faster and more efficient transmissions with data delivery guarantees, maintain data records of transmissions, and results in a lower cost of ownership.

Firefighting and Aviation missions may require additional dedicated nationwide wideband spectrum to support aircraft downlinks to map fires using real-time infrared technologies and video; and additional incident command frequencies may be needed to support large-scale incidents.

Commercial services:

The bureau uses cell phones where available, commercial satellite systems to support fire and non-government spectrum to provide dispatch service to its law enforcement officers.

The Forest Service is increasingly installing leased lines to supplement LMR infrastructure where point-to-point links are not economically feasible, or where legislation (e.g. 1710-1755 MHz) has forced relocation of these links.

Advanced Geographic Information System equipment is becoming a very useful tool in fighting wildland fires.

The Forest Service has replaced over thirty percent (30%) of its links between dispatcher systems and remote radio system controller sites with commercial landlines. These conversions result in a lower total-cost-of-ownership and save the FS $4K per system annually, since the FS is no longer paying the recurring labor and equipment costs for maintaining, upgrading and replacing repeaters used for wireless links. The FS plans to continue this conversion to commercial services as infrastructure supporting similar links reaches the end of its lifecycle.

USDA examined fiscal year 2006 and 2007 commercial wireless service expenditures for FS firefighting emergency suppression activities based on accounting budget object codes, and found that the use of commercial wireless services more than doubled in 2007.

It is possible that the increase reflects a rise in the use of contractors who provision NIFC fire camps. Contractors use commercial services for routine fire operations such as ordering equipment and local supplies. Contributing factors in addition to the increase in contractor personnel may be the sharp increase in wild land fires in 2007.

The Forest Service also deploys GIS via commercial satellite broadband technologies to assist with battling large fires. The technology allows firefighters to: save money by not performing unnecessary tasks; improve safety by accurately identifying hazardous areas; improve decision making by confirming human observations with hard data; save time by reducing the extent of physical reconnaissance efforts; and, reduce individual "learning curves" as new fire

management personnel are brought into a fire or as the scope of a fire broadens across jurisdictions.

The Forest Service is currently exploring the use of software-defined radios (SDR), which can tune to a wide range of frequency bands and receive modulation across a large frequency spectrum by means of a programmable hardware and software controls. This technology could greatly improve interoperability with other Federal, state and local agencies.

The Forest Service encounters challenges in using cellular service. While cellular service has been identified as a possible alterative to USDA's communications systems, coverage in remote locations is limited. The vase majority of the area that the Forest Service operates in is remote areas that are not located within a cellular service footprint. In areas where cellular service is available, services are not available to transmit voice messages immediately throughout the entire operating territory. Operations necessitate that systems provide features that allow users to instantaneously hear messages relating to safety for both Fire and Law Enforcement.

Other alternative technologies:

USDA is also increasing its use of spread spectrum because it is much more spectrum efficient, handles interference more effectively, is more secure, and does not require USDA to obtain licenses. Spread spectrum has been particularly useful during incidents that lack available UHF frequencies, or in locations where available frequencies are typically saturated such as southern California. In those instances, spread spectrum enables firefighters to transmit from point-to-point, independent of radio infrastructure.

Organization:

During the past year, USDA has centralized radio oversight business processes including budget planning and funding for new systems. Previously, local forest personnel purchased their own radio systems. The new business processes are the result of a reorganization that took place within the Forest Service based on an A-76 restructuring of the bureau's information technology (IT) functions. Under the new structure, local forest personnel submit radio requirements to an Information Solutions Organization (ISO), which is the organization that won the contract to provide IT services to Forest Service business units. The ISO allocates the business requirements into technical requirements and specifications, which are in turn submitted to Forest Service headquarters for review, approval and frequency coordination. Purchases must be made off of a fully competed radio contract established through the joint efforts of USDA, Department of Interior

and General Services Administration personnel. This promotes the standardization of equipment, which improves interoperability and lowers costs based on economy-to-scale.

Each year, Forest Service headquarters will work with ISO personnel to plan and prioritize a work plan, called a Program of Work that determines what radio systems will be upgraded and replaced during the subsequent fiscal year. This will allow the USDA Frequency Manager to develop a frequency plan in coordination with the ISO Program of Work.

This year USDA began restructuring and consolidating individual radio networks into four business functions; administration, firefighting, law enforcement and aviation. This greatly simplifies support for individual operational groups operating multiple radio networks. For example, within individual forests, administrative personnel may operate separate networks for recreation, engineering and other business functions. This reduces the overall number frequency assignments dedicated to each operational group. To date, systems have been restructured and consolidated in over ten forests. USDA anticipates continuing this streamlining initiative over the course of the next fourteen years at a rate of approximately ten forests per year in order to address each of the Nation's150 forests.

USDA has tight controls on requests for spectrum, and a centralized process for the analysis and assessment of the most spectrum efficient options and effective alternatives. USDA policy requires bureaus to submit formal applications for frequency assignments to a central office that processes and forwards the requests to the Interdepartment Radio Advisory Committee (IRAC). USDA applications are coordinated with all other Federal Government agencies through the IRAC coordination procedures.

All system descriptions proposed in the frequency assignment application must reflect the actual installed configuration. If a proposed system has substantial spectrum requirements, USDA initiates a system review (SRV) by the Spectrum Planning Subcommittee of the IRAC, which must approve the installation before frequencies are assigned. USDA sets the standards for field radios and performs radio assessments and analyses to identify what options are the most spectrum-efficient for the operational environment. Spectrum sharing is USDA's top priority whenever feasible.

Figure 1.10.7 illustrates how each of the bureaus interacts with the FS to obtain radio assignments.

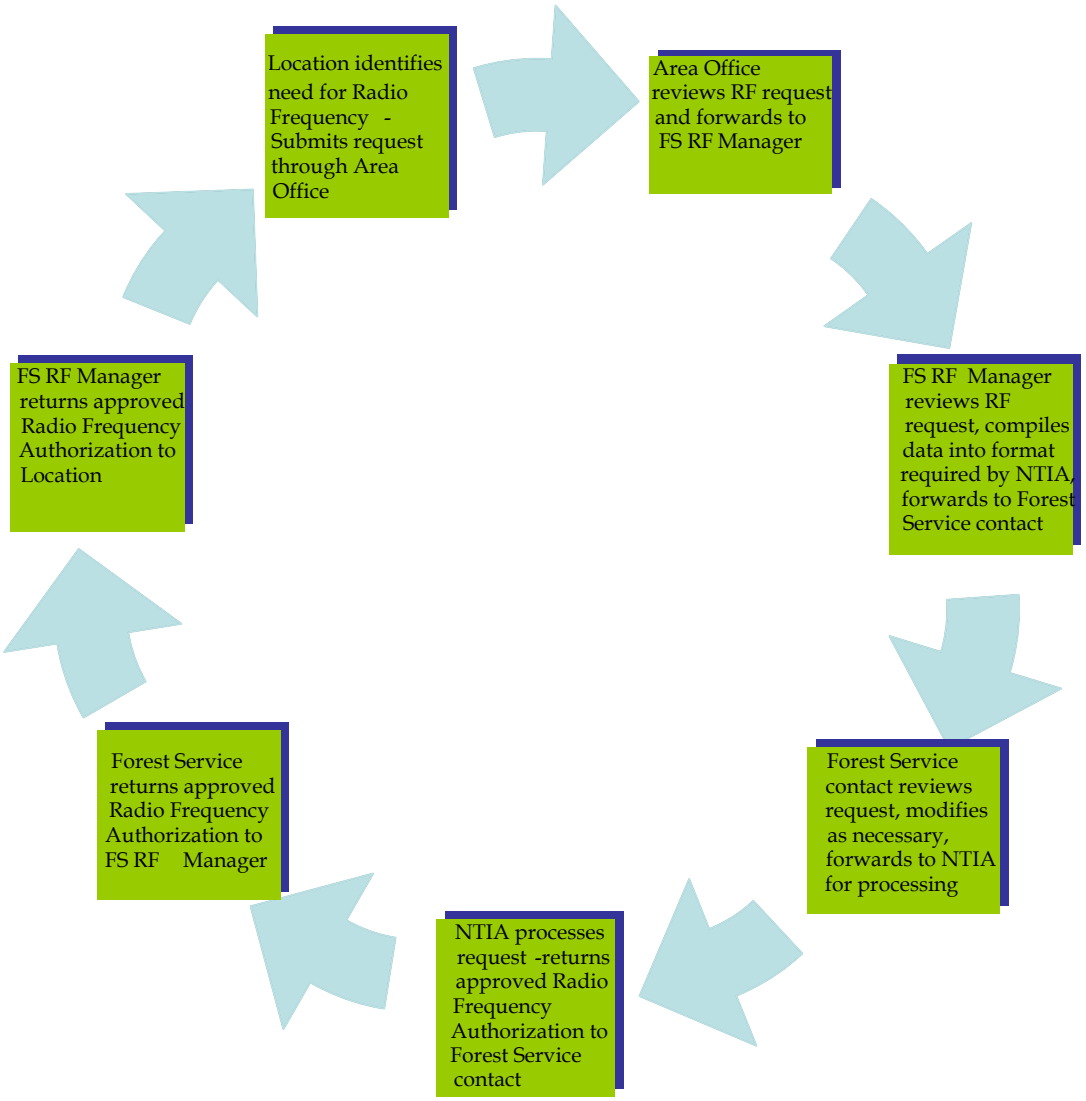


Figure 1.10.7. The same process is used to coordinate frequency assignment requests from each of the USDA bureaus and staff offices.

The Department's frequency spectrum management is delegated to the Forest Service and the Forest Service Radio Frequency Manager serves as the Department's Spectrum Manager representing USDA on the Interdepartment Radio Advisory Committee (IRAC), the Frequency Assignment Subcommittee (FAS), Technical Subcommittee (TSC) and the Spectrum Planning Subcommittee (SPS) of the National Telecommunications Information Administration (NTIA). Figure 1.10.8 shows the role in the Forest Service Office of the Chief Information Officer.

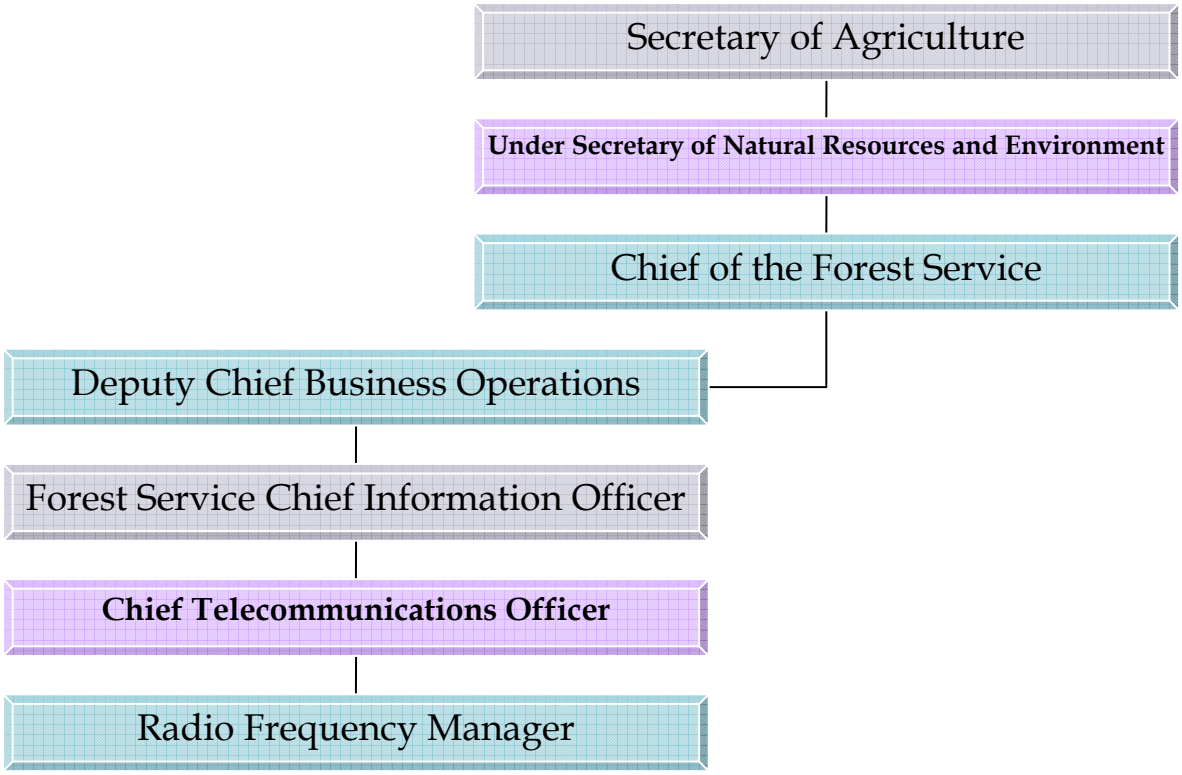


Figure 1.10.8. Forest Service radio management reporting structure.

Spectrum Office Contact:

Tom Thomison, Radio Frequency Manager
United States Forest Service
1621 North Kent Street, Suite 800
Arlington, VA 22209
(703) 605-4570 (O)
(703) 304-3993 (C)
Tom.Thomison@USDA.gov

1.10.6 Natural Resources Conservation Service (NRCS)

NRCS Mission Statement

Helping people help the land.

NRCS Vision Statement

Productive lands – Health environment.

NRCS technical and financial assistance promotes a balance between working farms and ranches, and a healthy environment. NRCS develops and delivers high quality products and services through five business lines:

1. Conservation Planning and Technical Consultation
2. Conservation Implementation
3. Natural Resource Inventory and Assessment
4. Natural Resource Technology Transfer
5. Financial Assistance

Since 1935, the Natural Resources Conservation Service (originally called the Soil Conservation Service) has provided leadership in a partnership effort to help America's private landowners and managers conserve their soil, water, and other natural resources. NRCS's natural resources conservation programs help people reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages caused by floods and other natural disasters. Public benefits include enhanced natural resources that help sustain agricultural productivity and environmental quality while supporting continued economic development, recreation, and scenic beauty.

NRCS employees provide technical assistance based on sound scientific methodology and tailor their efforts to a customer's specific needs. The agency provides financial assistance for many conservation activities and manages natural resource conservation programs that provide environmental, societal,

financial, and technical benefits. The science and technology activities provide technical expertise in such areas as animal husbandry and clean water, ecological sciences, engineering, resource economics, and social sciences.

NRCS employees provide technical assistance based on sound scientific methodology and tailor their efforts to a customer's specific needs. The agency provides financial assistance for many conservation activities and manages natural resource conservation programs that provide environmental, societal, financial and technical benefits. The science and technology activities provide technical expertise in such areas as animal husbandry and clean water, ecological sciences, engineering, resource economics, and social sciences.

NRCS Radio Program:

The NRCS radio system consists of three distinct operations in separate frequency bands: the 40.530 MHz – 41.530 MHz, the 162-174 MHz, and the 406.1-420 MHz bands.

Engineering Applications support conservation operations on private lands including dam safety and the use of survey grade Global Positioning Satellite (GPS) systems. Engineering applications support conservation operation activities nationwide on 411.250 MHz, 411.3000 MHz, 411.3250 MHz, 411.4250 MHz, 415.000 MHz, and 415.5 MHz; however the NRCS is vacating 415.000 and 415.5 MHz. NRCS two-way voice communication frequency assignments are 163.7125 MHz and 168.6125 MHz. Engineering applications are scenario-driven in many locations. When a project requires GPS survey grade engineering, the use of 411 MHz frequencies and the two general government wide voice communications are utilized between field crews. Some of the engineering applications use private frequencies that are incorporated into the land surveying equipment.

Meteor burst communication for SNOTEL and SCAN networks

The Natural Resources Conservation Service (NRCS) carries out a variety of missions and programs which require the use of the government radio spectrum. Some of the uses covered by NRCS that require government radio spectrum are Snow Survey and Water Supply Forecasting, Farm Bill implementation, National Resources Inventory work, Engineering, Cultural Resource Identification, and personnel safety.

Meteor burst communications reflect radio frequency energy off of "cosmic dust" particles that are consistently entering the earth's atmosphere. These "dust" particles operate as mini dipole antennas, which allow communication to take

place between a master station and remote station up to 1200 miles apart. Meteor burst communication technology is typically extremely reliable and cost affective for remote data collection, however, during the winter months the SNOTEL program occasionally uses aircraft to conduct field measurements, requiring two-way radio communication with ground crews.

The information that SNOTEL provides is vital to project spring and summer stream flows and water supplies. It is used by various government agencies for other public and private entities and individuals to make decisions regarding water use for agriculture, municipal and industrial purposes, drought mitigation, flood forecasting, hydropower production, recreation, endangered species, and fish and wildlife management.

Non-federal cooperators contribute money and in-kind services in support of the system. The use of Government Frequencies for SNOTEL is critical for the operation of this critical program. NRCS operates the SNOTEL system; however, numerous other state, federal, and private entities benefit from this program.

Figure 1.10.9 illustrates where the Government radio spectrum is used in the NRCS SNOTEL system.

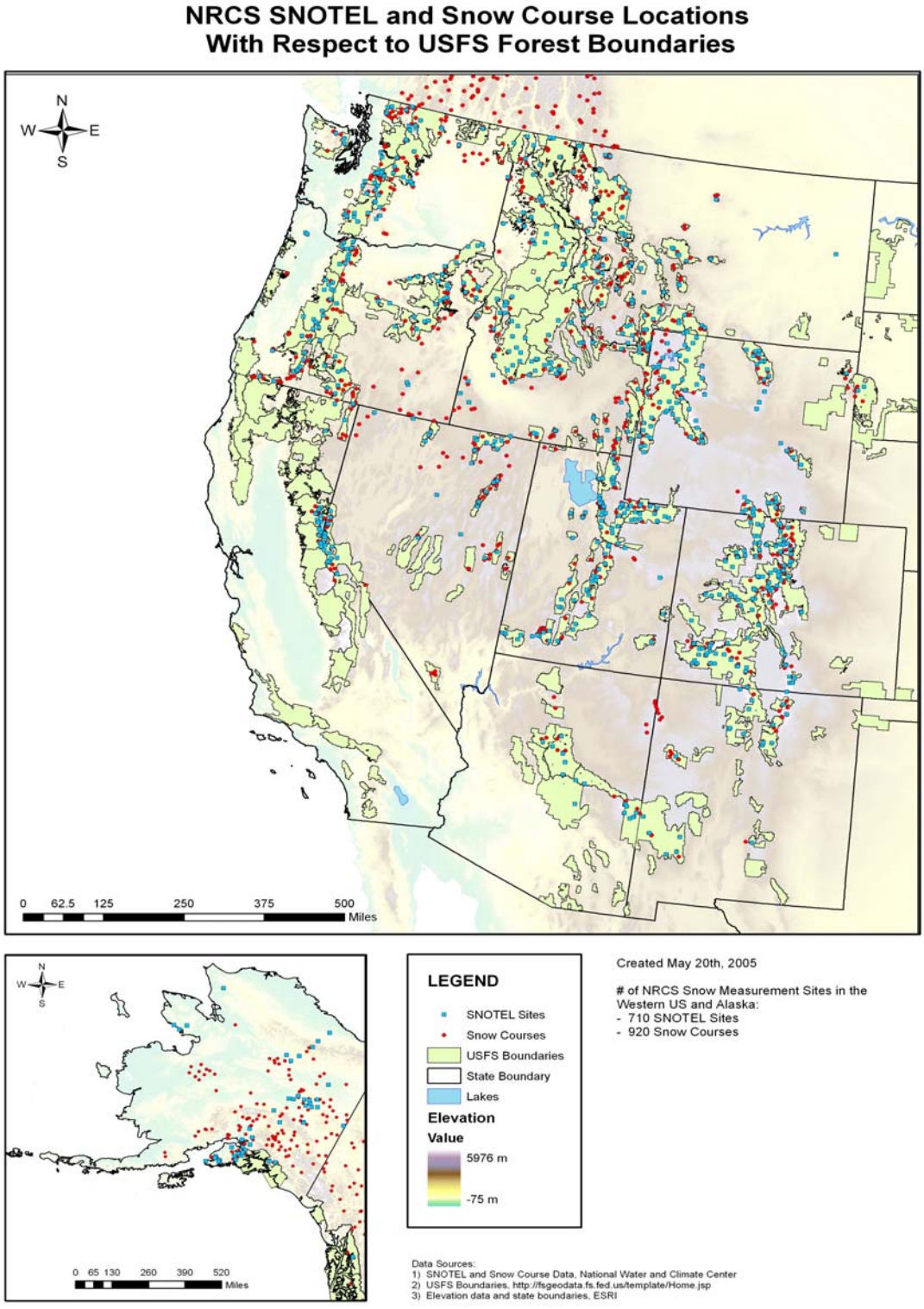


Figure 1.10.9 Radio transmission sites correspond to SNOTEL sites.

The following testimonials are from water users on the value of the SNOTEL and water supply forecast products that NRCS is Congressionally mandated to provide:

Excerpt from *Dallas Reigle, Senior Hydrologist, Water Resource Operations, Salt River Project, Arizona*

> In an area where the average annual rainfall is only seven inches, careful water management is important. Salt River Project manages six dams on two rivers, a 131-mile long system of canals and 250 groundwater wells to meet the needs of agriculture and city water users in metropolitan Phoenix. Successful water management often hinges on our working relationships with federal water supply forecasting agencies, such as the Natural Resources Conservation Service (NRCS). NRCS provides us with critical climatologically data through their automated SNOTEL system and manual snow course measurements. Both data sources are very important for assessing watershed conditions and runoff potential. The NRCS Water and Climate Center in Portland, Oregon, also coordinates with us in assessing the expected seasonal water supply by using those data in statistical forecast models.

Excerpt from *Nengjin LIU, Hydrologist, Idaho Power Company - Video Tape News Transcription*.

> "The snow pack and watershed from Continental Divide in Wyoming, all across southern Idaho and eastern Oregon has a direct effect on Idaho's agriculture and recreation industry, not to mention Idaho Power's ability to generate electricity at its hydroelectric power plants. That makes snow pack information precious. Since it is so valuable to so many interests, the US government has established the Natural Resources Conservation Service or NRCS."
>
> "The NRCS measures snow depth and water content…throughout the Snake River basin. The NRCS also has many remote sites with radio telemetry devices that provide data whenever it's needed." "Using the NRCS reports, Idaho Power hydrologists can quite accurately estimate the runoff that will occur once the snow melts." "Just how valuable is snow pack to Idaho Power? Let's suppose that in April Mother Nature drops the equivalent of 1" rain or snow water in the entire Snake River basin. Assuming an electric rate of 5 cents/kw hr." "How much would that precipitation be worth to Idaho Power Company?"
> Nengjin: "That would be worth about 30 million dollars."

The information that SNOTEL provides is vital to project spring and summer stream flows and water supplies. SNOTEL collects snow pack data, including its water content. It is used by various government agencies for other public and private entities and individuals to make decisions regarding water use for agriculture, municipal and industrial purposes, drought mitigation, flood forecasting, hydropower production, recreation, endangered species, and fish and wildlife management. Non-federal cooperators contribute money and in-

kind services in support of the system. The use of Government Frequencies for SNOTEL is essential for the operation of this critical program. NRCS operates the SNOTEL system; however, numerous other state, federal, and private entities benefit from this program. The Snow Survey and Water Supply Forecasting program utilizes 40.530 MHz and 41.530 MHz to operate the SNOTEL (SNOwpack TELemetry) system. These frequencies are critical for use with meteor burst communication technology. The SNOTEL system currently has over 700 remote stations throughout the Western United States and Alaska. NRCS owns and operates two master stations at Boise, ID and Ogden, UT. A third master station is located in Anchorage, AK and is a cooperator based system and operates on 41.77 MHz that is under the Bureau of Land Management control. The Alaska system is comprised of NRCS, BLM, NWS, and COE agencies. The SNOTEL system reflects a network investment of well over $35 million dollars. This network provides daily and up to hourly snow pack information that is used by NRCS and the National Weather Service (NWS) to produce over 1800 stream flow forecasts in the west. The NRCS SNOTEL system has been deemed as a "USDA Mission Critical" system and is used to support the NWS flood forecasting mission with hourly data.

Recent challenge:

The SNOTEL system master station facility at Ogden Utah on Hill Air Force facilities has been impacted due to RF noise. More filters were added over the years, but it has reached a point that technicians are unable to filter out the noise. SNOTEL program specialists are working on an agreement to relocate the meteor burst communication facility to the Dugway Proving Ground.

Future plans:

NRCS anticipates growing requirements for commercial spectrum to support satellite imagery and support existing wireless applications as programs areas expand their geographic footprints. In particular, the Soil Climate Analysis Network (SCAN) will need additional frequency assignments in the 40.530 and 41.530 spectrum range throughout the USA and its possessions when it becomes a fully funded program. The SNOTEL plans to migrate the radio system to 40.670 MHz and 41.61 MHz.

SCAN (Soil Climate Analysis Network)

SCAN currently operates 111 stations that nationwide, including Hawaii and Puerto Rico that house line-of-site systems that use single frequencies for data collection.

SCAN provides critical Soil-Climate information, which supports a wide variety of uses such as:

- Drought monitoring and mitigation
- Biomass and energy potential
- Carbon cycle
- Irrigation water management
- Fire risk assessment
- Crop production
- Disease and pest outbreak mitigation
- Stream flow forecasting
- Reservoir operations management
- Natural resource management & Research

SCAN utilizes both Government assigned frequencies as well as FCC assigned frequencies through a service provider under a Cooperative Agreement until SCAN is fully funded. The service provider furnishes meteor burst communication for NRCS in the Central and Eastern portions of the United States. However, when SCAN becomes a fully funded program, the NRCS will utilize 40.530 MHz and 41.530 MHz frequency assignments throughout the USA and its possessions, and NRCS predicts a need for additional Federal frequency assignments to meet expansion requirements. SCAN utilizes meteor burst communication technology as well as line-of-sight capability, and both of these capabilities use radio spectrum. . The SCAN line-of-sight frequency is currently 41.530 MHz. NRCS also has an agreement with a private company to the mutual benefit of the Government to use 44.20 MHz and 45.90 MHz.

Figure 1.10.10 is a current map, which identifies the SCAN coverage.

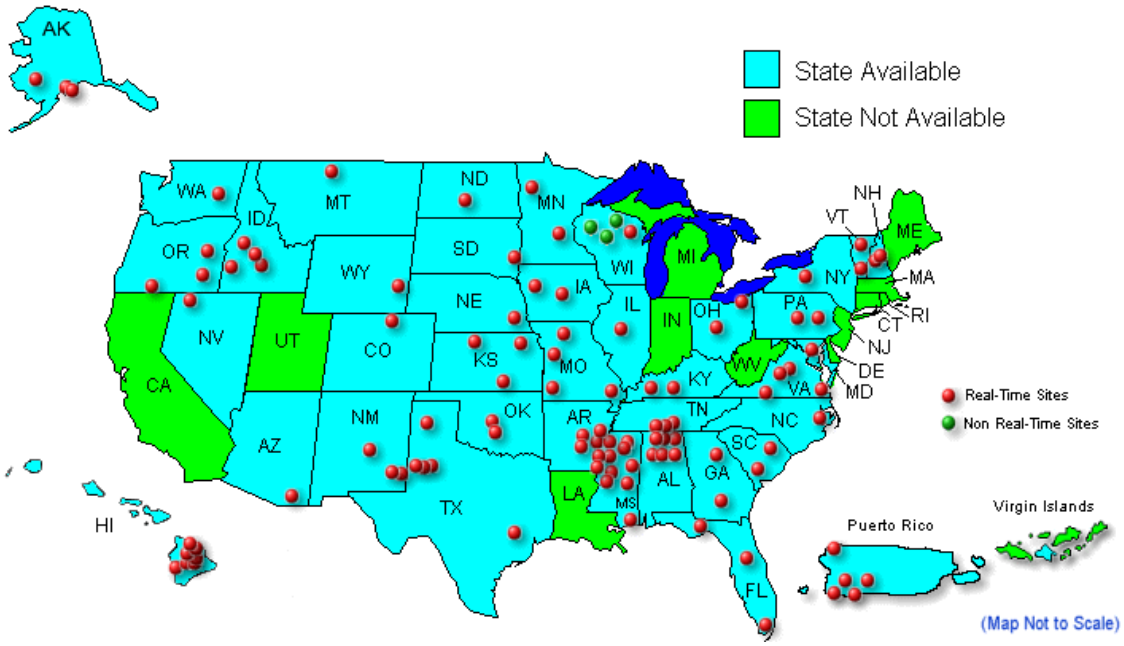


Figure 1.10.10. SCAN Radio Coverage.

Currently line-of-sight operations are in Hawaii and Puerto Rico. Meteor burst communication exists everywhere else.

Currently line-of-sight operations are in Hawaii and Puerto Rico. Meteor burst communication exists everywhere else.

Charles Johnson wrote an article called "SCAN the Weather" in the Spring 2005 version of "The Furrow," magazine in which Mike Brown, Mississippi Assistant State Climatologist says, "As for the real-time data aspect of SCAN, we love it." It goes on to describe how Kenneth Hood, a large cotton farmer in Gunnison, Mississippi has one of the SCAN stations located on his farm states. He states, "I'm using the SCAN station in crop simulations. I like to do 'what-ifs.' If you take the weather information and layer precision agriculture information on top of that, it's eye opening to see what's happening to the crop. SCAN gives a lot of information than was available on the old system."

SNOTEL and SCAN provide up to hourly data from remote stations. In addition, more frequent reception of data under flood conditions to supply data to the National Weather Service, Corps of Engineers, and other reservoir operators. The frequency spectrum that is used for meteor burst communication is limited to the 40 MHz range and must be separated by 0.75 MHz and not wider than 1.5 MHz.

Both SNOTEL and SCAN frequencies have text message capability and are used for personnel safety. Using meteor burst communications, it is possible for technicians servicing the equipment to send and receive messages at the remote

station location. At times, Forest Service frequencies are also used to support safety requirements. During manual snow course measurements or SNOTEL maintenance, two-way communication is used for flight and field crew safety.

In the future, SNOTEL, SCAN and engineering functions will continue to expand to improve water supply forecasting and drought and flood mitigation.

Field Personnel Communications:

The NRCS utilizes Government assigned radio spectrum (163.1 MHz – 172.4 MHz) for carrying out other congressionally mandated missions such as Farm Bill implementation, National Resources Inventory work, Engineering, Cultural Resource Identification, and personnel safety. The use of government assigned frequencies in this band is typically voice related. Soil Scientists and Range Conservations sometimes travel into remote areas where the only outside contact is with the use of Government assigned radios.

Radio communications are used for "flight following" where helicopters, in cooperation of the Bureau of Land Management assist with the inspection of land treatments, chemical applications, and erosion effects. The engineering mission utilizes Government radios to coordinate dam safety checks and maintain contact with construction crews. When NRCS is working on Tribal lands, it is a common practice to operate radios on Government assigned Tribal frequencies to carry out agency and Tribal missions. The Snow Survey and Water Supply Forecasting mission conducts annual training for personnel assigned to snow survey duties.

All program areas of NRCS utilize the government spectrum for job safety. NRCS employees are routinely away from cell phone coverage areas and must utilize Government radio frequencies to maintain contact. Two-way communications are critical to the NRCS when working with construction crews and for personnel safety. The Snow Survey program uses NRCS assigned frequencies and also shares frequencies with the Forest Service for personnel safety reasons when conducting snow surveys and carrying out SNOTEL maintenance activities.

Government radios are also used to ensure personnel safety for overnight bivouacs in which students are required to build and stay overnight in shelters they have constructed. When outside air temperatures reach single digits, cold weather injuries can become life threatening and immediate medical attention might be required. Radios are used from the training areas back to the base that has telephone access to medical assistance.

The NRCS has and will continue to use commercially available satellite phones for remote communications where feasible, but they are extremely costly to use and typically are only used for emergency operations. General government VHF radios and cell phone equipment are being used for COOP operations.

Differential Correction GPS Land Surveying:

NRCS GPS tools utilize 411.225 MHz – 474.00 MHz. Without the use of these Government assigned frequencies to carry out the extensive survey requirements, the NRCS would not be able to implement the Farm Bill with current staffing levels. Implementing the current Farm Bill requires extensive use of a differentially corrected GPS system in order to obtain accurate farm plot maps. The survey quality coordinates are then used in GIS applications. These maps become a part of watershed planning and identify various conservation treatment areas and applications.

Differentially corrected GPS units are also required to precisely identify holding pond areas and dam layouts. This information is utilized in GIS applications along with digital elevation maps to correctly design and repair new or old dams.

In addition, before engaging in construction or any activity that disturbs valuable land resources, an extensive Cultural Resource examination is necessary in order to identify those resources. Examinations require the use of differentially corrected GPS measurements using Government assigned frequencies in order to construct accurate area maps.

NRI (National Resources Inventory)

The NRI is another program that is congressionally mandated. This program identifies specific locations that periodic investigations on trends take place. This requires precise location capability that only is available through differentially corrected GPS units. The typical equipment that is available for NRCS to purchase requires a stationary GPS unit, which broadcasts correction information to the backpack units. The use of LIDAR might be possible if it is available in the area that is being surveyed. The information collected from these plots include farming practices, pollution information, erosion both wind and water, and other aspects of the landscape. This information is sensitive and restricted, but provides the NRCS and Congress with trend information throughout the private lands in the United States.

Future plans:

New GPS survey grade equipment is being marketed to NRCS which uses radio spectrum from FCC or is part 15 compliant. As new engineering GPS survey grade equipment becomes available to make the job more efficient, the NRCS will evaluate the technology and will plan on implementing it accordingly.

The SNOTEL, SCAN and engineering functions will continue to expand to improve water supply forecasting and drought and flood mitigation. As new technologies become available, NRCS will determine whether they will increase efficiency and improve products for the users. All radio spectrum use by NRCS is expected to continue and expand over the next 5 to 10 years. As long as the current radio frequencies are available NRCS believes it can meet agency requirements for radio spectrum.

NRCS will continue to use of the Survey Grade GPS systems to improve operations efficiencies.

The use of robotic engineering systems is under evaluation by NRCS offices. The new Robotic engineering systems will make the operation more efficient and can be accomplished with one person crews. The cost of the new Survey Grade equipment is expensive, but will allow for one person crews to complete the work.

Challenges:

The major challenges with the use of commercial systems are the rapid changes in the management of radio spectrum and requirements to ensure that the NRCS is complying with NTIA and FCC regulations. If an approach to simplify the coordination between the two agencies could be implemented, the process could be less confusing.

There could be congestion in locations where the NRCS is using the unlicensed Survey Grade GPS equipment. There is an increasing trend in the use of these systems. Survey Grade GPS systems are used to conduct accurate land surveys.

Use of commercial services:

As new capabilities are added to the survey grade GPS equipment, it is anticipated that NRCS will want to utilize these new technologies to make the work more efficient. NRCS uses survey grade GPS equipment and SCAN use of Meteor Communications Corporation FCC assigned licenses. Frequencies include 44.20 MHz, 45.90 MHz, and 400 MHz frequencies vary between survey grade GPS equipment commercial manufacturers.

Continuity of Operations:

General government VHF radios and cell phone equipment are being used for COOP operations.

Cellular coverage is sufficient in Arizona to allow the NRCS to use cellular phone exclusively throughout the state.

NRCS organization:

Figure 1.10.11 shows where the spectrum management function is located within NRCS.

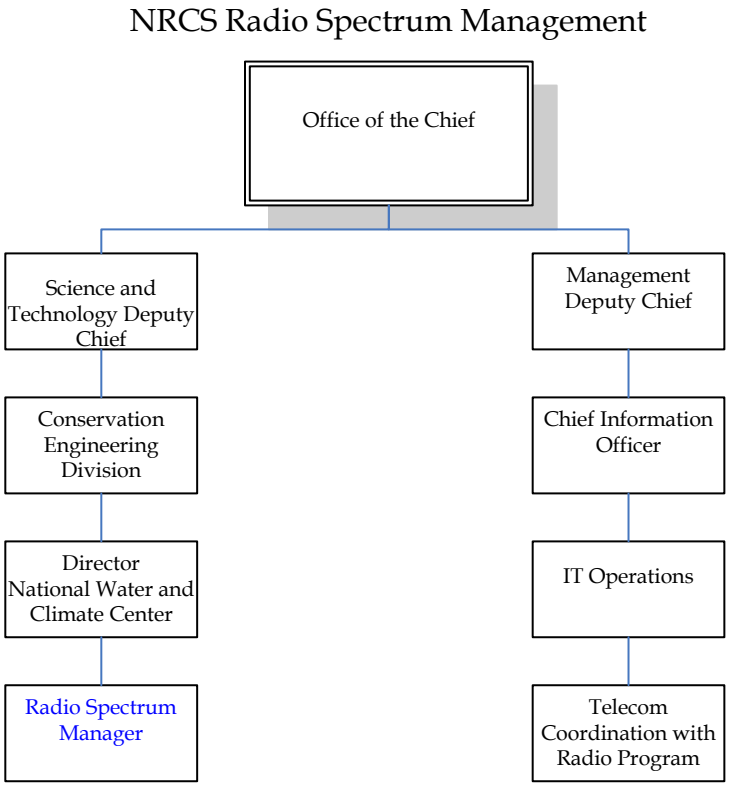


Figure 1.10.11. NRCS Spectrum management function.

The majority of the funding for radio infrastructure comes from individual state budgets. NRCS pays NTIA spectrum management fees rather than passing the cost on to each individual state.

Spectrum Office Contacts:

Gary Schaefer
Water & Climate Center
101 SW Main, Suite 1600
Portland, OR 97204-3224

(503) 414-3068 (O)
gschaefer@wcc.nrcs.usda.gov

and

Steve Webber, Telecommunications Specialist
2150 Centre Avenue
Building A
Ft. Collins, CO 80526
(970) 295-5420 (O)
Stephan.webber@one.usda.gov

All radio spectrum management functions have been assigned to the Radio Spectrum Manager. Requests for new equipment are sent to a Telecommunications Specialist, who tracks all IT purchases. Both offices maintain close coordination and collaboration when processing radio requests.

The NRCS prepared an OMB Exhibit 300, which identifies radio spectrum needs. This plan continually being evaluated to make sure it is on track with current and future agency requirements.

1.10.7 Department Administration (DA)

DA Mission Statement

Departmental Administration will provide management leadership to ensure that USDA administrative programs, policies, advice and counsel meet the needs of USDA program organizations, consistent with laws and mandates; and provide safe and efficient facilities and services to customers.

DA provides central administrative management support to Department officials and coordinates administrative programs and services.

Departmental Administration (DA) is USDA's central administrative management organization. DA provides support to policy officials of the Department, and overall direction and coordination for the administrative programs and services of USDA. In addition, Departmental Administration

manages the Headquarters Complex and provides direct customer service to Washington, D.C. employees.

Continuity of Operations:

USDA's Continuity of Operations Planning Division (CPD) is located within the DA's Office of Procurement and Property Management. CPD representatives are responsible for coordinating with the USDA Office of the Chief Information Officer (OCIO) and the USDA Office of Homeland Security (OHS) to meet National Communications System Directive (NCSD) 3-10 requirements for operational communications standards. OCIO representatives are purchasing and deploying standard equipment for senior leadership and primary COOP sites, and will lead an initiative to ensure that sub agency COOP sites follow suit.

The USDA Crisis Planning Division within DA supports COOP activities with a Crisis Action Team (CAT) and National Emergency Management Team. Up to 80 Wireless Priority Service (WPS) cellular telephones are assigned to team members.

Additionally, the COOP program participates as a Federal Partner in the HF SHARES Program operated by the National Communications System. SHARES stand for shared resources. The program provides a single, interagency radio system for use by Federal and State agencies as well as industry when normal communications are unavailable due to a national disaster or emergency. The network supports voice and Automatic Link Establishment (ALE). In order to participate in the HF Shares Program, USDA agencies must be willing to buy a compatible radio and participate in regularly scheduled network tests and exercises. USDA COOP watch officers regularly participate in both. SHARES users find learning the radio codes to be a challenge and have some concerns about reception clarity.
USDA also partners with FEMA to use the FEMA National Radio network on a limited basis for emergency communications with other government agencies.

<u>DA Radio Program</u>

DA also uses nine frequencies for a campus-wide radio network to support maintenance and facilities operations such as campus guard communications and to support on-campus emergencies using a common command channel. The system is located solely in the National Capital Region and is supported by 2-3 repeaters. Agency administrators, emergency responders and wardens can use the system in the event of a major incident or disaster.

1.10.8 Office of the Inspector General (OIG)

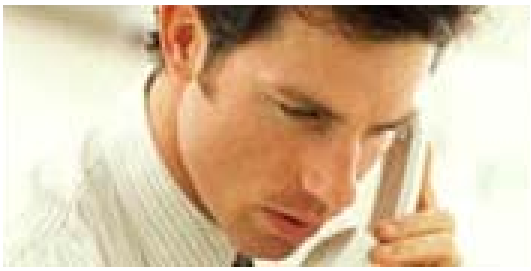
OIG Mission Statement

OIG's mission is to promote economy, efficiency, effectiveness, and integrity in the delivery of USDA's programs.

OIG Vision Statement

OIG will be a trusted contributor to the value, safety, and integrity of USDA programs.

OIG exists as a statutorily created independent and objective unit within USDA, the purpose of which is to conduct audits and investigations; provide leadership and coordination to promote economy, efficiency, and effectiveness and prevent fraud in USDA's programs and operations; and keep the Secretary and the Congress informed as to deficiencies in such programs and operations. USDA's mission is to provide leadership on food, agriculture, natural resources, and related issues based on sound public policy, the best available science, and efficient management. OIG, though independent, must work toward USDA's effectiveness to serve its statutory purpose. OIG investigates allegations of crime against the Department's program, and promotes the economy and efficiency of its operations.



The strategic vision for the spectrum management by the OIG is utilizing the fewest frequency, assignments possible to efficiently carry out our law enforcement and investigative mission.

OIG Radio Program:

The USDA OIG uses radio spectrum to provide reliable and secure communications system for all OIG field operations. The primary users are the criminal investigators assigned to the OIG, although spectrum may be shared with other law enforcement personnel during joint operations. The OIG land mobile radio system operates on VHF narrowband and uses 81 frequency assignments between 164.1375 and 173.2500 to support law enforcement operations:

Business functions supported by radio include: routine two-way voice traffic; requests for tag and criminal checks; emergency response coordination with other Federal agencies; taskforce coordination with other Federal agencies;

coordination of surveillance operations; investigations and all-hands communications for search warrant and arrest operations.

The Office of the Inspector General utilizes commercial off-the-shelf Land Mobile Radios (LMR) to implement a nationwide radio system to support OIG's investigative and Secretarial Protection operations. The OIG also shares infrastructure with the Department of Homeland Security (DHS) and has plans to integrate their communications system with the DHS and Department of Justice sponsored Integrated Wireless Network (IWN). The National Communications Center, operated by the DHS Bureau of Customs and Border Protection, performs all operational dispatching, communications security, and maintenance functions on the infrastructure that OIG uses to perform its mission. Currently, OIG has an inventory of 190 portables, 159 mobiles, and 3 mobile repeaters.

The land mobile system used by the OIG is limited because it lacks a repeater system. As result, the OIG has entered into a MOU with the Department of Homeland Security, Customs and Border Protection's Tactical Communications Division for tactical communications support. This system operates on the VHF band and utilizes DHS frequency assignments between 162.0000 and 174.0000.

The OIG relies on the expertise of the U.S. Forest Service (FS) and DHS, C&BP, Tactical Communications Center when it comes to new technologies for radio communications or to improve spectrum efficiency. OIG has determined that the Government Land Mobile System is the only system that adequately meets the mission needs of OIG investigations. Microwave and satellite systems are too costly and are incompatible with other law enforcement users. In the event of another attack on this county the likelihood of the cell network infrastructure being compromised is great. As long as we have our radios, we can still communicate.

COOP:

The OIG uses its radio system to support COOP and COG activities. Also OIG relies on the Forest Service, Radio Frequency Management Unit to obtain suitable frequency assignments. Thus, we defer to FS for appropriate response.

Future Spectrum Requirements:

OIG does not expect significant changes to spectrum requirements in the near future, and does not propose to expand the current system. Due to future requirements for VHF pairing, the OIG will review current Spectrum assignments with an eye for more efficient use of these assignments.

Additionally, we are subscribers to the DHS, C&BP, and Tactical Communications Network. Questions regarding that network should be directed to them.

Commercial Services:

The OIG does not use or rely on Commercial Spectrum-Dependent systems for radio communications.

New Technologies:

The OIG is dependent upon the expertise of the U.S. Forest Service and DHS, C&BP, and Tactical Communication's Center for the evaluation of new technologies.

Figure 1.10.12 depicts the roles performed by the OIG team.

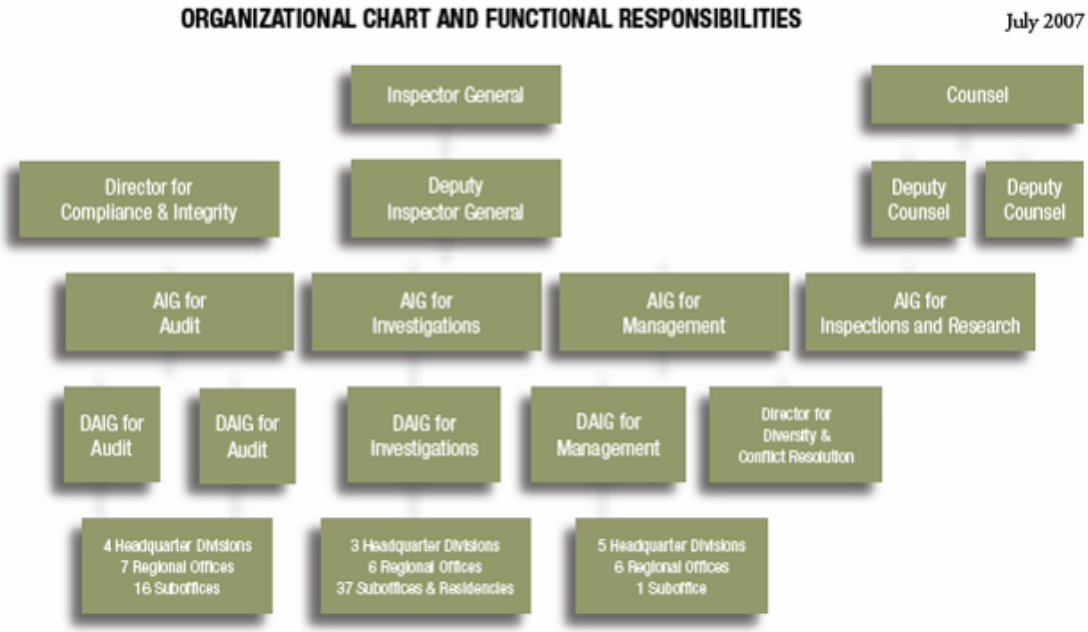


Figure 1.10.12. USDA Office of the Inspector General business structure.

Spectrum Office Contact:

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Washington, DC 20250
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(202) 720-5597 (F)
rfstevens@oig.usda.gov

1.11 IDENTIFING AND RECORDING USDA FUNCTIONAL SPECTRUM REQUIREMENTS

In order to develop USDA's functional spectrum requirements for this plan, the eight USDA bureaus and staff offices that use radios and associated spectrum to perform their missions described their use of these critical resources based on the business functions they perform. Appendix C of this plan details USDA's functional requirements and associated radio systems that support those requirements.

Current Spectrum Requirements

As evidenced in this plan, the USDA supports a wide range of business functions, each vital to the effective accomplishment of its mission. Many of the tools that help each bureau accomplish its mission require the use of federally allocated spectrum. On the whole, USDA has an estimated inventory of approximately 80,000 radio devices and infrastructure components supporting its varied missions including mobile units, portables, repeaters, portable repeaters, emergency deployable systems, fixed microwave, and various other fixed and mobile systems. USDA currently has a total of 249 Channel Allotments in 3 frequency bands supporting business functions in many remote locations that vary from wild land fire fighting and law enforcement, to natural resource management.

The U. S. Department of Agriculture generally fulfills the missions of the department, its bureaus, programs, and staff offices with Commercial Services. In cases where alternative technology is either not available or not feasible, federal government owned and operated radio systems fulfill the function.

Table 1.11.0 shows the bureau or staff office number of assignments, frequency band, type, name and operational use of system. The vast majority of USDA frequency assignments support land mobile voice operations, predominantly in

support of agricultural research, natural resources management, firefighting, law enforcement, and homeland security. The Forest Service and the Animal and Plant Health Inspection Service account for the largest block of spectrum users. Forest Service uses 85% of the spectrum assigned to USDA, while APHIS accounts for 7%, for a total of 92% of the spectrum used by USDA overall.

Each bureau and staff office has recorded how spectrum and radio technology support their business lines. The business functions that appear in Appendix C have been consolidated and summarized in Table 1.11.1.

Table 1.11.0 USDA Current Spectrum Usage

Agency/Bureau	Number of Assignments[14]	Predominant Frequency Band(s)	Type of System	Operational Use/Name of System	Remarks
APHIS	890	162-174 MHz	Mobile	APHIS LMR Net – Supports all Programs	
		406.1-420 MHz	Fixed	APHIS LMR Net and Telemetry stations	
ARS	141	162-174 MHz	Mobile	ARS Farm Research Ops	
		406.1-420 MHz	Mobile, Fixed	Facility Maint, System ctrl	
FS	10,733	162-174 MHz	Mobile	FS LMR Net, Aeronautical	Predominant Radio system within FS
		406.1-420 MHz, 1700-1800 MHz	Fixed	Data and LMR Infrastructure	
FSIS	7	162-174 MHz	LMR	Investigation	3 US&P Assignments
		406.1-420 MHz	LMR	Investigation	
NRCS	535	40.53-41.53 MHz	Meteor Burst	SNOTEL and SCAN Nets	
FSA	8	162-174 MHz	LMR	NRCS LMR Net	
		411.225-474.00 MHz	Land Survey	Differential Corrective GPS Surveying	
		406.1-420 MHz	System Control	Stationary radio telemetry control system	
OIG	81	162-174 MHz	LMR	Law Enforcement	
DA/SEC	257	30-50 MHz	Emergency	COOP	
MISC	9	162-174, 406.1-420 MHz	LMR	HQ Support Net	Includes Farm Home Administration and Food and Nutrition Service.
		Various	Fixed, Mobile	LMR, Data	
Total	12,661				

14 *Statistics are based on Government Master File. Note: Number of assignments cannot be equated to number of stations or radios.*

Table 1.11.1. USDA Mission Related Business Functions Supported by Radio

Agency - Bureau	Business Functions Supported by Radio Systems*15*
APHIS	1. Agency Wide Business 2. Animal Care 3. Biotechnology Regulatory 4. Emergency Programs 5. Incident Command System 6. Investigative and Evaluation Services 7. Plant Protection and Quarantine 8. Veterinary Services 9. Cattle Fever Tick Eradication Program 10. Wildlife Services
ARS	1. Nutrition, Food Safety and Quality 2. Animal Production and Protection 3. Natural Resources and Sustainable Ag. Systems 4.Crop Production and Protection 5. Operations and Maintenance
FS	1. National Forest Management 2. Operations and Maintenance Engineering 3. Law Enforcement & Investigations 4. Forest and Rangeland Management 5. Dispatch 6. Aviation 7. Ecosystems Management 8. Health Enterprises
FSIS	1. Surveillance 2. Investigation 3. Liaison with other Federal Law Enforcement Agencies
NRCS	1. Farm Bill Implementation 2. Personnel Safety 3. National Resources Inventory 4. Maintenance 5. Drought monitoring 6. Biomass/energy potential 7. Irrigation water management
FSA	1. Hazardous waste management
OIG	1. Law Enforcement /Investigative tasks 2. Interagency communications 3. Surveillance
DA/SEC	1. Emergency Preparedness (COOP) 2. Facility Operations and Maintenance 3. Security Operations

1.12 STRATEGIC SPECTRUM GOALS AND OBJECTIVES

Table 1.12.0 outlines the direction USDA will take during fiscal years 2008 & 2009 in order to better align wireless resources with USDA strategic goals and objectives. Wireless resources refer to licensed or unlicensed spectrum and spectrum dependent systems available through commercial means, sharing, or government-acquisition.

Table 1.12.0. Strategic spectrum goals and objectives are aligned with USDA goals and objectives.

Strategic Goals	Objectives
Goal 1: Enhance International Competitiveness of American Agriculture Wireless Goal: Address the Wireless Communications Needs of USDA Business Lines Established to Enhance International Competitiveness of American Agriculture	Objective 1.1: Expand and maintain international marketing opportunities Wireless Objective: Address wireless communications requirements for USDA programs established to expand and maintain international marketing opportunities
	Objective 1.2: Support international economic development and trade capacity building Wireless Objective: Provide wireless solutions as needed for USDA programs supporting international economic development and trade capacity building
	Objective 1.3: Improved Sanitary and Phytosanitary (SPS) system to facilitate agricultural trade Wireless Objective: Support wireless communications needs of Sanitary and Phytosanitary (SPS) system programs
USDA Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies Wireless Goal: Provide the Wireless Resources Needed to Support USDA Programs That Enhance the Competitiveness and Sustainability of Rural and Farm Economies.	Objective 2.1: Expand domestic market opportunities Wireless Objective: Ensure that wireless communications are available to support the expansion of domestic market opportunities.
	Objective 2.2: Increase the efficiency of domestic agricultural production and marketing systems Wireless Objective: Provide wireless resources that increase the efficiency of domestic agricultural production and marketing systems.

Strategic Goals	Objectives
	Objective 2.3: Provide risk management and financial tools to farmers and ranchers Wireless Objective: Enable USDA programs to interface to risk management and financial tools provided to farmers and ranchers using wireless technologies.
Goal 3: Support Increased Economic Opportunities and Improved Quality of Life in Rural America Wireless Goal: Furnish Wireless Tools and Expertise to USDA Programs That Contribute to Increased Economic Opportunities and Improved Quality of Life in Rural America	Objective 3.1: Expand economic opportunities by using USDA financial resources to leverage private sector resources and create opportunities for growth Wireless Objective: Provide wireless resources to assist USDA financial programs established to leverage private sector resources and create opportunities for growth
	Objective 3.2: Improve the quality of life through USDA financing of quality housing, modern utilities, and needed community facilities Wireless Objective: Provide wireless resources to support USDA programs that improve the quality of life in rural America through the financing of quality housing, modern utilities, and needed community facilities
Goal 4: Enhance Protection and Safety of the Nation's Agriculture and Food Supply Wireless Goal: Meet the Wireless Communications Needs of USDA Programs Established to Enhance Protection and Safety of the Nation's Agriculture and Food Supply	Objective 4.1: Reduce the incidence of food borne illnesses related to meat, poultry, and egg products in the U.S. Wireless Objective: Address USDA program requirements for wireless capabilities that can help reduce the incidence of food borne illnesses related to meat, poultry, and egg products in the U.S.
	Objective 4.2: Reduce the number and severity of agricultural pest and disease outbreaks Wireless Objective: Provide wireless support to USDA programs that reduce the number and severity of agricultural pest and disease outbreaks
Goal 5: Improve the Nation's Nutrition and Health Wireless Goal: Address Wireless Communications	Objective 5.1: Ensure access to nutritious foods Wireless Objective: Address wireless requirements

Strategic Goals	Objectives
Requirements for USDA Nutrition and Health Programs	for USDA programs established to ensure access to nutritious foods.
	Objective 5.2: Promote healthier eating habits and lifestyles Wireless Objective: Identify and implement wireless solutions for USDA programs that promote healthier eating habits and lifestyles.
	Objective 5.3: Improve nutrition assistance program management and customer service Wireless Objective: Support wireless communications requirements for nutrition assistance program management and customer service
Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment Wireless Goal: Identify and Address Wireless Communications Requirements for Programs that Protect and Enhance the Nation's Natural Resource Base and Environment	Objective 6.1: Protect watershed health to ensure clean and abundant water Wireless Objective: Provide wireless communications capabilities to meet the needs of watershed health programs
	Objective 6.2: Enhance soil quality to maintain productive working cropland Wireless Objective: Meet wireless communications requirements of USDA programs that enhance soil quality to maintain productive work cropland
	Objective 6.3: Protect forests and grasslands Wireless Objective: Align USDA wireless communications capabilities for programs that protect forests and grasslands with public safety interoperability standards and next-generation digital technologies
	Objective 6.4: Protect and enhance wildlife habitat to benefit desired, at-risk and declining species Wireless Objective: Support USDA programs that protect and enhance wildlife habitat to benefit desired, at-risk and declining species with wireless communications technologies as required

1.13 SPECTRUM MANAGEMENT STRATEGIES

The following strategies describe proactive plans of action to achieve wireless goals and objectives aligned with the *USDA Strategic Plan*.

Strategy 1: Identify and record current requirements for wireless communications capabilities for USDA strategic lines of business:

a. International economic marketing, development and trade;
b. Rural farm economic marketing, development and sustainability;
c. Agriculture and food supply protection and safety;
d. Health and nutrition; and,
e. Natural resource protection and enhancement.

Strategy 2: Identify alternative wireless technologies to meet wireless requirements.

Strategy 3: Select and implement technologies that meet USDA program requirements, comply with Federal and USDA guidelines, are cost effective, and are forward compatible with next-generation technologies.

Strategy 4: Implement National Communications System Directive 3-10 requirements for wireless technologies to support USDA senior leadership Continuity of Operations (COOP) communications.

Strategy 5: Adopt inventory and financial tracking capabilities for wireless assets in order to improve accountability and decision-making

APPENDIX A: SPECTRUM OVERVIEW

The Electromagnetic Spectrum (spectrum) is as much of a natural resource as the air we breathe, the crops we grow, and the forests we harvest. One important difference is that spectrum is finite and not renewable. For that seemingly simple reason, it is a resource that is must be protected and conserved so that we may continue to use it in an efficient and effective manner.

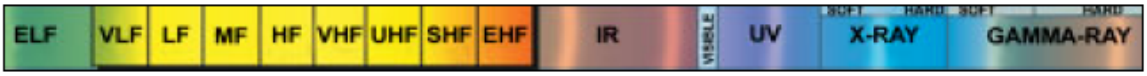
What is Spectrum?[16]

The "electromagnetic spectrum" describes the entire range of light radiation, and includes:

- Radio frequency waves
- Microwaves
- Infrared
- Visible light
- Ultraviolet light
- X-rays
- Gamma rays

Electromagnetic spectrum can be expressed in terms of energy, wavelength, or frequency. Electromagnetic waves can be generated in frequency ranges from 1Hz to Gamma rays (1025 Hz). Radio frequency (RF) spectrum refers to the frequencies (or wavelengths) associated with radio wave propagation. The RF spectrum extends in both directions from the visible range. Shorter-wavelength, higher frequency "light" includes ultraviolet, x-rays, and cosmic rays. Longer-wavelength, lower-frequency "light" includes first infrared light then, as wavelengths become longer and longer, radio waves. The usable part of the electromagnetic spectrum for communications purposes is arguably considered in the range of 30 Hertz (ELF or Extremely Low Frequencies) to 3000 GHz (beyond EHF or Extremely High Frequencies)[17], but the range of frequencies that are allocated, or regulated, starts at 9 kHz and ends at 275 GHz.

Figure A.1.0. Linear Representation of the Electromagnetic Spectrum

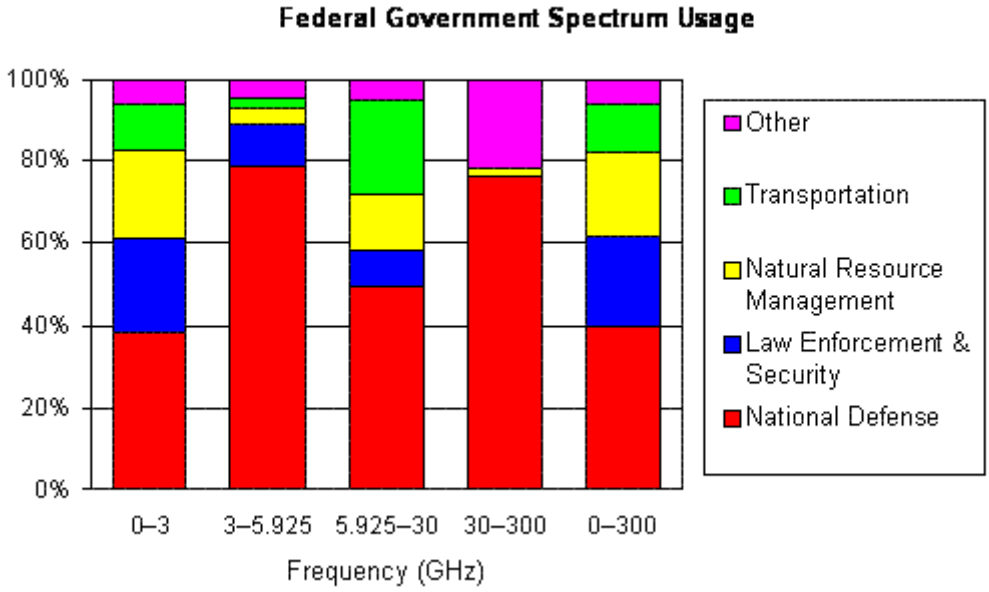


What is Spectrum Used for?

Simply put, ***Spectrum*** is used to transport voice and data communications without the use of wires. Although the work of scientists and engineers such as Marconi, Hertz, and Popov all contributed to the development of radio or wireless communications in the late 1800s, it was not until 1895[18] that Popov and Marconi (within months of each other) publicly demonstrated their experiments that radio communications was born. It is arguable whether Marconi, Popov, or another scientist invented radio communications. Nonetheless, Marconi was awarded the first U.S. Patent for the use of and radio to transmit voice and music over the electromagnetic spectrum[19].

Today, spectrum is used for a vast array of purposes from broadcasting to radar to navigation to voice and data communications. Within the federal government, it is used for a variety of essential purposes including Transportation, Natural Resources Management, Law Enforcement and Homeland Security, and National Defense.

Figure A.1.1. Federal Government Spectrum Usage[20]



How is Spectrum Regulated?[21]

Within the United States, the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA), an

agency of the U.S. Department of Commerce, coordinate the regulation and planning of the radio frequency spectrum.

The FCC regulates Non-Federal Government use of the radio spectrum. Radio stations belonging to, and operated by, the Federal Government come under NTIA regulatory control.

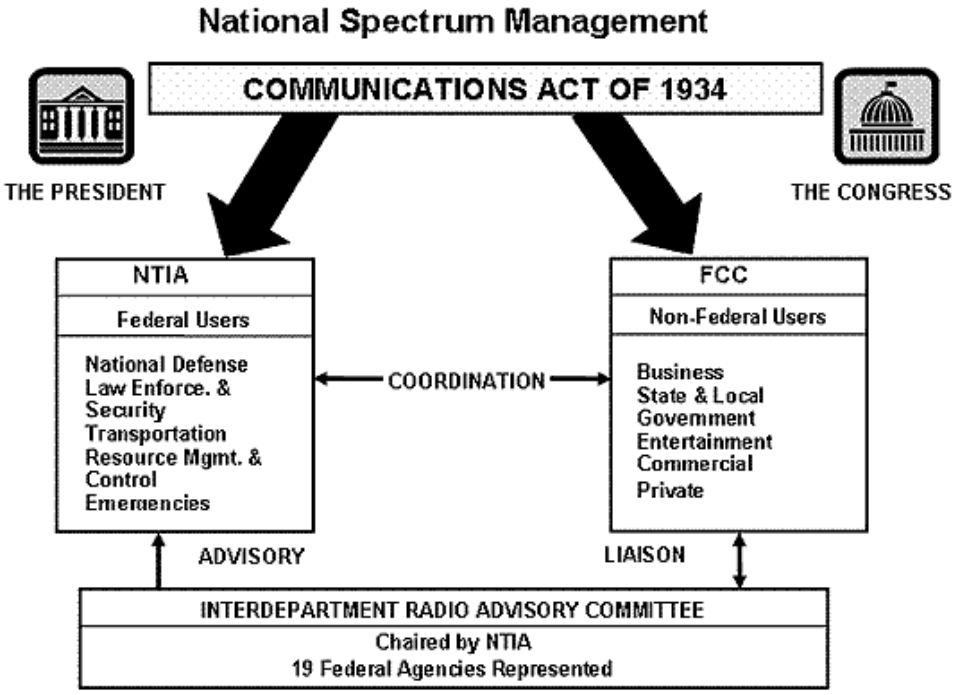
Radio frequency spectrum available for assignment to Federal Government stations is shown in the U.S. National Table of Frequency Allocations, and amplified by regulations contained in the Manual of Regulations and Procedures for Federal Radio Frequency Management. Spurred by the rapid increase in Government requirements for radio systems in the 1940s, the FCC and the President's Interdepartmental Radio Advisory Committee (IRAC) agreed to a national allocation table. The domestic distribution contained some frequency bands allocated exclusively for Federal Government use, some exclusively for private sector use, and the rest shared between Government and non-Government users.

Today, regulation of the spectrum is dictated by the Communications Act of 1934, as amended. It established the relationship between the two regulators of the spectrum in the U.S. (NTIA and the FCC). As shown below, the U.S. has maintained this duality in spectrum management and regulation since the Act became law. Little has changed in that regard, although the rules and regulations that provide the management of the spectrum have become more complex and far-reaching over the decades.

NTIA and the FCC manage the portions of the spectrum allocated for use by federal and non-federal users. These bands number about 800 and are allocated to about 34 services. Much of the spectrum is shared among federal and non-federal users alike (over 50% of the bands below 3 GHz are shared)[22].

Within the federal government, regulation and control of the spectrum is arguably a complex balancing of the needs of the important missions of federal departments and the value of the spectrum to the public.

Figure A.1.2. U.S. National Spectrum Management Relationship[23]


National Spectrum Management
COMMUNICATIONS ACT OF 1934
THE PRESIDENT
THE CONGRESS
NTIA
Federal Users
National Defense
Law Enforce. &
Security
Transportation
Resource Mgmt. &
Control
Emergencies
COORDINATION
FCC
Non-Federal Users
Business
State & Local
Government
Entertainment
Commercial
Private
ADVISORY
LIAISON
INTERDEPARTMENT RADIO ADVISORY COMMITTEE
Chaired by NTIA
19 Federal Agencies Represented

APPENDIX B: HOW SPECTRUM SAVES LIVES

This Appendix recounts a long list of anecdotal stories contributed by APHIS field personnel. They describe how APHIS radios not only help them perform their missions and business functions throughout the country, but more importantly, how they help save lives.

Animal and Plant Health Inspection Service

APHIS flies up to sixty aircraft within the US to track and remove predatory animals such as coyotes that threaten human life, cattle or valuable property using a technique called "flight following". Radio communications are required between ground and aircrews every thirty minutes while aircraft are engaged in tracking wildlife. Ground personnel are often on horseback in uninhabited areas.

The following anecdotal stories are presented as furnished by APHIS field personnel (with minor edits) and are arranged according to the state in which they occurred:

Arizona Wildlife Services (WS) Response

APHIS takes personnel protection seriously and considers radios essential tools. One manager described the assignment of a young woman to cover a tough territory stretching from Douglas to Nogales Arizona where cell phone coverage works less than ½ of the time. Management worked furiously to outfit her with a two-way radio to help ensure her safety. Other important ways that Arizona wild life services personnel use radios and the spectrum that support them are presented below:

- Coordinating with the Border Patrol on information on illegal aliens.
- Sharing a system for emergency use with APHIS/PPQ.
- Coordinating with the Cochise County Sheriff's Department on wildlife damage issues and search and rescue teams.
- Coordinating with the Mexican wolf program to manage an endangered species with 5 other agencies, AZ Game and Fish Department, NM Department of Game and Fish, White Mountain Apache Tribe, US Forest Service, US Fish and Wildlife Service.
- Finding and coordinating a search mission for an employee in the wilderness who did not report in on schedule.
- Covering remote areas with no have cell phone coverage.
- Aerial hunting program.
- Coordinating with US Forest Service during fire season and emergencies.

- Coordinating 15 groups used to combat a rabies outbreak in Flagstaff.
- Cross border coordination with other WS programs in bordering states.
- Coordination with the AZ Game and Fish Department of Wildlife damage issues.
- Coordination on military bases and civilian airports for wildlife damage management to preclude wildlife strike issues and coordinate our movements on airfields.

California WS

A WS field supervisor witnessed a fatal airplane crash. He saw the plane go down and was on the agency radio immediately, getting the emergency ground crew to the accident site. Without the radio it would have taken much longer to get medical help on site.

A CA field supervisor had a situation where he used the two-way radio to get emergency response to an auto accident. He had been working with another employee late one night and had just dropped him off at his residence. He turned the corner from his house and saw a fire hydrant spraying 40 ft. in the air and a car upside down. He immediately called the WSS who was unloading some equipment into his truck and luckily heard the supervisor on the radio. He ran into his house and called 911, while he checked on the people. It turned out to be 3 teenagers who had obviously been drinking. One girl had a head injury and the other two boys had some cuts and scrapes and were shaken up. An ambulance was there in just a few minutes. The entire area was at least a foot deep in water by the time I got there.

Colorado WS

The most recent situation in CO was last summer when one of our Wildlife Specialists was injured by a bear. Even though he used a cell phone to notify authorities, the radio system allowed him to contact another employee who was able to come to Justin's aid. The radio system allowed the Specialist to receive assistance he would not have gotten otherwise. We have certain areas where the radio is much more useful than cell phones because the location is so remote.

Hawaii

At present we are still conducting ground and aerial hunting activities for the army on the Island of Oahu and on the Big Island of Hawaii. Loss of any of the above frequencies will disrupt current and future planned activities.

Oklahoma WS Response

As a first response agency, all APHIS programs need radio systems. We must have the ability to coordinate aerial efforts while maintaining communications with USDA-APHIS-VS and PPQ. Our primary use of the WS radio system is related to safety in our aerial operations. Ground following of aircraft, etc. as required by policy for safety reasons.

Examples:

1. Our helicopter hit several power lines in 2002. They reported the incident to the State Office by radio and also reported the downed power lines that were cut by the wire cutters mounted on the helicopter.

2. The aviation program in general - without radios, our whole overdue aircraft procedure is null and void. Cell phones can't be used for air to ground and ground to air communications.

3. A wild life specialist reported a forest fire in Quachita National Forest (Oklahoma) on the mutual aid channel. His call was the first received by the U.S. Forest Service that was able to quickly dispatch fire trucks and crews to put out the forest fire before it did serious damage

4. Another wildlife specialist was out spotlighting beaver at a stock pond along a lightly used county road. As he sat in the complete darkness a car came down the county road, approached the corner too fast and went into the flooded bar ditch where it overturned. The driver was ejected from the car and severely injured. The WS Specialist used his radio (mutual aid channel) to report the accident to the local sheriff's office and to request an ambulance. The local sheriff then used his radio to report the accident to the county sheriffs department. As little as that county road was used the driver may have been there for hours. Instead, an ambulance arrived quickly thanks to the accurate directions received on the mutual aid channel.

5. A wild life specialist who is in an area with poor cell phone coverage has been the first one to arrive at two car accidents, one in which the sole occupant was in critical condition. Since he didn't have cell phone coverage, the Specialist used his radio to call the Sheriff's Office on the mutual aid channel to summon the Sheriff's department and an ambulance.

6. A Wildlife Specialist who was out of cell phone coverage used his radio to call police on the mutual aid channel after a drunk driver nearly ran him off the road then ran other drivers off the radio before crashing into a ditch.

7. A Wildlife Specialist was out on a ranch two years ago conducting predator damage management operations when he found a young man wandering around on foot. The man was completely disoriented and in very serious

condition. He could not tell the Specialist his name. He did not know who or where he was or describe what was wrong. The Specialist used his radio to call the Beaver County Sheriff's office on the mutual aid channel for an ambulance. By coincidence, this young man's father was a county employee who heard the Specialist's call for assistance. It turned out the county employee was the young man's father and he recognized the radio description of his son. His son was in serious insulin shock and close to coma. The Specialist was able to find glucose pills and gave the young man 6 pills and a soda. He was OK by the time an ambulance arrived. The paramedic said that the young man would not have survived the day without the Specialist's assistance. Beaver County is in the Oklahoma Panhandle where there is little, if any, cellular phone coverage.

8. A Wildlife Specialist reported that he has used his radio in three situations to communicate with ODAFF Forestry Services regarding wildfires. Each of these situations involved homes threatened by the fires. In most of his area, radio contact is all that is available since the cell phone coverage is so poor.

9. On occasion we communicate with the Oklahoma Department of Wildlife Conservation, when our respective agencies collaborate on special projects. In the past these projects have focused on removal of alligators in human health and safety situations. In another situation we removed deer from several airports that were endangering human health and safety. We also have direct radio communication with the Oklahoma Dept. of Agriculture, Food and Forestry, forestry Services division to coordinate with them in the case of a forest fire where they need our assistance. We also utilize our radios to communicate with county governments involved in search and rescue missions when they request assistance with our airplane and/or boats. Communication between agencies via the radio system is vital when working on projects related to potential disease transmission between wildlife and/or domestic livestock.

Oregon Wildlife Services (WS)

Oregon WS has initiated cooperative agreements with the U.S. Forest Service (USFS) to conduct fire reconnaissance flights. The USFS requires "flight following" radio communications during the flights. WS pilots have been called on in the past to assist in search and rescue efforts for lost individuals. Our cooperating counties appreciate participation in search and rescue missions with the use of aircraft. Radios are necessary to communicate with multi-jurisdictional operations.

During multi agency emergency response operations, radios are a vital. Wildlife disease projects have already realized significant benefits with radio communications support, and will continue to do so in the future.

The Oregon program has included the input on radio use from two District Supervisors:

From our Northwest Oregon District Supervisor:

I can think of 2 incidents where NW District personnel used radios in urgent situations. These may not have been 'emergency' situations, but they were definitely 'urgent' under the circumstances, and helped resolve the situations that not only would have taken a longer, but also would have greatly inconvenienced several people in the process. They both happened within the last three to five years.

1. A call was received late one evening on the radio from an employee in Clackamas County. I heard the employee calling on his radio for assistance from any WS employee who could monitor his call. No one heard him but me because of the late hour, and I just happened to be working at the time. He was hopelessly stuck in his GSA vehicle on a muddy hillside in a rural and remote part of his county, with no way to get himself out of the situation. I drove almost to where he was located. He gave me directions using the radio, and I ended up pulling his vehicle out with the aid of the Warn winch I had on my vehicle. If I had not heard him calling on my radio, he would have had a very long walk out of the back-country with no way to contact his family, not to mention an expensive tow bill the next day from a wrecking company. In addition, he would have found himself behind on his workload the next day without assistance.

2. Another situation involved an employee who was involved in a vehicle accident with his GSA truck. Due to the accident he was not able to drive his vehicle, and was quite shaken by the experience. He was able to contact me via radio, as I was working at the Portland Airport. I was able to resolve his situation by calling GSA in Vancouver for direction, and then making a call to the mid-west accident team. A tow company was located and dispatched to the location, and transportation arranged for the employee. Without the radio, this situation would have taken a lot longer to resolve, which would have greatly added to an already stressful situation.

From our John Day OR District Supervisor:

I've called in at least three automobile crashes and have heard others coordinating activities to contain wildlife in domestic settings, such as a cougar wandering around in the Monroe Schoolyard. Radio communications is key in a major wildlife disease response.

Last spring when flying in Nevada the supervisor on the wildlife project had his pickup stolen. I was able to contact the Lake Co. sheriff who contacted the Winnamucca sheriff, who, in turn, initiated an all-out search for the pickup and the escaped convict believed to have taken it. This person was wanted for killing two police officers in Colorado. He also had been stealing from all the ranches in the area, was considered armed, and vowed not to be taken alive. Cell phones would not work in the area due to the remote location. The areas where we work are very remote, where cell phone coverage will not work and we rely on

our radios for safety check-in calls. Should we have a problem we use a hand held radio to contact help.

Many of us have found ourselves stuck in remote locations. In most of the areas we work in the winter, and it is common for temperatures to be well below 0. We could die without the ability to summon help on our radios.

Several years ago I flew for a Sheriff looking for places where drugs are grown. This required that I stay in radio contact with the dispatcher during the flight.

APHIS personnel assist with firefighting. Fire patrol requires radio contact every 15 minutes for location for safety, and to let the Fire Center know where we spot fires.

One Oregon pilot has flown on car chases in Malheur Co. assisting the county sheriff and looking for escaped prisoners in Umatilla Co. with successful results.

Regardless of our program responsibilities, the public sees us as government officials whom they can contact in an emergency or for information. In some remote areas cell phones do not have service. We can share frequencies with city, county, state and federal agencies in these areas, thus allowing us immediate access to their systems. The public expects us to be able to make the necessary contacts in emergency situations. After all, we are publicly funded.

On numerous occasions, Specialists have used their vehicle radios to report vehicle accidents and seek help for injured victims. Due to the remote location of these accidents, our vehicle radios were the only form of communications to secure emergency medical response.

Because of the availability of our radios our personnel have been able to immediately report fires on private, state and federal lands to the Oregon Department of Forestry, USFS and BLM.

Montana WS Response

Cellular phones have supplemented the two-way radios, but have not replaced them. There are large sections of Montana that do not have cell-phone coverage and we have to rely on the two way-radio for communication, especially in our aerial program. The primary use of the two-way radio system is for personnel safety. We have expended thousands of dollars to move to narrow band radios to ensure that we have radio access using the most efficient technology available.

The two-way radio is a critical component in our aerial program. On June 6, 2005, a Montana Wildlife Services helicopter had a chip warning light illuminate in the aircraft in an area that does not have good cell phone coverage. The aircraft crew contacted the ground crew by two-way radio, notified them of the situation and said that they would have to land in a remote area. The ground crew was unable

to contact the state office or aircraft by cell phone and relied on the two -way radio for recovery.

New Mexico WS Response

Several years ago a government helicopter crashed in a remote area of New Mexico. APHIS personnel used radios were to direct medical emergency personnel to the site, where half a dozen personnel awaited rescue.

North Dakota WS

As in all other Wildlife Service's states in the Western Region, in ND, the primary use of the WS radio system is related to safety in our aerial operations. Ground following of aircraft, etc.

However, we also have the capability of communicating with the ND Game & Fish Dept., which we do on occasion when our respective agencies collaborate on special projects. In the past these projects have focused on removal of deer from captive rearing facilities whose owners have failed to comply with Chronic Wasting Disease (CWD) monitoring requirements. Communication between agencies via the radio system is vital when working on projects related to potential disease transmission between wildlife and domestic livestock.

With some minor programming, our radio system could be used to communicate with other federal and state agencies in times of natural disaster or major incidents. Even though we don't have that capability now, it seems important that we maintain our radio systems so that if they are needed in emergency situations we could truly be a first response agency.

One North Dakota wildlife services manager described the use of radios when a mountain lion was spotted within ten feet of several mountain bikers and had been stalking them for miles. Personnel on horseback used radios to coordinate their response.

Utah WS

In the State of Utah, we regularly check with sheep herder camps and have frequently (at least once or twice a year) used our radios to call in an emergency for a sheep herder. These have included injured herders (they didn't come back to camp and a search needed to be executed), sick herders who needed emergency assistance (tooth infections and an appendectomy), etc.

Where cell phones don't work, employees use radio's in their vehicles to call base stations at their house when they are in camp. This is their safety net, and we allow these calls to assure that the employee makes it back to camp each night. Because the WSSs work alone, this is often the only way to provide a safety check

on each employee each night. We can't imagine not having radios for personal safety.

Our presence is expected on the desert of West Utah. In some areas there are communal wells that serve as the only source of water for livestock, wildlife and wild horses. Our employees check these and notify someone (usually the DS who passes it along to the BLM) when a well goes down and assistance is needed. Without our presence, some of the wells would go unchecked and some wild horse herds would die of thirst. This communication is via radio.

We have called in automobile accidents in rural areas where cell coverage does not exist. Our use of the radio in some of these cases has meant the difference in prompt attention and hours of waiting in the cold while someone goes to get cell coverage.

Utah field supervisors have personally called in lightening strikes and range fires, and had the FS respond with aircraft within minutes rather than wait for hours or days for the fire to be discovered. A single water drop on a small strike saves the government tens of thousands of dollars fighting a larger fire.

We also use our radios to coordinate with other agencies. WS, the BLM and the DWR all cooperate on black-footed ferret protection in the Vernal UT area. We have signed a frequency sharing agreement with the BLM and DWR so that our frequency is the common frequency for these operations (because we use aircraft, we need to be on our frequencies).

It's hard to communicate our rural realities with someone who has not been here to experience it. We estimate that >60% of our deserts and 50% of the mountains (the bottom of canyons) does not have cell coverage. In order to be able to maintain communications for safety, aerial hunting efficiency and emergency communications, we need the radios.

Washington WS Response

We use the radios constantly during aerial hunting operations and boating operations. We would not be able to operate safely without radio communication. We also use them during the normal course of other projects where communication is essential, such as installing overhead wire grids at dams for the protection of endangered salmon and steelhead populations. We have up to a dozen people working on these projects at a time, and our radio system is their only way to communicate and is essential to their safety. Our radio system is crucial to the success of other projects such as conducting work in remote areas as well as in high-crime urban areas. In many areas, the only communication available is our two-way radio system. Three years ago we reported a remote methamphetamine lab to local authorities using our radios during an aerial hunting operation. A year later, our Specialists used their radios to report the discovery of a suicide victim, also in a remote area. Our Specialists venture into

areas that not many other people frequent, so we can reasonably be expected to be the first, or perhaps only, person on the scene of an accident or other occurrence. For the same reason, our Specialists also need the radio system for their own safety.

In Washington State, we operate on a shared system with State DNR, State Fish & Wildlife and others. Through this system we are able to communicate with these agencies and others, including law enforcement, anytime there is a safety issue or any other incident of common concern, such as wildfires, accidents, criminal activity, natural disasters, or a variety of other occurrences. When we had a 7.4 magnitude earthquake here in Olympia in 2000, the first thing to go down were the cell phones and land telephone lines. Our State-shared radio system remained functional and was of primary importance in responding to this disaster. The fact that we bring federal frequencies to the table to share with these other agencies is critical to the success of the shared radio system in Washington State.

Wyoming WS Response

The Carbon County WS Specialist was working on a ranch, 15 miles from civilization, during the winter when the outside temperature was -15 degrees F. While negotiating driving on the snowy country roads he became stuck in a snowdrift. He was out of cell phone coverage but managed to communicate with radio (through a repeater) to a Specialist working over 200 miles away. This specialist contacted the Carbon County Specialist's wife and she came out with his personal truck and pulled him out. Considering the temperature and the winds common to the area, this very easily could have saved his life. He would have had a fifteen-mile walk to get help. With the winds that we have in Wyoming, a specialist can start out on a relatively nice day and if the winds come up, the snow will drift over and close roads in a matter of minutes.

The Weston County WS Specialist was flying as a crewmember in 1996, when his house caught on fire. Using the radio, local personnel were able to get in contact with him, communicate with his wife during the emergency, and he was able to return home to attend to the situation quickly.

We use our radios everyday; contact with the aerial operation is a must for safety not only for aircraft but also, for effective and efficient work daily. The guys use the radio for help if needed; cell phones don't work in many places. The guys work alone anytime night or day, the radios are the link to each other while conducting operations.

APPENDIX C: TABLES SUMMARIZING USDA MISSION RELATED BUSINESS FUNCTIONS

Tables C.1.0–1.7 capture the business functions supported by federal spectrum in each of the eight USDA agencies and offices that have federal frequency assignments. The first column in each of the tables lists the Business Unit in which business functions that require spectrum take place. Business functions are listed in column two. Columns four through six provide data on the systems that use federal frequencies, the frequencies used, the user community, and geographic coverage.

Table C.1.0. APHIS Mission Functions Supported by Federal Spectrum

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
APHIS – Agency Wide	Contractor Management	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT& NONGOVT	US,USA, USP
	Deliver and move supplies	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Infrastructure maintenance	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Order, schedule update materials or check shipments	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Personnel control, during treatment and survey activities and personnel safety	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Provide communications infrastructure and personnel during natural disasters and potential terrorist activity	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Rapid reporting of survey data so the treatments can be timed for optimum control	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Receive contacts from field personnel reporting in with important information for the control of unwanted introductions of plant materials, disease, or illegal importation activities	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Relay messages to stat/local agencies when needed	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Be available and able to join in the Incident command System in support of disaster and terrorist activity	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	To delineate infestations of plant pests so the affected area can be quarantined and unaffected areas can continue to produce product	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
Animal Care	Administer the missing pet network (MPN) for lost or stolen animals	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Conduct randomly scheduled inspections	LE NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Conduct unannounced inspections	LE NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Ensure all regulated facilities comply with and enforces the law by meeting minimum standards for most warm-blooded animals bred for sale, research, transported commercially or exhibited to the public	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Monitor for illegal dogfights, cockfights, bear raccoon baiting, and other similar activity	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Monitor and inspect horses	LE NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
Biotechnology Regulatory Services	Assess the agricultural and environmental safety of genetically engineered organisms	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Evaluate petitions for the USDA to deregulate genetically engineered organisms	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
Emergency Programs	Respond to plan pest and other national emergencies including Asian Long horned Beetle, Citrus Cancer, Emerald Ash Borer, Exotic Newcastle Disease, Fruit Flies, Karnal Bunt, Plum Pox	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
Investigative and Evaluation Services	Investigate violations of: agriculture import rules that prevent introduction of exotic plant and animal diseases into the U.S., Animal Welfare Act and Horse Protection Act, maintains all information about agricultural health and animal welfare law violations, rules pertaining to agricultural products exported from	ADMIN, LE NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
	the United States, sanitary standards for garbage and food fed to swine, standards for accredited veterinarians working in Federal/State cooperative programs, standards that control the quality of veterinary biological products, unauthorized release of genetically engineered organisms				
Incident Command System	Support nationwide organizational structure	ADMIN, LE NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
Plant Protection and Quarantine	Contribute to the preservation of the global environment	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Monitor the use of pesticide in the treatment of grasshoppers for environmental impact	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Insures an abundant, high-quality, varied food supply	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Oversees the safe disposal of confiscated materials	ADMIN, LE NET	162-174 MHz 406-420 MHz WBA, NBW, Dig	GOVT	US, USA, USP
	Oversee the fumigation of materials for export	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Promote the education of travelers	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Protect croplands from grasshopper and Mormon Cricket devastation	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Provide safety of personnel	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Provide identification of insect pests and plant diseases for CBP, State/local organizations	ADMIN, LE NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Provide inspection of quarantine facilities	ADMIN, LE NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Certification of heat treatment and cold treatment facilities	ADMIN, LE NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
	Strengthen marketability of U.S. Agriculture in domestic and international commerce	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Support the eradication and control efforts of Cotton Growers Foundations for Pink Bollworm and Boll Weevil programs	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Defend against crop disease introduction	ADMIN, LE NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Eradicate and control invasive plant species	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
Veterinary Services	Animal health safeguarding	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Monitor and promote animal health and productivity	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Prevent, control, eliminate animal diseases	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
Cattle Fever Tick Eradication Program	Dispatch and coordinate work	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	TEXAS
	Guide enforcement agencies to scene	LE NET	162-174 MHz WBA, NBA, Dig	GOVT	TEXAS
	Report illegal activity	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	TEXAS
	Request emergency assistance	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	TEXAS
	Safety on horseback – River patrol	LE NET	162-174 MHz WBA, NBA, Dig	GOVT	TEXAS
Wildlife Services	Animal body recovery	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Animal tracking coordination	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Area coverage – APHIS aircraft	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Assign changes during course of day	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Chemical treatment – ground	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Conduct livestock depredation site investigation	LE NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Coordinate hiker or vehicle distress	ADMIN, LE & AIR NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Coordinate search and rescue	ADMIN, LE & AIR NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
	Coordinate with air patrol	ADMIN, LE & AIR NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Coordinate emergency response w/ other federal agencies	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Coordinate EMS rescue	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Assist firefighting – air	AIR,FIRE NET	162-174 MHz	GOVT	US, USA, USP
	Flight following	AIR NET	162-174 MHz NBA, Dig	GOVT	US, USA, USP
	Coordinate geology, timber wildlife & personnel	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Dispatch ground crew	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Coordinate hazmat reporting and cleanup	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Manage distress channel for regional business units	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Minimize wildlife threats to public health and safety	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Monitor livestock grazing allotment	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Preserve natural resources	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Protect private and industrial property	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP
	Protect threatened and endangered species	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Resolve wildlife conflicts in urban areas	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT & NONGOVT	US, USA, USP US, USA, USP
	Routine LMR use	ADMIN NET	162-174 MHz 406-420 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Safety and warnings	ADMIN NET	162-174 MHz WBA, NBA, Dig	GOVT	US, USA, USP
	Vehicle safety	ADMIN , FIRE NET	162-174 MHz WBA, NBA, Dig	GOVT	US,USA, USP

Table C.1.1. ARS Mission Functions Supported by Federal Spectrum

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
Nutrition, Food Safety/Quality	Ensure food supply is safe for consumers	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
	Ensure that food and feed meet foreign and domestic regulatory requirements	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
	Decrease hazards of both introduced and naturally occurring toxicants in foods and feed	ADMIN/GPS	162-174 MHz 406-402 MHz	Government	Nation-wide
Animal Production and Protection	Reduce economic losses from infectious, genetic and metabolic diseases of livestock and poultry	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
	Assess farm animal well-being	ADMIN/GPS/ TELEMETRY	162-174 MHz 406-420 MHz	Government	Nation-wide
	Improve competitiveness of US aquaculture	GPS ARGOS Satellite	406-420 MHz 401.650 MHz	Government Government	Nation-wide Nation-wide
	Food Animal Production & Rangeland, Pasture and Forages	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
Natural Resources and Sustainable Agricultural Systems	Develop innovative concepts for determining movement of water in agriculture landscapes and watersheds	ADMIN/GPS/ TELEMETRY	162-174 MHz 406-420 MHz	Government & Non-Government	Nation-wide
	Develop new and improved practices, technologies, strategies for managing Nation's agricultural water resources	ADMIN/GPS TELEMETRY	162-174 MHz 406-420 MHz	Government	Nation-wide
	Develop procedures and systems that maintain, enhance beneficial soil and environmental quality, balance, productivity	ADMIN/GPS/ TELEMETRY	162-174 MHz 406-420 MHz	Government	Nation-wide
	Study wind erosion, air pollution	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
	Develop and test control measures	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
	Provide aids to minimize and reduce erosion and air pollution	ADMIN/GPS/ TELEMETRY	162-174 MHz 406-420 MHz	Government	Nation-wide
	Predict and mitigate impact of air quality on agriculture	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
	Resolve effects of environmental change on agriculture and food security	ADMIN/GPS/ TELEMETRY	162-174 MHz 406-420 MHz	Government	Nation-wide

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
	Develop technologies to manage Nation's grazing lands	ADMIN/GPS/ TELEMETRY	162-174 MHz 406-420 MHz	Government	Nation-wide
	Understand fundamental ecological processes and agronomic practices	ADMIN/GPS/ TELEMETRY	162-174 MHz 406-420 MHz	Government	Nation-wide
	Enhance forage production, watershed function, wildlife habitat, biodiversity and conservation of resources	ADMIN/GPS/ TELEMETRY	162-174 MHz 406-420 MHz	Government	Nation-wide
	Develop methods to use animal manures, municipal and industrial wastes, biosolids	ADMIN/GPS/ TELEMETRY	162-174 MHz 406-420 MHz	Government	Nation-wide
	Research, development and tech transfer to solve problems and address opportunities in farming systems	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
	Develop alternate energy sources and increase use of agricultural crops as biofuel	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
	Safeguard and utilize microbial, germplasm and genetic, genomic data to ensure safe and inexpensive food supply	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
	Research greater crop productivity and efficiency	ADMIN/GPS	162-174 MHz 406-420 MHz	Government	Nation-wide
Crop Production and Protection	Develop effective, affordable control to reduce losses caused by plant diseases	ADMIN/GPS/ LAND IRRIGATION CONTROL	162-174 MHz 406-420 MHz	Government	Nation-wide
	Study biology, ecology and impact of insects and pests on agricultural production systems and ecosystems	ADMIN/GPS/ LAND IRRIGATION CONTROL	162-174 MHz 406-420 MHz	Government	Nation-wide
	Develop safe technologies to manage pest populations	ADMIN/GPS/ LAND IRRIGATION CONTROL	162-174 MHz 406-420 MHz	Government	Nation-wide
	Study and promote use of crop production and cropping systems	ADMIN/GPS LAND IRRIGATION CONTROL	162-174 MHz 406-420 MHz	Government	Nation-wide
	Develop environmentally compatible and economically feasible alternatives to methyl bromide as a soil treatment	ADMIN/GPS/ LAND IRRIGATION CONTROL	406-420 MHz	Government	Nation-wide

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
	Emergency response coordination with State/local governments	ADMIN/GPS/ FIRE COMMS	162-174 MHz 406-420 MHz	Government	Nation-wide
	Routine communications between employees in remote areas, labs.	ADMIN/GPS/	162-174 MHz 406-420 MHz	Government	Nation-wide
Operations and Maintenance	Facility maintenance	ADMIN	162-174 MHz 406-420 MHz	Government	Nation-wide
	Personnel safety and administration	ADMIN	162-174 MHz 406-420 MHz	Government	Nation-wide

Table C.1.2. DA Mission Functions Supported by Federally Allocated Spectrum

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
COOP Planning Division	Emergency Preparedness (COOP)	SHARES/ALE		Government	Greater DC metro
Operations	Facility Operations and Maintenance Security Operations	Operations		Government	Headquarters campus only

Table C.1.3. FS Mission Functions Supported by Federal Spectrum

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
National Forests	Road Crew Coordination and logistics for road building and repair	ADMIN NET	162-174 MHz	GOVT	NATION WIDE
	Search and Rescue	ADMIN, LE, FIRE & AIR NETS	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Law Enforcement coordination with County Sheriffs	LE NET	162-174 MHz	GOVT & NON GOVT	NATION WIDE
	Coordination with Contractors that perform work	ADMIN NET	162-174 MHz 406-420 MHz	GOVT	NATION WIDE
	Delivering and moving supplies	ADMIN NET	162-174 MHz 406-420 MHz	GOVT	NATION WIDE
	Hikers or vehicles in distress	ADMIN, LE, AIR NETS	162-174 MHz 406-420 MHz	GOVT	NATION WIDE
	Infrastructure Maintenance	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Coordination with State firefighters or foresters	FIRE & AIR NETS	162-174 MHz	GOVT	NATION WIDE
	Soil Inspection: communicate observations with foresters, hydrologists, recreation personnel	ADMIN NET	162-174 MHz	GOVT & NON GOVT	NATION WIDE
	Safety away from vehicle (Forestry policy)	ADMIN & FIRE NET	162-174 MHz 406-420 MHz	GOVT	NATION WIDE
Forest and Rangeland Management	Livestock grazing allotment monitoring	ADMIN & LE NET	162-174 MHz	GOVT	NATION WIDE
	Contact with nurse tanker	FIRE & AIR NET	162-174 MHz	GOVT & NON GOVT	NATION WIDE
	Contact with helicopters	FIRE & AIR NET	162-174 MHz	GOVT & NON GOVT	NATION WIDE
	Firefighting assistance	FIRE & AIR NET	162-174 MHz	GOVT & NON GOVT	NATION WIDE
NONM Operations	Remote travel safety and trouble reporting	ADMIN & LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Hazmat reporting and cleanup coordination	ADMIN & LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Mowing shoulders, erecting barricades for dangerous road conditions	ADMIN NET	162-174 MHz	GOVT & NON GOVT	NATION WIDE
	Contractor mgmt (logistics, contact district office on disputes, timber removal)	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Surveyor coordination and logistics	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Receive emergency notification and coordinate response	ADMIN, LE & AIR NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
	Property mgmt (locate trails, locate corners of property)	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Dispatch saw crews	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
Law Enforcement and Investigations	Routine two-way traffic	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Alarm systems broadcast for facility physical security	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Talk to State police & local sheriffs & request backup	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Run vehicle license tags & identify individuals (possible felons)	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Talk to FS investigators or other law enforcement officers while on patrol	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Talk to FS dispatcher (e.g. relay message to Commander while on patrol) or State dispatcher	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Talk to county or city officials to report crimes & coordinate sting operations	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Emergency response coordination with other USDA business units (i.e. trail, fire, & aviation crews)	LE, ADMIN, AIR NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Manage distress channel for all regional FS business units	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Coordination with air patrol	LE, AIR NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Task force coordination with federal agencies (e.g. drug busts, terrorism)	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Conduct investigations (primarily with counties)	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Coordinate with firefighting crews	LE, FIRE & AIR NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Receive contacts from field personnel reporting in	LE, ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Search for personnel not reporting in	LE, ADMIN, FIRE & AIR NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Tourist or field personnel transmit emergency messages to family members or vice versa	LE, ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Establish communications around green areas (e.g. Greenbank Observatory)	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
	All-hands communication for search & rescue (i.e. rural counties, fire department volunteers, horse/mule teams)	LE, ADMIN, FIRE & AIR NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Assist county or local agencies with stolen vehicles	LE NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
Dispatch – Supports 150 personnel during normal operations & up to 300 in emergencies	Coordinate with firefighters and provide assistance	LE, FIRE, AIR & ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Coordinate flood operations	LE, FIRE, AIR & ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Coordinate search and rescue	LE, FIRE, AIR & ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Assist with lost field personnel or visitors	LE, FIRE, AIR & ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Engineering assistance	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Follow aircraft (e.g. helicopters involved in logging operations or reconnaissance flights – Policy)	AIR & ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Insect and ice damage inspection coordination	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Geology, timber wildlife & personnel coordination	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	EMS rescue coordination	LE, FIRE, AIR & ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Call-in four-wheel drive vehicles or tow trucks as needed	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Relay messages to state/local agencies when needed	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Receive project updates				NATION WIDE
	Receive personnel report on mid-day change in location	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Monitor field personnel returning late	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
Fire Aviation and Air	Logistics and maintenance to support aircraft takeoffs & landings	FIRE & AIR NET	162-174 MHz	GOVT & NON GOVT	NATION WIDE
	Communications with ground facility	AIR NET	162-174 MHz	GOVT & NON GOVT	NATION WIDE
Ecosystem Analysis and Planning	Safety (i.e. if vehicle breaks down)	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Used for personnel check-in while camping (check-in required three times daily)	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
	Contact other USDA agencies on joint remote projects	ADMIN NET	162-174 MHz	GOVT	NATION WIDE
Sustainable Forest Ecosystems in the Central Appalachians	Safety (e.g. contact office if logging crew has accident)	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Contact remote workers in case of emergency	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Coordinate moving supplies	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Changing assignments during course of day	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Long term research studies	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Locate personnel	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
Health Enterprise	Coordinate with State wildlife commission	ADMIN NET	162-174 MHz 406-420 MHz	GOVT & NON GOVT	NATION WIDE
	Accident investigation	ADMIN, FIRE & LE NET	162-174 MHz 406-420 MHz	GOVT	NATION WIDE
	Examine fire burnovers	ADMIN NET	162-174 MHz 406-420 MHz	GOVT	NATION WIDE

Table C.1.4. FSA Mission Functions Supported by Federal Spectrum

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
Conservation and Environmental Programs Division/ Hazardous waste management program	Remotely operated spray irrigation treatment system for hazardous waste management	Telemetry system	406.225 415.225	Government	Utica, Nebraska
Administration	Operations	Portable system		Government	Wash DC & Kansas City, MO

Table C.1.5. FSIS Mission Functions Supported by Federal Spectrum

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
Food Safety and Inspection Service/ Compliance and Investigations	Used for investigative/personnel check-in while conducting investigations (Routine two-way traffic)	Conventional LMR	169-174 MHz	Government	Nationwide
	Remote travel safety and trouble reporting				
	Law Enforcement coordination with other Federal, State, or Local Law Enforcement Division				

Table C.1.6. NRCS Mission Functions Supported by Federal Spectrum

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
Snow Survey and Water Supply Forecasting	SNOwpack TELemetry system (SNOTEL). Utilizes meteor burst communication technology to telemeter data in Western United States and Alaska.		40.530 MHz and 41.530		
	Network provides daily and up to hourly snow pack information that is used by NRCS and the National Weather Service to produce over 1800 stream flow forecasts in the west.		40.530 MHz and 41.530		
	NRCS shares frequencies with the Forest Service for personnel safety reasons when conducting snow surveys and carrying out SNOTEL maintenance activities.		163.7125 MHz and 168.6125 MHz		
	Annual training: Overnight bivouacs in which the students are required to build and camp overnight in the shelters they constructed. Government radios are used during the course of this training session to ensure personnel safety for students.		163.7125 MHz and 168.6125 MHz		
	When outside air temperatures reach single digits, cold weather injuries can become life threatening and immediate medical attention might be required. Radios are used from the training areas back to the base where the base has telephone access to medical assistance.		163.7125 MHz and 168.6125 MHz		
SCAN (Soil Climate Analysis Network)	Utilizes meteor burst communication technology to telemeter data in Central and Eastern portions of the United States.		41.530 MHz, 44.20 MHz and 45.90 MHz		

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
	Soil-Climate information which supports drought monitoring and mitigation, biomass and energy potential, irrigation water management, fire risk assessment, crop production, disease and pest outbreak mitigation, stream flow forecasting, and reservoir operations management.		41.530 MHz, 44.20 MHz and 45.90 MHz		
Dam Safety	The engineering mission utilizes Government radio spectrum use in coordinating dam safety checks and to maintain contact with construction crews.		163.7125 MHz and 168.6125 MHz		
	Differentially corrected GPS units are required for land survey operations.		411.250 MHz, 411.3000 MHz, 411.3250 MHz, 411.4250 MHz, 415.000 MHz, and 415.5 MHz		
	Maintain two-way communication with contractors on construction sites.		163.7125 MHz and 168.6125 MHz		
	Personnel safety in case of accidents.		163.7125 MHz and 168.6125 MHz		

Table C.1.7. OIG Mission Functions Supported by Federal Spectrum

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
Office of the Inspector General	Routine two-way voice traffic	LMR	164.1375 one assignment	Government	US
	Routine two-way voice traffic	LMR	166.1250 one assignment	Government	US, AK, AZ, CA, HI, ID, NV, OR, and WA
	Surveillance Operations	LMR	167.3450 one assignment	Government	US
	Surveillance Operations	LMR	167.3575 two assignments	Government	AR, LA, NM, OK, TX, AL, FL, GA, SC, NC, TN, KY, AND MS
	Surveillance Operations	LMR	167.3600 one assignment	Government	CT, ME, MA, NH, NJ, PR, RI, VT, NY and VI
	Surveillance Operations	LMR	167.3750 one assignment	Government	AL, FL, GA, SC, NC, TN, KY, and MS
	Surveillance Operations	LMR	167.9750 one assignment	Government	AL, FL, GA, SC, NC, TN, KY, and MS
		LMR	168.0250 one assignment	Government	US, AK, AZ, CA, HI, ID, NV, OR, and WA
		LMR	168.1000 one assignment	Government	USP
		LMR	168.1250 one assignment	Government	CA
		LMR	168.1500 Nine assignments	Government	CO, IL, IN, MI, MN, OH, WI, IA, KS, MO, MT, NE, ND, SD, WY, AK, AZ, CA, HI, ID, NV, OR, & WA
		LMR	168.1750 14 assignments	Government	CA, CO, IA, KS, MO, ND, NE, SD, AK, AZ, CA, HI, ID, NV, OR, WA, MT, WY, & UT
	Surveillance Operations	LMR	168.4125 one assignment	Government	IL, IN, MI, MN, OH, WI

Business Unit	Function	System Description	Bandwidth & Frequencies	User Community	Geographic Coverage
	Special Operations	LMR	168.6000 three assignments	Government	DC, MD & USP
			168.6750 two assignments	Government	AK, AZ, CA, HI, ID, NV, OR & WA
		LMR	168.7000 three assignments	Government	MD & USP
		LMR	168.7250 one assignment	Government	CA
		LMR	168.7750 three assignments	Government	CO, IA, KS, MO, MT, NE, SD, WY, & UT
		LMR	168.9750 one assignment	Government	AR, LA, NM, OK, & TX
		LMR	169.1750 one assignment	Government	AK, AZ, CA, HI, ID, NV, OR, & WA
		LMR	169.9500 14 assignments	Government	CO, IA, KS, MO, ND, NE, SD, USA
		LMR	170.4750 6 assignments	Government	CT, NJ, NY, AL, FL, GA, SC, NC, TN, KY, MS, DE, DC, MD, PA, VA, WV, ME, MA, NH, PR, RI, VT, & VI
		LMR	170.6000 one assignment	Government	DE, DC, MD, PA, VA, & WV
		LMR	170.700 one assignment	Government	DE, DC, MD, PA, VA, & WV
	Special Operations	LMR	170.9750 two assignments	Government	MD & USP
		LMR	172.2500 five assignments	Government	CT, NJ, NY, RI, ME, MA, NH, PR, VT, & VI
	Special Operations, Surveillance Equipment,	LMR	172.3250 one assignment	Government	
	Surveillance Equipment	LMR	173.2500 one assignment	Government	AR, LA, NM, OK & TX