



National Plant Diagnostic Network

Strategic Plan

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**NATIONAL PLANT DIAGNOSTIC NETWORK
FOR THE FOOD AND AGRICULTURE DEFENSE INITIATIVE
NATIONAL INSTITUTE OF FOOD AND AGRICULTURE,
U.S. DEPARTMENT OF AGRICULTURE**

CATALOG OF FEDERAL DOMESTIC ASSISTANCE 10.304

Sections 1484 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977
7USC authorize the National Plant Diagnostic Network (NPDN) (3351).

EXECUTIVE SUMMARY

Accelerating global trade in plants and plant products, land-use change, and climate change has increased the introduction of pathogens and pests that negatively impact the productivity, profitability, and sustainability of natural and managed plant systems. In this environment, there is a clear need for plant diagnostics systems that can quickly and accurately identify the increasing array of pathogens and pests to the ever-finer levels of taxonomic resolution necessary to inform phytosanitary decisions, outbreak response, and other pest management decisions. The National Plant Diagnostic Network (NPDN) fulfills that need, and as such, is a vital part of the nation's biosecurity infrastructure.

NPDN recognizes that it needs to adapt to changing times in order to continue answering that need. This includes adapting to constantly evolving technologies upon which diagnostics depend; and develop resilience to changes in people and administrative support over time. This strategic plan was built around NPDN's core mission areas of supporting early detection, accurate diagnostics, and timely communications. Strategic Planning discussions outlined in this document identify the Mission of the NPDN, define the Vision for the Strategic Plan, outline Goals and Objectives for the future of NPDN, and provide NPDN response to NIFA challenges issued in the 2016 Cooperative Agreement.

NPDN Mission: The National Plant Diagnostic Network is a premier diagnostics system with the ability to quickly detect and accurately identify plant pests and pathogens and to communicate timely and accurate information.

Quality, relevance, and service were identified as NPDN's primary guiding principles. NPDN envisions a network of highly skilled diagnosticians employing the full array of advanced diagnostics technologies to meet the needs of our clientele in each single state and territory, and to better serve our partners in plant protection. To achieve this vision, NPDN will strive to provide the resources necessary to enhance quality, capability, and capacity of diagnosticians and plant diagnostic labs around the country.

The goal of NPDN is to support national biosecurity with accurate, timely, and reliable diagnostics. To that end, NPDN aims to develop standards for diagnostics performance, data quality, and lab management that promote the highest confidence in the network, in NPDN diagnosticians, and in the quality and integrity of the diagnostics records in the NPDN National Data Repository. This will be achieved by developing new programs for professional development and proficiency and strengthening laboratory accreditation. In response to NIFA challenges, NPDN will also establish a system of tiered classification of labs by their capacity, that will use incentives to promote improvements, and will facilitate documenting that improvement.

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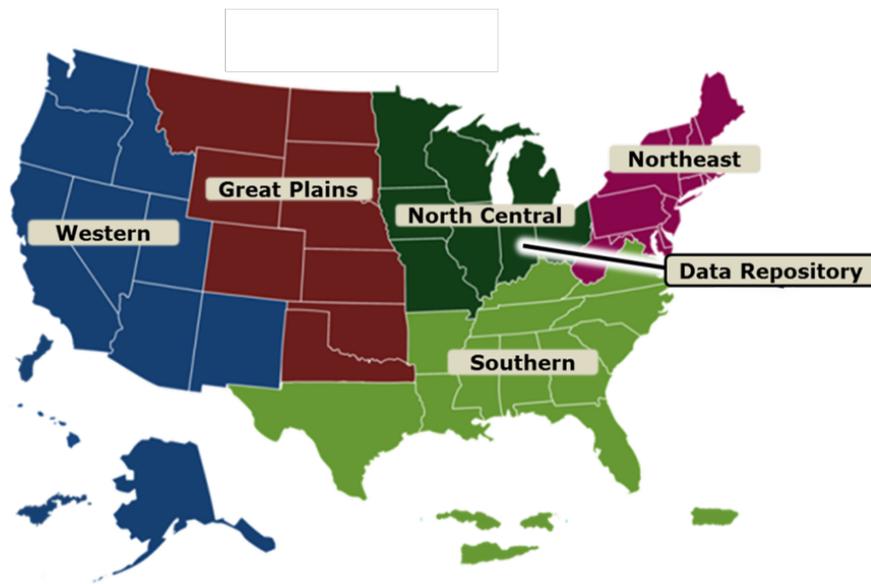
NPDN STRATEGIC PLAN

Introduction

The National Plant Diagnostic Network (NPDN) is a critical component of our nation's plant biosecurity infrastructure providing diagnostics services in support of state and federal plant health emergency response efforts as well as routine diagnostics to a diverse clientele on a wide array of plant health issues. Through a network of over 70 diagnostic labs in all 50 states and 4 U.S. territories (Puerto Rico, Virgin Islands, Guam, and American Samoa), NPDN has provided diagnostics services to approximately 97% of the over 3,000 counties in the U.S.. NPDN diagnostics are valued by government regulatory agencies, the academic research community, commercial enterprises, and the general public.

The NPDN operates from five Regional Centers and the Data Repository. Each Regional Center coordinates a network of states and territories. Each also administers one high capacity Regional Lab that houses advanced diagnostics technologies, maintains surge-support capability, and provides diagnostics leadership and support to NPDN member labs within their region and throughout the national network. In addition, each Regional Center contributes to NPDN management and administration, and provides leadership in national programs.

NPDN REGIONAL NETWORKS



NPDN REGIONAL CENTERS: **GPDN:** KANSAS STATE UNIVERSITY, **NCPDN:** MICHIGAN STATE UNIVERSITY, **NEPDN:** CORNELL UNIVERSITY, **SPDN:** UNIVERSITY OF FLORIDA, **WPDN:** UNIVERSITY OF CALIFORNIA AT DAVIS, **NPDN NATIONAL DATA REPOSITORY:** PURDUE UNIVERSITY

Background

Accelerating global trade in plants and plant products has increased the introduction of pathogens and pests that negatively impact the productivity, profitability, and sustainability of natural and managed plant systems. Land-use change, climate change, global trade and travel are facilitating the emergence of pests and pathogens with novel phenotypes, including expanded host and geographic ranges. In this environment, there is a clear need for plant diagnostics systems that can quickly and accurately identify the increasing array of pathogens and pests to the ever-finer levels of taxonomic resolution necessary to inform phytosanitary decisions, outbreak response, and other pest management decisions. The National Plant Diagnostic Network (NPDN) fulfills that need, and as such, is a vital part of the nation's biosecurity infrastructure.

NPDN recognizes that it needs to adapt to changing times in order to continue answering that need. This includes adapting to constantly evolving technologies upon which diagnostics depend; and develop resilience to changes in people and administrative support over time. In the 2017 USDA NIFA Cooperative Agreement (CA), NIFA issued the following challenges: *“Current economic realities require that the network identify new ways to economize and reduce operating costs without losing the most critical biosecurity functions. When practical ... avoid redundancy and unnecessarily duplicative infrastructure. Every effort should be made to economize within the current structure. Regional hub labs are encouraged ... to develop a system of tiered labs.”* NIFA also requested that NPDN develop a plan to document performance and improvement over time.

To better serve our diagnostics clientele and stakeholders and to address the challenges outlined by NIFA, NPDN completed an in-depth strategic planning process in April 2019. Through this process we developed a vision for NPDN that ensured quality diagnostics and constant improvement in a landscape of increasing biological threats to plant systems and constantly evolving technologies upon which diagnostics depend.

The strategic plan was built around NPDN's core mission areas of early detection, accurate diagnostics, and timely communications. Strategic Planning discussions identified the Mission of the NPDN, defined the Vision for the Strategic Plan, and outlined Goals and Objectives for the future of NPDN. Quality, relevance, and service were identified as NPDN's primary guiding principles. This document outlines those outputs, and provides NPDN response to NIFA challenges.

NPDN Mission Statement

The National Plant Diagnostic Network is a premier diagnostics system with the ability to quickly detect and accurately identify plant pests and pathogens and to communicate timely and accurate information.

In other words, NPDN's mission is to provide high quality diagnostics services and convey relevant information to clientele, partners and stakeholders. To fulfill its mission NPDN needs to advance the detection and diagnostics capabilities and capacity of our labs.

Vision

The challenges to plant health, nationally and globally, are constantly increasing. Diagnostics systems with the capabilities and capacity to quickly detect and accurately identify the pathogens and pests are essential to protect the plant systems that underpin our economy, our health, and our environment. The National Plant Diagnostic Network (NPDN) has become, and will remain, a vital part of our national biosecurity infrastructure. Our vision is to ensure that NPDN keeps pace with advancing detection and diagnostics technologies and remain prepared to meet the challenges of protecting plant systems to keep people and the environment healthy.

We envision a network of highly skilled diagnosticians employing the full array of advanced diagnostics technologies to meet the needs of our clientele in each state and territory, and to better serve our partners in plant protection. To achieve this vision, NPDN will strive to provide the resources necessary to enhance capability and capacity of diagnosticians and plant diagnostic labs around the country.

Goals of NPDN

Strategic Planning discussions identified the following goals necessary to promote constant improvement, guided by NPDN mission:

- To provide value to U.S. Plant Biosecurity by establishing new programs, standards and practices aimed at increasing diagnostics capability and the capacity of the network, and increase the value of NPDN to its' clientele, partners and stakeholders.
- To support state and federal regulatory response efforts with accurate, timely, and reliable diagnostics; with collaborations and open channels of communication with regulatory entities; and maintaining of appropriate confidentiality in diagnostics data.
- To develop standards for diagnostics performance, data quality, and lab management that promote the highest confidence in the network, in NPDN diagnosticians, and in the quality and integrity of the diagnostics records in the NPDN National Data Repository.
- To provide or develop IT systems that aid diagnostics work by sharing and optimizing diagnostics methods, enhancing professional development and self-assessment, and improving communication among diagnosticians.
- To provide value to all member labs by enhancing the performance, credibility, and standing of NPDN labs; and provide the training and education foundation necessary for improvement of the labs and NPDN as a whole.

Specific Objectives

NPDN will address these goals through the creation of new programs and the refocus and strengthening of existing programs.

- NPDN will implement a new *Professional Development Program* to provide the resources necessary to ensure that NPDN diagnosticians can:
 - fulfill their professional development goals

- achieve the highest level of technical competency
- fulfill the needs for expertise in the network
- NPDN will strengthen the *Laboratory Accreditation* Program, by setting standards for all NPDN labs that will vary depending on lab capacity. This set of standards will promote lab management practices that maintain an environment for quality diagnostics.
- NPDN will establish a *Diagnostician Proficiency Program* that will ascertain and validate the highest level of technical competency and performance of the labs. The NPDN *Diagnostician Proficiency System* will ensure the highest confidence in the diagnostics performed by NPDN labs.
- The *Professional Development Program* will support the *Laboratory Accreditation Program* and *Diagnostician Proficiency Evaluations* in order to increase accessibility and participation of all labs and the network.
- These three programs will jointly ensure the highest confidence in the diagnostics records in the NPDN National Data Repository.
- NPDN will establish *Data Quality Standards* for diagnostics records in the NPDN National Data Repository
- IT systems will be used extensively to host the *Professional Development Program*, support *Laboratory Accreditation* and *Diagnostician Proficiency Evaluations*, and improve internal network communications. Online tracking systems will also be used to track metrics that document improvement.
- NPDN will modify the committee structure, to ensure member participation in the development, implementation, and management of these programs.

Working groups were established comprised of NPDN members representing each NPDN region and the NPDN National Data Repository. Each working group was provided a specific charge from these objectives and a set of starting assumptions by which to develop a plan for that area. Approximately 30 NPDN members contributed to the development of the NPDN Objectives. The final goals and objectives of the programs, developed by the working groups are detailed in the Appendix A.

Response to challenges from USDA-NIFA

Challenge 1: *Identify new ways to reduce operating costs without losing the most critical biosecurity functions.*

Response: NPDN has already been operating under reduced funding for a number of years. During this time, operating costs have been greatly reduced. Despite cost saving measures, NPDN has also suffered reductions in its original functions, as it has lost staff that was responsible for running many of its programs. For example, programs to improve communications with regulatory agencies and to use repository data to inform epidemiology analysis and decisions have been inactive. Also, programs to educate first detectors and improve early detection, have been de-emphasized.

Hence, NPDN does not expect to be able to further reduce operating costs without losing additional biosecurity functions. As “*the most critical biosecurity functions*”, NPDN reaffirmed its commitment to accurate diagnostics and timely communications as its primary mission.

To more efficiently manage NPDN operating costs, a centralized planning model (CPM) for resource allocation will be implemented. This CPM may not result in additional cost savings, but may allow NPDN to better prioritize its functions under its current funding levels.

Challenge 2: *When practical ... avoid redundancy and unnecessarily duplicative infrastructure.*

Response: Redundancy and duplicative infrastructure are essential to a secured diagnostics system such as NPDN. For the past several years, surge support for outbreak response and/or trace forwards has depended upon duplicative infrastructure and redundancy in capability and capacity. Without a massive investment in new technologies, that will remain the model for the foreseeable future. It is those very traits that allows NPDN to support national and state plant health emergency response efforts. To “*avoid redundancy and unnecessarily duplicative infrastructure*” NPDN will better coordinate diagnostics activities, strategically invest in technological capabilities, and implement professional development programs that promote enhanced and more cooperative expertise.

- Coordinated Diagnostics and Enhanced Cooperative Expertise: NPDN regional labs and designated state labs will develop a system of complementary technical expertise. Thus, NPDN does not aim to equip all labs with the same capabilities, but to coordinate small groups of labs (at least 2) in becoming proficient and capable in confirmatory techniques for the most critical pests.
- Strategic Investment in Technological Capabilities: NPDN will invest in diagnostics technologies to provide complementary capabilities among NPDN labs to more efficiently utilize technical competencies in support of regional and state needs.
- Professional development programs to promote cooperative expertise: NPDN will implement professional development programs that enhance capability, provide access to expertise, and promote cooperation among NPDN labs and their state counterparts.

Challenge 3: *Develop a system of tiered labs*

Response: NPDN recognizes that labs provide diagnostic support to a wide diversity of natural and managed plant systems in the U.S. and its Pacific and Caribbean territories. As a result, there is great diversity among NPDN labs. NPDN diagnostic labs are not staffed equally, do not have the same technology capabilities, and have widely divergent clientele demands.

NPDN will implement a new tiered lab categorization consistent with the wide diversity of capability and capacity among NPDN labs. The tiered system will provide the flexibility to recognize specific expertise or capability across the network through special category lab designations. Through our Strategic Planning process NPDN developed the following lab categories based on roles and capacity:

Tiers based on Roles: NPDN labs contribute to the network in different capacities, and have different responsibilities towards it. We use the following terminology to identify lab roles in the network:

- **NPDN Regional Labs** – Provide diagnostic support and leadership for their region, maintain working relationships with NIFA leadership, state (SPRO) and federal regulatory officials (SPHD) in multiple states in the region, and develop NPDN policies and procedures. NPDN Regional Labs will complement each other with respect to expertise, technologies and capacity with an attempt to reduce “*unnecessary redundancy and duplicative infrastructure*”. There will be one Regional Lab per region, co-located with and administered by the Regional Center.
- **NPDN Hub Labs** – There will be one designated NPDN Hub Lab per state/territory, funded by a single subcontract with a regional center. NPDN Hub Labs provide diagnostic support and leadership for their state/territory, maintain working relationships with their state (SPRO) and federal regulatory officials (SPHD), and abide by NPDN policies and procedures. NPDN Hub Labs are located at Land Grant Universities, Departments of Agriculture, and other NPDN recognized institutions. NPDN Hub Labs will be categorized and funded depending upon their capacity and additional contributions to the NPDN mission.
- **NPDN Partner Labs** – These are all other diagnostic labs that work in collaboration with NPDN Hub labs, or that actively participate in NPDN programs, and maintain close relations with NPDN. These can be labs that provide complementary expertise, or greater geographic coverage to NPDN Hub labs. They also include State or Federal Regulatory labs. Partner labs do not receive NPDN subcontracts, but may receive NPDN funds for specific purposes. Because they don’t have a subcontract, Partner Labs do not have direct responsibility to NPDN, other than what is agreed through their collaboration with NPDN or NPDN Hub labs.

Tiers based on lab Capacity: NPDN Hub labs will be categorized based on their diagnostics capacity. For example, labs vary in their access to appropriate laboratory facilities, the type of equipment available, and the proficiency of their staff in different organisms or analytical techniques. Together, these capabilities influence the lab’s capacity to process larger volumes of samples. For example, some small labs can process only a few hundred samples per year, using only basic culture techniques and visual identification, while other labs have more staff and/or can use molecular techniques to process thousands of samples per year.

Classification of labs by their capacity will be used to encourage constant improvement. NPDN Hub Labs and Regional labs will be classified based on their diagnostics capacity and expertise with terms such as small, standard, and large. This tiered system will be coupled with financial incentives for labs with more capacity or expertise, and for labs that contribute more to the NPDN. NPDN will set a system to allow labs to increase their capacity.

The tiered laboratory structure will become the foundation for other elements in this strategic plan, including, the NPDN Professional Development System, the NPDN Diagnostician Proficiency System, and the NPDN Laboratory Accreditation System. Thus minimum requirements in all of those programs will depend on the lab capacity and responsibilities. Also, by categorizing states capacity and expertise, NPDN has the necessary information to prioritize resources to implement a system of cooperative expertise.

Once implemented, this laboratory structure will determine (in part) the level of funding to NPDN labs and will facilitate the coordination of diagnostics services across the network.

Challenge 4: *Develop a plan to document improvement over time*

Response: Specific guidance by NIFA requires that NPDN identifies metrics to demonstrate success of its programs and improvement over time. NPDN will develop metrics for performance assessment over time and a system to facilitate improvement. This system will:

- Account for diversity among NPDN labs
- Include metrics that Promote professionalism
- Encourage constant improvement
- Inform USDA of accomplishments
- Inform NPDN of lab performance

IT systems and tools will be instrumental in tracking and providing these metrics. To that end NPDN will implement tools necessary to track metrics of success and improvement for the different programs and committees. This includes:

- Determine what information outside the immediate diagnostics reporting (e.g. training, certification, diagnostics lab proficiency testing, etc.) needs to be collected and how it should be available for those who need to know.
- Provide ongoing assessment of the metrics used for annual reporting based on information requested by stakeholders (USDA).
- Evaluate what metrics need to be added, modified, or removed.
- Identify tools to pull improvement information more efficiently.

General Implementation Plan

To operationalize the NPDN Strategic Plan, implementation teams will translate the goals outlined above into actionable objectives within the framework of the assumptions made for that area of the plan. A milestone table will be created to coordinate activities and measure progress towards full implementation. Establishing the programs and standards outlined above will require time. To prevent disruptions to Network operations and ensure uninterrupted diagnostics services to clientele and partners, full implementation will likely take place incrementally over a period of a few years, consistent with the magnitude of change required for full implementation. Implementation plans with design and delivery specifications for each program will be reviewed

by a coordination working group to ensure compatibility, complementarity, and inter-operability where possible.

The Professional Development Program will provide the knowledge foundation upon which to build both the laboratory accreditation and diagnostician proficiency systems. Consequently, creation of the Professional Development System will begin immediately. It is envisioned that this system will be designed and built on the concept of constant improvement to keep pace with the changing landscapes of diagnostics and communications technologies and pathogen and pest challenges to plant health.

NPDN leadership reaffirmed its commitment to raise the profile of all NPDN labs within their respective states and host institutions. This will be accomplished through a variety of actions including, site visits to all NPDN labs by Regional Center leadership (i.e., Directors and Associate Directors). The objectives of such visits will be to strengthen relationships between Regional Centers and member states and to recognize state contributions to the national network.

Implementation may require fine-tuning or modification of the objectives and/or standards in order to achieve the intended goals. The focus will remain on realizing the vision set forth in this Strategic Plan and stated in the NPDN mission.

APPENDIX A

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RECOMMENDATIONS FROM STRATEGIC PLANNING WORKING GROUPS

Laboratory Structure Working Group

Laboratory Structure Value to the NPDN: Formal definitions of what constitutes an NPDN laboratory and basic capabilities of lab types will facilitate fair, standardized, and transparent funding distribution network-wide, clear communications of responsibilities and privileges of NPDN membership, and focus on improvement of diagnostics throughout the network.

NPDN Laboratory Structure Goals:

1. Establish a framework for membership within which all NPDN diagnostic labs are included.
2. Establish meaningful and achievable standards for each of the NPDN lab categories
3. Define metrics and policies to guide implementation of the structure framework
4. Develop plan for transition of working group to implementation team

Assumptions for the NPDN Laboratory Structure:

1. There will be an NPDN laboratory in every state and territory.
2. NPDN laboratories are defined as plant diagnostic labs whose NPDN members actively participate in NPDN functionality (committee membership, professional development, upload data to the NPDN National Data Repository, etc.) and abide by NPDN policies and procedures.
3. The NPDN, as a premier diagnostics system, must ensure that all NPDN diagnostic labs maintain certain standards for laboratory operations and management.
4. Analysis of the NPDN structure and responsibilities has been completed and will continue to avoid unnecessary redundancy while maintaining and improving national diagnostics capability.
5. Individual laboratories have varying levels of institutional support and responsibility, therefore, the NPDN lab system must:
 - a. be designed around the newly designated NPDN laboratory types.
 - b. be funded in a manner commensurate with capability, sample capacity, and contribution to the network

Professional Development Working Group

The professional development working group was charged with developing a program of training opportunities and metrics that will benefit our membership with a broad range of topics on plant diagnostics, management, IT resources, and network information with the goal of constant improvement and an increased knowledge base. The working group will structure a curriculum, search and catalog existing materials, review new materials, and identify new topics that could be added to the knowledge and skill base of the NPDN membership.

Assumptions/Charge for NPDN Professional Development:

1. For NPDN to be a premier diagnostics system, it must ensure that all NPDN diagnostic labs maintain a predetermined set of standards for laboratory operations and management that considers variation across types of NPDN diagnostic labs.
2. NPDN must identify the education and training resources necessary to support diagnostician professional development, proficiency, and laboratory accreditation.
3. A position will be created to manage the professional development component of the NPDN program.
4. The Professional Development Working Group (PDWG) will propose policy for the various components of the Professional Development Program (PDP) to the NPDN leadership and an eventual charged group composed of network members.
5. There is a need for orientation or one-time trainings that need to be completed in a very timely manner AND for ongoing professional development that will allow an individual to choose topics based on need/interest and the scope of their laboratory.
6. The PDWG (and later the charged group) will identify and classify trainings that exist within the NPDN network, that are available from other entities and that are not available and need to be created.
 - a. The NPDN members and colleagues have developed professional development workshops and trainings and these will be evaluated and incorporated where appropriate in the NPDN Professional Development System.
 - b. There are trainings and workshops produced by other entities such as universities, industry, regulatory agencies, supply companies and equipment manufacturers; and these trainings will be evaluated and incorporated where appropriate in the NPDN Professional Development System.
 - c. Trainings that are needed and do not exist, will to be prioritized so that available funding can be focused on the most important training needs.
 - d. Education level, years of experience and/or work place trainings will be considered for satisfying requirements and an equivalency system will be established as part of the NPDN Professional Development system.
7. The PDWG will communicate with the strategic planning subcommittees and the NPDN leadership and diagnosticians to ensure work plans meet the needs of all areas of strategic planning.
8. The PDWG will to work with IT to determine if a 3rd party or packaged software or a created program will be the best option for tracking of professional development completed trainings.

9. The PDP system will include measurement of change components to aid in the process of tracking improvement and acquired knowledge of new technologies and techniques, new equipment and new pathogens.

NPDN Professional Development Strategic Planning Goals:

1. Develop a listing of needed Professional Development IT modules requested by the IT Strategic Planning Subcommittee.
2. Define professional development terms.
3. Propose NPDN Professional Development Program (PDP) policies and procedures for the overall system and for the individual member. For NPDN members, requirements will include type of topics required, (do this as a PDP categories of a, b, c, and d based on job responsibilities/tasks), at each type of laboratory that considers variation among labs and the timeline requirements for completing trainings.
4. Propose that the system considers an individual's level of education or prior job experience may allow for some to skip the training and go straight to test for all electronic trainings.
5. Develop a curriculum of trainings and workshops using various delivery methods (PPT, video, face to face, etc.) to provide the NPDN members with professional development options that keep learning interesting and accessible.
6. Develop *curricula* for the following areas:
 - a. DIAGNOSTICS may include the following topics: NPDN National Repository, use of the NPDN National Repository data, diagnostic techniques, common plant pests and pathogens, high consequence pests and pathogens, proficiency and laboratory quality management and accreditation.
 - b. NEW DIAGNOSTICIAN OR KEY STAFF MEMBER may include the following topics: the areas of the NPDN mission including structure and the NPDN National Repository, diagnostic techniques, common plant pests and pathogens, high consequence pests and pathogens, proficiency and laboratory quality management and accreditation.
 - c. LABORATORY ACCREDITATION may include various quality management topics and network specific laboratory accreditation subjects.
 - d. PROFICENCY curriculum may include trainings to prepare for an evaluation and the evaluation tools to determine if an individual has succeeded in becoming proficient in a specified area or on a specified technique.
 - e. IT curriculum may include trainings to prepare members for use of various software programs, to provide an understanding of software security methods, to introduce and provide demonstration of use and tools within the various LIMS systems and other IT related topics.
7. Identify and classify trainings as one of the following. The needed components will be prioritized so that available funding can be focused on the most important training needs.
 - a. Exists within the NPDN network.
 - b. Is available from other entities.
 - c. Needs to be created.
8. Develop an evaluation tool to show learning progression, improvements, increased knowledge base and increased technical ability for use in reporting accomplishments.

9. Develop a method for equivalent trainings that allows for submitting external Continuing Education Units into the Professional Development system.
10. Provide for a means to share critical information on Professional Development offerings and requirements with rapid distribution to those who need to know.

Diagnostician Proficiency Working Group

Why have a proficiency testing program?

Provides important information and feedback on lab performance and adds value to the Laboratory and the NPDN

Value to the specific lab and the NPDN

1. Regular proficiency testing adds to the overall credibility of the lab and the tests that it performs along with any complementary accreditation.
2. Can provide the basis for professional development and education related to diagnostics methods
3. Identify any issues with testing or testing methods
4. Platform to compare methods and approaches across the network
5. Enhances the confidence of the diagnosticians
6. Strengthens the network and provides further support for value of data submitted to the National Repository.

Assumptions/Charge for NPDN Laboratory Proficiency Testing Program:

1. For NPDN to be a premier diagnostics system, it must ensure that all NPDN diagnostic labs use the best and most appropriate methods for diagnostics and that the diagnosticians are skilled in using these techniques
2. The budget for the proficiency testing system must include costs of a proficiency coordinator(s) and needed supplies (sustainability).
3. Must be fully compatible and synchronized with the NPDN Professional Development and Accreditation Systems. Utilize common terminology; there must be professional development modules to help diagnosticians prepare for and successfully demonstrate proficiency for their laboratory designation.
4. Must be consistent with and not redundant to the NPDN Laboratory Accreditation System. The NPDN Proficiency testing system, Professional Development System, and the NPDN Laboratory Accreditation System should be complementary by design.
5. Consider a variety of delivery vehicles that will be accessible by all NPDN labs; e.g., web-based delivery and testing components, on-line workshops, etc.
6. Notes: discussion with APHIS needed for development of system if sending specimens (digital version and DNA would not require this).

NPDN Laboratory Proficiency Testing Program Goals:

1. Establish a framework for proficiency testing within which all NPDN diagnostic labs are included.
2. Establish meaningful and achievable proficiency standards for each of the NPDN lab categories.
3. Establish specific definitions and terminology for Proficiency program terms; these must be synchronized with professional development.

Laboratory Accreditation Working Group

Laboratory Accreditation Goals:

1. Establish a framework for accreditation within which all NPDN diagnostic labs are included consistent with their tiered lab structure designation.
2. Establish meaningful and achievable accreditation standards for each of the NPDN lab categories.
3. Establish specific definitions for accreditation terms that will be integrated with the Proficiency System and the Professional Development System.

Assumptions/Charge:

1. For NPDN to be a premier diagnostics system, it must ensure that all NPDN diagnostic labs attain and maintain certain standards for laboratory operations and management. It is reasonable to expect that NPDN labs are managed in a professional manner, that NPDN diagnosticians are proficient in the technologies and protocols used in their lab, and that all NPDN personnel actively participate in professional development programs that promote constant improvement.
2. NPDN Laboratory accreditation standards are not to be onerous or unattainable.
3. The NPDN lab accreditation system must be:
 - a. Designed around the newly designated NPDN tiered laboratory structure.
 - b. Fully compatible and synchronized with the NPDN Professional Development System; there will be professional development modules to help diagnosticians prepare for and successfully attain accreditation for their laboratory designation. Specialty labs may not require accreditation.
 - c. Compatible with and not redundant to the NPDN Proficiency Testing System. The NPDN Laboratory Accreditation System, Professional Development System, and the NPDN Proficiency Testing System should be complementary by design.
4. Consider a variety of delivery vehicles that will be accessible by all NPDN labs; e.g., web-based delivery and testing components, on-line workshops, etc.

Information Technologies Working Group

It takes a mix of personnel with various IT skills to maintain, operate, and enhance the NPDN IT network. Hence, the IT infrastructure and expertise required to support NPDN, is provided by multiple providers. The Center for Environmental and Regulatory Information Systems (CERIS) in Purdue University houses the National Data Repository (NDR), the NPDN Web Portal, and serves as the leader and coordinator of NPDN IT providers. Other IT providers are the Laboratory Information Management Systems (LIMS), like PDIS, DDDI, PClinic, and LIMS developed internally by NPDN member universities. Local university networks and computers that serve NPDN diagnostic lab are also considered part of the NPDN IT network, as those support diagnostics work and house diagnostics data.

In moving forward with strategic planning for the NPDN IT network, what is required is not the capability to predict all new technologies and innovations that will be used for the network. Instead, we need to be in a position to respond to the diagnosticians' needs implementing new technologies and innovation. The aim of NPDN IT systems is to allow the diagnosticians to easily access critical information while maintaining confidentiality of sensitive information; and access tools that are efficient so that they are able to give their primary focus to diagnostics.

IT Mission Statement

The central mission of NPDN IT network is to provide, maintain, and implement infrastructure and tools that ensure the efficient functioning of the NPDN, which includes the NDR, LIMS, web portals, and other tools.

Vision

IT systems will provide efficient tools that ensure diagnosticians are able to give their primary focus to diagnostics.

IT needs to consider ways to strategically align IT resources to support the implementation of the general strategic plan. Priorities need to be determined, so that actual work plans and IT efforts are focused on the most important needs of the NPDN.

Goals/Charges for the IT Systems:

1. It is imperative that NPDN IT providers ensure the security, availability and reliability of contributing systems and core infrastructure. Security is more than preventing the hackers from getting in.
2. The stability of the supporting systems is the responsibility of each provider, but it is all part of the whole NPDN IT systems. All systems must meet baseline guidelines for operating through NPDN.
3. All IT providers in the network must maintain documentation for Critical Processes/Procedures/Plans. Particularly important is the IT Disaster Recovery Plan.

4. The existing IT infrastructure has some very good components. However, the components and their importance need to be assessed regularly to determine both short-term and long-term direction (see IT components below).
5. Funding levels will have volatility in the future. Hence, IT efforts need to be sustainable, maintainable and adaptable.
 - a. Sustainable means they can continue to operate with minimal infrastructure.
 - b. Maintainable means they can support the core functions with minimal staffing.
 - c. Adaptable means that they have designed the system to easily incorporate enhancements with limited resources.
6. IT needs to provide a base IT infrastructure that can operate with reduced funding, changes and/or losses of personnel and technology changes.
7. Priorities need to be determined, so that actual work plans and IT efforts are focused on the most important needs.
8. Effective communication among diagnosticians, subject matter experts, and the IT staff is critical for successful implementation and maintenance of tools. IT relies on regional hub labs for consistent communication.
9. IT providers need to continue exploring new technologies as they enter the marketplace to see if they can bring value to the NPDN Network. The NPDN will consider 3rd party or packaged software when needed. In some instances, 3rd party options may replace a legacy component or introduce a new component to the IT network.
10. NPDN IT network must ensure that 3rd party packaged software is well integrated into the IT network.

Secured Communications:

Data confidentiality is critical to our regulatory partners. IT needs to provide means to share critical and sensitive information rapidly and in a secured manner to subsets of the network ‘who need to know’.

Support for the NDR:

The NDR is central to the NPDN operation and communication of diagnostics data. In supporting the NDR IT has the following goals:

1. Data entry is still not fully realized due to technological challenges. To have a repository we need data. IT must support multiple methods of data entry to the NDR to encourage as much participation as possible. These currently include the LIMS systems and a direct data upload to the NDR.
2. Tools for data entry and upload should be streamlined and well integrated, so they are easy to use and do not create an additional undue burden to diagnosticians.
3. Optimize the portability of data to minimize multiple data entry. Data should be integrated and standardized so that real-time, dynamically processed information is available.

4. Collaborate with subject matter experts to ensure that diagnostics data entered to the NDR meets standards of quality. This includes the preparation of data upload guidelines, the Database Committee, and the Diagnostics Committee.
5. Make NDR data available to diagnosticians and NPDN members in a secured manner and in real-time.
6. Provide diagnosticians and NPDN members with easy to access reports, charts, graphs in real-time for analysis, metrics, impacts, planning, and justification of the network. (i.e. document the story).
7. Support access to NDR data from all common devices (e.g. tablets, cell phones, laptops, etc.)
8. Provide tools for data requests from members or external collaborators, so approved NDR data can be shared with a wide audience. This is currently being developed.

Current IT components

The following are the IT resources that were identified by the committee:

- 1. Components – IT components currently maintained.**
 - a. Core infrastructure: servers, backups, redundancy, security.
 - b. Critical Processes/Procedures/Plans (NPDN IT Disaster Recovery Plan, etc.)
 - c. LIMS (Laboratory Information Management Systems) – PDIS, DDDI, PClinic, etc.
 - d. Tools for direct excel data upload and direct data entry forms
 - e. NPDN National Repository (npdn.ceris.purdue.edu)
 - f. NPDN Portals (npdn.org)
 - g. NPDN Committee pages (Database, Diagnostics, IT, etc...)
 - h. NPDN BOLO (be-on-the-lookout) Communication System (npdn-bolo-dev.ceris.purdue.edu)
 - i. NPDN Exercises (npdn-ex-dev.ceris.purdue.edu)
 - j. NPDN 1st Detector Site (firstdetector.org)
 - k. NPDN Accreditation STAR-D (www.npdn.org/diag_lab_accreditation)
- 2. Communication – Channels IT uses to communicate with the diagnosticians as a whole.**
 - a. IT/Diagnostician meeting
 - b. Portals
 - c. Certain committees (National Database, Diagnostics, IT)
 - d. Newsletter/blogs posted on portal
 - e. Additional infrastructure to implement and facilitate a plan of effective communication between the NPDN Diagnosticians and IT staff so that there is both a consensus and understanding of the IT work to be done.

Communications Working Group

The essence of the NPDN is captured in the last word of the name, National Plant Diagnostic NETWORK. A network is based on communication and communication is at the core of the NPDN Mission. NPDN exists to communicate timely and accurate diagnostics information. The communications enterprise is complex. It must be carefully coordinated with the diagnostics and regulatory communities. Additionally, we have diverse audiences that dwell outside our distinct diagnostics community. To be effective and relevant to all critical stakeholders, we must recognize our audiences and engage them appropriately.

Value Statement:

With effective communications, we all are aware of new threats, trends, and changes in regulated organisms. Similarly, we are better able to inform the public through our various programs and our individual networks in each state. The database benefits in that we communicate a more complete history of the year. The network benefits in that we are informed. The funding agency benefits in that they can better see what the network was doing for any given time period. The public benefits in that it is more informed of what to look for. And the public has an awareness of known concerns.

Communications Working Group Goals:

The communications working group set the following goals:

1. Categorize the types and methods of communication currently available to the network.
2. Audience recognition is foundational.
 - a. We must identify audiences.
 - b. We must clarify the environment in which we interact with those audiences.
 - c. We must develop appropriate context for messaging.
3. In communicating, what does the Network want its audience to do in response to its message? What is the function of the communication with each audience.
 - a. We need to think outside the network itself.
 - b. We need a common understanding of who the network is.
 - c. We need to create a list of the universe of audiences and how they apply to categories of communications.
4. Suggest methods to achieve communication goals.

NPDN Communication Types:

1. Standard internal communications: Communicate to those in the NPDN network with the designated level of security access via appropriate methods to ensure dissemination of accurate and quality information rapidly in order to make adjustments and responses. (day-to-day communications, posting data to NDR, communications about routine samples, etc.)
2. Secure internal communications: Communicate in a shared and secured manner for exchange of sensitive and urgent information among members of the network. (BOLO, exercises, outside of the routine/day-to-day)

3. Collaborative educational networks: communicate relevant information to extension networks and partners.
4. Communications to the public: Communicate the NPDN message to the public to convey the value and mission of the network.
5. Communicate to the appropriate parties who need justification of the network, the ‘stories’ and high impact results of the network. (some of this bullet addresses the reporting topic below in notes.)

Methods of Communications:

1. Automated communications
 - a. Text Messages *
 - b. Emails - list servers
2. Closed communications - higher level of security
 - a. Websites – behind member login
 - b. BOLO secured alerts *
 - c. Exercises
 - d. Emails – private or one-on-one
 - e. Conference calls / Video conferences
 - f. Committee and working group meetings
1. Open/Public communications
 - a. Websites
 - b. Public Pest alerts *
 - c. Reports to funding agencies
 - d. Attendance/participation in society meetings
 - e. Fact-sheets
 - f. Press releases / official information releases
 - g. Brochures and trifold
 - h. Presentations and conferences
2. Social Media Communications
 - a. Social media sites: Facebook/Twitter/YouTube *
3. Diagnostics data communications
 - a. Data uploads from labs to repository
 - b. Data reports and summaries in the repository
 - c. Data feeds
 - d. Data downloads
 - e. First detection reports – email

* Communication type not implemented

NPDN Audiences:

The working group summarized audience groups based on similar communication purposes. Audience groups are listed below. Bold indicates high priority based on NPDN mission, vision and goals.

Audience Group	Specific Audience
Diagnostics Community – High priority based on NPDN goals	NPDN member diagnostic labs

	Non-member labs
	State Diagnostic labs
Regulatory Community – High priority based on NPDN goals	Federal - APHIS
	Federal - SPDHs
	National Association of State Dept of Ag
	State Plant Boards
	National Plant Board - SPROs
	State Departments of Ag - Regulatory
Funding Sources – High priority	NIFA
	Congressional Delegations
	University Administrators
Pest Surveillance Programs – Medium to high priority depending on situation	CAPS
	CISMA
	Others
Education, Outreach, and Extension Partners – Medium to high priority depending on situation	Extension Disaster Education Network
	Invasive species NGOs
	IPM Centers
	Sentinel Plant Network
	Clean Plant Network
Outreach and Extension Audiences – Low priority for direct contact. Communication through partners	Nurseries
	Grower Associations
	Botanical Gardens
	County agents
	Public/Home owners
	Chemical/Ag companies
Academic Institutions – Low priority for network. High priority for members.	Graduate Students
	University colleagues Research/Extension Faculty
Others – Low priority	National Association of Counties
	Professional Societies

Assumptions of the audience matrix:

- Audiences have been grouped by priority based on perceived priority/importance of communicating with that group.
- Groups like pest surveillance programs, or Extension and Outreach belong in a medium priority group, understanding that they might rise to the high level in certain circumstances that are directly relevant to their stakeholders.
- There are instances where messages may be varied by topic within audience group. For example, what we can share with a commercial lab may be different than what we can share with an NPDN member lab that is affiliated with a university and providing a service to a SPRO.

Communication functions:

A communication strategy must be aware of what the function of the message is, and what does the Network want its audience to do in response to its message. The table below lists the main functions of communication conducted by NPDN and assigns the main audience groups to those functions.

Communication Function or purpose	Diagnostics community	Agencies / Regulators	Pest Surveillance programs	Funding sources	Pest / Invasive Networks/NGOs
Threat detection / regulatory alert	x	x	x		
Conducting sound diagnosis	x				
Obtaining financial administrative support				x	
Maintain stakeholder relationships		x	x		x
External Outreach and Education					x
Improving internal communications	x				

We acknowledge that effective communication will require multiple means, appropriate to the various audiences. Further, methods of communication that are in current use should be best defined and bound by guidelines that will assure uniform use and understanding.

APPENDIX B

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DEFINITION OF TERMS

NPDN Member: An individual, agency, or organization that directly contributes to fulfilling the mission of the National Plant Diagnostic Network. Examples: NPDN Regions, Sea Grant and Land Grant (1862, 1890, 1994) Institutions (labs, diagnosticians, specialists), State Departments of Agriculture (labs, diagnosticians), USDA APHIS (CPHST, diagnosticians), Private company laboratories.

NPDN Partner: An individual, agency, or organization that works with the National Plant Diagnostic Network in fulfillment of the NPDN mission. Examples: Extension Disaster Education Network, Integrated Pest Management Centers, National Animal Health Laboratory Network, Scientific Societies (APS, ESA, CSSA), National Plant Board, USDA-ARS (FDWRL).

Stakeholder: An individual, agency, or organization who has a vested interest in the success of the National Plant Diagnostic Network. Examples: USDA APHIS (NIS, PPQ, permitting, CPHST, PHP, SPHD), NIFA, Sea Grant and Land Grant (1862, 1890, 1994) Institutions (Experiment Station Directors, Extension Directors, NUSALG, administrators), Law Enforcement (FBI, DHS CBP); industry (ASTA, chemical, advising/consulting).