

Delaware Water Gap NRA GRI Workshop

October 3, 2001

SUMMARY

A Geologic Resources Inventory (GRI) workshop was held for Delaware Water Gap National Recreation Area (DEWA) on October 3, 2001. The purpose was to view and discuss the park's geologic resources, to address the status of geologic mapping for compiling both paper and digital maps, and to assess resource management issues and needs. Cooperators from the NPS Geologic Resources Division (GRD), DEWA, the United States Geological Survey (USGS) and New Jersey Geological Survey were present for the workshop.

This involved field trips to various points of interest in DEWA as part of the 66th Field Conference of Pennsylvania Geologists, as well as another half-day scoping session to present overviews of the NPS Inventory and Monitoring (I&M) program, the GRD, and the on-going GRI. Round table discussions involving geologic issues for DEWA included the status of geologic mapping efforts, interpretation, paleontologic resources, sources of available data, and action items generated from this meeting.

Appendix A contains a list of attendees for the scoping session.

OVERVIEW OF GEOLOGIC RESOURCES INVENTORY (GRI)

The NPS GRI has the following goals:

1. to assemble a bibliography of associated geological resources for NPS units with significant natural resources ("GRBIB") to compile and evaluate a list of existing geologic maps for each unit,
2. to conduct a scoping session for each park,
3. to develop digital geologic map products, and
4. to complete a geological report that synthesizes much of the existing geologic knowledge about each park.

It is stressed that the emphasis of the inventory is *not* to routinely initiate new geologic mapping projects, but to aggregate existing "baseline" information and identify where serious geologic data needs and issues exist in the National Park System. In cases where map coverage is nearly complete (ex. 4 of 5 quadrangles for Park "X") or maps simply do not exist, then funding may be available for geologic mapping.

After introductions by the participants, Tim Connors (NPS-GRD) presented overviews of the Geologic Resources Division, the NPS I&M Program, the status of the natural resource inventories, and the GRI in particular.

He also presented a demonstration of some of the main features of the digital geologic database for Dinosaur NM in Colorado and Utah. This has become the prototype for the NPS digital geologic map model as it reproduces all aspects of a paper map (i.e. it incorporates the map notes, cross sections, legend etc.) with the added benefit of being

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geospatially referenced. It is displayed in ESRI ArcView shape files and features a built-in Microsoft Windows help file system to identify the map units. It can also display scanned JPG or GIF images of the geologic cross sections supplied with the paper "analog" map. Geologic cross section lines (ex. A-A') are subsequently digitized as a line coverage and are hyperlinks to the scanned images.

Tim further demonstrated the developing NPS Theme Manager for adding GIS coverage's into projects "on-the-fly". With this functional browser, numerous NPS themes can be added to an ArcView project with relative ease. Such themes might include geology, paleontology, hypsography (topographic contours), vegetation, soils, etc.

GRBIB

At the scoping session, individual Microsoft Word Documents of Geologic Bibliographies for DEWA were distributed.

The sources for this compiled information are as follows:

- AGI (American Geological Institute) GeoRef
- USGS GeoIndex
- ProCite information taken from specific park libraries

These bibliographic compilations were validated by GRI staff to eliminate duplicate citations and typographical errors, as well as to check for applicability to the specific park. After validation, they become part of a Microsoft Access database parsed into columns based on park, author, year of publication, title, publisher, publication number, and a miscellaneous column for notes.

From the Access database, they are exported as Microsoft Word Documents for easier readability, and eventually turned into PDF documents. They are then posted to the GRI website at: <http://www2.nature.nps.gov/grd/geology/gri/products/geobib/> for general viewing.

EXISTING GEOLOGIC MAPS

After the bibliographies were assembled, a separate search was made for any existing surficial and bedrock geologic maps for DEWA. The bounding coordinates for each map were noted and entered into a GIS to assemble an index geologic map. Separate coverage's were developed based on scales (1:24,000, 1:100,000, etc.) available for the specific park. Numerous geologic maps at varying scales and vintages cover the area. Index maps were distributed to each workshop participant during the scoping session.

Geologic Mapping

Numerous parties have been involved in geologic mapping activities in the DEWA area including the USGS, NJGS, and PAGS. Map type (bedrock or surficial), vintage and

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scales are variable (large and small). Also, several are published and others are unpublished.

There are several 1:24,000 scale geologic maps showing as completed for the area; these are:

Quadrangle	Bedrock	Surficial	Geology digitized	Notes
Promised Land				
Pecks Pond				
Edgemere				
Milford				May be contained on Pike and Monroe Counties report G6; 48,000 scale
Port Jervis South				
Skytop	24k complete			
Twelvemile Pond				
Lake Maskenozha	24k complete		Yes, ArcInfo	
Culvers Gap	24k complete		Yes, ArcInfo	
Branchville				
East Stroudsburg	Bedrock not done	A214c (PAGS atlas)		
Bushkill	GQ 908 (USGS)	Surficial for NJ done, but none for PA portion		Done at 12k as unpublished mylar; needs digitized. Numerous fossiliferous units.
Flatbrookeville	Unpublished mylar separates	Unpublished mylar separates		Jack Epstein has both maps and is awaiting publication. Has landslides and paleo features too.
Newton West	GQ 1703 (USGS)	NJGS has surficial mapped		NJGS has another interpretation of bedrock too
Stroudsburg	Gq 1047 (USGS)	g-57 (PAGS)		Both mapped by Jack Epstein
Portland	i-552 and i1530	Of 97-12 (PA GS)		Both Portland and Belvidere also have additional MS theses maps on surficial at 24k; paper only
Belvidere				
Blairstown	GQ-1585 (USGS)	NJ mapped surficial, but not published		

The NJGS has digital bedrock geologic maps at 1:100,000 scale for the northern part of the state. This compilation was based upon 1:24,000 scale mapping of both published and unpublished maps. The NJGS is willing to share their available digital coverages with interested parties.

The NJ portion of DEWA does have surficial geology mapped, but it is not digitized and the NJGS currently has no plans to digitize it. However, if there were interested parties and available funds they emphasized that it could become a priority. Also, the northern parts of New Jersey have been completed as part of the StateMap program for surficial geologic mapping.

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Mike Girard has produced a glacial aquifer/sediment type thickness map that is digital and was updated in 2000.

Because there were no representatives from the Pennsylvania Geological Survey (PAGS), it is unknown what, if other, digital coverages exist for the Pennsylvania portion of DEWA that aren't already on their website at <http://www.dcnr.state.pa.us/topogeo/map1/digital.htm>.

Jack Epstein thought that the surficial geology along the Pennsylvania portion of DEWA was in need of significant revision and suggested that Ron Witte (NJGS-Surficial geologist) be the one to complete the mapping, as he has done significant mapping in the New Jersey portion of DEWA. Jack mentioned that PAGS surficial geologist William Sevon has just retired and that Gary Fleeger will be taking over his duties.

Other desired GIS datasets for DEWA

Groundwater

DEWA staff are interested in obtaining more datasets that pertain to the hydrologic regime of the park. As this is not part of the GRI, it is suggested that they will want to contact the NPS-WRD in Fort Collins, Colorado to see what types of assistance their program can give.

Don Monteverde (New Jersey Geological Survey) did mention that NJ is doing groundwater modeling and making maps to quantify how much rainwater is getting into the ground and how much groundwater is getting into the regional aquifer. They are using 1995 land use and cover data for counties and the DEWA portion (NJ side) is completed.

DEWA GIS person Craig Thompson specifically mentioned the following as projects he would like to see:

Requested Additional Geologic Data Needed for Watershed Model:

Geologic Data: Geological data based on a conceptual understanding of the groundwater aquifer system is needed to establish a geological model to support the overall hydro model. Bore hole or well-log data used to perform stratigraphic correlation is a good source for obtaining this information. Lithological classification at a number of geo-referenced well sites can also serve as basic data for the geological interpretation of unsaturated and saturated zones.

Geophysical data of the model area could be useful in deriving the electromagnetic resistance values of the lithology.

Hydro-geology Data: The hydraulic properties of aquifers, aquitards and aquicludes specified in terms of horizontal conductivity, vertical conductivity, confined storage coefficient and unconfined storage coefficient. These parameters are mainly derived from pump test analysis. This data is use to determine the transmissivity or storage coefficient data parameters of the model.

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Abstraction Data: Groundwater abstraction data from monitoring wells located in the basin and data observations of the groundwater head provide a good source for model calibration and validation. Data on monthly basis are normally sufficient to describe the annual variation.

Paleontology

John Wright mentioned that Dave Parris (curator of paleontology at the New Jersey Museum) did paleontological surveys for various stratigraphic intervals from the Ordovician to the Devonian in the DEWA area. In these reports he mentioned specific areas in the park where excellent opportunities to interpret paleontology were present and should be utilized. John Wright has copies of the reports and has offered to share them out to interested parties. From these reports it was suggested to derive a digital coverage of the paleontological localities mentioned for use in a GIS.

Geologic Report

While there is no encompassing report on the geology of DEWA, there are a few publications that could be used to supplement such a volume.

"*The Delaware River and the Flow of Time*" is sold in the visitor center and talks about the area.

As a by-product of the 66th Field Conference of Pennsylvania Geologists, the publication "*2001: A Delaware River Odyssey*" was produced and talks about various facets of DEWA geology.

Interpretation

During the scoping session, several interpretive themes involving geology were discussed. These included talking about the "gap" itself and its geological significance. There is a bioherm of a patch reef containing stromatoporoids in the park boundary as well. Also, at Sambo Island, there is a large landslide that could be used for interpretive purposes. At this place, there is a glacial surface on steeply dipping bedrock where soil is thin and when significant moisture events occur, it causes landslides.

Additionally, many of the geologic hazards of DEWA are mentioned in the guidebook.

OTHER MISCELLANEOUS ITEMS

- Copies of Dave Parris' paleontological articles are desired. John Wright says he can supply them to interested parties. Also, one is on-line at:
http://www2.nature.nps.gov/grd/geology/paleo/pub/grd3_3/dewa1.htm
- Jack Epstein has a list of type sections derived from the DEWA area and will supply a list to Tim Connors for the unique geologic features of the park.

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- John Wright mentioned that while there are no active mining claims or mineral deposits within the park, there is a copper mine called the Pahaquarry.
- The NJGS has GPS coordinates for municipal well locations and cave locations in and near the park.

**Appendix B: Index to GRCA Quadrangles of Interest
(24,000 and 100,000 scale)**

NAME	AFFILIATION	PHONE	E-MAIL	Field Trip	Scoping Session
Bill Laitner	NPS, DEWA Superintendent	570-588-2418	Bill_laitner@nps.gov		X
Tim Connors	NPS, Geologic Resources Division	(303) 969-2093	Tim_Connors@nps.gov	X	X
Ron Pristas	New Jersey Geological Survey	609-292-2576	Rpristas@dep.state.nj.us		X
Mike Girard	New Jersey Geological Survey	609-633-1036	Mgirard@dep.state.nj.us		X
Don Monteverde	New Jersey Geological Survey	609-292-2576	Dmonteve@dep.state.nj.us	X	X
Jack Epstein	USGS	703-648-6944	Jepstein@usgs.gov	X	X
John R. Wright	NPS, DEWA	570-588-2432	John_r_wright@nps.gov	X	X
Jacki Katzmire	NPS, DEWA	570-588-2439	Jacki_katzmire@nps.gov		X
Patrick Lynch	NPS, DEWA	570-588-2428	Patrick_lynch@nps.gov		x