

EDEN Real-Time Evaluation Tools: Cape Sable Seaside Sparrow Habitat Viewer and Tree Island Inundation Monitoring

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<http://sofia.usgs.gov/eden/>

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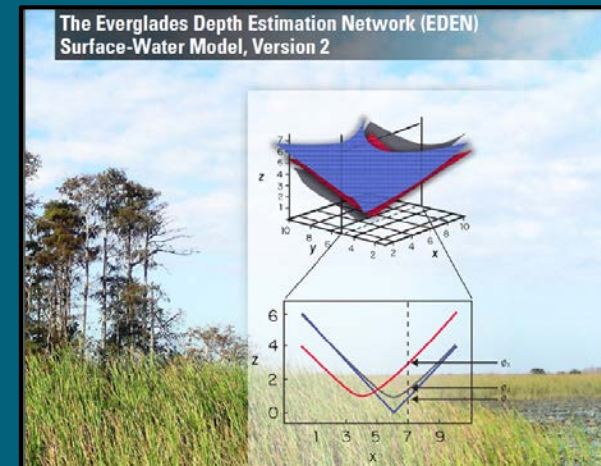
Background: What is EDEN?

An integrated network of water-level gages, interpolation models that generate daily water-level and water-depth data, and applications that compute derived hydrologic data across the freshwater part of the greater Everglades landscape



*RECOVER: Restoration Coordination & Verification
A Federal-State (Florida) partnership*

GEPES: USGS Greater Everglades Priority Ecosystems Science

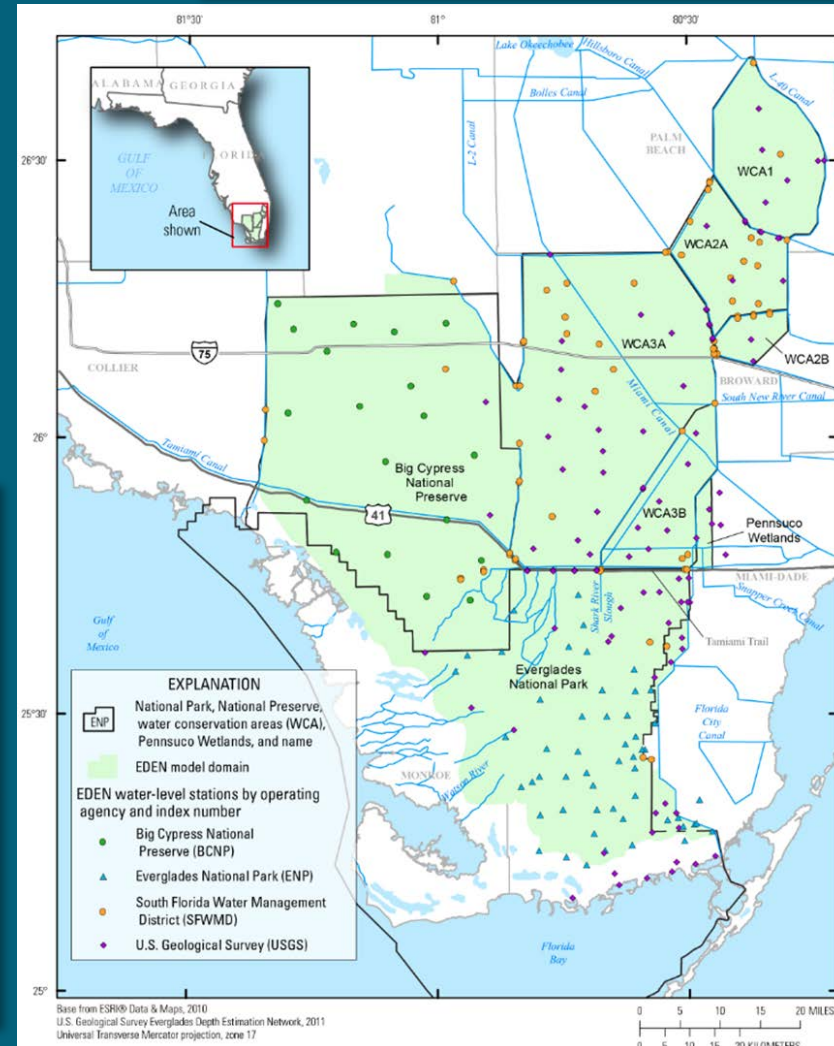


<http://pubs.usgs.gov/sir/2014/5209/>

The Monitoring Network

314 water-level stations (275 real-time) are served by EDEN and operated by:

- ❖ USGS
- ❖ Everglades National Park
- ❖ Big Cypress National Preserve
- ❖ South Florida Water Management District

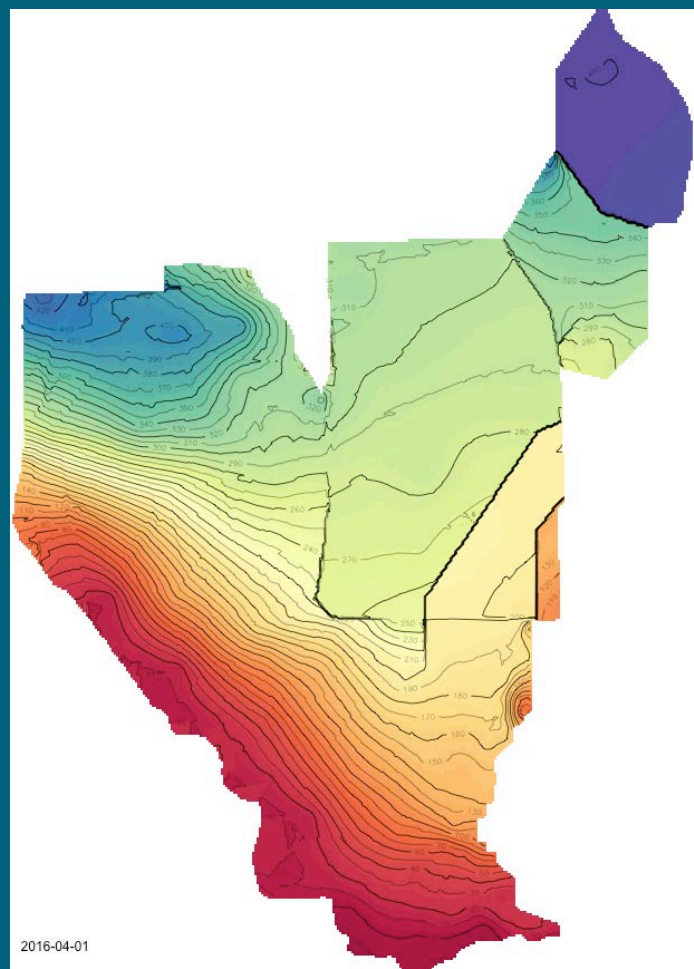
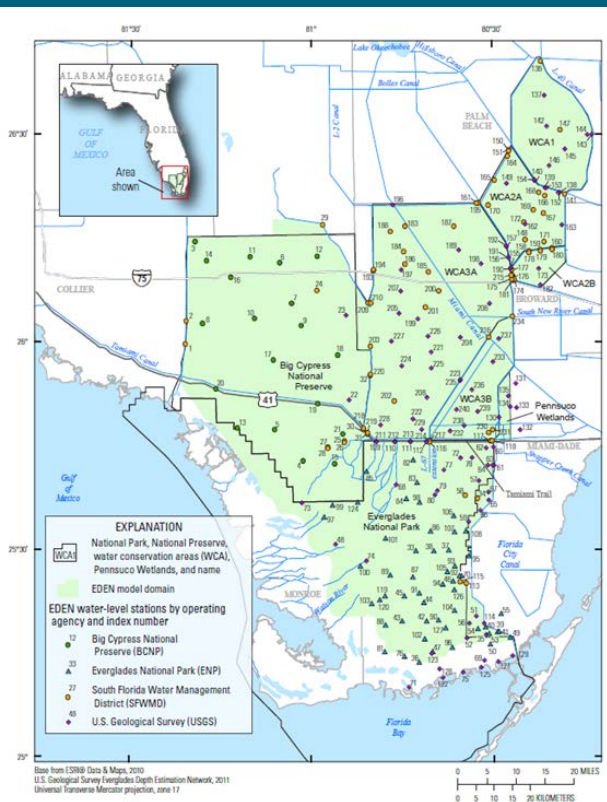


From Monitoring Data to Water-level Surfaces



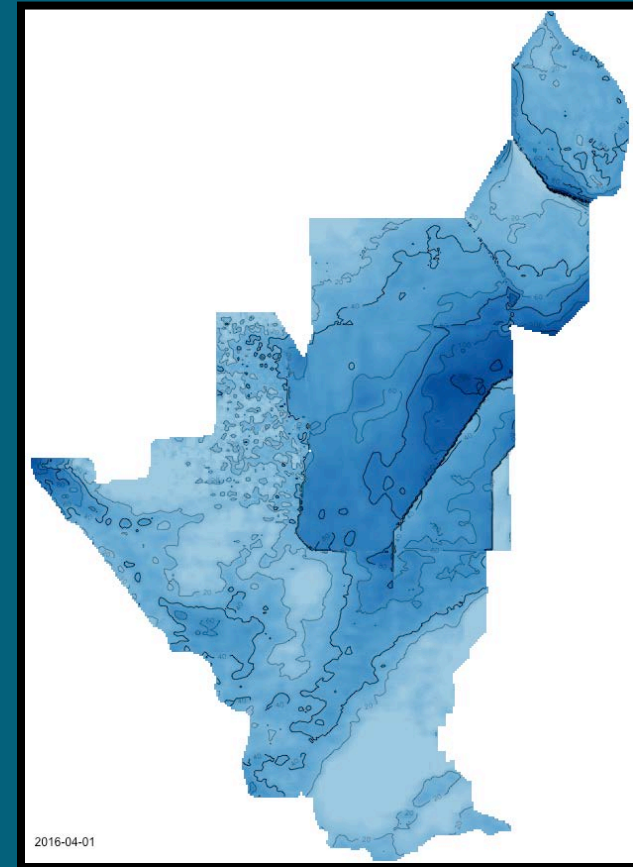
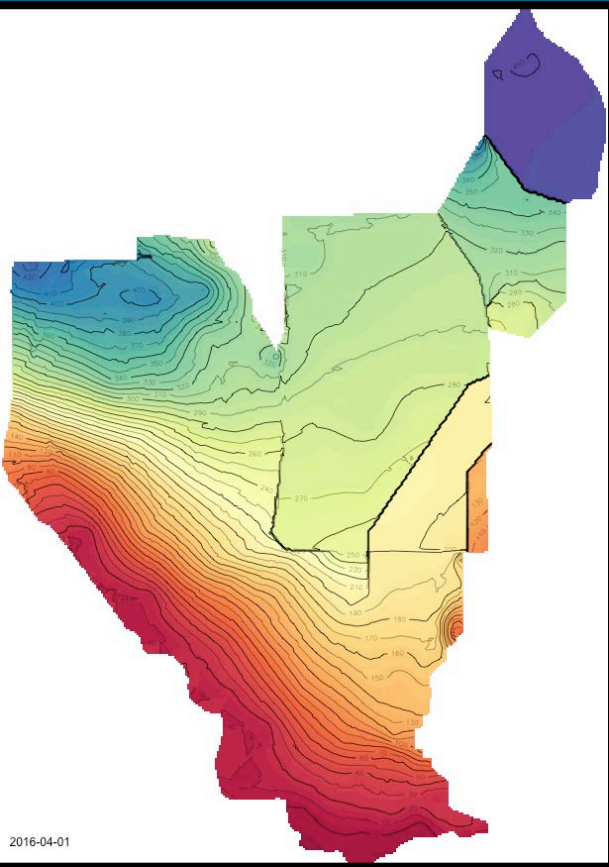
WATER-LEVEL SURFACES

- ❖ Daily, from 1991 – present
- ❖ Near real-time, provisional (quarterly), and final (annual)
- ❖ 400 x 400 meter grid (over 57,000 cells)



From Water-level Maps to Water-depth Maps

Water Level surfaces → Digital Elevation Model → Water Depth surfaces



EDEN Web Applications

– CSSS viewer continued...



<http://sofia.usgs.gov/eden/csss/>

Water-Depth Map Summary Statistics

secutive dry days

Year	A Nesting		B Nesting		C Nesting		D Nesting		E Nesting		F Nesting	
	≥ 40	≥ 90	≥ 40	≥ 90	≥ 40	≥ 90	≥ 40	≥ 90	≥ 40	≥ 90	≥ 40	≥ 90
1992	56.2%	25.8%	95.2%	90.7%	100%	100%	97.6%	80.9%	100%	99.1%	100%	100%
1993	2.9%	0.2%	78.1%	60.1%	98.7%	97.4%	72.8%	58.5%	91.9%	62.4%	100%	100%
1994	22.9%	3.1%	94.6%	73%	96.2%	82.1%	56.5%	22.8%	99.7%	70.3%	100%	100%
1995	0%	0%	70.4%	44.7%	98.7%	89.7%	58.1%	20.3%	46.3%	19.2%	100%	99.3%
1996	21.4%	2.3%	79.1%	42%	100%	43.2%	88.2%	34.1%	82%	48.8%	100%	86.3%
1997	22.4%	10.5%	86.5%	55.1%	100%	81.2%	94.3%	70.7%	98.6%	35.5%	100%	100%
1998	27.1%	5.6%	87.5%	47.5%	98.3%	95.3%	58.1%	17.5%	95.8%	44.8%	100%	100%

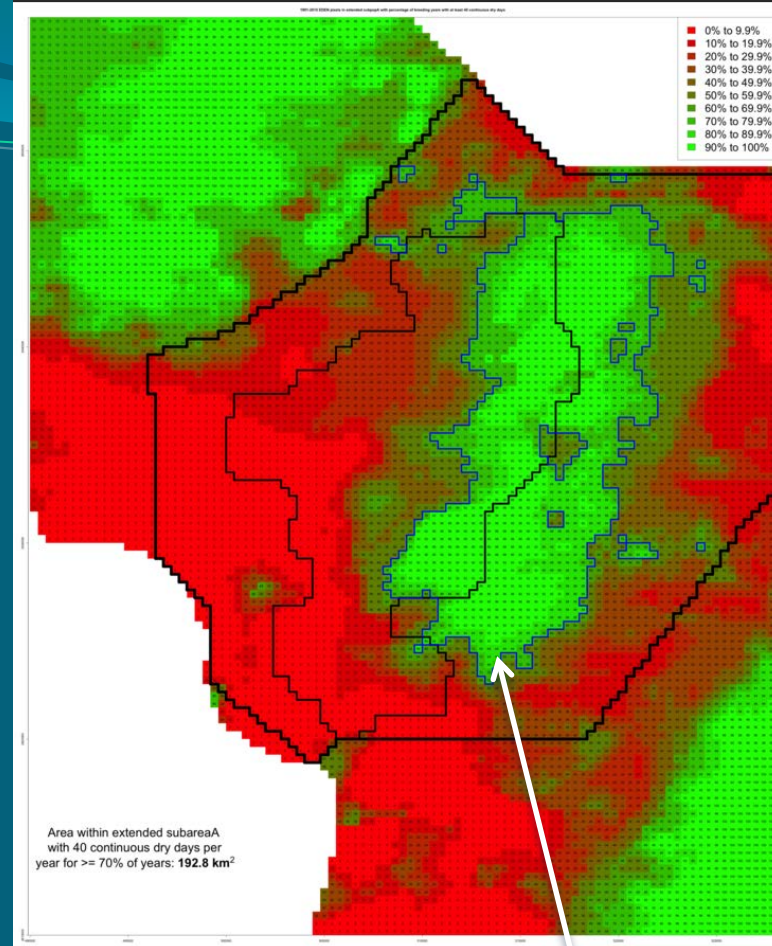
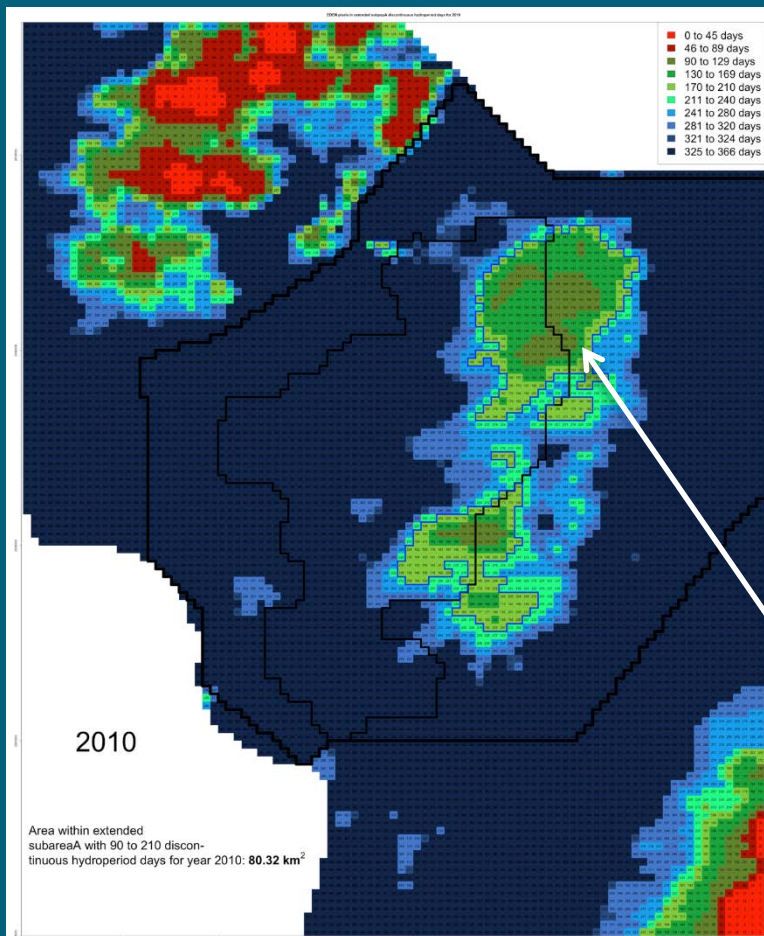
Annual Statistics: Non-consecutive hydroperiod

Year	A Annual			B Annual			C Annual			D Annual			E Annual			F Annual		
	0 to 89	90 to 210	≥ 211	0 to 89	90 to 210	≥ 211	0 to 89	90 to 210	≥ 211	0 to 89	90 to 210	≥ 211	0 to 89	90 to 210	≥ 211	0 to 89	90 to 210	≥ 211
1992	0%	22.5%	77.5%	26.8%	56.9%	16.4%	91.5%	8.5%	0%	32.9%	44.3%	22.8%	32.6%	67.3%	0.2%	100%	0%	0%
1993	0%	0.2%	99.8%	34.8%	26.9%	38.3%	43.6%	55.1%	1.3%	8.5%	52.4%	39%	31.1%	34.6%	34.3%	92.5%	7.5%	0%
1994	0%	2.1%	97.9%	20.9%	52.2%	26.9%	15.8%	80.3%	3.8%	3.7%	51.6%	44.7%	4.9%	75.4%	19.7%	67.1%	32.9%	0%
1995	0%	0%	100%	6.4%	31.2%	62.4%	8.1%	50%	41.9%	0%	5.7%	94.3%	0%	5.5%	94.5%	47.9%	28.1%	24%
1996	0%	0.1%	99.9%	32.8%	27%	40.1%	56.8%	41.9%	1.3%	5.7%	52.4%	41.9%	17.4%	26.4%	56.2%	88.4%	11.6%	0%
1997	0%	2.8%	97.2%	18.7%	30.8%	50.5%	14.1%	85.9%	0%	3.7%	54.9%	41.5%	7.4%	28.3%	64.3%	88.4%	11.6%	0%
1998	0%	0.7%	99.3%	25.1%	13.8%	61.1%	59%	33.3%	7.7%	6.5%	19.9%	73.6%	14.6%	16.6%	68.9%	94.5%	5.5%	0%



Other Uses of EDEN Data

BIOLOGICAL OPINIONS: The US Fish and Wildlife Service is currently working with EDEN to update information on CSSS sub-population areas.



> 40 continuous breeding season dry days

90 to 210 discontinuous hydroperiod days

EDEN Web Applications

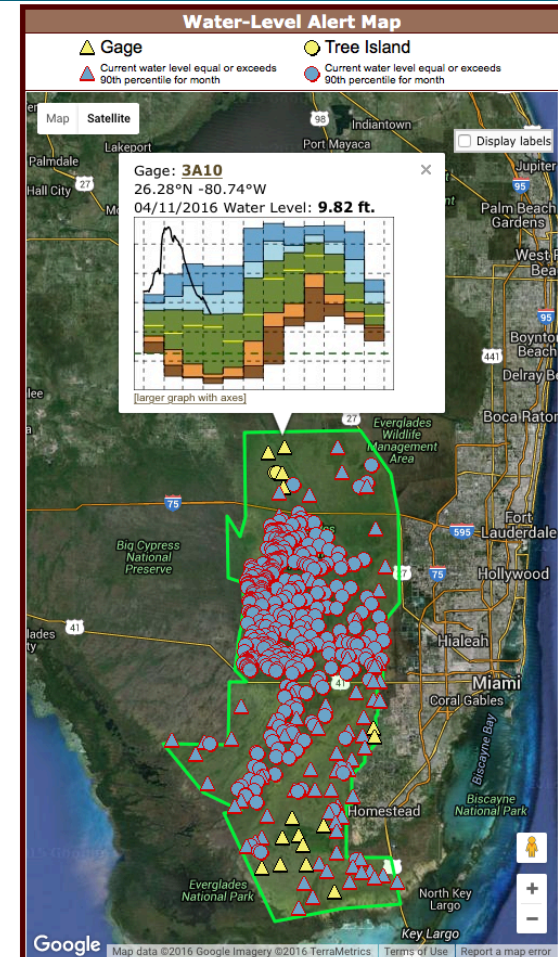
Everglades Restoration Transition Plan (ERTP) monitoring

- ❖ ERTP monitoring application was developed to compare near real-time water levels to water-level statistics from the previous water management plan, the Interim Operational Plan (IOP)
- ❖ Includes 394 tree islands (TI) and 106 monitoring stations within the area of interest (WCA3A, WCA3B, and ENP)
- ❖ Daily value of blue gages and TIs exceed the 90th percentile for the month

- A list of gages and tree islands is available below.
- Download a Google Earth (KML) file or view a list of gages and tree islands in Google Maps

EDEN-domain WCA3A, WCA3B, and ENP Tree Island and Gage Listing
 Click on radio button to locate on map.
 (Gages and tree islands with current water levels above 90th percentile for the month in **bold**.)

Tree Island	Gage
<input type="radio"/> 3A-1-1	<input checked="" type="radio"/> 3A10
<input type="radio"/> 3A-1-2	<input type="radio"/> 3A11
<input type="radio"/> 3A-1-3	<input type="radio"/> 3A12
<input type="radio"/> 3A_10_1	<input type="radio"/> 3AN1W1
<input type="radio"/> 3A_10_2	<input type="radio"/> 3ANE_GW
<input type="radio"/> 3A_10_3	<input type="radio"/> 3ANW_GW
<input type="radio"/> 3A_10_4	<input type="radio"/> 3AS
<input type="radio"/> 3A_10_5	<input type="radio"/> 3AS3W1
<input type="radio"/> 3A_11_1	<input type="radio"/> 3ASW
<input type="radio"/> 3A_11_2	<input type="radio"/> 3B-SE
<input type="radio"/> 3A_11_3	<input type="radio"/> 3BS1W1
<input type="radio"/> 3A_11_4	<input type="radio"/> A13
<input type="radio"/> 3A_11_5	<input type="radio"/> ANGEL
<input type="radio"/> 3A_11_6	<input type="radio"/> CP
<input type="radio"/> 3A_11_7	<input type="radio"/> CR2
<input type="radio"/> 3A_11_8	<input type="radio"/> CR3
<input type="radio"/> 3A_11_9	<input type="radio"/> CT27R
<input type="radio"/> 3A_11_10	<input type="radio"/> CT50R
<input type="radio"/> 3A_11_11	<input type="radio"/> CV5NR
<input type="radio"/> 3A_11_12	<input type="radio"/> CY2
<input type="radio"/> 3A_11_13	<input type="radio"/> CY3
<input type="radio"/> 3A_11_14	<input type="radio"/> DO1
<input type="radio"/> 3A_11_15	<input type="radio"/> DO2
<input type="radio"/> 3A_11_16	<input type="radio"/> E112
<input type="radio"/> 3A_11_17	<input type="radio"/> E146
<input type="radio"/> 3A_11_18	<input type="radio"/> EDEN_10
<input type="radio"/> 3A_11_19	<input type="radio"/> EDEN_12
<input type="radio"/> 3A_11_20	<input type="radio"/> EDEN_14
<input type="radio"/> 3A_11_21	<input type="radio"/> EDEN_3
<input type="radio"/> 3A_11_22	<input type="radio"/> EDEN_4
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<input type="radio"/> 3A_11_24	<input type="radio"/> EDEN_7
<input type="radio"/> 3A_11_25	<input type="radio"/> EDEN_8
<input type="radio"/> 3A_11_26	<input type="radio"/> EDEN_9



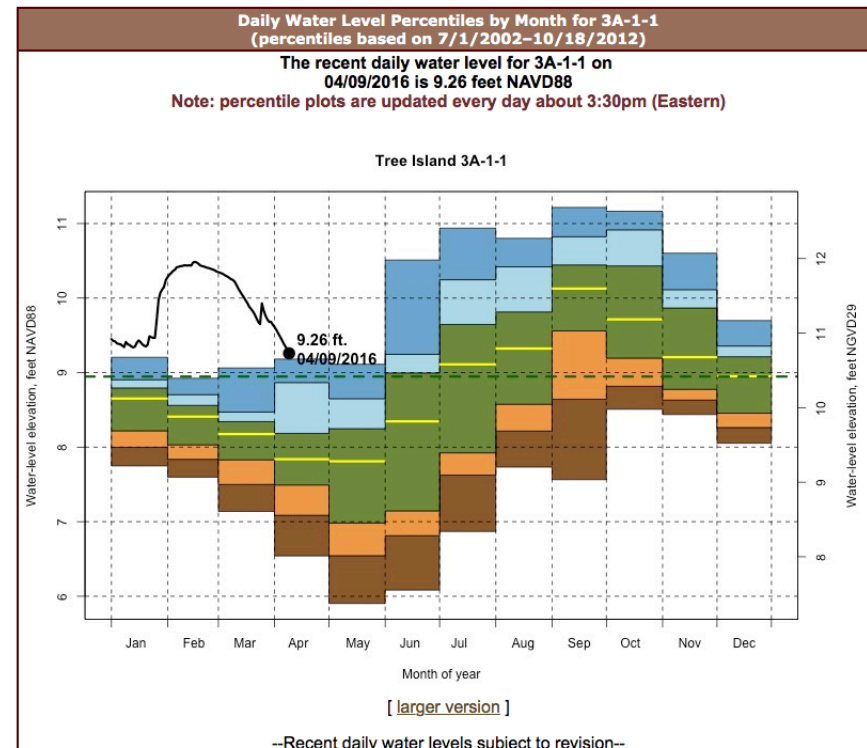
Google Map showing EDEN-domain WCA3A, WCA3B, and ENP gages and tree islands. This map requires enabled JavaScript to view; if you cannot fully access the information on this page, please contact Heather Henkel.

References to non-U.S. Department of the Interior (DOI) products do not constitute an endorsement by the DOI. By viewing the Google Maps API on this web site the user agrees to these TERMS of Service set forth by Google.

EDEN Web Applications – E RTP continued...

- ❖ IOP-period monthly water levels are calculated for all gages and TIs, and current conditions are compared to those percentiles
- ❖ Users with cultural, recreational, and environmental concerns can track inundation of tree islands relative to historic levels
- ❖ Automated daily email sent to users notifying which gages and tree islands exceed 90th percentile monthly historic water level

Tree Island ID: 3A-1-1
 Location: Latitude 26°12'3.02", Longitude -80°31'43.07"
 Subbasin Location: WCA3A
 Maximum ground elevation (ft. NAVD88): 8.947 (as reported by Carlos Coronado, SFWMD)
 Vertical conversion at tree island (ft.) used by EDEN (NGVD29 to NAVD88): -1.47



EXPLANATION		For more information:
	90th Percentile to Maximum	<ul style="list-style-type: none"> • About Water-level Data • Methods • Email Alert System
	75th to 90th Percentile	
	25th to 75th Percentile	
	10th to 25th Percentile	
	Minimum to 10th Percentile	
	Median water level	
	Recent daily water level	
	Maximum ground elevation at tree island	

EDEN Web Applications

<http://sofia.usgs.gov/eden/eve/>

Explore and View EDEN (EVE)

- ❖ EDEN data visualization tool
- ❖ Users can view and download water-level, rainfall, and evapotranspiration data for all EDEN monitoring locations

Explore and View EDEN (EVE)

Timeseries

Start: 2014-04-16
End: 2016-04-15

Site List

Select multiple gages by holding the control (PC) or command (Mac) key.

- 3A10
- 3A11
- 3A12
- 3A9
- 3AN1W1
- 3ANE
- 3ANE_GW
- 3ANW
- 3ANW_GW
- 3AS
- 3AS3W1
- 3ASW
- 3B_SE
- 3BS1W1
- A13
- ANGEL
- BARW4
- BARW6A
- BCA1
- BCA10

Parameters

Water level
 Daily median
 Hourly
 Rainfall
 Evapotranspiration

Views

Graph
 Table

Update Selection

Send feedback about EVE

[Download selected data](#)

BCA10 **BCA11** **BCA12** **BCA13** **BCA14**

Go to EDEN station page for **BCA10**

Operating Agency: BCNP (Agency POC)

Vertical Conversion at Gage (feet) used by EDEN (NGVD29 to NAVD88): -1.43 ft.

Available EDEN data	Period of record
Water Level (measured)	1990-01-01 — 2016-04-14
Rainfall	2002-01-01 — 2016-01-31
Evapotranspiration	1995-06-01 — 2014-12-31

Go to BCNP for complete datasets for this gage

Legend

- BCA10
- BCA11
- BCA12
- BCA13
- BCA14
- Observed data
- Estimated data
- Hindcasted data
- Dry conditions

Recent water levels subject to revision. Non-final data are either **real-time** or **provisional**.

Daily Median Water Level

2012/02/25: P33 ft. NAVD88: 4.47 ft. NGVD29: 5.98

Total Daily Rainfall

in. / 5.08 cm

Total Daily Potential Evapotranspiration

mm / 0.5 cm

Daily Median Water Level

2014/09/02: BCA10: 2.92 BCA11: 3.66 BCA12: 13.32 BCA13: 11.71 BCA14: 9.02

Total Daily Rainfall

2014/05/29: BCA10: 0.01 BCA11: 0.04 BCA12: 0.29 BCA13: 0.66 BCA14: 0.81

in. / 0.81 cm

Total Daily Potential Evapotranspiration

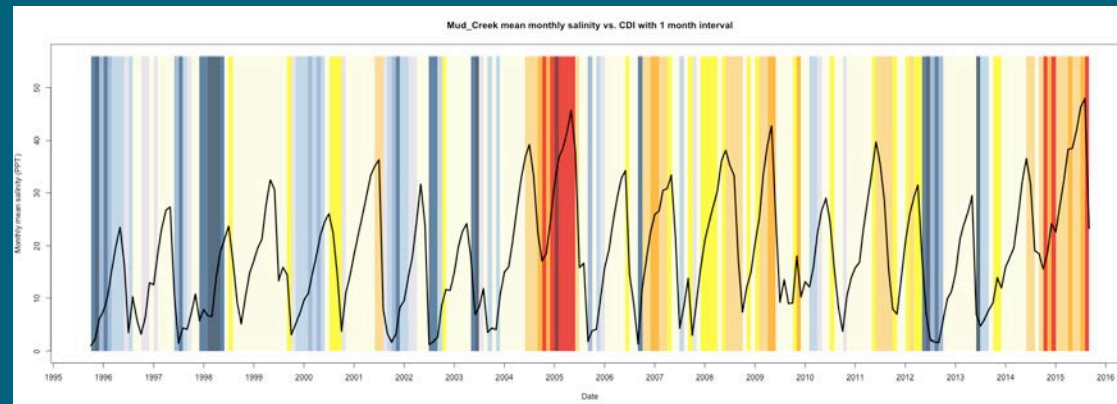
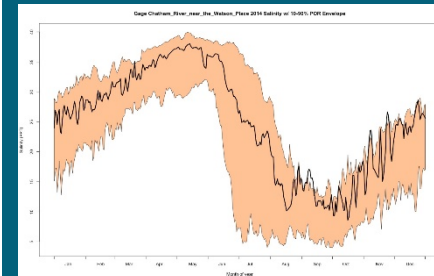
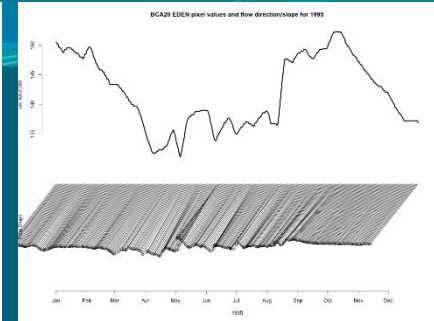
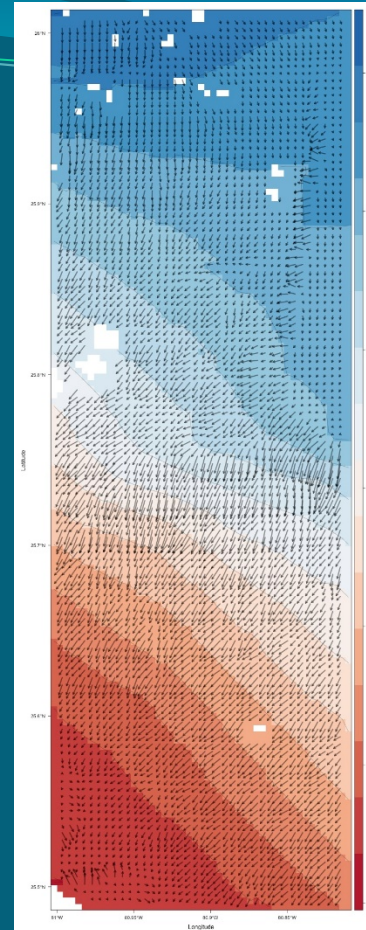
mm / 0.5 cm

Other/Future EDEN Tools

Coastal Drought Index: Using coastal salinity data as an indicator of drought/wet conditions

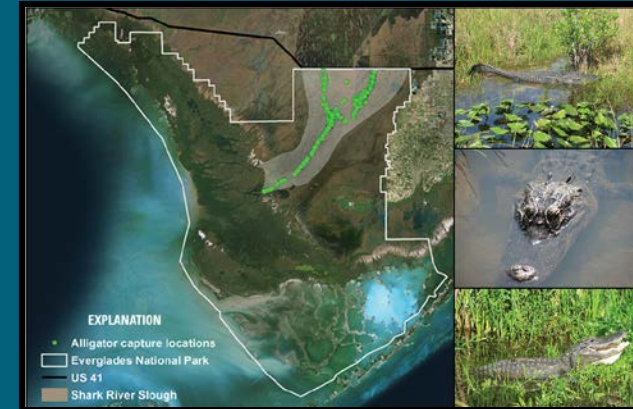
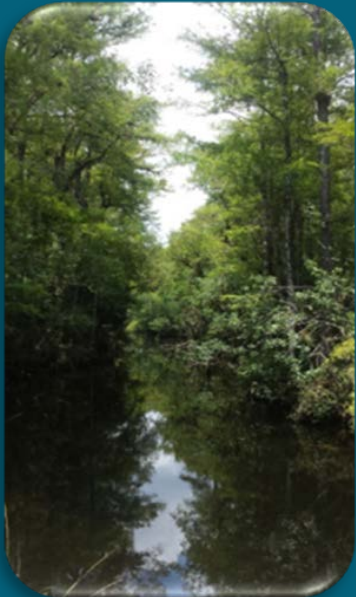
Water surface vectors: Water level surface slopes over space and time

Mobile EDEN applications: Making EDEN data and tools available to researchers in the field





QUESTIONS?



Acknowledgements

This work would not have been possible without the vision of [Aaron Higer](#) (deceased), the dedication of the EDEN Team: [Pamela Telis](#) (retired), [Paul Conrads](#), [Heather Henkel](#), [Matt Petkewich](#), and [Eduardo Patino](#), and significant contributions from many others.