

NPDN 2023 ANNUAL REPORT

OVERVIEW

NPDN is a consortium of plant diagnostic laboratories established in 2002 to enhance agricultural biosecurity by detecting and more effectively communicating instances of biological attacks. NPDN mission is to support plant health and biosecurity in U.S. agricultural and natural ecosystems by providing expert diagnostic capacity, communication, coordination, and quality pest and disease diagnostic information.

A NETWORK OF DISTRIBUTED DIAGNOSTIC CAPACITY

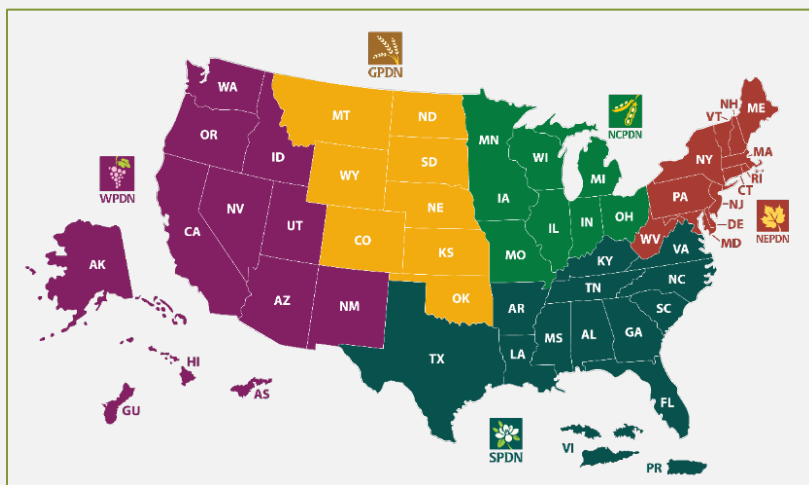
NPDN has **276** members representing **125** laboratories and agencies in land grant university diagnostic labs, federal agencies, state departments of agriculture, and other stakeholders.

NPDN has partnered with labs in all **50** states and **4** U.S. territories.

327 Full Time Equivalents of staff, including other non-diagnostician roles such as student employees, technical, and other part-time staff were involved in NPDN funded diagnostic labs. This included **201** plant diagnostic professionals.

To effectively coordinate the work of institutions and members across the U.S., the NPDN is divided in five regions, each organized by a Regional Center as follows:

- ❖ Northeast Plant Diagnostic Network (NEPDN), University of Maine.
- ❖ Southern Plant Diagnostic Network (SPDN), University of Florida
- ❖ North Central Plant Diagnostic Network (NCPDN), Michigan State University
- ❖ Great Plains Diagnostic Network (GPDN), Kansas State University and
- ❖ Western Plant Diagnostic Network (WPDN), University of California, Davis



Each Regional Center has been selected in a competitive grant process and is in charge of coordinating the communication and support of laboratories for all states in their region. Regional Centers also work together to coordinate and implement all network programs and initiatives at the national level.



NPDN 2023 ACCOMPLISHMENTS

This report lists the accomplishments of **75** labs from **53** states and territories that answered the 2023 NPDN Lab Capacity and Impact Evaluation. This included all **68** NPDN-funded labs plus **7** other non-funded NPDN partner labs.

ACCOMPLISHMENTS IN QUALITY DIAGNOSTIC:

NPDN aims to provide high quality diagnostics to support plant health communities through constant improvement and quality assurance.

DIAGNOSTIC CAPACITY

NPDN's extensive network of labs processed **383,000** samples in 2023.

NPDN labs reported diagnosis from **78%** of the U.S. counties.

Labs reported **197** first detections. These are organisms found for the first time in the U.S. or in a state of the U.S. NPDN labs are trained to report first occurrences to state regulatory partners, which may use this information to take action to prevent spread.

NATIONAL DATA REPOSITORY

The NDR is a database that collects diagnostic data from NPDN diagnostic laboratories throughout the USA and its territories. It provides the plant diagnostic community with regional and national information on whether a pest or pathogen is new, emerging, re-emerging, or increasing in any given area.

224,000 diagnoses were submitted to the NPDN National Data Repository (NDR) in 2023.

LABORATORY QUALITY ACCREDITATION

The NPDN Accreditation program aims to ensure that all NPDN labs will meet the same quality standards that enhance professionalism and strengthen our state of readiness in performing timely and accurate detections.

3 NPDN labs have current StarD accreditation. StarD accreditation is being phased out. A new Core Standard Laboratory Accreditation is currently being implemented to provide a sustainable laboratory accreditation program that all NPDN labs can attain.

55 NPDN members started or completed the on-line "Accreditation Orientation Course One - An Introduction to Quality Management" as a first step to complete Core Standard.



DIAGNOSTIC PROFICIENCY

The NPDN Essential Proficiency Program aims to establish a standard for measuring fundamental diagnostic knowledge among NPDN diagnosticians and to ensure the quality of data uploaded to the NDR.

NPDN labs also participate in APHIS-PPQ proficiency certification programs.

17 NPDN labs have current certifications by USDA-APHIS National Plant Protection Laboratory Accreditation Program (NPPLAP).

A new Plant Pathogen Diagnostic Certification Program (PPDCP) will replace NPPLAP in 2024. PPQ is working in close collaboration with NPDN labs to implement the new program.

DIAGNOSTIC CAPABILITY

NPDN labs are mostly plant pathology labs, but they also provide diagnostic services in other fields of plant health.

	Pathology	Entomology	Nematology	Weed/plant ID
Number of NPDN lab providers	69	59	44	50

NPDN plant pathology labs are equipped to conduct diagnostics using traditional techniques including visual diagnostics, incubation, isolation and microscopy. In addition, labs have the capability for molecular diagnostic techniques and other specialized tests listed below.

Diagnostic Method Category	Number of NPDN lab providers
Conventional PCR	59
Real-time PCR	45
ELISA	52
Basic DNA sequencing	40
Next-generation sequencing	6
Isothermal amplification	32
Resistance tests (fungicide, insecticide, herbicide)	38
Bioassay	41

DIAGNOSTIC SUPPORT FOR REGULATORY PARTNERS

The National Plant Diagnostic Network (NPDN) serves regulatory partners with a distributed ability to process samples during agricultural emergencies.



Number of NPDN labs with surge support capability for organisms of concern

Regulated organism	Full capability	Some capability
P. ramorum ELISA	22	21
PPV ELISA	18	18
HLB qPCR	12	11
Pospiviroids	8	9
ToBRFV	18	23
Other APHIS-listed	14	9
Other (State listed)	15	10

ACCOMPLISHMENTS IN PROFESSIONAL DEVELOPMENT

NPDN aims to provide training opportunities and experiential learning that accelerate the learning curve and enhance diagnostic capabilities of current and future diagnosticians.

PLANT DIAGNOSTIC WORKSHOPS

NPDN continued partnering with USDA-APHIS Plant Pathogen Confirmatory Diagnostics lab (PPCDL) to provide in-person and virtual advanced diagnostics training workshops.

NPDN offered **10** PPCDL advanced diagnostic workshops were offered, **94** NPDN members participated in one or more workshops.

NPDN funds also help diagnosticians attend other professional development activities such professional conferences and workshops in various specialized topics. NPDN members attended on average **8** other non-NPDN professional development activities and events per lab.

ON-DEMAND VIRTUAL LEARNING SYSTEM

During 2023 NPDN continued developing our new on-line virtual learning system in NPDN LearnUpon.

42 virtual trainings/webinars in diagnostics are currently available to NPDN members

283 NPDN members were active users of the Learning system (meaning that they registered in at least one offering).

8 new NPDN webinars were recorded with total attendance of **121** participants

LEADERSHIP AND CAREER OPPORTUNITIES

8 NPDN committees and additional working groups provide NPDN members with the opportunity to provide leadership and steer all NPDN Programs that support the diagnostic community.



28 new career opportunities in diagnostics were advertised in the NPDN website and NPDN Communicator

TRAINING AND INTERNSHIP OPPORTUNITIES FOR STUDENTS

106 NPDN labs are in Land grant universities affording students access to work-study diagnostic opportunities.

In 2023 NPDN opened new membership opportunities for students.

ACCOMPLISHMENTS IN COMMUNICATION

NPDN aims to ensure effective and timely communications and productive collaborations with regulatory partners, diagnostic labs, and the plant health communities; as well as curate and communicate quality diagnostic information that benefits plant health.

Each Regional Center conducted at least one in-person meeting during 2023. In person meetings provide networking, communication and professional development opportunities for NPDN diagnosticians.

NPDN WEBSITE

The NPDN website provides information about NPDN and our programs, it also contains resources useful to diagnosticians in our network.

53,000 times that visitors engaged (clicks) with NPDN website.

268,000 times that NPDN Website was visited.

THE NPDN COMMUNICATOR NEWSLETTER

The NPDN Communicator is a monthly publication to share information valuable to the plant diagnostic community.

12 issues of the NPDN Communicator published in 2023.

1038 subscribers that include NPDN members and non-NPDN stakeholders interested in diagnostics receive the NPDN Communicator.

49 articles published in the communicator including committee and program communications, network news, articles about work conducted by NPDN members, announcements from regulatory partners, and various articles on diagnostics.



REGULATORY COMMUNICATION AND SUPPORT:

The NPDN strives to support and foster strong relationships with our regulatory partners in protecting plant health. NPDN members are trained in communication protocols with regulatory partners and for pests of concern.

15 state department of agriculture labs are members of NPDN.

5 Regional and National Plant Board meetings attended by NPDN representatives.

67 NPDN members are diagnosticians from SDA labs.

In states where the state department of agriculture does not have plant diagnostic labs, samples are usually referred to the NPDN university plant clinics.

NPDN labs in most states regularly support their state department of agriculture by screening samples or participating in different projects or programs.

NPDN LABS WORKED TO ADVANCE THE SCIENCE OF DIAGNOSTICS

NPDN diagnosticians are active in communication in the field of diagnostics for scientific and academic audiences.

143 refereed (peer-reviewed) publications related to diagnostic work produced by NPDN diagnosticians.

126 presentations in scientific conferences and meetings and **140** courses taught.

NPDN LABS OUTREACH TO PLANT HEALTH COMMUNITIES

NPDN diagnosticians are active in Outreach & Extension (O&E) communication with non-academic plant health communities in their state.

504 outreach publications such as webpages, extension materials, extension articles, and fact sheets produced by NPDN members.

1,260 Outreach & Extension presentations, and **150** radio or video appearances.

1.6 million people reached in various audiences.

FISCAL EFFICIENCY AND NETWORK OPERATIONS

Since the Implementation of the 2019 NPDN Strategic Plan, the regions coordinate their work such that all the programmatic work for NPDN is done in a centralized way at the national level, and different regions take the leadership role in advancing different goals. This system has helped reduce redundancy and increase budget efficiency.

NPDN regions work cooperatively to develop and advance NPDN programs in order to reduce duplicative efforts. The organization has one full-time position (Secretary and National



Coordinator) and two part-time positions (Accreditation Program Manager, and Professional Development Coordinator).

NPDN member labs make extensive use of the networked nature of the program to achieve efficiency in diagnostic determinations and maximize existing expertise.

NPDN programs work with member-lead committees that steer the operation and implementation of the program activities. This bottom-up approach ensures that NPDN programs serve the needs of the diagnostic community.

NPDN CENTRALIZED PLANNING MODEL (CPM)

To more efficiently manage operating costs, NPDN uses a centralized planning model (CPM) for resource allocation. The CPM allows NPDN to direct limited funds to programs of importance to the network mission and goals.

NPDN CPM allocated financial support to one lab per state. This financial support ensures lab participation, and provides stability to University labs that frequently face more uncertainty in their year-to-year funding.

The CPM does not result in additional cost savings, but allows NPDN to better prioritize its functions under its current funding.

Methods

This report is based on answers to the 2023 NPDN Annual Lab Capacity and Impact Evaluation, and other data housed in the NPDN National Data Repository.

76 labs from **53** states and territories answered the 2023 Evaluation but only **75** completed all the answers. Respondents represented labs from Land Grant Universities (91%) and State Departments of Ag (9%).

All NPDN-funded labs are required to answer the Evaluation (**68** answers), non-NPDN funded partner labs are encouraged but not required (**7** answers, less than 10%).

40 responses represented the only NPDN lab in the state. The other **36** responses represented 13 other states (in SPDN and WPDN) with more than one NPDN lab.

Year to year variation in the statistics shown in this report are partly due to differences in the number of labs responding to the survey.