

**2008 Innovations Awards Program
APPLICATION**

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ID # (assigned by CSG): 08-E-24PA

Please provide the following information, adding space as necessary:

State: Pennsylvania

Assign Program Category (applicant): Environmental Protection (Use list at end of application)

1. Program Name: **COMMONWEALTH OF PA ENTERPRISE WATER INITIATIVES LEVERAGED ON FEDERAL TECHNOLOGY PROJECTS**

2. Administering Agency **PA DEPARTMENT OF ENVIRONMENTAL PROTECTION (PA DEP)**

3. Contact Person (Name and Title) **NANCIE L. IMLER**

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9. Please provide a two-sentence description of the program. **PA has initiated and developed an enterprise integration of water and land attributes for the Commonwealth of PA based on the National Hydrography Dataset and other Federal technology projects. This foundation serves as the technology support for the Water Program's business processes.**

10. How long has this program been operational (month and year)? Note: the program must be between 9 months and 5 years old on March 1, 2008 to be considered. **January 2, 2007**

11. Why was the program created? What problem[s] or issue[s] was it designed to address? **The United States Environmental Protection Agency's (U. S. EPA) enforces federal clean water and safe drinking water laws, provides support for municipal wastewater treatment plants, and takes part in pollution prevention efforts aimed at protecting watersheds and sources of drinking water. U.S. EPA carries out both regulatory and voluntary programs through its delegation to States and Tribes to fulfill its mission to protect the nation's waters. Throughout the years, various aspects of these Programs and related partners (Chesapeake Bay Program,**

Coastal Zone States, River Basin Commissions, Federal and State Agricultural Programs, Natural Resource Conservation Service, state district and private conservation programs, and nutrient trading initiatives) have collected and produced data. This “silo” collection and storage has been without regard of an overall standardized department view of the health of the environment. PA DEP has leveraged both federal and state technology projects to provide a foundation of comprehensive, integrated, and standardized data with tools and spatial displays for all water and land-related events within the Commonwealth.

12. Describe the specific activities and operations of the program in chronological order.

- a. **PA DEP leveraged the joint partnership of the U. S. EPA and United States Geological Survey (USGS) which developed the National Hydrography Dataset (NHD) for the nation. PA’s adoption of the new water surface network identifies unique water reaches for the entire Commonwealth much like the U. S. Department of Transportation’s initiative to use standardized mile markers on Federal highways. With the use of Hydrologic Unit Codes (HUCs) and NHD, it is possible for land and water attributes to be placed on a map – perfect for reviewing water quality data and making environmental decisions.**
- b. **PA DEP conflated all its water attributes stored in enterprise software systems to NHD addresses by Geo-referencing both the physical and snap points.**
- c. **PA DEP’s Bureau of Information Technology (BIT) developed a suite of tools to Geo-reference new water data collected by Department staff such as the NHD Locator and the Instream Comprehensive Evaluation (ICE). These tools can be called from enterprise systems when water related information has mandatory location data entered.**
- d. **PA DEP Water Program and BIT staff identified and prioritized environmental water attributes not maintained in enterprise systems that stored permitting and compliance data. These data stores were moved from desktop tools to a set of data tables known as the Streams and Lakes Integrated Management System (SLIMS). This ensured all employees in the Department have access and that mission critical environmental data such as integrated stream assessments, fish and macroinvertebrate assessments, total maximum daily loads (TMDLs), and PA’s Chapter 93 existing and designated uses data were protected by Disaster Recovery Plans.**
- e. **BIT developed the Water Attribute Viewer for the Enterprise (WAVE) for department staff to have one tool to view all water data on a map, drill down to the actual database records without querying the resident enterprise systems, and download the WAVE data as a flat or XML file, a spreadsheet, or a PDF image.**
- f. **BIT consolidated GIS layers considered critical information to serve with water attributes – such as the soils layer – allowing WAVE to serve as a one-stop tool for any employee to access what the Department knows about a basin, watershed, or water reach.**

- g. **PA DEP analyzed, prioritized, and recommended solutions for the Department’s data gaps – such as business processes with paper sources of data including Non Point Source Best Management Practices (NPS BMP), NPDES permitting parameters, parameter limits and the resulting Discharge Monitoring Report parameters and limits.**
- h. **PA DEP leveraged the U. S. EPA’s National Environmental Information Exchange Network (NEIEN) to send facility, drinking water, water quality assessment, TRI, and other environmental information to Federal, State, and Local partners via web services (XML) with data mapped from the integrated enterprise architecture.**
- i. **PA DEP integrated the Department “analyzers” (data cubes for trends and analysis) such as Toxic Release Inventory (TRI), water samples, radon, citizen complaints, and mining analytes with WAVE.**
- j. **PADEP recognized that each Local government unit is a data steward – the state does not need to “build” the mother of all systems but leverage and integrate with its partners.**

13. Why is the program a new and creative approach or method? **PA DEP is the water “steward” on behalf of the Commonwealth and this integration project brings credibility to the public vision that the state is looking at its data for making environmental decisions and protecting its Citizens.**

14. What were the program’s start-up costs? (Provide details about specific purchases for this program, staffing needs and other financial expenditures, as well as existing materials, technology and staff already in place.) **Approximately 2.7 million dollars was expended over a three-year period to get the project on its feet. PA contracted with USGS to prioritize and complete 13 HUCs that were not converted to NHD so that every water attribute could be Geo-referenced. Other major costs included contractor support to design tables, write software, and develop tools. PA DEP also sought U. S. EPA’s assistance on Oracle Spatial and ESRI interfaces for a solid spatial foundation. Additional capacity was required for Terabytes of GIS storage. Enterprise software had to be modified to enforce the NHD requirements for water attributes.**

15. What are the program’s annual operational costs? **The annual operational costs have been absorbed into the enterprise IT budget. The budget items cannot be separated from enterprise license renewals. State staff and limited contractor support is required as various data sets not in the initial scope are brought into the enterprise. The IT budget carries \$500,000 for maintenance of its existing infrastructure and small enhancements; otherwise, major initiatives are supported by the environmental programs’ budgets.**

16. How is the program funded? **PA DEP’S IT budget comes from state general operating funds.**

17. Did this program require the passage of legislation, executive order or regulations? If YES, please indicate the citation number. **NO.**

18. What equipment, technology and software are used to operate and administer this program? **PA DEP has leveraged various technologies from its Federal and State partners. NHD is a**

national initiative and can be used by any state/tribe. The tools and software code support U. S. EPA reporting requirements and some state-unique requirements. The integration project crosses various platforms such as Oracle, Microsoft SQL, and ESRI and exists in a virtualized environment. The standard for Personal Computers within the Commonwealth is Dell.

19. To the best of your knowledge, did this program originate in your state? If YES, please indicate the innovator's name, present address, telephone number and e-mail address. **The information and technologies used in the project are available to all states. The importance of the PA's Water Integration Project is that the Department adopted NHD as its baseline without exception so that all environmental programs can access, understand, and share the enterprise data. The IT staff at PA DEP, along with water employees serving as End User Representatives, defined the project, studied AS IS and TO BE business process analysis, gathered technical requirements, developed, tested and implemented the integration project. The CIO is the same as the POC above.**

20. Are you aware of similar programs in other states? If YES, which ones and how does this program differ? **Various uses of NHD are being incorporated by States and Federal Government. Mostly, it serves as a data layer that is used in combination with other data layers. The importance of this project is that actual data attributes are Geo-referenced to the NHD (like stitches on a quilt) and these attributes can be viewed spatially.**

21. Has the program been fully implemented? If NO, what actions remain to be taken? **Currently the Department is implementing the NPS BMP repository (land practices that affect water quality).**

22. Briefly evaluate (pro and con) the program's effectiveness in addressing the defined problem[s] or issue[s]. Provide tangible examples.

Overall, the Pros include:

- a. PA establishment of a single source for water information.**
- b. PA establishment of a unified, recognized repository with input tool for water assessments, TMDLs, Existing and Designated Use.**
- c. PA's ability to provide mapped information allowing users to more easily look for potential cause and effect relationships, or to identify areas of concern based on activities and incidents.**
- d. The nutrient trading program will have a foundation for exchanging point source and non point source information when trading in a watershed.**
- e. The agency has one source to draw down information for science models or other informational needs. This is critical because in the past, the answer depended on who you asked and what private data store was used – causing conflict in responses to the public or decision making.**
- f. Mobile platform technology is emerging for the department based on the foundation – preloading of environmental and administrative data onto devices**

for use in the field, and the data exchange back to the enterprise systems without personnel time required for keying the data.

- g. Where possible, all data reporting is targeted for exchange via the Commonwealth's NEIEN node using web services. Outside of the U. S. EPA, data exchanges occur between state agencies such as the PA Department of Transportation passing permit application information for road construction; and water and air data forwarded to the PA Health Department for eventual use at CDC.
- h. Citizen Volunteer Data can be Geo-referenced in the enterprise while still allowing it to be identified as volunteer data collections.
- i. The time required to report the bi-annual Integrated Assessment Report to the U. S. EPA went from 6 months to 6 weeks. The new tools allowed all regions to input their data into the same tables following standards, reducing the need to manipulate varied regional input into a consolidated Commonwealth report.

Overall, the Cons include:

- a. The Department is still working to upgrade modeling tools to use NHD vice River Mile Index and other locators.
- b. Users' reluctance to change to new ways of doing business processes, although this reluctance has measurably decreased.
- c. Additional data needs are being identified and must be addressed through the development of new data layers or the consolidation of existing data layers.
- d. Much of the historic data that might have been able to provide a baseline is without locational information.

23. How has the program grown and/or changed since its inception? **The biggest measure of success and growth for the integrated project is the number of employees coming forward with private data stores to be placed in the enterprise. Also, employees want to use mobile platforms and take advantage of web services for mandated reporting and, in order to do that, the information must be generated by good business processes and stored in the enterprise.**

24. What limitations or obstacles might other states expect to encounter if they attempt to adopt this program? **Culture issues as employees desire to maintain their own data for tasks. It takes Agency commitment to require standards.**