

Final Report: FY Ending June 30, 2002

**Pennsylvania Spatial Data Access (PASDA)
The Geospatial Data Clearinghouse for the Commonwealth of Pennsylvania**

Submitted to:

Pennsylvania Department of Environmental Protection

Harrisburg, PA 17105

Submitted by:

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August 2003

A. Introduction

The Pennsylvania Spatial Data Access system (PASDA—<http://www.pasda.psu.edu>) is Pennsylvania's official geospatial information clearinghouse and the Commonwealth's node on the National Spatial Data Infrastructure (NSDI). The PASDA clearinghouse provides for the widespread sharing of geospatial data, eliminates the creation of redundant data sets, and serves as a resource for locating data throughout the Commonwealth through its data storage, interactive mapping/webgis applications, and metadata/documentation efforts.

PASDA also serves as a primary member of the Geography Network (www.geographynetwork.com) and serves as a node of the National Biological Information Infrastructure (NBII) for fisheries and aquatic resources (far.nbii.gov).

PASDA was developed as a service to the citizens, governments, and businesses of the Commonwealth. PASDA is a collaborative program of the Pennsylvania State University and the Pennsylvania Department of Environmental Protection. Funding is provided by the Pennsylvania Department of Environmental Protection.

B. PASDA Services

PASDA data and services are provided free of charge to all users. The services available from the PASDA team include:

- **Support to PADEP**

PASDA staff have provided extensive assistance to groups and individuals within the PA DEP. This assistance includes the following:

- **Management and Technical Services.** PASDA has worked with management and technical services to provide support for:
 - GIS Town Meetings initiative throughout 1999/2000
 - SPOT Imagery access, data storage, management
 - Tutorials supporting the GIS software grant program
- **Growing Greener Program.** PASDA staff have worked extensively with GG grantees and the DEP grants center to support GIS related grants, provide data, and provide technical expertise when necessary. These grantees include the Natural Lands Trust, Pennsylvania Environmental Council, Heritage Conservancy, Clearwater Conservancy, Mifflin County, Slippery Rock Watershed Coalition/Stream Restoration Inc., Hollow Oak Land Trust, Pennsylvania Organization for Watersheds and Rivers, and others.
- **Bureau of Watershed Management.** PASDA works with the bureau of watershed management to provide documentation and storage of and access to data from the bureau.
- **Bureau of Abandoned Mine Reclamation.** PASDA has provided extensive assistance in the development of metadata for BMR data.
- **West Nile Virus.** PASDA is working to support the efforts of the West Nile Virus program and will be working with the WNV ArcIMS team in 2002.
- **Office of Information Technology.** PASDA has provided extensive support to DEP OIT. Some of these include:
 - GIS Day Activities. PASDA has worked with DEP OIT on behalf of their GIS Day educational activities. PASDA provided educational materials and GIS related items.
 - GIS Video. PASDA provided information and support materials for the GIS Day video produced by OIT.
 - Geospatial Data Center. PASDA has supported GDC activities extensively both through data and metadata efforts. PASDA has provided customized data products, metadata materials, and related support.
 - Bureau of Program Integration and Effectiveness. PASDA has supported PA DEP efforts in the Chesapeake Bay Region by providing information to the CIMS committee.

- **Field Operations.** PASDA has worked with the PA DEP watershed coordinators, providing educational materials, GIS tutorials, and seminars on GIS and PASDA to assist them in their efforts.
 - Other offices within DEP to which PASDA has provided assistance/educational information/data include the director of local government relations, public participation coordinator, and director of environmental education. In 2002, PASDA will also be working with PADEP on its enterprise Metadata project.
- **Advisory role to PAGIC**
PASDA serves in an advisory capacity to Pennsylvania state government entities in relation to their GIS and data needs under the auspices of the Pennsylvania Geospatial Information Council. PASDA serves as a bridge among agencies, projects, and non-governmental organizations to promote cooperation and coordination in the Commonwealth. PASDA staff work to further knowledge of GIS, data, and cooperative opportunities throughout the state and region.
 - **Data Liaison Activities**
PASDA staff work directly with state agencies to identify, document, and provide access to data.
 - **Inventory and Documentation (Metadata)**
PASDA will create FGDC standard metadata free of charge for any agency, organization, or data stakeholder. The metadata will also be hosted by PASDA for the purposes of developing the state data inventory.
 - **Data Storage and Access**
PASDA works directly with state and federal agencies, local and regional governments, non-profit organizations, and academic institutions to provide access to the widest variety of data possible. There is no fee to store or provide access to data via the PASDA clearinghouse.
 - **Metadata and PASDA Training**
PASDA staff provide free metadata training and training in the use of PASDA and PASDA data for individual organizations and groups. PASDA offers formal training twice a year at different locations throughout the Commonwealth. PASDA has trained organizations including PADEP, PADOT, PA Game Commission, PEMA, PHMC, county governments, regional planning commissions, and non profit organizations throughout the state.
 - **Educational Outreach**
PASDA works with non-profit organizations such as watershed groups and K-12 schools to promote the knowledge and use of GIS. PASDA develops lessons, tutorials, and guidelines for new GIS users. PASDA has worked with schools as diverse as Fairhill elementary in

- **Presentations & Seminars**
PASDA staff offer seminars and presentations at meetings, conferences, and schools. In the 1999/2000 contract year, PASDA presented seminars on metadata, the use of PASDA, and general GIS educational information in more than 200 locations, agencies, organizations throughout the state.
- **User Assistance**
PASDA is committed to providing timely user assistance with the PASDA site and data. PASDA fields between 10 to 25 requests for information, assistance, and user inquiries per day. PASDA provides full time user assistance via e-mail and assistance via phone Monday thru Friday from 9-5.
- **PASDA Data on CD-ROM**
All data on PASDA can be obtained on CD-ROM through a cooperative arrangement with the Pennsylvania State Data Center for a nominal charge.

C. PASDA Staff

- **Maurie Caitlin Kelly**, PASDA Coordinator
- **Gary W. Petersen**, Co-Director, Office for Remote Sensing of Earth Resources (ORSER), Environmental Resources Research Institute
- **Rick L. Day**, Assistant Professor of Soil Science and Environmental Information Systems, College of Agricultural Sciences
- **Chris Pfeiffer**, Metadata Coordinator
- **Ryan Baxter**, Information Technology Coordinator
- **Tracey Walrath**, Education Coordinator
- **David Walrath**, Research Assistant & Applications Programmer
- **Michael Kulakowski**, Watershed & Conservation Resources Coordinator & Developer
- **Scott Dane**, Data Manager
- **Ryan Leech**, GIS Specialist
- **Jason R. Cupp**, Research Assistant

D. PASDA Data, Metadata, & Infrastructure

. PASDA, which began serving data in 1995 via the Internet, currently serves an average of 100,000 users per month, with 24,000 metadata records, and over 24,000 data sets. PASDA, which is Pennsylvania's node on the National Spatial Data Infrastructure (NSDI) and a node on the National Biological Information Infrastructure (NBII), works with Federal, state, regional, and local government agencies, as well as academic institutions and non-profit organizations to identify, acquire, and provide access to GIS and geo-referenced (PASDA also acquires and provides access to tabular, location-based data such as Census data, PA Department of Revenue data, and other relevant data sets) throughout the Commonwealth. All state government agencies and anyone with an Internet connection have free access to PASDA. PASDA has several main components including the data archive, relational database (RDBMS), and interactive/web GIS applications.

Existing PASDA architectures

The architecture of the PASDA website has followed an evolutionary development from its inception in 1995. .

Data archive and Delivery

The data archive or FTP site is the main component of PASDA. As it is intended to serve as an archive of source data this will remain largely unaffected by the RDBMS development. The hardware is a Sun Enterprise 250 with 2 storage arrays totaling 300 GB. All software used in the site are freely available open-source programs supported by the UNIX community or the FGDC.

FTP site

The base of the PASDA site has always been its data archive, currently a flat file structure available via FTP. A mix of raster formats including TIF, BIL, BSQ, and GRID and shape-files and coverages (in e00 exchange format). All files on the FTP site are zipped for a more efficient download. The FTP site itself is arranged by 'collection' in some cases these are arranged by provider or in other cases by the theme topic (DOQQ, floodplains, etc.).

For distribution the layers are zipped by PASDA staff with no modification from the original source. In some cases the data may be made available in a variety of formats or geographic extents. For example the watershed, floodplain, streams and roads originally produced as ArcInfo coverages in the Albers projection were transformed by PASDA and are available as shape-files in UTM and as unprojected layers to simplify use in ArcView and with the USGS imagery. Many statewide layers have been clipped and are

distributed in county files to simplify download. In all cases the original data is archived and available from the FTP site.

For more current additions to the PASDA collection metadata for data layers are included in the compressed archive in both text and XML formats for distribution with the data. Text files follow FGDC content standards and XML files are validated against the FGDC Document Type.

The FTP site is available via anonymous login and is accessible through either a web browser or simple FTP client for bulk downloads. The FTP service is configured to require a reverse DNS lookup to access the site for security reasons.

Web site

The web server is a Sun 350 running Apache web server software. Data access pages are static pages created to list available data by collection allowing access to metadata, preview images and direct download of the data. Direct access to the FTP site also available through the website.

The open-source Isite web-site search suite is used for keyword search access to the data collection. Made available by the Center for Networked Information Discovery & Retrieval (CNIDR) Isite is fully supported by the FGDC for use in the NSDI. This is used to provide search access to both the metadata collection and the website pages. Metadata on the site is stored as discrete XML files making use of the XLINK specification from the W3 Consortium for redundant information. The Isite suite includes an indexing program which harvests information from the XML files for retrieval through the website. A recent upgrade of the software will allow the indexing of metadata files from remote sites to allow a search of distributed sites while maintaining the indexes locally for high performance.

Geographic search capability is made possible through three scripted image map interfaces for watershed boundaries, county boundaries, and USGS quadrangle boundaries. This search uses bounding boxes to retrieve metadata for all indexed layers that are entirely or partially included in the respective features. This capability is built into the Isite suite.

Once accessed, the XML metadata files are parsed on the fly through stylesheets for browser display, printing or saving. Links for data download and preview if available are provided in the metadata.

Interactive Applications

Several interactive mapping applications have been developed or are currently under development and map services for base data layers are made available through ESRI's GeographyNetwork. .

All of these applications are developed using ESRI's ArcIMS software. Currently these applications use discrete files (shape-files and imagery) for their data source. While these data files can be shared among applications, using an RDBMS through ArcSDE would be beneficial.

Specific Applications

GeographyNetwork

PASDA has a commitment to providing applications to the GeographyNetwork. Currently there are seven services available from PASDA including FEMA-FIRM floodplain boundaries, political boundaries, watershed boundaries, land stewardship boundaries, roads, streams and satellite land cover imagery. Currently these are served from a cluster of NT machines housed in ERRI. These applications will move to a server cluster being created at the Center for Academic Computing (CAC) for permanent production.

Pennsylvania Atlas and other PASDA mapping applications.

Several interactive mapping applications have been developed. The Pennsylvania Atlas includes most of the statewide base framework layers from PASDA as well as selected 1990 census data and allows interactive display through the web browser. This application also provides clip and ship capabilities allowing users to create a view with desired data and the desired geographic extent and download a single file containing the selected layers clipped to that extent in shape-file format.

Pennsylvania Watershed Explorer

The Watershed Explorer is an application under development to provide information based on the watershed boundaries in Pennsylvania. Functionality includes the previously mentioned clip and download as well as the capability to buffer features to a user specified distance.

General Infrastructure

The PASDA infrastructure and search capabilities are based on the Z39.50 standard protocol and use Isite software in accordance with the NSDI standard. All PASDA metadata is generated in XML format using the Federal Geographic Data Committee Content Standard for Geospatial Metadata (in the interest of creating a comprehensive data inventory for the state, PASDA staff provide free metadata/documentation services

for any agency or interested GIS data provider in the Commonwealth on request). PASDA data resides in two forms. First, PASDA maintains an FTP site where all data sets are zip/compressed (DOQQs are compressed first with Mr. SID compression software then zipped for ease of downloading) and accessible to anyone with an Internet connection. These data may be accessed through several types of searches (keyword, geographic [by county, quadrangle, watershed], topic, or provider) or by going directly to the FTP site. PASDA data also resides in a relational database (DB2 with Arc SDE) and is accessed through an ArcIMS Web GIS interface. This interface allows users to customize their data requests by identifying, viewing, selecting, reprojecting, and clipping desired data.

The basis of the PASDA data/metadata repository is state-wide framework data which includes digital ortho photographs, digital elevation models, digital raster graphics (scanned, geo-referenced images of the 7.5' USGS topographic maps), the state road network/transportation data, hydrography/state-wide streams, floodplains, river basins, and governmental units. In addition to this data, PASDA acquires cadastral data such as property and parcel data, digital aerial photos, and land use data from regional and local governments. Biodiversity information is included in the PASDA data repository through agreements with state agencies, such as the PA Game Commission, with non-profit institutions such as the Academy of Natural Sciences which provides the Pennsylvania Breeding Bird Atlas data, and with academic institutions engaged in Federally funded state-based research projects, such as the GAP Analysis Project.

Data available through the clearinghouse are, in most cases, stored in a central location. However, in some cases, in particular those of local government data providers, some data may be distributed, with links provided from PASDA via the metadata.

Hardware/Software Specifications

Aside from the legacy web server, PASDA maintains a development server cluster in the Land & Water Building and a cluster is being built at the CAC. The original PASDA server was described earlier. As a part of ESRI's Beta program and through the IBM Scholar's program access is provided ArcSDE and DB2 for development purposes. Other details of the cluster machines are as follows:

ERRI Cluster

Dell 2400 Server (two 500 Mhz Processors, 1GB RAM)

Running Windows NT 4 and IIS 4

Unify ServletExec Java servlet engine

ColdFusion 4.0

ArcIMS 3

3 Dell Precision workstations

1 running AutoDesk Map Guide

2 ArcIMS spatial servers (DB2 Spatial Extender will be installed on one of

these)

CAC Cluster

- 1 Sun Enterprise 350 dual processor server with 2GB RAM
 - Solaris with Apache and Jserv Servlet engine
 - PERL
 - Python
 - ArcIMS application server
 - 3 IBM Netfinity dual processor servers (eventually with 1GB RAM each)
 - Windows NT4
 - ESRI ArcIMS 3 Spatial Server
- Shared storage array initially with 160GB disk space
Access to CAC's IBM dual processor server running AIX and ERRI Cluster DB2
UNIX, AIX, and DB2 administration from CAC personnel

E. PASDA Outreach and Education

PASDA staff work directly with state agencies through the data liaison program which provides a single point of contact at PASDA for each agency, and through participation in the Pennsylvania Geospatial Information Council (PAGIC). PASDA also maintains a schedule of updates for all data that is updated regularly such as roads, surface water intakes, and tabular data. These updates, which vary in frequency depending on the data set, are agreed upon and performed in conjunction with the actual data creator or his/her bureau.

In addition to providing access to data and metadata and assisting the state in coordinating GIS activities, PASDA provides free metadata training sessions, training in the use of GIS data available on PASDA, and on using the PASDA web site. PASDA outreach and education activities also include providing free GIS software (ArcView and/or ArcView extensions in cooperation with ESRI) and data to K-12 schools in Pennsylvania that participate in the Pennsylvania Conservation Challenge. For those new to GIS, tutorials in the use of GIS data and software were created by PASDA staff and are available for viewing and downloading from the PASDA site. PASDA works directly with the PA K-12 GIS Alliance group to assist teachers in using GIS and developing GIS related lessons for their classes.

PASDA has also assisted PA DEP with their GIS Day efforts.

PASDA staff also work directly with agencies new to GIS to provide guidance, standards, and seminars in using GIS in their agency. In June, PASDA held a half day seminar at the request of the Pennsylvania Department of Insurance to educate departmental staff on using GIS in their Children's Health Insurance (CHIP) and Underground Storage Tank programs.

A PASDA watershed resources coordinator works directly with state programs that fund watershed assessments and conservation plans to develop guidelines, standards, and resources for state grantees to ensure uniformity and quality in GIS products resulting from state grants and contracts such as the Rivers Conservation Program and Growing Greener grantees. Some of the organizations PASDA has assisted in the past year are:

Clearwater Conservancy
Schuylkill River Development Council
Schuylkill River Keepers
Slippery Rock Watershed Coalition
PA Organization for Watersheds and Rivers
Hollow Oak Land Trust
Pennsylvania Environmental Council
Greenspace Alliance
Natural Lands Trust
Kiski-Conemaugh River Basin Alliance
Heritage Conservancy
Ducks Unlimited
PA Biodiversity Partnership
Chesapeake Bay Program
PA Audubon Society
Western Pennsylvania Conservancy

F. PASDA Related Projects

In addition to its regular involvement with Commonwealth agencies through data hosting, metadata creation, and guidance, PASDA has spearheaded or participated in many related projects which work to enhance available data and services to the Commonwealth and provide needed expertise. These include:

F.1 NBII Fisheries and Aquatic Resources Node

PASDA, in cooperation with the Northern Appalachian Research Lab of the Biological Resources Division of the USGS, is serving as a fisheries and aquatic resources node for the region on the National Biological Information Infrastructure (NBII). Due to the richness and detail of PASDA data, NARL partnered with Pennsylvania to develop this important resource that will allow the public, in particular fisheries managers, to interact with data via a web-based GIS.

F.2 West Indies/Caribbean Spatial Data Access

PASDA is providing guidance and advice in the development of a geospatial data clearinghouse to serve the West Indies. Pennsylvania's clearinghouse was chosen as the model for this project due to the large number of data sets available, its advanced architecture and services, and the cooperative approach among agencies and the PA

Geospatial Information Council. PASDA staff will be working with representatives from the University of the West Indies to implement a prototype service by the end of 2001.

F.2 Innovations in Rural GIS--RGIS

PASDA is working with the Penn State College of Agricultural Sciences and the US Department of Agriculture to develop data and information resources for local governments in the Chesapeake Bay region. PASDA is hosting data and creating metadata for these resources. This effort reinforces the watershed-based approach to much of the work of state agencies in Pennsylvania.

F.3 Breeding Bird Atlas/Important Bird Areas of Pennsylvania

PASDA is working with the Pennsylvania Ornithological Society, the Audubon Society, and the Pennsylvania Game Commission to develop a web-based GIS application to provide access to the breeding bird atlas of Pennsylvania, as well as the important bird area data from the Audubon Society. The ArcIMS based application will allow users to query, map, display, and download the BBA/IBA data.

F.4 Carbon County, PA GIS FGDC Grant

PASDA is working with Carbon County GIS to develop metadata and documentation for their GIS data. Carbon County received a grant from the Federal Geographic Data Committee for this effort.

F.5 Union County, PA GIS FGDC Grant

PASDA is working with the GIS department of Union County to develop metadata for their extensive GIS holdings and make it available through the NSDI.

F.6 Southwest Pennsylvania Commission Metadata Project

PASDA created metadata for hundreds of data sets created and maintained by the Southwest Pennsylvania Commission. The SPC serves as the GIS repository and developer for nine counties in southwestern Pennsylvania. PASDA works closely with SPC to ensure that all metadata is updated and accurate. All metadata is available through the PASDA clearinghouse.

F.7 Susquehanna Economic Development Council of Governments Metadata

PASDA developed FGDC standard metadata for the data holdings of SEDA-COG, a coordinating planning organization serving 11 counties in central Pennsylvania. All metadata is available through the PASDA clearinghouse.

F.8 Pennsylvania Environmental Council Conservation Data Project

PASDA worked with the Pennsylvania Environmental Council to develop metadata for a series of conservation data that was acquired and/or developed for distribution to over 100 non-profit organizations in the Commonwealth.

F.9 PAGIC/PAMAGIC GIS Data Standards and Town Meetings

PASDA played an integral role in a series of GIS data standards development meetings and educational town meetings conducted jointly by the Pennsylvania Geospatial Information Council and the PA Mapping and Geographic Information Consortium. Meetings were held throughout the Commonwealth in 2000 to create data standards and to educate GIS users and persons new to GIS about the importance of standards and data sharing.

F.10 SPOT Imagery

In a cooperative effort with the Pennsylvania Department of Environmental Protection, which provides funding, PASDA is providing access to SPOT satellite imagery for the Commonwealth, including black and white and multi-spectral.

F.11 Soil Survey Data for Pennsylvania

In a cooperative effort with the Natural Resources Conservation Service (NRCS) and the PA Office of Administration/Office of Information Technology, which provides the funding, and the Penn State College of Agricultural Sciences, PASDA is providing free public access to digital soil survey data for the Commonwealth.

F.12 Natural Lands Trust Conservation Data/Hot Spot Mapping Project

PASDA is hosting the first Web GIS based conservation hot spot mapping application in cooperation with the Natural Lands Trust. This application will allow users to input information in a conservation model to identify areas of concern in southeastern Pennsylvania. The application will be deployed in April 2002.

F.13 Northeast Counterdrug Training Center, National Guard

PASDA is working directly with the Northeast Counterdrug Training Center of the National Guard to bring together GIS law enforcement stakeholders in the Commonwealth.

F.14 Digital Mapping Initiative of the National Guard

PASDA works directly with the DMI of the National Guard out of Atlanta to provide access to GIS data and contact information for use by hundreds of drug enforcement and law enforcement agencies throughout the country. In February 2001, PASDA brought together members of the DMI, the PA National Guard, the PA State Police, and the Northeast Counterdrug Training Center in an effort to foster cooperation and communication among groups with common goals and interests.

F.15 Pennsylvania K-12 GIS Alliance

PASDA works to support the efforts of the PA K-12 GIS Alliance through the development of tutorials, lesson plans, and through its support of Geography Week/GIS Day in the Commonwealth. The Alliance is a cooperative effort of state agencies, K-12

teachers, and GIS experts that fosters communication and the transfer of expertise and technology to PA schools.

F.16 Regional Clearinghouse and River Basin Cooperative Efforts

PASDA has spearheaded a number of regional meetings among mid Atlantic states GIS data clearinghouses—New York, New Jersey, Delaware, Maryland. These meetings allow for open communication, sharing of resources and knowledge, and the development of and access to regional framework data.

In addition, in cooperation with the US Geological Survey, Ducks Unlimited, the Chesapeake Bay Program, the Chesapeake Bay Foundation, the Delaware River Basin Commission, the Susquehanna River Basin Commission, and other regional entities, PASDA is coordinating meetings of data stakeholders to identify common needs and gaps in data, and to provide a basis for growing cooperation.

F.17 Pennsylvania Emergency Management GIS Seminar

In addition to the many seminars PASDA staff hold throughout the year, PASDA held a special seminar in February 2000 for PA county 911 coordinators in a cooperative effort with the PA Emergency Management Agency. This seminar was the first introduction for many of these coordinators to the uses and applicability of GIS. Since this effort, PEMA has undergone an extensive needs analysis related to GIS and is in the midst of implementing many of the recommendations in the report.

F.18 Geography Network

In cooperation with ESRI, Inc., PASDA is a member of the Geography Network--a network to provide widespread access to GIS data throughout the world.

F.19 Rivers Conservation Program/Watershed & Conservation Resources

A watershed and conservation resources coordinator at PASDA works to develop services and resources for grantees of the PA DCNR Rivers Conservation Program and Growing Greener program. Included in this effort are the expansion of the Pennsylvania Watershed Explorer, the development of educational resources for watershed and conservation groups new to GIS, and guidelines and standards for the development of river conservation plans.

F.20 Mid-Atlantic Slope Consortium

PASDA is working with the Wetlands Cooperative Center of the Pennsylvania State University to identify and host data for the mid-Atlantic slope of the United States. This regional approach will allow for the study of areas on a watershed and river basin basis.

F.21 Southwestern Amenities Project

PASDA has provided guidance and technical expertise and will host data for this project, funded through a PA Growing Greener grant, which is a cooperative effort of the Pennsylvania Environmental Council and the University of Pittsburgh.

F.22 University of Pittsburgh K-12 Geoinformatics Program

This program, developed by the University of Pittsburgh, provides GIS training for K-12 teachers each summer. The PASDA website, data, and tutorials are used as the basis for much of this program's efforts. PASDA staff participate in the training as well and are available to teachers for question and answer periods.

F.23 Upper Susquehanna Watershed Assessment Project

PASDA provided assistance to the GIS and Remote Sensing Center of Wilkes University in the development of metadata for Susquehanna River watershed metadata.

F.24 Pennsylvania Framework Data: A Local Approach

The PA Framework Data project was a cooperative project with PAMAGIC and was funded by a Don't Duck Metadata Grant from the Federal Geographic Data Committee. PASDA conducted metadata training sessions throughout the Commonwealth to promote the knowledge and development of metadata in local governments.

F.25 Pennsylvania Interactive Watershed Atlas

The Pennsylvania Interactive Watershed Atlas was a collaborative project with PAMAGIC, funded by a grant from the Federal Geographic Data Committee under the NSDI Cooperative Agreements Program. The Atlas, as an extension of PASDA, is being developed to serve those populations who are unfamiliar with geospatial data and GIS but who have a demonstrated need for or interest in watershed viability.

F.26 Digital Mapping and Economic Development: Erie County Pilot Project

The Erie County pilot project, funded by the PA Department of Community and Economic Development, focused on the ability of digital mapping to assist in the economic development of a particular region. The data and functionality generated for this project has been incorporated into the PA Atlas on PASDA.

F.27 Building an Information Access Partnership: Linking Pennsylvania's Resource Agencies' Multiple Biological Databases

This project was a collaborative project with the PA Department of Conservation and Natural Resources, the PA Fish and Boat Commission, and the PA Game Commission. The main purpose of the project was to survey data stakeholders, inventory biodiversity and natural resources databases, document (create metadata for) data sets, acquire and make available data sets, develop an analysis of statewide databases and to develop data and software standards for interoperability..

G. Measurement of Success

The success of the Pennsylvania Geospatial Data Clearinghouse, PASDA, is measured in several ways. First, input from agencies and the general public is gathered on two

occasions annually. The PASDA annual review is held each spring in a central location. Representatives from PAGIC, local and regional governments, academic institutions, businesses, and non-profit institutions are invited to participate in the review. The review consists of an evaluation of available data, web site functionality, staff responsiveness, ease of use, quality of metadata, and general comments on the usefulness of the site. These comments are gathered electronically via Group Systems Software and used as the basis for future planning for the clearinghouse. A user requirements/needs analysis was also completed in 2000 that included a review of technology and user suggestions/comments which was used to plan, design, and implement the current FTP/relational database structure and the Web GIS/Arc IMS services.

In addition to the annual review, PASDA has an annual exhibit and several presentations at the Pennsylvania GIS conference where comments, suggestions, and ideas are gathered for use in planning.

Interactions with PAGIC members, daily input from site users via e-mail and phone, and the PASDA outreach efforts to government agencies, K-12 schools, and non-profit organizations (see PASDA on the Road section of the PASDA website) are also instrumental in determining the quality and effectiveness of the clearinghouse.

Another factor in measuring the success of the clearinghouse is the extensive collection of data and metadata, advanced, customizable Web GIS services, and the consistent increase in use by both agencies and the public.

H. Meetings/Conferences/Presentations

June, 2003

- [PA GIS Conference](#)
- TUGIS--Towson University GIS Conference
- State College Area High School
- Capital Area Intermediate Unit--American History Teaching Project

May, 2003

- PA DEP Metadata Project
- PA DCNR Biodiversity Coordinator
- LORL Informational Meeting of the PA State House Veterans Affairs & Emergency Preparedness Committee
- Chesapeake Bay CIMS Meeting
- Mid Atlantic Chapter--URISA Annual Meeting
- City of Philadelphia

April, 2003

- NASA Space Day
- Whitaker Center
- DCNR GIS Workgroup
- DEP Metadata Project
- PEMA
- PA Department of Agriculture
- DEP Geospatial Data Center
- Delaware GIS Conference
- Explore PA History--Capital Rotunda
- Breeding Bird Atlas Coordination Meeting
- PAGIC Monthly Meeting

March, 2003

- Chesapeake Bay CIMS Workshop
- DEP Metadata Project
- Delaware River Basin Commission iMap Meeting
- USGS Biological Resources Division--NBII
- PAGIC Monthly Meeting
- Octaro Watershed Association

February, 2003

- City of Philadelphia
- Chester County
- PAGIC Monthly Meeting
- Delaware River Basin Commission iMap Meeting
- Octaro Watershed Association
- Wildlands Conference
- National Conservation Research Service

January, 2003

- Chesapeake Bay Program
- Towson University

- University of Maryland
- PAGIC Monthly Meeting
- Westmoreland County GIS Users Group

December, 2002

- National Institutes of Justice, Crime Mapping Research Conference, Denver
- City of Philadelphia
- PAGIC Monthly Meeting
- PA Biodiversity Conference

November, 2002

- American Water Resources Association Conference, Philadelphia
- USGS Biological Resources Division, Wellsboro
- Fish & Wildlife Data Summit, Baltimore MD
- USGS State Cooperators Meeting, Reston, VA
- Carbon County
- Whitaker Center GIS Teacher Training, East Gate Center, PSU Harrisburg
- Chester County GIS Conference
- GIS Day, Capital Rotunda, Harrisburg
- Allegheny Township GIS Seminar
- Delaware River Basin Commission

October, 2002

- USGS New Cumberland
- PAGIC Monthly Meeting
- DEP Metadata Project
- Whitaker Center
- National Council for Geographic Education Conference, Philadelphia
- Chesapeake Bay Land Use Project Seminar, Penn State
- City of Philadelphia Technology Symposium
- USGS Wellsboro
- Allegheny Township
- Wissahickon Middle School

- PA GIS Conference Planning Committee Meeting
- Whitaker Center GIS Teacher Training, East Gate Center, PSU Harrisburg
- PA DCNR
- PA DEP Northwest Regional Office
- PA DEP Southwest Regional Office
- Penn State Landscape Architecture/SEDA-COG/PA DCNR Susquehanna Resources Assessment Project Progress Reports

September, 2002

- California University of Pennsylvania GIS Conference
- Chesapeake Bay Program CIMS Meeting
- PAGIC Monthly Meeting
- PA DCNR

August, 2002

- HopeWorks
- American History Teachers Project
- Shippensburg University
- Wilkes University
- California University of Pennsylvania
- Allegheny Township
- USGS New Cumberland

July, 2002

- ESRI Education Conference
- ESRI International Users Conference
- Chesapeake Bay Program CIMS meeting
- SEDA-COG
- Juniata County Conservation District GIS Technical Session
- National Guard Technology Forum

June, 2002

- Chester County
- City of Philadelphia
- HopeWorks
- PAGIC Meeting
- USGS Wellsboro
- DEP/West Nile Virus Program
- LORL Digital Issues Forum
- Schuylkill River Development Council
- Natural Lands Trust

May, 2002

- SEDA-COG
- PA GIS Conference
- PAGIC Meeting

- Whitaker Center
- Shippensburg University
- DEP
- PEMA
- EPA Region 3
- Juniata County Conservation District
- Chester County
- USGS

April, 2002

- Chesapeake Bay Program
- Natural Lands Trust
- PA State Association of Township Supervisors Annual Conference
- DCNR Grantee Workshop
- PAGIC Meeting
- DEP
- PennDOT
- Chesapeake Bay Program Education Work Group
- Delaware GIS Conference

March, 2002

- USGS
- Lycoming County
- SEDA COG
- Natural Lands Trust

February, 2002

- USGS--Biological Resources Division
- PA Department of Conservation and Natural Resources
- Keystone Coldwater Conference, Penn Stater Conference Center

- Lycoming County
- Metadata Training, Carbon County
- Monroe County
- Centre County
- PAGIC Monthly Meeting, Middletown
- Natural Lands Trust
- Chester County
- City of Philadelphia--Water Department
- Cooperative Wetlands Center--Penn State University
- Brandywine Conservancy

January, 2002

- USGS New Cumberland
- Natural Lands Trust
- PA Department of Conservation and Natural Resources--Biodiversity
- PAGIC Services Committee Meeting
- Lancaster County
- Clinton County
- Chester County
- City of Philadelphia
- West Chester University
- SEDA-COG GIS Task Force Meeting
- PA Department of Environmental Protection--Geospatial Data Center
- PA Department of Environmental Protection--Metadata Project
- WITF--Harrisburg
- PA Historic and Museum Commission
- PAGIC Monthly Meeting--PEMA Headquarters
- Clearwater Conservancy

December, 2001

- ESRI Philadelphia
- Carbon County
- Natural Lands Trust
- PAGIC Meeting, Harrisburg, PA

November, 2001

- National Geodata Forum, Denver, CO
- GIS Day in the Rotunda, November 14, 2001
- PA Department of Environmental Protection
- PA Audubon Society
- PA Game Commission
- PA Biodiversity Conference
- PA Association for Educational Communications and Technology Annual Conference, Hershey, PA
- Hollow Oak Land Trust
- PAMAGIC Standards Meeting
- Keystone Watershed Network Data Committee Meeting
- PA National Guard

October, 2001

- Pennsylvania Organization for Waterways and Rivers (POWR)
- [PA Watersheds Conference](#), Lake Harmony PA
- PA Department of Environmental Protection Greener Team
- Dickinson College
- PA Web GIS Conference
- PA Audubon Society
- PA Game Commission
- State University of New York--New Paltz
- Delaware Water Gap

- Chesapeake Bay Program Information Management Sub committee
- Delaware River Basin Commission
- Heritage Conservancy
- NBII Clearinghouse Working Group meeting, Oak Ridge, Tennessee

September, 2001

- California University of Pennsylvania GIS Conference
- URISA, Montego Bay, Jamaica
- Northern Appalachian Research Lab, Wellsboro
- ESRI, Redlands, CA
- Juniata County
- PA Office of Information Technology
- PA Department of Environmental Protection
- Chesapeake Bay Program
- Gettysburg Battlefield National Historic Site
- Borough of Hanover
- Northeast Counterdrug Training Center, Ft. Indiantown Gap
- Union County
- Bucknell University
- Susquehanna River Basin Commission, Water Quality Monitoring meeting, Gettysburg
- PA K-12 GIS Alliance meeting
- Slippery Rock Watershed Coalition

August, 2001

- National Biological Information Infrastructure (NBII) meeting, Reston, VA
- USGS Biological Resources Division, Wellsboro
- PA Department of Military and Veterans Affairs, Ft. Indiantown Gap
- PA Department of Revenue
- PA Emergency Management Agency

- PA Department of Environmental Protection, West Nile Virus Program
- PA Geological Survey
- Juniata County
- Clinton County
- Chesapeake Bay Program
- National Counterdrug Training Center, Ft. Indiantown Gap
- PAGIC Services Committee Meeting
- Department of Conservation and Natural Resources, Rivers Conservation Program
- Department of Conservation and Natural Resources, Information Technology Bureau

July, 2001

- ESRI Education Conference
- ESRI International Users Conference
- National Biological Information Infrastructure All-Node Workshop
- University of Pittsburgh
- Pennsylvania Environmental Council
- Natural Lands Trust
- Clearwater Conservancy
- PA Department of Conservation and Natural Resources
- Pennsylvania National Guard
- National Guard Counter Drug Training Center
- Canaan Valley Institute
- ESRI Philadelphia

I. Data Partners

Local and Regional Governments

- **Chester County, PA**
[Data](#) and metadata from the Chester County Planning Commission and Bureau of Land Records.
- **Lancaster County, PA**
[Data](#) from the Lancaster County, PA Landbase.
- **Mifflin County, PA**
[Mr. Sid DOQQs](#) for Mifflin County, PA.
- **SEDA Council of Governments**
[Metadata](#) for SEDA-COG data.
- **Southwest Pennsylvania Commission**
[Metadata](#) for SPC data.
- **City of Murraysville, PA**
[Metadata](#) for Murraysville data.

Pennsylvania State Government Agencies

- **PA Department of Environmental Protection**
[Pennsylvania GIS Compendium](#)
[Networked Streams](#)
[Streams Explorer](#)
[Pennsylvania Watersheds](#)
[Watershed Explorer](#)
[Various coverages](#) from the Bureau of Mining and Reclamation.
- **PA Department of Conservation and Natural Resources**
[Various coverages](#) from DCNR.
- **Bureau of Topographic and Geologic Survey**

The Bureau of Topographic and Geologic Survey has managed the acquisition of [DOQQs](#) for the Commonwealth of Pennsylvania and has provided them to PASDA for free download. PAGES has also worked with PASDA to provide access to the [National Elevation Database for Pennsylvania](#) and the [National Land Cover Data Set for Pennsylvania](#), and has created the [Preliminary Landform Subdivisions of Pennsylvania](#). A discussion of other PAGES data can be found at <http://www.dcnr.state.pa.us/topogeo/map1/digital.htm>.
- **Rivers Conservation Program**
See list below or [Click on a watershed](#) to find a rivers conservation plan.

- [North Branch Susquehanna Rivers Conservation Plan](#) submitted by the Susquehanna River Basin Commission and Pennsylvania Environmental Council.
- [Shamokin Creek Rivers Conservation Plan](#).
- [Kiski-Conemaugh Rivers Conservation Plan](#) submitted by the Kiski-Conemaugh River Basin Alliance.
- [Swatara Creek Watershed Conservation Plan](#) submitted by the Swatara Creek Watershed Association.
- [Youghiogheny Watershed Conservation Plan](#).
- [Middle Youghiogheny River Corridor Rivers Conservation Plan](#) submitted by the Chestnut Ridge Chapter of Trout Unlimited.
- [Sustainable Watershed Management, Northern Chester County](#) submitted by the Green Valleys Association.
- [Tunkhannock Creek Watershed](#) submitted by Wilkes University GIS and Remote Sensing Center.
- [Monocacy Creek Watershed](#).
- [Cooks Creek Rivers Conservation Plan](#) submitted by Durham Township.
- [Monongahela Rivers Conservation Plan](#) submitted by Brownsville Borough.
- [Monongahela at Brownsville Rivers Conservation Plan](#) submitted by Brownsville Area Revitalization Corporation.
- [Riparian Buffer Assessment of Southeastern PA](#) submitted by the Heritage Conservancy.
- [Lower Delaware Rivers Conservation Plan](#) submitted by the Heritage Conservancy.
- [Neshaminy Creek Rivers Conservation Plan](#) submitted by the Heritage Conservancy.
- [French and Pickering Creek Rivers Conservation Plan](#) submitted by the Green Valleys Association of Southeastern Pennsylvania.
- [Spring Creek Watershed Rivers Conservation Plan](#) submitted by the Clearwater Conservancy.
- [Doylestown Township/Neshaminy Creek Rivers Conservation Plan](#) submitted by Doylestown Township.

- [Clarion River Conservation Plan](#).
- [Shamokin Creek Rivers Conservation Plan](#).
- **[PA Game Commission](#)**
[Deer harvest data](#) from PGC.
- **[PA Department of Transportation](#)**
[Data](#) from PennDOT such as state and local roads and boundary files.
- **[PA Department of Health](#)**
[Data](#) layers including airports, heliports, and hospitals.
- **[PA Department of Military and Veterans Affairs](#)**
[Data layers](#) from Ft. Indiantown Gap.
- **[PA Department of Revenue](#)**

US Government Agencies

- **US Environmental Protection Agency (EPA)**
[Data](#) from EPA include EPA Reach files, Toxic Release Inventory, AMD, and CERCLIS.
- **US Department of Agriculture Forest Service**
- **US Natural Resources Conservation Service (NRCS)**
[County Soil Surveys](#).
- **US Geologic Survey (USGS)**
 - [Pennsylvania 1:24,000 scale DEMs](#)
 - [Pennsylvania 1:24,000 scale DRGs with cropped collars \(Albers\)](#).
 - [Pennsylvania 1:24,000 scale DRGs \(UTM\)](#).
 - [Pennsylvania 1:24,000 scale DEMs/10 meter](#).
 - [Pennsylvania 1:100,000 scale DRGs](#).
 - [Pennsylvania 1:24,000 scale DRGs with cropped collars \(UTM\)](#).
 - [Pennsylvania 1:24,000 scale DRGs \(UTM/NAD 83\) revised](#).
 - [Pennsylvania 1:250,000 scale DRGs](#).
 - [Pennsylvania Digital Ortho Photo Quads \(1993-1995\)](#).

- [Pennsylvania Digital Ortho Photo Quads \(1999\).](#)
- [National Elevation Database for Pennsylvania by county.](#)
- [National Land Cover Data Set for Pennsylvania.](#)
- [Mr. Sid versions of the PA DOQs and PA DRGs.](#)
- **US Fish and Wildlife Service**
 - [Data](#) from the National Wetlands Inventory for Pennsylvania, Virginia, New York, New Jersey, West Virginia, Delaware, North Carolina, and Maryland.

Intergovernmental Agencies

Delaware River Basin Commission

[8 digit Hydrologic Unit Code data](#) for the Delaware River Basin.

Susquehanna River Basin Commission

Road, county, streams, sheds, and more [data](#) for the Susquehanna River basin.

Chesapeake Bay Program

[Data](#) such as boundaries, roads, railways, streams, and more for the Chesapeake Bay Region.

Academic Institutions

- The Pennsylvania State University
 - **Environmental Resources Research Institute**
 - [School Districts of Pennsylvania: Explorer CD-ROM Edition](#)
 - [Urban Areas from the Pennsylvania Explorer CD-ROM](#)
 - [Surface Geology](#)
 - [Floodplains](#)
 - [Terrabyte County Images](#)
 - [Terrabyte Images](#)
 - [Terrabyte Explorer](#)
 - [Spring Creek Watershed](#)
 - [Stone Valley Experimental Forest](#)
- Wilkes University
 - GIS and Remote Sensing Center**
 - [Tunkhannock Creek Watershed.](#)
- Dickinson College
 - Alliance for Aquatic Resources Monitoring (ALLARM)**
 - [Water quality data](#) from 1986-present from 622 testing sites throughout PA.

Special Projects & Programs

- [GAP Analysis Project](#)

- [Terrabyte Imagery for Pennsylvania.](#)
- [Terrabyte Imagery for Pennsylvania by County.](#)
- [Pennsylvania Explorer CD-ROM Edition.](#)
- [Species, land cover, and managed lands data and more from GAP.](#)
- [Breeding Bird Atlas of Pennsylvania.](#)

J. New Applications

Finders:

[Interactive Quadrangle Finder](#)

[Interactive County Finder](#)

[Interactive Place Finder](#)

Data Customization:

PA Atlas

(http://gis1.pasda.psu.edu/Website/PA_Atlas/viewer.htm?Title=Pennsylvania%20Atlas)
Clipper/Reprojector (<http://gis2.pasda.psu.edu/pasda/datawiz/dataaccess.asp>)

PA Watershed Explorer

(<http://cegis2.cas.psu.edu/Website/Watershed/viewer.htm?Title=Pennsylvania%20Watershed%20Explorer>)

Unique Applications:

National Fish Strain Registry

(<http://pasdaims.eri.psu.edu/website/TroutSet/viewer.htm>)

Fisheries Explorer (<http://pasdaims.eri.psu.edu/website/NBII2/viewer.htm>)

Pennsylvania Map Gallery (http://www.pasda.psu.edu/map_gallery/index.shtml)

K. User Feedback

Comments from the 2001 PA GIS Conference

Question: Is PASDA a valuable service of the state?

- Yes, I use it all the time. – J.R. Grugan, PENNDOT
- Anyone who promotes metadata is well worthwhile – Chris Garnard, EarthData

- Definitely, I am extremely happy with PASDA, I always recommend your site to other agencies – Lawrence Smith, PEMA
- Of course; we routinely download all kinds of data. Everytime I search through the catalogue there is new stuff that I want to use. – Casey McCracken, Union County
- Yes, data sharing is critical to success in PA. – Regional Planning Technologies
- Yes, agree strongly with all of the above; we in MD use it as well. – David Sides, Towson University
- Yes, we use PASDA all the time. – Joe Rubisch, Novalis Tech
- Yes, we access PASDA regularly for data sets. – Kevin Winne, Michael Baker Jr. Inc.
- Yes, I use it frequently for downloading information to save me from (Snail Mail). – Jarrett Handt, Skelly Loy
- Yes, it saves time, money & headaches! The rest of the country should catch up. – Duane Peters
- I use PASDA on a weekly basis. We point our municipalities to your site for data & metadata. This is an excellent resource and I cannot express how much time I've saved with this. Give them more funding! – George Basila, Monroe County Planning Commission
- Yes it is very useful to see what kind of data is out there. We use it to retrieve other county's road data for projects such as our 3 Mile Island maps. These maps cover other counties such as Dauphin, Lebanon, & York. – Wode Gobrecht, Lancaster County GIS
- I use PASDA to get info for the county and others. It's great and user friendly. – Brian Forshey, Mifflin County
- PASDA provides a needed service. Very useful in teaching. Metadata service is critical to successful GIS in the Commonwealth. – Jay Parish, Lancaster County GIS
- Many of our files come from PASDA and I find it invaluable for any coverage and or shape-file we need. – Gerald Johnston, GIS Technologies
- Many Uses. – Chris Hagerman, C.S. Davidson

- PASDA is the best source of GIS data for PA around. – John Dubrowsky, Southern Alleghenies Planning and Development Commission (SAPDC)
- Working on PENNDOT and PASDA will be a great resource. L V, PA One Call
- PASDA seems to be an invaluable resource for PA State Data. Had no idea that it existed. Plan to visit web site regularly. – Neil D’Anna, PA One Call
- PASDA is an excellent resource! – Jason D. Kramer
- Yes, PASDA is essential for local government. – Steve Bruce
- Absolutely, keep up the good work. – Steven Arnold, PSU
- PASDA is a great source of information, I visit the website often. Diego Samanez, Perry County
- PASDA is an excellent resource. Every State should have a central data clearinghouse like this. – Joe DeWalle, SEDA-COG
- 24/7/365 Resource/advertisement of available GIS Information. Acts like a hidden staff person. You folks are doing a fantastic & much-appreciated job. – Kirk Brethauer, SPC
- PASDA is a great source of floodzone & wetlands info that we often use in the county govt. level. – Ryan Close, GIS Tech
- PASDA is a great source for information dealing with floodplains. – Rick Berkovic, GIS Tech
- PASDA IS GREAT. – Kevin Maxfield, Union County
- PASDA’s educational initiatives especially in the realm of metadata, makes me proud to be a part of the Pennsylvania Geospatial family. I ♥ PASDA. -- John Emmett, DMVA
- The state has made a great effort in data distribution with PASDA. I will continue to visit your site. – Jason Finnerty, Bradford County Office of Community Planning & Grants
- PASDA has been a great source of data for the Delaware River Basin Commission. We continue to visit this site on a weekly basis. – Karen Reavy, Delaware River Basin Commission

- Yes, I have only used it once. It was very helpful and I found exactly what I needed. – Tim Eisenhauer, PADOT
- Yes, PASDA is a very valuable asset to data sharing. I use it often and will continue in the future. – Howard Hudder, HRG, Inc.
- PASDA provides a great service! – Ed Wells, GeoDecisions.
- We use PASDA all the time! – D... S.... Lancaster County