Statewide Communication Interoperability Plan (SCIP)

May 2016

Prepared in consultation with the
Office of Emergency Communications,
Department of Homeland Security

Pennsylvania

EXECUTIVE SUMMARY

The Commonwealth of Pennsylvania Statewide Communication Interoperability Plan (SCIP) is a stakeholder-driven, multi-jurisdictional, and multi-disciplinary statewide strategic plan to enhance interoperable and emergency communications. The SCIP is a mid-range (five years) strategic planning tool to help Pennsylvania prioritize resources, strengthen governance, identify future investments, and address interoperability gaps.

The purpose of the Pennsylvania SCIP is to:

- Provide strategic direction for those responsible for interoperable and emergency communications at the state, regional, and local levels.
- Explain to leadership and elected officials the vision for interoperable and emergency communications and demonstrate the need for funding.

The following are Pennsylvania's Vision and Mission for improving emergency communications operability, interoperability, and continuity of communications statewide.

Vision: To achieve effective, coordinated, and interoperable communications among all public safety/service and support agencies in Pennsylvania.

Mission: To facilitate and improve interoperable communications for all public safety/service and support agencies throughout Pennsylvania. Specifically:

- Provide strategic direction to decision makers at all levels.
- Promote interoperable communications using comprehensive outreach in training and exercise programs.
- Recommend technical and operational standards and procedures to build upon and sustain existing communications investments and to guide future investments.

The following strategic goals represent the priorities for delivering Pennsylvania's vision for interoperable and emergency communications.

- <u>Governance</u>
    - Strengthen the Public Safety Communications Council (PSCC) through continued participation and evolution to serve as the authoritative, representative, coordinating body for operable and interoperable communications statewide.
    - Support PEMA and the 9-1-1 Advisory Board as needed to implement interoperable communications strategies and initiatives as well as participate in Title 35 rewrite activities relative to interoperable communications.
    - Establish and continue to develop standards for communications networks convergence to ensure and promote interoperability.
    - Coordinate public safety broadband activities between FirstNet, the state Single Point of Contact (SPOC), the PSCC, regions, counties, and local first responders.

- Standard Operating Procedures (SOPs)
    - Manage the life cycle of standard operating procedures (SOPs) (e.g., development, review, update, gap identification).
    - Ensure requesting intra-Commonwealth agencies provide contact information and location for all responding units upon initial request.
    - Establish a matrix of county PSAP contact methods available to public safety personnel traversing the Commonwealth.
    - Establish standard operating procedures (SOPs) for national interoperability frequencies statewide overlays.
    - Identify and evaluate existing and the need for new wireless data SOPs.
- Technology
    - Coordinate with PEMA on PSAP connectivity statewide. Expand PSAP connectivity to statewide networks (e.g., STARNet, ESINet).
    - Increase the adoption of P25 technology at all levels of government as well as agreements for interoperating using P25.
    - Work with counties to expand and explore interoperability concepts to include sharing spectrum and infrastructure to effectively increase capacity and coverage of the STARNet, and to support opportunities for counties to join it.
    - Promote increased interoperability through use of multiband radio technology. (Example: PSP used multiband radio technology to establish direct interoperability with every county except four due to compatibility issues with proprietary technology or use of low band frequencies.)
    - Identify and implement a statewide communications asset management system.
    - Continue to improve interoperability at the State and local level by exploring ISSI technology.
    - Ensure that strategic plans for existing and near term planned public safety communications systems remain aware and inclusive of NPSBN planning and build out activities.
- Training and Exercises
    - Incorporate interoperable communications into all training and exercises statewide.
- Outreach and Information Sharing
    - Develop formal, written communications strategies to identify, catalog, and share communications assets and topics.
    - Present interoperable communications updates at the annual Pennsylvania Emergency Management Agency (PEMA) conference.

- Develop strategic planning processes for FirstNet outreach to stakeholders.
- Prepare for and engage in consultation and outreach processes for the NPSBN.

- Life Cycle Funding
  - Investigate funding options for statewide interoperability infrastructure and state-to-county demarcation points.

Pennsylvania is committed to employing strong interoperable communications governance, coordination, and outreach to provide first responders and the wider public safety community the tools, training, and support needed to ensure the safety and security of its citizens.

The PSCC and public safety personnel will utilize this SCIP to guide and implement interoperable communications solutions throughout the Commonwealth in conjunction with federal, state, county, local, and association partners. Progress on the SCIP will be reported on an annual basis both to OEC and to stakeholders in Pennsylvania to ensure open access to information about the interoperable communications goals and initiatives outlined in this SCIP.

Statewide Interoperability Coordinator:

James Mark Wrightstone

May 16, 2016

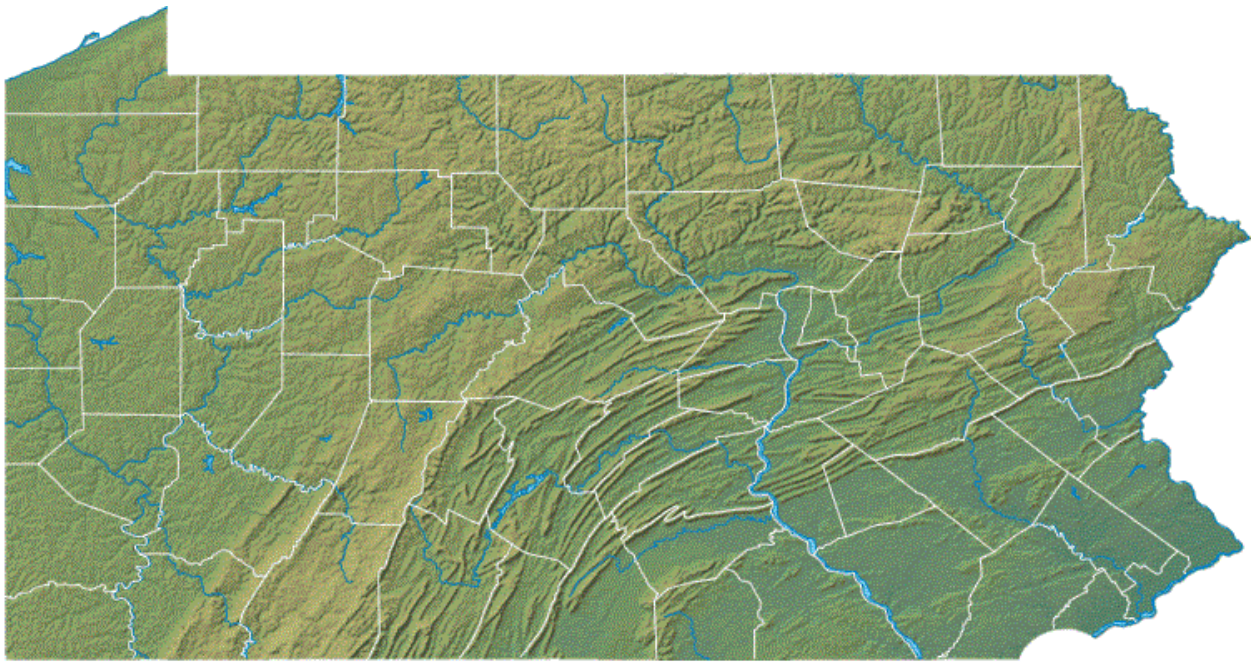


Table of Contents

EXECUTIVE SUMMARY 2
1. INTRODUCTION 6
2. PURPOSE 11
3. OVERVIEW 12
4. VISION AND MISSION 13
5. STRATEGIC GOALS AND INITIATIVES 13
5.1 GOVERNANCE 13
5.2 STANDARD OPERATING PROCEDURES (SOPS) 18
5.3 TECHNOLOGY 21
5.4 TRAINING AND EXERCISES 26
5.5 USAGE 27
5.6 OUTREACH AND INFORMATION SHARING 27
5.7 LIFE CYCLE FUNDING 30
6. IMPLEMENTATION 31
6.1 ACTION PLAN 31
6.2 MEASURES OF SUCCESS 31
6.3 MANAGEMENT OF SUCCESS 32
6.4 STRATEGIC PLAN REVIEW 32
7. REFERENCE MATERIALS 32
APPENDIX A: LIST OF ACRONYMS 33
APPENDIX B: REFERENCE MATERIALS 34
APPENDIX C: PA-STARNET SOP: USING THE UHF OVERLAY 35
APPENDIX D: PA-STARNET SOP: USING THE VHF OVERLAY 38
APPENDIX E: PA-STARNET UHF OVERLAY MAPS 40
APPENDIX F: PA-STARNET VHF OVERLAY MAPS 66
APPENDIX G: NETWORK CONVERGENCE DOCUMENT 92
APPENDIX H: EXHIBIT: SAMPLE INTEROPERABILITY AGREEMENT 99

1. Introduction

The Pennsylvania Statewide Communications Interoperability Plan (SCIP) is a stakeholder-driven, multi-jurisdictional, and multi-disciplinary statewide strategic plan to enhance interoperable and emergency communications. The SCIP is a mid-range (five years) strategic planning tool to help Pennsylvania prioritize resources, strengthen governance, identify future investments, and address interoperability gaps. This document contains the following planning components:

- Introduction – Provides the context necessary to understand what the SCIP is and how it was developed.
- Purpose – Explains the reasons for and the functions of the SCIP in Pennsylvania.
- Overview – Provides an overview of the State's current and future emergency communications environment, and defines ownership of the SCIP.
- Vision and Mission – Articulates the State's five-year vision and mission for improving emergency communications operability, interoperability, and continuity of communications at all levels of government.
- Strategic Goals and Initiatives – Outlines the strategic goals and initiatives aligned with the five-year vision and mission of the SCIP and consists of the following sections: Governance, Standard Operating Procedures (SOPs), Technology, Training and Exercises, Usage, Outreach and Information Sharing, and Life Cycle Funding.
- Implementation – Describes the process to evaluate the success of the SCIP and to conduct SCIP reviews to ensure it is up-to-date and aligned with the changing internal and external environment.
- Reference Materials – Identifies additional information about interoperable and emergency communications to support the continued development of the SCIP.

Figure 1 depicts how these components of the SCIP interrelate to develop a comprehensive plan for improving interoperable and emergency communications.

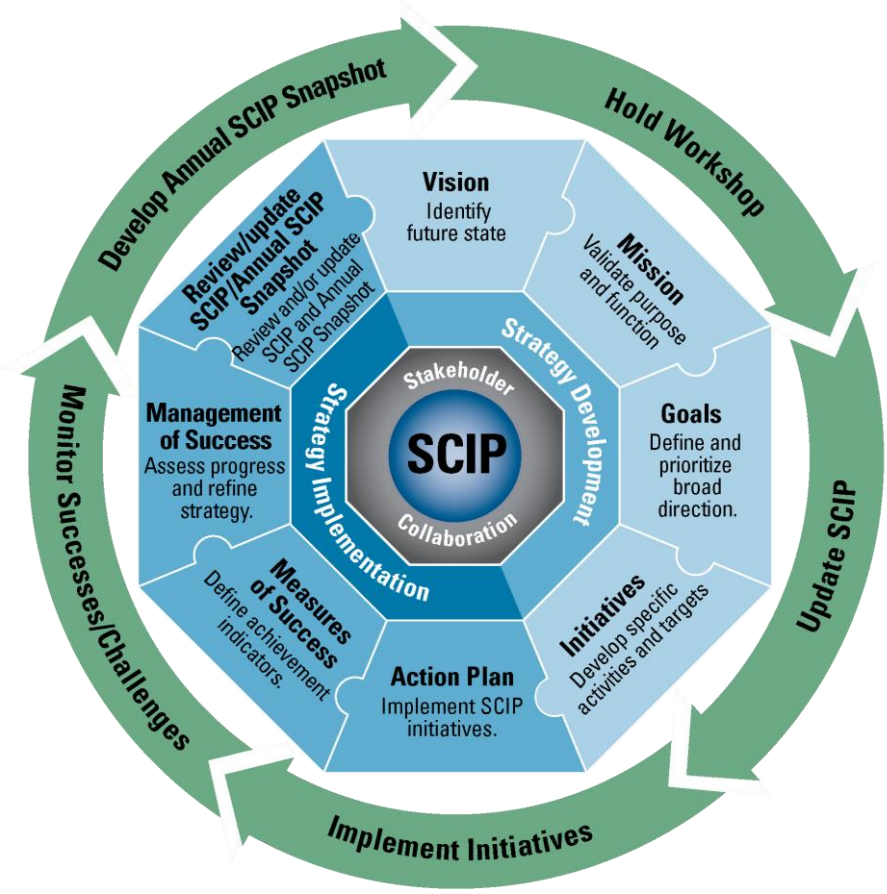


Figure 1: SCIP Strategic Plan and Implementation Components

The Pennsylvania SCIP is based on an understanding of the current and mid-range interoperable and emergency communications environment. Pennsylvania has taken significant steps towards enhancing interoperable and emergency communications, including:

- New opportunities for interoperability and partnering. Currently, it is difficult to share proprietary land mobile radio technology with counties due to the fact the vast majority are aligned with P25 open standards. However, PA-STARNet currently shares radio tower space and microwave network capacity with 11 local and regional networks utilizing 34 radio sites. STARNet's microwave network is a robust system capable of being leveraged for initiatives for increased interoperability
- Continual improvements to county radio systems by local system owners.
- Ongoing meetings of the Public Safety Communications Council (PSCC), a governance and advisory group, that will have a regular meeting schedule and personnel from a variety of public safety organizations.

- Enhancement of statewide training for radio system end-users, 9-1-1 operators, and other first responders through videos, classroom courses, five regional communications exercises, and annual task force exercises.
- Promotion of broadband capabilities in collaboration with First Responder Network Authority (FirstNet) and in relation to the State and Local Implementation Grant Program (SLIGP), including statewide data collection.
- Successful use of interoperable technology and procedures for large, nationally-prominent events.
- Progress on the upcoming initiative to change the statewide land mobile radio network to Project 25 (P25).

However, more remains to be done to achieve Pennsylvania's vision for interoperable communications. It is also important to note that this work is part of a continuous cycle as Pennsylvania will always need to adapt to evolving technologies, operational tactics, and changes affecting key stakeholders. In the next five years, Pennsylvania will encounter challenges in operability, interoperability, geography, aging equipment and systems, emerging technologies, and sustainable funding.

Wireless voice and data technology is evolving rapidly and efforts are underway to determine how to leverage these new technologies to meet the needs of public safety. For example, the enactment of the Middle Class Tax Relief and Job Creation Act of 2012, specifically Title VI, for Public Safety Communications, authorizes FirstNet to deploy the Nationwide Public Safety Broadband Network (NPSBN). The NPSBN is intended to be a wireless, interoperable nationwide communications network that will allow members of the public safety community to securely and reliably gain and share information with their counterparts in other locations and agencies. New policies and initiatives such as the NPSBN bring additional changes and considerations for future planning efforts and require an informed strategic vision to properly account for these changes. Figure 2 illustrates a public safety communications evolution by describing the long-term transition toward a desired converged future.

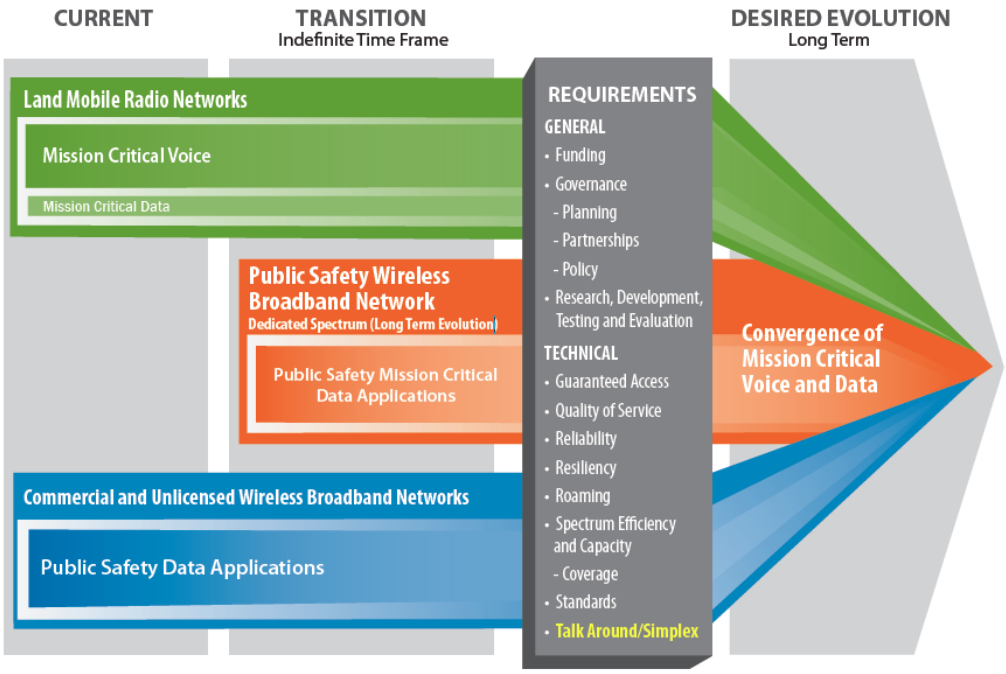


Figure 2: Public Safety Communications Evolution

Integrating capabilities such as wireless broadband provides an unparalleled opportunity for the future of interoperable communications in Pennsylvania. It may result in a secure path for information-sharing initiatives, Public Safety Answering Points (PSAP), and Next Generation 9-1-1 (NG9-1-1) integration. Broadband will not replace Land Mobile Radio (LMR) voice systems in the near future due to implementation issues with planning, deployment, technology, and cost. A cautious approach to this evolving investment is needed.

Because the deployment timeline for the NPSBN is not well defined, Pennsylvania will need to keep up-to-date with the planning for and build-out of the NPSBN in coordination with FirstNet. Planning for this network will require continuing education and commitment at all levels of government and across public safety disciplines to document user requirements.

It will also be necessary to develop and maintain strategic partnerships with a variety of stakeholder agencies and organizations at the national, state, regional, and local levels to design effective policy and governance structures that address new and emerging interoperable and emergency communications technologies.

During this process, investments in LMR will continue to be necessary. In the near term, wireless data systems or commercial broadband will complement LMR. More information on the role of these two technologies in interoperable and emergency communications is available in the Department of Homeland Security (DHS) Office of Emergency Communications (OEC) Public Safety Communications Evolution brochure, identified in Appendix B.

Additionally, achieving sustainable funding in the current fiscal climate is a priority for Pennsylvania. As state and federal grant funding diminishes, states need to identify alternative funding sources to continue improving interoperable and emergency communications for voice and data systems. Key priorities for sustainable funding in Pennsylvania are:

- Continue to enhance the interconnectivity of intra-state regional and local networks and systems.
- Continue to pursue cross-border/inter-state regional efforts.
- Utilize SLIGP funding for NPSBN planning.
- Develop a comprehensive matrix of public safety assets available to public safety personnel traversing the Commonwealth.
- Explore options for a future P25-capable system.

More information on emergency communications system life cycle, cost planning, and budgeting is available in OEC's System Life Cycle Planning Guide, identified in Appendix B.

The Interoperability Continuum, developed by SAFECOM and shown in Figure 3, serves as a framework to address all of these challenges and to continue improving operable/interoperable and emergency communications. It is designed to assist emergency response agencies and policy makers as they plan and implement interoperability solutions for voice and data communications.

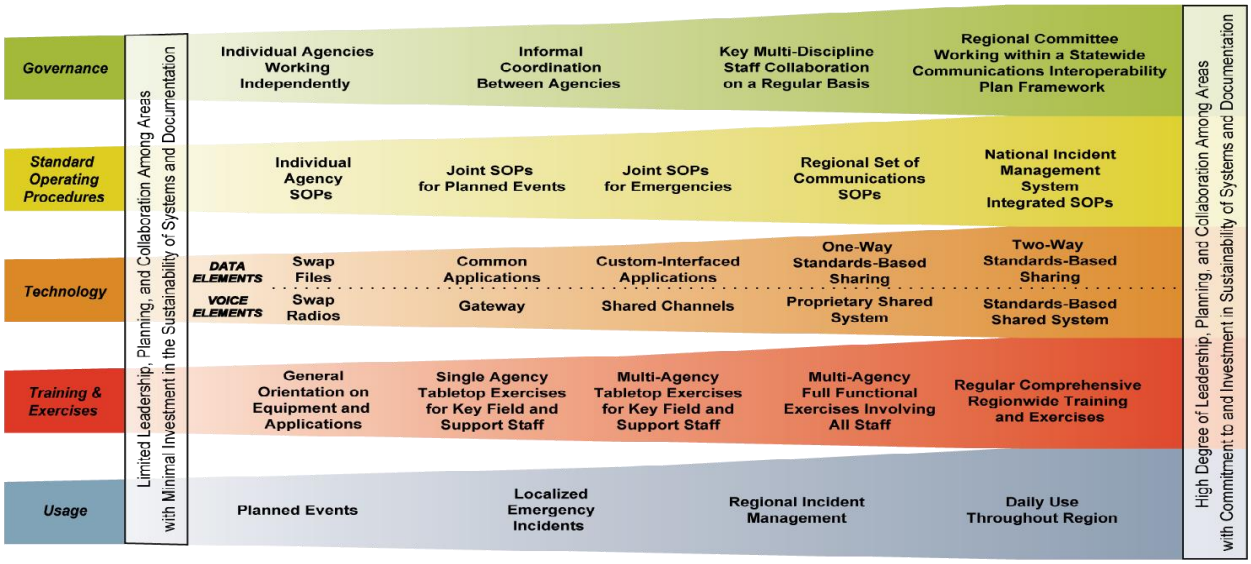


Figure 3: The Interoperability Continuum

The Continuum identifies five critical elements that must be addressed to achieve a successful interoperable communications solution:

- Governance – Collaborative decision-making process that supports interoperability efforts to improve communication, coordination, and cooperation across disciplines and jurisdictions. Governance is the foundation of Pennsylvania's efforts to address communications interoperability.

- SOPs – Policies, practices, and procedures that guide emergency responder interactions and the use of interoperable communications solutions.

- Technology – Systems and equipment that enable emergency responders to share voice and data information efficiently, reliably, and securely.

- Training and Exercises – Scenario-based exercises used to demonstrate communications interoperability and to familiarize the public safety community with equipment and procedures.

- Usage – Familiarity with interoperable communications technologies, systems, and operating procedures used by first responders to enhance interoperability.

More information on the Interoperability Continuum is available in OEC's Interoperability Continuum brochure, identified in Appendix B.

2. Purpose

The purpose of the Pennsylvania SCIP is to:

- Provide strategic direction for those responsible for interoperable and emergency communications at the state, regional, and local levels.
- Explain to leadership and elected officials the vision for interoperable and emergency communications and demonstrate the need for funding.

The development and execution of the SCIP assists Pennsylvania with addressing the results of the National Emergency Communications Plan (NECP) Goals and the Federal government with fulfilling the Presidential Policy Directive 8 (PPD-8) National Preparedness Goal for Operational Communications.

In addition to this SCIP, Pennsylvania will develop an annual SCIP Snapshot that will be shared with OEC and other stakeholders to highlight recent accomplishments and demonstrate progress toward achieving the goals and initiatives identified in the SCIP. More information on the SCIP Snapshot is available in Section 6.3.

This SCIP is owned by the PSCC and managed by the Pennsylvania Statewide Interoperability Coordinator (SWIC) in coordination with the PSCC and any subcommittees and ad hoc groups it may form. The SWIC has the authority to and is responsible for making decisions regarding this plan and will regularly brief the PSCC. The SWIC is also responsible for ensuring that this plan is maintained and implemented statewide. This document was updated during the 2015 SCIP Update Workshop, in which multi-jurisdictional and multi-disciplinary representatives collaborated to establish an updated vision and mission, develop strategic goals, and identify initiatives to achieve those goals.

3. Overview

Pennsylvania is refocusing its SCIP to connect unique and often localized systems and efforts across the Commonwealth toward a common five-year interoperable and emergency communications vision.

The governor established the PSCC via Executive Order 2014-06 (EO), authorizing the Council as Pennsylvania's interoperability governing body. The PSCC will create by-laws, subcommittees, and a meeting schedule to accomplish the mission prescribed in the EO. The SWIC, in consultation with the governor's office and other relevant public safety personnel will work to fill the required positions. The Statewide Radio Network Division (SRND) will provide initial staff support, and then the PSCC can determine members of subcommittees and ad hoc groups, as well as work to secure permanent administrative support. The PSCC will establish subcommittees that allow for bottom-up communications of interoperable communications issues and for technical and subject matter experts to assist in further interoperable communications work throughout the Commonwealth.

Pennsylvania has nine regional counter-terrorism task force (RCTF) bodies that work on a variety of homeland security-related activities. While interoperable communications is not the sole focus of the RCTFs, they do have county personnel who work on communications, many of whom act as local points of contact to the SWIC.

Pennsylvania's statewide radio system is PA-STARNet, a network of more than 1,000 tower and cell sites. This network serves as the statewide backbone for interoperable communications. The organization that oversees the operation of PA-STARNet is the Statewide Radio Network Division (SRND), a division of the Pennsylvania State Police. Additionally, SRND has been assigned the lead role in promoting interoperability within the Commonwealth. It will do so under guidance from the PSCC.

Pennsylvania's public safety communications environment includes numerous systems under local control. Coordinated local, county, regional, and statewide interoperability efforts vary; however, significant efforts have been made to connect the state-level system to county PSAPs and other dispatch centers, which act as a conduit to local first responders. Note: PEMA is responsible for PSAP interconnectivity statewide. Also, efforts are also underway to connect PA-STARNet with regional emergency communications systems.

There is no single tool that solves interoperable communications for all of Pennsylvania, but the Commonwealth is working toward strengthened governance to align efforts, leverage opportunities, identify solutions, and deepen statewide interoperability as well as provide communications assistance for any public safety personnel who travel across the state. Examples can be found in the Appendices:

- Appendix C - PA-STARNet SOP: Using the UHF Overlay
- Appendix D - PA-STARNet SOP: Using the VHF Overlay
- Appendix E - PA-STARNet UHF Overlay Maps
- Appendix F - PA-STARNet VHF Overlay Maps
- Appendix G - Network convergence document

- Appendix H - Exhibit: Sample interoperability agreement

4. Vision and Mission

The Vision and Mission section describes the Pennsylvania vision and mission for improving emergency communications operability, interoperability, and continuity of communications statewide.

Pennsylvania Interoperable and Emergency Communications Vision:

To achieve effective, coordinated, and interoperable communications among all public safety/service and support agencies in Pennsylvania.

Pennsylvania Interoperable and Emergency Communications Mission:

To facilitate and improve interoperable communications for all public safety/service and support agencies throughout Pennsylvania. Specifically:

- Provide strategic direction to decision makers at all levels.
- Promote interoperable communications using comprehensive outreach in training and exercise programs.
- Recommend technical and operational standards and procedures to build upon and sustain existing communications investments and guide future investments.

5. Strategic Goals And Initiatives

The Strategic Goals and Initiatives section describes the statewide goals and initiatives for delivering the vision for interoperable and emergency communications. The goals and initiatives are grouped into seven sections: Governance, SOPs, Technology, Training and Exercises, Usage, Outreach and Information Sharing, and Life Cycle Funding.

5.1 Governance

The Governance section of the SCIP outlines the future direction of the Pennsylvania governance structure for interoperable and emergency communications. The PSCC has been named the advisory body for statewide interoperability in the Commonwealth. The PSCC has undergone changes due to a new executive order, and as a result the Strategic Workgroup is currently serving as the acting PSCC.

Pennsylvania will continue its commitment to interoperable public safety communications by allowing representation from different disciplines and levels of government to begin implementing the goals and initiatives of this SCIP.

The Executive Order authorizes the PSCC to:

- Serve as the single body to coordinate the various aspects of public safety communications for the Commonwealth of Pennsylvania.
- Charter subcommittees that focus on specific issues relating to public safety communications.
- Provide recommendations to relevant agencies to achieve operability, interoperability, and continuity of emergency communications, establish inter-jurisdictional agreements, ensure grants meet all criteria, and develop polices, standards, and procedures for interoperable communications.
- Oversee the implementation of the SCIP and provide general input to SRND and the SWIC on matters relating to implementation.
- Provide strategic direction for public safety radio communications within the Commonwealth through outreach by members to their respective organizations or associations.

More information about the authorizing EO for the PSCC can be found in the Reference Materials section of this SCIP, and Appendix B.

While the PSCC establishes its by-laws, administrative infrastructure, subcommittees, and other work, SRND will continue to serve as the statewide lead for promoting public safety communications interoperability within the Commonwealth. It will then advise the PSCC through the SWIC position, currently residing in SRND.

At the county level, the Pennsylvania uses its nine RCTFs, which are aligned by county borders, to support effective management and coordination of interoperable and emergency communications issues.

Because Pennsylvania is a commonwealth, it grants responsibility for providing services, including public safety, to local jurisdictions. In this environment, most police and fire department communication systems are local in scope, including locally-purchased subscriber equipment. As a result, the Commonwealth's public safety communications environment includes numerous distinct systems under local control. Coordinating statewide interoperability governance through a single, empowered governing body to align the varied efforts statewide will complement the Commonwealth's existing system of bottom-up communications governance.

Pennsylvania's goals and initiatives related to Governance:

Goal	Description	
Governance-1	Strengthen the Public Safety Communications Council (PSCC) through continued participation and evolution to serve as the authoritative, representative, coordinating body for operable and interoperable communications statewide.	
	Initial State	Target State
	EO governing PSCC has been signed, but PSCC has not met	PSCC meeting regularly with 80% of the committee slots filled
Initiative	Owner	Completion
Governance-1.1 Coordinate with the governor's staff to name a chairperson and nominate members.	SRND, PEMA, SWIC	July 2016
Governance-1.2 Assist the PSCC chairperson in setting up and running the first meeting.	SRND	August 2016
Governance-1.3 Present the draft SCIP at a PSCC meeting.	SRND	September 2016

Goal	Description	
Governance-2	Support PEMA and the 9-1-1 Advisory Board as needed to implement interoperable communications strategies and initiatives as well as participate in Title 35 rewrite activities relevant to interoperable communications.	
	Initial State	Target State
	Changes to 9-1-1 laws are attempted periodically. Act 12 of 2015 sunsets in June of 2019. Title 35 rewrite is in early stages.	Legislative reviews are shared among affected organizations.
Initiative	Owner	Completion
Governance-2.1 Establish a PSCC subcommittee on legislative efforts relevant to interoperable communications.	SRND, PEMA, OA	September 2016
Governance-2.2 Review legislative efforts to change Title 35.	SRND, PEMA	ongoing

Goal	Description	
Governance-3	Establish and continue to develop standards for communications networks convergence to ensure and promote interoperability.	
	Initial State	Target State
	Disparate, fledgling efforts to converge networks	All networks convergence efforts are understood at all levels of government
Initiative	Owner	Completion
Governance-3.1 Establish a PSCC subcommittee on networks convergence.	SRND, PEMA, OA	October 2016

Goal	Description	
Governance-4	Coordinate public safety broadband activities between FirstNet, the state Single Point of Contact (SPOC), the PSCC, regions, counties, and local first responders.	
	Initial State	Target State
	Limited broadband coordination	Point of Contact for broadband activities identified and contact information disseminated Commonwealth-wide
Initiative	Owner	Completion
Governance-4.1 Engage stakeholders by establishing sub-committee working groups to focus on broadband/FirstNet	PSCC	August 2016, ongoing
Governance-4.2 Identify and evaluate existing partnerships and determine new partners that may enhance the State's position with regard to the FirstNet Commonwealth plan	SWIC	August 2016
Governance-4.3 Engage private/commercial sector companies to prepare for NPSBN planning and implementation	SWIC	ongoing
Governance-4.4 Conduct meetings with local and county agencies and other interested stakeholders to gather input for NPSBN planning and implementation	SWIC	ongoing
Governance-4.5 Conduct informational meetings with stakeholders to provide information on FirstNet and the upcoming steps that will be taken	SWIC or designee	June 2016, ongoing
Governance-4.6 Participate in consultation process resulting in a Commonwealth plan	SWIC, SPOC	2016, 2017

5.2 Standard Operating Procedures (SOPs)

The SOPs section of the SCIP identifies the framework and processes for developing and managing SOPs statewide. Pennsylvania adopted national standards for developing statewide SOPs, including the National Incident Management System (NIMS)/Incident Command System (ICS). It also follows other guidelines, including the National Interagency Fire Center, National Crime Information Center, and the National Response Framework (NRF). SOPs for PA-STARNet were developed in 2010 and updated in 2011. The SOPs serve as the consolidated reference for state, county, and municipal agencies and emergency responders.

Typically developed at the local agency level, SOPs vary across the Commonwealth in terms of detail and/or frequency of testing and updates. The PSCC will convene a subcommittee that will facilitate the sharing of best practices and SOPs. While SOPs are not currently developed or managed statewide, Pennsylvania is committed to sharing knowledge and best practices to create a better operating environment for public safety personnel.

In addition, Pennsylvania plans to work with county PSAPs to create a matrix of contact paths available to public safety entities traversing the Commonwealth.

Pennsylvania's goals and initiatives for SOPs:

Goal	Description	
SOP-1	Manage the life cycle of standard operating procedures (SOPs) (e.g., development, review, update, gap identification).	
	Initial State	Target State
	No SOP Subcommittee exists to do this	SOP Subcommittee meets regularly and has the appropriate staff to research and disseminate SOPs
Initiative	Owner	Completion
SOP-1.1 Identify and invite subcommittee membership	SWIC	June 2016
SOP-1.2 Conduct outreach to stakeholders to announce new subcommittee and provide point(s) of contact	SWIC	July 2016

Goal	Description	
SOP -2	Ensure requesting intra-Commonwealth agencies provide contact information and location for all responding units upon initial request.	
	Initial State	Target State
	Limited and fragmented SOPs with varying effectiveness across the Commonwealth	100% completion of ICS/NIMS compliant communications plans prior to regular or unplanned deployments
Initiative	Owner	Completion
SOP-2.1 Promote ICS and NIMS best practices for the development of communication plans prior to and when deploying	SWIC	January 2017

Goal	Description	
SOP -3	Establish a matrix of county PSAP contact methods available to public safety personnel traversing the Commonwealth.	
	Initial State	Target State
	There is no central repository of PSAP hailing methods in the Commonwealth	A published and available catalog of PSAP hailing methods with regularly updated contact information
Initiative	Owner	Completion
SOP-3.1 Survey existing PSAPs across the Commonwealth to identify all hailing methods. Note: PSAP inventory was conducted and may contain elements requested.	PEMA	May 2016
SOP-3.1 Provide PEMA the template for survey results.	SWIC	March 2016
SOP-3.2 Establish a catalog of all hailing methods by county.	PSCC, SOP Subcommittee	October 2016
SOP-3.3 Work with the 9-1-1 Advisory Board to include the contact methods in the annual 9-1-1 report produced and submitted by PEMA.	PEMA	January 2017

Goal	Description	
SOP -4	Establish standard operating procedures (SOPs) for national interoperability frequencies statewide overlays.	
	Initial State	Target State
	Uneven implementation of programming and utilization of national interoperability frequencies	SOPs developed and disseminated
Initiative	Owner	Completion
SOP-4.1 Develop a plan for National Emergency Police Frequency (NEPF), VTAC, 8TAC, and UTAC SOPs	SWIC, Subcommittee, and Operations Subcommittee	December 2016
SOP-4.2 Review SOPs with agency stakeholders and incorporate feedback	SWIC	June 2017
SOP-4.3 Promote SOPs and usage	SWIC, PSCC, SOP Subcommittee	June 2017

Goal	Description	
SOP -5	Identify and evaluate existing and the need for new wireless data SOPs.	
	Initial State	Target State
	No wireless data SOPs in place and no evaluation process in place	Evaluation and SOP writing process for wireless data SOPs implemented and SOPs are written and distributed as needed
Initiative	Owner	Completion
SOP-5.1 Research and recommend best practices for codification as SOPs for specific technologies, services, or processes	SRND, PSCC Subcommittee	September 2016
SOP-5.2 Create/establish the repository facility and management practices for content	SRND	November 2016
SOP-5.3 Disseminate and encourage agencies to use a central repository for developed SOPs	SWIC, PSCC	February 2017

5.3 TECHNOLOGY

The Technology section of the SCIP outlines: the plan to maintain and upgrade existing technology; the roadmap to identify, develop, and implement new and emerging technology solutions; and the approach to survey and disseminate information on current and future technology solutions to ensure user needs are met.

PA-STARNet provides services to 22 state agencies with 29,233 two-way radios used by first responders and 1,029 antenna sites. The network handled 50 million push-to-talk voice communications in 2015 and 10 million data transactions using the PSP mobile data terminals. PA-STARNet employs a robust microwave transport network that supports a wide range of applications in addition to its primary purpose of providing mission critical backbone connectivity to LMR sites. Expanded network capabilities include connections to PSP stations for radio communications, increased enterprise network bandwidth at PSP stations, network augmentation for other state agencies, and connections with emergency services IP networks (ESINETs) and local 9-1-1 centers for interoperability. Note: Coordinate with PEMA on PSAP connectivity statewide. For interoperability with county emergency responders, radios and/or gateways are installed in nearly every Public Safety Answering Point (PSAP), a.k.a. 9-1-1 centers, where they are integrated into 9-1-1 dispatcher communication consoles.

Upgrade of PA-STARNet Land Mobile Radio (LMR) capabilities from proprietary technology to the Association of Public Safety Communications Officials (APCO) Project 25 (P25) open standards is a high priority. The PA-STARNet LMR system has been in existence since 2002. It is currently based on proprietary technology – OpenSky. The introduction of open standards, based on P25, has opened the field of radios to multiple vendors operating on the same P25 network, thereby allowing the customer to choose from among a variety of radio manufacturers that best meets their needs in a competitive environment. The current model of proprietary mobile radio was introduced in 2003 and was discontinued in 2009; its service parts were discontinued in 2014. Rather than replacing the existing fleet of radios and effectively lock into proprietary technology with an unknown future, plans are underway to replace the LMR infrastructure to achieve P25 compliance in parallel with plans to replace current subscriber radios.

Another primary technology challenge is interconnecting the numerous systems in use throughout the state. Pennsylvania's technology-related strategic goals and initiatives reflect the need to identify interoperability solutions given existing equipment, systems, and networks in place throughout the state. As broadband and other systems such as the Emergency Services IP Network (ESINet) for PSAPs expand, interconnectivity between state and local systems will play a greater role in facilitating interoperable and resilient public safety communications.

Pennsylvania's goals and initiatives for Technology:

Goal	Description	
Technology-1	Work with PEMA to expand PSAP connectivity statewide, including statewide networks (e.g., STARNet, ESINet).	
	Initial State	Target State
	No definitive record of how all county PSAPs are connected to statewide networks	100% of PSAPS surveyed for connectivity gaps and a plan developed to address the gaps
Initiative	Owner	Completion
Technology-1.1 Conduct a gaps assessment of connectivity per county	PEMA	October 2016
Technology-1.2 Research connectivity options	County 9-1-1 Centers, PEMA	February 2017
Technology-1.3 Develop connectivity plan based on assessment and available research	County 9-1-1 Centers, PEMA	October 2017
Technology-1.4 Prioritize and execute connectivity plan, based on available funding	County 9-1-1 Centers, PEMA	October 2017

Goal	Description	
Technology-2	Increase the adoption of P25 technology at all levels of government as well as the use of agreements for interoperating using P25.	
	Initial State	Target State
	Some P25 systems exist; some interconnect. Few system operators are aware of who else has or is planning to use P25.	All levels of government in PA are familiar with and routinely consider P25 technology for their communication needs.
Initiative	Owner	Completion
Technology-2.1 Promote information sharing about P25 technology, P25 build-out, and P25 interoperating at all levels of government.	SWIC	May 2017
Technology-2.2 Keep all stakeholders apprised of the progress in updating the LMR technology of STARNet from proprietary technology to P25 standards.	SRND	November 2016, ongoing

Goal	Description	
Technology -3	Work with counties to expand and explore interoperability concepts to include sharing spectrum and infrastructure to effectively increase capacity and coverage of the STARNet, and to support opportunities for counties to join it.	
	Initial State	Target State
	Interaction between STARNet and county emergency comm leaders has been sporadic.	All county emergency communications leaders understand opportunities for interoperability with statewide radio.
Initiative	Owner	Completion
Technology-3.1 Outreach to counties	SWIC	January 2017, ongoing
Technology-3.2 Create a template documents for MOUs for interoperating.	SWIC	January 2017, ongoing

Goal	Description	
Technology -4	Promote increased interoperability through use of multiband radio technology. (Example: PSP used multiband radio technology to establish direct interoperability with every county, except four due to compatibility issues with proprietary technology or use of low band frequencies.)	
	Initial State	Target State
	Knowledge about multiband radio opportunities varies widely around the state.	Public safety agencies across the state are aware of multiband radio opportunities.
Initiative	Owner	Completion
Technology-4.1 Outreach to agencies and counties.	SRND, SWIC	January 2017, ongoing
Technology-4.2 Present, at yearly PA APCO conference, opportunities for, and lessons learned about , multiband radio.	SRND, SWIC	March 2017, ongoing
Technology-4.3 Create and maintain a current/best practices reference document for opportunities in using multiband radio.	SRND, SWIC	October 2017, ongoing

Goal	Description	
Technology-5	Identify and implement a statewide communications asset management system.	
	Initial State	Target State
	CASM identified as statewide management system, but not actively used	SRND and RCTF CASM managers identified, trained, and using the system regularly
Initiative	Owner	Completion
Technology-5.1 Conduct Communication Assets Survey and Mapping (CASM) training to determine if suitable as the single statewide inventory system	SRND	November 2017
Technology-5.2 Identify CASM managers for all regions	SWIC, Regional PEMA offices	June 2017
Technology-5.3 Train regional CASM managers	SWIC, SRND	December 2017

Goal	Description	
Technology-6	Continue to improve interoperability at the State and local level by exploring ISSI technology.	
	Initial State	Target State
	ISSI technology is not currently utilized within the Commonwealth	Completed ISSI pilot and report on recommendations and next steps
Initiative	Owner	Completion
Technology-6.1 Identify funding for an ISSI pilot	SWIC	December 2017
Technology-6.2 Identify a pilot location	SWIC, Regions	December 2017
Technology-6.3 Conduct a pilot	SWIC, Pilot County	July 2018
Technology-6.4 Assess the results of the pilot	SWIC	October 2018

Goal	Description	
Technology-7	Ensure that strategic plans for existing and near term planned public safety communications systems remain aware and inclusive of NPSBN planning and build out activities.	
	Initial State	Target State
	Broadband information has been somewhat disseminated	Broadband information is regularly disseminated throughout the Commonwealth
Initiative	Owner	Completion
Technology-7.1 Coordinate with local stakeholders to identify current assets and capabilities (e.g., existing fiber infrastructure resources, mobile data applications); consider using the Communication Assets Survey and Mapping (CASM) tool	SWIC, SRND CASM Administrator	August 2016, ongoing
Technology-7.2 Assess cybersecurity and data security needs and gather data about the security/privacy safeguards available for public safety data use and technology	SRND	September 2016
Technology-7.3 Assess wireless data usage and coverage needs	SRND, SPOC	October 2016, ongoing
Technology-7.4 Consistent with FirstNet/SLIGP direction conduct asset inventory of existing or near term planned systems and potential support infrastructures that may support the FirstNet State Plan	SPOC, SRND	November 2016
Technology-7.5 Determine potential and exploit intersections between Next Generation 9-1-1 initiatives and NPSBN initiatives	PEMA, SPOC	November 2016

5.4 Training and Exercises

The Training and Exercises section of the SCIP explains Pennsylvania's approach to ensuring that emergency responders are familiar with interoperable and emergency communications equipment and procedures. While training was previously conducted by individual agencies, SRND has appointed a training manager and assumed full responsibility for all training for the statewide system.

Various exercises are conducted in the state throughout the year. The Pennsylvania Emergency Management Agency (PEMA) conducts an annual weather exercise every March. Each of the 67 counties is required by legislation to participate in this annual exercise; interoperable voice and data communications is an essential component.

Each of the nine RCTFs is required to conduct an annual regional exercise. Some exercises span several days and are geographically dispersed, while others are focused on one particular area and are several hours long. Many of these exercises include federal, state, county, and first responders and use emergency equipment that would be used in real-life scenarios, including the use of specific communications equipment.

All of the exercises mentioned involve communications among multiple disciplines, but communications are not always a specific objective. The PSCC will form a subcommittee to examine how to integrate communications components into more exercises and to review After Action Reports (AARs) to record lessons learned about improving interoperability.

Pennsylvania's goals and initiatives for Training and Exercises:

Goal	Description	
Training-1	Incorporate interoperable communications into all training and exercises statewide.	
	Initial State	Target State
	Incomplete knowledge about what exercises and events contain communications tests and injects	Subcommittee formed and communicating with all regions about exercises
Initiative	Owner	Completion
Training-1.1 Establish a subcommittee to examine adding communications to events in the statewide multi-year training and exercises plan	SWIC, Commonwealth Fire Commissioner, PA Department of Health (DOH)	October 2016
Training-1.2 Develop specific objectives/communications to be tested	SWIC, host jurisdictions	December 2016, ongoing
Training-1.3 Review exercise AARs and recommend adjustments to SOPs, training, and exercises as necessary	SWIC, PEMA, host agency	As received

5.5 Usage

Usage programs ensure responders adopt and familiarize themselves with interoperable and emergency communications technologies, systems, and operating procedures. Regular usage ensures the maintenance and establishment of interoperability in case of an incident. The Commonwealth has integrated information pertaining to usage into the other sections of this SCIP.

5.6 Outreach and Information Sharing

The Outreach and Information Sharing section of the SCIP outlines Pennsylvania's approach for building a coalition of individuals and emergency response organizations statewide to support the SCIP vision and for promoting common emergency communications initiatives.

Pennsylvania plans to develop a secure means of sharing information among public safety agencies. Secure options will be analyzed and reported to the PSCC, which will make the final decision on what capability to utilize. A secure content management tool will be able to store SOPs, After Action Reports, communications-related forms and trainings, and other outreach materials. In addition, the PSCC and support staff will work on a regular newsletter that will be disseminated at a minimum to the nine RCTF regions. The newsletter may contain updates from the RCTFs, PEMA, the Pennsylvania State Police, federal partners, and others.

Current challenges to interoperability outreach and information sharing include the unique structure of governance within the Commonwealth, in which local governance functions without mandatory collaboration and coordination among cities, counties, and regions. Information is shared at regional meetings and ad-hoc through other meetings and efforts, but this plan sets out the strategic steps to conduct regular, coordinated outreach and information sharing.

Pennsylvania's goals and initiatives for Outreach and Information Sharing:

Goal	Description	
Outreach-1	Develop formal, written communications strategies to identify, catalog, and share communications assets and topics.	
	Initial State	Target State
	Incomplete knowledge about what exercises and events contain communications tests and injects	Subcommittee formed and communicating No secure content management system utilized to share communications-related information
Initiative	Owner	Completion
Outreach-1.1 Evaluate opportunities to create a secure means (e.g. SharePoint, website, or portal) of sharing and receiving information on communications topics	SRND, PEMA,	June 2016
Outreach-1.2 Report on viable options to the PSCC and relevant subcommittees	SRND, PEMA, PSCC Technology Subcommittee	October 2016
Outreach-1.3 Create and disseminate a periodic online newsletter on topics relevant to interoperable communications	SWIC, PEMA	October 2016
Outreach-1.4 Explore additional methods of sharing and distributing communications information	SWIC	December 2017

Goal	Description	
Outreach-2	Present interoperable communications updates at the annual Pennsylvania Emergency Management Agency (PEMA) conference.	
	Initial State	Target State
	PSCC members do not present at the PEMA conference	PSCC provides regular updates at PEMA events
Initiative	Owner	Completion
Outreach-2.1 Work with PEMA staff to get a timeslot at the conference	SWIC	April 2016
Outreach-2.2 Present updates and receive feedback on statewide interoperability efforts at each conference	SWIC	Annually

Goal	Description	
Outreach-3	Develop strategic planning processes for FirstNet outreach to stakeholders.	
	Initial State	Target State
	Some outreach conducted, no approved strategy in place	Measurable plan approved and publically available
Initiative	Owner	Completion
Outreach-3.1 Include broadband capabilities in the State's public safety communications strategic planning process	SWIC	May 2016, ongoing
Outreach-3.2 Create a central coordination point for broadband communications information	SPOC	TBD

Goal	Description	
Outreach-4	Prepare for and engage in consultation and outreach processes for the NPSBN.	
	Initial State	Target State
	Initial meetings have occurred	Pennsylvania is on-schedule with approved FirstNet timelines and meetings
Initiative	Owner	Completion
Outreach-4.1 Conduct outreach with a variety of stakeholders in preparation for FirstNet consultation	SPOC, SRND, PSCC	ongoing
Outreach-4.2 Implement a repeatable stakeholder outreach strategy	SPOC, PSCC	TBD

5.7 Life Cycle Funding

The Life Cycle Funding section of the SCIP outlines Pennsylvania's plan to fund existing and future interoperable and emergency communications priorities. Pennsylvania has sustainment plans for some individual systems and equipment throughout the Commonwealth, but there is no comprehensive funding plan for all systems.

Determining a holistic view and budget for statewide operable and interoperable communications is challenging in a Commonwealth. However, as SRND moves closer towards a P25 system with new capabilities and improved interfaces with local and regional systems, the PSCC, SRND, and other stakeholders are committed to examining possible funding options that work within Commonwealth rules and improve communications.

The SCIP will encourage all organizations to incorporate sustainable funding planning into grants requirements to ensure all future communications efforts consider long-term sustainability. Because the Commonwealth cannot manage life cycle funding for all of the systems within its borders, its enhanced outreach and information sharing program will promote incorporation of life cycle funding planning across all localities, counties, and regions.

Pennsylvania's goals and initiatives for Life Cycle Funding:

Goal	Description	
Funding-1	Investigate funding options for statewide interoperability infrastructure and state-to-county demarcation points.	
	Initial State	Target State
	No cost estimates developed for future update of the statewide interoperable communications system	Funding sources have been identified and analyzed by the PSCC
Initiative	Owner	Completion
Funding-1.1 Identify costs associated with interoperability infrastructure assets	SRND, PSCC	January 2019
Funding-1.2 Identify funding resources for ongoing life cycle and replacement costs for interoperability infrastructure assets	SRND, PSCC	October 2019

6. Implementation

6.1 Action Plan

The Action Plan section of the SCIP describes the processes Pennsylvania will use to execute the initiatives in the SCIP. Each initiative owner will take responsibility for ensuring intermediate actions are accomplished, and the PSCC will determine a status update schedule for committees and initiative owners. The PSCC will review progress annually during the strategic plan review and provide the governor a report as required by the EO. The PSCC is also authorized to forward to the governor any urgent issues as needed to ensure timely resolution.

6.2 Measures of Success

The Measures of Success section of the SCIP defines the measures that Pennsylvania will use to monitor progress and indicate accomplishments toward achieving the vision for interoperable and emergency communications. In Section 5, Target States are provided for each Goal. Success will be measured in terms of progress toward reaching each Target State.

More information on how these measures are managed is included in Section 6.3.

6.3 Management of Success

The Management of Success section describes the iterative, repeatable method Pennsylvania will follow to add, update, and refine the measures of success.

The SWIC is responsible for overseeing implementation of efforts related to goals and initiatives, and will work with the PSCC to maintain oversight of initiative owners.

In addition, Pennsylvania will complete an annual Snapshot that will be shared with OEC. This report will provide a status check on goals and initiatives, identify successes and roadblocks to success, and will assist OEC in providing targeted services that address gaps in Pennsylvania.

6.4 Strategic Plan Review

The Strategic Plan Review section outlines the process Pennsylvania will use to conduct reviews of the SCIP to ensure it is up to date and aligned with the changing internal and external interoperable and emergency communications environment as well as to track and report progress against the defined initiatives and measures of success.

In advance of PEMA's quarterly meetings, the SWIC will send the SCIP for electronic review by the RCTFs and provide time on each quarterly meeting agenda to discuss updates to and feedback on the SCIP. In advance of the PSCC's final meeting of the year, the SWIC will send the SCIP for electronic review by the PSCC, RCTFs, and state agencies.

The PSCC will review the SCIP annually and will work with OEC on a regular basis to ensure the SCIP remains updated to meet the current and emerging needs of the Commonwealth.

7. Reference Materials

The Reference Materials with additional background information on the SCIP and interoperable and emergency communications in Pennsylvania, as well as reference documents from the OEC are provided in Appendix B.

APPENDIX A: LIST OF ACRONYMS

CASM	Communication Assets Survey and Mapping
COW	Cell on Wheels
DHS	U.S. Department of Homeland Security
EMS	Emergency Medical Services
ESINet	Emergency Services IP Network
FirstNet	First Responder Network Authority
ICS	Incident Command System
IP	Internet Protocol
ISSI	Inter-RF Subsystem Interface
LMR	Land Mobile Radio
MHz	Megahertz
NECP	National Emergency Communications Plan
NEPF	National Emergency Police Frequency
NG9-1-1	Next Generation 9-1-1
NIMS	National Incident Management System
NPSBN	Nationwide Public Safety Broadband Network
NRF	National Response Framework
NTIA	National Telecommunications and Information Administration
OEC	Office of Emergency Communications
PEMA	Pennsylvania Emergency Management Agency
PPD	Presidential Policy Directive
PSAP	Public Safety Answering Point
PSCC	Public Safety Communications Council
PSP	Pennsylvania State Police
RCTF	Regional Counterterrorism Task Force
SCIP	Statewide Communication Interoperability Plan
SIEC	Statewide Interoperability Executive Committee
SLIGP	State and Local Implementation Grant Program
SOP	Standard Operating Procedure
SPOC	Single Point of Contact
SRND	Statewide Radio Network Division
SWIC	Statewide Interoperability Coordinator
VHF	Very High Frequency
UHF	Ultra High Frequency

APPENDIX B: REFERENCE MATERIALS

PA-STARNet Website
Information about the statewide radio system
http://www.psp.pa.gov/About%20Us/Pages/pastarnet.aspx#.VnRiSxUrLcs

Executive Order 2014-06
PA Executive Order authorizing the PSCC
http://www.oa.pa.gov/Policies/eo/Documents/2014_06.pdf

OEC's Public Safety Communications Evolution brochure
http://publicsafetytools.info/oec_guidance/docs/Public_Safety_Communications_Evolution_Brochure.pdf

OEC's System Life Cycle Planning Guide
http://publicsafetytools.info/oec_guidance/docs/OEC_System_Life_Cycle_Planning_Guide_Final.pdf

OEC's Interoperability Continuum
http://www.safecomprogram.gov/oecguidancedocuments/continuum/Default.aspx

PPD-8
Defines a series of national preparedness elements and emphasizes the need for the whole community to work together to achieve the National Preparedness Goal.
http://www.dhs.gov/presidential-policy-directive-8-national-preparedness

APPENDIX C: PA-STARNET SOP: USING THE UHF OVERLAY

By overlaying the commonwealth's 800 MHz system with a network of UHF repeaters and mapping each repeater to an OpenSky talk group, the state allows users of UHF radio systems to communicate directly with state agencies.

Typically at selected radio tower sites, two UHF repeaters are installed and mapped to OpenSky talk groups. Taking full advantage of this capability requires knowing all of the following:

- The location in which use of the overlay is to occur
- The coverage footprint of the tower site for that location
- The frequency and tone information for the tower site

This information appears in the table below and in the UHF overlay coverage maps.

For example, suppose a local responder with a UHF radio is assigned to an event at the State Farm Show Building that requires communication with state agencies. The first step is to determine if an overlay site is available with coverage at the Farm Show Building. The coverage footprint maps show that the DAUP17 site should provide the required coverage.

The next step is to program the UHF radio to operate with the repeaters installed at DAUP17. The chart below shows that UTAC41 is available at DAUP17 as well as at nearly every UHF overlay site in the state. UTAC42 is the second repeater available at DAUP17. It is important to ensure that these channels are programmed for narrowband operation.

Each repeater in the state encodes a Continuous Tone-Coded Squelch System (CTCSS) tone of 156.7 and nothing else. Each repeater decodes 156.7 and a second tone specified in the chart. It is preferable to use the secondary repeater decode tone specified rather than 156.7 to prevent hitting multiple repeaters in areas of overlapping coverage.

In the Farm Show Building example, following is the programming for the UHF radio that results from the steps above:

Alias	Transmit Freq/Tone	Receive Freq/Tone
UTAC41	458.4625 / 118.8	453.4625 / 156.7
UTAC42	458.7125 / 146.2	453.7125 / 156.7

The final step in ensuring the ability to communicate with state agencies when using the UHF radio is to make sure those agencies have the talk groups corresponding to the selected UHF channels available in their OpenSky radios. In this case, the appropriate talk groups are 41_DA17 and 42_DA17.

The talk group naming convention uses 41, 42, or 43 according to whether UTAC41, UTAC42, or UTAC43 is used. DA17 refers to the tower site location. For instance, the

name 41_DA17 means that the corresponding UHF channel is UTAC41 located at the DAUP17 site.

SRND recommends that local agencies program the overlay channels in their areas of operation into their radios in advance. Agencies might consider doing this when purchasing new radios or when reprogramming radios.

UHF Overlay Coverage and Connectivity

The document *PA-STARNet UHF overlay coverage maps* (PDF, 2.8 MB) shows coverage footprint maps for each serving site to plan communications support using the UHF overlay. Table 1 below shows key information for each site. Note that UHF repeaters are narrowband operating at 12.5 KHz. Mobile's transmit is + 5MHz. All repeaters encode 156.7 only.

UHF Overlay Site Inventory

Site Code	Latitude	Longitude	Call Sign	UTAC41 f =453.4625	UTAC41 CTCSS Decode	UTAC42 f =453.7125	UTAC43 f =453.7125	2nd Station CTCSS Decode
ARMS01	40.90863	-79.44474	WQJF541	X	79.7	X		94.8
BEAV02	40.49644	-80.42033	WQIE490	X	110.9		X	127.3
BEDF02	39.82994	-78.54350	WQIE496	X	97.4	X		103.5
BERK02	40.20147	-75.81297	WQIE497	X	136.5		X	179.9
BERK04	40.60425	-75.99133	WQIE494	X	97.4	X		103.5
BLAI02	40.29300	-78.26056	WQIE496	X	91.5		X	85.4
BRAD41	41.65285	-76.41092	WQIE491	X	167.9		X	79.7
BUCK40	40.44622	-75.25100	WQIE497	X	118.8	X		146.2
BUTL01	41.08989	-79.85386	WQJF541	X	97.4		X	103.5
CAMB02	40.37078	-78.98308	WQIE490	X	127.3		X	136.5
CAME05	41.45922	-78.36794	WQIE495	X	74.4		X	85.4
CENT04	40.73200	-78.32531	WQIE496	X	136.5	X		179.9
CENT08	40.75311	-77.75569	WQIE496	X	203.5		X	74.4
CLIN02	41.39742	-77.85431	WQIE491	X	146.2	X		167.9
CLIN41	41.05084	-77.37940	WQIE494	X	186.2	X		77
COLU01	40.93925	-76.42439	WQIE494	X	179.9		X	203.5
COLU02	41.14703	-76.59773	WQIE494	X	203.5		X	74.4
CRAW01	41.66745	-79.83914	WQJF541	X	127.3		X	136.5
CUMB04	39.98869	-77.40428	WQIE500	X	146.2	X		167.9
DAUP01	40.42036	-76.81219	WQIE500	X	186.2		X	77
DAUP17	40.28717	-76.87858	WQIE500	X	118.8	X		146.2
ELKC04	41.27533	-78.41447	WQIE491	X	110.9	X		127.3
ERIE92	41.88267	-80.19007	WQJF541	X	85.4			91.5
FAYE01	39.78258	-79.70172	WQIE490	X	85.4		X	91.5
FORE07	41.46506	-79.28307	WQIE495	X	167.9	X		79.7
FULT40	39.94869	-77.93694	WQIE496	X	74.4		X	85.4
GREE08	39.79800	-80.38133	WQIE490	X	103.5		X	110.9
HUNT01	40.49668	-78.13165	WQIE496	X	167.9	X		79.7
INDI01	40.66728	-78.99683	WQIE490	X	186.2		X	77
JEFF02	41.31728	-78.99476	WQIE495	X	179.9		X	203.5
JUNI05	40.47696	-77.38662	WQIE500	X	118.8	X		146.2
LAWR06	40.91173	-80.19673	WQJF541	X	91.5		X	85.4
LUZE04	41.15870	-76.16910	WQIE493	X	110.9	X		127.3
LYCO02	41.31056	-77.34606	WQIE491	X	79.7		X	94.8
MCKE01	41.80894	-78.36850	WQIE495	X	118.8	X		146.2
MERC92	41.39353	-80.17186	WQJF541	X	118.8	X		146.2
MONR03	41.16398	-75.31824	WQIE493	X	79.7	X		94.8
MONT01	40.95981	-76.70829	WQIE494	X	91.5	X		85.4
PERR01	40.35800	-77.54792	WQIE497	X	79.7			94.8
PHIL02	39.99706	-75.21739	WQIE497	X	85.4	X		91.5
PIKE01	41.29981	-75.12462	WQIE493	X	127.3		X	136.5
POTT12	41.75978	-77.87611	WQIE495	X	97.4		X	103.5
SNYD02	40.72244	-77.12136	WQIE494	X	127.3		X	136.5
SOME06	39.80611	-79.17306	WQIE490	X	118.8		X	146.2
SULL03	41.52036	-76.73107	WQIE491	X	85.4	X		91.5
SUSQ06	41.90633	-75.69367	WQIE493	X	91.5	X		85.4
TIOG06	41.84758	-77.15636	WQIE491	X	136.5	X		179.9
WARR34	41.83287	-79.00101	WQIE495	X	103.5	X		110.9
WAYN31	41.57231	-75.19156	WQIE493	X	186.2		X	77
WAYN33	41.78564	-75.45908	WQIE493	X	146.2		X	167.9
YORK16	40.07550	-76.80483	WQIE500	X	103.5	X		110.9
YORK94	39.75483	-76.66238	WQIE500	X	110.9		X	127.3

APPENDIX D: PA-STARNET SOP: USING THE VHF OVERLAY

By overlaying the commonwealth's 800 MHz system with a network of VHF base stations and mapping each one to an OpenSky talk group, the state allows users of VHF radio systems to communicate directly with state agencies.

Use of the VHF overlay is similar to use of the UHF overlay, except that it is simpler in that there are no repeaters or tones. The VHF overlay uses the National Emergency Police Frequency (NEPF) in wideband operational mode. Although every VHF overlay site encodes a specific tone, this is only for maintenance use as a means of identifying which VHF overlay site is transmitting.

Following is the VHF radio programming required to use the VHF overlay:

Alias	Transmit Freq/Tone	Receive Freq/Tone
NEPF	155.475 / none (CSQ)	155.475 / none (CSQ)

To ensure the ability to communicate with state agencies when using the VHF radio, it is essential that those agencies have the talk groups corresponding to NEPF available in their OpenSky radios. The naming convention for VHF uses NP for "National Police" in place of the 41, 42, or 43 used in the UHF naming convention (see Appendix C).

SRND recommends that local agencies program the overlay channels in their areas of operation into their radios in advance. Agencies might consider doing this when purchasing new radios or when reprogramming radios.

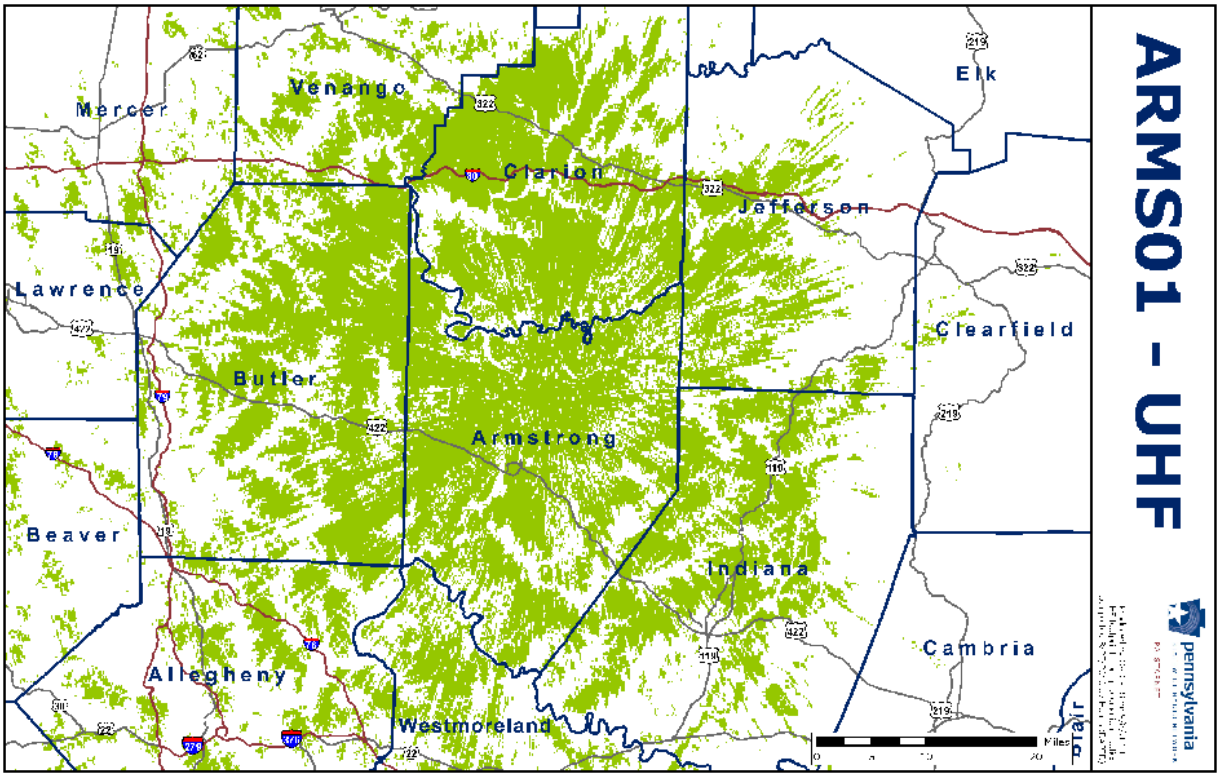
VHF Overlay Coverage and Connectivity

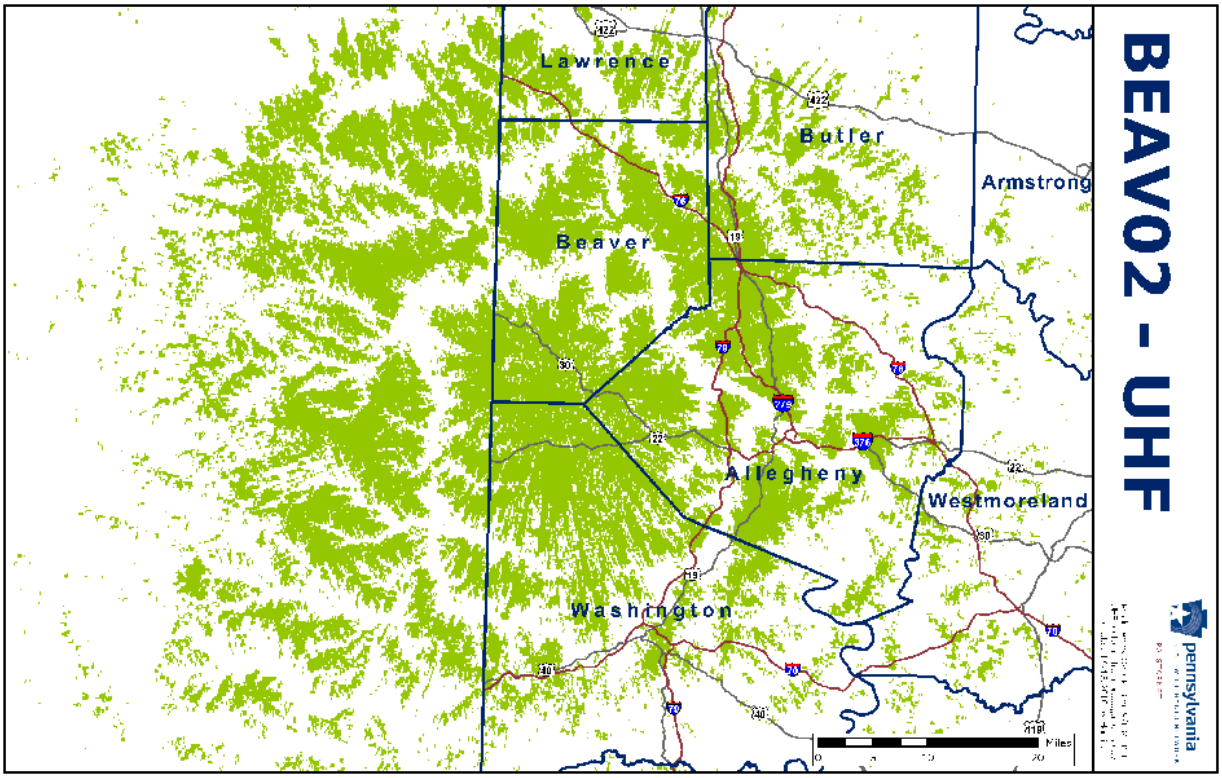
The document *PA-STARNet VHF overlay coverage maps* (Adobe PDF, 2.6 MB) shows coverage footprint maps for each serving site to help plan communications support using the VHF overlay. The table below shows key information for each site. Note that NEPF is 155.475 wideband. CTCSS encode tone is for maintenance use only.

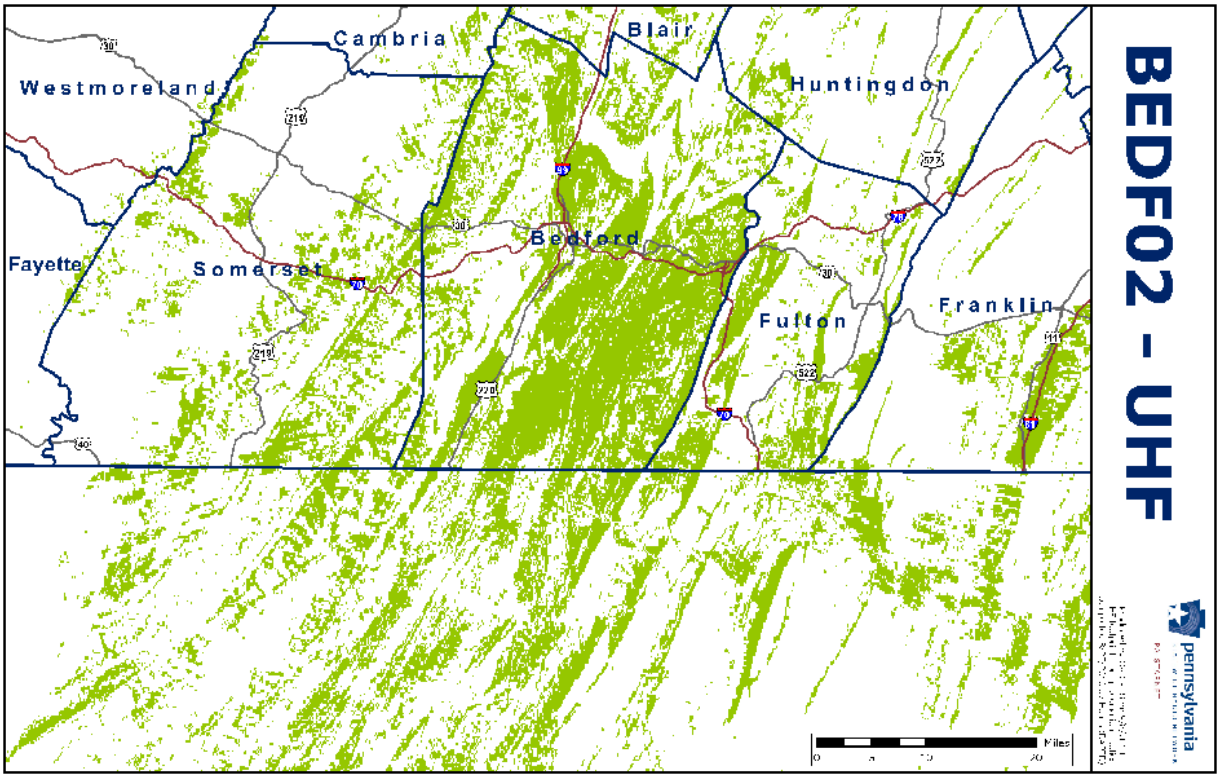
VHF Overlay Site Inventory

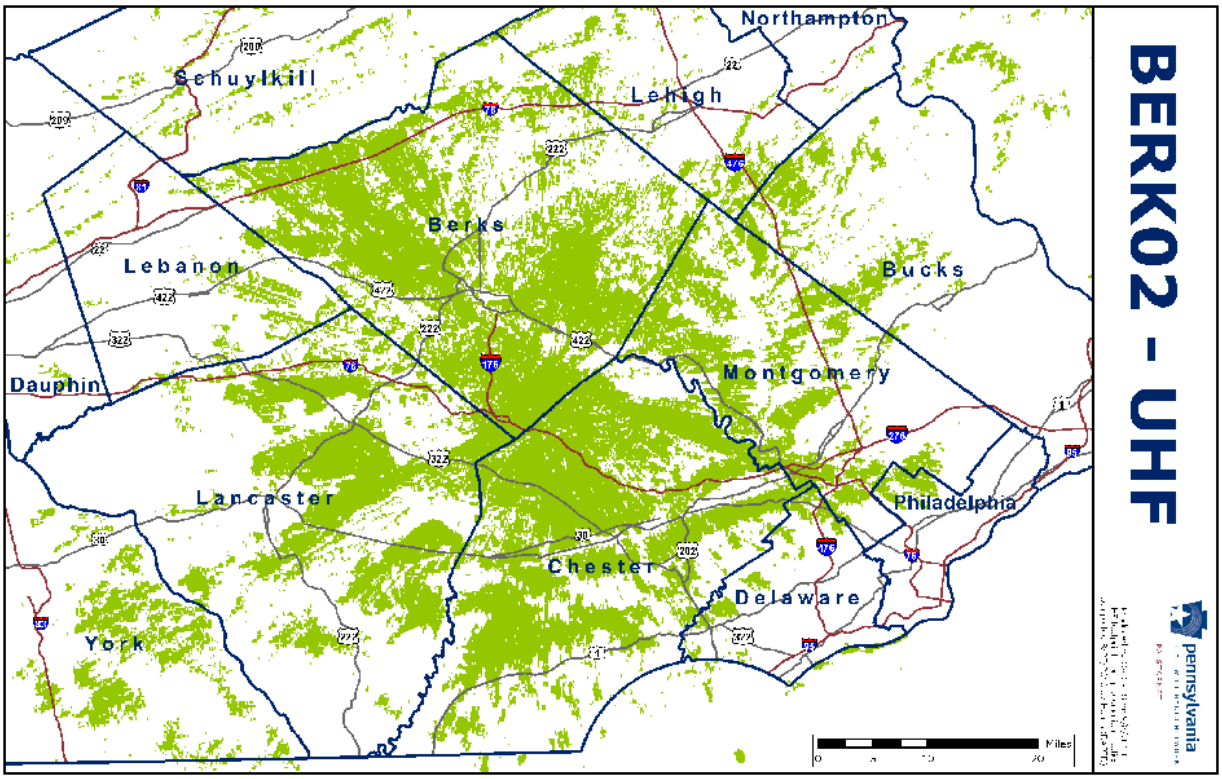
Region	Site ID	Site Name	TG Name	Call Sign	CTCSS Encode
1	BUTL01	PGC: Hilliards	NP_BT01	WQGN636	94.8
1	CRAW01	Townville	NP_CW01	KXH388	123
1	ERIE92	Washington Stockpile	NP_ER92	WQGN636	82.5
1	FORE07	Tylersburg	NP_FO07	WQGN636	162.2
1	JEFF02	Hays Lookout	NP_JF02	KXH361	173.8
1	LAWR06	Grindstone	NP_LW06	WQGN636	88.5
1	MERC92	New Vernon Stockpile	NP_MC92	WQGN636	114.8
1	WARR34	Kinzua Dam	NP_WR34	WQGN636	100
2	ALLE76	State Office Building	NP_AL76	WQGL632	173.8
2	BEAV02	Raccoon Creek	NP_BV02	WQGL632	107.2
2	CAMB02	Lower Yoder	NP_CB02	WQGL628	123
2	FAYE01	Pondfield	NP_FY01	KXH381	82.5
2	GREE08	Waynesburg PDOT	NP_GR08	WQGL632	100
2	INDI01	Clymer Fire Tower	NP_IN01	KXH377	151.4
2	SOME06	Negro Mountain	NP_SM06	WQGL629	114.8
2	WEST03	Beacon	NP_WS03	WQGL632	141.3
3	CAME05	Truman	NP_CM05	WQGL632	71.9
3	CLIN02	Tamarack	NP_CL02	WQGL632	141.3
3	CLIN41	Rainsares III	NP_CL41	WQGL629	151.4
3	LYCO02	Waterville	NP_LY02	KXO915	77
3	MCKE01	Port Allegheny	NP_MK01	WQGL628	114.8
3	POTT12	Denton Hill	NP_PO12	WQGL628	94.8
3	TIOG06	Pat Jr. Fire Tower	NP_TI06	WQGL628	131.8
4	BEDF02	Martin Hill	NP_BD02	WQGL628	94.8
4	BLAI02	Martinsburg	NP_BL02	WQGL628	88.5
4	CENT04	Rush	NP_CT04	WQGL628	131.8
4	CENT08	Little Flat	NP_CT08	WQGL634	192.8
4	CLEA51	SCIBootcamp	NP_CF51	WQGL634	107.2
4	HUNT01	Loop Lookout	NP_HT01	WQGL634	162.2
4	JUNI05	Ickesburg PGC	NP_JU05	WQGL634	114.8
4	SNYD02	Richfield	NP_SN02	WQGL634	123
5	BRAD41	Robwood III	NP_BR41	WQGL635	162.2
5	COLU01	Catawissa	NP_CO01	KXH332	173.8
5	COLU02	Vandine	NP_CO02	WQGL635	192.8
5	LUZE01	Wyoming Mtn	NP_LZ01	WQGL635	107.2
5	MONR03	Coolbaugh	NP_MR03	WQGL635	77
5	MONT01	Montour	NP_MT01	WQGL635	88.5
5	PIKE01	High Knob	NP_PI01	WQGL638	123
5	SULL03	Bear Wallow	NP_SL03	WQGL635	82.5
5	SUSQ06	Great Bend	NP_SQ06	WQGL636	88.5
5	WAYN31	Beach Lake	NP_WN31	WQGL636	151.4
5	WAYN33	Mount Ararat	NP_WN33	KXH345	141.3
6	BERK02	Hopewell	NP_BE02	WQGL636	131.8
6	BERK04	Port Clinton	NP_BE04	WQGL638	94.8
6	BUCK40	Nockamixon State Park	NP_BU40	WQGL636	114.8
6	PHIL02	PSP Phila. HQ. Troop K.	NP_PH02	WQGL636	82.5
7	CUMB04	Big Flat Heliport	NP_CU04	WQGL638	141.3
7	DAUP01	Ellendale	NP_DA01	WQGL638	151.4
7	LANC01	Cornwall	NP_LN01	WQGL638	100
7	YORK94	I-83 Rest	NP_Y094	WQGL638	107.2

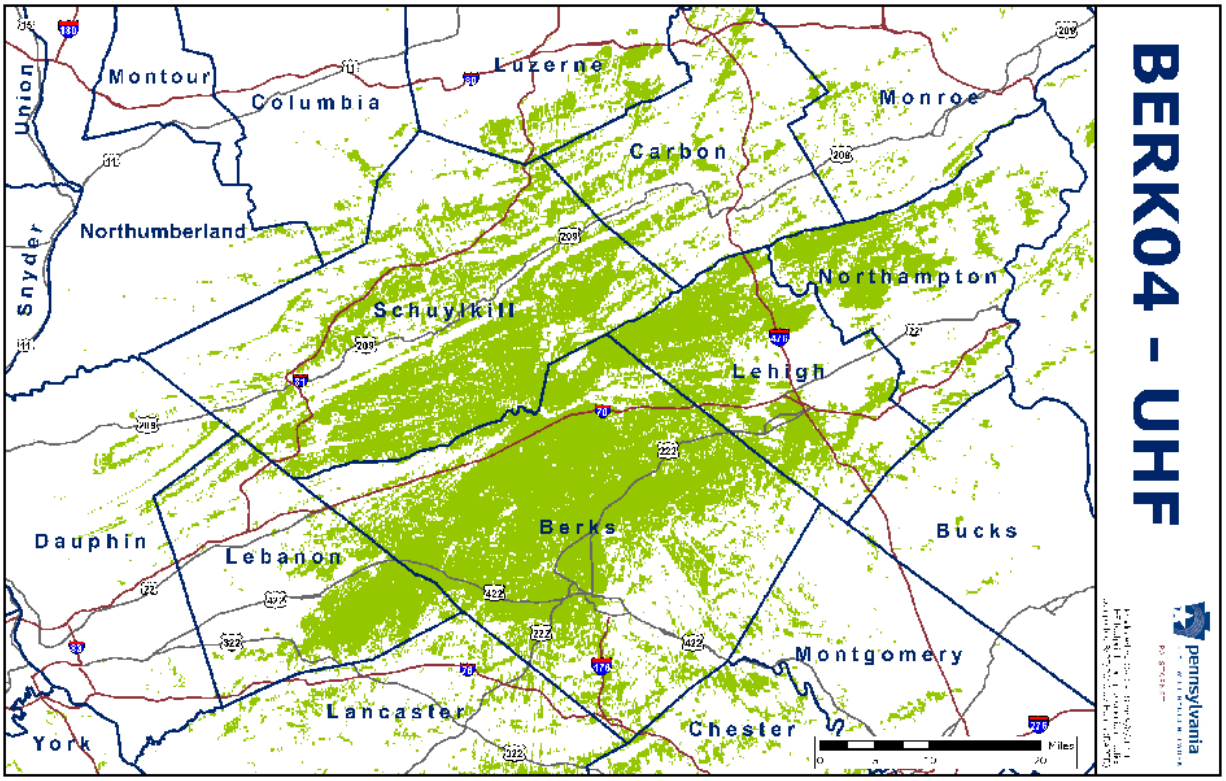
APPENDIX E: PA-STARNET UHF OVERLAY MAPS

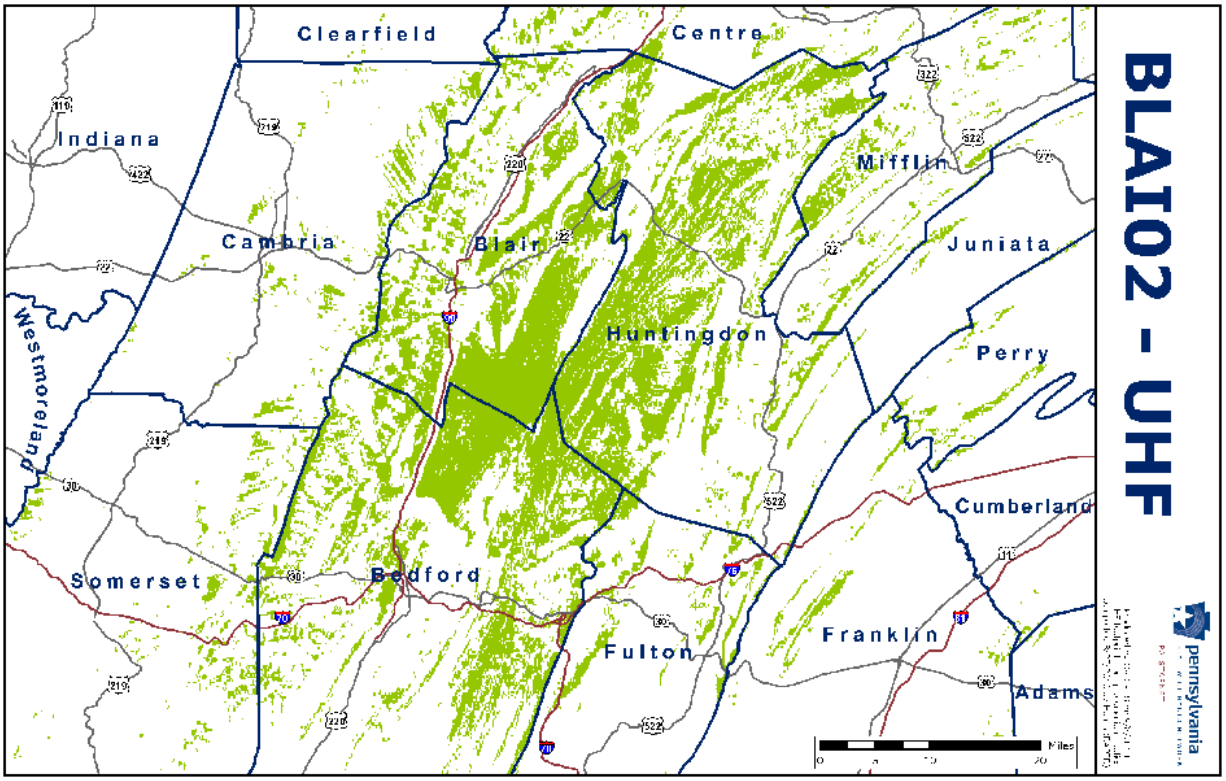


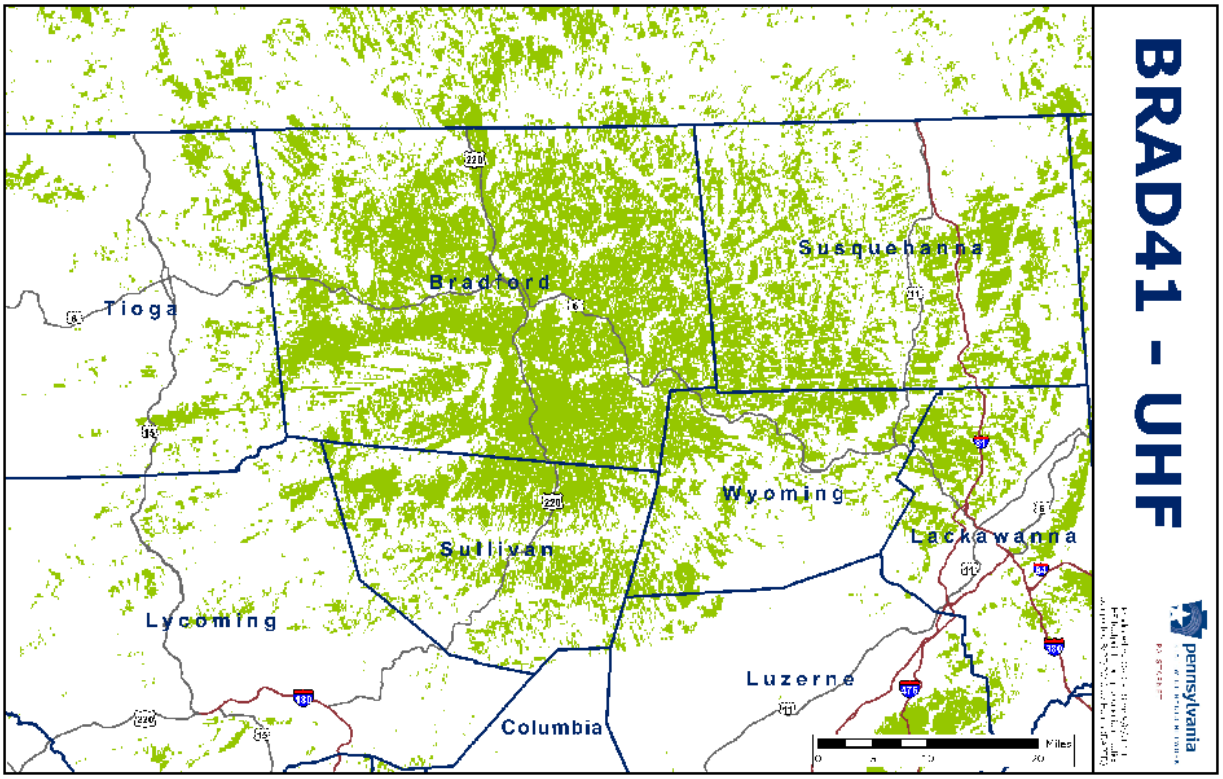


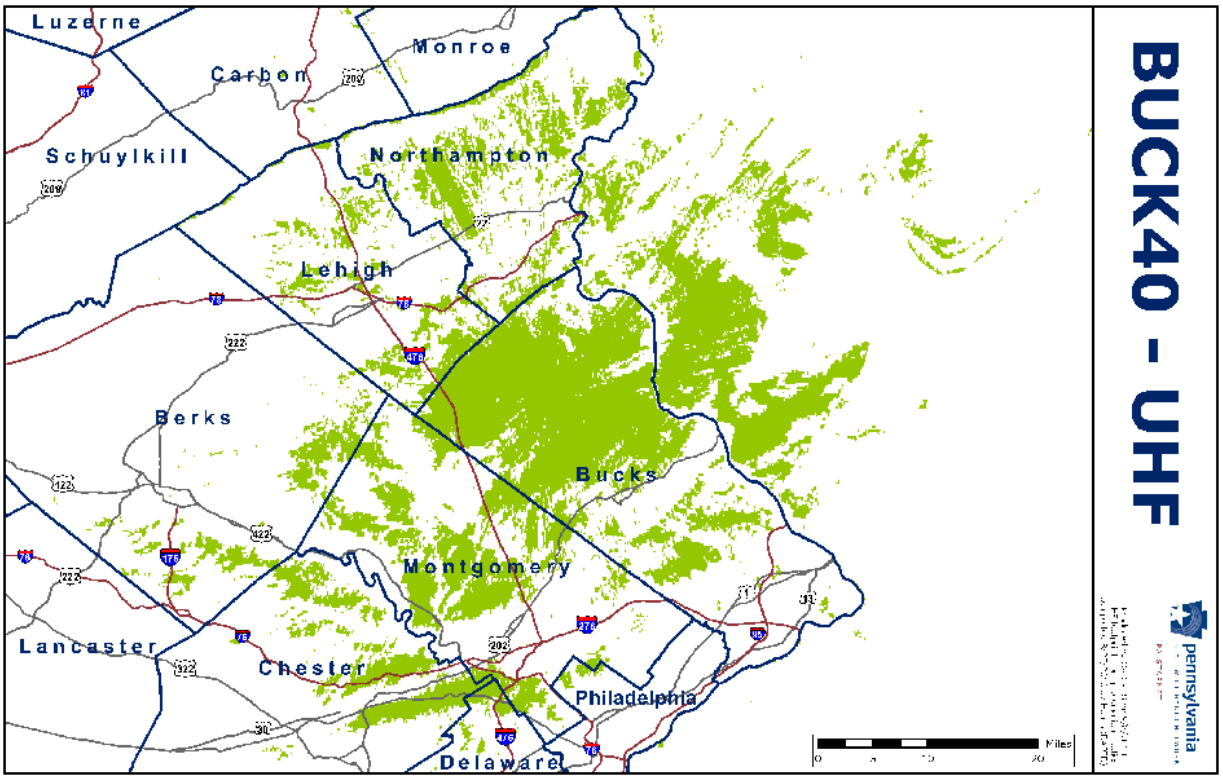

BEDF02 - UHF
pennsylvania
Cambria
Blair
Westmoreland
Huntingdon
Bedford
Fayette
Somerset
Fulton
Franklin
Miles

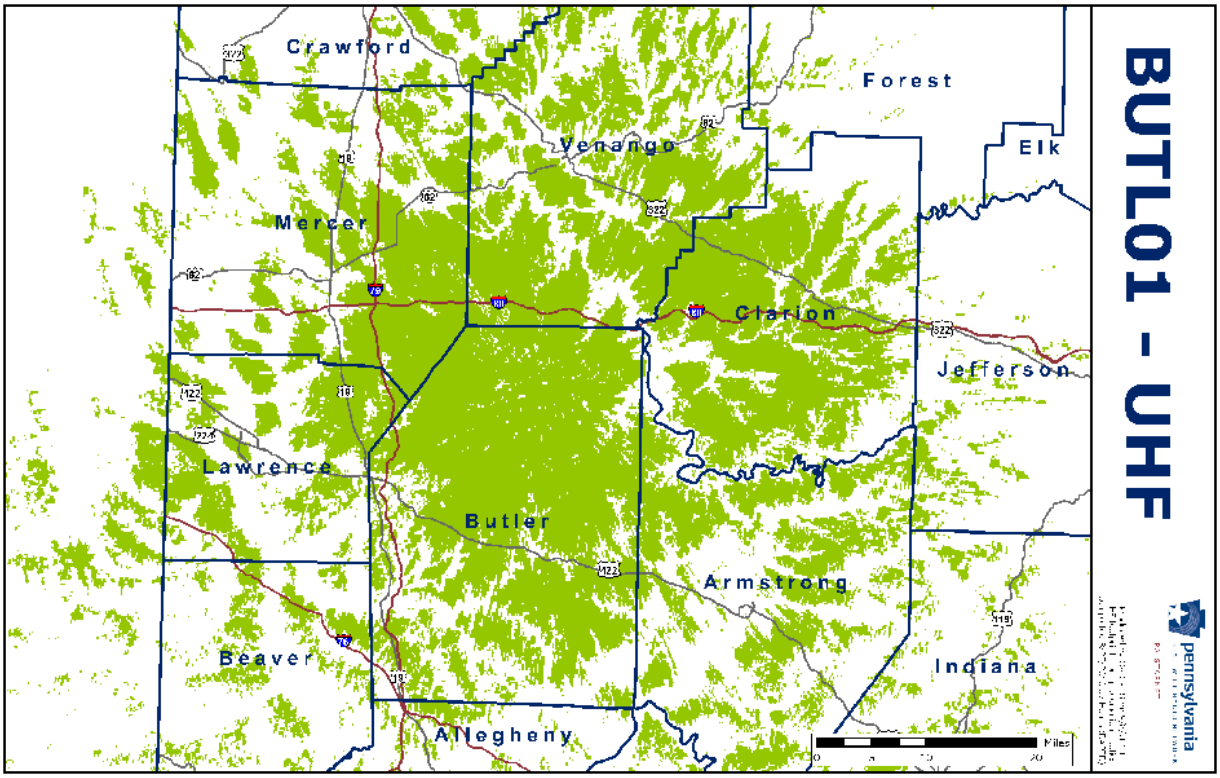

BERK02 - UHF
pennsylvania
Northampton
Schuylkill
Lehigh
Berks
Lebanon
Bucks
Dauphin
Montgomery
Lancaster
Philadelphia
Chester
Delaware
York
Miles

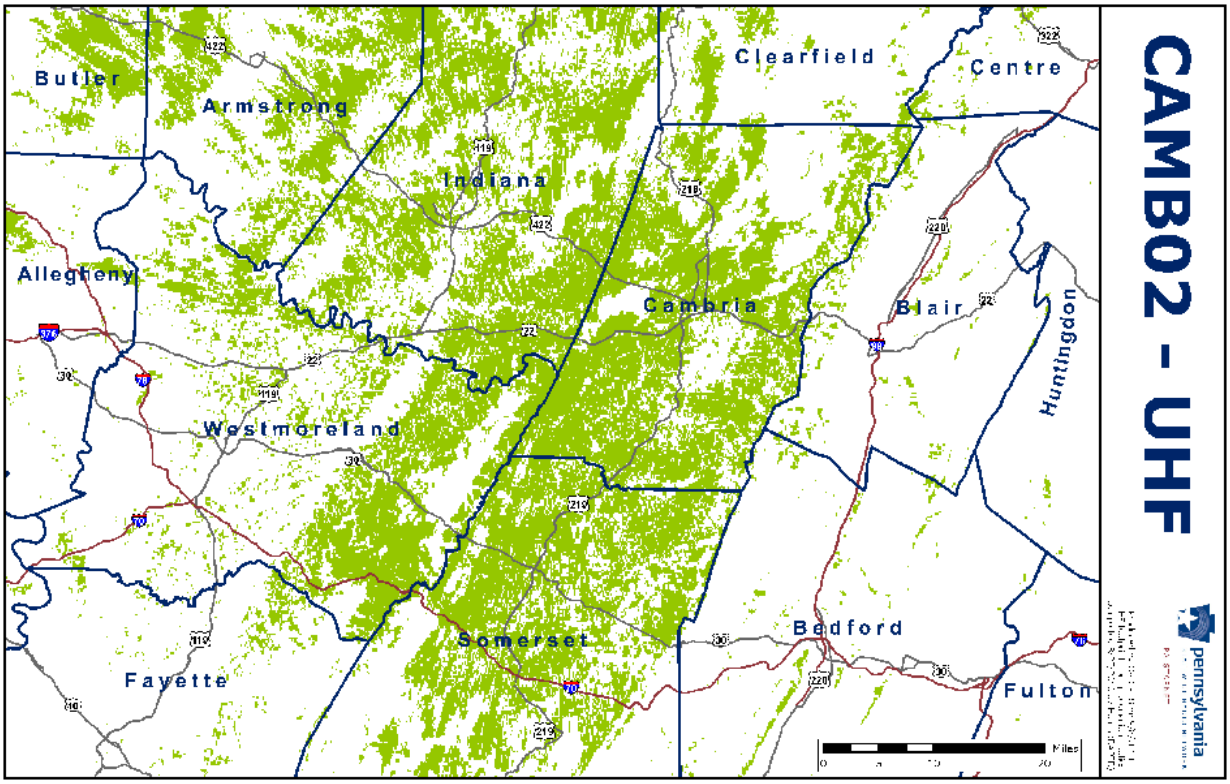

BERK04 - UHF
Union
Snyder
Montour
Columbia
Luzerne
Monroe
Carbon
Northumberland
Northampton
Schuylkill
Lehigh
Dauphin
Lebanon
Berks
Bucks
Montgomery
Lancaster
Chester
York
pennsylvania
Miles

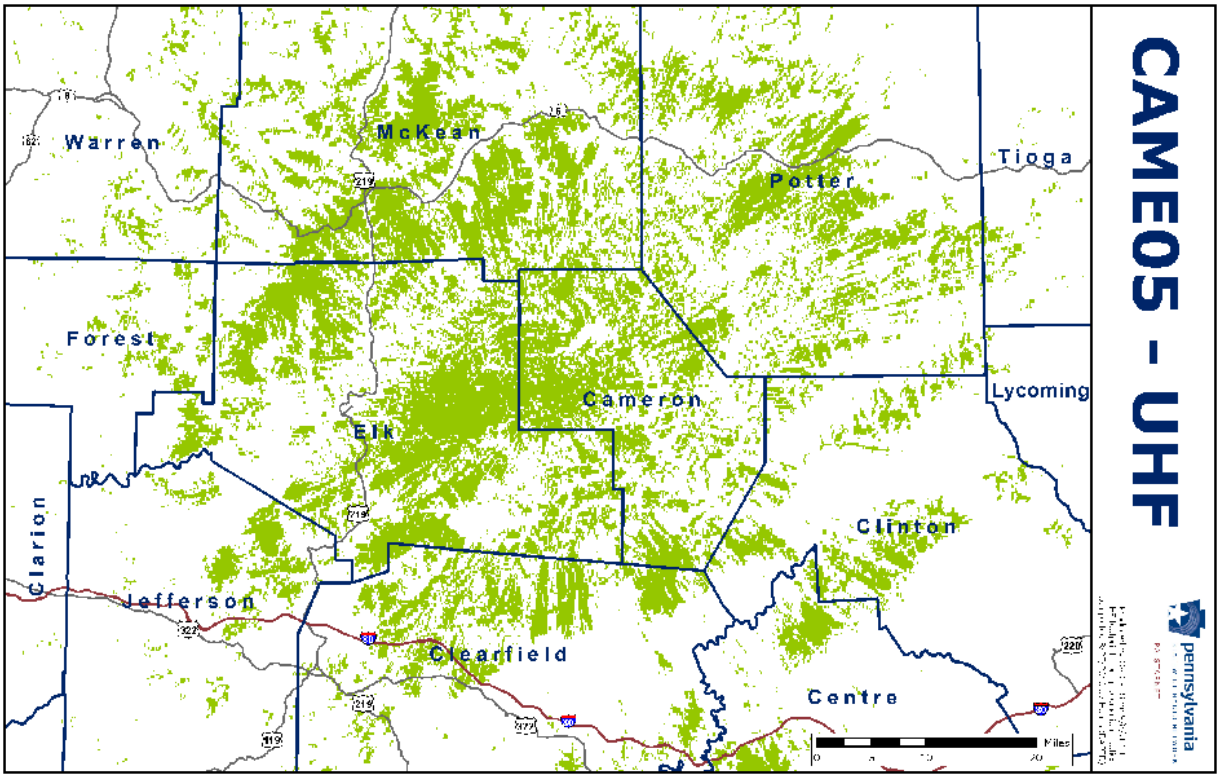

BLAI02 - UHF
Clearfield
Centre
Indiana
Mifflin
Cambria
Blair
Juniata
Westmoreland
Huntingdon
Perry
Cumberland
Somerset
Bedford
Franklin
Fulton
Adams
pennsylvania
Miles

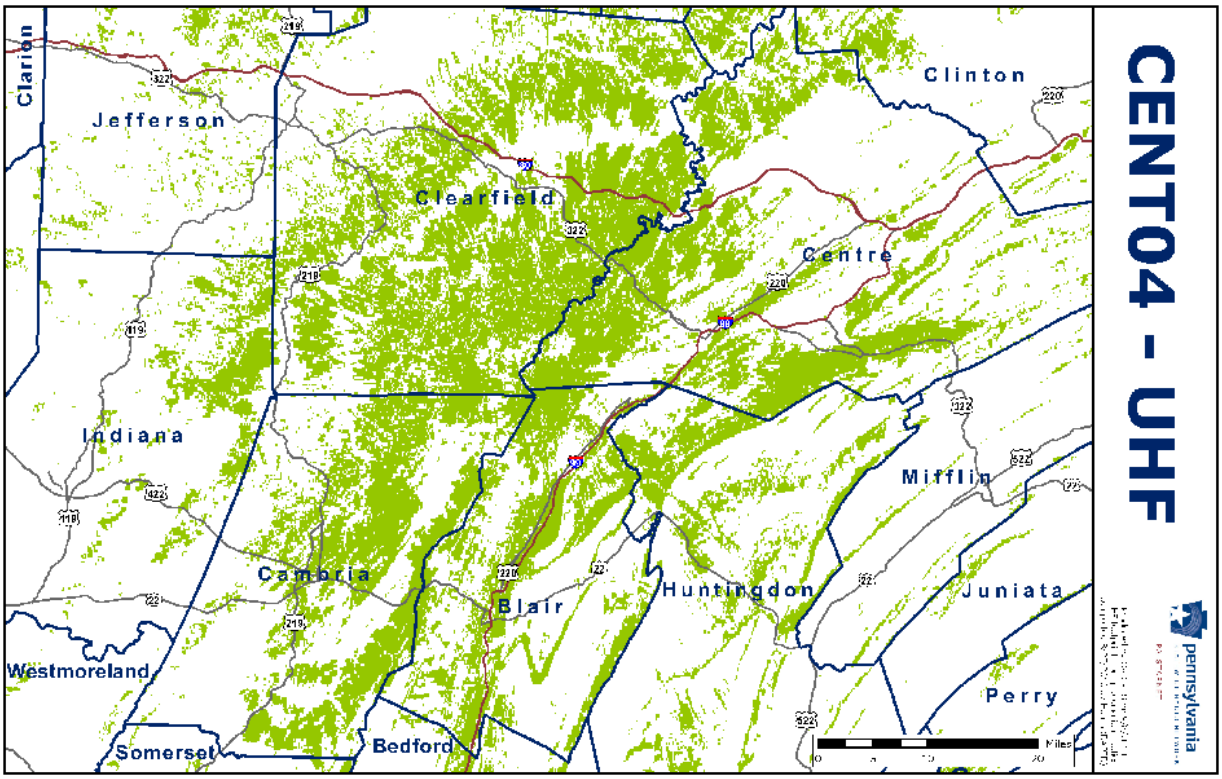

BRAD41 - UHF
Susquehanna
Bradford
Tioga
Wyoming
Lackawanna
Sullivan
Lycoming
Luzerne
Columbia
Miles
0
10
20
pennsylvania

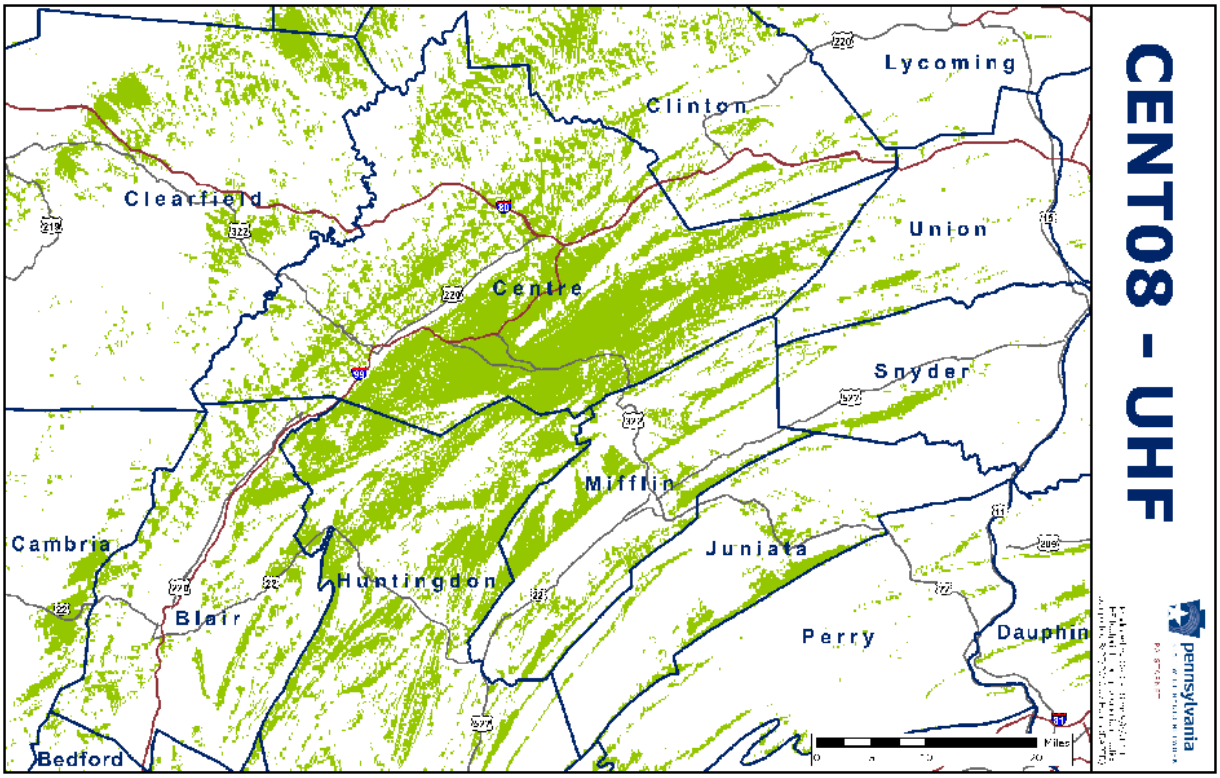

BUCK40 - UHF
Luzerne
Monroe
Carbon
Schuylkill
Northampton
Lehigh
Berks
Bucks
Montgomery
Lancaster
Chester
Philadelphia
Delaware
Miles
0
10
20
pennsylvania

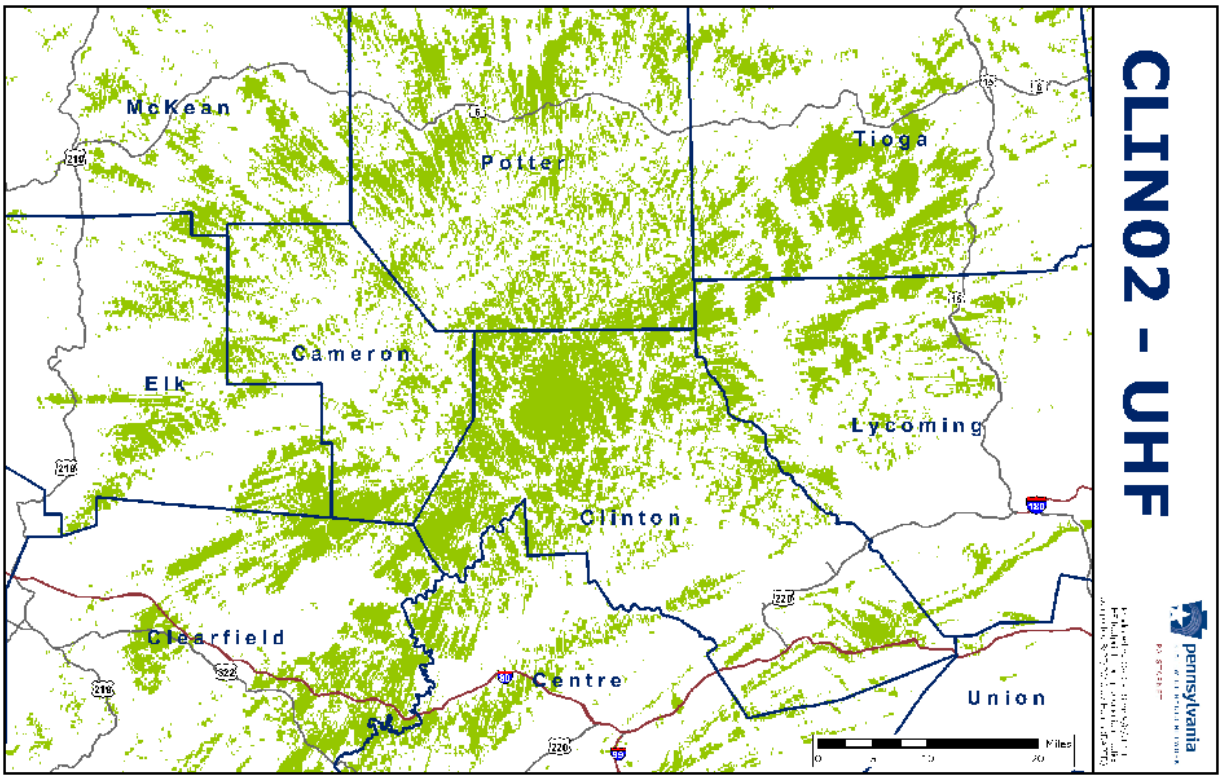

BUTL01 - UHF
Crawford
Forest
Venango
Elk
Mercer
Clarion
Jefferson
Lawrence
Butler
Armstrong
Beaver
Indiana
Allegheny
Miles
pennsylvania

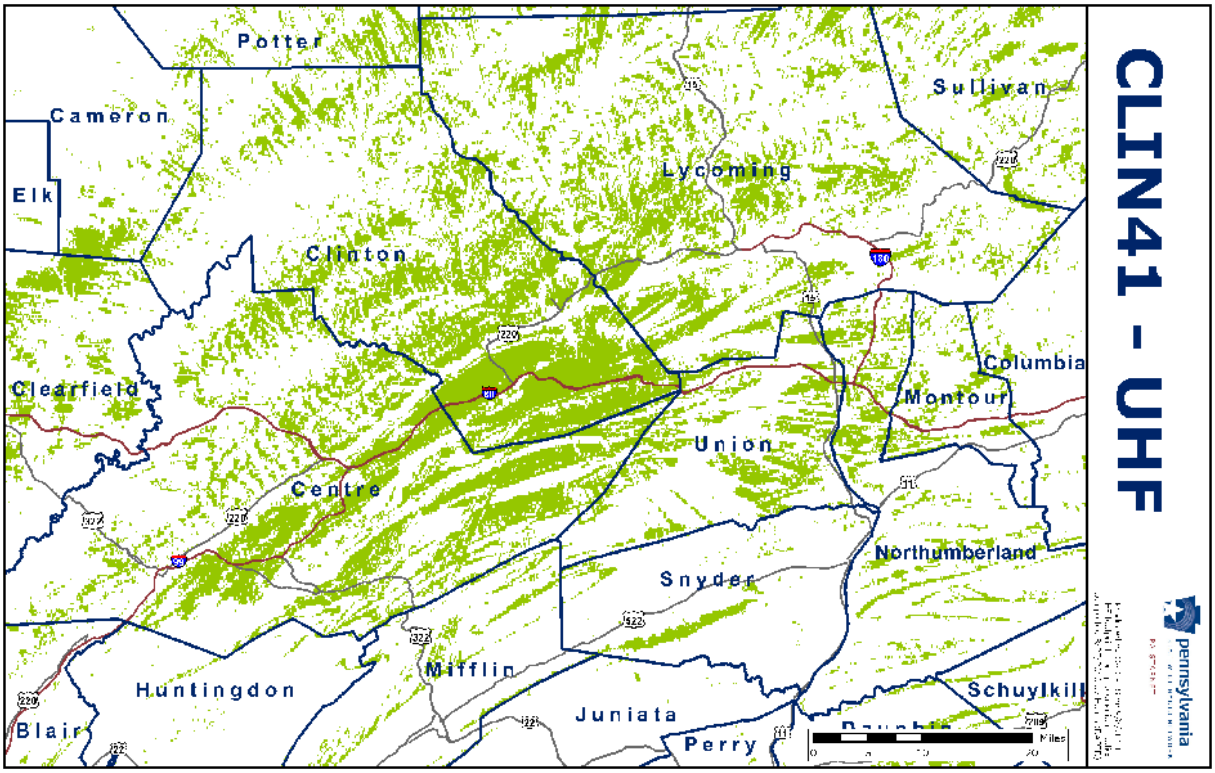

CAMB02 - UHF
Butler
Clearfield
Centre
Armstrong
Indiana
Allegheny
Cambria
Blair
Huntingdon
Westmoreland
Somerset
Bedford
Fayette
Fulton
Miles
pennsylvania

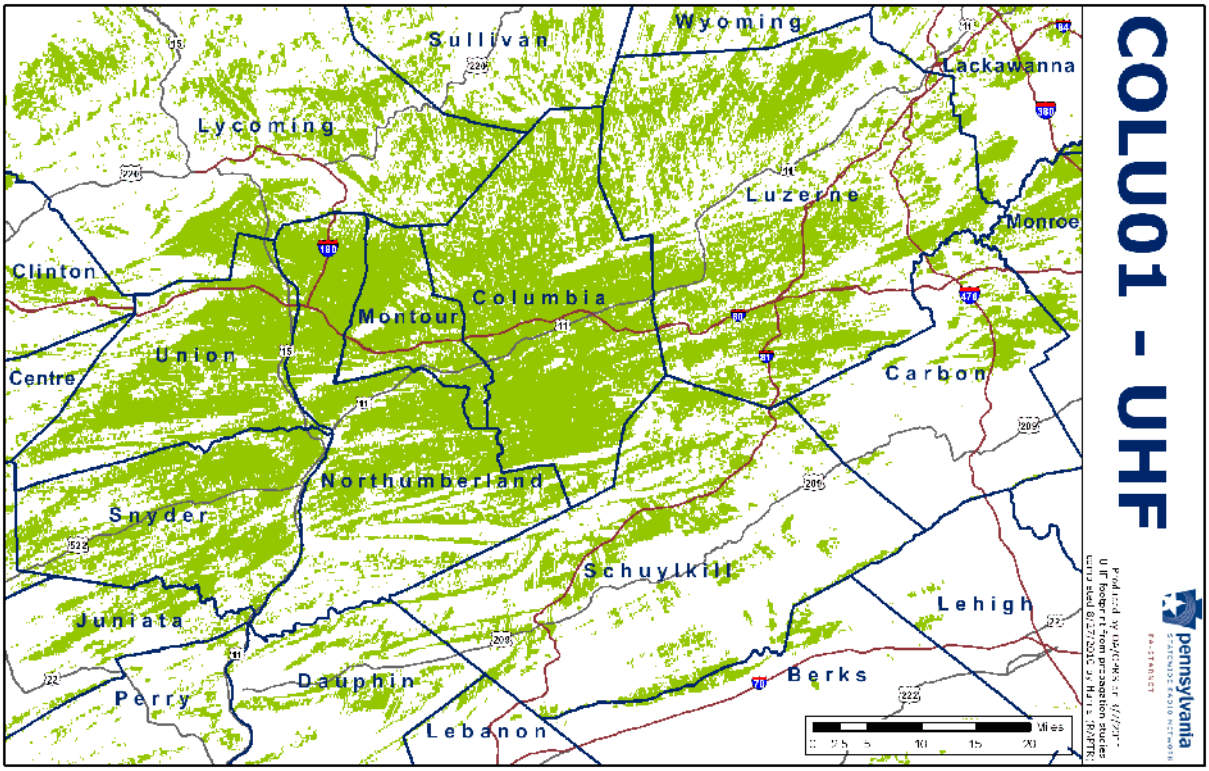

CAME05 - UHF
pennsylvania
Warren
McKean
Potter
Tioga
Forest
Cameron
Lycoming
Elk
Clarion
Clinton
Jefferson
Clearfield
Centre
Miles

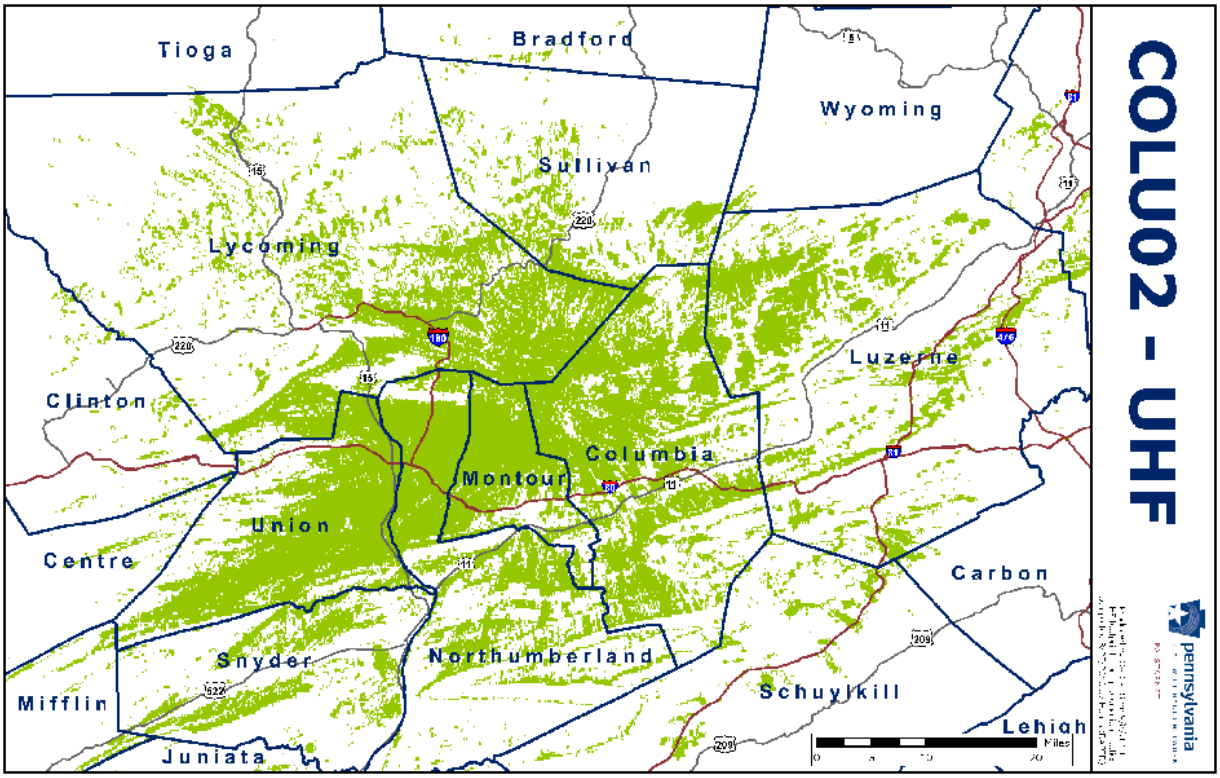

CENT04 - UHF
pennsylvania
Clarion
Clinton
Jefferson
Clearfield
Centre
Indiana
Mifflin
Cambria
Blair
Huntingdon
Juniata
Westmoreland
Perry
Somerset
Bedford
Miles

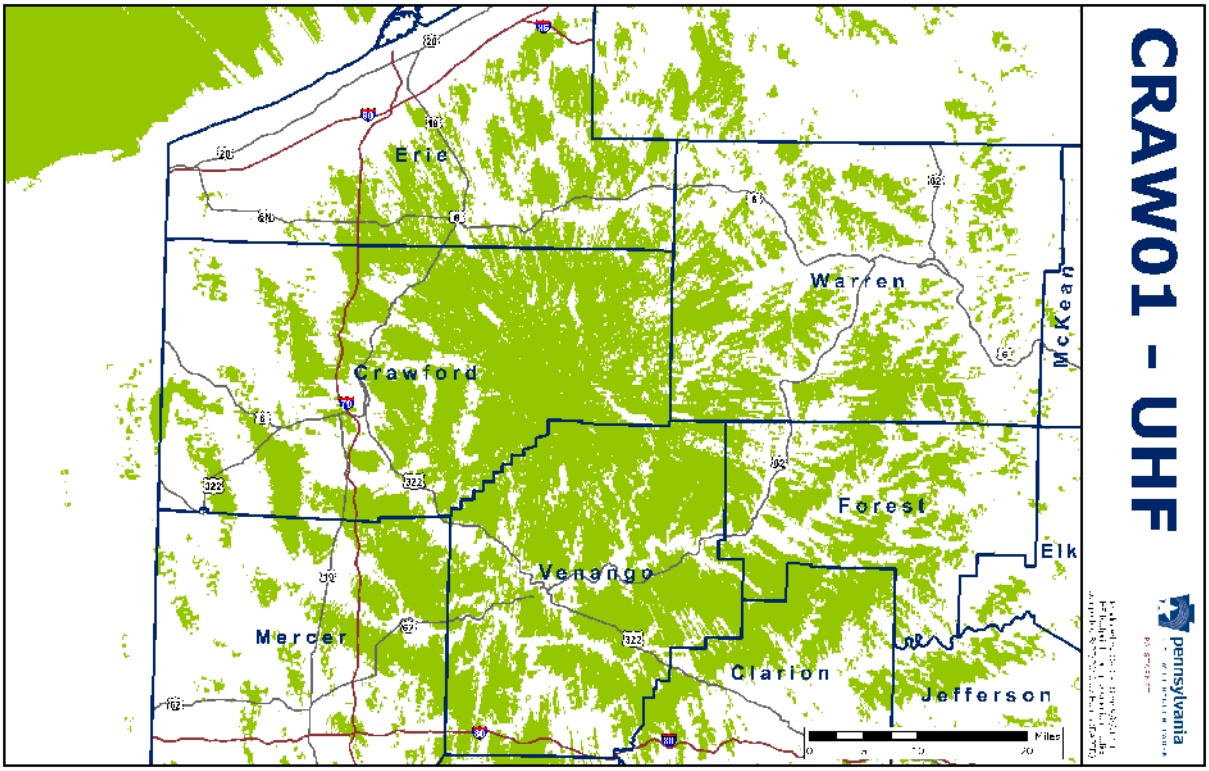

CENT08 - UHF
Lycoming
Clinton
Union
Snyder
Clearfield
Centre
Mifflin
Juniata
Cambria
Huntingdon
Blair
Perry
Dauphin
Bedford
Miles
0
20

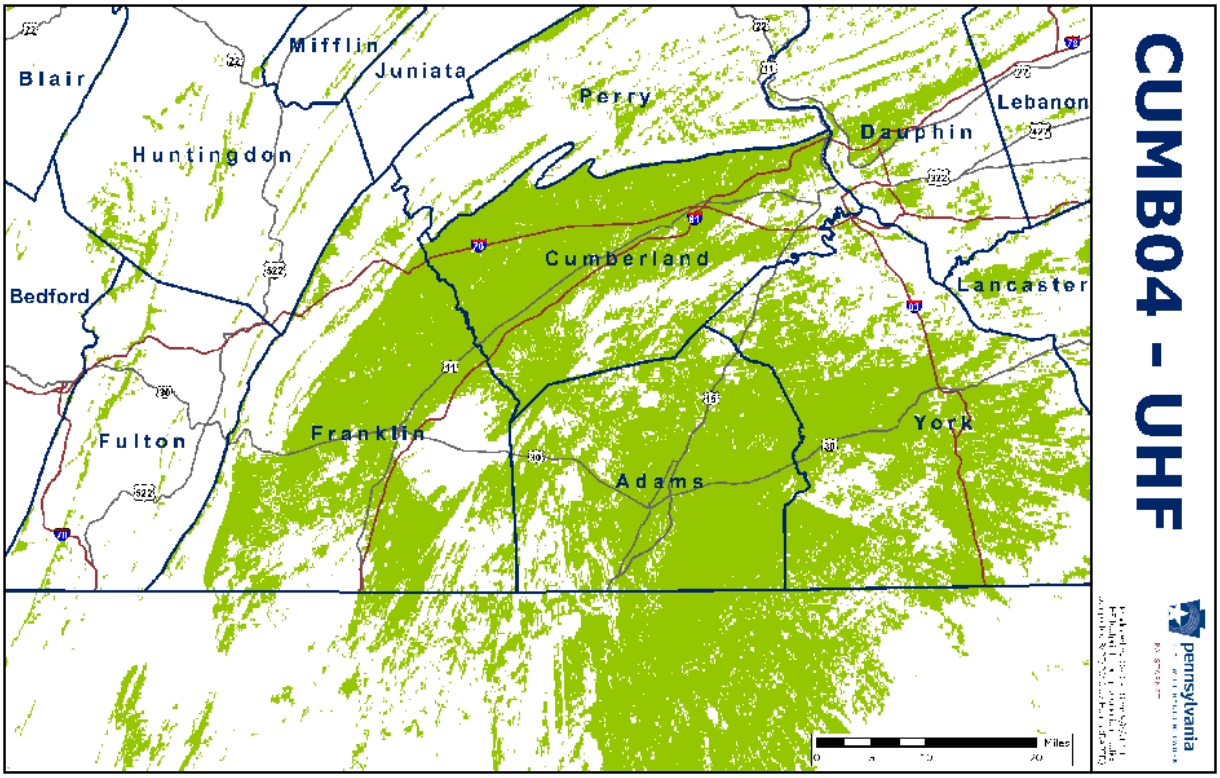

CLIN02 - UHF
McKean
Potter
Tioga
Cameron
Elk
Lycoming
Clinton
Clearfield
Centre
Union
Miles
0
20

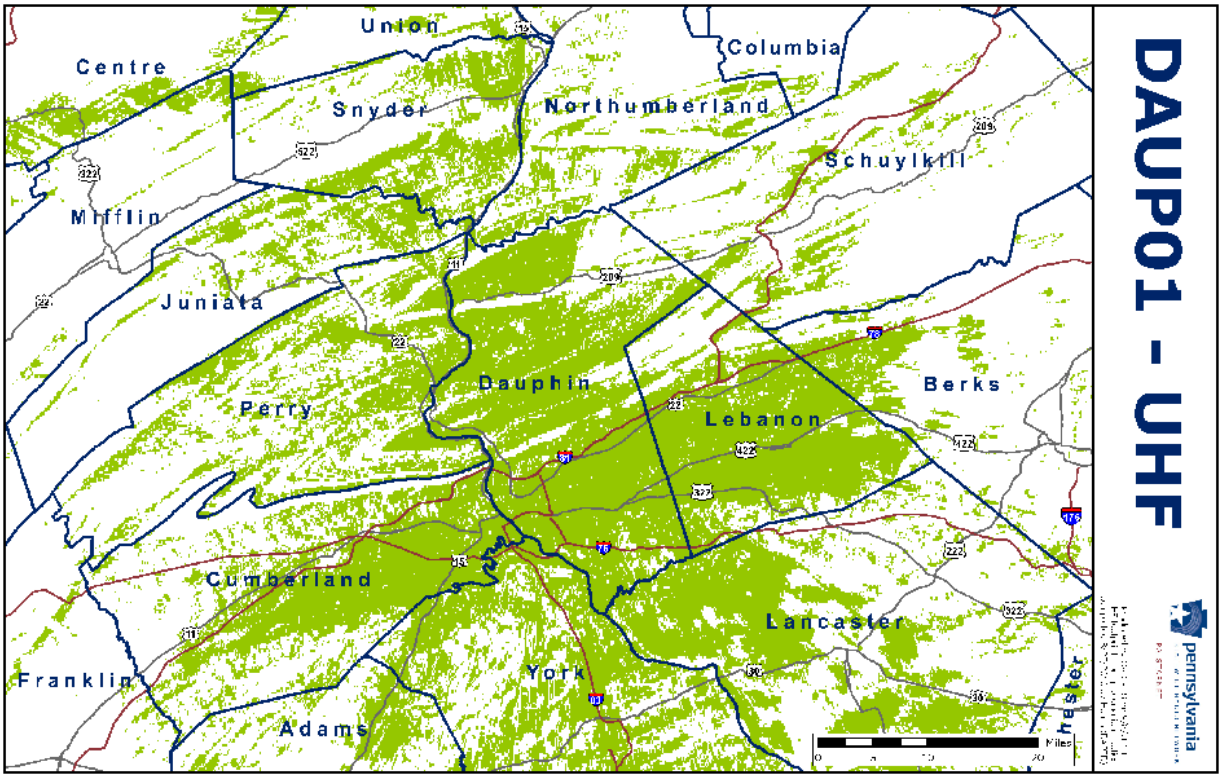

CLIN41 - UHF
Potter
Cameron
Elk
Clinton
Clearfield
Centre
Huntingdon
Blair
Mifflin
Juniata
Perry
Snyder
Union
Lycoming
Sullivan
Columbia
Montour
Northumberland
Schuylkill
Miles

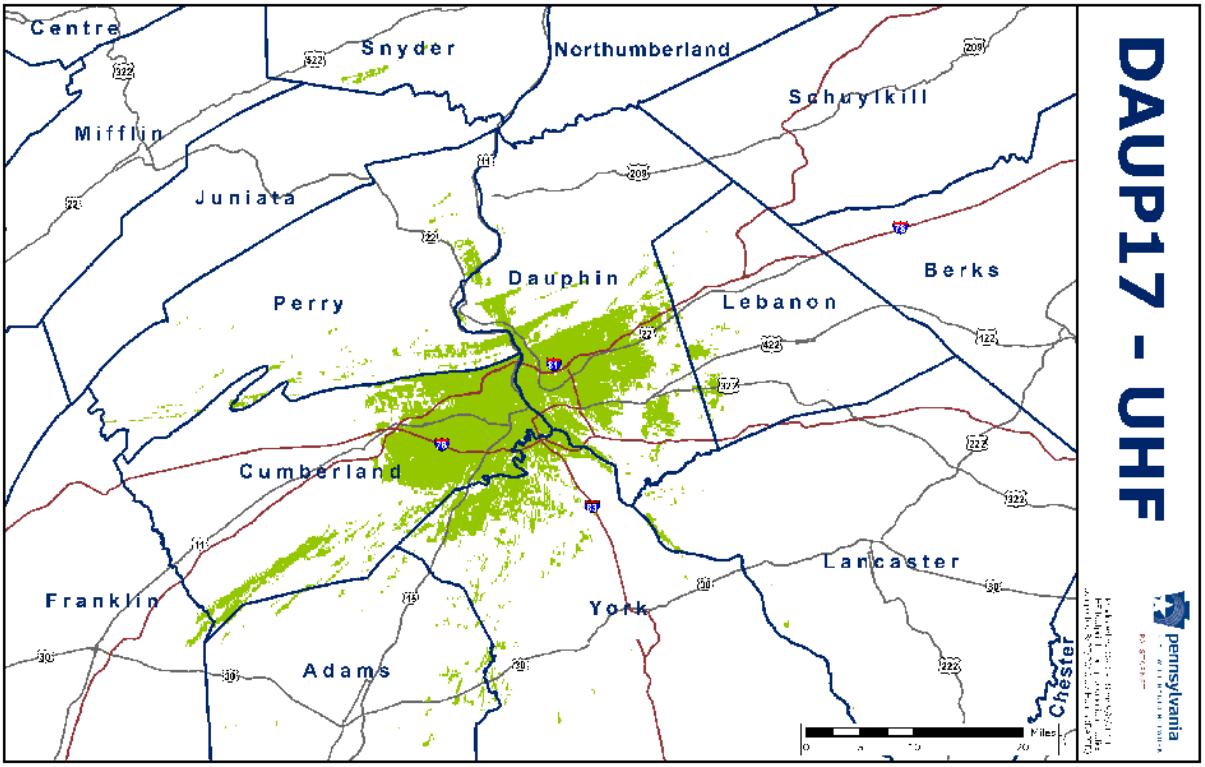

COLU01 - UHF
Sullivan
Wyoming
Lackawanna
Lycoming
Luzerne
Monroe
Clinton
Columbia
Montour
Union
Centre
Carbon
Northumberland
Snyder
Schuylkill
Lehigh
Juniata
Berks
Dauphin
Perry
Lebanon
Miles

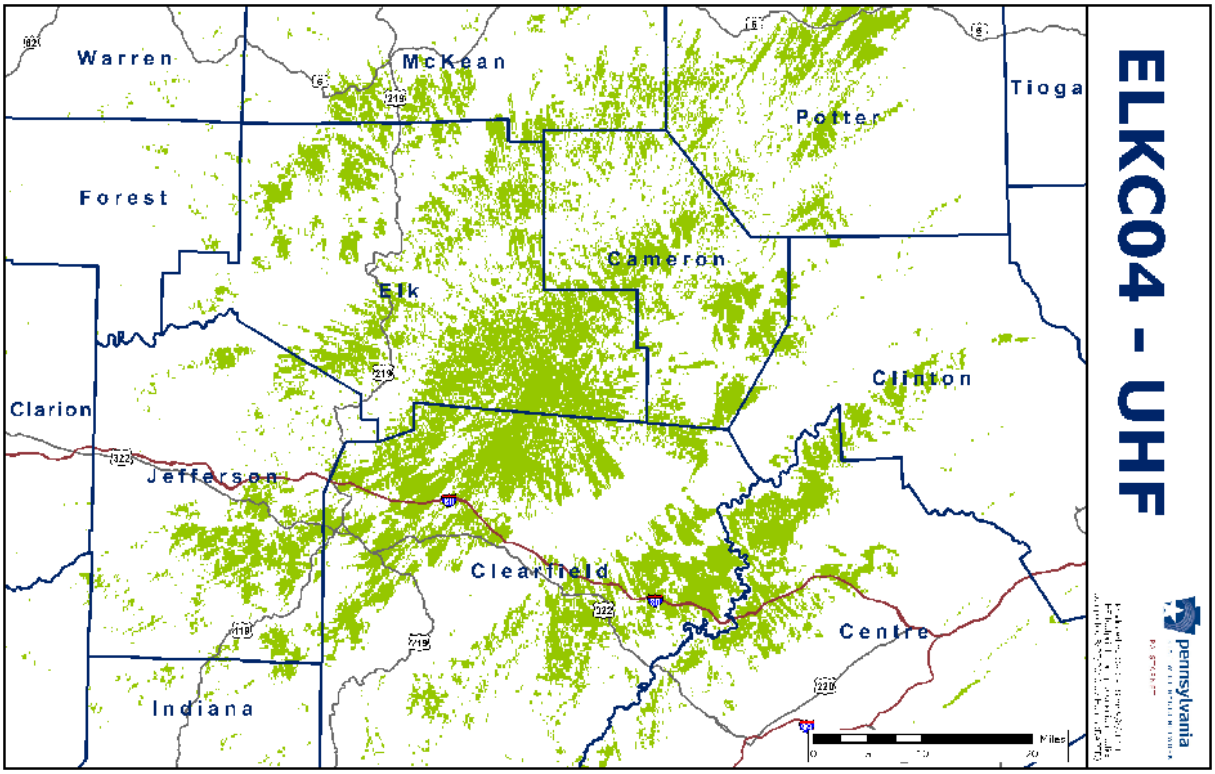

COLU02 - UHF
Tioga
Bradford
Wyoming
Sullivan
Lycoming
Clinton
Luzerne
Columbia
Montour
Union
Centre
Carbon
Snyder
Northumberland
Mifflin
Schuylkill
Lehigh
Juniata
Miles
pennsylvania

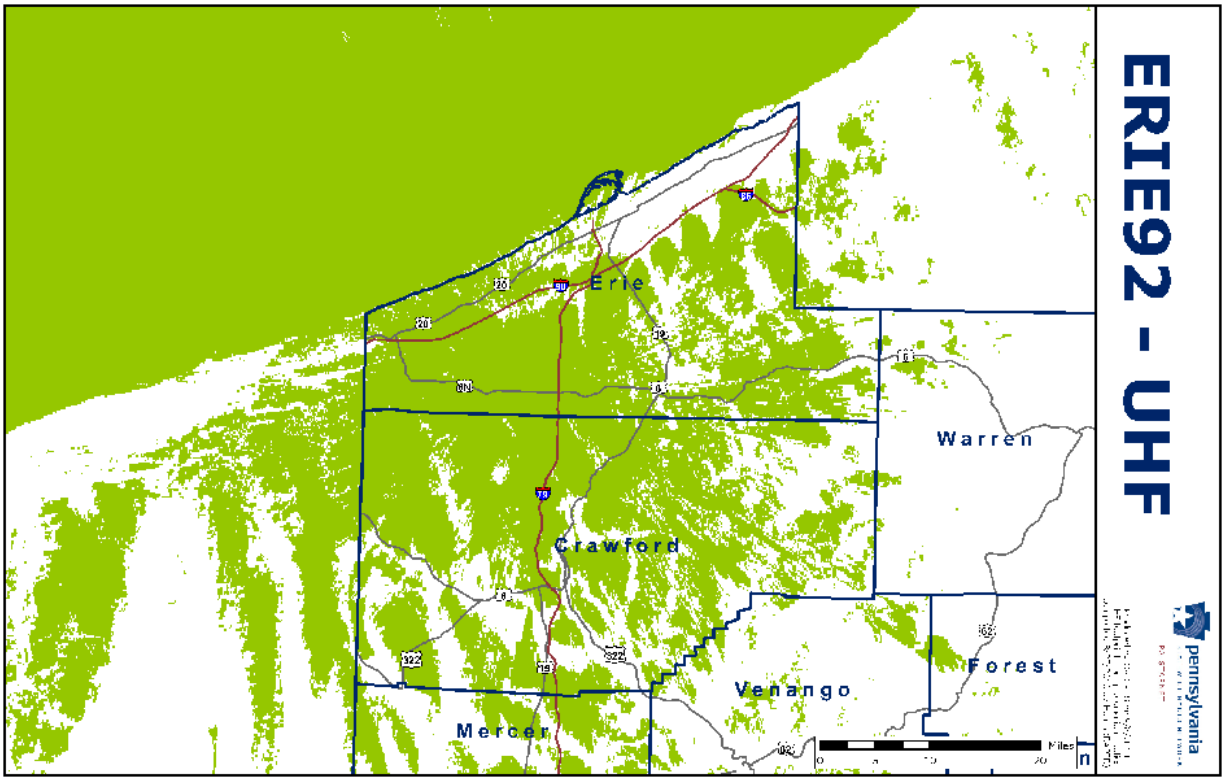

CRAW01 - UHF
Erie
Warren
McKean
Crawford
Forest
Elk
Venango
Mercer
Clarion
Jefferson
Miles
pennsylvania

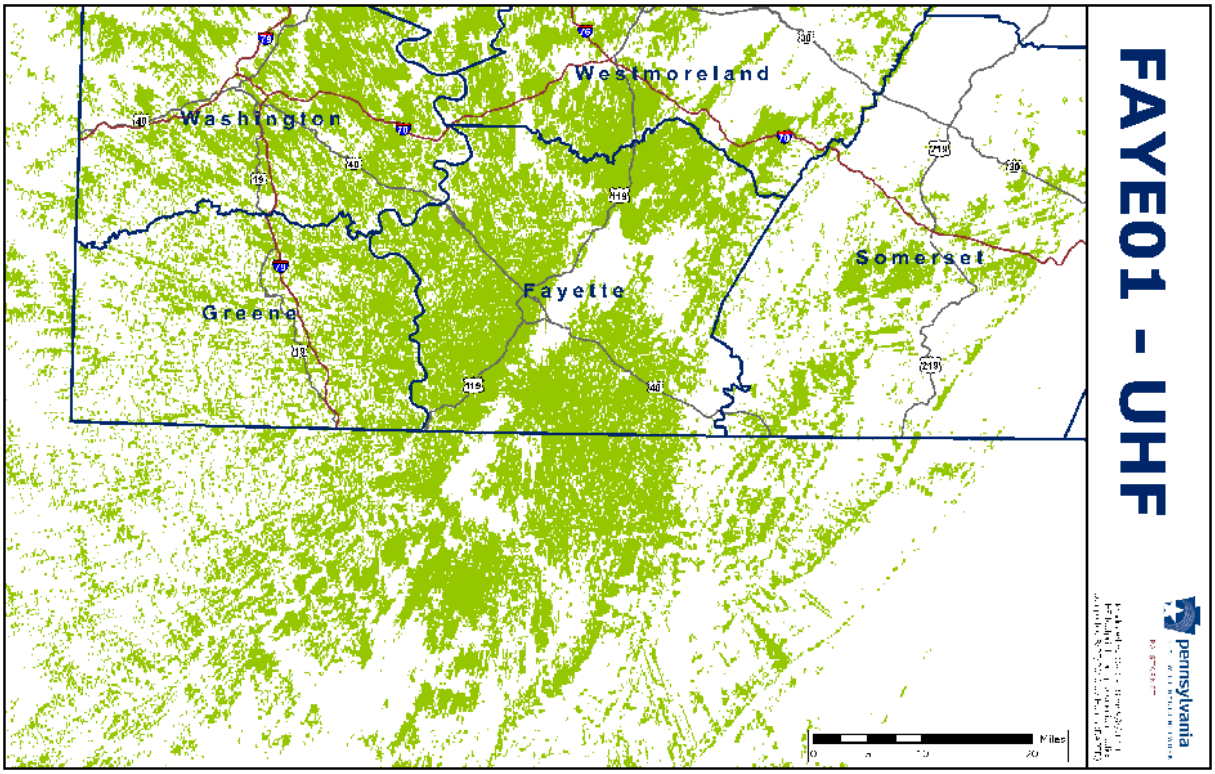

CUMB04 - UHF
pennsylvania
Blair
Mifflin
Juniata
Perry
Lebanon
Dauphin
Huntingdon
Cumberland
Lancaster
Bedford
Fulton
Franklin
York
Adams
Miles

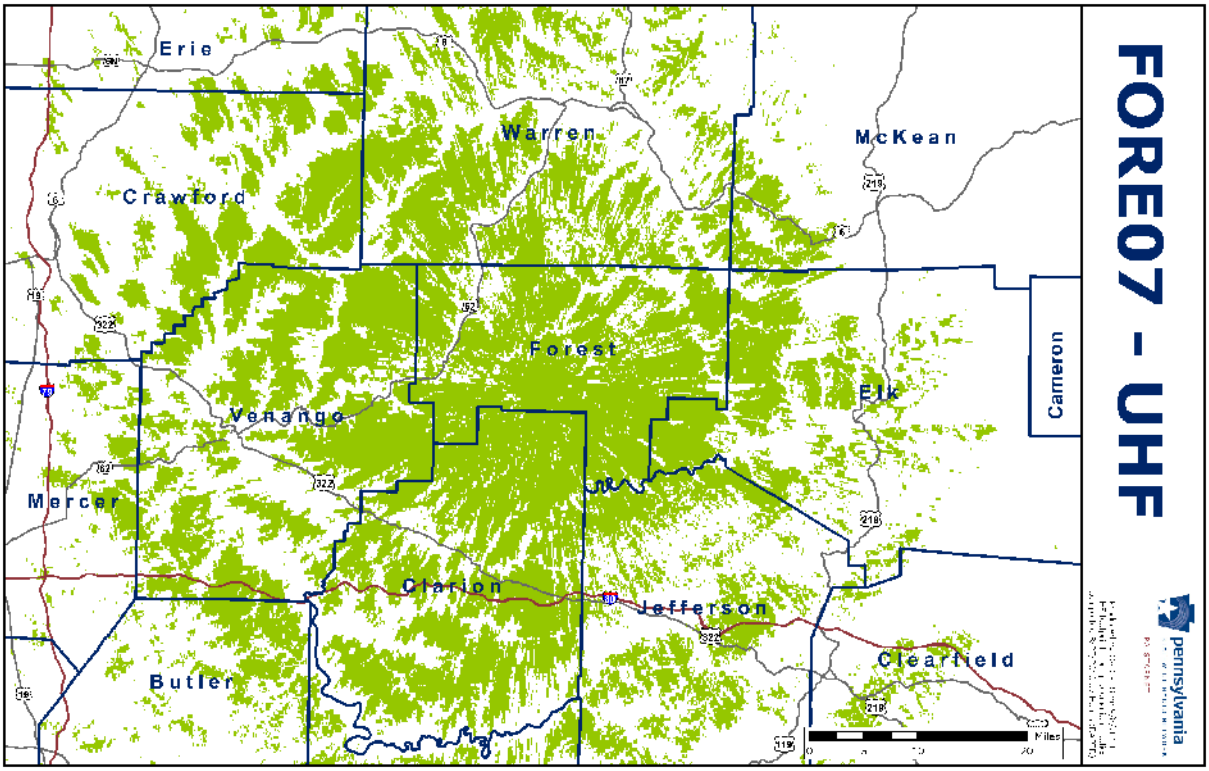

DAUP01 - UHF
pennsylvania
Union
Columbia
Centre
Snyder
Northumberland
Schuylkill
Mifflin
Juniata
Dauphin
Berks
Perry
Lebanon
Cumberland
Lancaster
Franklin
York
Adams
Miles

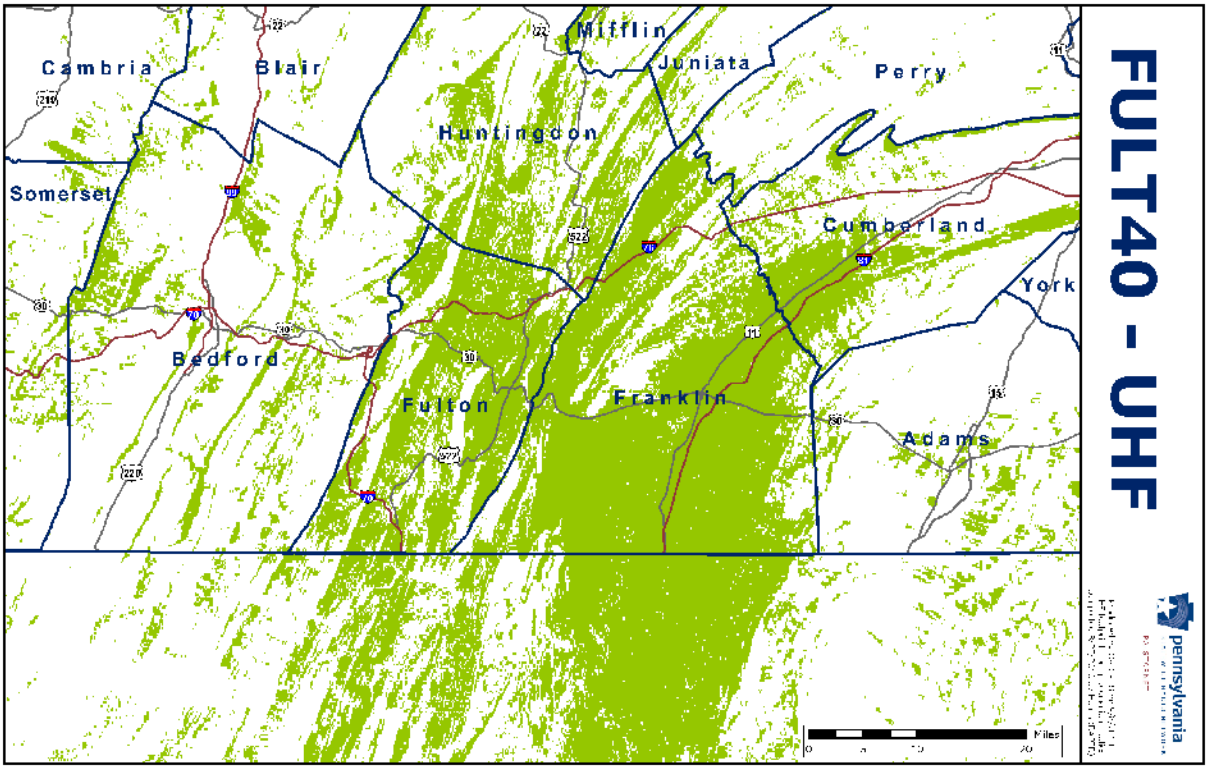

DAUP17 - UHF
Centre
Snyder
Northumberland
Schuylkill
Mifflin
Juniata
Dauphin
Berks
Perry
Lebanon
Cumberland
Lancaster
Franklin
York
Adams
Chester
Miles
0
10
20
pennsylvania

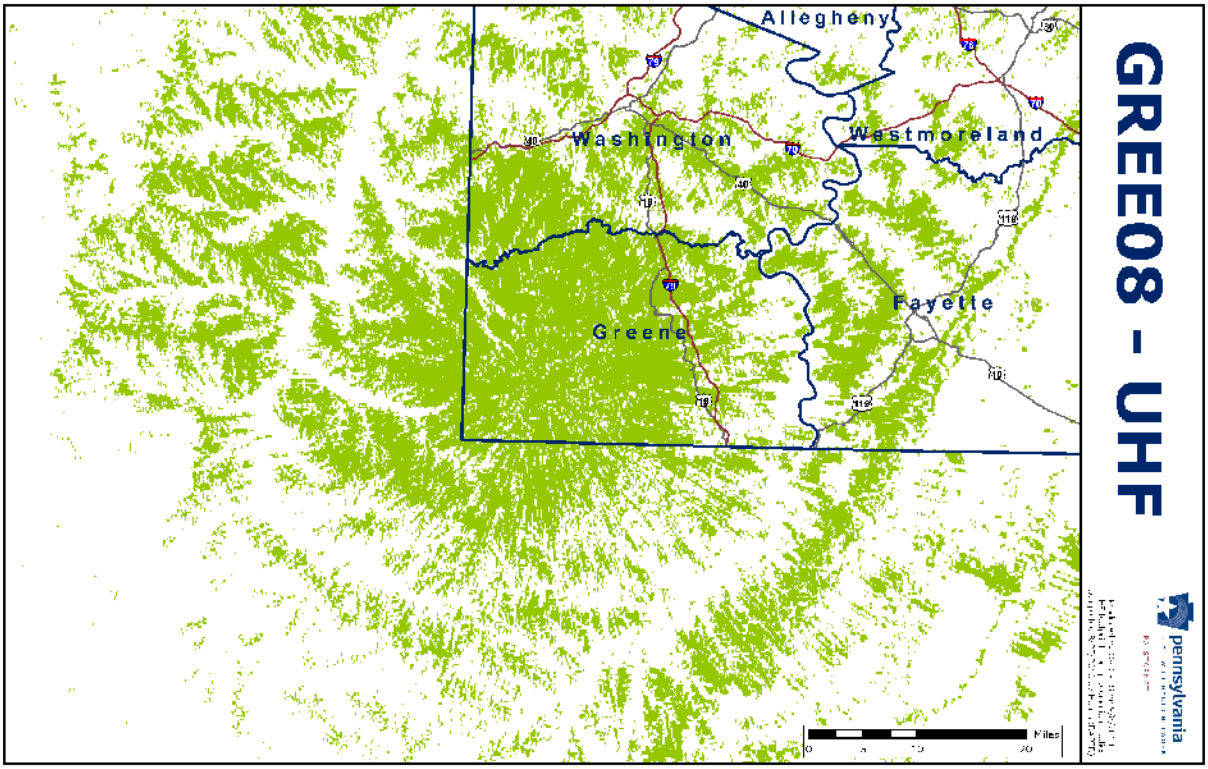

ELKC04 - UHF
Warren
McKean
Tioga
Potter
Forest
Cameron
Elk
Clinton
Clarion
Jefferson
Clearfield
Centre
Indiana
Miles
0
10
20
pennsylvania

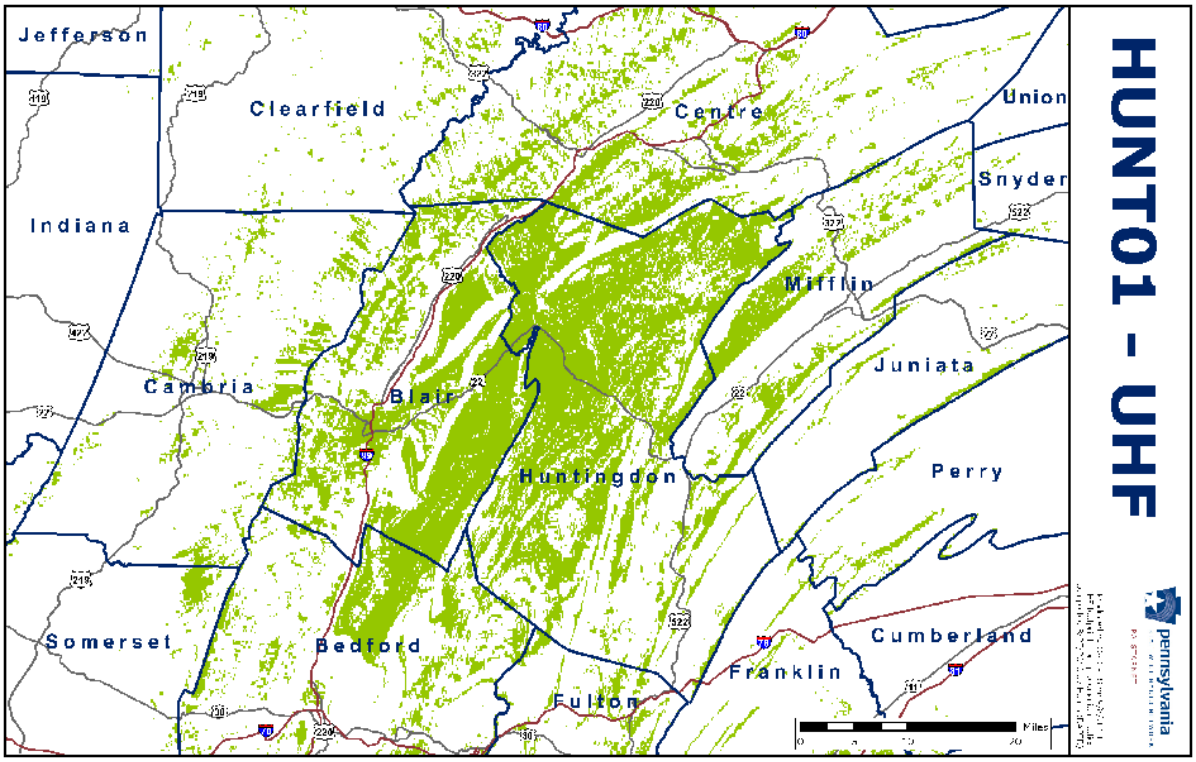

ERIE92 - UHF
Erie
Warren
Crawford
Forest
Venango
Mercer
Miles
0
5
10
20
N

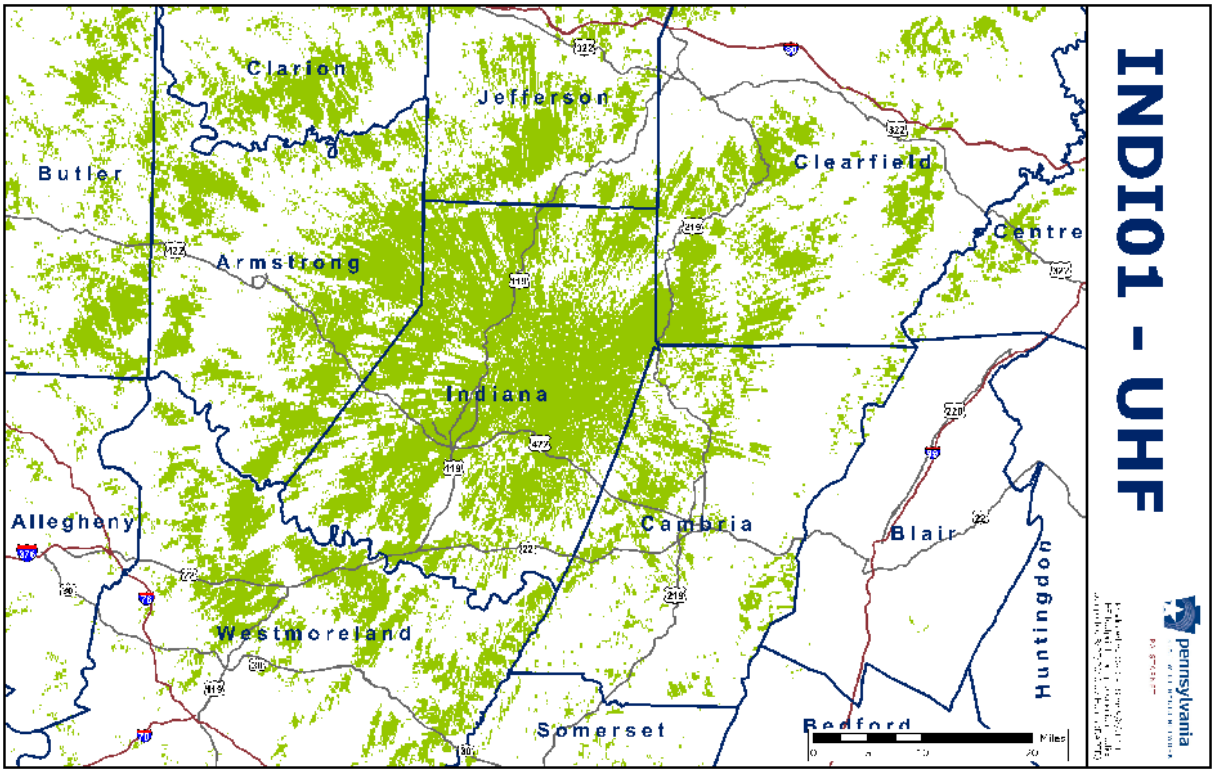

FAYE01 - UHF
Westmoreland
Washington
Somerset
Fayette
Greene
Miles
0
5
10
20

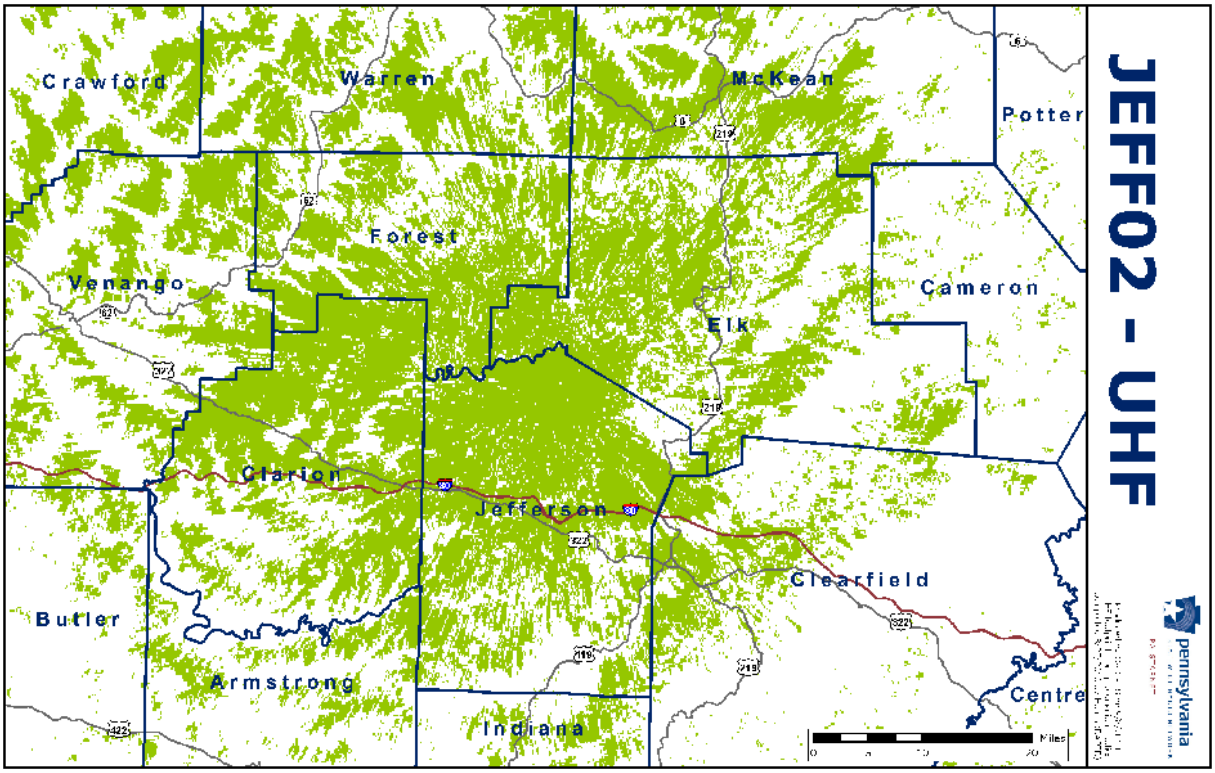

FORE07 - UHF
Erie
Warren
McKean
Crawford
Forest
Cameron
Elk
Venango
Mercer
Clarion
Jefferson
Cleartield
Butler
Miles
0
10
20
pennsylvania

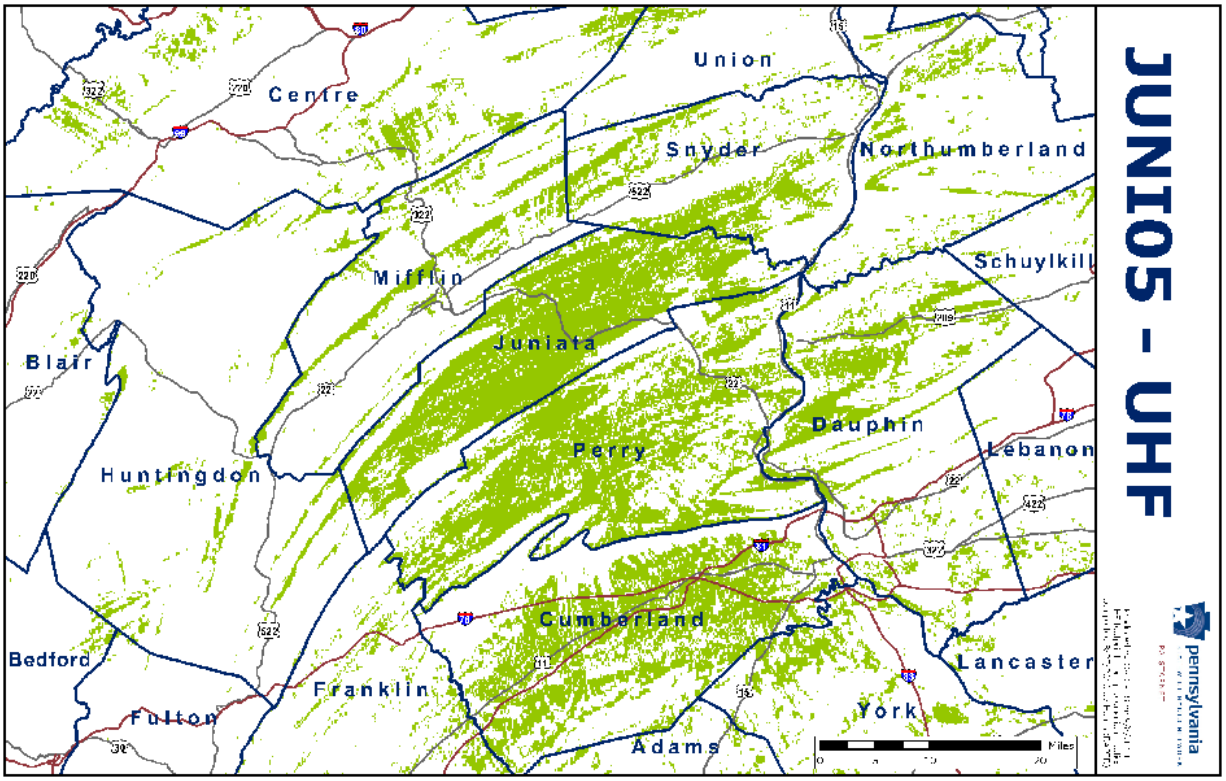

FULT40 - UHF
Cambria
Blair
Mitflin
Juniata
Perry
Huntingdon
Somerset
Cumberland
York
Bedford
Fulton
Franklin
Adams
Miles
0
10
20
pennsylvania

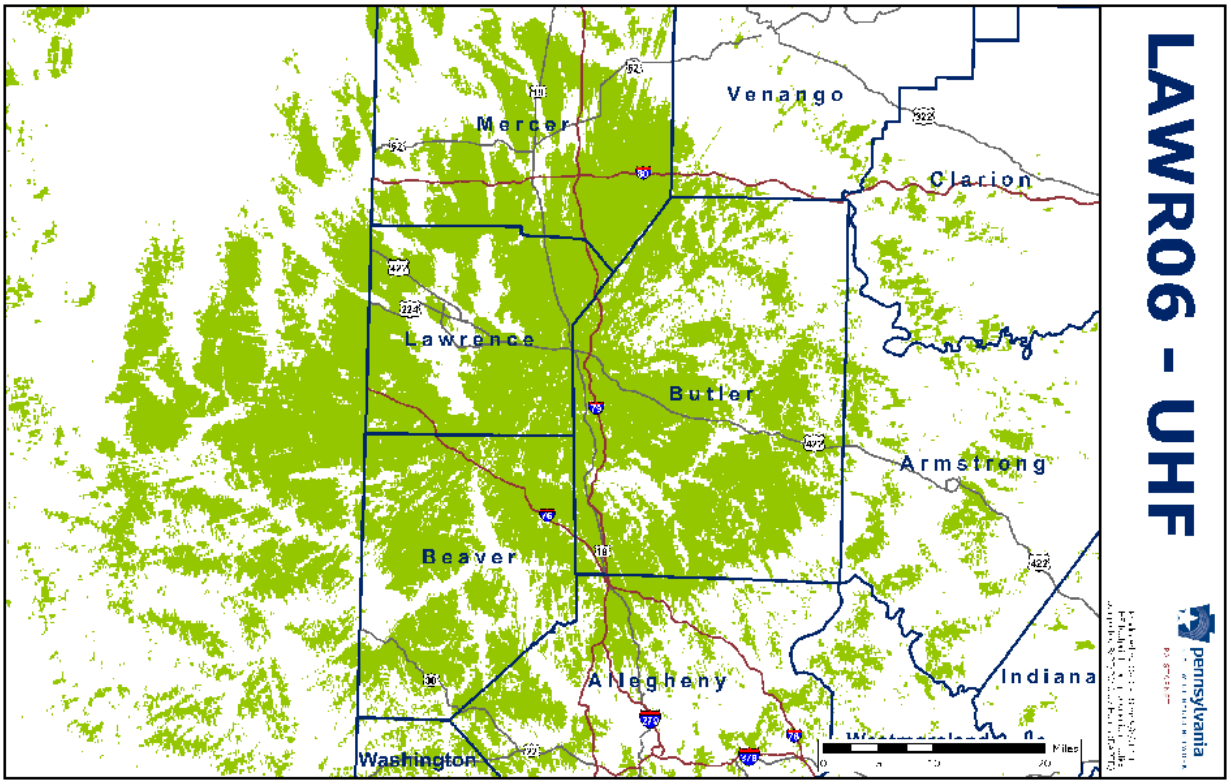

GREE08 - UHF
Allegheny
Washington
Westmoreland
Fayette
Greene
Miles
0
10
20
pennsylvania

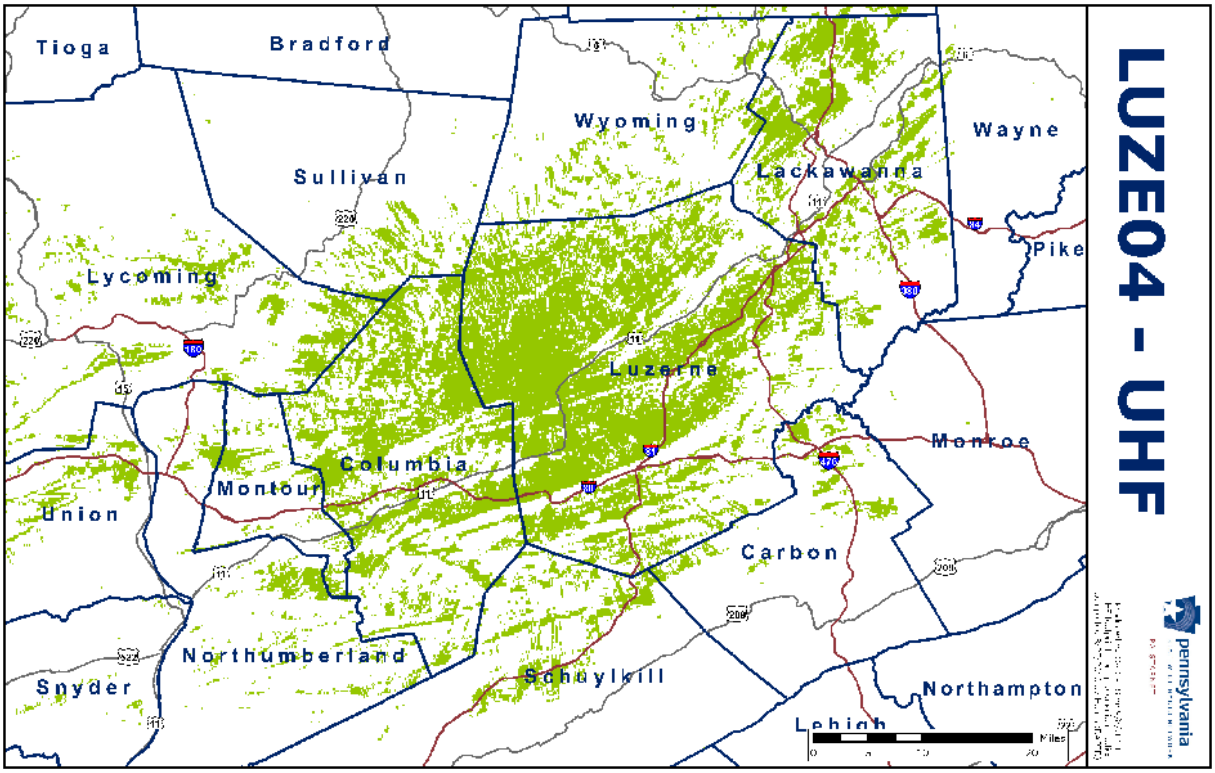

HUNT01 - UHF
Jefferson
Clearfield
Centre
Union
Snyder
Indiana
Mifflin
Juniata
Cambria
Blair
Huntingdon
Perry
Somerset
Bedford
Cumberland
Franklin
Fulton
Miles
0
10
20
pennsylvania

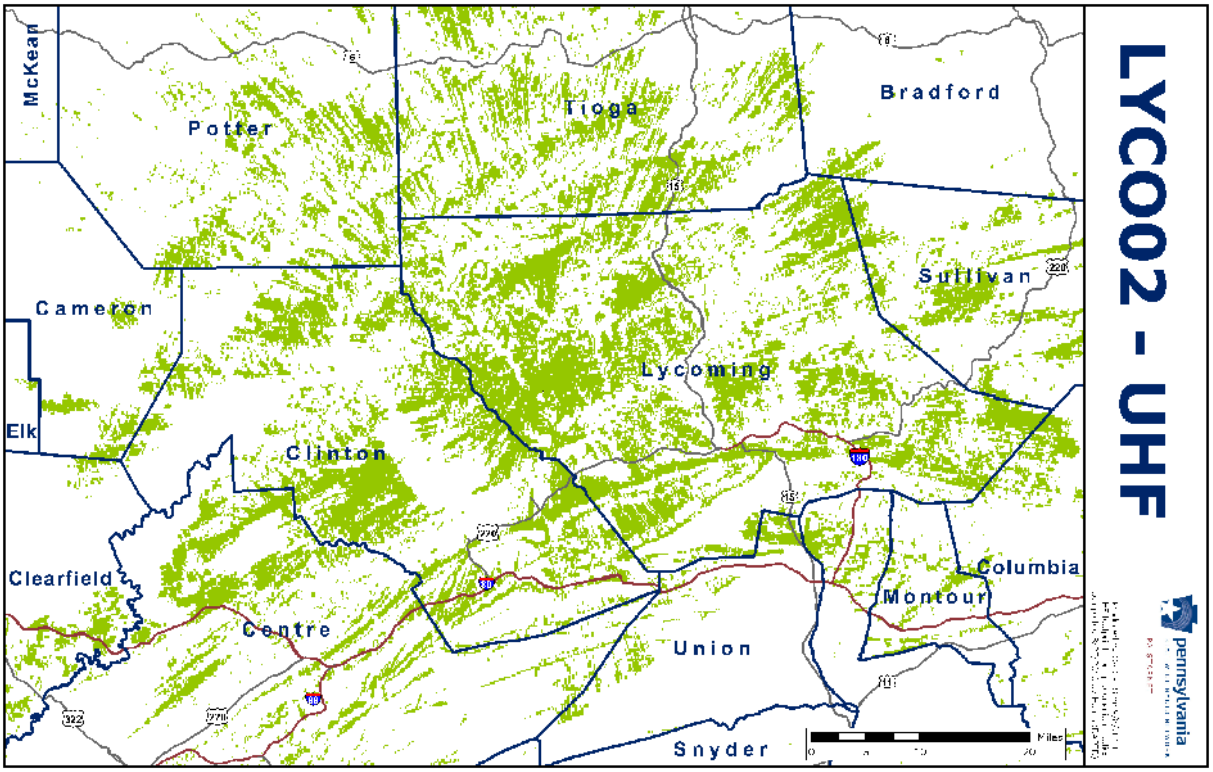

INDI01 - UHF
Clarion
Jefferson
Clearfield
Butler
Centre
Armstrong
Indiana
Allegheny
Cambria
Blair
Huntingdon
Westmoreland
Somerset
Bedford
Miles
pennsylvania

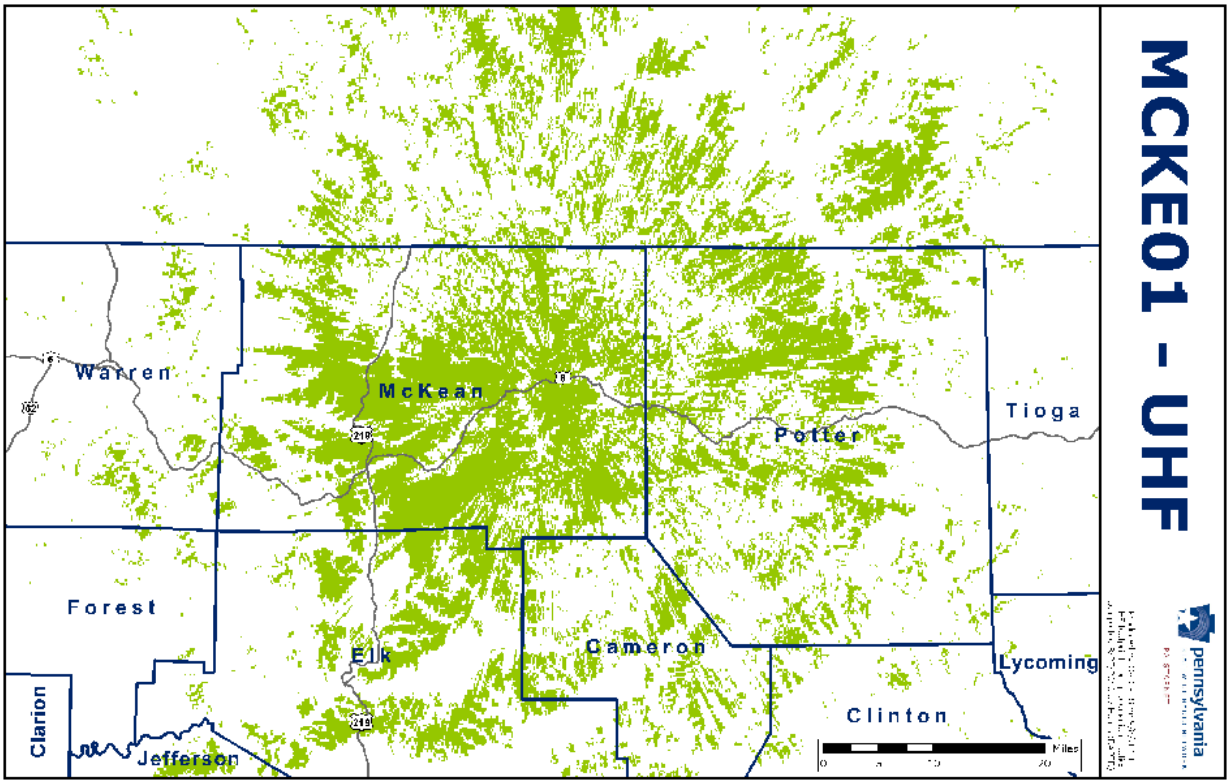

JEFF02 - UHF
Crawford
Warren
McKean
Potter
Forest
Venango
Cameron
Elk
Clarion
Jefferson
Clearfield
Butler
Armstrong
Centre
Indiana
Miles
pennsylvania

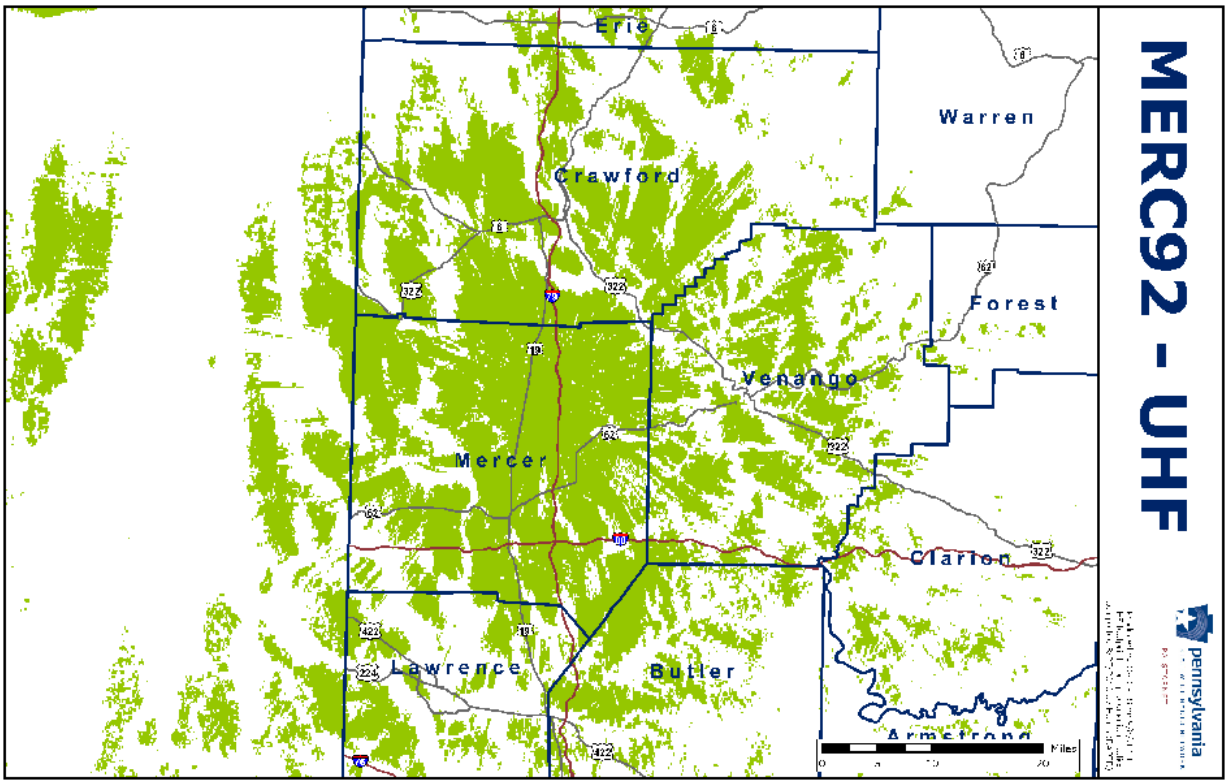

JUNI05 - UHF
Union
Centre
Snyder
Northumberland
Schuylkill
Mifflin
Juniata
Blair
Dauphin
Perry
Lebanon
Huntingdon
Cumberland
Lancaster
Bedford
Franklin
Fulton
York
Adams
Miles
pennsylvania

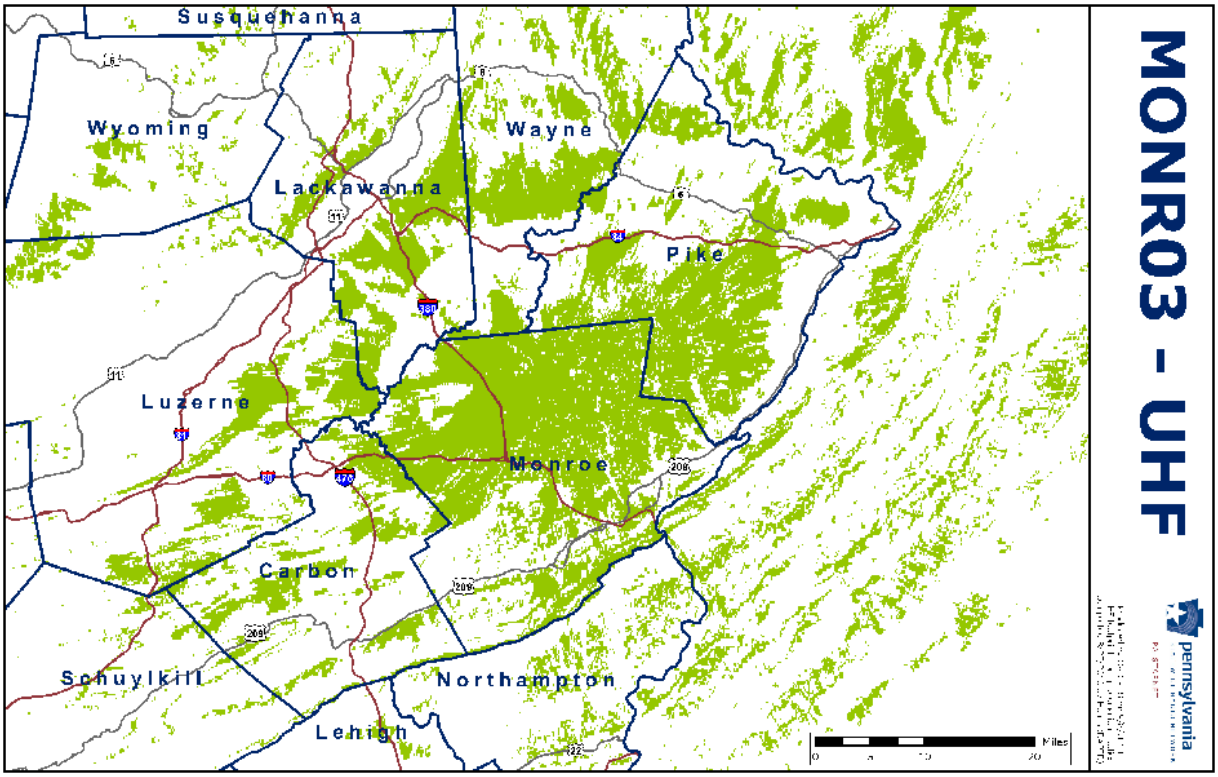

LAWR06 - UHF
Venango
Mercer
Clarion
Lawrence
Butler
Armstrong
Beaver
Indiana
Allegheny
Washington
Miles
pennsylvania

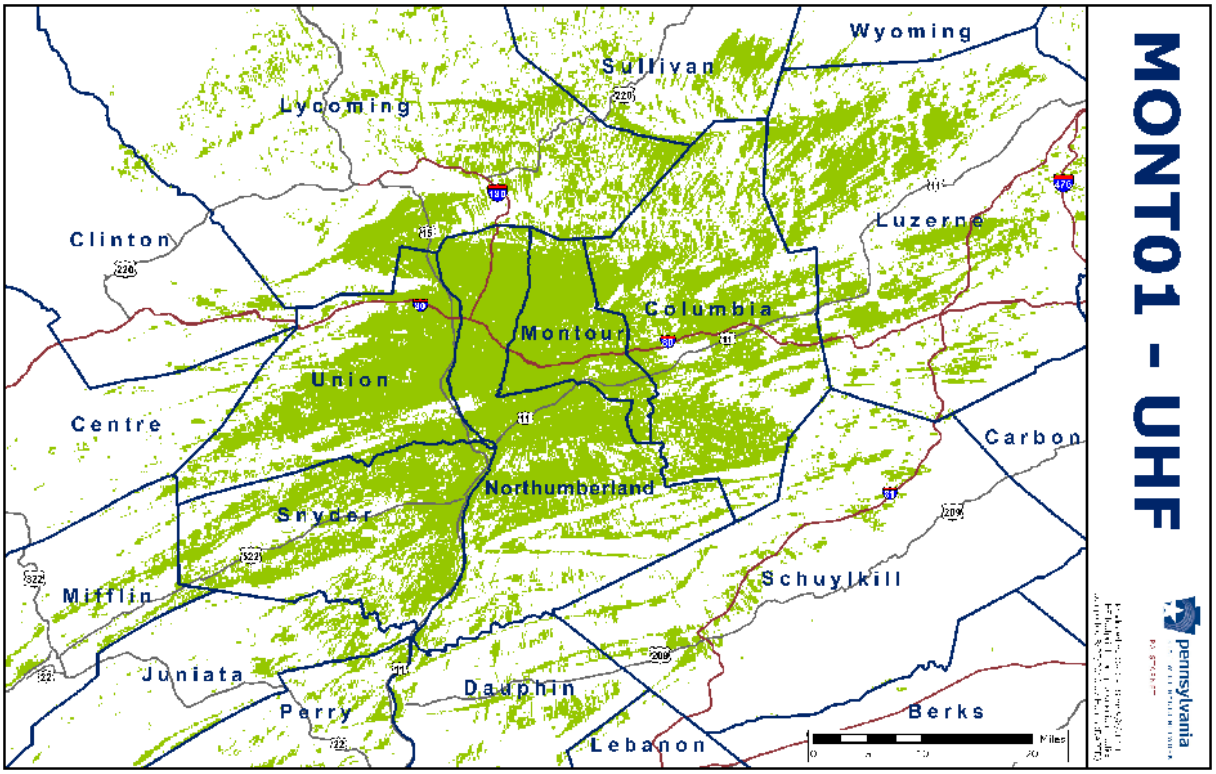

LUZE04 - UHF
Tioga
Bradford
Wyoming
Wayne
Sullivan
Lackawanna
Pike
Lycoming
Luzerne
Monroe
Columbia
Montour
Union
Carbon
Northumberland
Schuylkill
Northampton
Snyder
Lehigh
Miles
pennsylvania

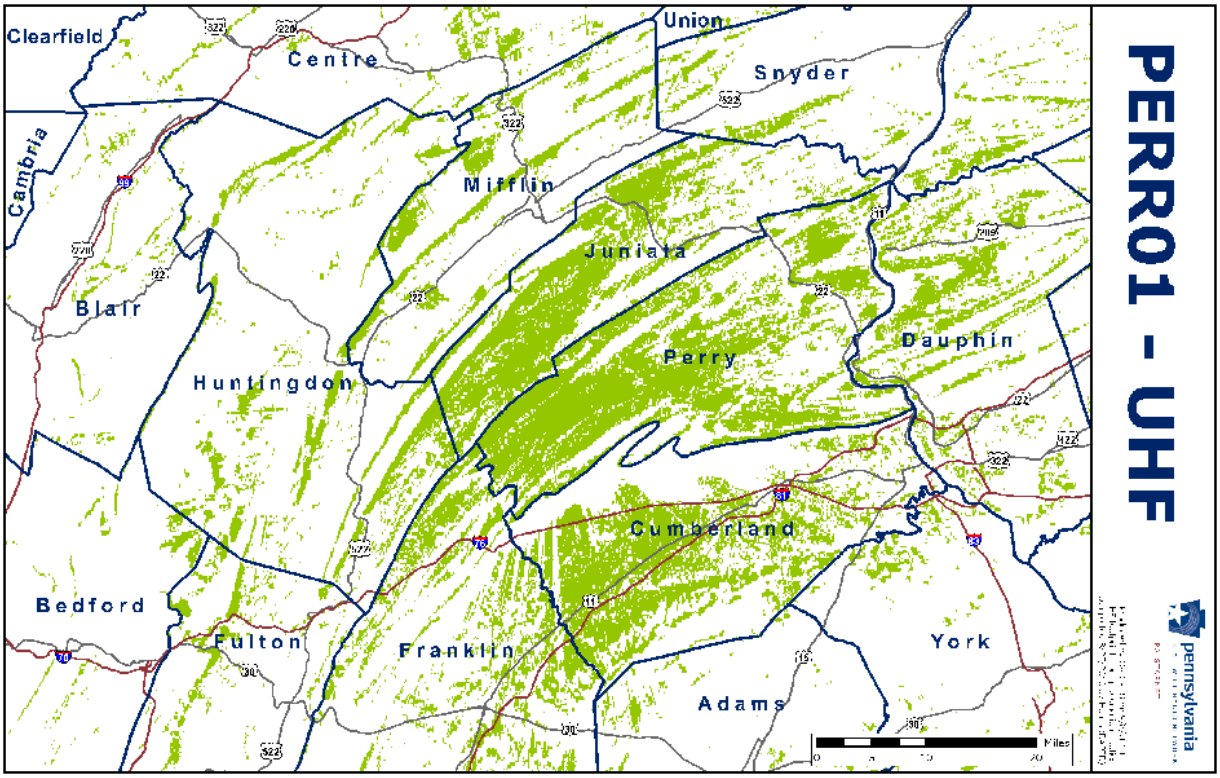

LYCO02 - UHF
McKean
Potter
Tioga
Bradford
Sullivan
Cameron
Lycoming
Elk
Clinton
Clearfield
Columbia
Montour
Centre
Union
Snyder
Miles
pennsylvania

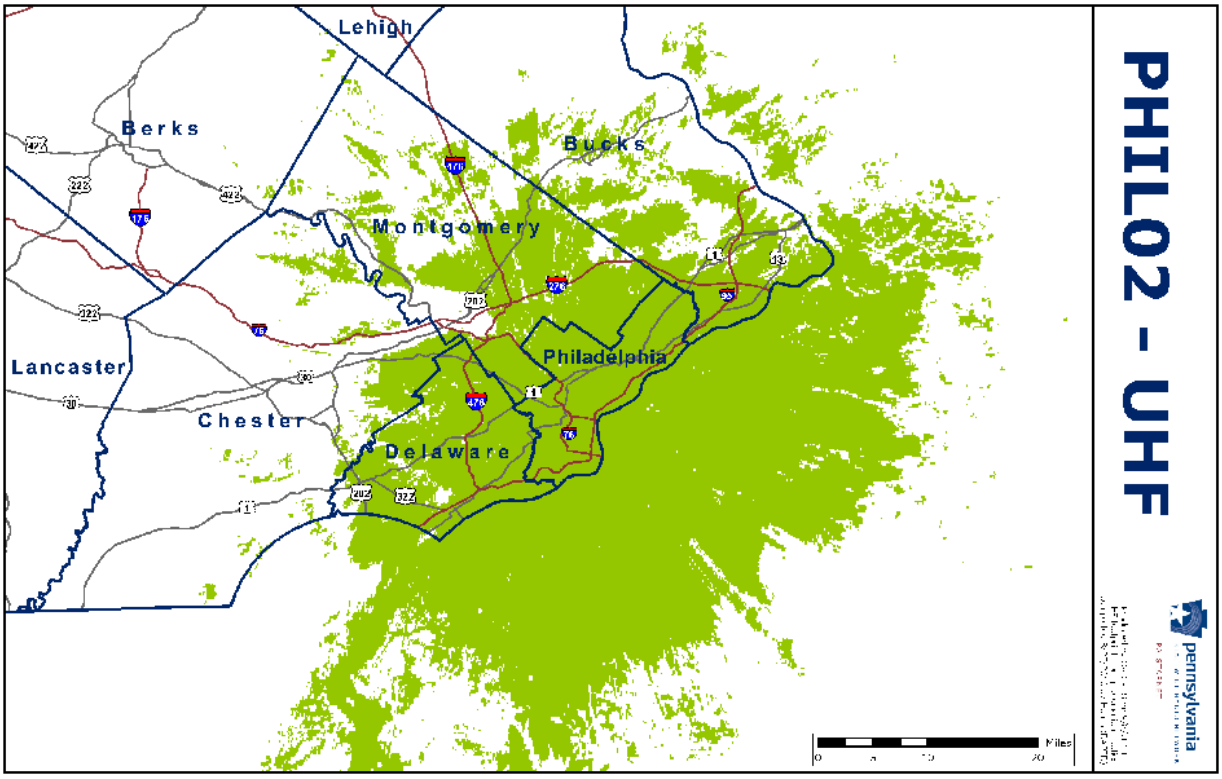

MCKE01 - UHF
pennsylvania
Warren
McKean
Potter
Tioga
Forest
Elk
Cameron
Lycoming
Clinton
Clarion
Jefferson
Miles

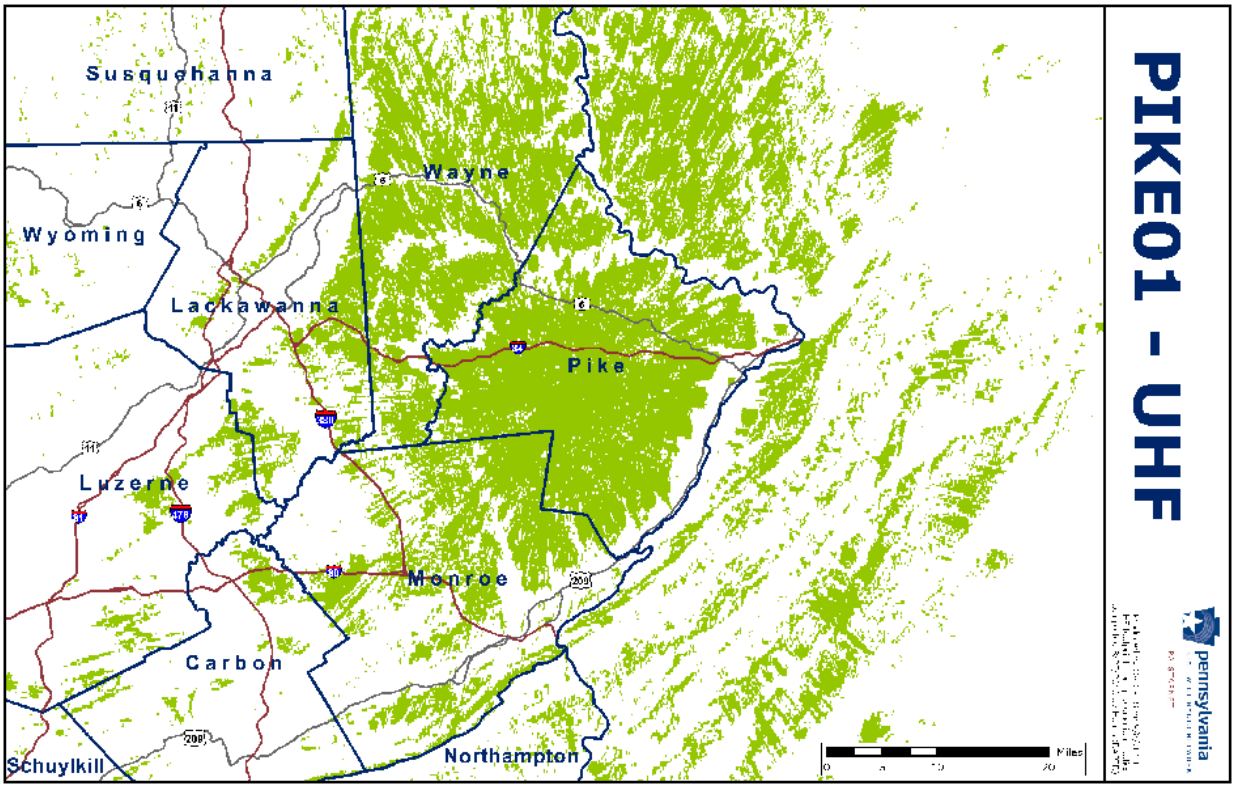

MERC92 - UHF
pennsylvania
Erie
Warren
Crawford
Forest
Venango
Mercer
Clarion
Lawrence
Butler
Armstrong
Miles

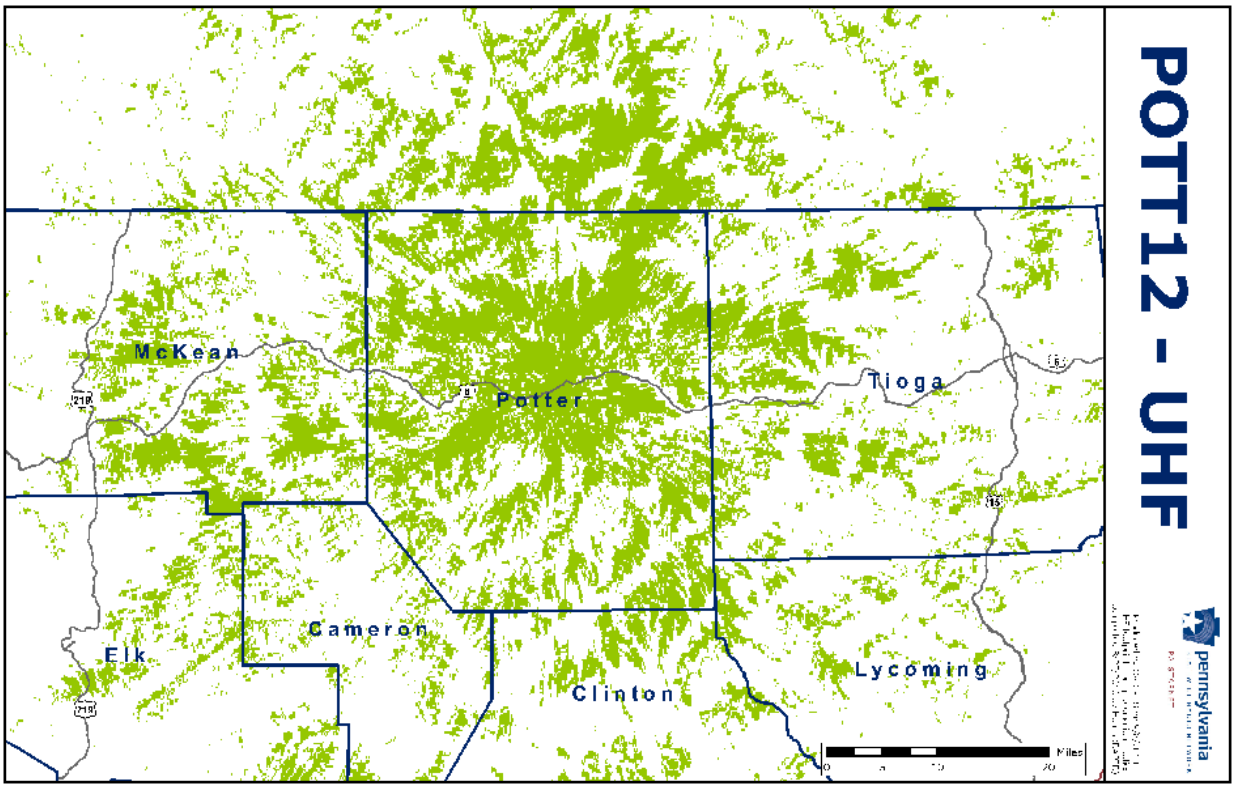

MONR03 - UHF
pennsylvania
Susquehanna
Wyoming
Lackawanna
Wayne
Pike
Luzerne
Monroe
Carbon
Schuylkill
Northampton
Lehigh
Miles
0
10
20

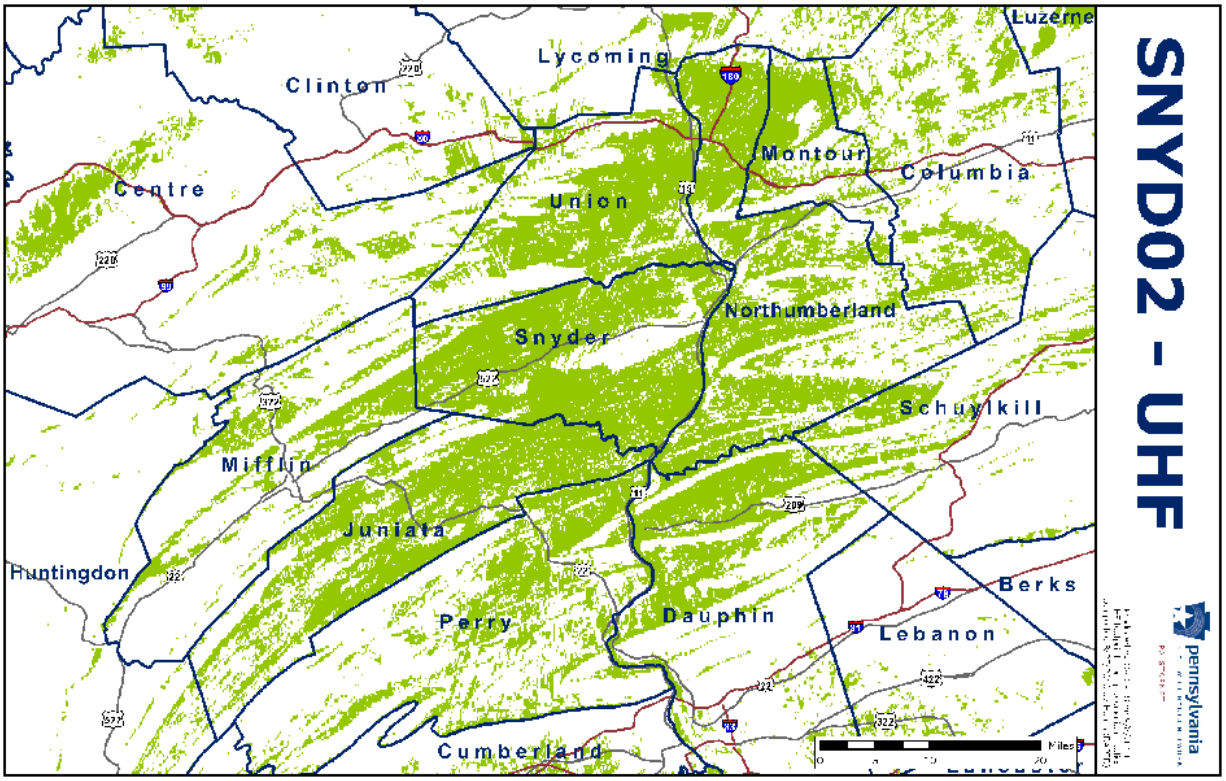

MONT01 - UHF
pennsylvania
Wyoming
Sullivan
Lycoming
Clinton
Luzerne
Columbia
Montour
Union
Centre
Carbon
Northumberland
Snyder
Schuylkill
Mifflin
Juniata
Dauphin
Perry
Berks
Lebanon
Miles
0
10
20

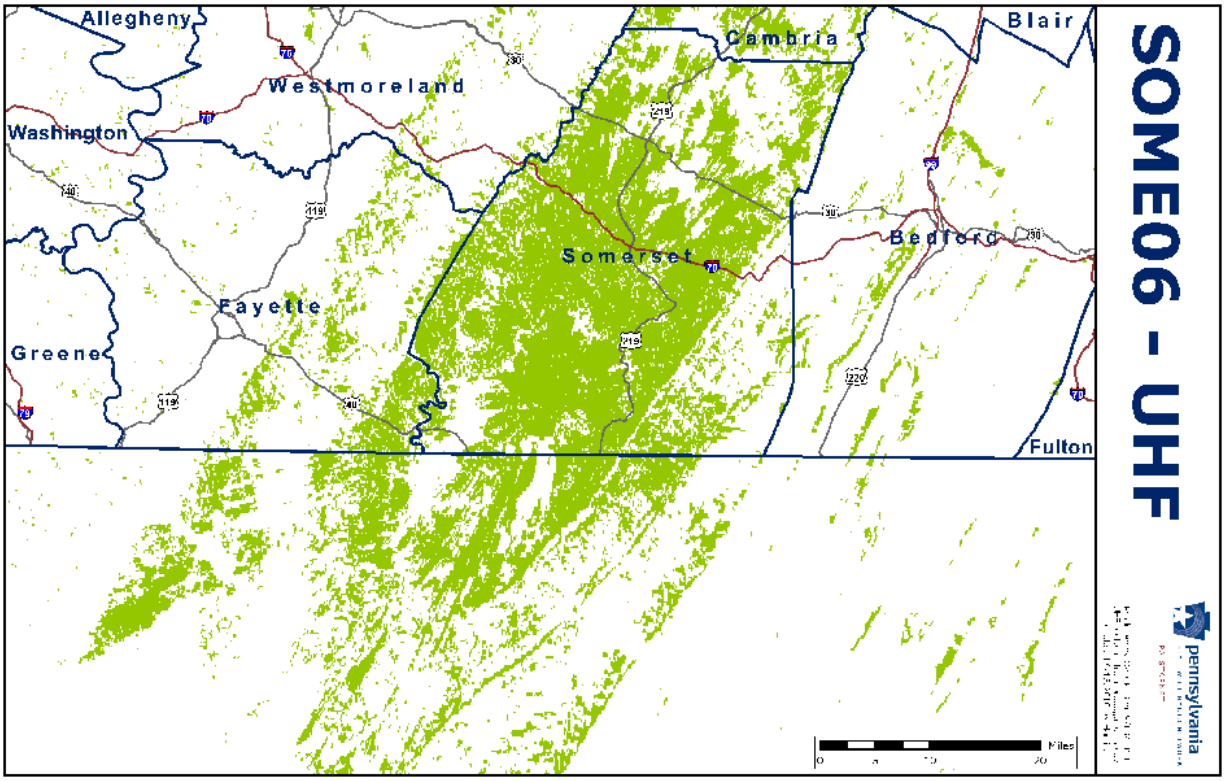

PERR01 - UHF
pennsylvania
Union
Snyder
Clearfield
Centre
Cambria
Mifflin
Juniata
Blair
Dauphin
Perry
Huntingdon
Cumberland
Bedford
Fulton
Franklin
York
Adams
Miles

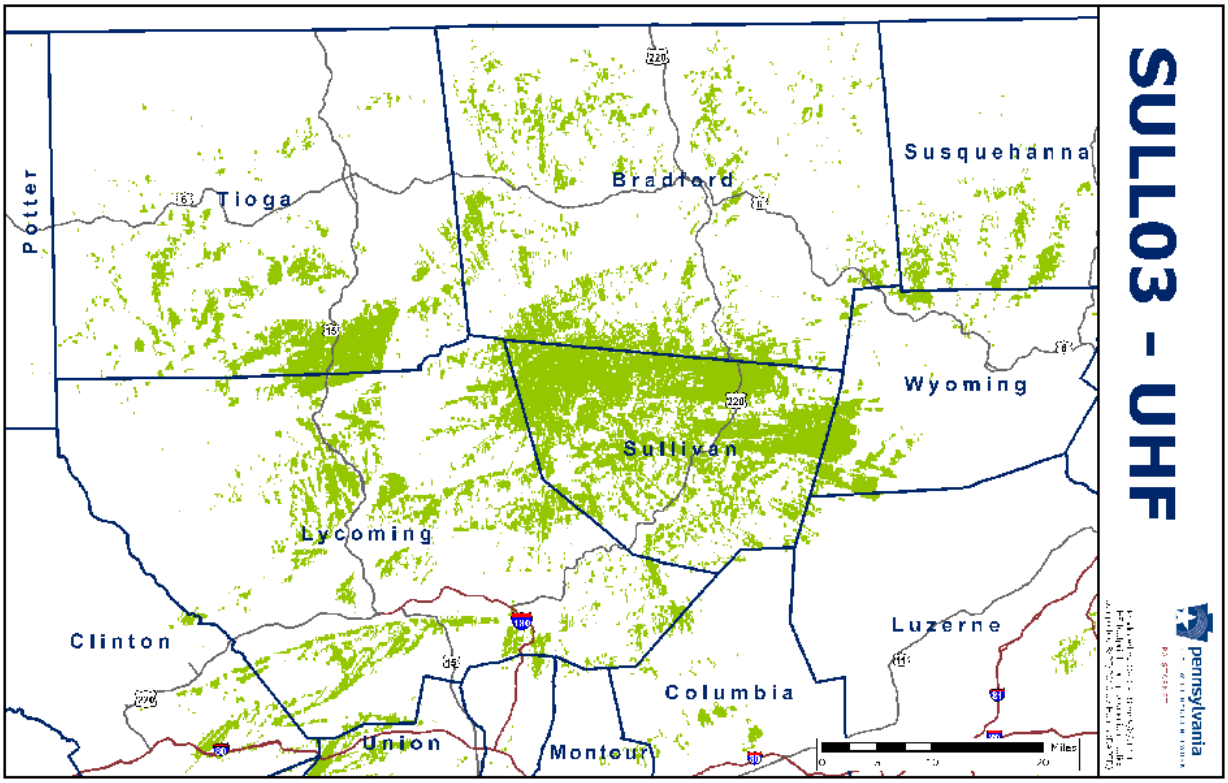

PHIL02 - UHF
pennsylvania
Lehigh
Berks
Bucks
Montgomery
Lancaster
Philadelphia
Chester
Delaware
Miles

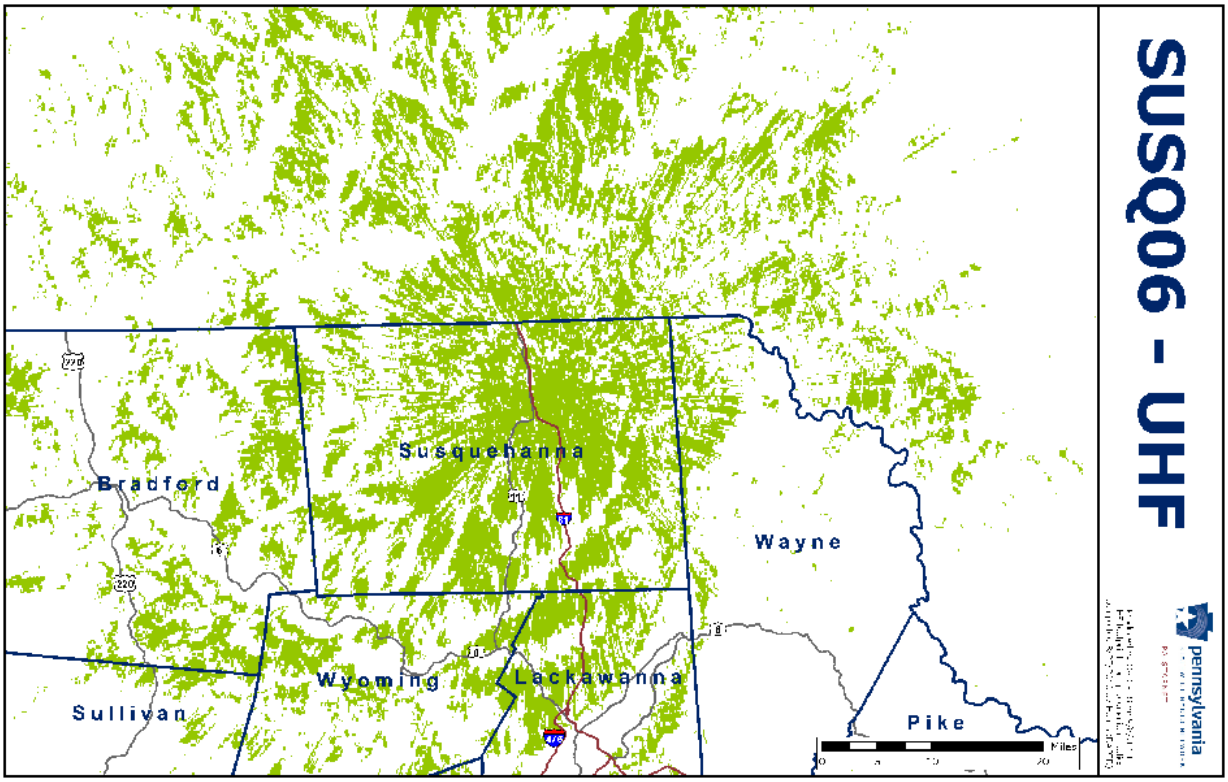

PIKE01 - UHF
pennsylvania
Susquehanna
Wayne
Wyoming
Lackawanna
Pike
Luzerne
Monroe
Carbon
Schuylkill
Northampton
Miles

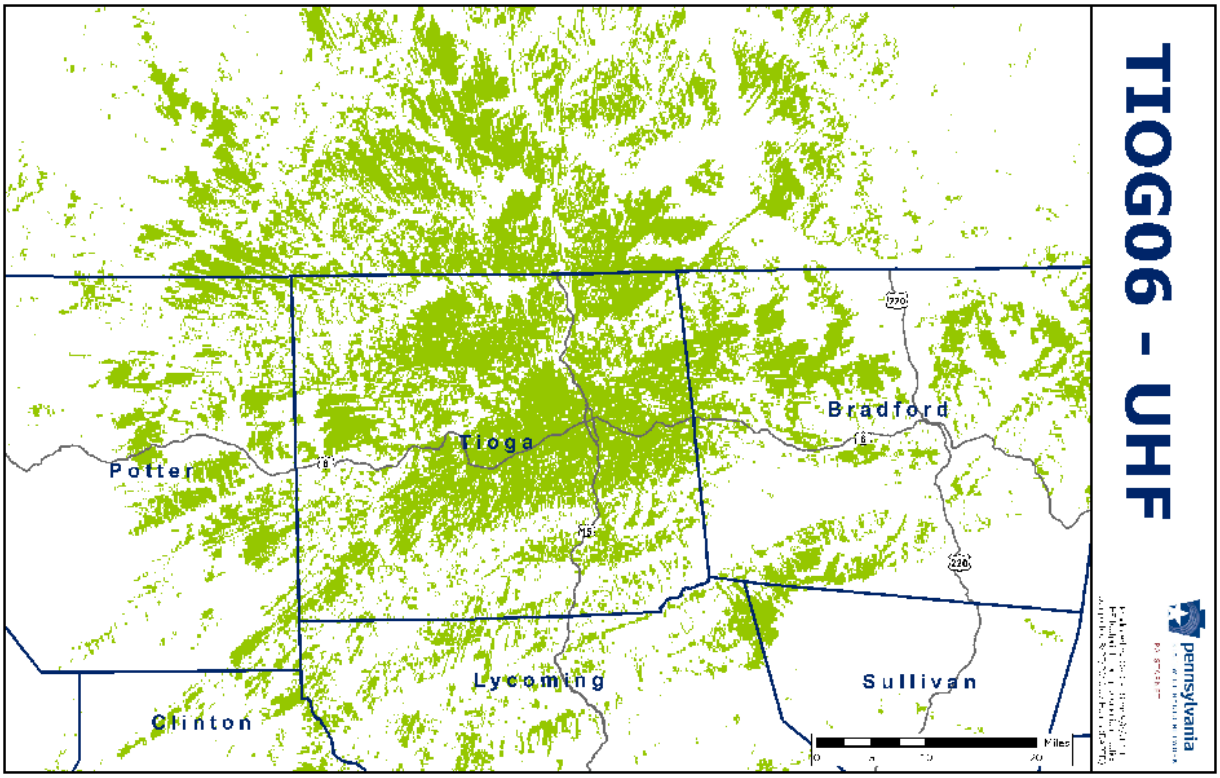

POTT12 - UHF
pennsylvania
McKean
Potter
Tioga
Cameron
Elk
Clinton
Lycoming
Miles

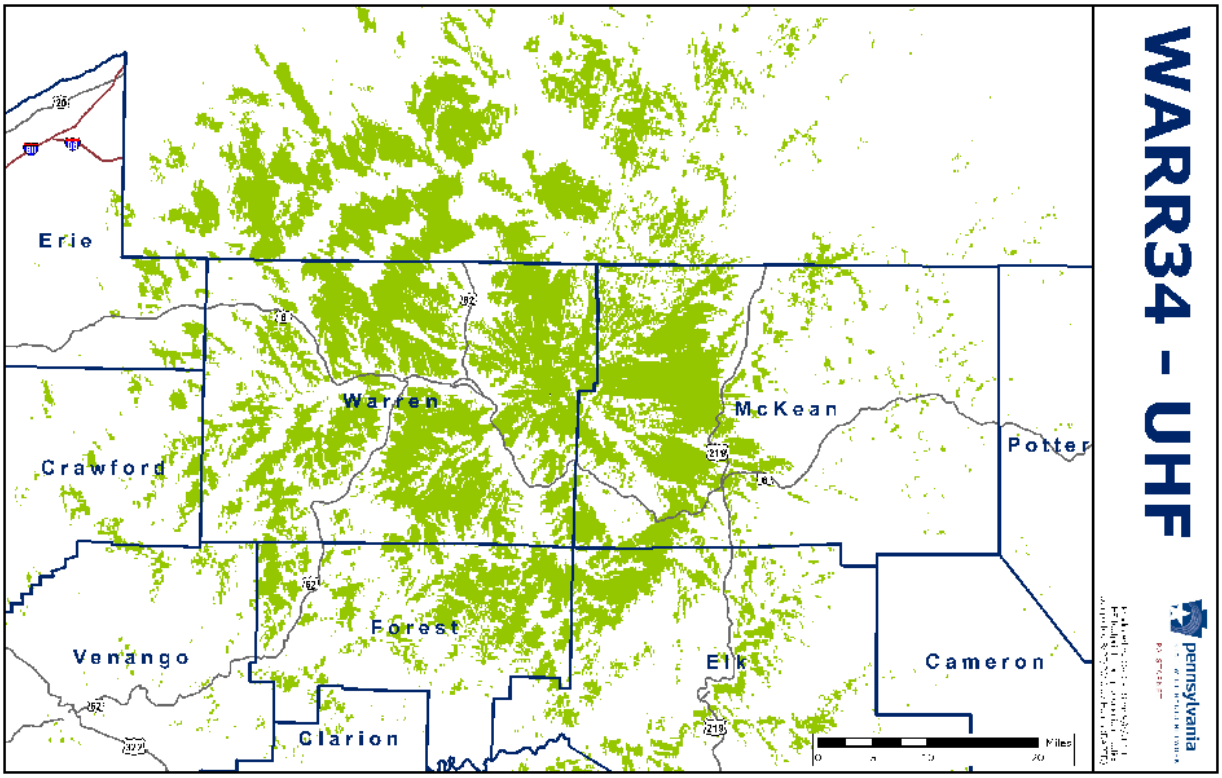

SNYD02 - UHF
Luzerne
Lycoming
Clinton
Montour
Columbia
Centre
Union
Northumberland
Snyder
Schuylkill
Mifflin
Juniata
Huntingdon
Berks
Perry
Dauphin
Lebanon
Cumberland
Miles
pennsylvania

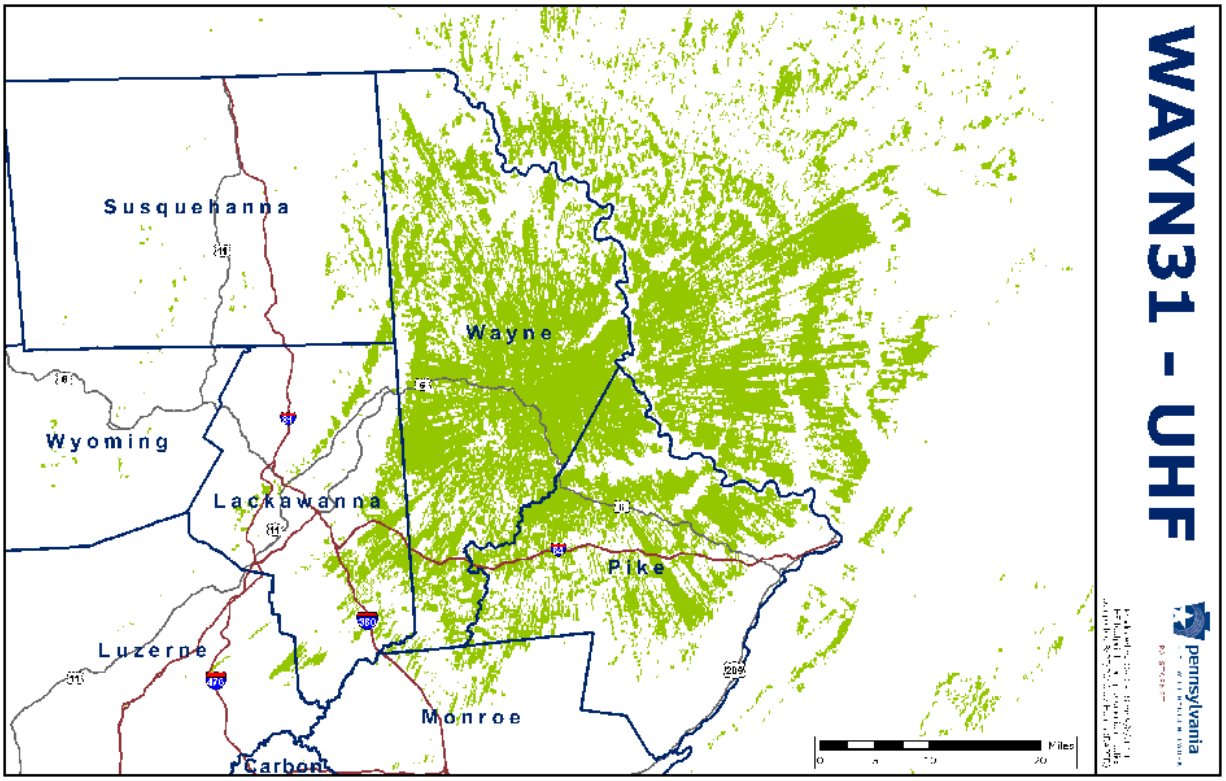

SOME06 - UHF
Allegheny
Cambria
Blair
Westmoreland
Washington
Somerset
Bedford
Fayette
Greene
Fulton
Miles
pennsylvania

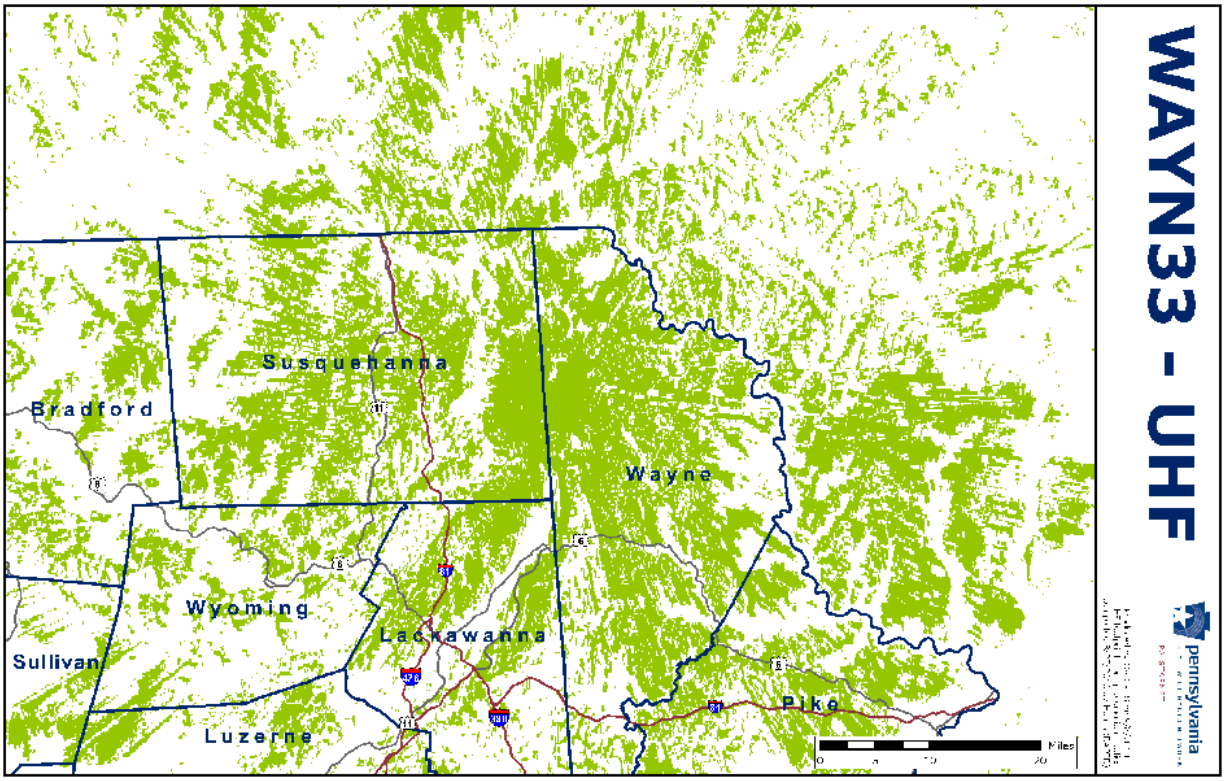

SULL03 - UHF
Susquehanna
Wyoming
Luzerne
Bradford
Tioga
Potter
Sullivan
Lycoming
Clinton
Columbia
Union
Montour
Miles
pennsylvania

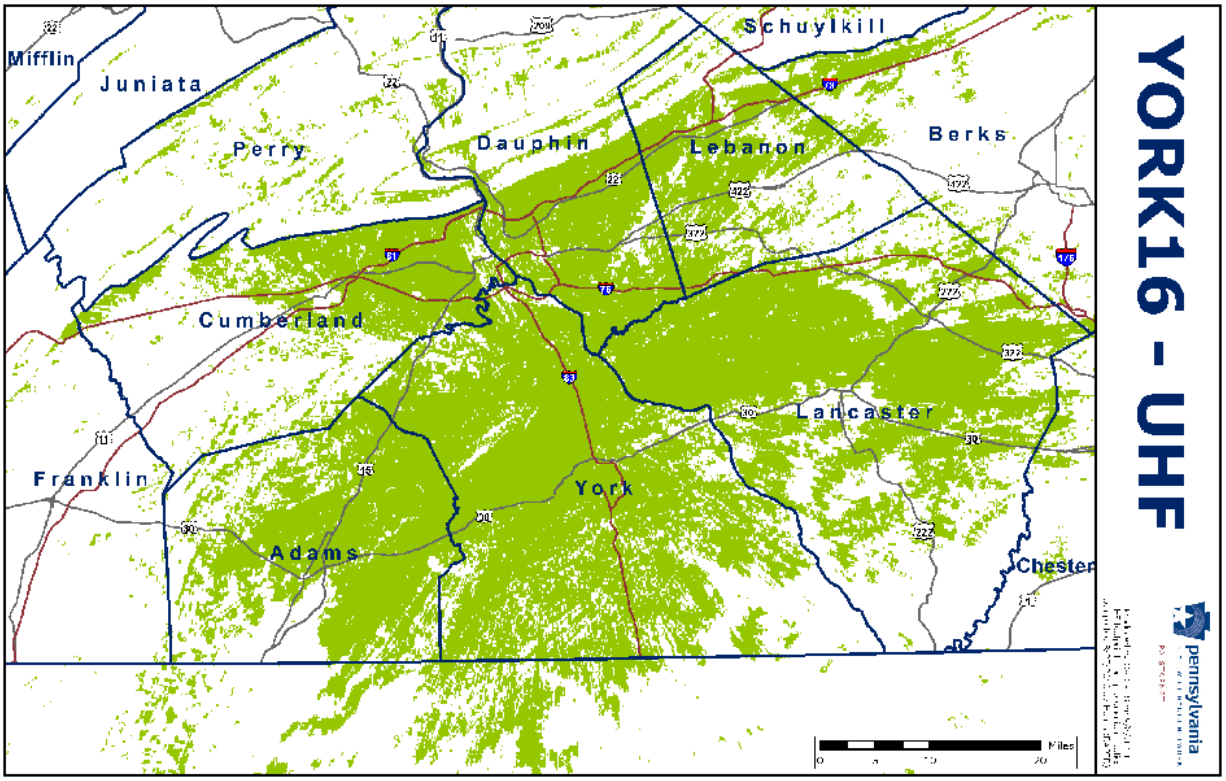

SUSQ06 - UHF
Susquehanna
Bradford
Wayne
Wyoming
Lackawanna
Sullivan
Pike
Miles
pennsylvania

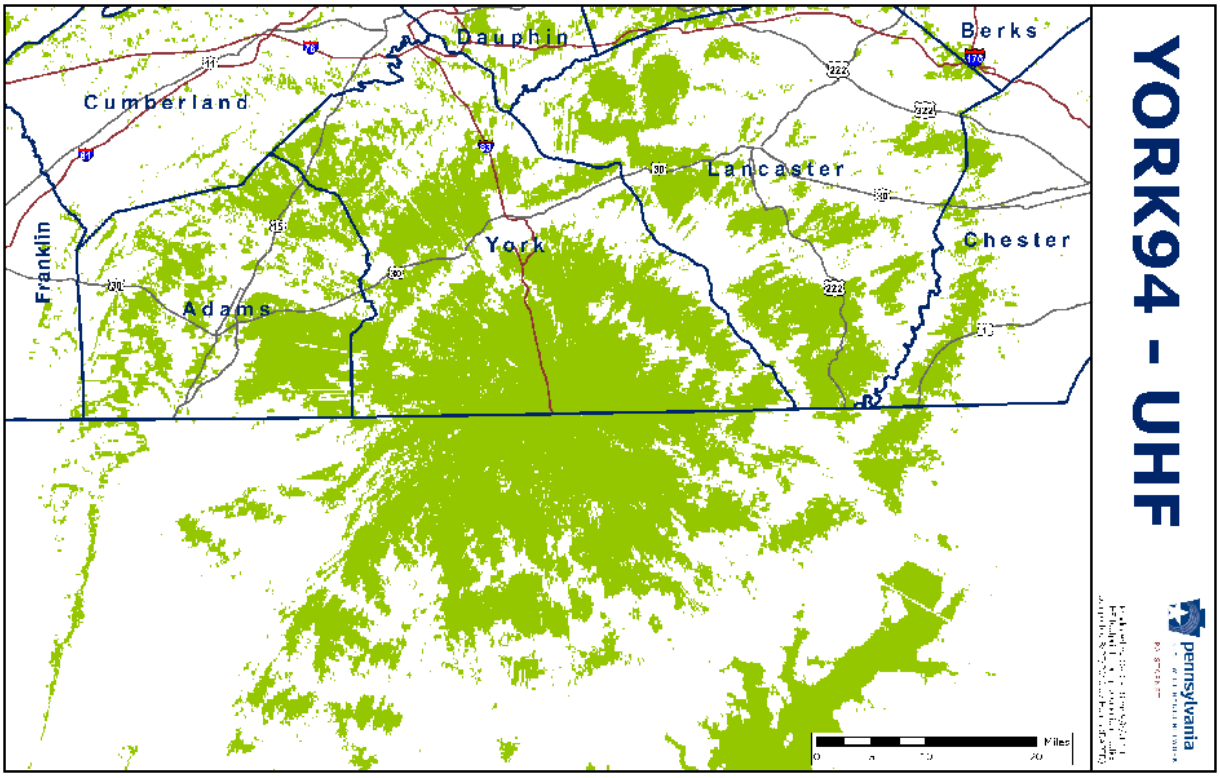

TIOG06 - UHF
pennsylvania
Bradford
Tioga
Potter
Lycoming
Sullivan
Clinton
Miles


WARR34 - UHF
pennsylvania
Erie
Warren
McKean
Potter
Crawford
Forest
Venango
Elk
Cameron
Clarion
Miles

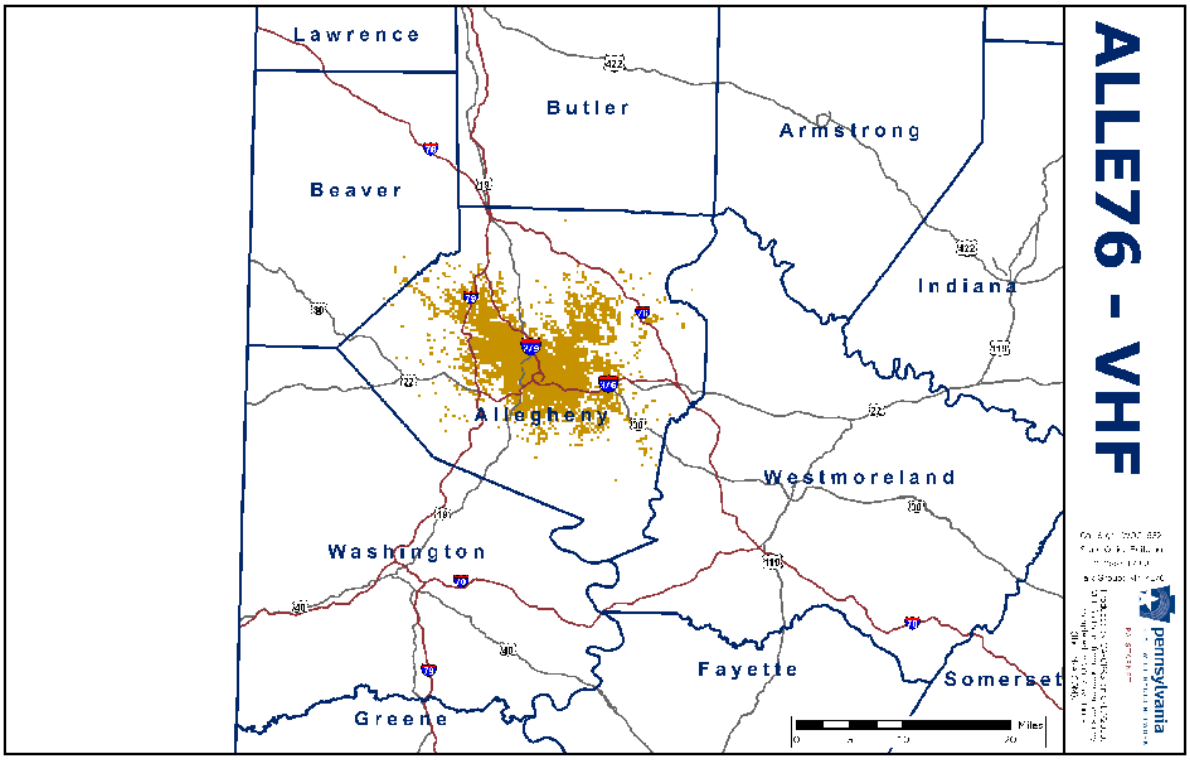

WAYN31 - UHF
pennsylvania
Susquehanna
Wayne
Wyoming
Lackawanna
Pike
Luzerne
Monroe
Carbon
Miles
0
5
10
20

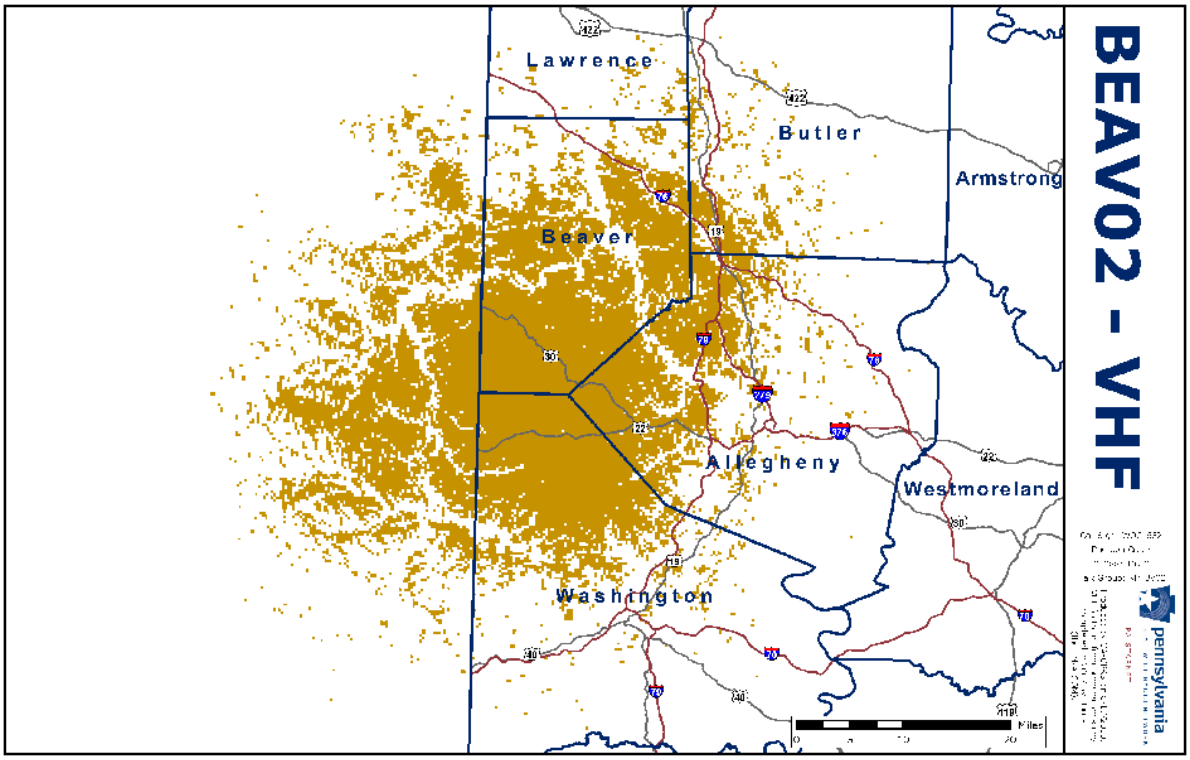

WAYN33 - UHF
pennsylvania
Susquehanna
Bradford
Wayne
Wyoming
Lackawanna
Sullivan
Pike
Luzerne
Miles
0
5
10
20

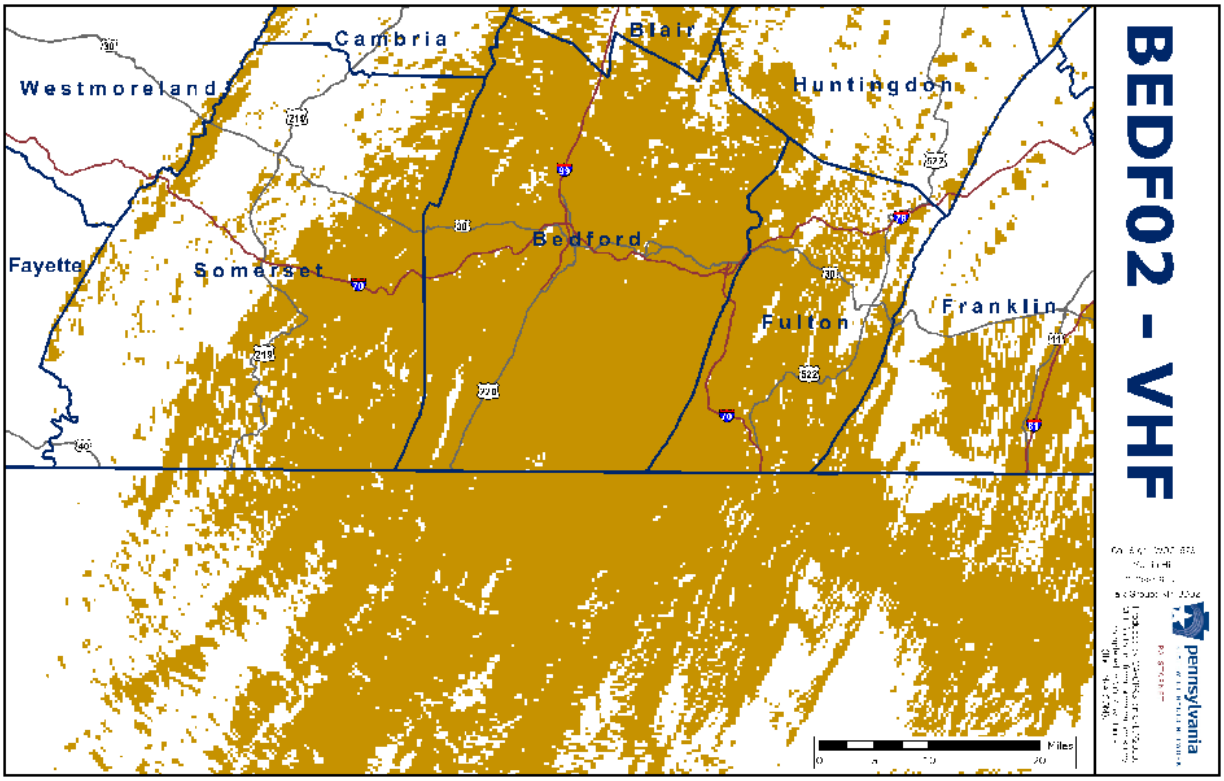

YORK16 - UHF
pennsylvania
Schuylkill
Berks
Lebanon
Dauphin
Perry
Juniata
Mifflin
Cumberland
Lancaster
York
Franklin
Adams
Chester
Miles
0
5
10
20

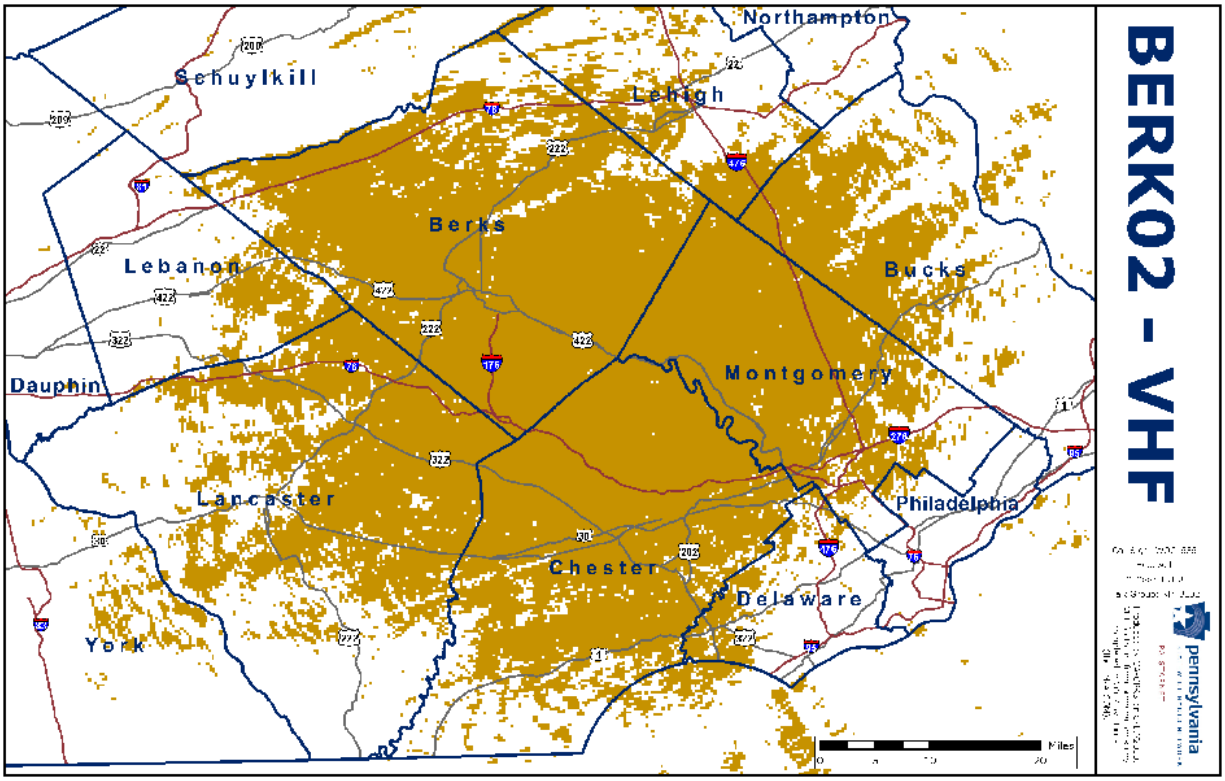

YORK94 - UHF
pennsylvania
Berks
Dauphin
Cumberland
Lancaster
Chester
York
Franklin
Adams
Miles
0
5
10
20

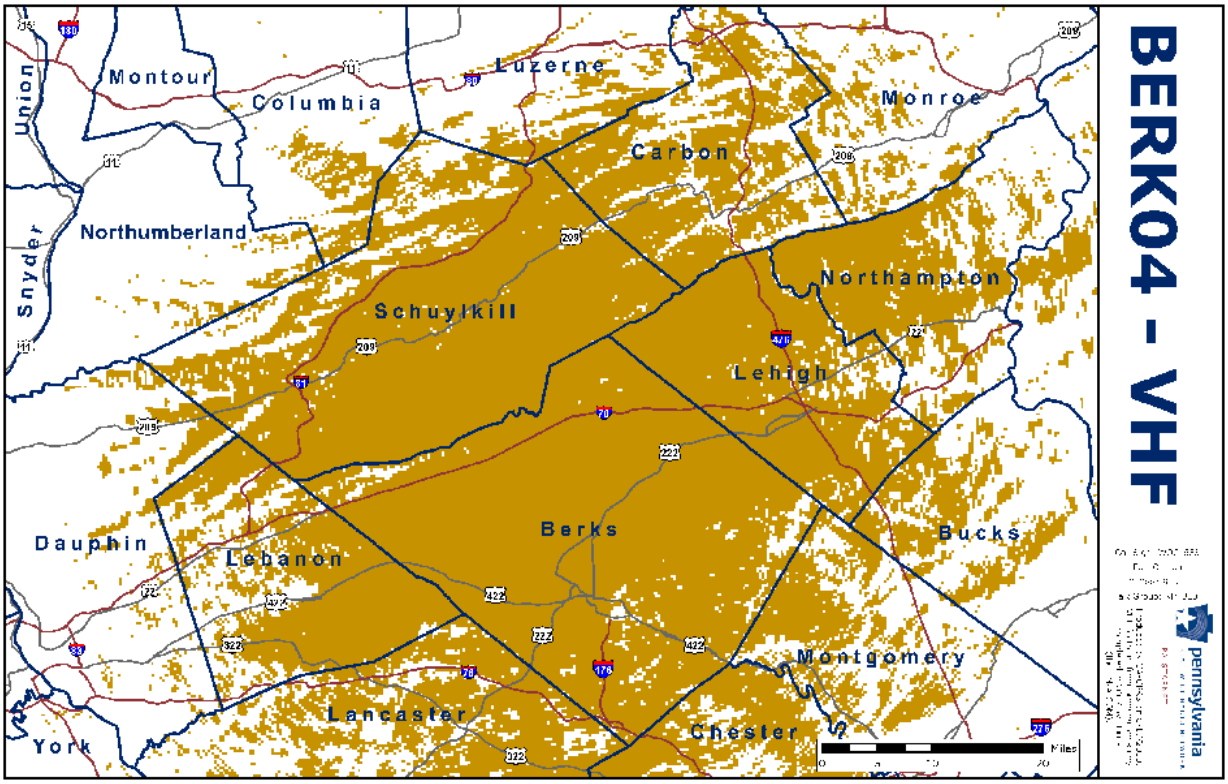
APPENDIX F: PA-STARNET VHF OVERLAY MAPS

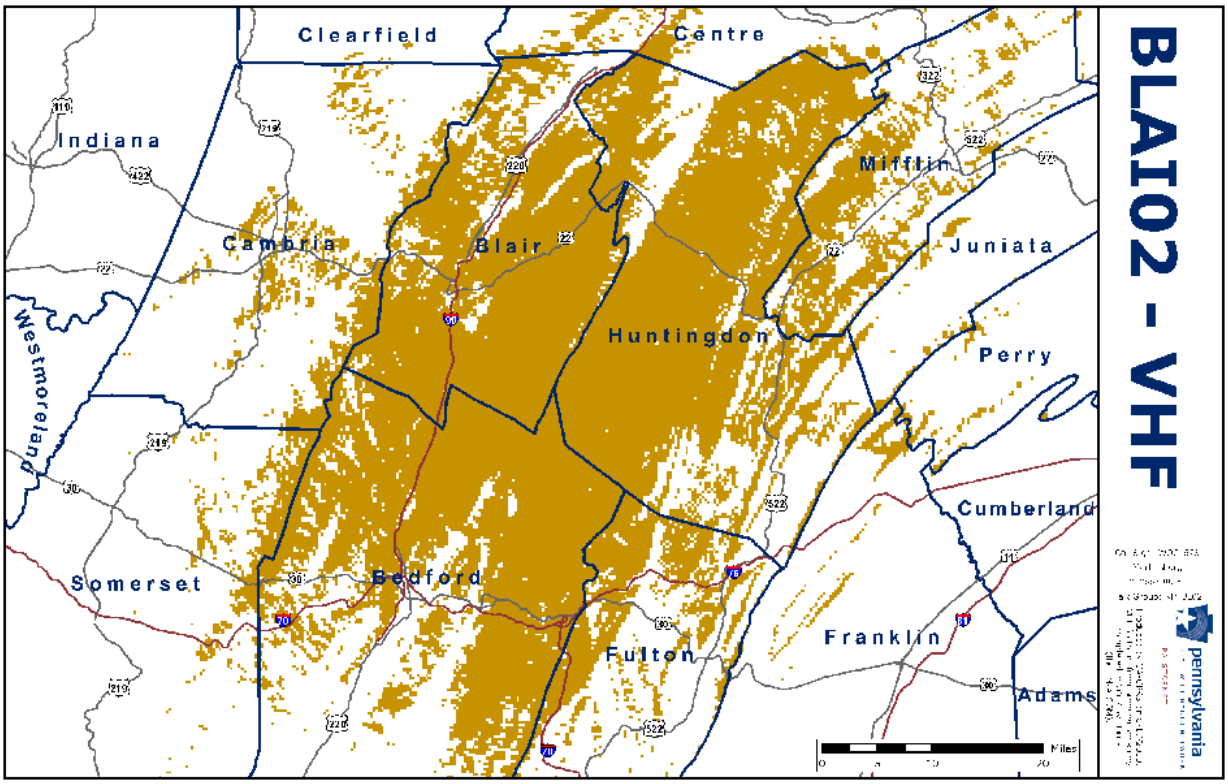


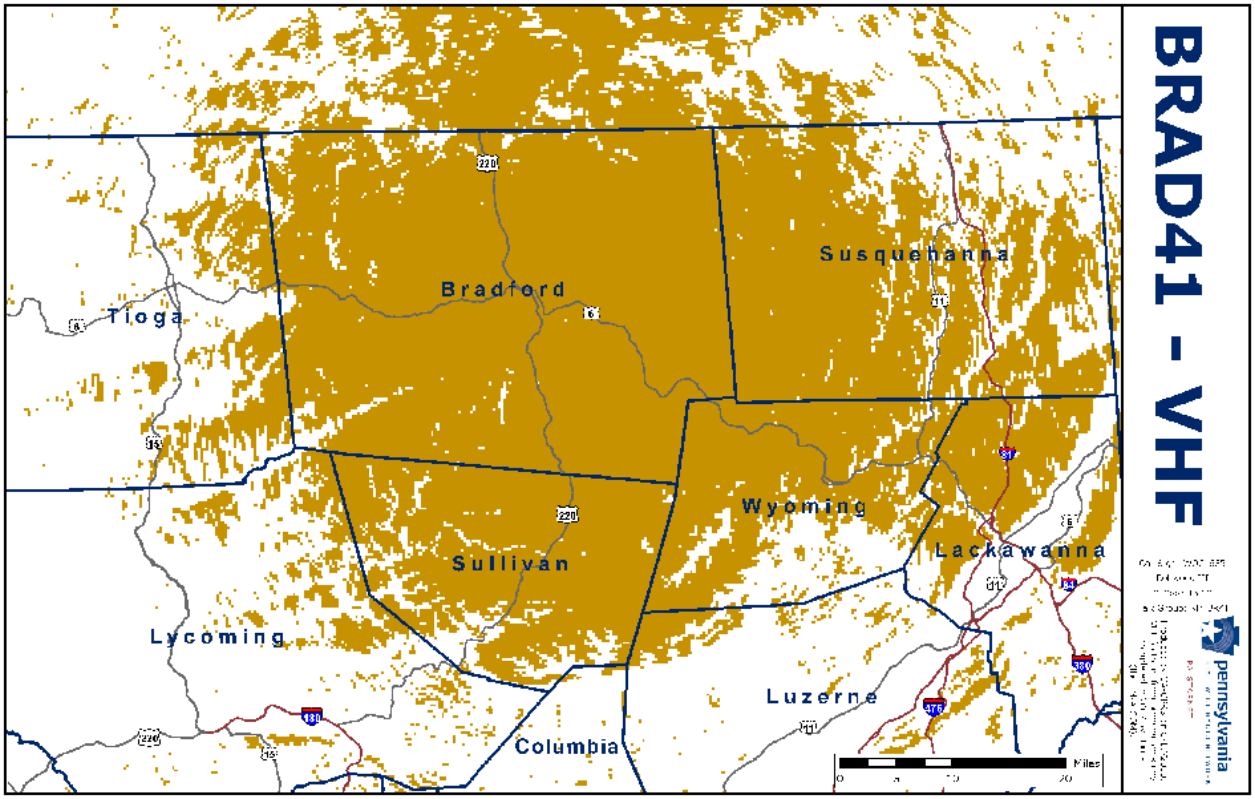


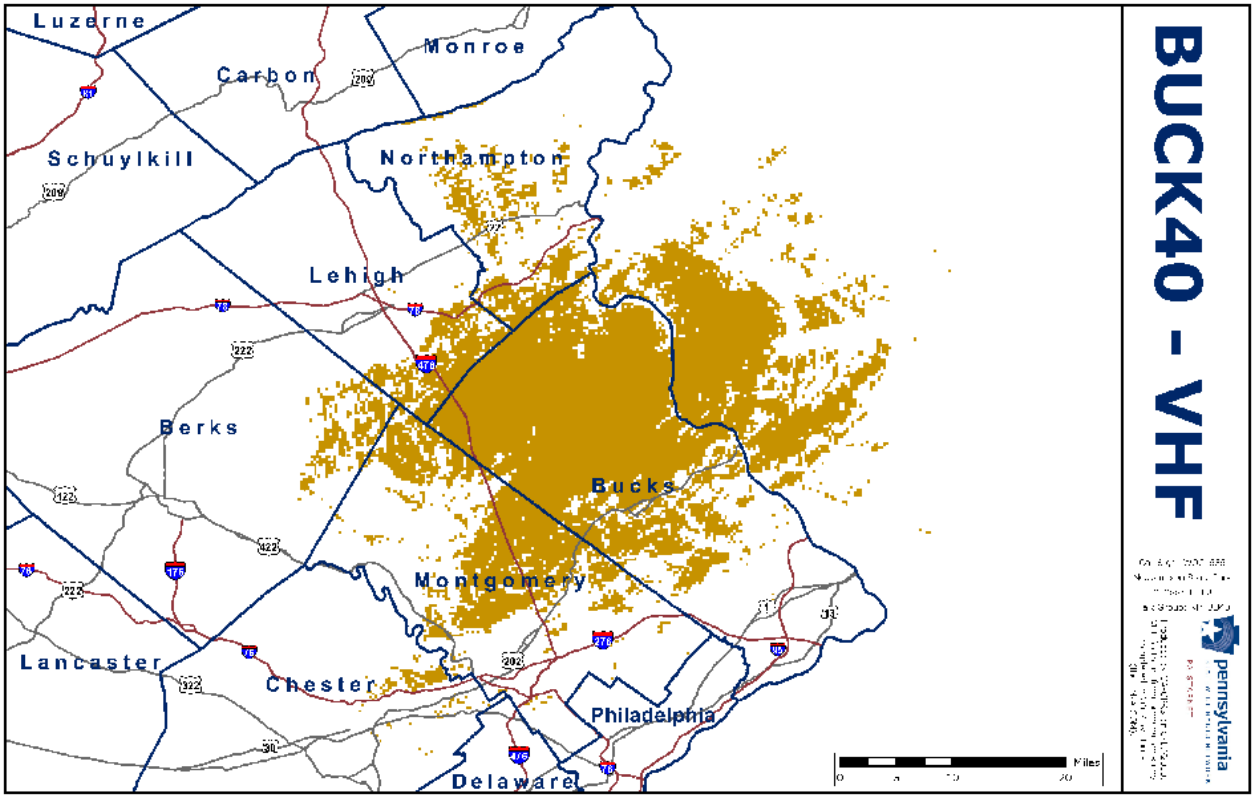

BEDF02 - VHF
Westmoreland
Cambria
Blair
Huntingdon
Fayette
Somerset
Bedford
Fulton
Franklin
Miles
pennsylvania

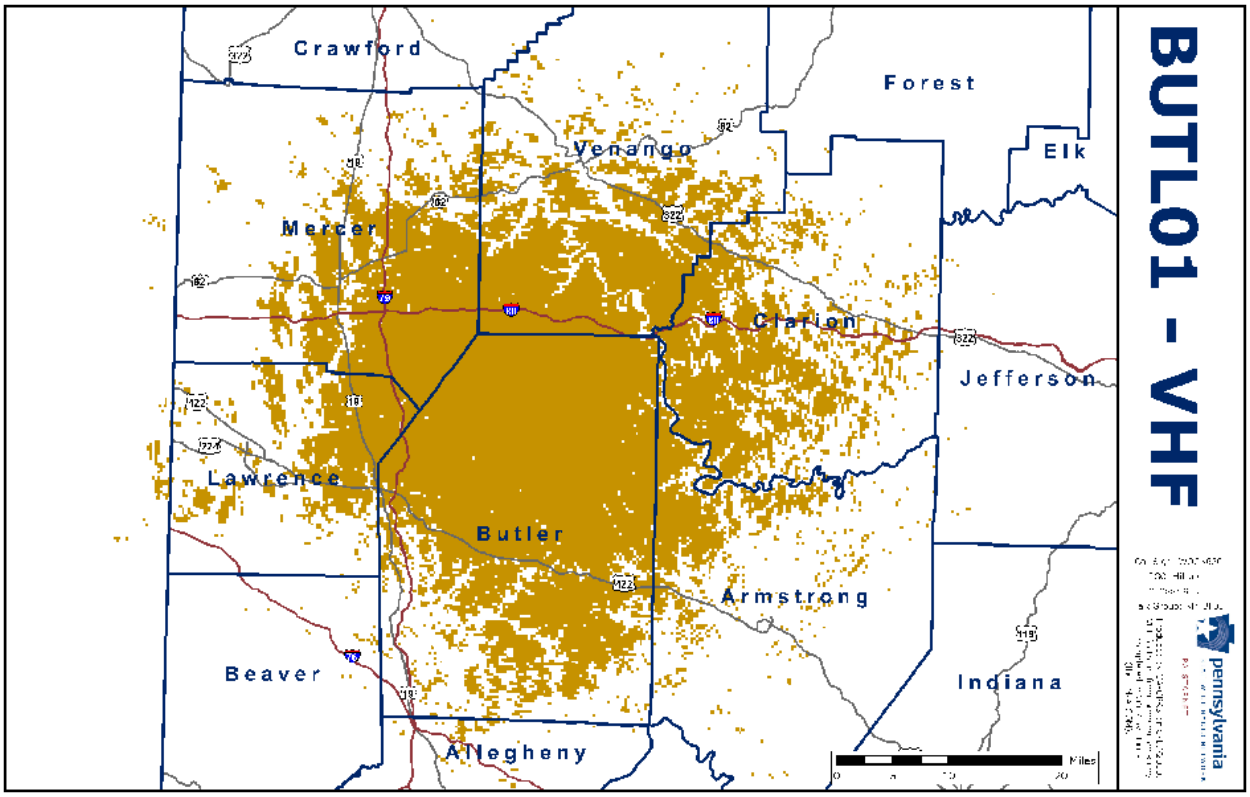

BERK02 - VHF
Northampton
Schuylkill
Lehigh
Berks
Lebanon
Bucks
Dauphin
Montgomery
Lancaster
Philadelphia
Chester
Delaware
York
Miles
pennsylvania

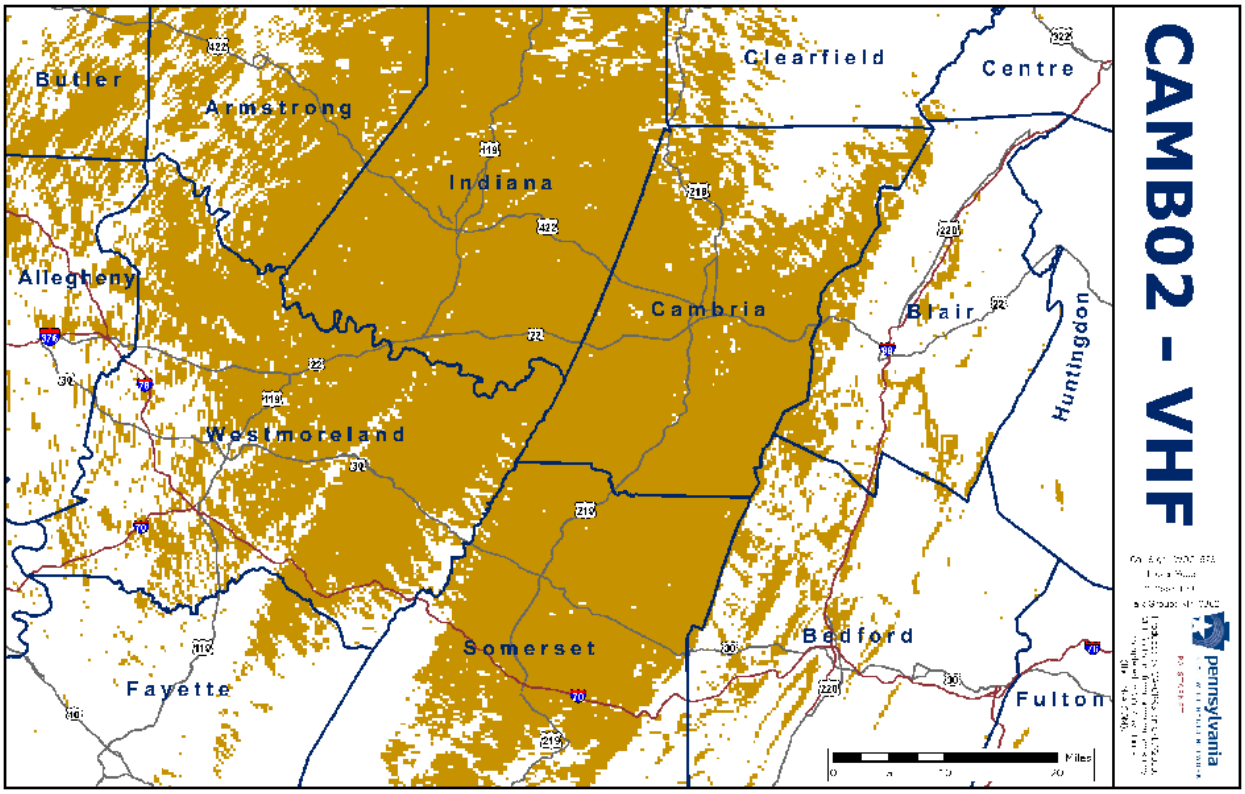

BERK04 - VHF
Montour
Columbia
Luzerne
Monroe
Carbon
Union
Northumberland
Snyder
Schuylkill
Northampton
Lehigh
Berks
Bucks
Dauphin
Lebanon
Montgomery
Lancaster
Chester
York
Miles
pennsylvania

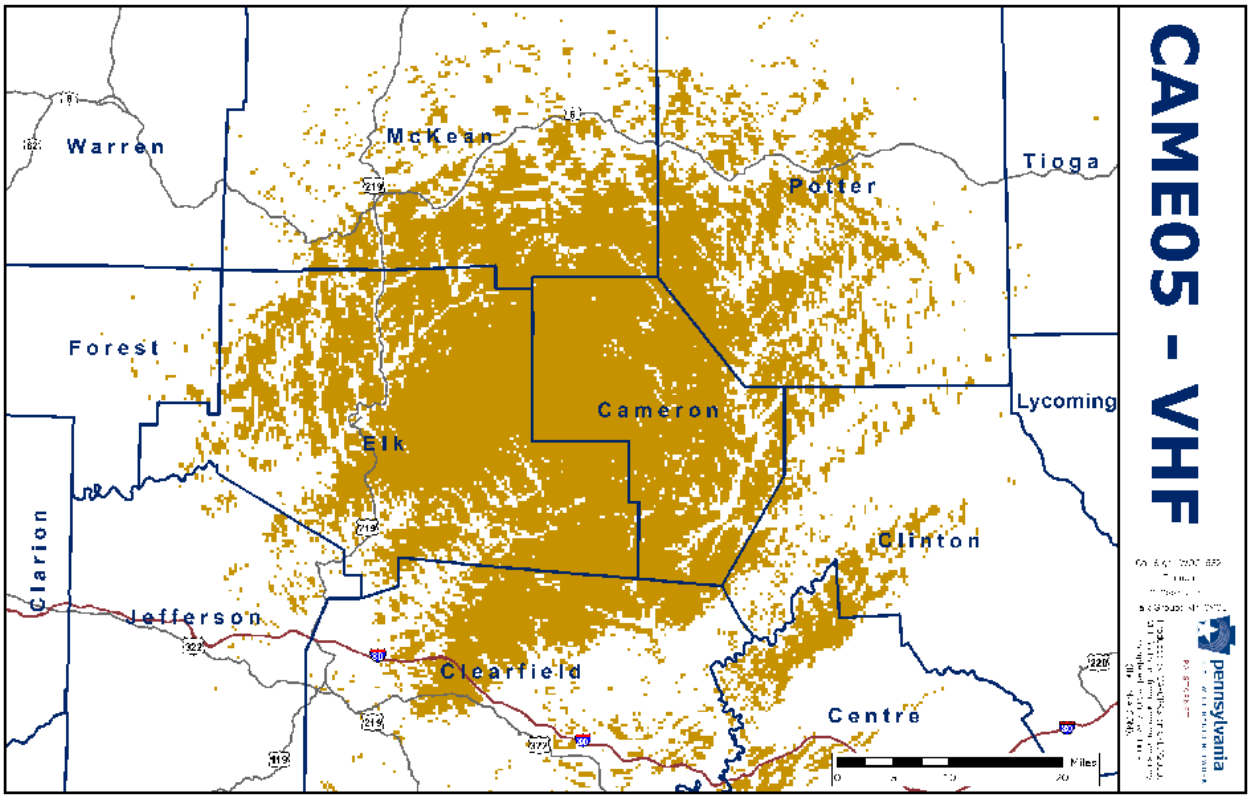

BLAI02 - VHF
Clearfield
Centre
Indiana
Mifflin
Cambria
Blair
Juniata
Huntingdon
Perry
Westmoreland
Cumberland
Somerset
Bedford
Franklin
Fulton
Adams
Miles
pennsylvania

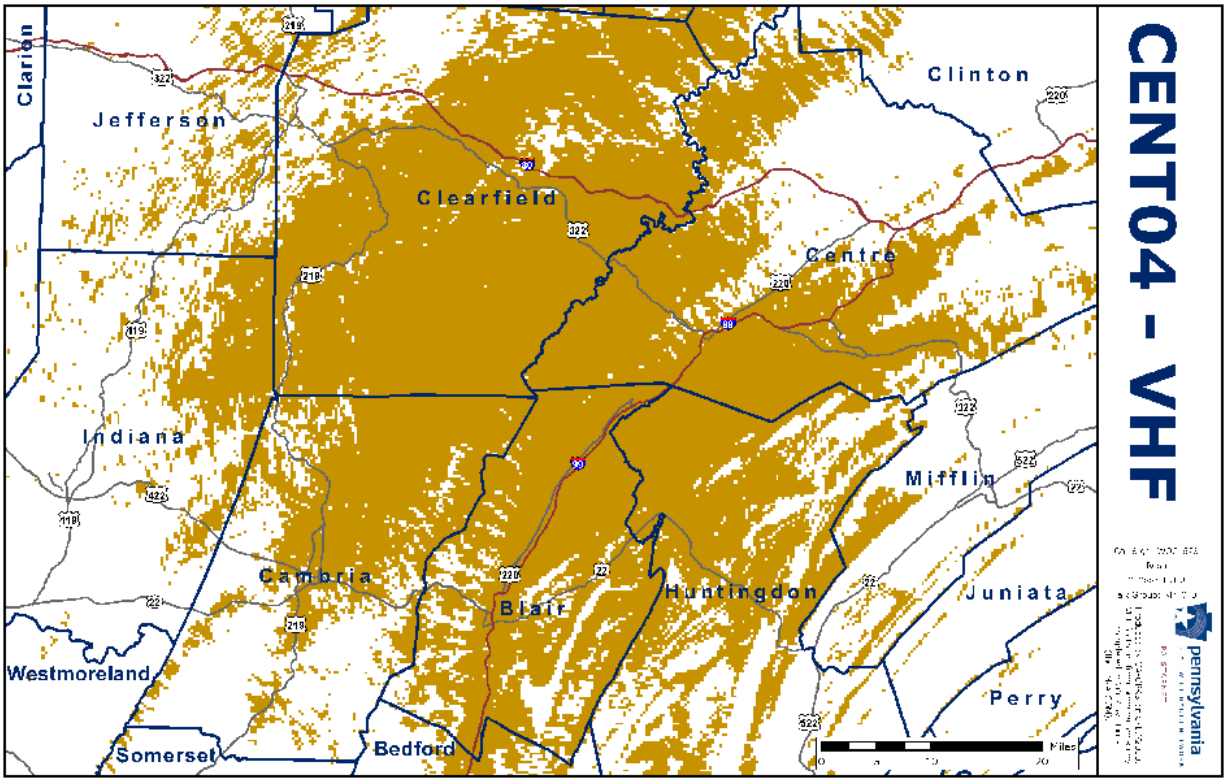

BRAD41 - VHF
Tioga
Bradford
Susquehanna
Wyoming
Lackawanna
Sullivan
Lycoming
Luzerne
Columbia
Miles
0
10
20
pennsylvania

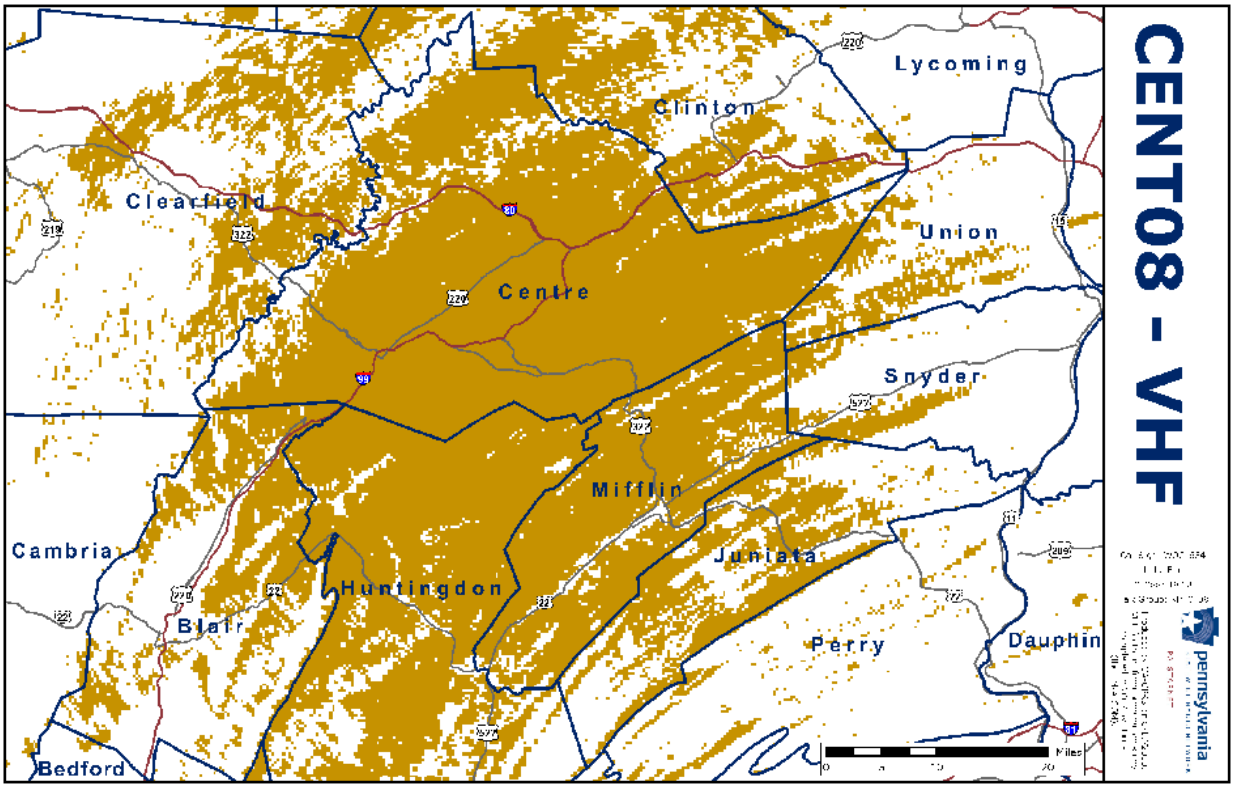

BUCK40 - VHF
Luzerne
Carbon
Monroe
Schuylkill
Northampton
Lehigh
Berks
Bucks
Montgomery
Lancaster
Chester
Philadelphia
Delaware
Miles
0
10
20
pennsylvania

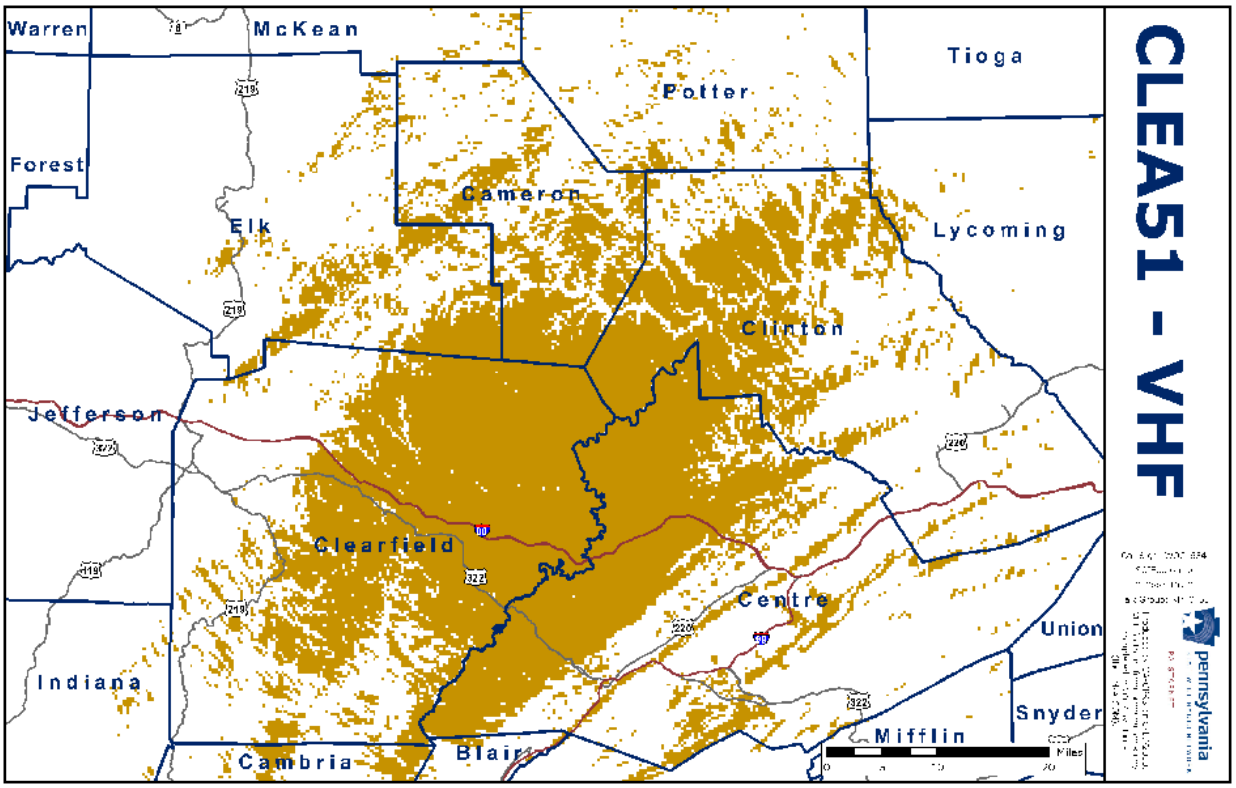

BUTL01 - VHF
Crawford
Forest
Venango
Elk
Mercer
Clarion
Jefferson
Lawrence
Butler
Armstrong
Beaver
Indiana
Allegheny
Miles
pennsylvania

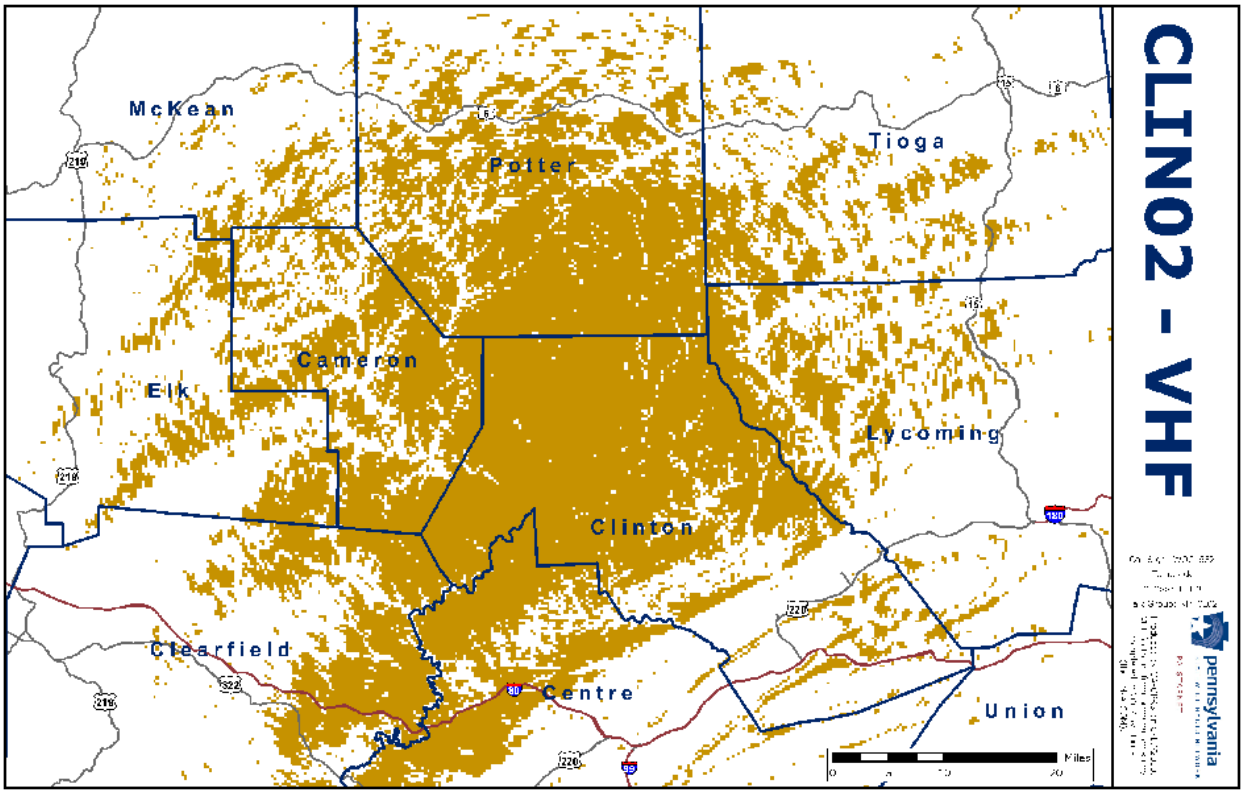

CAMB02 - VHF
Butler
Clearfield
Centre
Armstrong
Indiana
Allegheny
Cambria
Blair
Huntingdon
Westmoreland
Somerset
Bedford
Fayette
Fulton
Miles
pennsylvania

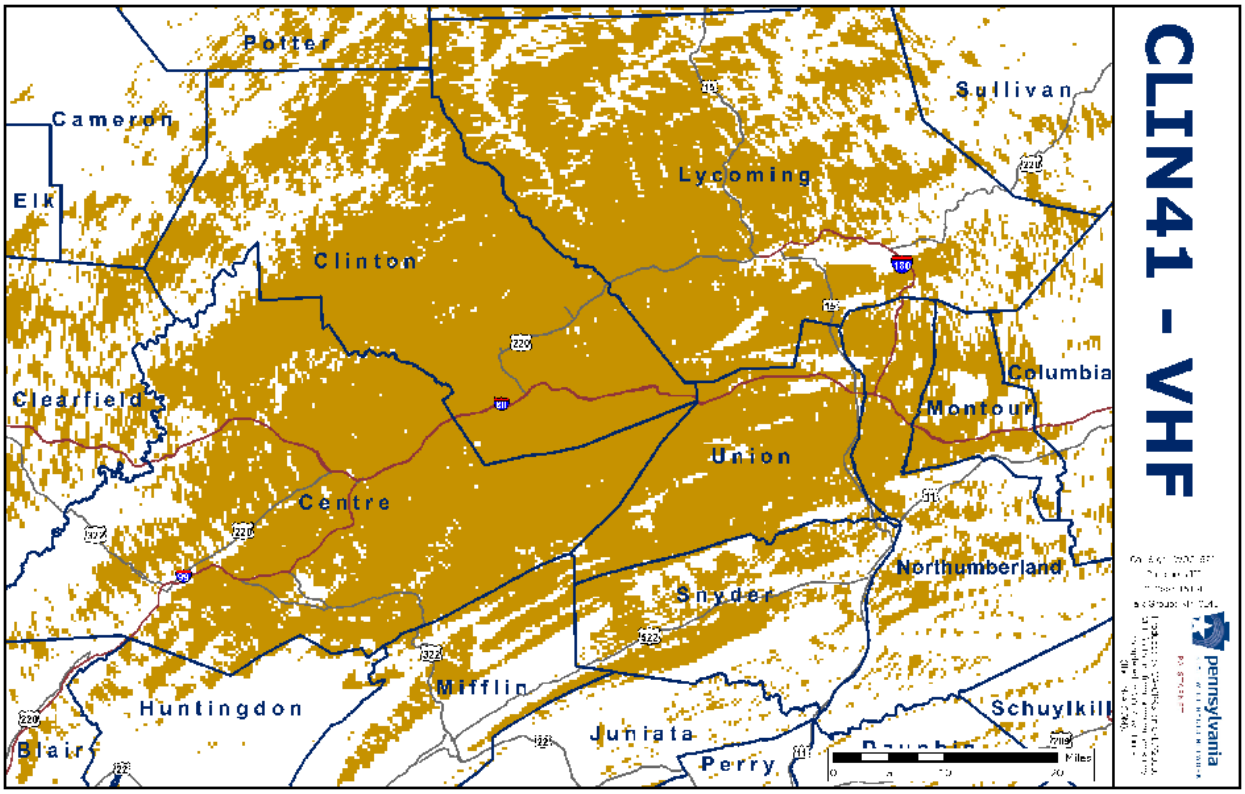

CAME05 - VHF
Warren
McKean
Potter
Tioga
Forest
Cameron
Lycoming
Elk
Clarion
Clinton
Jefferson
Clearfield
Centre
Miles
pennsylvania

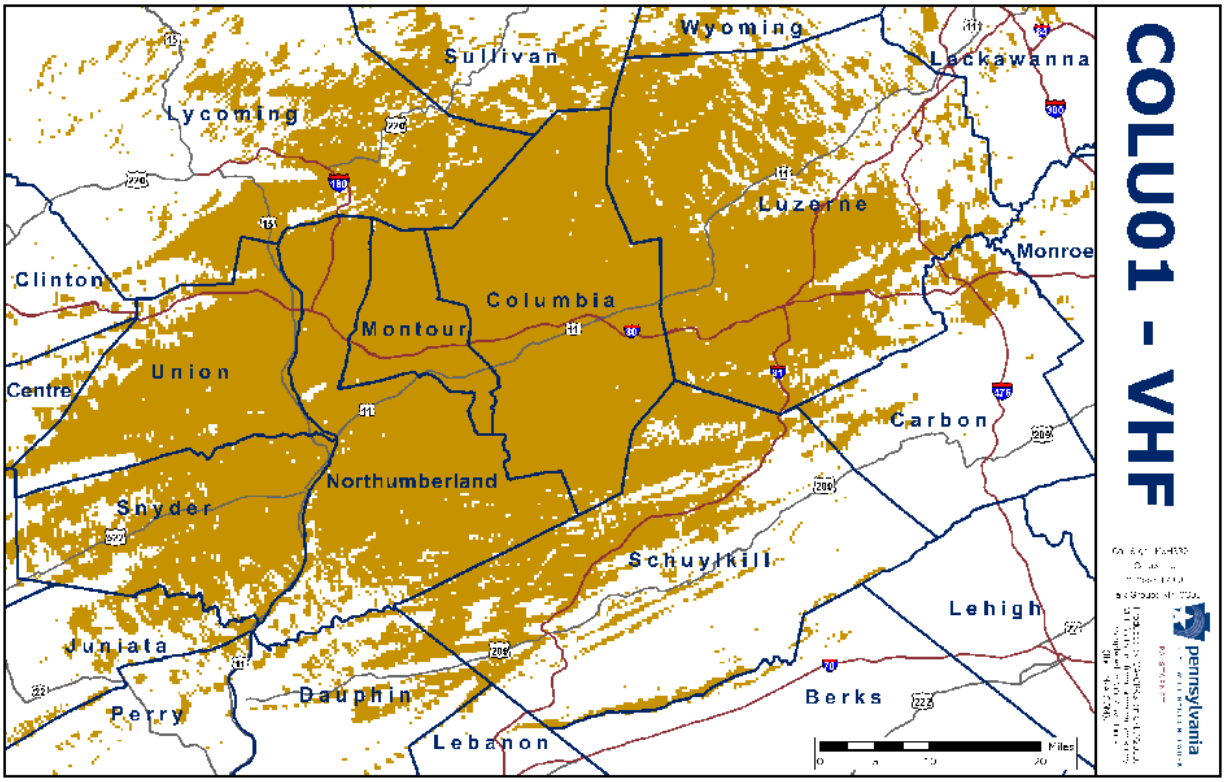

CENT04 - VHF
Clarion
Clinton
Jefferson
Clearfield
Centre
Indiana
Mifflin
Cambria
Blair
Huntingdon
Juniata
Westmoreland
Perry
Somerset
Bedford
Miles
pennsylvania

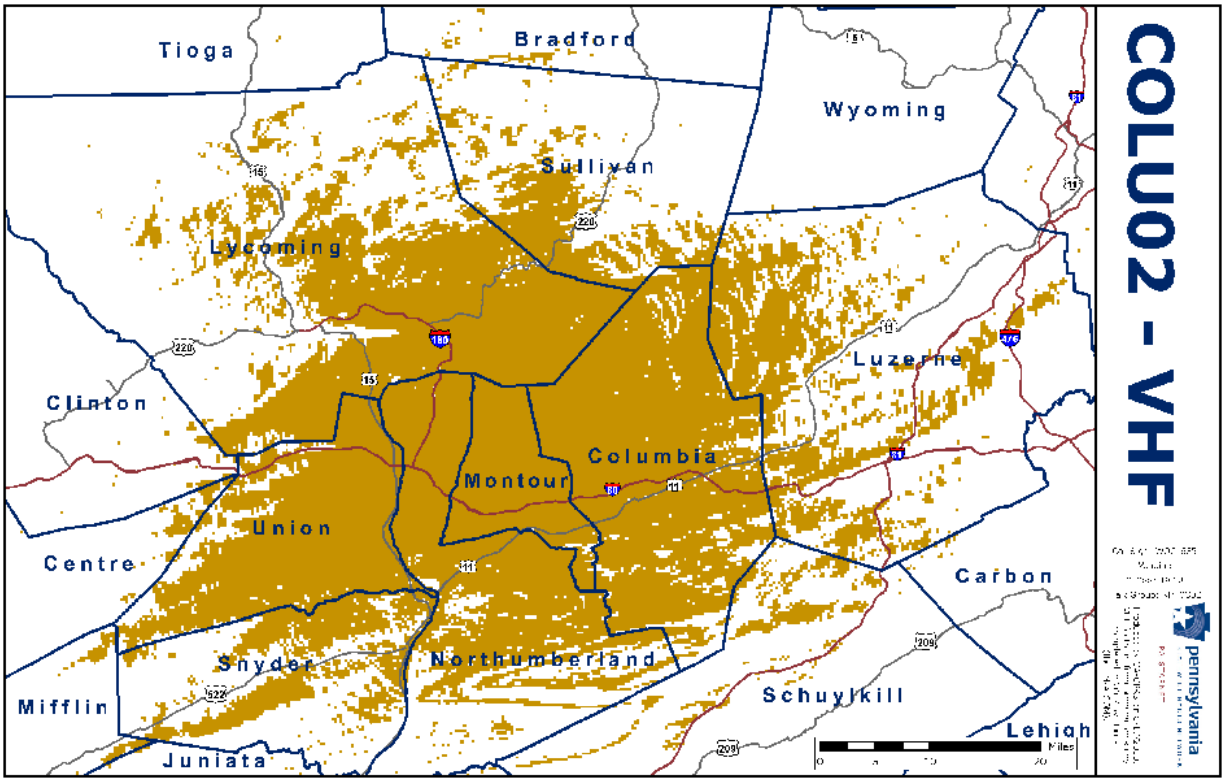

CENT08 - VHF
Lycoming
Clinton
Clearfield
Union
Centre
Snyder
Mifflin
Cambria
Juniata
Huntingdon
Blair
Perry
Dauphin
Bedford
Miles
pennsylvania

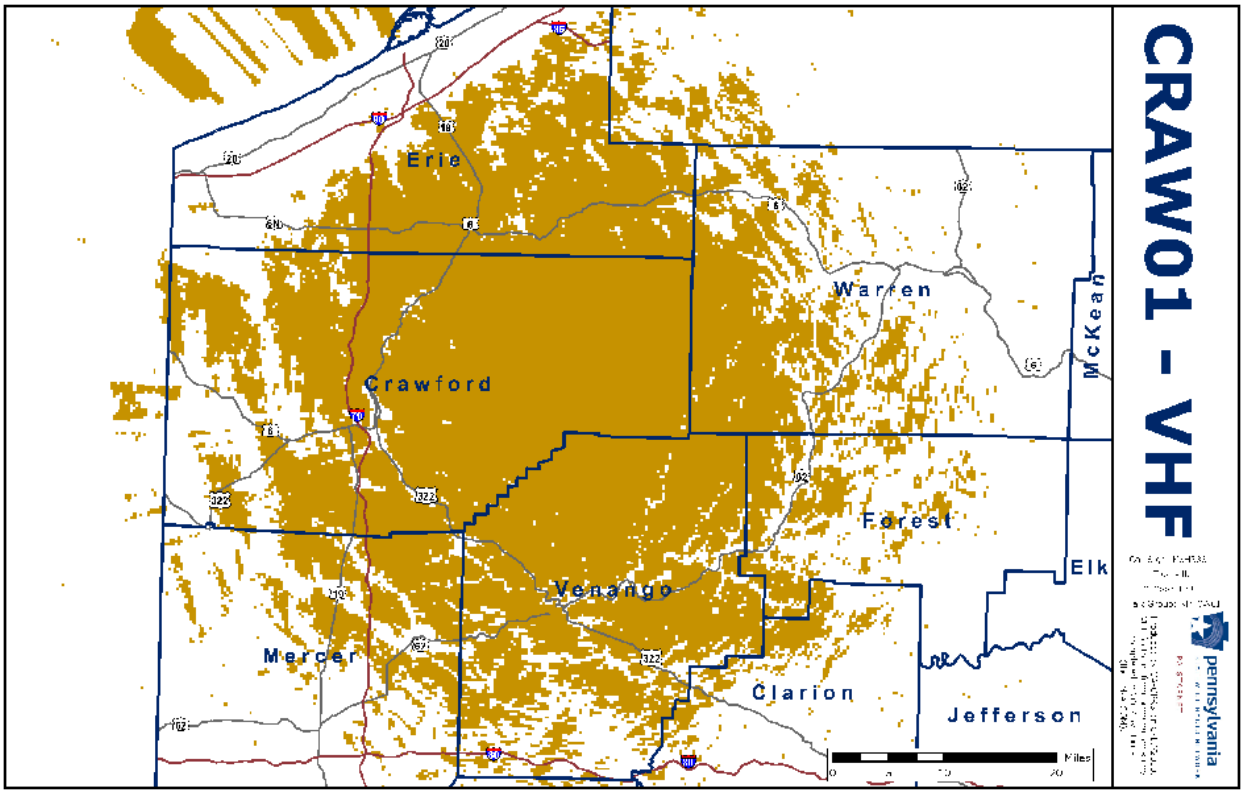

CLEA51 - VHF
Warren
McKean
Tioga
Potter
Forest
Cameron
Elk
Lycoming
Clinton
Jefferson
Clearfield
Centre
Union
Indiana
Snyder
Mifflin
Cambria
Blair
Miles
pennsylvania

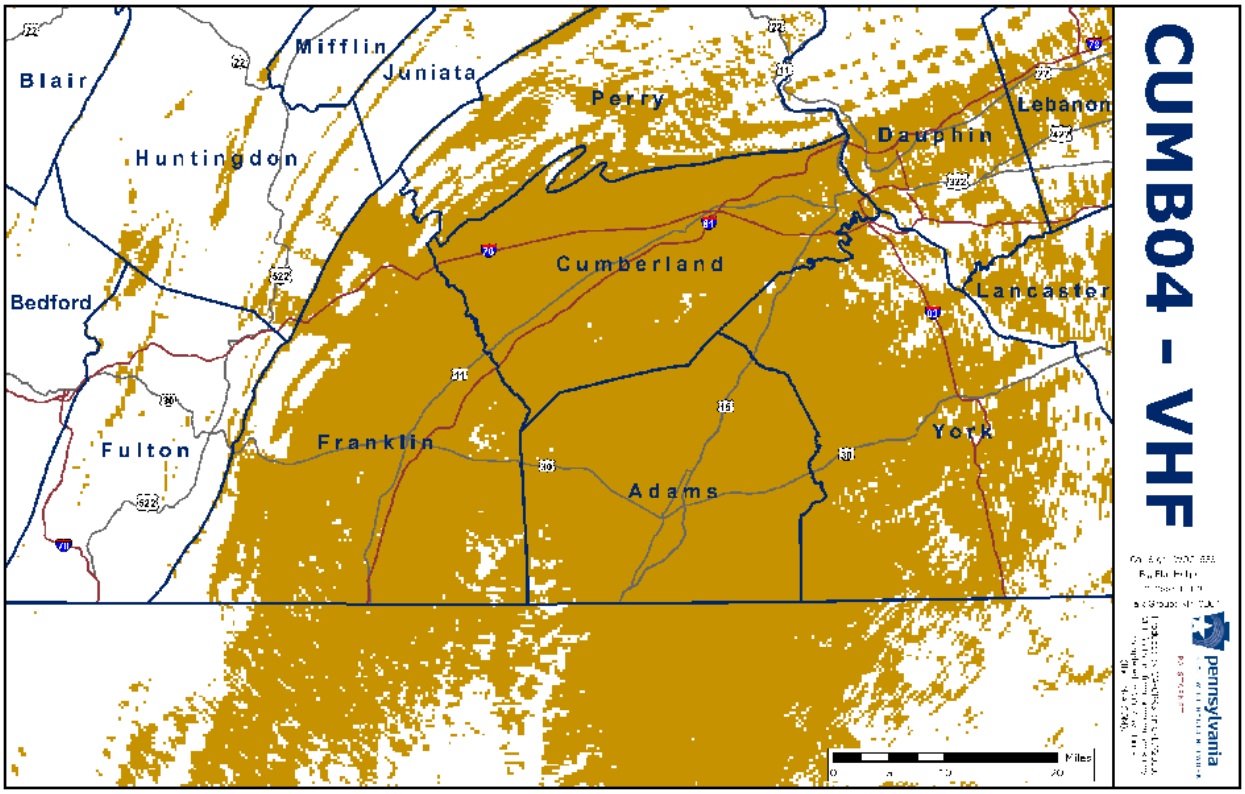

CLIN02 - VHF
McKean
Potter
Tioga
Cameron
Elk
Lycoming
Clinton
Clearfield
Centre
Union
Miles
0
10
20
pennsylvania

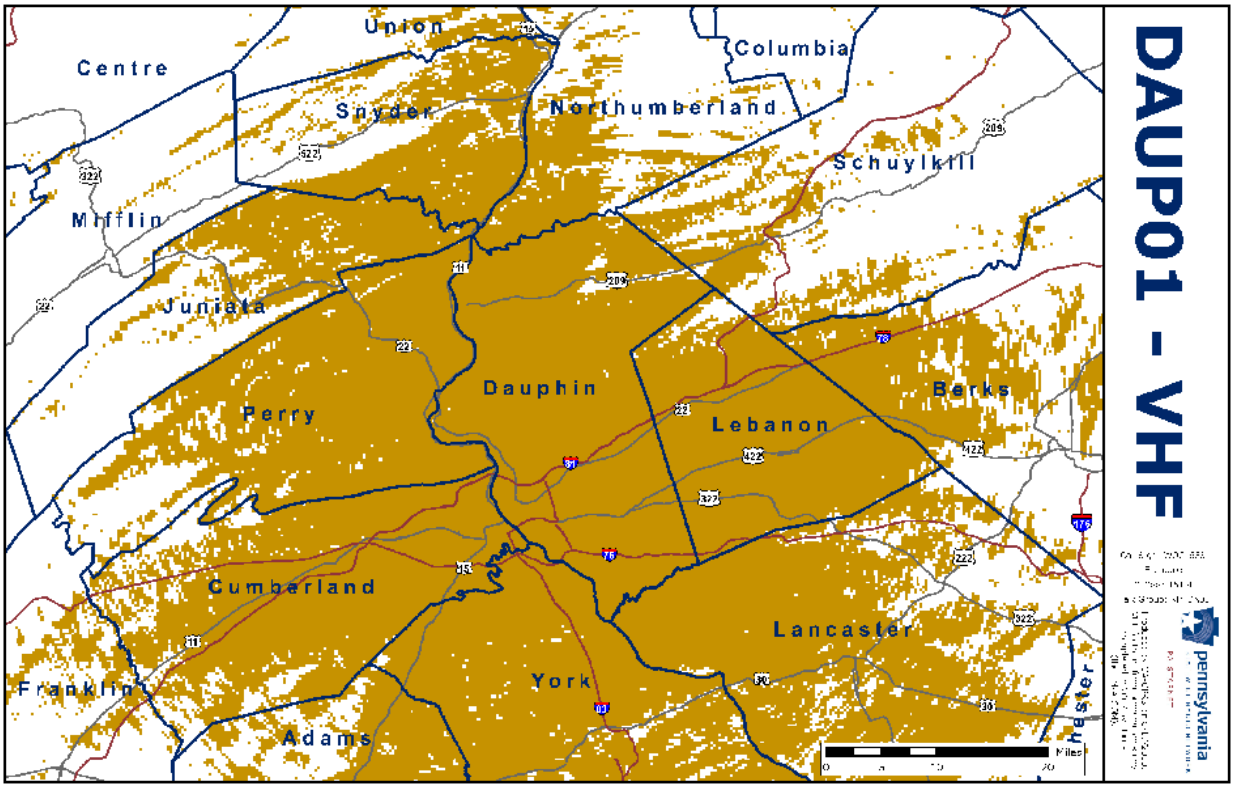

CLIN41 - VHF
Potter
Cameron
Elk
Sullivan
Lycoming
Clinton
Clearfield
Columbia
Montour
Union
Centre
Northumberland
Snyder
Mifflin
Huntingdon
Schuylkill
Juniata
Blair
Perry
Miles
0
10
20
pennsylvania

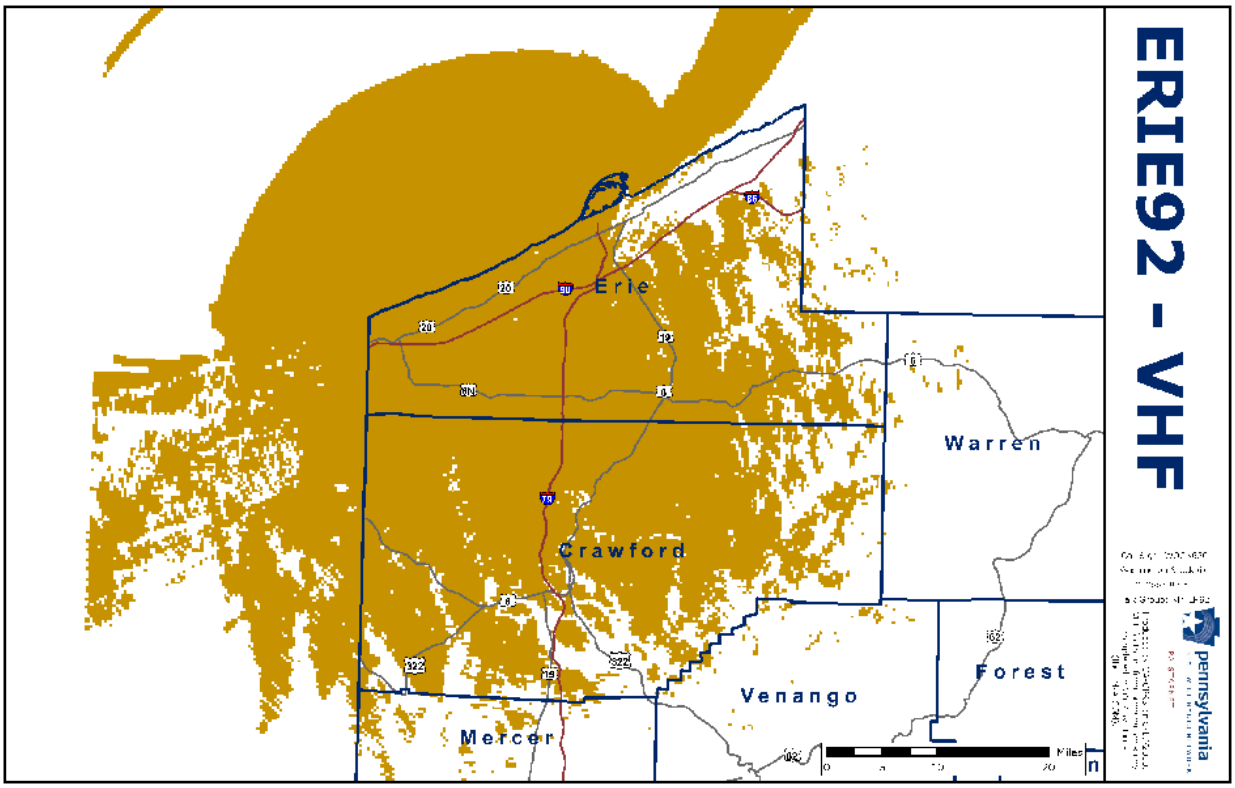

COLU01 - VHF
Wyoming
Sullivan
Lackawanna
Lycoming
Luzerne
Monroe
Clinton
Columbia
Montour
Union
Centre
Carbon
Northumberland
Snyder
Schuylkill
Lehigh
Juniata
Dauphin
Berks
Perry
Lebanon
Miles
pennsylvania

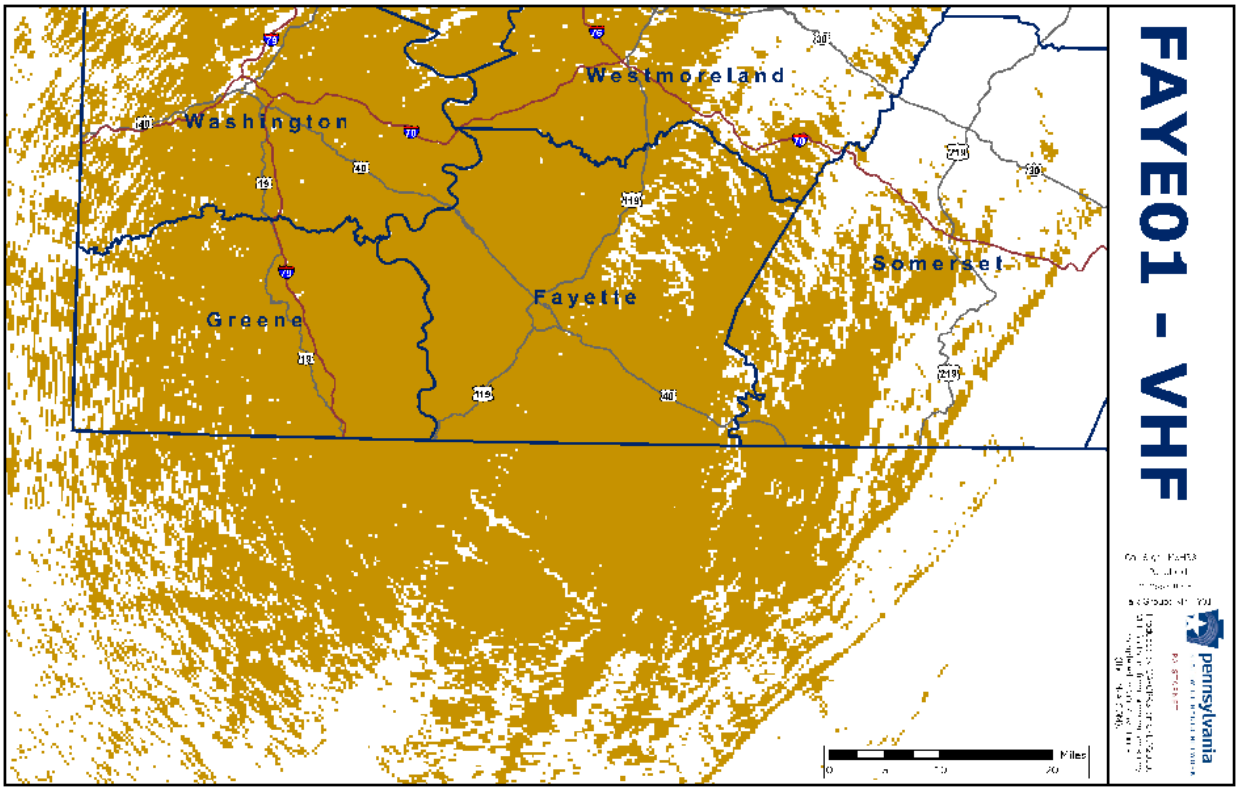

COLU02 - VHF
Tioga
Bradford
Wyoming
Sullivan
Lycoming
Luzerne
Clinton
Columbia
Montour
Union
Centre
Carbon
Snyder
Northumberland
Mifflin
Schuylkill
Lehigh
Juniata
Miles
pennsylvania

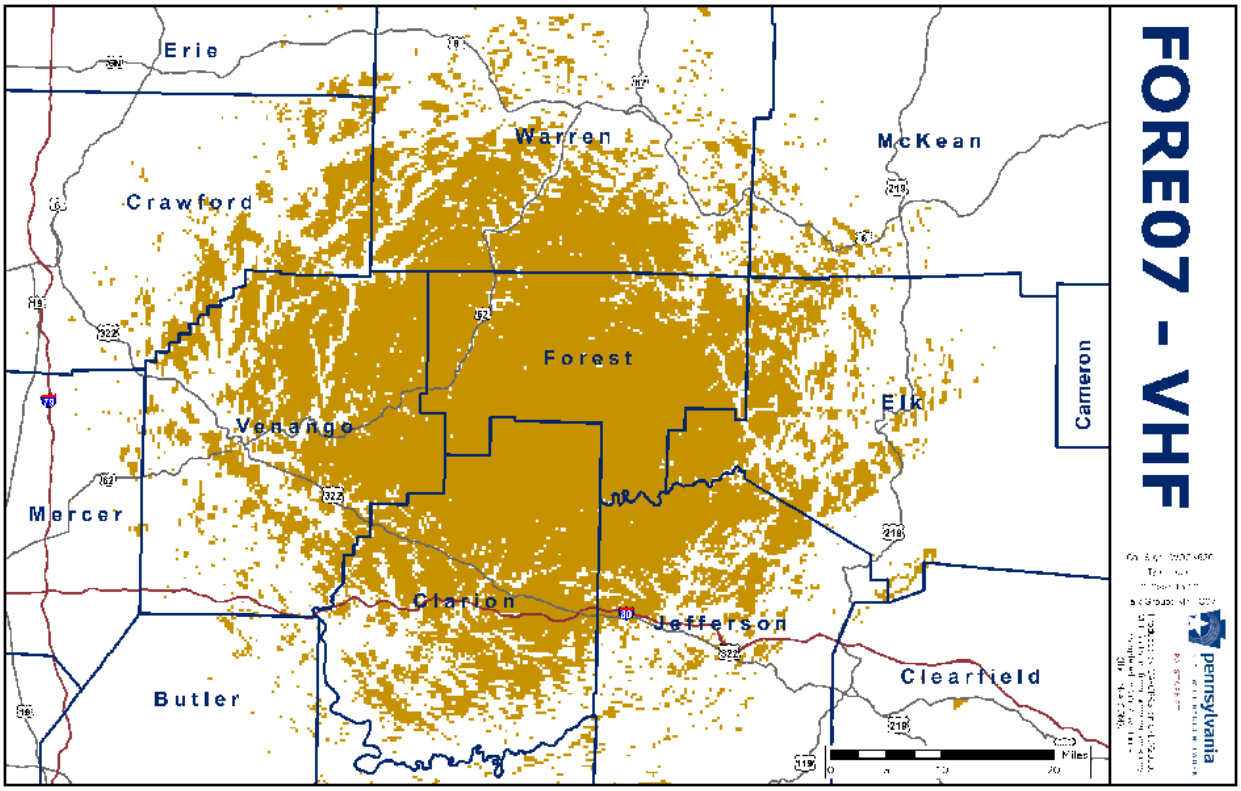

CRAW01 - VHF
Erie
Warren
McKean
Crawford
Forest
Elk
Venango
Mercer
Clarion
Jefferson
pennsylvania
Miles
0
10
20

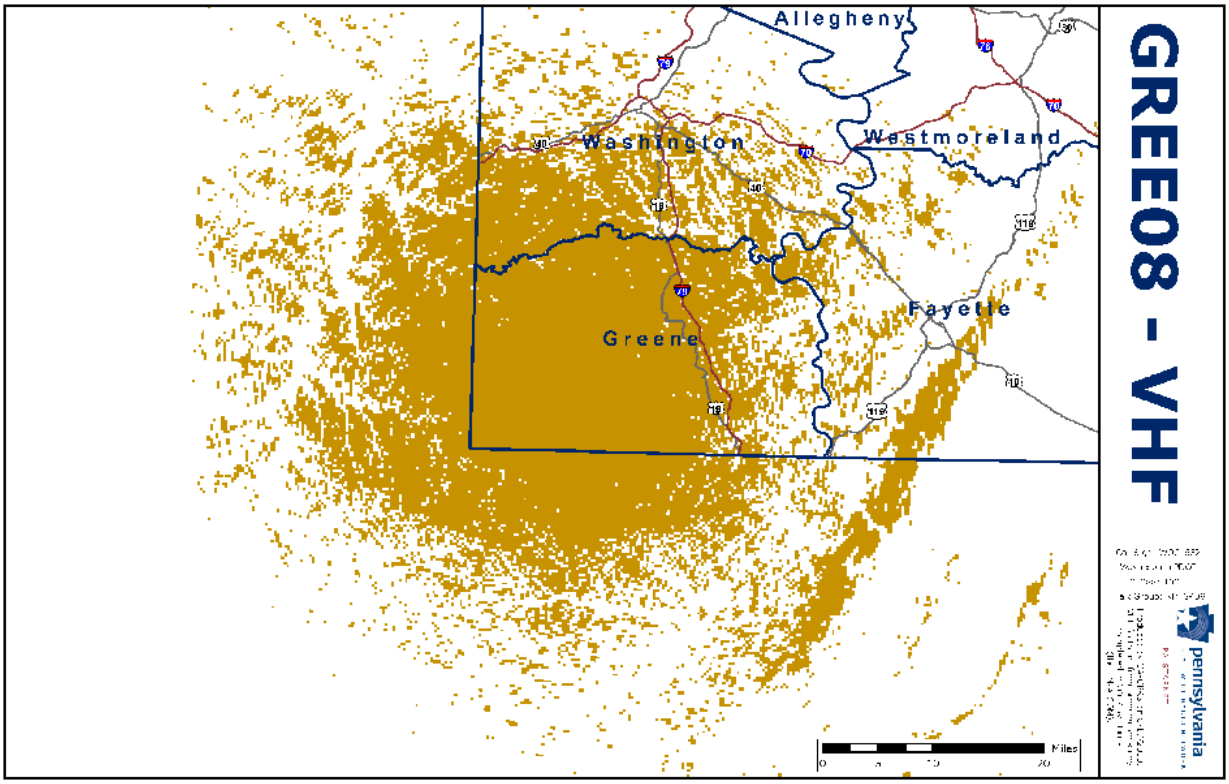

CUMB04 - VHF
Blair
Mifflin
Juniata
Perry
Lebanon
Dauphin
Huntingdon
Cumberland
Lancaster
Bedford
Fulton
Franklin
York
Adams
pennsylvania
Miles
0
10
20

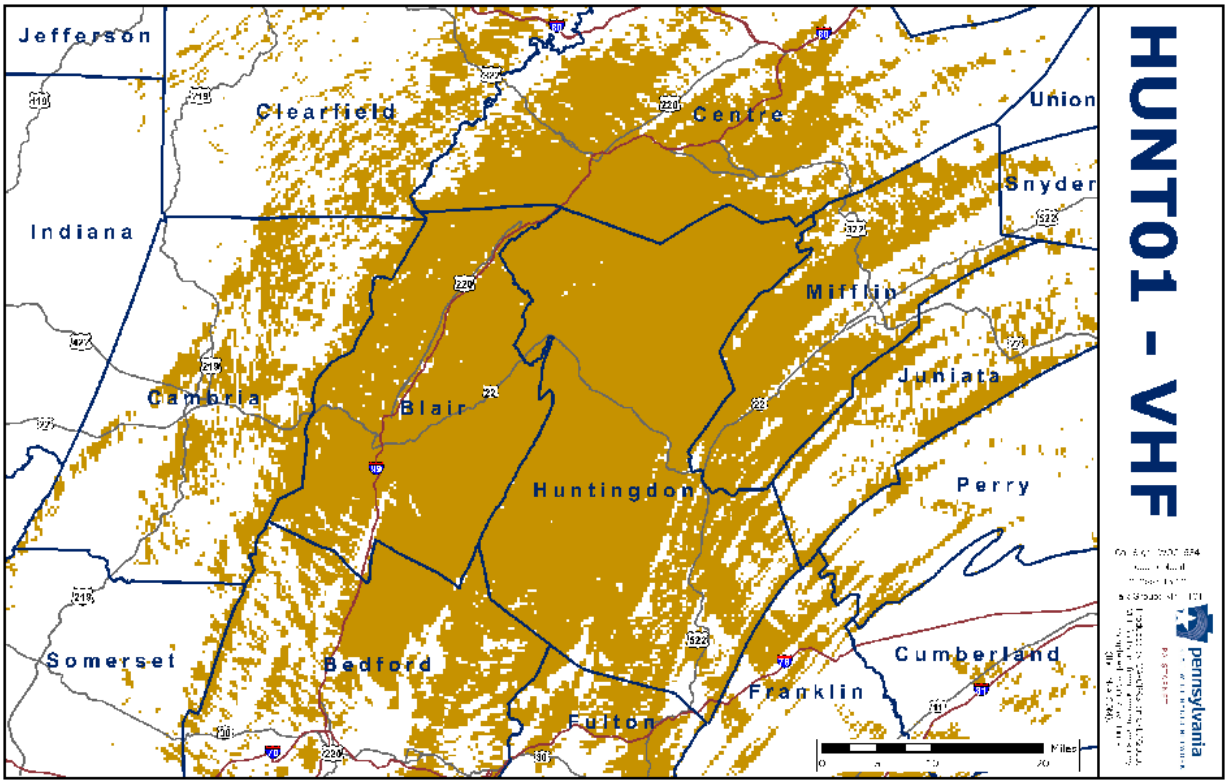

DAUP01 - VHF
Centre
Union
Columbia
Snyder
Northumberland
Schuylkill
Mifflin
Juniata
Dauphin
Perry
Berks
Lebanon
Cumberland
Lancaster
Franklin
York
Adams
Chester
Miles
0
10
20
pennsylvania

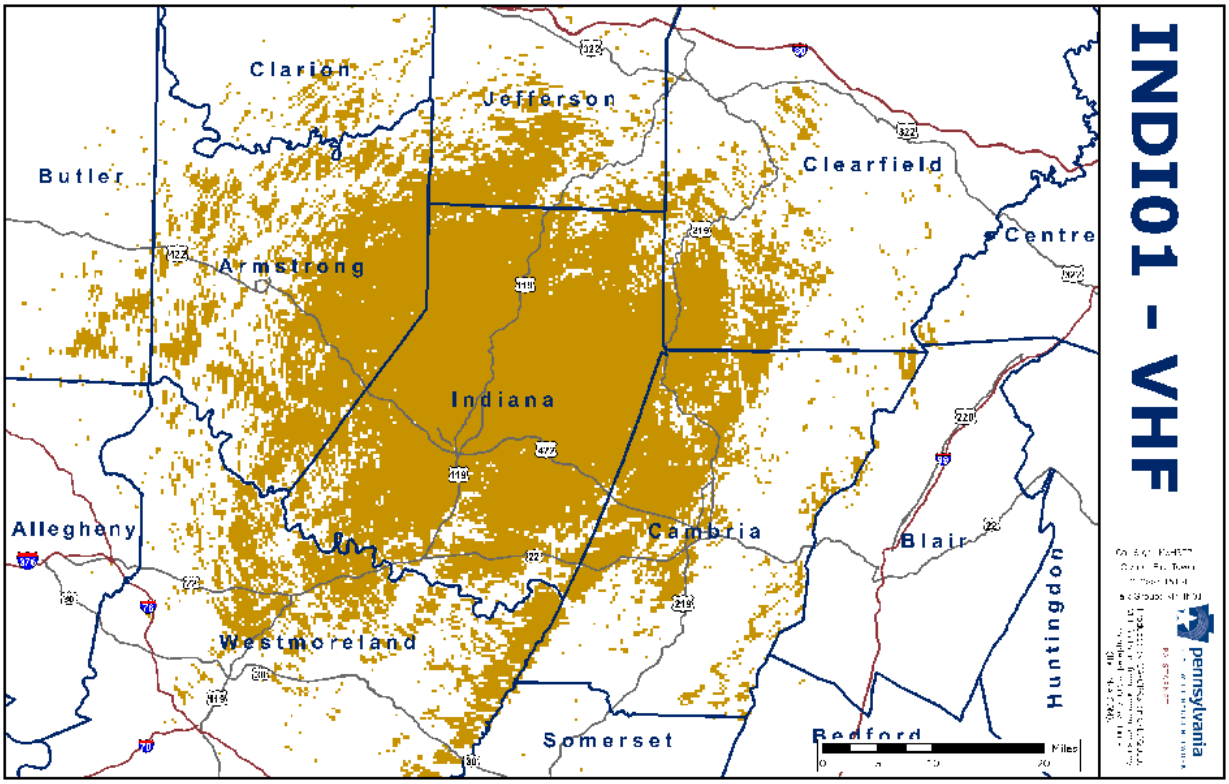

ERIE92 - VHF
Erie
Warren
Crawford
Venango
Forest
Mercer
Miles
0
10
20
pennsylvania

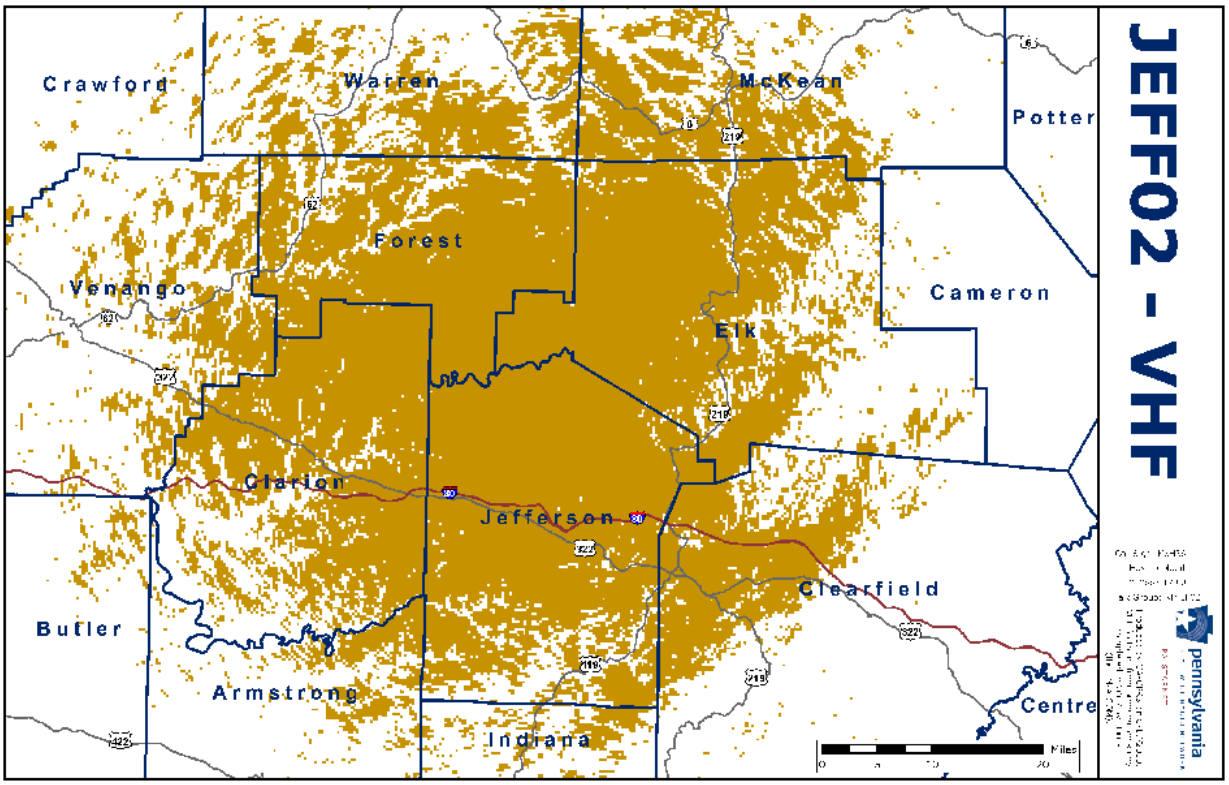

FAYE01 - VHF
Westmoreland
Washington
Somerset
Fayette
Greene
Miles
0
10
20
pennsylvania

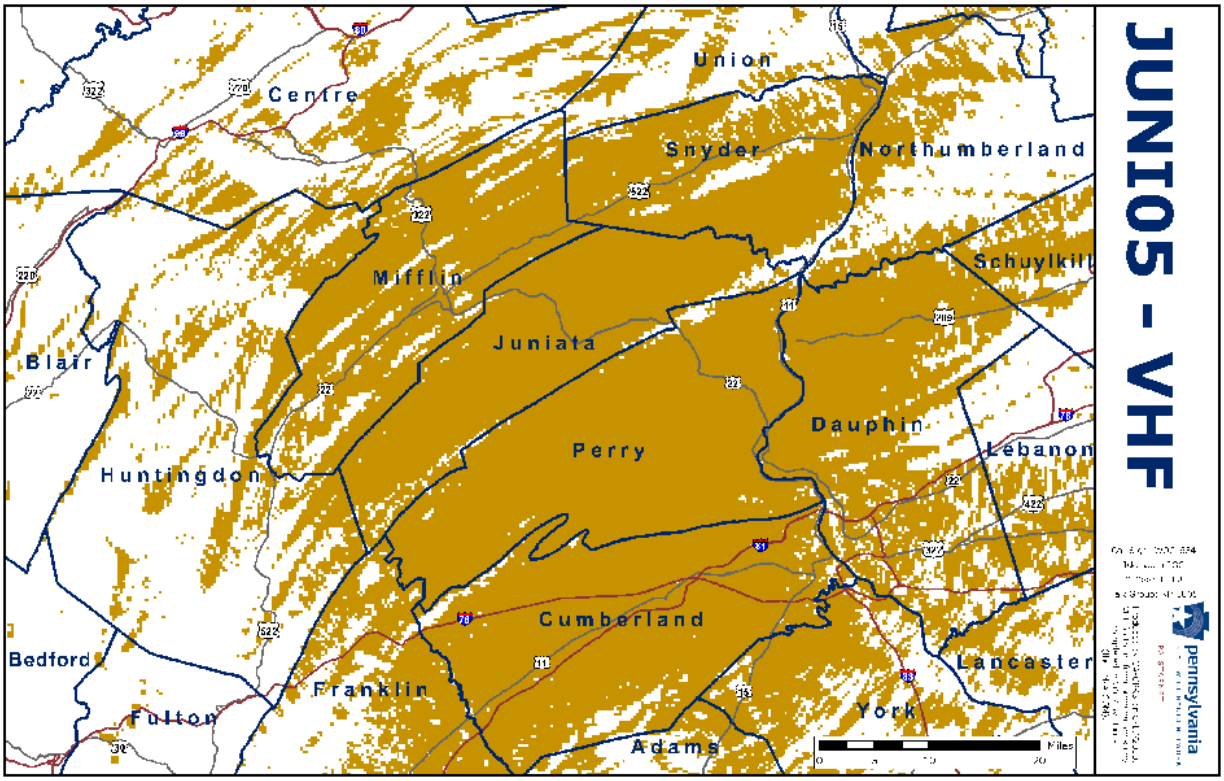

FORE07 - VHF
Erie
Warren
McKean
Crawford
Forest
Cameron
Elk
Venango
Mercer
Clarion
Jefferson
Clearfield
Butler
Miles
0
10
20
pennsylvania

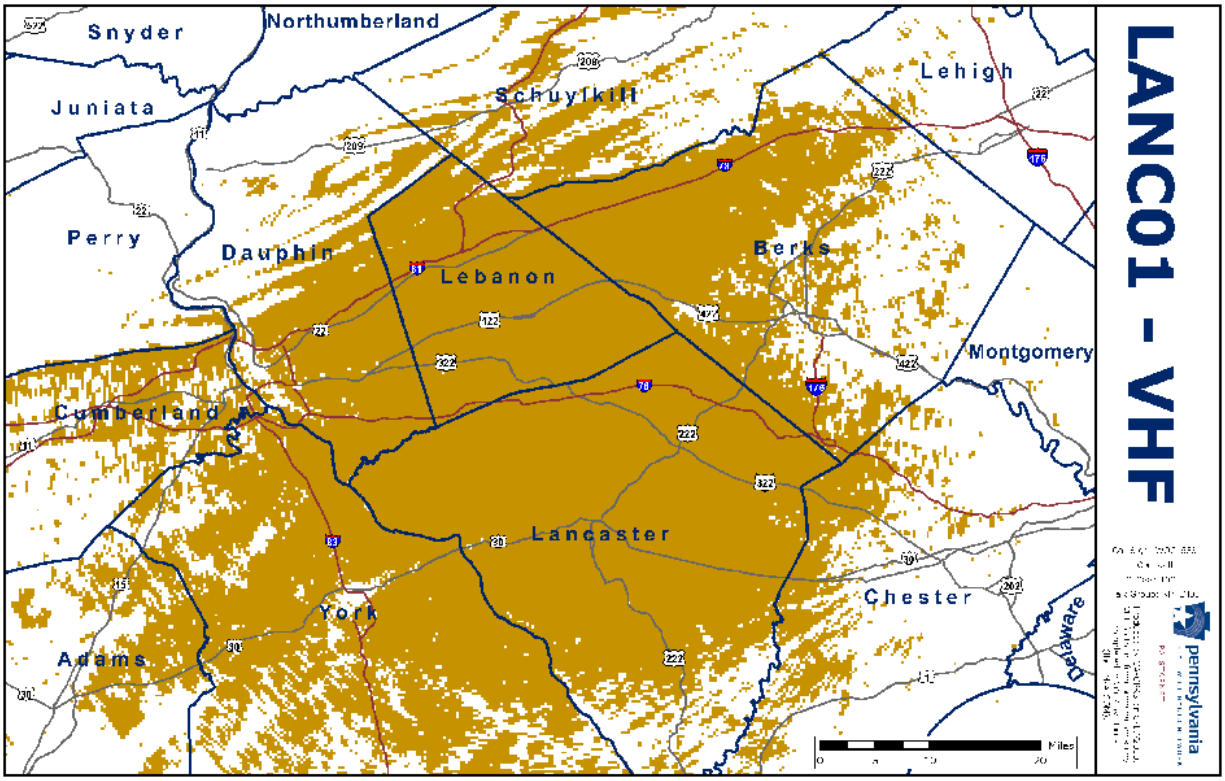

GREE08 - VHF
Allegheny
Washington
Westmoreland
Fayette
Greene
Miles
0
10
20
pennsylvania

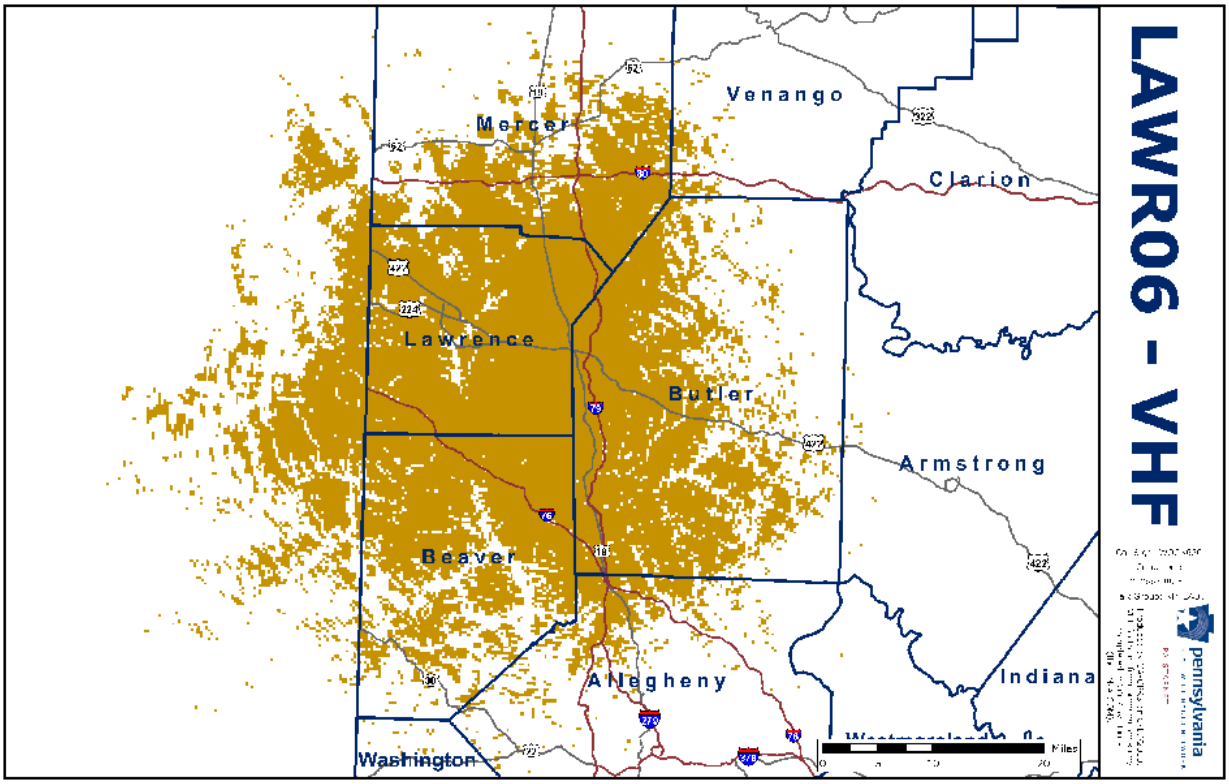

HUNT01 - VHF
Jefferson
Clearfield
Centre
Union
Snyder
Indiana
Mifflin
Juniata
Cambria
Blair
Huntingdon
Perry
Somerset
Bedford
Cumberland
Franklin
Fulton
Miles
0
10
20
pennsylvania

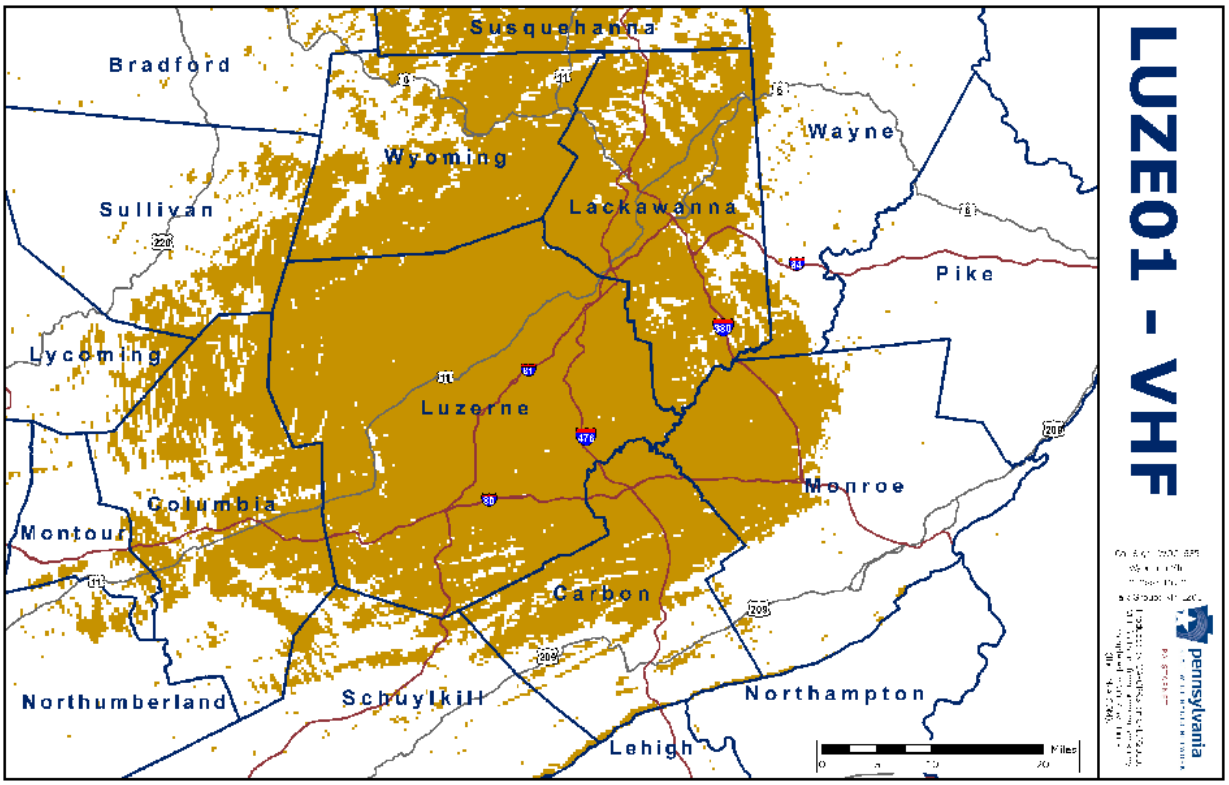

INDI01 - VHF
Clarion
Jefferson
Butler
Clearfield
Centre
Armstrong
Indiana
Allegheny
Cambria
Blair
Huntingdon
Westmoreland
Somerset
Bedford
Miles
pennsylvania

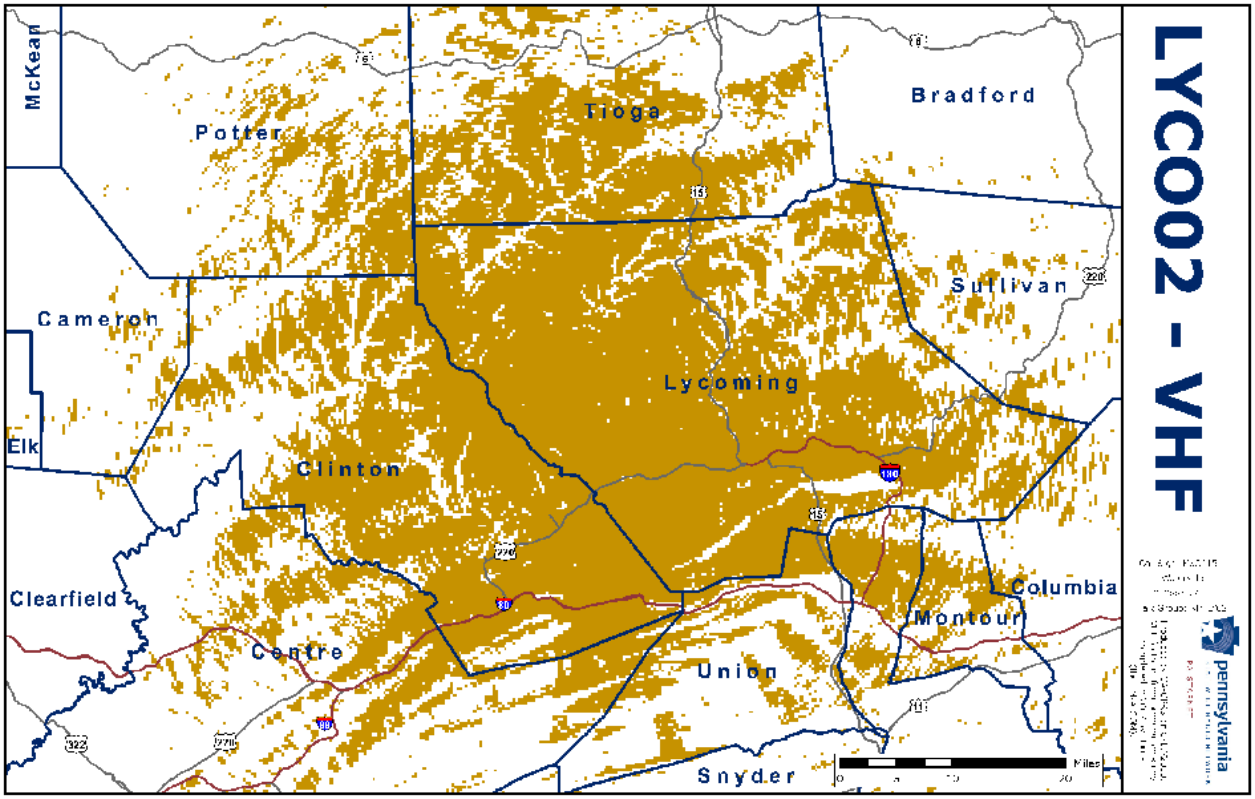

JEFF02 - VHF
Crawford
Warren
McKean
Potter
Forest
Venango
Cameron
Elk
Clarion
Jefferson
Clearfield
Butler
Armstrong
Centre
Indiana
Miles
pennsylvania

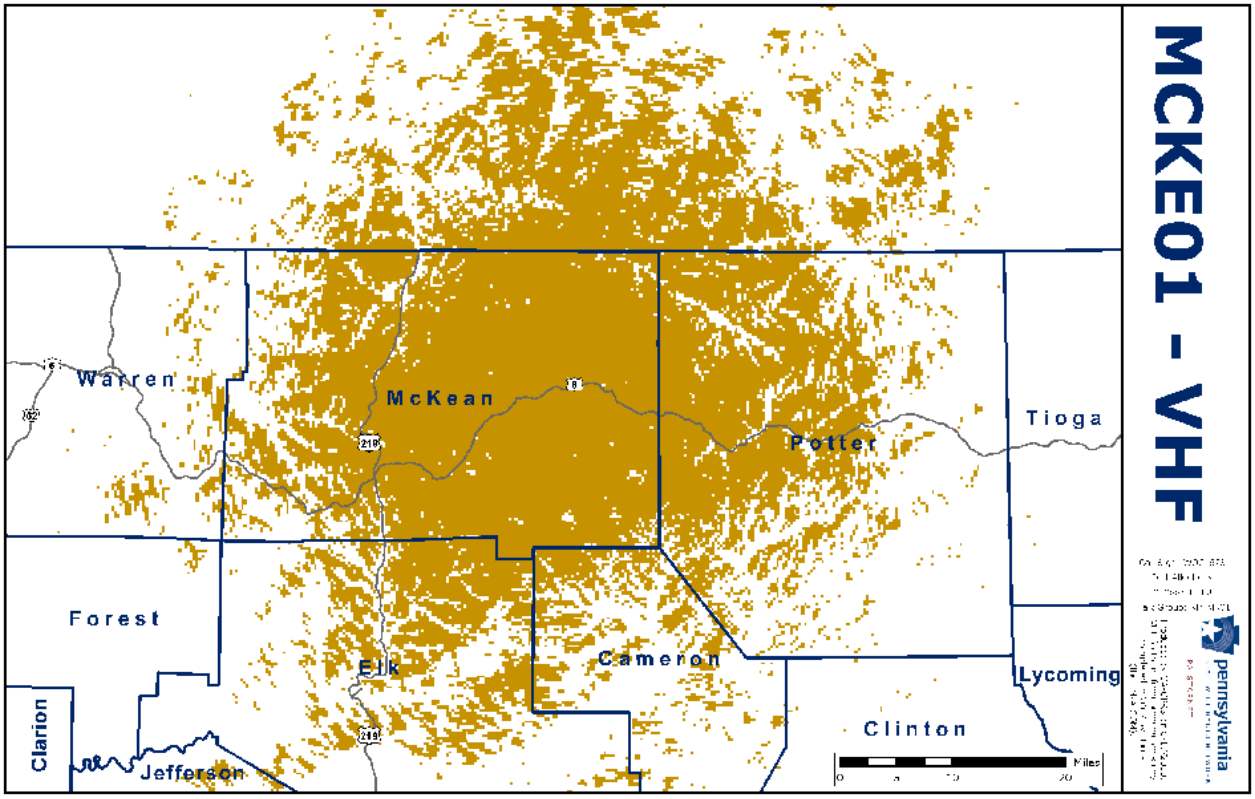

JUNI05 - VHF
Union
Centre
Snyder
Northumberland
Schuylkill
Mifflin
Juniata
Blair
Dauphin
Perry
Lebanon
Huntingdon
Cumberland
Bedford
Lancaster
Franklin
Fulton
York
Adams
Miles
pennsylvania

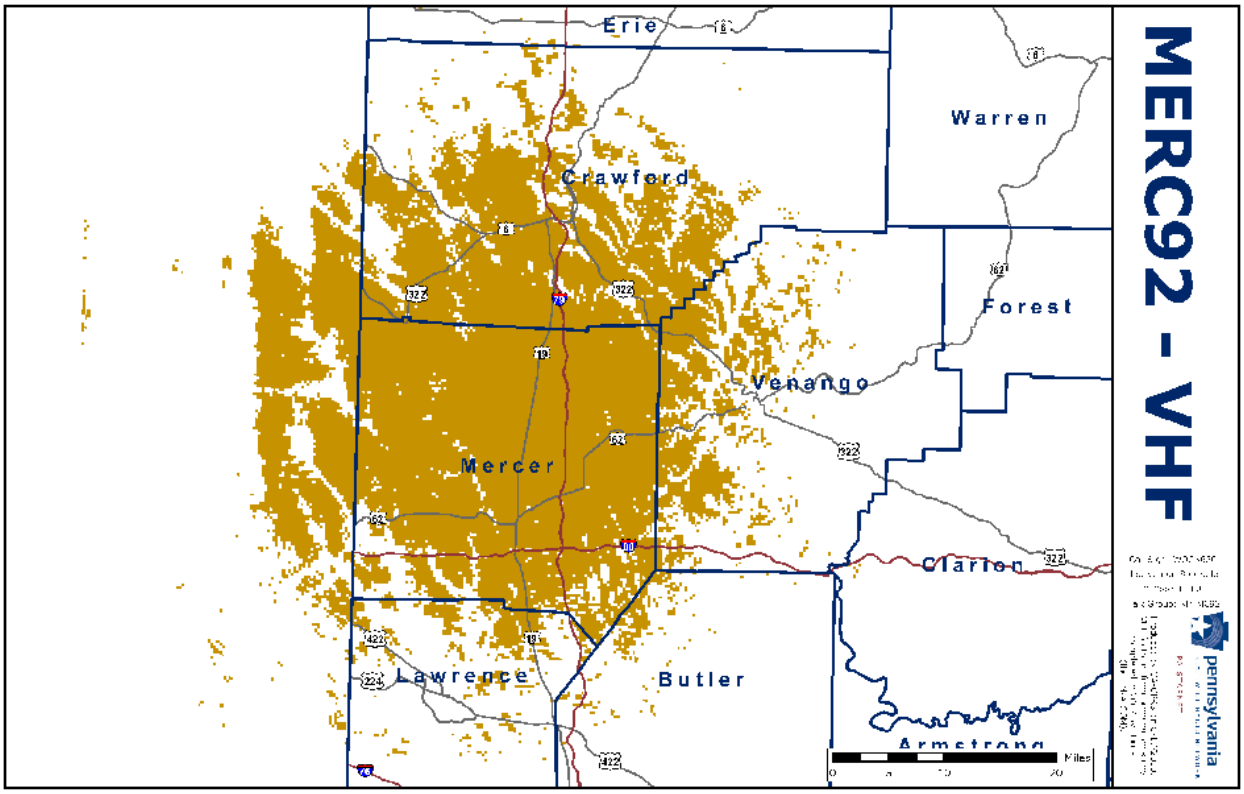

LANC01 - VHF
Snyder
Northumberland
Lehigh
Juniata
Schuylkill
Perry
Dauphin
Berks
Lebanon
Montgomery
Cumberland
Lancaster
Chester
York
Adams
Delaware
Miles
pennsylvania

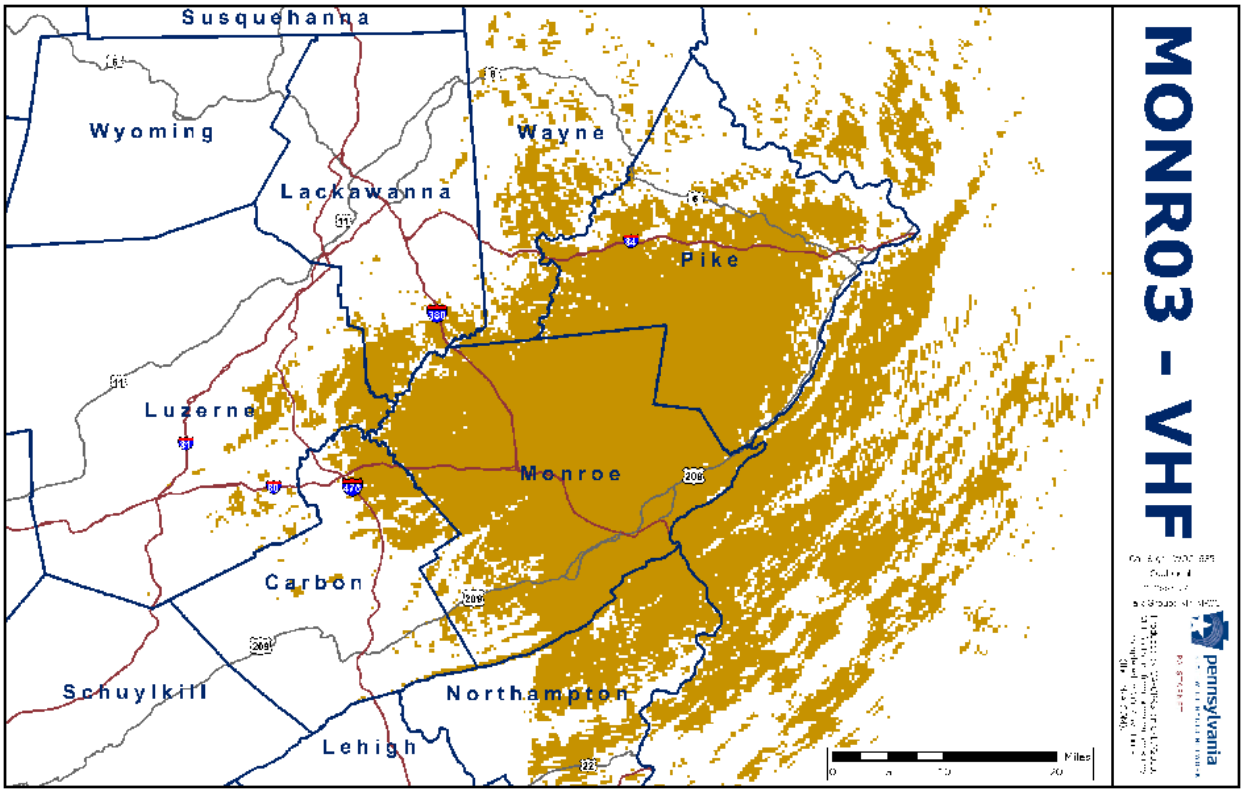

LAWR06 - VHF
Venango
Mercer
Clarion
Lawrence
Butler
Armstrong
Beaver
Allegheny
Indiana
Washington
Miles
pennsylvania

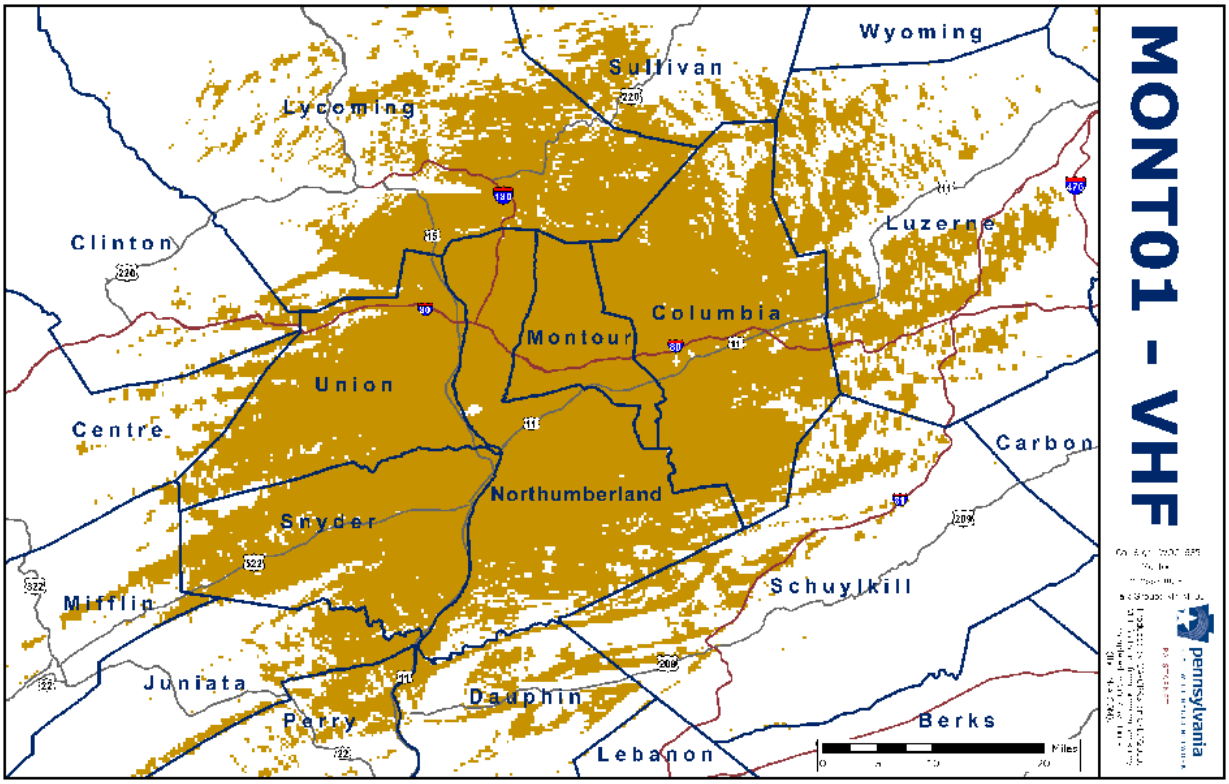

LUZE01 - VHF
Susquehanna
Bradford
Wyoming
Wayne
Sullivan
Lackawanna
Pike
Lycoming
Luzerne
Monroe
Columbia
Montour
Carbon
Northumberland
Schuylkill
Northampton
Lehigh
Miles
pennsylvania

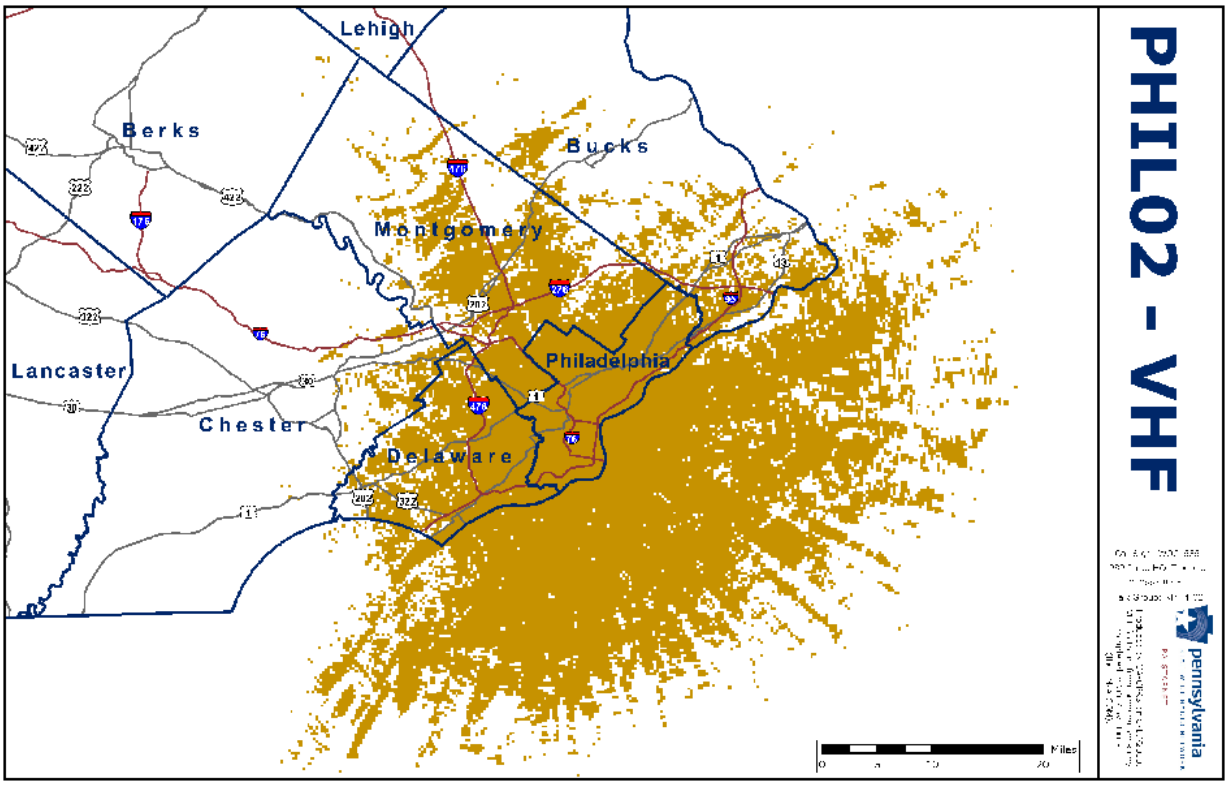

LYCO02 - VHF
McKean
Potter
Tioga
Bradford
Sullivan
Cameron
Lycoming
Elk
Clinton
Clearfield
Centre
Union
Columbia
Montour
Snyder
Miles
pennsylvania

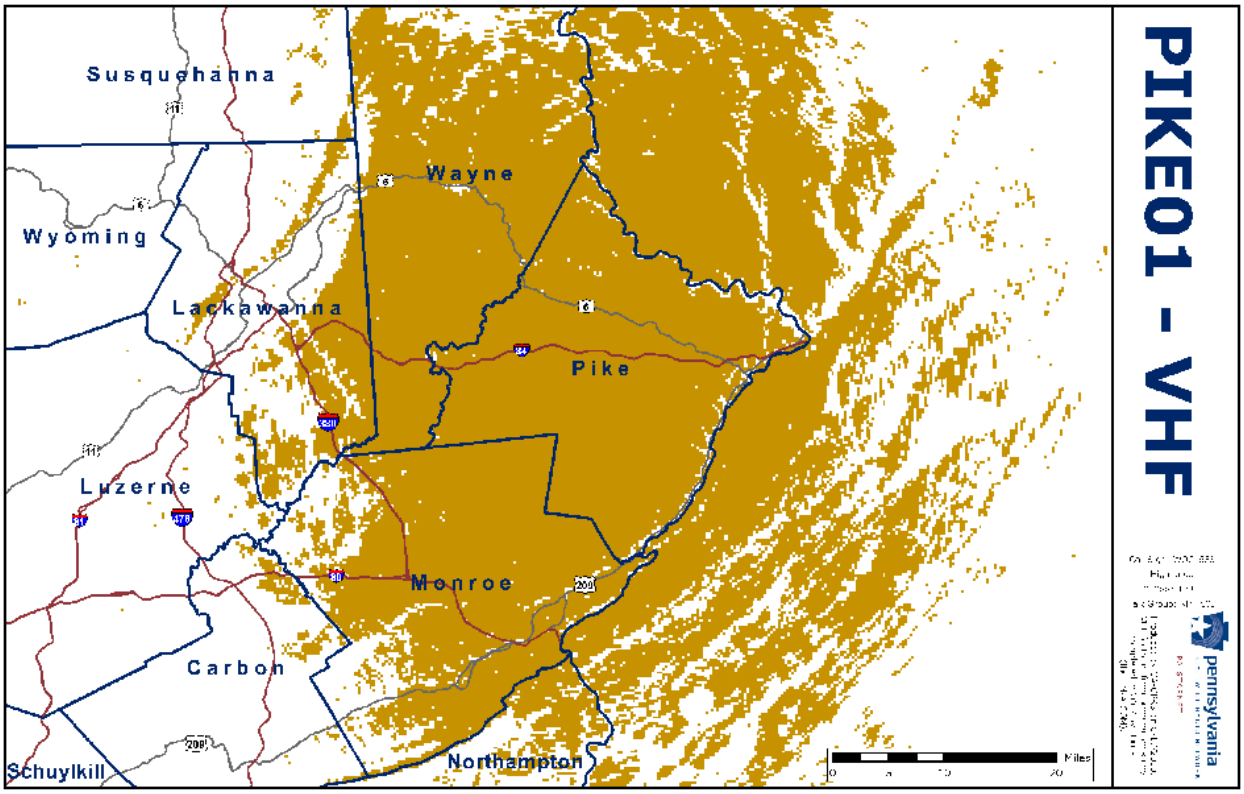

MCKE01 - VHF
Warren
McKean
Potter
Tioga
Forest
Elk
Cameron
Lycoming
Clinton
Clarion
Jefferson
Miles
pennsylvania

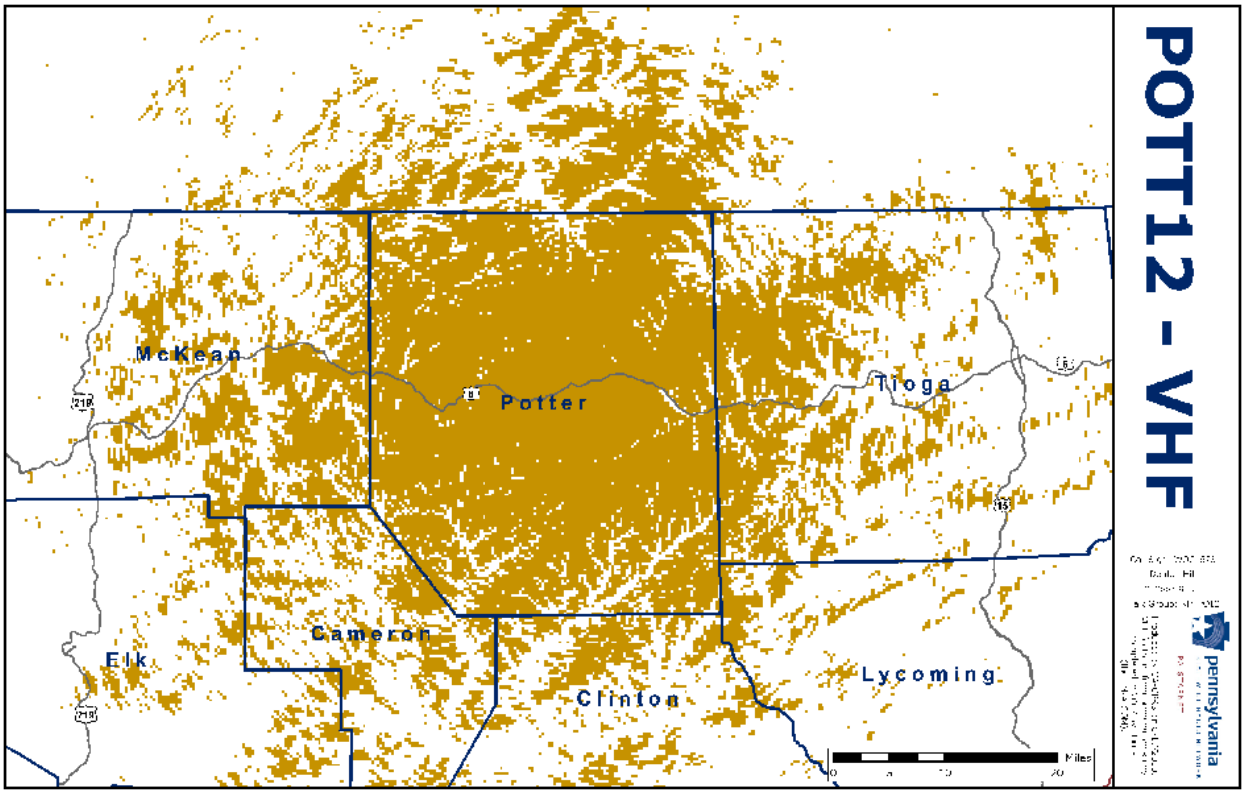

MERC92 - VHF
Erie
Warren
Crawford
Forest
Venango
Mercer
Clarion
Lawrence
Butler
Armstrong
Miles
0
10
20
pennsylvania

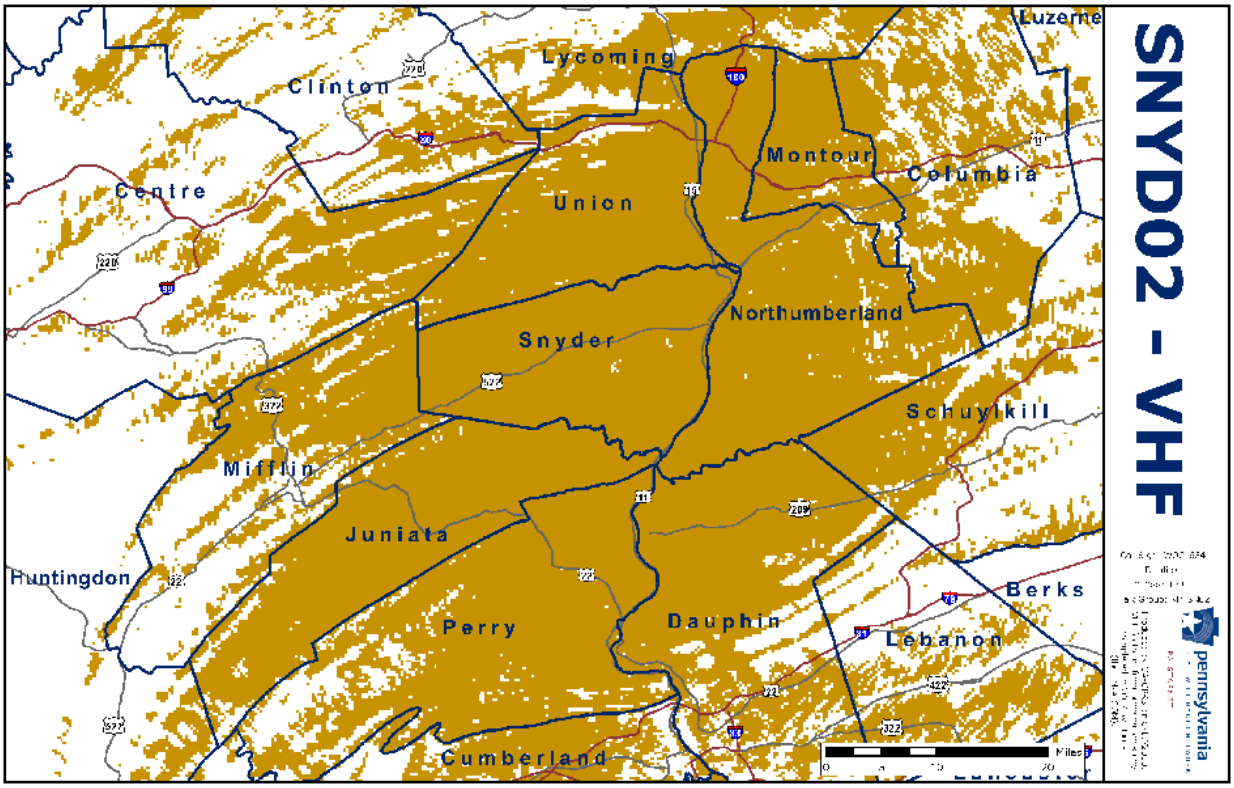

MONR03 - VHF
Susquehanna
Wyoming
Wayne
Lackawanna
Pike
Luzerne
Monroe
Carbon
Schuylkill
Northampton
Lehigh
Miles
0
10
20
pennsylvania

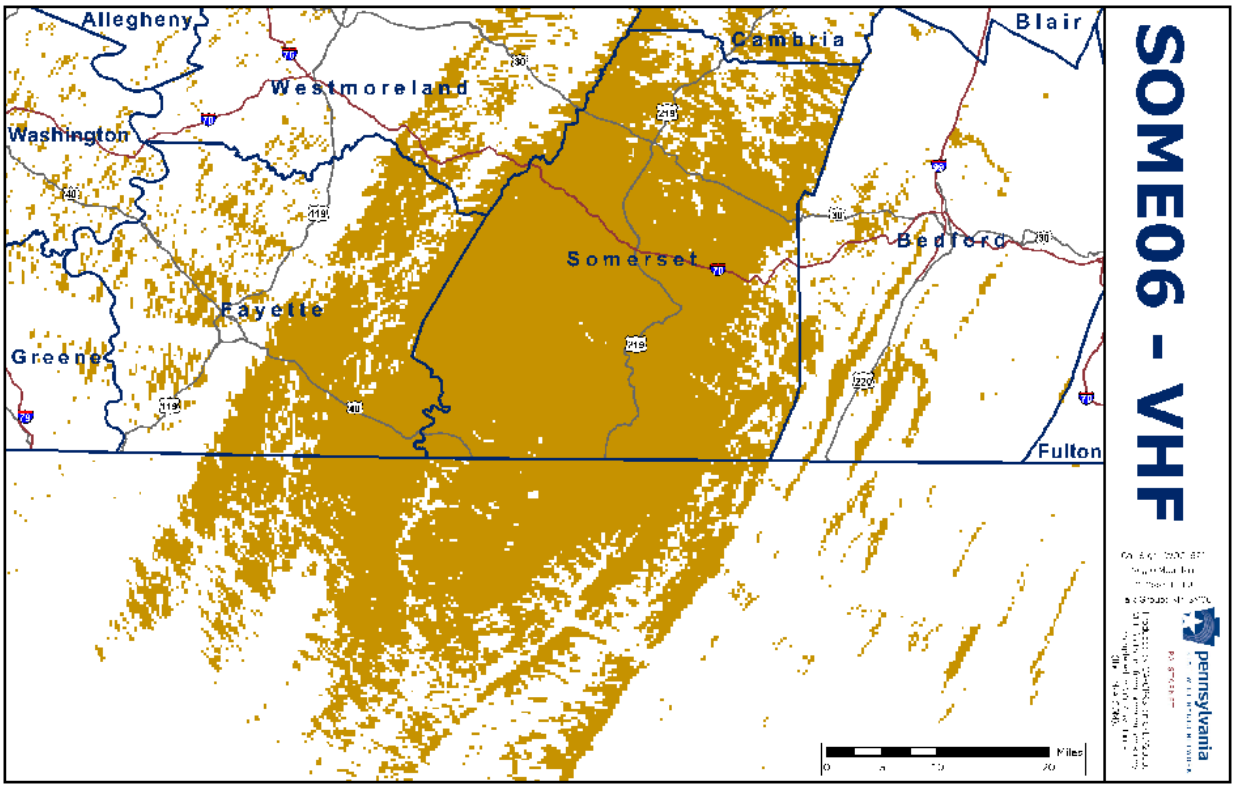

MONT01 - VHF
Wyoming
Sullivan
Lycoming
Clinton
Luzerne
Columbia
Montour
Union
Centre
Carbon
Northumberland
Snyder
Schuylkill
Mifflin
Juniata
Dauphin
Perry
Berks
Lebanon
Miles
pennsylvania

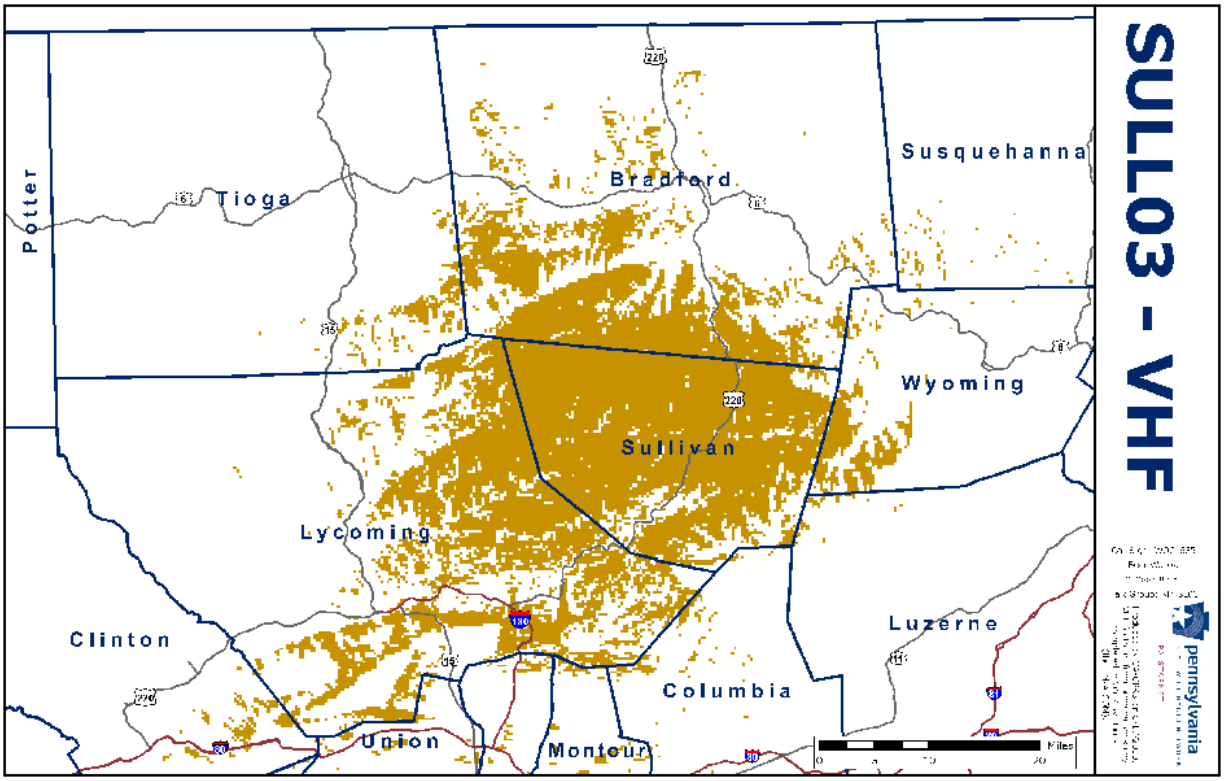

PHIL02 - VHF
Lehigh
Berks
Bucks
Montgomery
Philadelphia
Lancaster
Chester
Delaware
Miles
pennsylvania

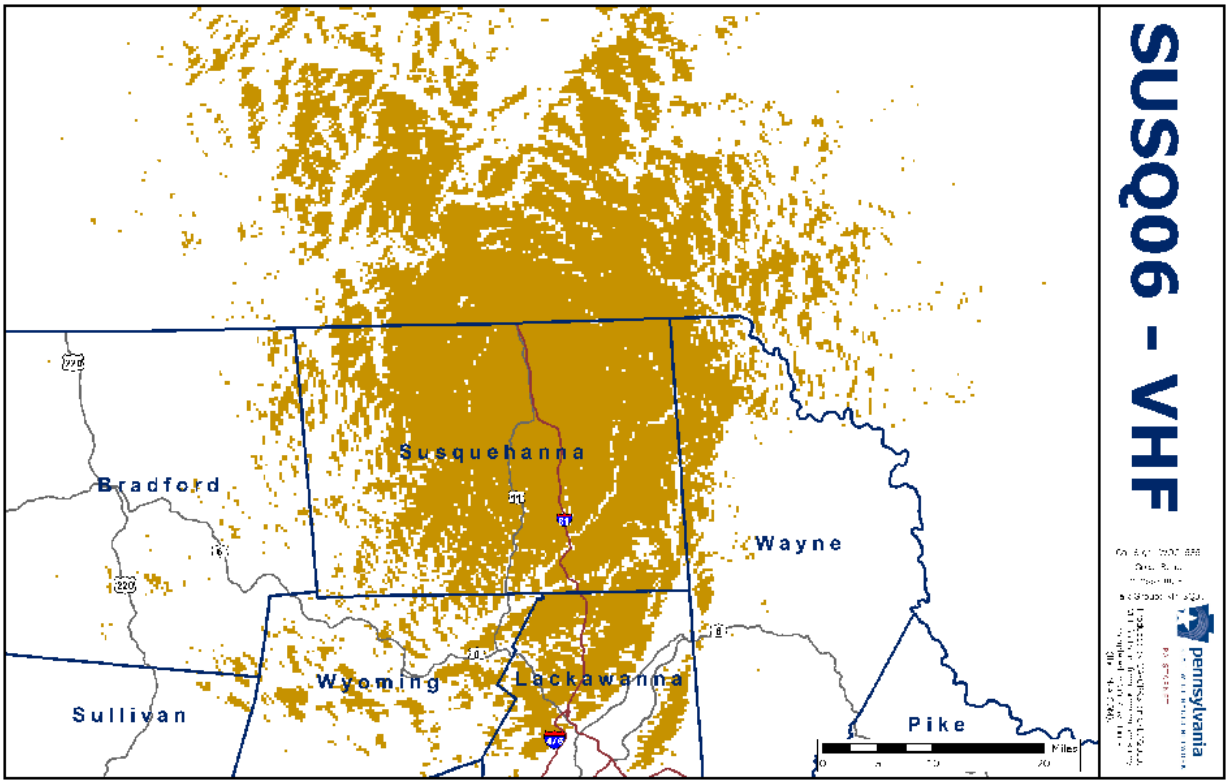

PIKE01 - VHF
Susquehanna
Wayne
Wyoming
Lackawanna
Pike
Luzerne
Monroe
Carbon
Schuylkill
Northampton
Miles
0
10
20
pennsylvania

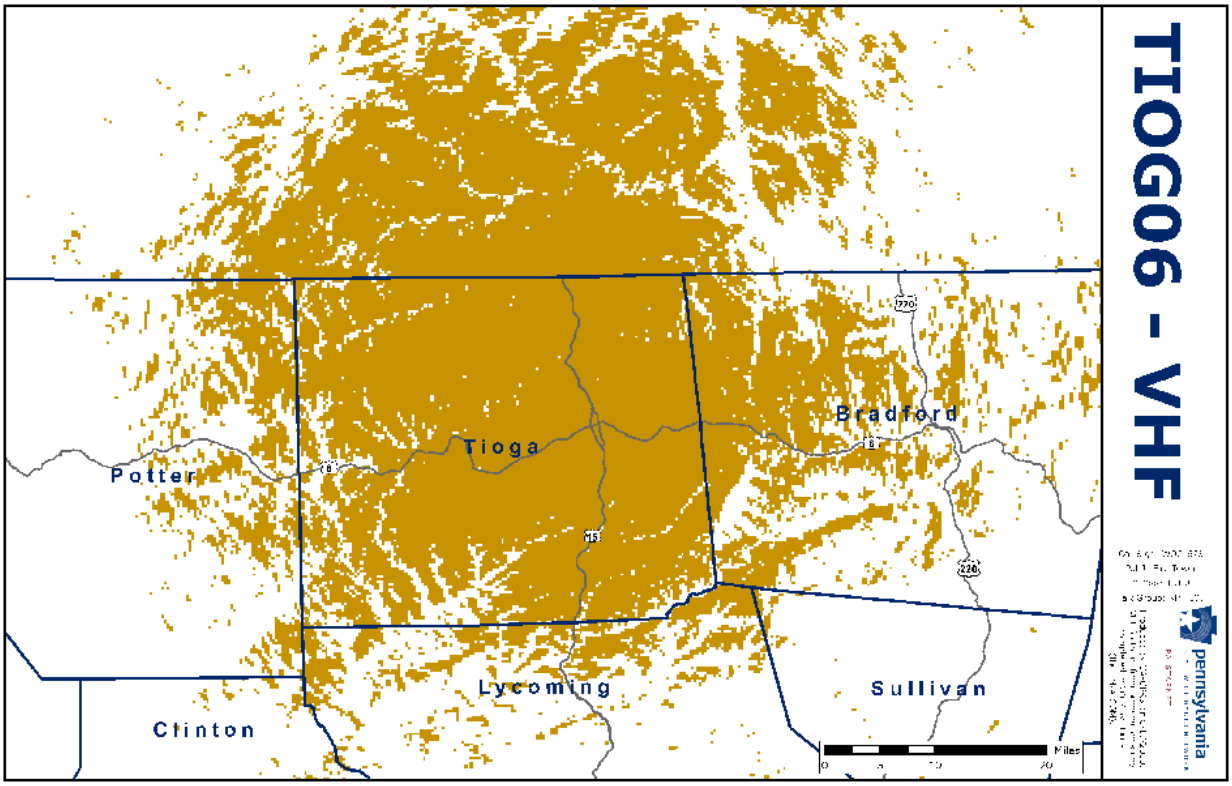

POTT12 - VHF
McKean
Potter
Tioga
Cameron
Elk
Clinton
Lycoming
Miles
0
10
20
pennsylvania

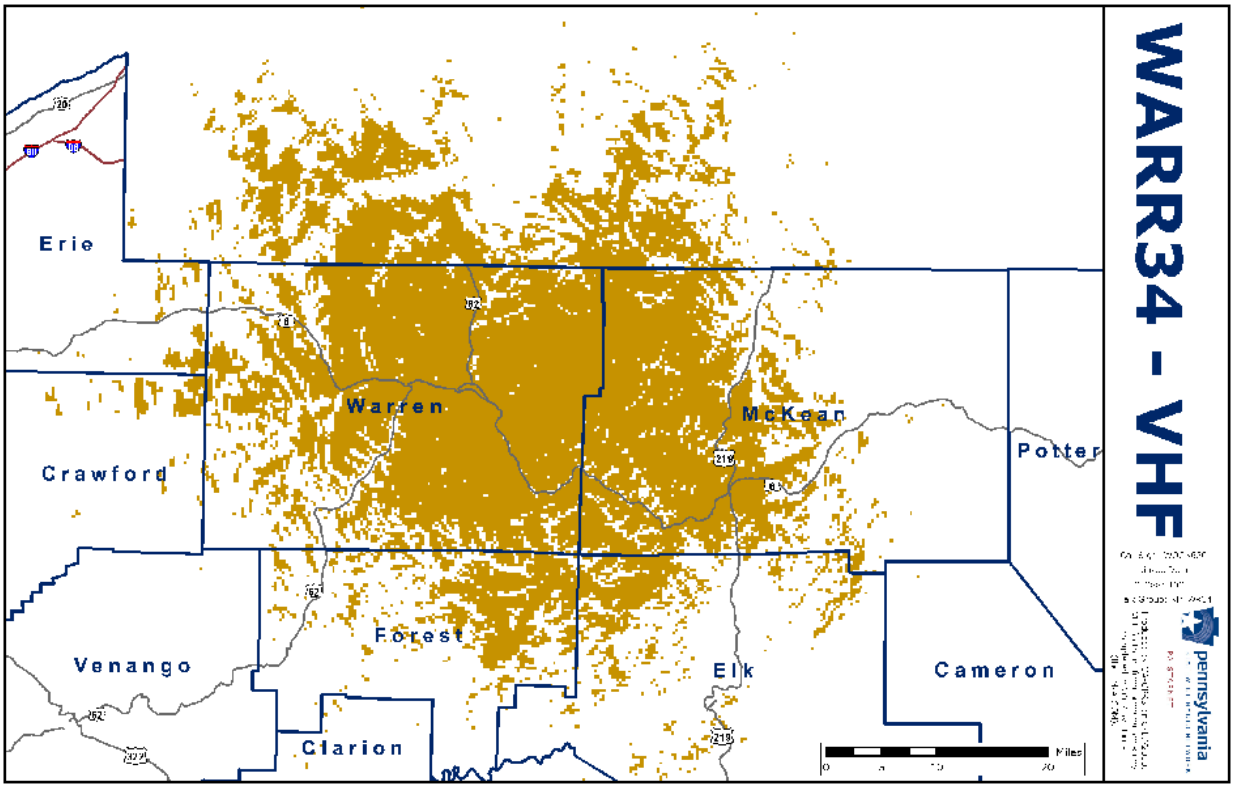

SNYD02 - VHF
Luzerne
Lycoming
Clinton
Centre
Montour
Columbia
Union
Northumberland
Snyder
Schuylkill
Mifflin
Juniata
Huntingdon
Berks
Perry
Dauphin
Lebanon
Cumberland
Miles
pennsylvania

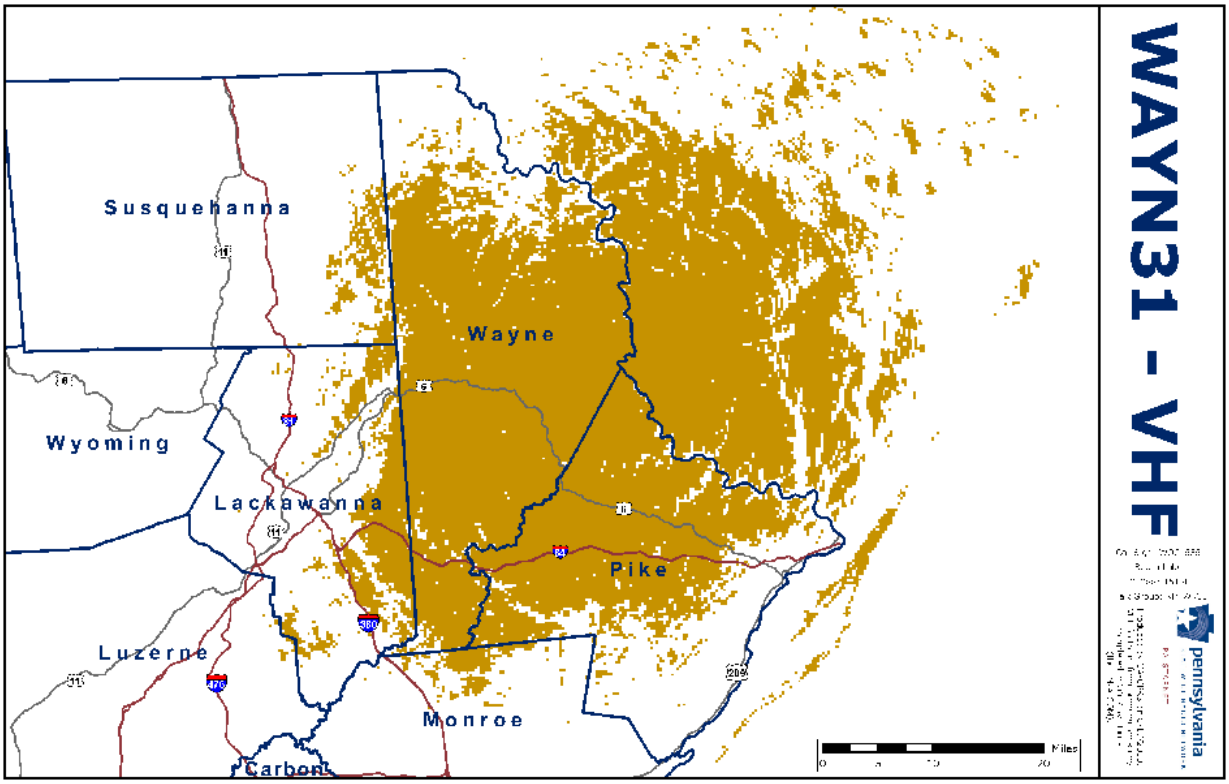

SOME06 - VHF
Allegheny
Cambria
Blair
Westmoreland
Washington
Bedford
Somerset
Fayette
Greene
Fulton
Miles
pennsylvania

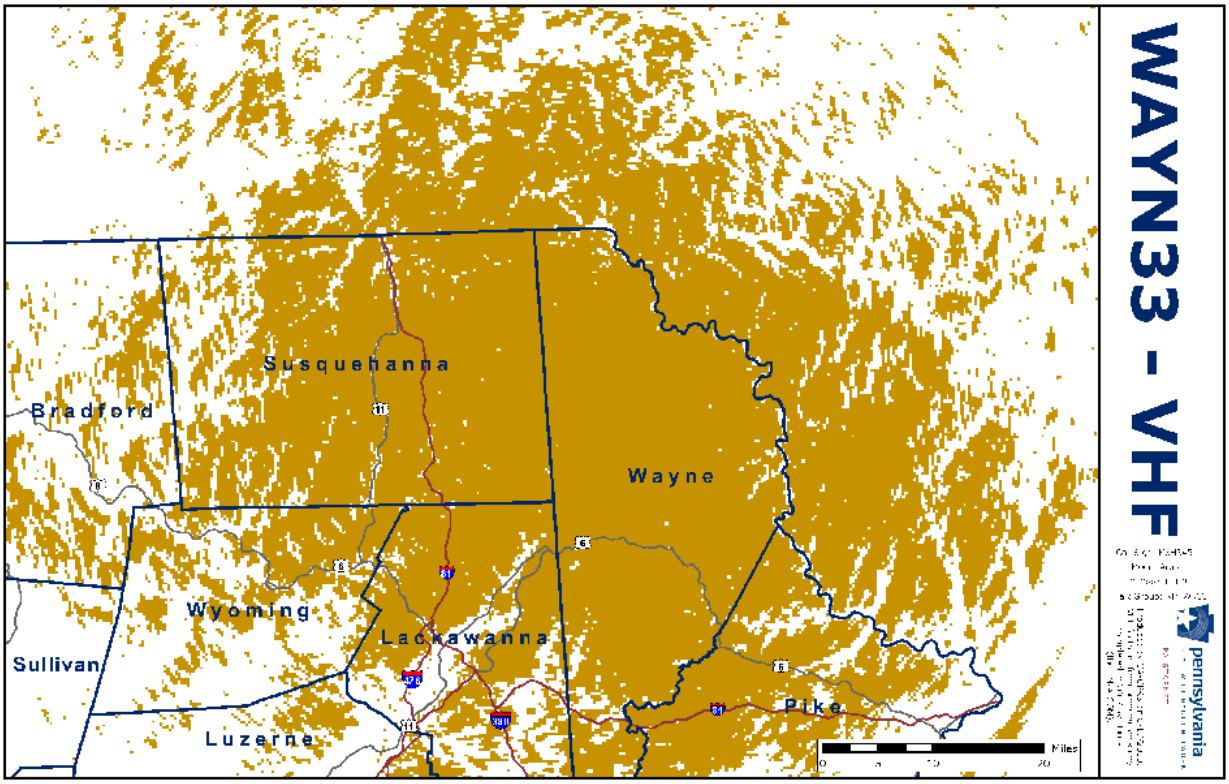

SULL03 - VHF
Susquehanna
Bradford
Tioga
Potter
Wyoming
Sullivan
Lycoming
Luzerne
Clinton
Columbia
Union
Montour
Miles
pennsylvania

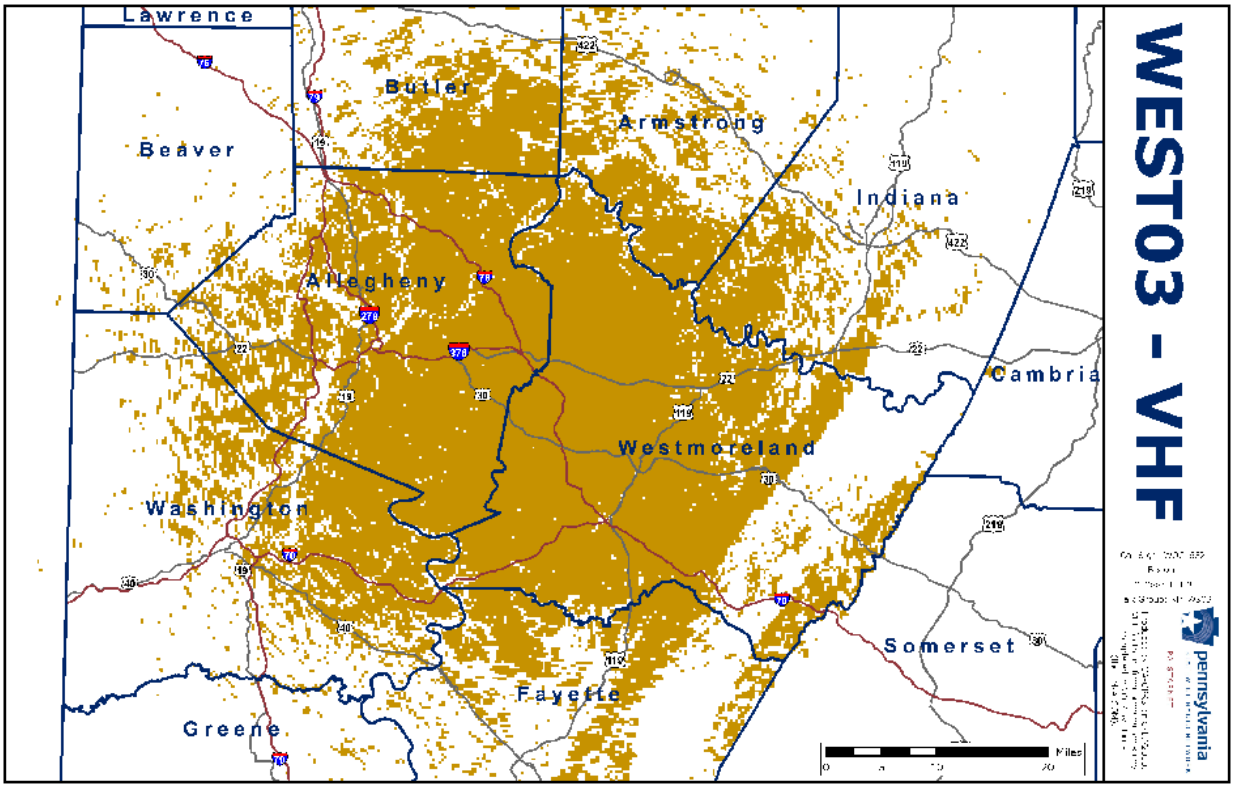

SUSQ06 - VHF
Susquehanna
Bradford
Wayne
Wyoming
Lackawanna
Sullivan
Pike
Miles
pennsylvania

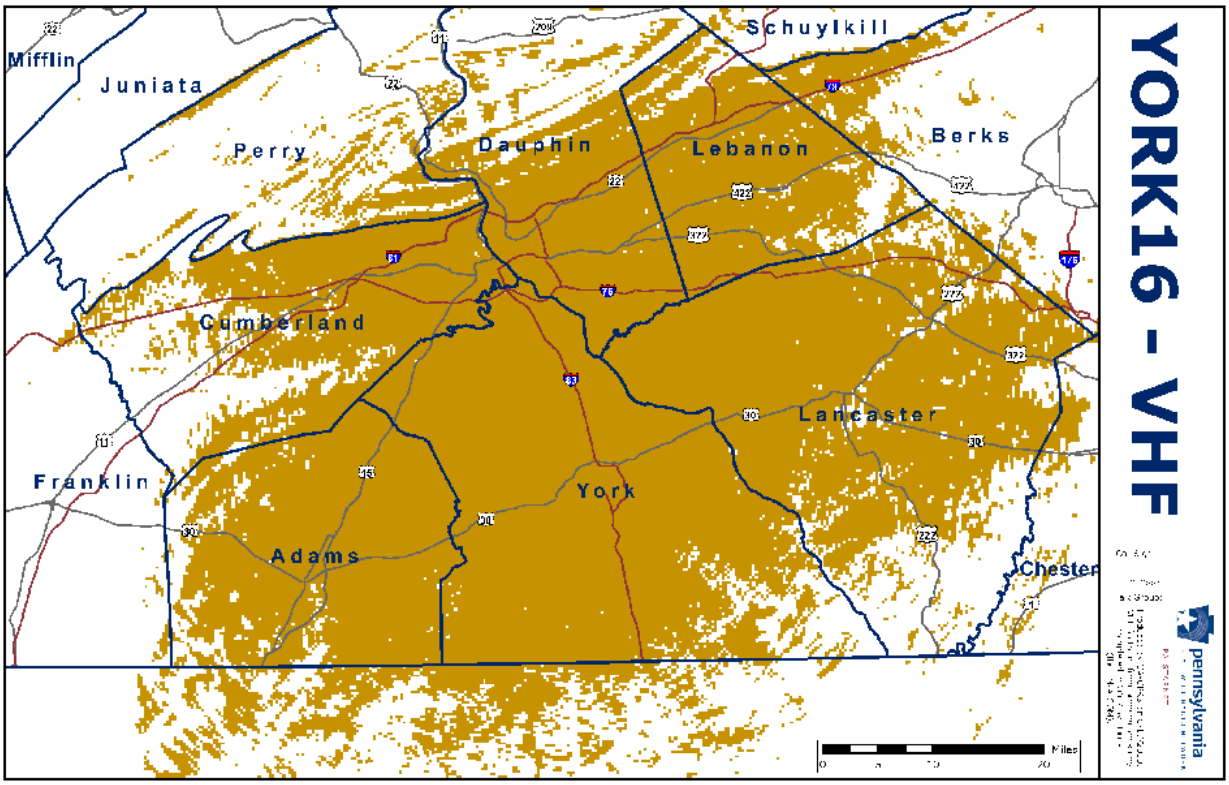

TIOG06 - VHF
Potter
Tioga
Bradford
Lycoming
Sullivan
Clinton
Miles
pennsylvania

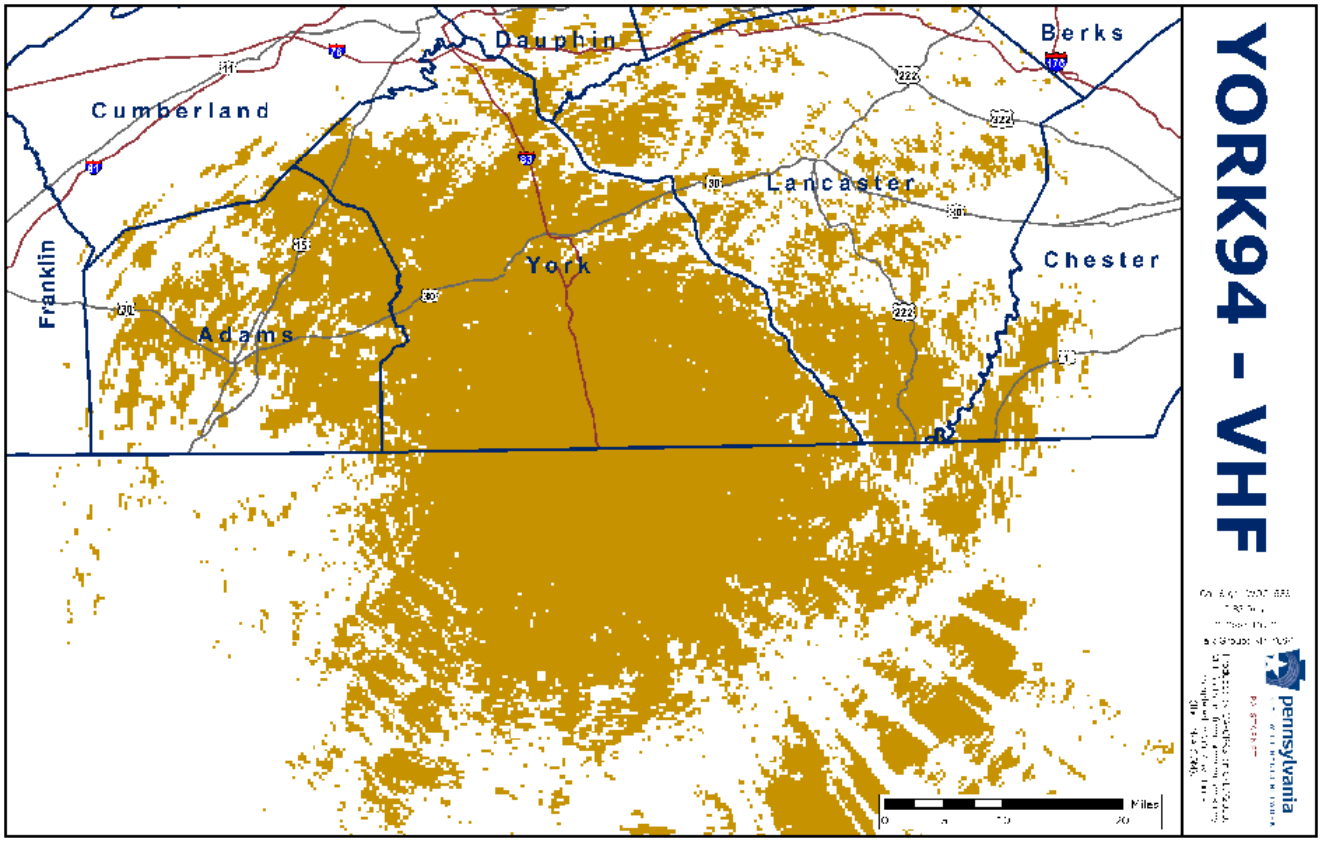

WARR34 - VHF
Erie
Warren
McKean
Potter
Crawford
Forest
Venango
Elk
Cameron
Clarion
Miles
pennsylvania


WAYN31 - VHF
Susquehanna
Wayne
Wyoming
Lackawanna
Pike
Luzerne
Monroe
Carbon
Miles
pennsylvania


WAYN33 - VHF
Susquehanna
Bradford
Wayne
Wyoming
Lackawanna
Sullivan
Pike
Luzerne
Miles
pennsylvania


WEST03 - VHF
Lawrence
Butler
Armstrong
Beaver
Indiana
Allegheny
Cambria
Westmoreland
Washington
Somerset
Fayette
Greene
Miles
pennsylvania


YORK16 - VHF
Schuylkill
Mifflin
Juniata
Perry
Dauphin
Lebanon
Berks
Cumberland
Lancaster
Franklin
York
Adams
Chester
Miles
pennsylvania


YORK94 - VHF
Berks
Dauphin
Cumberland
Lancaster
Chester
York
Franklin
Adams
Miles
0
20
pennsylvania

APPENDIX G: NETWORK CONVERGENCE DOCUMENT

Converged Network Standards vs1.5

Overview

As the Commonwealth looks forward to a future of interconnecting disparate networks and converging services, it is important that all organizations abide by a common set of standards. This document provides a set of network standards for those entities wishing to offer communications and/or application services to the Commonwealth. This applies to Physical and Virtual Environments. Additionally, all providers must adhere to standards listed in other Commonwealth Informational Technology Policies (ITP).

Definitions

The following definitions are utilized in this Standards document:

TERM	DEFINITION
RETIRED	This standard is no longer accepted by the Commonwealth. Items will only be maintained on this list for a maximum of 24 months after retirement.
CONTAIN	The Commonwealth currently supports this standard but no longer accepts it for new services. (possibly match text to ITP language)
PREFERRED	The Commonwealth currently prefers these service standards.
SPECIAL	The Commonwealth has approved these standards; however, they are not preferred. They may require special equipment or other special considerations. In some cases, additional cost, which may be forwarded to the requesting entity, would be required to implement such a connection. An example of this is the use of Single-Mode (SM) Fiber vs. Multi-Mode (MM) Fiber; such a scenario involves the purchase of expensive SM optics.
FUTURE	The Commonwealth foresees the future use of this standard, but the current infrastructure would require upgrades to support it. Entities may request the use of such standard but should not expect that existing facilities will support it.
CPOP	A Commonwealth Point-of-Presence (CPOP) is a point of access for service providers to interconnect with Commonwealth's network(s).
REQUIRED	The Commonwealth currently requires these standards. Such requirements may involve public safety concerns or protection of regulated information (ex: CJIS, HIPPA, PII, etc.).

Commonwealth Point-of-Presence (CPOP) Locations

Currently, the Commonwealth provides the following CPOP location(s):

- Group A
  - Commonwealth Technology Center
  - Cameron St. (Limited Space and Environmental)
  - Keystone Building (Limited Space and Environmental)
  - M25E Capital Building (Limited Space and Environmental)
  - Rachel Carson Building (Limited Space and Environmental)
  - Strawberry Square (Limited Space and Environmental)

- Group B – Commonwealth Owned facilities outside of Harrisburg
    - TBD
- Group C – State-Wide Radio
    - Radio to provide list of sites
- Group D – Middle-Mile Backbone Sites (Non Commonwealth)
    - TBD

The Commonwealth reserves the right to modify the list of CPOP locations with reasonable notification to all entities currently providing services through any locations changing status.

Provider Responsibilities

Critical Sites

Commonwealth-identified critical sites require redundant connections that are physically diverse. Organizations wishing to provide services to or from locations defined as critical sites must, upon Commonwealth request, provide end-to-end physical and logical path details to ensure that diversification is maintained. If diversification is not provided by the service provider, the provider shall support the coordination with the Commonwealth, and where appropriate other service provider(s), necessary for the Commonwealth to obtain such diversity through multiple carriers.

Telecommunication Service Priority (TSP)

All organizations providing common carrier services to the Commonwealth must support the federal TSP program. If a provider's service does not qualify for the TSP program, the provider must notify the Commonwealth as such.

Service Delivery Standards

Authentication

The Commonwealth considers integration with Commonwealth authentication systems to be preferred. Providers, whose services include a web-based management or reporting functionality or allow for some form of Commonwealth management of devices, should seek solutions that can integrate with the Commonwealth's infrastructure for authentication.

Network Time Protocol (NTP)

Providers must maintain reliable NTP synchronization with all devices to ensure that logging is accurate. The Commonwealth considers a minimum of Stratum 2 to be Preferred for the time source.

Interconnection Standards

Included are the standards for interconnection with the Commonwealth network. Any desire to connect with a deviation from these standards will be dealt with on a case-by-

case basis. In such cases, every effort will be made to conform to the standard or modify the standards list to include another connection method that can be widely utilized. The Commonwealth will periodically update the standards for connections with reasonable notification to all entities currently affected by a status changing to Contain or Retired.

Layer 1 – Physical Layer

Technology	Speed	Status	CPOP Group(s)	Media	Standard(s)	Fiber Size(s)	Connector(s)
Fiber	Any	Contain	N/A	Any	Any	Any	ST, FC
Fiber	Any	Special	N/A	Any	Any	Any	SC
Fiber	Any	Preferred	N/A	SM Fiber	Any	N/A	LC
Fiber	Any	Preferred	N/A	MM Fiber	Any	50µm	LC
Fiber	Any	Contain	N/A	MM Fiber	Any	62.5µm	Any
Ethernet	10Mbps	Special[1]	A,B	>= Cat 5	10BASE-T	N/A	RJ45
Ethernet	10Mbps	Special	C	>= Cat 5	10BASE-T	N/A	RJ45
Ethernet	100Mbps	Special[2]	A, B	>= Cat 5	100BASE-T	N/A	RJ45
Ethernet	100Mbps	Preferred	C	>= Cat 5	100BASE-T	N/A	RJ45
Ethernet	1Gbps	Preferred	A, B, D	>= Cat 5e	1000BASE-T	N/A	RJ45
Ethernet	1Gbps	Preferred	A, B, D	MM Fiber	1000BASE-SX	50µm OM3/4	LC
Ethernet	1Gbps	Special	A, B, D	SM Fiber	1000BASE-LX 1000BASE-EX	N/A	LC
Ethernet	10Gbps	Preferred	A, D	Twinax	10GSFP+Cu 802.3	N/A	SFP+
Ethernet	10Gbps	Preferred	A, D	MM Fiber	10GBASE-SR	50µm OM3/4	LC
Ethernet	10Gbps	Special	A, D	SM Fiber	10GBASE-LR 10GBASE-ER	N/A	LC
Ethernet	40Gbps	Future	A, D	MM Fiber	40GBASE-SR4	50µm OM3/4	LC
Ethernet	40Gbps	Future	A, D	SM Fiber	40GBASE-LR4	N/A	LC
Ethernet	100Gbps	Future	A, D	MM Fiber	100GBASE-SR10	50µm OM3/4	LC
Ethernet	100Gbps	Future	A, D	SM Fiber	100GBASE-LR4	N/A	LC
DWDM	100Gbps	Future	A	SM Fiber	-	N/A	LC
CWDM	TBD	Future	TBD	SM Fiber	-	N/A	LC
All Others[3]	Any	Special	Any	Any	Any	Any	Any

[1] Voice Only Standard: This standard is Preferred for new PIP Voice circuit installs.
[2] Voice Only Standard: This standard is Preferred for new PIP Voice circuit installs.
[3] Examples: cable modems, CATV, satellite, wireless, WiFi, microwave, etc.

Layer 2—Data Link Layer

Technology	Status
Ethernet	Preferred
Link Aggregation Control Protocol (LACP)	Preferred
MPLS	Preferred[4]
802.1Q	Preferred
Link Layer Discovery Protocol (LLDP)	Preferred
Cisco Discovery Protocol (CDP)	Special

Layer 3—Network Layer

Technology	Status
IPv4	Preferred
IPv4 – Multicast	Future
IPv6	Future[5]
Differentiated Services (DSCP)	Preferred[6]
RFC 1918 Private Internets	Contain[7]
Network-to-Network Tunnels	Special

IPv4 Routing

Technology	Standard
OSPF	Special
EIGRP	Special
Static	Special
BGP or MP-BGP[8]	Preferred
BGP or MP-BGP[9]	Special

[4] This standard is also preferred for PIP SIP trunking.
[5] The Commonwealth's standard Network Layer protocol is IPv4. At this time, the Commonwealth does not provide native transport or translation of IPv6 traffic. The Commonwealth is investigating implementation strategies for IPv6 and will support it in the future. Vendors must be prepared to support IPv6 when the Commonwealth deploys.
[6] Use of DSCP marking on all Layer 3 traffic is "Preferred", with standards that prioritize public-safety voice and honor DSCP through disparate networks. If providers do not honor QoS tags, they must, at minimum, pass the QoS tags through their network. Providers that do not honor the QoS tags must disclose this to the Commonwealth.
[7] To promote interoperability, the Commonwealth will route Commonwealth-assigned RFC1918 prefixes only and any other use is "Contained." IPv4 public addresses are "Preferred" when connecting Layer 3 networks.
[8] Private AS numbers must be assigned by the Commonwealth.
[9] Private AS numbers are not assigned by the Commonwealth.

DSCP Standards

Use	DSCP	DS Field	Status
VoIP Traffic	Expedited Forwarding (EF)	101 110	Preferred
LMR and 9-1-1 Voice	Network Control 1(NC1)	110 000	Preferred
Network Control Routing Protocol	Network Control 2(NC2)	111 000	Preferred
Life and Safety[10]	Assured Forwarding (AF31) Mission-Critical Data	011 010	Preferred
Video	Assured Forwarding(AF41)	100 010	Preferred
General	Assured Forwarding (AF11) Best Effort	001 010	Preferred[11]

Layer 3+

Perimeter Control – Commonwealth Security Zones

Entities wishing to connect to the Commonwealth may not provide interconnections between Security Zones of the Enterprise network. All non-Commonwealth connectivity and/or traffic must be isolated from all Commonwealth Security Zones. If there is a special business need to provide this functionality (ex: route leaking for device management), the entity must have its sponsoring agency submit the appropriate COPPAR and obtain approval before implementing such a configuration.

Perimeter Control – Service Provider Network

All service providers shall be responsible for providing any necessary perimeter control among their client networks and management network. The service provider is solely responsible for any traffic that is permitted to cross between these networks. Additionally, such activities may cause the service provider to be in violation of this and/or other Commonwealth standards.

Voice Standards

- Concurrent calls – Status of this capability is dependent on the agencies needs/requirements. Providers must disclose the status of this capability to the Commonwealth.
- Make Table:
    - ITU Telecommunication Standardization Sector (ITU-T) Standards
        - G.711 – 64kb uncompressed (Preferred, best voice quality)
        - G.729 – 8kb compressed – high complex algorithm (Special – bandwidth constraints)
        - G.729A – 8kb compressed – medium complexity algorithm – lower quality (Special – bandwidth constraints)

[10] Examples: Building fire alarms, Building security devices, etc.
[11] All data not previously tagged with DSCP should be treated as Bulk Data.

    - T.38 – for FAX – If agency wants total IP configuration
- Session Border Controller (SBC) – A SBC, or gateway device with equivalent functionality, is essential at the agency level to connect to the providers IP/PSTN SIP cloud. This is required for both new PIP and existing PIP. [To verify: EISO requirements for the minimum firewall capabilities.]
- Encryption is Preferred for all voice traffic on the Commonwealth network. This ensures compliance with HIPPA, IRS, and other regulatory requirements. Non-encrypted communications are acceptable for certain application—including those with communications that ultimately are broadcasted in the clear (ex: Fire/Police radio that would not be encrypted otherwise).

Video Standards

Video Conferencing

- **PRI -** 23B+D, FAS signaling, ISDN Protocol NI2, Pulse Type DTMF, 10 digits out, Hunt Sequential Ascending, B Channel configuration 2 Way universal

General Video Transmission

- Transport stream encapsulation of:
    - Video - MPEG-2, H.264, H.265 (future)
    - Audio - MPEG-1, MPEG-2, AAC, Dolby/AC3
- Unicast for point to point transmission
- Multicast for point to multi-point/broadcast transmission
- RTMP/RTSP/HLS stream encapsulation allowed for non-broadcast/web applications using same audio/video standards above

Facilities

Environmental Specifications

Entities wishing to house terminating equipment within a Commonwealth Point of Presence (CPOP) facility must submit a request to the Commonwealth, including the following environmental specifications:

- Total power consumption of all equipment
- Power diversity requirements
- Quantity and connector type for all powered devices
- Heat dissipation specifications for all equipment
- Number of rack units (RUs) required for equipment
- Weight of equipment/rack
- Fiber/Copper connectivity required
- Phone/Video/CATV connectivity required
- Surveillance requirements

- Physical security requirements
- Special audit requirements

All equipment must meet the following specifications. If no device that meets the specifications below is available, the entity must obtain prior approval for a waiver.

- Power
    - 220V AC Preferred, 110V AC as required at Group A and B CPOP locations
    - -48V DC Preferred, 110V AC as required at Group C locations
    - Vendor-owned UPS's will not be permitted when facility power is already UPS supported
- Proper grounding must be maintained on all equipment.
- Equipment must be rack mounted.
    - Commonwealth-provided racks will be 19" wide
    - If waiver is obtained, the following additional specifications must be provided:
        - Equipment footprint
        - Service area
        - Tile cut-out positioning
        - Full equipment dimensions

Access to Facilities

Monitoring and Surveillance

All entities within CPOP locations must support onsite and remote auditing of the CPOP, equipment in the CPOP, and access to the equipment. This may include alerts from, real-time system access to, or reporting from security, physical access, environmental monitoring, surveillance, and other monitoring systems and may include onsite visits to audit.

Physical Access

All CPOP facility access will be coordinated through the Commonwealth's representative.

APPENDIX H: EXHIBIT: SAMPLE INTEROPERABILITY AGREEMENT

INTEROPERABILITY AND SITE SHARING AGREEMENT

This Interoperability and Site Sharing Agreement ("Agreement") is made and entered into this _____day of _____, 20__, by and between the Commonwealth of Pennsylvania, acting by and through the Pennsylvania State Police, at 8001 Bretz Drive, Harrisburg, Pennsylvania, 17112 (hereinafter referred to as "Commonwealth"), and the County of _____ by and through its Board of Commissioners, address: _____ (hereinafter referred to as "County") (individually, each a "party," and collectively, the "parties.").

WITNESSETH:

WHEREAS, the Pennsylvania State Police is responsible for developing, managing and maintaining a wireless communications network throughout the Commonwealth known as the Statewide Radio Network or "PA STARNet" ; and

WHEREAS, the County has certain statutory duties pursuant to the Emergency Telephone Act, P.L. 1181, Act 118 of 2010, as amended, codified at 35 Pa. C.S. § 5301 – 5398, and the 9-1-1 Emergency Services, Act 12 of 2015, among which is the requirement that the County operate a 9-1-1 emergency dispatch system, requiring an emergency telecommunications system in the geographic area of the County; and

WHEREAS, the Commonwealth and County own or control certain sites located at various places throughout the Commonwealth of Pennsylvania on which are or may be located towers and equipment buildings for the location of antennas, microwave dishes, transmission lines, base stations, network routers, and other equipment relating thereto; and

WHEREAS, the effectiveness of PA STARnet and the County emergency dispatch system networks are best served by the collocation of sites owned by the Commonwealth and the County; and

WHEREAS, both parties wish to cooperate and assist with their respective networks; and

WHEREAS, the Commonwealth has responsibility to develop, maintain, and administer interoperability of emergency communications through the statewide communications interoperability plan, and County maintains an emergency communications system critical to interoperability, and the sharing of tower infrastructure, antennas and network meeting points facilitate the required interoperability, resiliency, and redundancy critical to public safety communications.

NOW, THEREFORE, in consideration of the mutual promises, agreements, covenants, and undertakings contained herein and other valuable consideration, the parties hereto mutually agree as follows:

1. **Tower Use License**. The Commonwealth hereby grants to the County a license to use the Commonwealth tower(s) set forth in the attached Site License Agreement(s) ("SLA") for each site in the form of Exhibit A and/or the Network Resource Sharing Agreement for each site in the form of Exhibit B.

2. **Consideration**. The County hereby grants the Commonwealth a license to use the County tower(s) set forth in the attached Site License Agreement(s) ("SLA") for each site in the form of Exhibit A and/or the Network Resource Sharing Agreement for each site in the form of **Exhibit B**.

3. **Interoperability and Shared Sites**

   a) The Exhibit A and/or Exhibit B is not an amendment to this Agreement, but becomes part of this Agreement as though it was included in the Agreement when it was executed.

   b) The SLA need not be executed as an Amendment.

   c) There shall not be any license or bandwidth fees except as contained herein.

   d) The County will have access to all Commonwealth built towers, after the requirements of the Commonwealth have been satisfied. A list of such these sites is detailed in Exhibit C. The Commonwealth may have access to County built towers, after the requirements of the County have been satisfied. The list of these sites detailed in Exhibit C-1 and updated periodically.

   e) Should a Commonwealth tower listed in Exhibit A or B be unavailable to the County due to pre-existing equipment loading, interference, or other issue making County co-location on the tower not commercially reasonable, the County may construct a new tower on the Commonwealth's property, at County's sole cost, and at the sole discretion of Commonwealth.

   f) Should a County tower listed in Exhibit A or B be unavailable to the Commonwealth due to pre-existing equipment loading, interference, or other issue making Commonwealth co-location on said tower not commercially reasonable, the Commonwealth may construct a new tower on the parcel of the unavailable tower, at Commonwealth's sole cost, and at the sole discretion of County.

   g) A separate Exhibit A and/or Exhibit B will be prepared by the Commonwealth and approved by the County for each site prior to any use. Responsibility of both the Commonwealth and the County as to the

construction and development of the site(s) is contained in Exhibit A and/or Exhibit B to include any engineering drawings contained therein.

h) The Commonwealth retains title to Commonwealth built towers. The County retains title to County built towers.

i) The County will assist the Commonwealth as requested in obtaining all building and other permits, zoning permits, land use variances, and any other requirement of local government relating to the building and operation of a radio tower on this site, provided the County has sufficient expertise in this area, and sufficient resources to provide such assistance. At no time will the Commonwealth be considered a legal client of the County. Failure on the part of the County to assist the Commonwealth in a timely manner in this regard may cause the Commonwealth to abandon any building program related to this agreement.

j) The County and the Commonwealth agree that interconnection between networks and sharing of network bandwidth will be mutually agreed to and documented in **Exhibit B**-1 or other specific network interoperability agreements entered into by the two parties.

k) The County and the Commonwealth agree that land mobile radio interoperability is a national priority established by the U.S. Department of Homeland Security and the Commonwealth has published the Statewide Communications Interoperability Plan (SCIP) as approved by the Public Safety Communications Council to establish priorities and policies for interoperability. Collocation of antennas and connection of antenna and programming or radios should be done in a manner consistent with the SCIP and in conjunction with the designated Statewide Interoperability Coordinator. Channel/Talkgroup sharing agreements may be executed and shall be in the format as described in Exhibit J.

4. **Term of the Agreement**. Upon full execution of this Agreement, the term of this License shall be twenty (20) years, from the date affixed to the first page of this Agreement. Either party may cancel this Agreement without cause at the end of the term of agreement by issuing twelve (12) months prior written notice to the other party. If neither party exercises its cancellation rights, the Agreement will automatically extend for another twenty (20) year term on the same terms and conditions as set forth herein.

5. **Equipment Shelters/Cabinets**. Placement and ownership of shelters/cabinets and appurtenances shall be defined in Exhibit A and/or Exhibit B. Procurement, installation, and operation of said shelters/cabinets and all equipment contained and related to said shelter/cabinet shall be in accordance with the site technical standards developed by the Commonwealth and County detailed on the approved Site Design Drawings. In the absence of any agreement

to the contrary, both County and Commonwealth shall be responsible for provision of utilities to its own shelter/cabinet.

6. Site Management Standards

a) The County shall not install nor permit the installation of additional communications equipment, beyond the tower loads specified in Exhibit A and/or Exhibit B, without the express written permission of the Commonwealth on any Commonwealth owned tower. The Commonwealth shall not install nor permit the installation of additional communications equipment beyond the tower loads specified in Exhibit A and/or Exhibit B, without the express written consent of the County on any County owned tower. Both parties agree that additional users or tower loads added without written concurrence shall be removed immediately from the tower upon demand of tower owner. Notwithstanding the above, the County reserves the right to retain space and weight reservations on County towers... The Commonwealth reserves the right to retain space and weight reservations on Commonwealth towers.

b) No lease, rent, fee, charge, or cost transfer other than those listed herein or on Exhibit A or Exhibit B will be levied by the Commonwealth or any Commonwealth agent, assignee, or successor-in-interest upon the County. No lease, rent, fee, charge, or cost transfer other than those listed herein will be levied by the County or any County agent, assignee, or successor-in-interest upon the Commonwealth.

c) The Commonwealth and the County agree to operate the facilities so as to cause no interference with the operation of the other's radio system and/or network. Final determination as to the resolution of any technical problems will be made jointly by the Director, Statewide Radio Network Division and the Director of Emergency Service for the County. The need for the Commonwealth and County to engineer and maintain a suitable operating environment for the operation of the public safety radio systems will not be compromised. In order to ensure a suitable operating environment, both Directors will co-sign the technical specifications included in Exhibits A and B and serve as approving authority for final site design drawings.

d) The County and the Commonwealth agree to jointly and individually require and enforce compliance with the standards developed by the Commonwealth and County, both in their own operations and in any action they authorize on their behalf at the site.

e) Any party requesting additional tower loads shall be responsible for providing a tower analysis. Following such analysis, no reasonable request by either party shall be disallowed by the other party provided it does not impinge on any pending reservations or future needs.

f) Maintenance of site grounds and surrounding areas at the site(s) listed in Exhibit A and/or Exhibit B is defined in Exhibit A and/or Exhibit B for each individual site.

7. Other Maintenance.

a) The County, at its own expense, shall maintain and repair all existing radio communications assets of the County situated upon the site(s) listed in Exhibit A and/or Exhibit B. Such maintenance shall be conducted by the County in accordance with reasonable engineering standards to assure that at all times the property of the County conforms to the requirements of the FCC and all other governmental authorities having lawful jurisdiction over the County. The County shall maintain its shelter and equipment in good order and repair.

b) The Commonwealth, at its own expense, shall maintain and repair all radio communications assets of the Commonwealth situated upon the site(s) listed in Exhibit A and/or Exhibit B. Such maintenance shall be conducted by the Commonwealth in accordance with reasonable engineering standards to assure that at all times the property of the Commonwealth conforms to the requirements of the FCC and all other governmental authorities having lawful jurisdiction over the Commonwealth. The Commonwealth shall maintain its equipment in good order and repair.

c) All access, repair, installation, and modification work completed at any tower supplied by the Commonwealth under this agreement is restricted to vendors authorized by the County and supplied, in writing, to the Commonwealth, and adhering to site installation standards of the Commonwealth.

d) All access, repair, installation, and modification work completed at the tower supplied by the County under this agreement is restricted to vendors authorized by the Commonwealth and supplied, in writing, to the County, and adhering to site installation standards of the County.

e) Installation, repairs, and maintenance affecting both Commonwealth and County at any shared site, including but not limited to: access road maintenance, common compound maintenance, fence and gate

installation and repairs, and utility access, if not specifically addressed in the site specific Exhibit A, shall be agreed to by the parties prior to any authorization of work that obligates either party to payment for such a service.

8. **Ingress and Egress**. The Commonwealth and the County, and their designees or contractors shall have access to the site at all times. The County and the Commonwealth shall not interrupt or disturb any entrances and shall use all reasonable means to prevent any interruption, or interference by any third party; provided, however this does not require either party to install signs or erect fences or erect any other types of obstacles or barricades except as provided for in the tower owners approved construction drawings**.**

9. **Security**. Security issues shall be addressed in each site specific Exhibit A and/or Exhibit B.

10. **Liability**.

a) County assumes all risks and liabilities for injury to or death of any person or damage to any property, in any manner arising out of possession, use, or operation of the property by County whether such injury or death be with respect to agents or employees of County or of third parties, and whether such property damage be to County's property or the property of others; provided, however that said damage or injury results from the negligence of County, its agents or employees, and provided that judgment has been obtained against the County. This provision shall not be construed to limit the governmental immunity of the County.

b) The Commonwealth neither expresses nor implies any warranty as to the suitability of the site for the purpose of the County's intended use. It is the responsibility of the County to assure that its intended use meets all applicable laws or regulations, governing the intended use and to obtain any inspections, licenses, or permits necessary to meet any laws or regulations. Further, the costs of any equipment or modifications necessary to meet any laws or regulations or to meet the standards of the Commonwealth radio system and to obtain any necessary licenses or permits are the responsibility of the County.

c) Commonwealth assumes all risks and liabilities for injury to or death of any person or damage to any property, in any manner arising out of possession, use, or operation of the property by Commonwealth whether such injury or death be with respect to agents or employees of Commonwealth or of third parties, and whether such property damage be to Commonwealth's property or the property of others; provided, however

that said damage or injury results from the negligence of Commonwealth, its agents or employees, and provided that judgment has been obtained against the Commonwealth. This provision shall not be construed to limit the sovereign immunity of the Commonwealth.

d) The County neither expresses nor implies any warranty as to the suitability of the site for the purposes of the Commonwealth's intended use. It is the responsibility of the Commonwealth to assure that its intended use meets all applicable laws or regulations, governing the intended use and to obtain any inspections, licenses, or permits necessary to meet any laws or regulations. Further, the costs of any equipment or modifications necessary to meet any laws or regulations or to meet the standards of the County radio system and to obtain any necessary licenses or permits are the responsibility of the Commonwealth.

11. **Trash**. Both parties shall be responsible for removal of all rubbish or waste materials related to or generated by each party's activities or each party's designee or contractors' activities.

12. **Environment.** During the term (including any renewal term), the County and the Commonwealth shall:

a) not conduct or authorize the management of any hazardous materials on the sites, including installation of any underground storage tanks, without the prior written disclosure to the other party;

b) not take any action that would subject the sites to violation of lawful requirements for on-site disposal of hazardous materials;

c) not cause or allow the release of any hazardous materials on, to, or from the sites, except in full compliance with environmental laws and permits issued thereunder; and

d) at each entities sole cost and expense, arrange for the lawful transportation and off-site disposal of all hazardous materials that are generated on the site.

13. **Assignment.** Neither the County nor the Commonwealth shall assign its rights under this Agreement without the prior consent of the other party. Such consent should not be unreasonably withheld.

14. **Notices**. All notices, requests, demands, or other communications hereunder shall be in writing and sent United States registered or certified mail, return receipt requested, or overnight mail, postage prepaid as follows:

If to the Commonwealth:

Pennsylvania State Police

Statewide Radio Network Division

8001 Bretz Drive

Harrisburg, PA 17112

If to the County:

County of _____

_____

With a copy to:

_____

Either party, by notice given in conformity with this Section, may change the name and addresses above set forth.

15. **Termination**.

This Agreement may be terminated as follows:

a) At the option of Commonwealth, upon one hundred eighty (180) days written notice to County if Commonwealth determines that it is in the best interest of the Commonwealth to terminate the Agreement. If Commonwealth elects to terminate this Agreement, County shall be entitled to payment for satisfactory services rendered under the Agreement up to the time of termination.

b) At the option of County, upon one hundred eighty (180) days written notice to Commonwealth if County determines that it is in the best interest of the County to terminate the Agreement. If County elects to terminate this Agreement, Commonwealth shall be entitled to payment for satisfactory services rendered under the Agreement up to the time of termination.

c) Any payment obligation or portion thereof of Commonwealth or the County created by this Agreement is conditioned upon the availability of Commonwealth or Federal funds, or County funds as applicable which are appropriated or allocated for the payment of such an obligation or portion thereof; provided, however, that Commonwealth and the County will

request such funds each year during the Term. If such funds are not allocated and available, this Agreement may be terminated by Commonwealth at the end of the period for which funds are available. No penalty shall accrue to Commonwealth or the County in the event this provision is exercised, and neither the Commonwealth nor the County shall be obligated or liable for any future payments due for any damages as a result of termination under this Section.

d) If, through any cause other than nonpayment, the Commonwealth or the County fails to fulfill, in a timely and proper manner, that party's obligations under this Agreement, the other party shall give the defaulting party written notice of a deficiency in its performance. If the defaulting party does not correct the deficiency to the satisfaction of the other party within thirty (30) days of its receipt of the written notice of deficiency, non-defaulting party may terminate this Agreement, provided that the obligation could reasonably be completed within the thirty (30) day period. Extensions based upon reasonable completion standards shall be provided by the non-defaulting party upon written notice of efforts to fulfill the obligations, accompanied by engineering or other evidence supporting the need for the period beyond thirty (30) days. In no instance will this period extend beyond six (6) months, regardless of the conditions causing the deficiency in performance.

16. **Waiver.** Failure or delay on the part of the Commonwealth or of the County to exercise any right, remedy, power or privilege hereunder shall not operate as a waiver thereof. A waiver, to be effective, must be in writing and must be signed by the party making the waiver. A written waiver of a default shall not operate as a waiver of any other default or of the same type of default on a future occasion.

17. **Applicable Law**. The laws of the Commonwealth of Pennsylvania shall apply to this Agreement signed by duly authorized representatives of both parties

18. **Amendments**. No revision of this Agreement shall be valid unless made in writing and signed by duly authorized representatives of both parties.

19. **Incorporation of Exhibits.** Exhibit A, Exhibit B, Exhibit C, Exhibit D, Exhibit E, Exhibit F, Exhibit G, Exhibit H, Exhibit I, and Exhibit J are hereby incorporated into this Agreement. Wherever the term "Contactor" appears in the exhibits it shall refer to and mean the same as the term "County."

20. **Entire Agreement**. This Agreement constitutes the final expression of the agreement of the parties; it is intended as a complete and exclusive statement of their agreement, and it supersedes all prior and concurrent promises, representations, negotiations, discussions and agreements that may have been made in connection with the subject matter hereof.

IN WITNESS WHEREOF AND INTENDING TO BE LEGALLY AND BOUND HEREBY, the parties hereto have caused this agreement to be executed by their duly authorized representative as of the last date and year written.

FOR THE COUNTY OF _____

By: _____

Commissioner Date

_____

Commissioner Date

_____

Commissioner Date

FOR THE COMMONWEALTH OF PENNSYLVANIA

Pennsylvania State Police

_____

Commissioner Date

_____

Director Date

APPROVED AS TO FORM AND LEGALITY:

_____

Office of Chief Counsel

_____

Office of General Counsel

_____

Office of Attorney General

APPROVED:

_____

Comptroller