

## **Status Report**

**Period Covered:** October 1, 2012 through September 30, 2013

**Project:** South Florida Surface Water Monitoring Network for Support of MAP Projects

**Agency:** U.S. Geological Survey (USGS)

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**Agreement:** USGS IA#28 under MOA between USGS and USACE

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This annual report for 2013 summarizes the major accomplishments, lists deliverables and reports, and outlines the work plan for 2014 for the EDEN project. The EDEN's primary deliverable and product continues to be the EDENweb (<http://sofia.usgs.gov/eden>); the project website that provides all data, results, documentation, and other project information for EDEN users.

### **I. MAJOR ACCOMPLISHMENTS**

- **Real-time, provisional, and final EDEN surfaces** are being produced and posted to EDENweb on schedule. Surfaces currently posted on the EDENweb include:
  - Provisional for 10/1/2012 through 6/30/2013
  - Real-time for 7/1/2013 through current
- With the support of USGS Greater Everglades Priority Ecosystem Science (GEPES) funds, maintained **operation of 19 of the original 25 EDEN-funded gages and 2 coastal water-level gages** (originally established for Tom Smith's SET project). Starting 10/1/12, 6 water-level gages funded by EDEN had to be discontinued because RECOVER funding was cut by 30% in FY12.
  - Four gages operated by SFWMD and used by the EDEN surface-water model were discontinued in FY13.
  - One gage was installed by ENP and added to the EDEN network of gages.
- Participated in numerous meetings for the **2014 System Status Report (SSR)** and generated over 150 graphics using EDEN datasets for review and analysis by the SSR team. Assisted with draft 2014 SSR write-ups for Greater Everglades and Hydrology sections.
- Provided quarterly reports (March and June) for **water-level monitoring under ERTP** at gages and tree islands and continued to maintain access to real-time conditions on EDENweb.
  - An email alert system was developed to inform stakeholders on days when current water levels under ERTP, the new operational plan for the Central and South Florida project, reach specified elevations at gages or overtop tree islands.

- Feedback from both the Miccosukee and Seminole Tribes indicate they are using the EDEN datasets and EDENweb to monitor water levels in the Everglades.
- Provided **support to several RECOVER principal investigators (PIs)** and agencies representatives for EDEN data:
  - Joel Trexler and Chris Catano (FIU) – calculation of ponds for fish sampling data
  - Brad Mueller and Moriah Joy (Seminole Tribe) – information about webpage to monitor water levels under ERTTP
  - Gabriela Bucini (Univ. of VT) – provided gage data for ENP
  - Roman Foti (Princeton Univ.) – provided gage and rainfall data for ENP
  - Lori Miller (USFWS) – water depth data for snail kite nesting analysis
  - Chris McVoy (consultant to ENP) – support for EDENapps tools
  - Dan Scheidt (EPA) – water depth data prior to field sampling event
  - Kevin Palmer (USFWS) – impacts of CEPP on water levels in CSSS habitat in ENP
  - David Warfel (Miccosukee Tribe) – EDENapps support and request for training
  - Gina Ralph (USACE) – ENP gage datasets for evaluation of ERTTP
  - Matahel Anser (SFWMD) – SPARO gage data
- Continued to maintain **EDENweb** (<http://sofia.usgs.gov/eden>) to provide data, metadata, and documentation to RECOVER PIs, water-resource managers, and others.
  - The member list for the EDEN newsletter is about 150 and includes participants from federal government agencies (such as DOI, ENP, USGS, FWS, EPA), State agencies (such as SFWMD, FDEP), many local and other universities and several international affiliations.

## II. SUPPORT FROM OTHER PROGRAMS AND FUNDING SOURCES

Greater Everglades PES funds continue to support the EDEN project by funding efforts by Paul Conrads (USGS-SC), Heather Henkel (USGS-St. Pete), Bryan McCloskey (USGS-St. Pete), and Matt Petkewich (USGS-SC). Additionally, GEPES provides some funds for Pamela Telis (USGS-Jacksonville) in her role as project coordinator and liaison with the USACE. The following major accomplishments were completed with GE PES funds:

- **Coastal EDEN** webpages completed and posted to EDENweb, data provided includes:
  - Three parameters for 24 coastal gages
    - Water level
    - Water temperature
    - Salinity

- Three statistics are computed and plotted
  - Current conditions
  - 7-day average
  - 7-day change
- **Rainfall and evapotranspiration (ET)** data continue to be updated regularly for the EDEN gage network and posted to the EDENweb. Currently, rainfall data is available for 2002 to July 2013 and ET data is available for 1995 to 2012.
- **EDEN-Syn** was developed and tested by users using the prototype application developed in FY12. EDEN-Syn generates synthetic hydrographs for WCA3A South thereby allowing users to create hypothetical hydrologic datasets for use in ecological models.
- Initiated development and testing of **subarea models** for water-level surfacing; may be used to improve daily surfaces and allow for more efficient testing of scenarios by users.
- In coordination with the USGS Center for Integrated Data Analytics (CIDA) began development of a graphical interface to allow access to the EDEN database replacing the less versatile USGS NWISweb. Design of **Explore and View EDEN (EVE) Version 1** is complete and programming has begun.
- Revised two **EDENapps** tools to provide better user experience and to work with 64-bit machines
  - DataViewer (V2.0.2) was based on the EverVIEW Data Viewer used for viewing model data
  - TransectPlotter (V1.2) was recompiled for 64-bit machines
- Developed **THREDDS Server** to provide easier access to EDEN datasets. Test version shares space with another server in St. Pete USGS office. After testing will be migrated to production server.
- Published one and drafted four **reports** that document aspects of the EDEN project:
  - APPROVED – **Estimation of Missing Water-Level Data for the Everglades Depth Estimation Network (EDEN) by Matthew D. Petkewich and Paul A. Conrads.**

### III. SIGNIFICANT MEETINGS/WORKSHOPS/CONFERENCES

- South Carolina Water Resources Conference (Columbia, SC)
  - PRESENTATION – **Integrating of Cyberinfrastructures to Provide Hydrologic Data for the Restoration of the Everglades, by Matthew**

**Petkewich, Paul Conrads, Pamela A. Telis and Heather Henkel**

- **POSTER – Using the Automated Data Assurance and Management (ADAM) Software for Quality Control of Water-level Data for the EDEN Network, by Matthew D. Petkewich, Paul A. Conrads, and Ruby C. Daamen**
- 2013 National Conference on Ecosystem Restoration (NCER, Chicago, IL)
  - **PRESENTATION - Real-time evaluation of the water-control plan and its impacts on tree islands in the Florida Everglades, by Pamela Telis, Bryan McCloskey, and Paul Conrads**
  - **POSTER - EDEN-Syn – Moving from “What Was” to “What If”, by Paul Conrads, Ruby Daamen, Edwin Roehl, and Stephen Benedict**
  - **POSTER – Everglades Depth Estimation Network (EDEN): Integrating real-time networks to provide hydrologic data for the restoration of the Everglades, by Heather Henkel, Paul Conrads, and Pamela Telis**
- Southeast Coastal Ocean Observing Regional Association (SECOORA Workshop Jacksonville, FL)
  - Participated on Water-Quality Panel and used EDEN example of integrating upstream water levels and downstream salinity response.

**IV. ADMINISTRATIVE (Contractual and Budgetary)**

- Florida Atlantic University (FAU, Dr. Zhixiao Xie) was funded by the EDEN project through a CESU agreement in FY13 for:
  - Development and testing of the sub-domain model for south WCA3A for use in the EDEN-Syn application
  - Support to complete the final draft of the USGS report to document the EDEN surface-water model Version 2.

**V. FY13 DELIVERABLES/REPORTS**

- EDENweb has been updated throughout the year to provide data, metadata, and documentation to MAP PIs and others.
- Quarterly reports have been submitted on time to the RECOVER MAP coordinators.
- Graphics and text for 2014 System Status Report
- Published USGS-series report
  - *Estimation of Missing Water-Level Data for the Everglades Depth Estimation Network (EDEN)* by Matthew D. Petkewich and Paul A. Conrads.

**VI. FY14 WORKPLAN**

This plan includes work elements funded from both RECOVER MAP and USGS GEPES:

- Continue to generate and post daily water-level surfaces of the Everglades for users
- Document all the new work via USGS series reports and journal articles
- Develop EVE Version 1 to make EDEN water level gage data accessible to users
- Complete EDEN-Syn application and documentation, post to EDENweb
- Provide training for users about EDEN datasets, EDENweb, and EDEN resources
- Participate in one or more conferences and present recent EDEN analyses and results
- Support preparation of the final version of 2014 System Status Report
- Revise EDEN data management plan.
- Integrate THREDDS Server into user experience
- Continue to expand Coastal EDEN datasets and webpage based, in part, on user needs
- Conduct a user survey to obtain specific information about user needs for hydrologic data
- Enhance the percentile plots for monitoring ERTTP to include elements requested by Miccosukee Tribe
- Explore integration of EDEN datasets with ecological models
- Explore other ground elevation data that might be used to enhance the EDEN ground elevation data i.e. ENP and BCNP
- Explore model logistics for finer resolution water-level model results in areas of interest, i.e. C111 spreader canal project area
- Explore correlations of other datasets, such as sea level or groundwater salinity, with water levels estimated by EDEN

**VII. ANTICIPATED NEEDS AND ISSUES**

- Several USACE-funded water-level gages have not had elevation surveys in several decades. These gages are significant gages used by the EDEN surface-water model and used by scientists and managers for managing water resources in the Everglades. It is important that funding be made available to have updated surveys conducted at these gages to ensure the best possible datasets used by EDEN and others.

**VIII. FUNDING STATUS**

- As of 9/30/13, all of the FY12 funding under USGS IA #28 has been expended or obligated. Invoices will be electronically submitted to the USACE within the next few months.
- USGS Priority Ecosystem Science (PES) funding in FY13 was approximately \$300,000 to multiple principal investigators in support for EDEN research efforts. This level of support is expected to be continued in FY14 with a potential 5-10% cut.