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# Vital Signs Water Quality Data Management in the National Park Service

by

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**National Park Service**

**Water Resources Division**

**Fort Collins, CO**

# Presentation Overview

National Park Service  
U.S. Department of the Interior

Water Resources Division  
Fort Collins, CO



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## Vital Signs Background



## WQ Data Mgt. Challenges



## The Path Chosen



## Lessons Learned



Lassen Volcanic National Park, CA





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-  NPS Organic Act
-  Preservation/Use Mandate
-  Use Very Successful
-  Preservation Record Mixed









# Vital Signs Background

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-  By the year 2000, 80 (1/3) of the “natural resource parks” had no professional natural resource manager
-  Another 84 parks had only 1 or 2 natural resource professionals.
-  Almost all projects/studies were short-term; staff mostly deals with the “crisis of the day”.
-  Few parks are able to identify the ‘desired future condition’ of resources, or current status & trend.

No Time      No Money      No Clue

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## NPS Natural Resource Challenge

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-  Provides funding and new positions for natural resource stewardship to add to NPS visitor services capability
-  Learn what is in parks (inventories), and monitor the vital signs of natural systems
-  Engage the scientific community and the public, and facilitate their inquiries
-  Share the information widely



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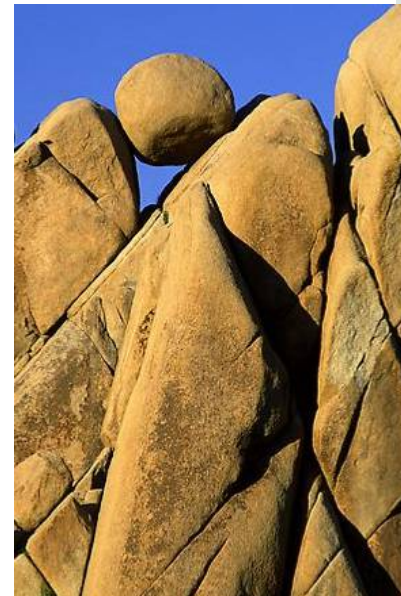


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**Revitalize and expand the natural resource program within the NPS  
& improve park mgt. through greater reliance on scientific knowledge**

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- 🔦 Accelerate **Inventories**
- 🔦 Design/Implement **Vital Signs Monitoring**
- 🔦 **Collaboration** with scientists and others
- 🔦 Improve **Resource Planning**
- 🔦 Enhance **Parks for Science**
- 🔦 Assure **Fully Professional Staff**
- 🔦 Control **Non-native Species**
- 🔦 Protect **Native and Endangered Species**
- 🔦 Enhance **Environmental Stewardship**
- 🔦 Expand **Air Quality** efforts
- 🔦 Protect and restore **Water Resources**
- 🔦 Establish **Research Learning Centers**



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The intent of park vital signs monitoring is to track a subset of physical, chemical, and biological elements and processes of park ecosystems that are selected to represent the overall health or condition of park resources, known or hypothesized effects of stressors, or elements that have important human values.



Scotts Bluff National Monument, Nebraska

# NPS Vital Signs Networks

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**270 Parks Grouped into  
32 Monitoring Networks**

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Vital Signs Monitoring Framework		
Level 1 Category	Level 2 Category	Examples of Vital Signs Selected by First 12 Networks
Air and Climate	Air Quality	Ozone, wet and dry deposition, visibility and particulate matter, air contaminants
	Weather and Climate	Weather and climate
Geology and Soils	Geomorphology	Glaciers, shoreline change, channel morphology, physical habitat index
	Subsurface Geologic Processes	Cave air quality, seismic activity
	Soil Quality	Biological soil crusts, soil structure and stability, soil cover, permafrost
Water	Hydrology	Groundwater dynamics, surface water dynamics, stream flow, lake and pond elevation, saltwater marsh water table
	Water Quality	Water chemistry, chloride flux, kettle pond acidification, nutrient loading and eutrophication, pollutant metals, aquatic macroinvertebrates
Biological Integrity	Invasive Species	Invasive/Exotic plants early detection, areal extent of established populations, exotic aquatic assemblages
	Infestations and Disease	Whitebark pine disease, forest insect/disease outbreaks
	Focal Species or Communities	Landbirds, forest vegetation structure & composition, fish communities, intertidal communities, salt marsh vegetation, seagrass communities, wetland vegetation, riparian plant communities, prairie grassland communities, freshwater mussels, cave

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## Overall Purpose of Vital Signs Monitoring:

**Determine status/trends  
in the condition of park resources:**

-  Assess the efficacy of management and restoration efforts;
-  Provide early warning of impending threats and/or stressors;
-  Provide a basis for understanding and identifying *meaningful change* in natural systems characterized by complexity, variability, and surprises – improve decision-making.

North Cascades  
National Park

# Vital Signs WQ Data Mgt

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## The Challenge



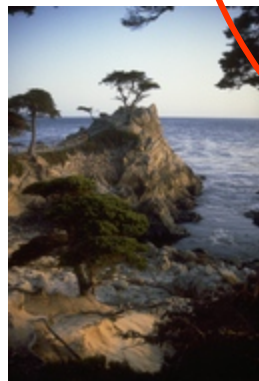
*Physical*

*Chemical*

*Other*



*Biological*



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# WQ Data Mgt. Challenges

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 Archive Data in STORET Data Warehouse

 Decentralized Network Approach

- 32 Different Monitoring Programs

 Scarce Funding/Small Staff

 Limited or no Top-Down Authority

- Guidance, but No Standards

 Remote Locations/Limited Internet Capability



# Overcoming Challenges

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## Existing Implementation of STORET

- 17,667 Sites
- 2,155,540 Results
- 976 Characteristics
- 194 NPS Units



Olympic National Park, WA



## Committed Staff



## Regulatory Monitoring Charge/CWA



## Requirement: Data into STORET

# The Chosen Path

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## Two pronged approach:



# NPSTORET



# NPSEDD



Olympic National Park, WA



Microsoft  
Access-based



N.R. Database  
Template for  
Water Quality



Tailored to  
flow data to  
STORET



STORET-lite



Virgin Islands National Park, VI

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# NPSTORET Main Switchboard

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NPSTORET Main Switchboard

Delete Org & All its Data ...

Copy Org & All its Data from NPSTORET Back End ...

<--- Alpha Testers

<--- System Users



**Main Templates**

Projects

Stations

Metadata

Results

Reports & Stats

Exit

About ...

Import ...

Options ...

Select the Organization Whose Data You'd Like to Edit or Click "Add New ...":

Available Organizations:

CUPN	Cumberland Piedmont Network
CUVA	Cuyahoga Valley National Park
GRBA	Great Basin National Park
GRYN	Greater Yellowstone Inventory and Monitoring Network

Add New ...

Select a Log In ID for this Organization or Click "Add New ...":

Available Log In IDs:

KARST	Joe	Meiman
KJS	Katie	Seadler
SHEPARD	Shepard	McAninch
TOM	Tom	Diggs

Add New ...

NPSTORET v.0.97  
April 4, 2006

Re-Link ...

STORET Ref. Tables v.0.97  
April 4, 2006



# NPSTORET Project Template

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Project ID: SHIL\_WQ for: Cumberland Piedmont Network

Sort by: Date of Last Edit

NPSTORET Project Entry Template

Jump to Project ID:

Main	Additional Info ...	Stations	Characteristics	Personnel	Documents	Citations
Project ID:	SHIL_WQ					
Project Name:	CUPN WQ Monitoring, SHIL					
Start Date:	10/1/2004 ...	Project Duration:	Long Term			
Project Purpose:	Paramount to the conservation of the surface and subsurface aquatic ecosystems of a park, is the knowledge of and the ability to recognize long-term trends in water quality. Over the next few years many inventory efforts, including those pertaining to aquatic biota, will be conducted throughout the Cumberland-Piedmont Network (CPN). For the first time many park managers and researchers will be able to see the effects of landscape-scale use and change upon the dependent aquatic ecosystems. Central to any long-term aquatic monitoring effort are water quality monitoring data. Through recent research at Mammoth Cave, built upon a scientifically sound and statistically rigorous program by the United States Geological Survey (USGS) we have determined the most accurate methods and protocols for surface and groundwater sampling. We know that a solid program be based upon non-conditional synoptic sampling in order to track long-term trends in water quality.					1508
Contact:	Joe Meiman, Hydrogeologist Division of Science and Resources Management Mammoth Cave National Park P.O. Box 7 Mammoth Cave, KY 42259  phn: 270-758-2137					206
Study Area:	The streams and springs of Shiloh National Military Park					56

Project: 1 of 14 (Filtered)

Add New Project

Delete Project

Close Projects

Export to SIM

# NPSTORET Station Template

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StationID: KIMO\_SCSC for: Cumberland Piedmont Network

Sort by:

## NPSTORET Station Entry Template

Jump to Station ID:

Main

Additional Info ...

Pictures

Station ID:  Name:

Primary Type:  Est. Date:

Latitude:    Longitude:    Geo. Method:

- OR -  - OR -  Geo. Datum:

Decimal Degrees:   Map Scale:

Latitude Longitude

Elevation:  Units:  Method:  Datum:

County:  State:  HUC:  NRCS ID:  NHD:

Water Depth:  Units:

Station Description:  281

Travel Directions:  294

Station:   of 82 (Filtered)

# NPSTORE Metadata Template

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Organizational Metadata for: Cumberland Piedmont Network

## NPSTORE Metadata Template

1. Collection Procedures	2. Gear Configurations	3. Preserve/Transport	4. Analytical Procedures	5. Lab Sample Prep
6. Characteristics	7. Characteristic Groups	8. Laboratory Info	9. Staff and Roles	10. Citations

### Define Your Characteristics

Define the characteristic: OK: ☐ Y ☐ Sort Results: 1003 Jump to Characteristic:

STORE Characteristic Name: Nitrogen, Nitrate (NO3) as NO3 Local Name: NO3 Seq.: 19

Sample Fraction: Total Units: mg/l Medium: Water Field/Lab: Lab

Value Type: Actual Statistic Type: Duration: Weight Basis:

Temp. Basis: Particle Size Basis:

Choose previously entered procedures, configuration, & lab:

Analytical Procedure: 4110-B: Anions in Water by Ion Chromatogr Lab Sample Prep. Procedure:

Collection Procedure: CUPN\_GRAB: Grab Sample Gear Configuration: CUPN\_STFAR: Standard Field Array

Handling Procedure: CUPN\_ANION: Anion Collection

Lab Analysis Done by: CUPN\_WAT: WATERS Laboratory Lab EPA Certified for this Characteristic: ☐

Enter detection and/or quantification limits:

Detection Limit: 0.02 Lower Quantification Limit: 0.0636 Upper Quantification Limit:

Detection/Quantification Limit Description: MDL from Lab, PQL computed as 3.18x the MDL

Enter range value checks for QA/QC: Lower Range Value: Upper Range Value:

Enter any other characteristic details: Characteristic Description:

Characteristic: 17 of 38 (Filtered) Add New Characteristic Delete Characteristic

Close Metadata

# NPSTORET Result Template

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Visits, Activities, and Results for Project: CUPN WQ Monitoring, SHIL

Jump to Station Visit:  **NPSTORET Result Entry Template** Choose Input Group: All Organization Charact...

Station ID:  Activity ID:  Replicate #:  QA/QC Sample: ☐

Start Date:  Start Time:  Zone:  Vis# 001  
End Date:  End Time:  Zone:

Depth:  Units:  Custody ID:   
Relative Depth:  Person:

Visit Comment:  23  
Add New Visit Delete Visit

Activity Comment:  87  
Add New Activity Delete Activity

Visit:  of 90 (Filtered) Pictures: 0  
Activity:  of 1

Double-click on a result record to pop up an alternate data editing form Clean Activity Auto Fill

Local Name	Detection Condition	Result Value	Units	Value Status	Value Type	Lab Remarks	C
Air Temp	Detected and Quantified	25.5	deg C	Final	Actual		
Water Temp	Detected and Quantified	17.3	deg C	Final	Actual		
SPC	Detected and Quantified	24.7	mS/cm	Final	Actual		
pH	Detected and Quantified	5.9	None	Final	Actual		
DO sat	Detected and Quantified	91.8	%	Final	Actual		
DO conc	Detected and Quantified	8.21	mg/l	Final	Actual		
ANC Field	Detected and Quantified	4.8	mg/l CaC	Final	Actual		
FC Field	Detected and Quantified	150.6	#/100ml	Final	Calculated		
Flow	Detected and Quantified	NORMAL		Final	Actual		
Discharge	Detected and Quantified	5.89	l/sec	Final	Calculated		
Weather	Detected and Quantified	0		Final	Actual		
Precip Past Week	Detected and Quantified	0	cm	Final	Estimated		
Cl	Detected and Quantified	1.6203	mg/l	Final	Actual		
NO2	*Non-detect	*Non-detect	mg/l	Final	Actual		
NO3	Detected and Quantified	12	mg/l	Final	Actual		
SO4	Detected and Quantified	2.7788	mg/l	Final	Actual		
Na	Detected and Quantified	1.75	mg/l	Final	Actual		

Record:  of 23

Import Close Results Export to SIM



# NPSTORE Reports & Stats

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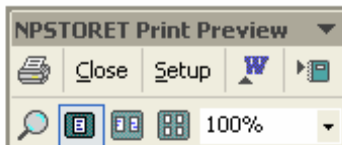


NPSTORE Results List

NPSTORE Stations List, Sorted by ID

NPSTORE Print Preview

NPSTORE Characteristics List, Sorted by Sequence Number



## NPSTORE Characteristics

### Cumberland Piedmont Network

Sorted by

	STORET Name	Local Name	Sample Fraction	Unit of Measure	Value Type	Field/ Lab	Medium	Statistic Type	Duration	Weight Basis	Temp. Basis
1	Temperature, air	Air Temp		degC	Act	Field	Air				
2	Temperature, water	Water Temp		degC	Act	Field	Water				
3	Specific conductance	SPC		mS/cm	Act	Field	Water				
4	pH	pH		None	Act	Field	Water				
5	Dissolved oxygen saturation	DO sat		%	Act	Field	Water				
6	Dissolved oxygen (DO)	DO conc		mg/l	Act	Field	Water				
7	Acid Neutralizing Capacity (ANC)	ANC Field	Total	mg/l CaCO <sub>3</sub>	Act	Field	Water				
8	Acid Neutralizing Capacity (ANC)	ANC Lab	Total	mg/l CaCO <sub>3</sub>	Act	Lab	Water				
9	Fecal Coliform	FC Field		#/100ml	Cal	Field	Water				
10	Fecal Coliform	Fecal Lab		#/100ml	Cal	Lab	Water				
11	Flow, stream stage (choice list)	Flow				Field	Water				
12	Flow	Discharge		l/sec	Cal	Field	Water				

# NPSTORE Reports & Stats

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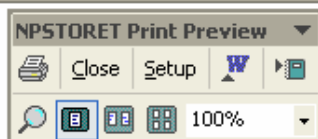
NPSTORE Summary Statistics - Period of Record, Grouped by Station

NPSTORE Water Quality Criteria Analysis - Period of Record, Grouped by Station

NPSTORE Ordered Characteristic Descriptive Statistics - Period of Record, Sorted by Mean DESC

NPSTORE Print Preview

NPSTORE - [NPSTORE Precision Analysis]



## NPSTORE Precision Analysis



Cumberland Piedmont Network

Filtered Results

Project ID: MACA\_WQ

Station ID: MACA\_BSBS

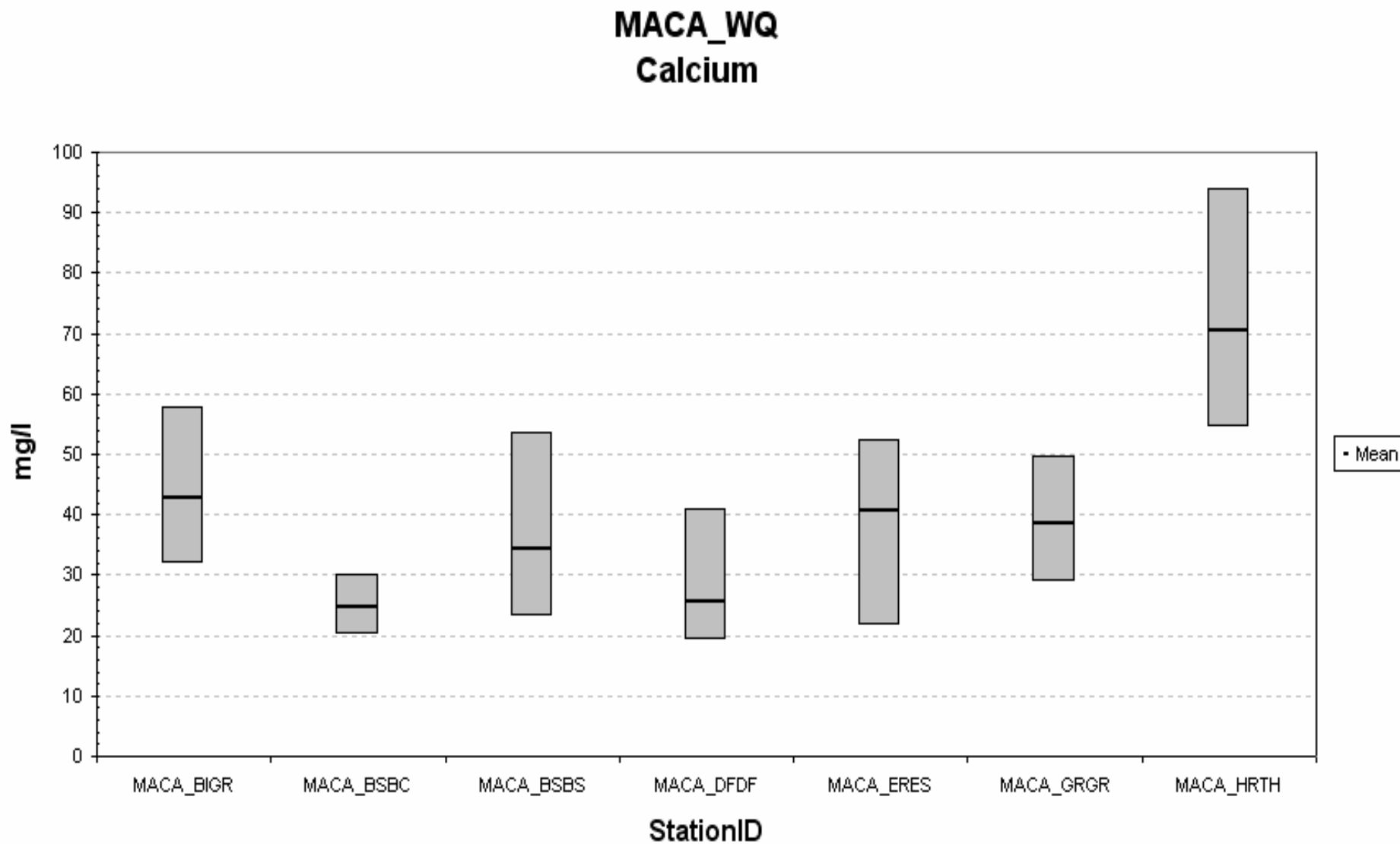
Station Name: Big Spring

Characteristic	Units	Sample Date/Time	Depth (m)	# of Samples	Minimum	Maximum	Mean	Std Dev	% Rel Precision
DO sat	%	9/10/2002		2	100.9	101.1	101	0.1414	0.20%
DO sat	%	7/10/2003		2	90.6	90.6	90.6	0	0.00%
DO sat	%	8/10/2004		2	88	88.7	88.35	0.495	0.79%
DO sat	%	9/10/2004		2	104.7	105.2	104.9	0.3536	0.48%
DO sat	%	12/10/2004 9:25:00 AM - 12/10/2004 9:32:00 AM		2	93.4	93.8	93.6	0.2828	0.43%
DO sat	%	4/11/2005 10:30:00 AM - 4/11/2005 10:36:00 AM		2	92.8	92.9	92.85	0.0707	0.11%
e. Coli	#/100ml	4/11/2005 10:30:00 AM - 4/11/2005 10:36:00 AM		2	9.8	17.1	13.45	5.162	54.28%
FC Field	#/100ml	9/10/2002		2	140	180	160	28.28	25.00%
FC Field	#/100ml	7/10/2003		2	160	171	165.5	7.778	6.65%
FC Field	#/100ml	8/10/2004		2	26	28	27	1.414	7.41%
FC Field	#/100ml	9/10/2004		2	41	45	43	2.828	9.30%
Fecal Lab	#/100ml	12/10/2004 9:25:00 AM - 12/10/2004 9:32:00 AM		2	71.43	77.14	74.29	4.038	7.69%
Fl	mg/l	9/10/2002		2	0.3221	0.3249	0.3235	0.002	0.87%
Fl	mg/l	7/10/2003		2	0.1135	0.1188	0.1161	0.0037	4.57%
Fl	mg/l	9/10/2004		2	0.1198	0.1307	0.1253	0.0077	8.70%
K	mg/l	12/10/2004 9:25:00 AM - 12/10/2004 9:32:00 AM		2	1.03	1.03	1.03	0	0.00%
K	mg/l	4/11/2005 10:30:00 AM - 4/11/2005 10:36:00 AM		2	0.859	0.901	0.88	0.0297	4.77%
Mg	mg/l	12/10/2004 9:25:00 AM - 12/10/2004 9:32:00 AM		2	1.97	1.99	1.98	0.0141	1.01%
Mg	mg/l	4/11/2005 10:30:00 AM - 4/11/2005 10:36:00 AM		2	3.537	3.658	3.597	0.0856	3.36%

# NPSTORET Reports & Stats

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# NPSTORET Reports & Stats

National Park Service  
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	A	B	C	D	E	F	G	H	I
1	ProjectID	StationID	Visit Start Date	Activity/Sample ID	LocCharNameCode	DETECTION_CONDITION	RESULT_TEXT	UOM_NAME	SMPL_FRAC
2	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	Cl	Detected and Quantified	9.0773	mg/l	Total
3	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	NO3	Detected and Quantified	4.1945	mg/l	Total
4	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	Na	Detected and Quantified	5.17	mg/l	Dissolved
5	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	SO4	Detected and Quantified	18.5531	mg/l	Total
6	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	NPOC	Detected and Quantified	2.277	mg/l	Total
7	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	Mg	Detected and Quantified	6.86	mg/l	Dissolved
8	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	Turbidity	Detected and Quantified	4.82	NTU	
9	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	K	Detected and Quantified	2.15	mg/l	Dissolved
10	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	Ca	Detected and Quantified	54.9	mg/l	Dissolved
11	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	Chyl-a	Detected and Quantified	.1133	ppb	Filterable
12	MACA_WQ	MACA_BIGR	10/10/2004	BIGR10102004	Air Temp	Detected and Quantified	21.5	deg C	
13	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	Fecal Lab	Detected and Quantified	46.92	#/100ml	
14	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	Cl	Detected and Quantified	9.1964	mg/l	Total
15	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	NO3	Detected and Quantified	4.5054	mg/l	Total
16	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	Na	Detected and Quantified	5.26	mg/l	Dissolved
17	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	SO4	Detected and Quantified	18.6849	mg/l	Total
18	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	Mg	Detected and Quantified	7.17	mg/l	Dissolved
19	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	K	Detected and Quantified	2.30	mg/l	Dissolved
20	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	Ca	Detected and Quantified	57.8	mg/l	Dissolved
21	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	NPOC	Detected and Quantified	2.109	mg/l	Total
22	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	Turbidity	Detected and Quantified	4.21	NTU	
23	MACA_WQ	MACA_BIGR	10/10/2004	BIGRQ102004	Chyl-a	Detected and Quantified	.1477	ppb	Filterable
24	MACA_WQ	MACA_BSBS	10/10/2004	BSBS10102004	DO sat	Detected and Quantified	80.7	%	
25	MACA_WQ	MACA_BSBS	10/10/2004	BSBS10102004	DO conc	Detected and Quantified	8.07	mg/l	
26	MACA_WQ	MACA_BSBS	10/10/2004	BSBS10102004	ANC Field	Detected and Quantified	78	mg/l CaCO3	Total
27	MACA_WQ	MACA_BSBS	10/10/2004	BSBS10102004	Discharge	Detected and Quantified	28	l/sec	
28	MACA_WQ	MACA_BSBS	10/10/2004	BSBS10102004	Precip Past Week	Detected and Quantified	0	cm	
29	MACA_WQ	MACA_BSBS	10/10/2004	BSBS10102004	Weather	Detected and Quantified	0		
30	MACA_WQ	MACA_BSBS	10/10/2004	BSBS10102004	Fecal Lab	Detected and Quantified	30	#/100ml	
31	MACA_WQ	MACA_BSBS	10/10/2004	BSBS10102004	Cl	Detected and Quantified	3.9608	mg/l	Total
32	MACA_WQ	MACA_BSBS	10/10/2004	BSBS10102004	Flow	Detected and Quantified	LOW		
33	MACA_WQ	MACA_BSBS	10/10/2004	BSBS10102004	SO4	Detected and Quantified	53.8529	mg/l	Total

# NPSTORET Imports

National Park Service  
U.S. Department of the Interior

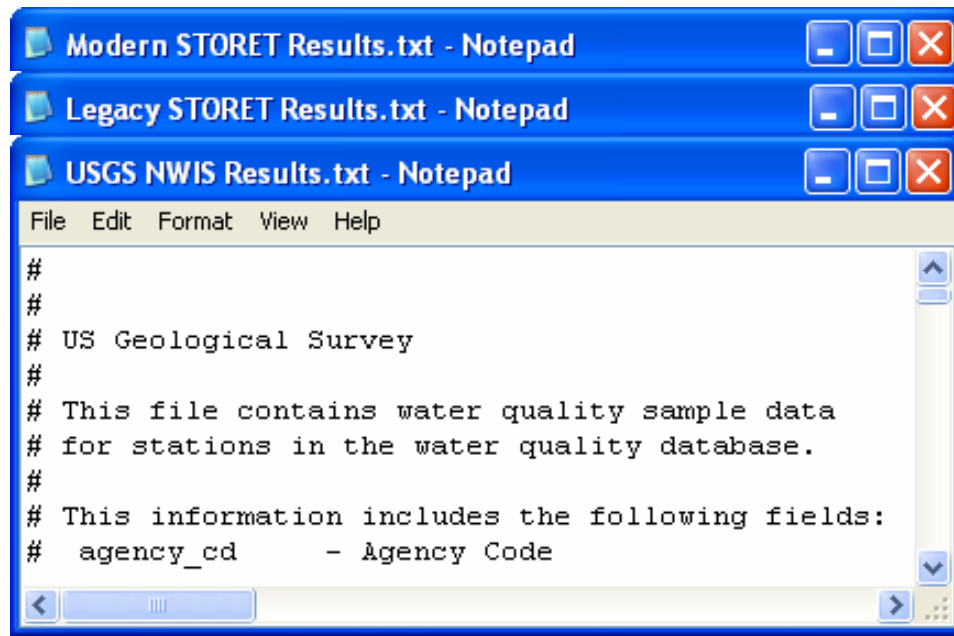
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 Import Existing Station and Results Data from User Excel, Access, and Text Files

 Seamless Imports from National WQ Databases



Seamless  
Import

Automatic  
Characteristic  
Creation





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 Version 0.98 available for download at:

<http://nrdata.nps.gov/Programs/Water/NPSTORET/NPSTORET.ZIP>

## Learning Resources

- Installation instructions
- Context sensitive help
- First time user's guide
- Workshop guide
- Data import instructions



 Version 1.00 this summer

- Automatic Installation/De-Installation
- Streamlined WRD Data Submission

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## Future Versions

- More Data QA
- Additional Biological Data Support
- Depth Profile Graphics
- Non-parametric Statistics/Trend Analysis
- Analytical Groups
- Interface for User-defined WQ Criteria
- WQX – XML Export
- Security
- Auto-Backup
- User-entered Data Qualifiers
- Lots of Other Ideas



Haleakala National Park, HI

# NPSEDD – “Eddy”

National Park Service  
U.S. Department of the Interior

Water Resources Division  
Fort Collins, CO



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- STORET Electronic Data Deliverable
- Hybrid of several state and federal EDDs adapted for NPS
- Set of Microsoft Excel spreadsheets designed to collect the data necessary to drive SIM



Rocky Mountain National Park, CO

# NPSEDD Overview

National Park Service  
U.S. Department of the Interior

Water Resources Division  
Fort Collins, CO



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Microsoft Excel

File Edit View Insert Format Tools Data Window Help Adobe PDF

Type a question for help

A2

Ex\_Projects.xls [Read-Only]

	A	B
1	The 5 fields in red lettering are required. SIM supports the first 7 fields, however	
2		
3	tblLegacy_STORET_Projects	
4	ProjectID	Name
5	SHIL0004	Packaging Corporation of America NPDES survey sheet
6	CAVE0011	Lechuguilla Cave Water Study by Gregg Oelker
7	CABR0001	City of San Diego Ocean Monitoring Program
8	FOCO0001	WRD Test Site in Chesapeake Bay
9	BISC0016	Groundwater Characterization Biscayne National Park
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Project Info

Ex\_Stations.xls [Read-Only]

	A	B
1	The 54 fields below are supported by SIM. Nine fields in red letters are required.	
2		
3	tblLegacy_STORET_Stations.xls	
4	Station ID	Station Name
5	BISC_USGS_AR	Alina's Reef Surface Water in Biscayne Bay
6	BISC_USGS_AR1A	Well AR1A 60' below seafloor at Alina's Reef in I
7	BISC_USGS_AR1B	Well AR1B 32' below seafloor at Alina's Reef in I
8	BISC_USGS_AR1C	Well AR1C 12' below seafloor at Alina's Reef in I
9	BISC_USGS_BPI	er in Biscayne
10	BISC_USGS_BY	cayne Bay
11	BISC_USGS_MB	ne Bay
12	BISC_USGS_PP	cayne Bay
13	BISC_USGS_PR	Pacific Reef Surface Water in Biscayne Bay
14	CABR_OMP_A01	Pacific Ocean 1.9 km west of the Point Loma Li
15	CABR_OMP_A02	Pacific Ocean 3.4 km west of the Point Loma Li

Station Info

Ex\_NonBioResults.xls [Read-Only]

	A	B	C	D	E
1	This Results Worksheet contains eight required fields in red lettering. There are also many fields in				
2					
3					Trip QC Ty
4	Trip ID	Trip Start Date	Trip Stop Date	Trip Name	Trip QC Ty
5	BISC0016-2002	08/20/2002		Groundwater Characterization in Biscayne Nati	
6	BISC0016-2002	08/20/2002		Groundwater Characterization in Biscayne Nati	
7	BISC0016-2002	08/20/2002		Groundwater Characterization in Biscayne Nati	
8	BISC0016-2002	08/20/2002		Groundwater Characterization in Biscayne Nati	
9	BISC0016-2003	06/22/2003		h in Biscayne Nati	
10	BISC0016-2003	06/22/2003		h in Biscayne Nati	
11	BISC0016-2003	06/22/2003		h in Biscayne Nati	
12	BISC0016-2003	06/22/2003		Groundwater Characterization in Biscayne Nati	
13	BISC0016-2003	06/22/2003		Groundwater Characterization in Biscayne Nati	
14	BISC0016-2003	06/22/2003		Groundwater Characterization in Biscayne Nati	
15	BISC0016-2003	06/22/2003		Groundwater Characterization in Biscayne Nati	

Result Info



# NPSEDD Overview

National Park Service  
U.S. Department of the Interior

Water Resources Division  
Fort Collins, CO



Designed to drive SIM



Current version available for  
download at:

<http://nrdata.nps.gov/Programs/Water/NPSEDD/NPSEDD.ZIP>

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Glen Canyon NRA, UT



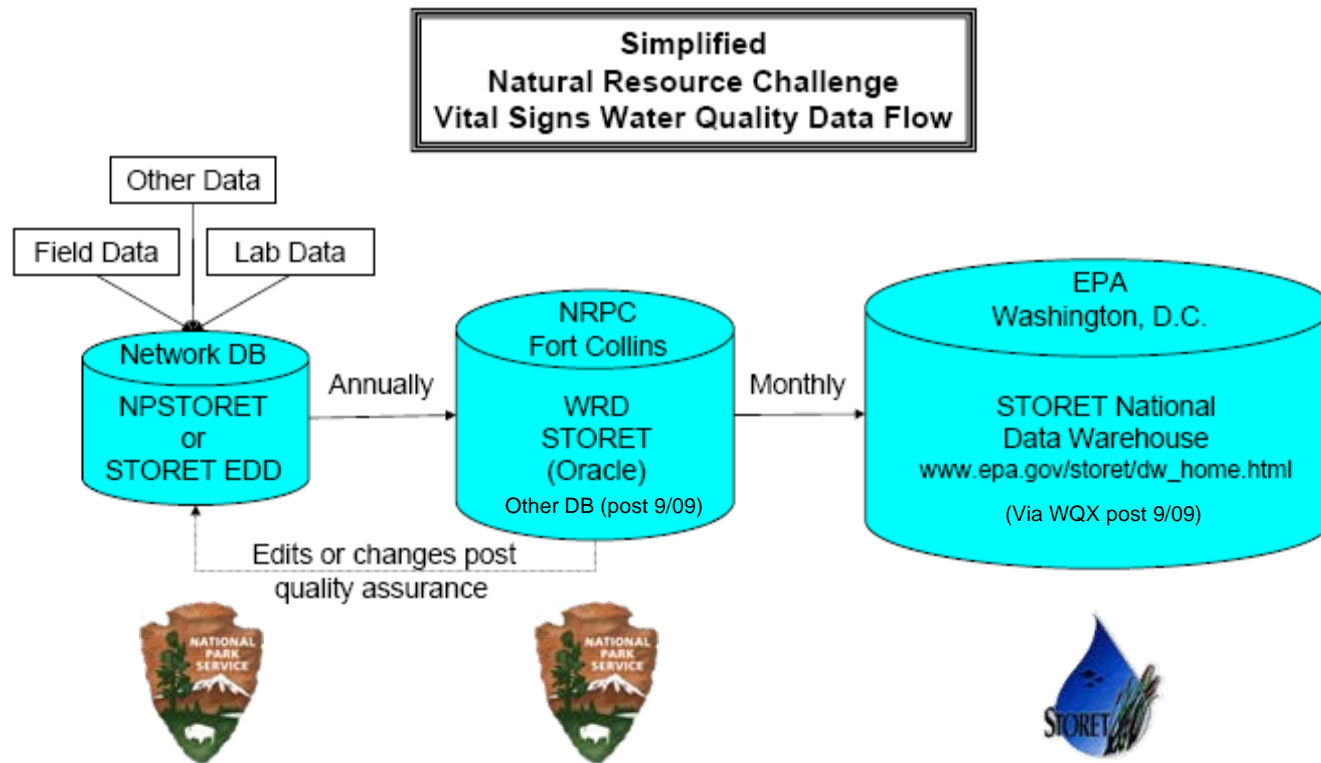
# Vital Signs WQ Data Flow

National Park Service  
U.S. Department of the Interior

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<http://www.nature.nps.gov/water/infoanddata/index.htm>

# Lessons Learned

National Park Service  
U.S. Department of the Interior

Water Resources Division  
Fort Collins, CO



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 No one size fits all solution

 Stay flexible



 Importance of standards

 Importance of data sharing



Cabrillo National Monument, CA

# National Park Service

National Park Service  
U.S. Department of the Interior

Water Resources Division  
Fort Collins, CO



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## Additional Info:

<http://www.nature.nps.gov/water/infoanddata/index.htm>

Great Smoky Mountains National Park, NC/TN