The Penn State Approach to Watershed Conditional Assessment

at

Upper Delaware Scenic and Recreational River

and

Delaware Water Gap National Recreational Area

Bruce J. Miller – Penn State University
Alan C. Ellsworth – National Park Service

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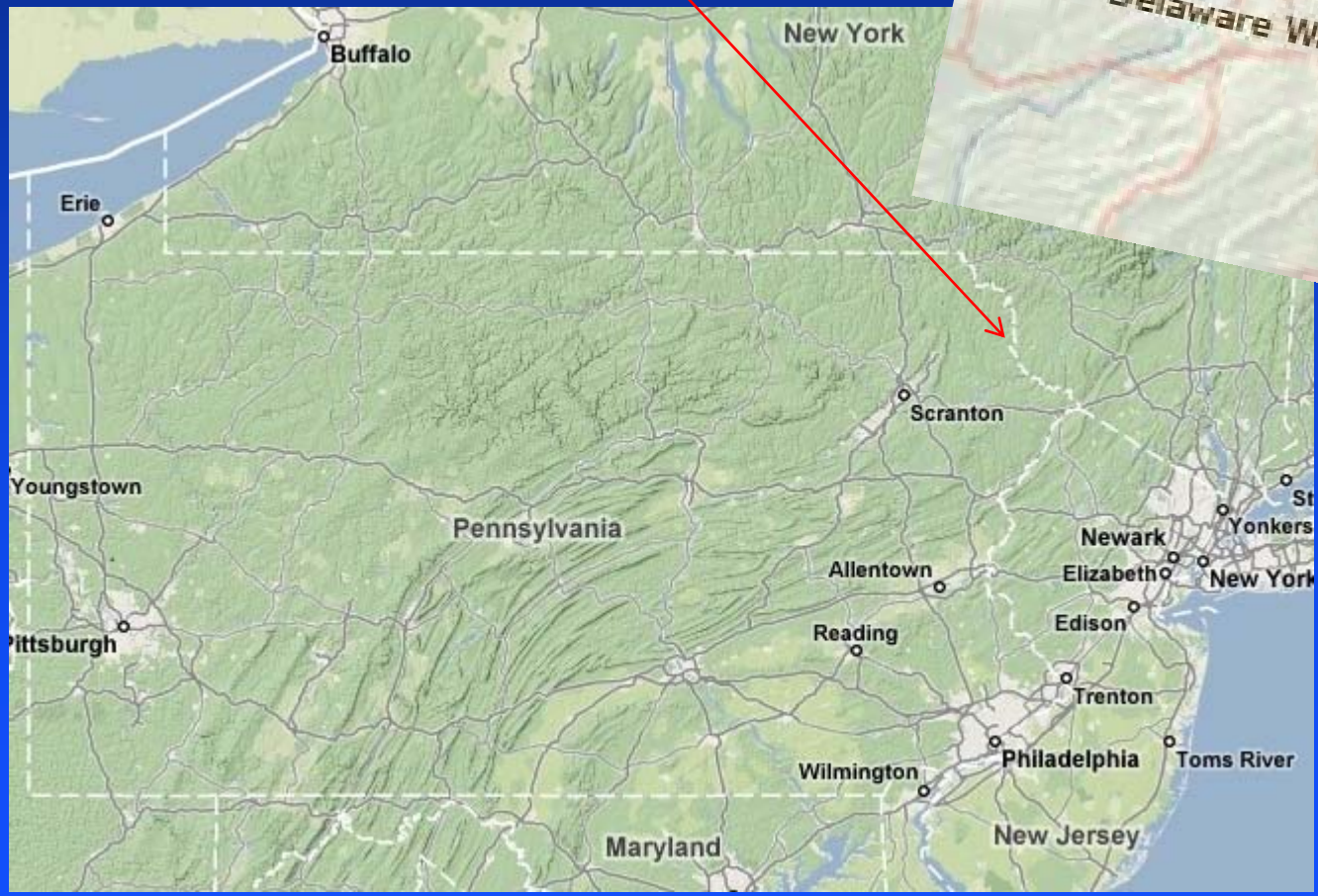
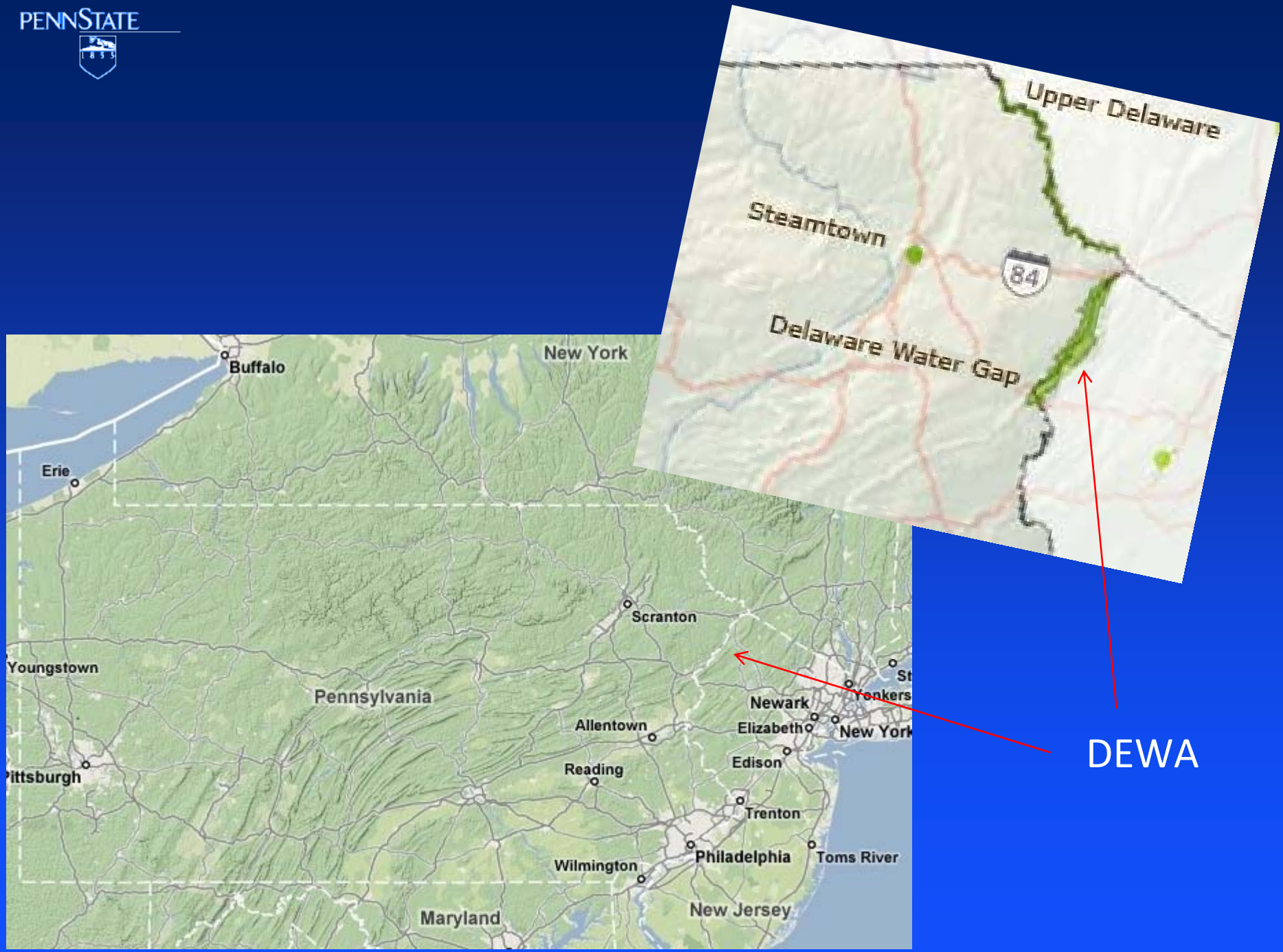
UPDE




Upper Delaware
Steamtown
84
Delaware Water Gap
New York
Buffalo
Erie
Scranton
Youngstown
Pennsylvania
Newark
Allentown
Elizabeth
New York
Edison
Reading
Trenton
Philadelphia
Toms River
Wilmington
Maryland
New Jersey
DEWA

Upper Delaware

Scenic and Recreational River
New York, Pennsylvania

- Wild and Scenic River System
- 73 Miles of Mainstem Delaware River
- Bisects Southeast New York and Northeast Pennsylvania
- Supports boating, swimming, fishing, and hiking

Upper Delaware

Scenic and Recreational River
New York, Pennsylvania

- One of cleanest free-flowing rivers in eastern US
- World class trout fishery
- T&E species – Dwarf Wedge Mussel & Am Bald Eagle
- Very little land area – subject to land use decisions in surrounding watersheds

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Delaware Water Gap National Recreation Area and Middle Delaware National Scenic River

Pennsylvania, New Jersey

- 40 Miles of Mainstem Delaware River
- Bounds New Jersey and Pennsylvania
- 67,000 acres of mountain ridge, forest, and floodplain
- Supports boating, swimming, fishing, and hiking

Delaware Water Gap
National Recreation Area
and
Middle Delaware
National Scenic River

Pennsylvania, New Jersey

- Black bear, timber rattlesnakes, bald eagles, nesting peregrine falcons
- Hemlock ravines, trout streams, lakes, ponds, some of highest waterfalls of either state
- Exceptional Water Quality

UPDEWA

- Share a common river with exceptional water quality
- Neither park has much land area
- Only a small percentage of watersheds within parks
- Water quality influenced by forces outside the parks
- Each spans two states, many counties and municipalities

Why WCA is important to UPDEWA?

- Centralized Data Repository
- Information Synthesis
- Access to current conditions and current data
- Informs water and other NR management planning

The Penn State Team

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- Carolyn Mahan, PhD – Penn State University

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Penn State Approach

- “Living Document”
- Continuous Assessment VS Snapshot Assessment
- Infrastructure VS Report

Methodology

- Collaboration
- Data Collection/Entry
- Data Aggregation
- Data Assessment
- Results Synthesis
- Results Presentation

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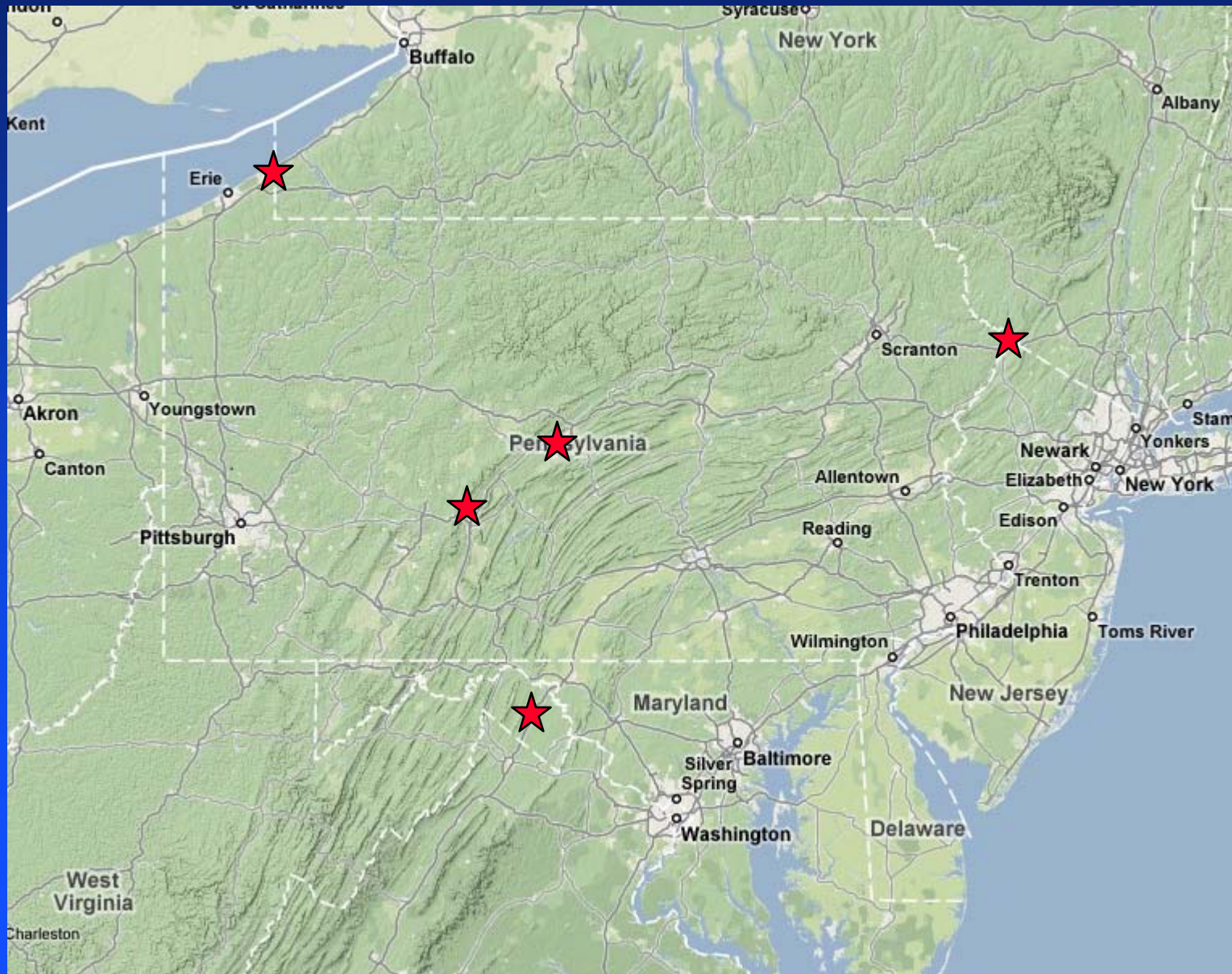
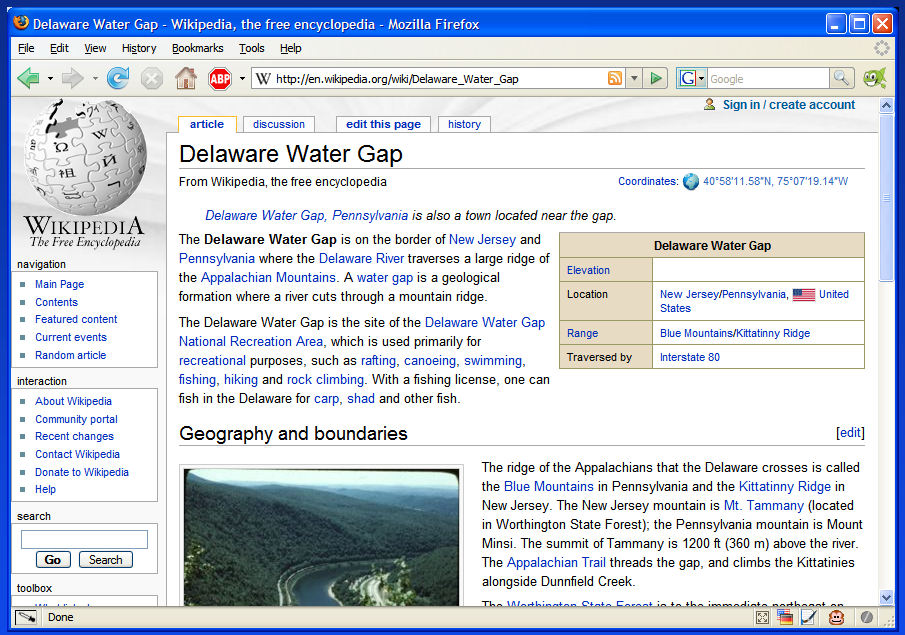
Collaboration

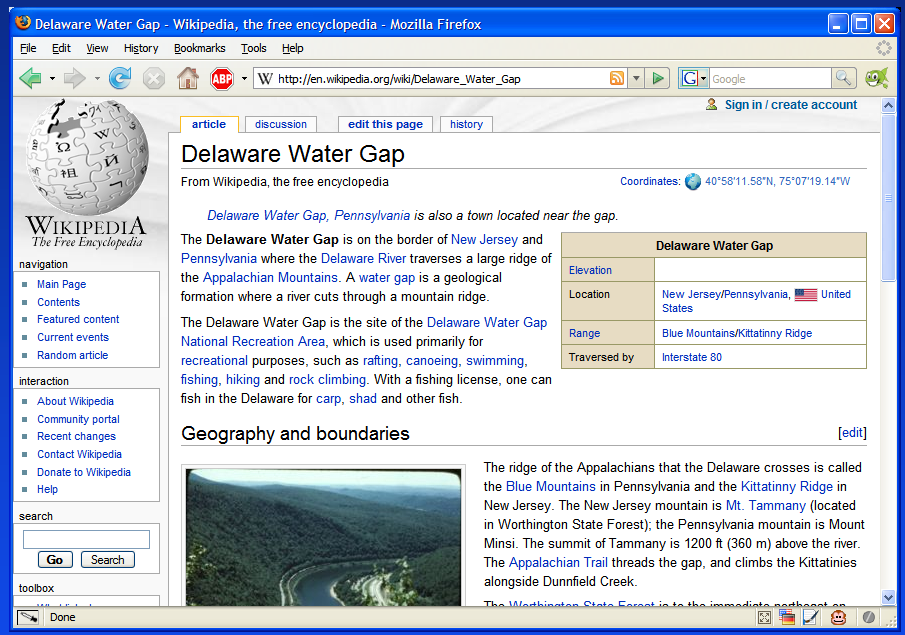
Collaboration





MediaWiki Software

PENNSTATE



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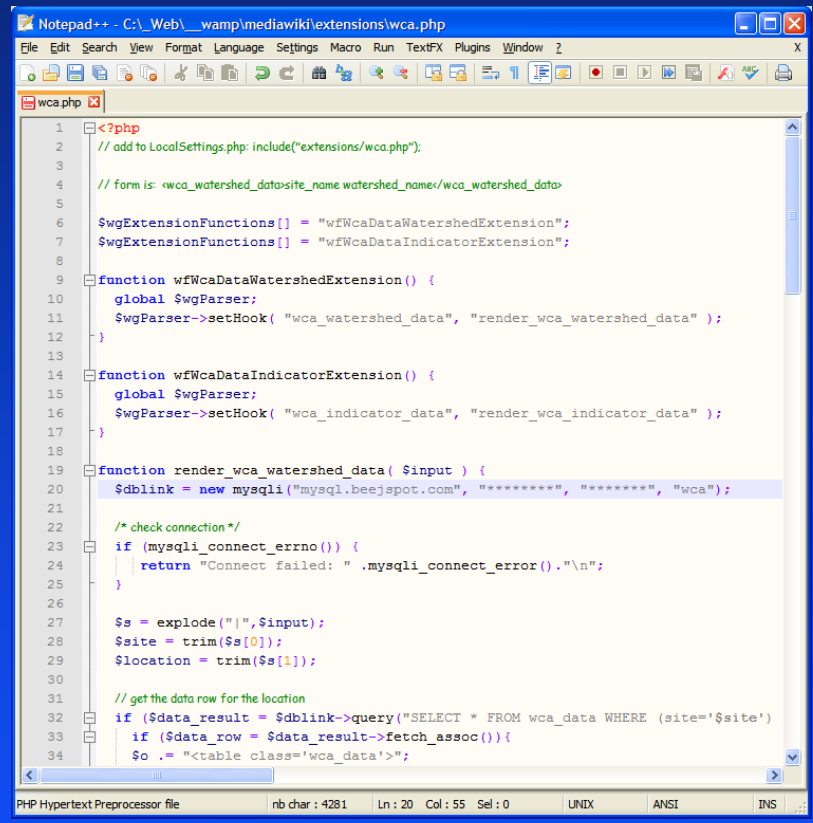
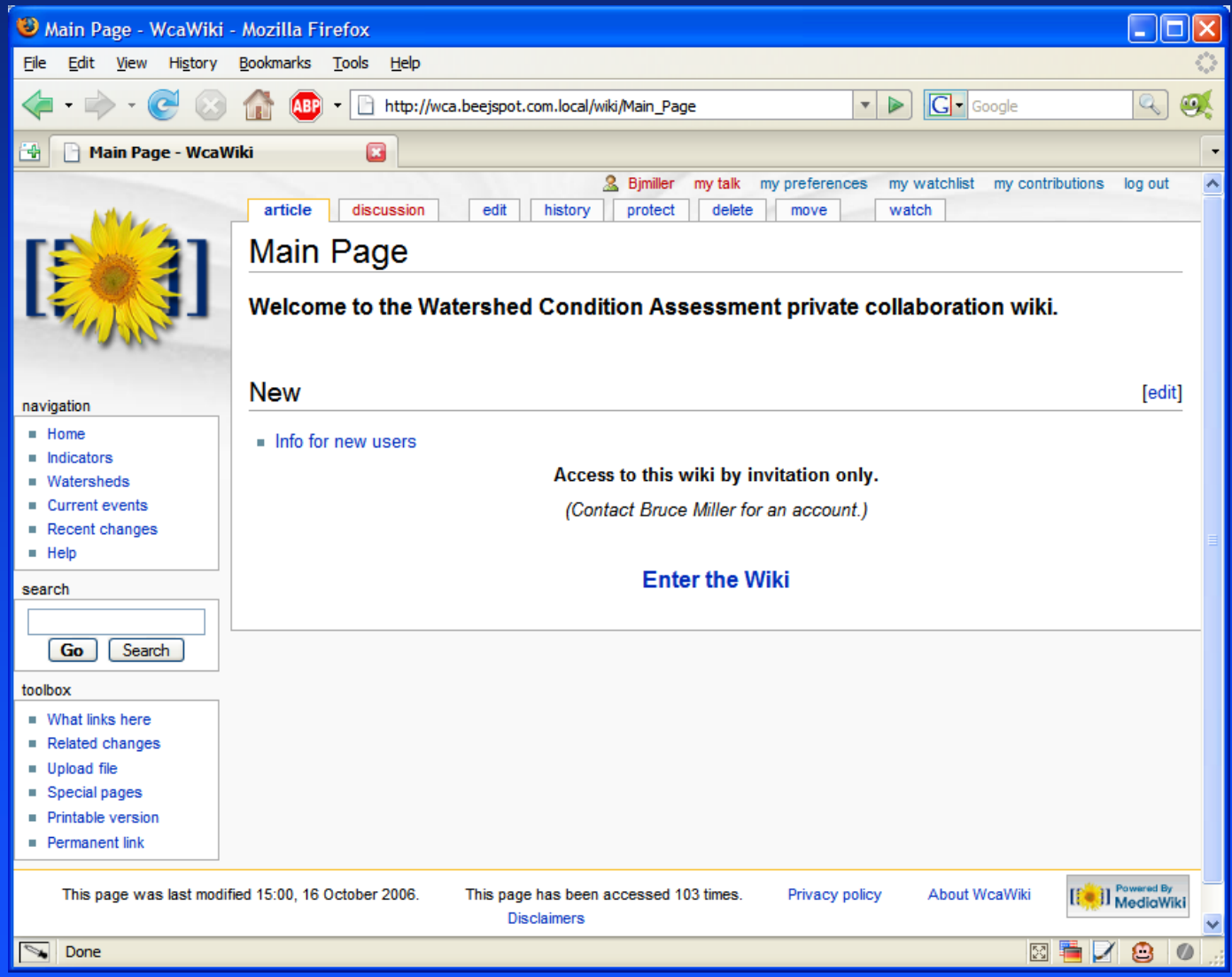


MediaWiki Software

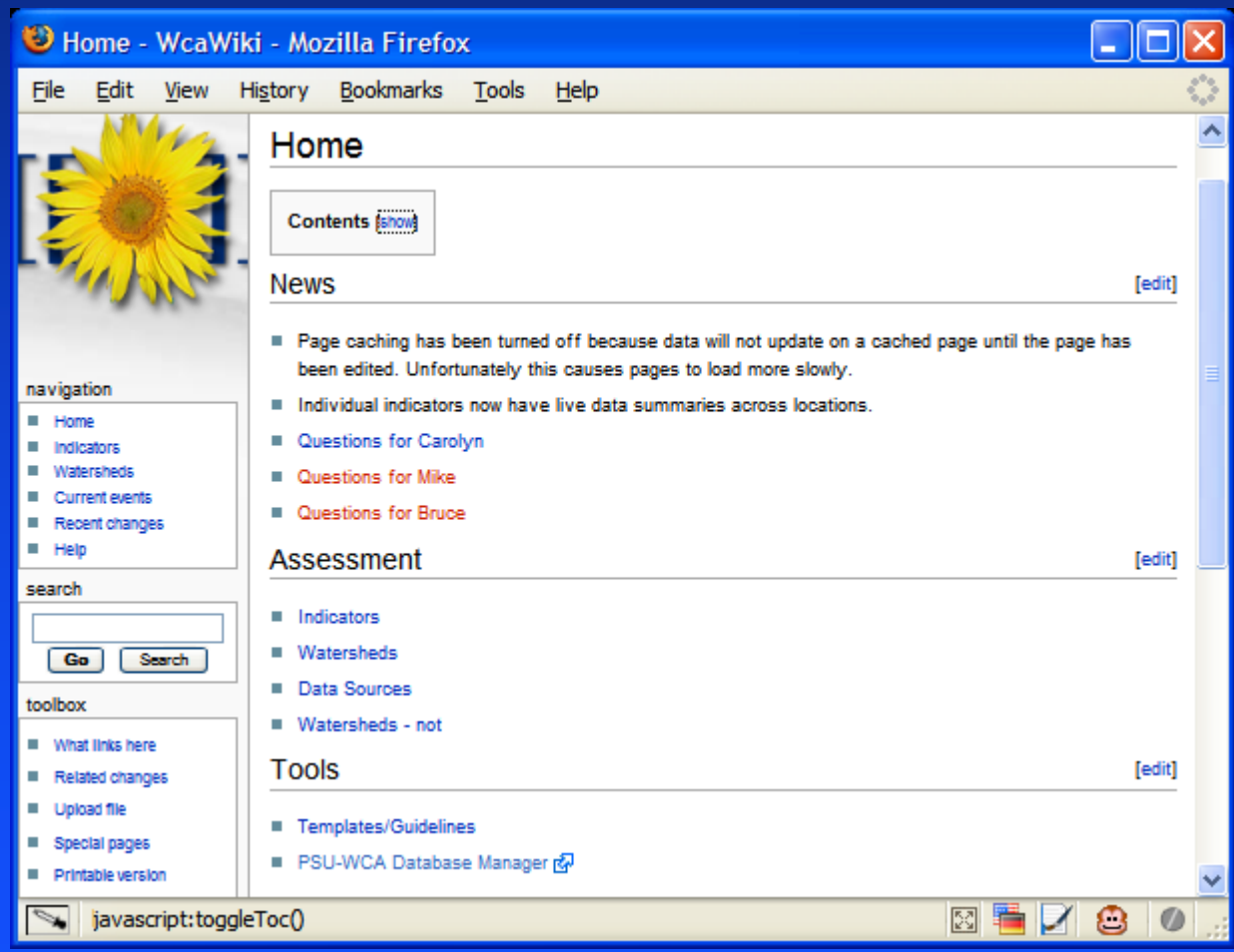
Custom Data Display Extensions

WCA Wiki


Main Page - WcaWiki - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://wca.beejspot.com.local/wiki/Main_Page
Main Page - WcaWiki
Bjmiller my talk my preferences my watchlist my contributions log out
article discussion edit history protect delete move watch
Main Page
Welcome to the Watershed Condition Assessment private collaboration wiki.
New [edit]
Info for new users
Access to this wiki by invitation only.
(Contact Bruce Miller for an account.)
Enter the Wiki
navigation
Home
Indicators
Watersheds
Current events
Recent changes
Help
search
Go Search
toolbox
What links here
Related changes
Upload file
Special pages
Printable version
Permanent link
This page was last modified 15:00, 16 October 2006.
This page has been accessed 103 times.
Privacy policy
About WcaWiki
Disclaimers
Powered By MediaWiki
Done

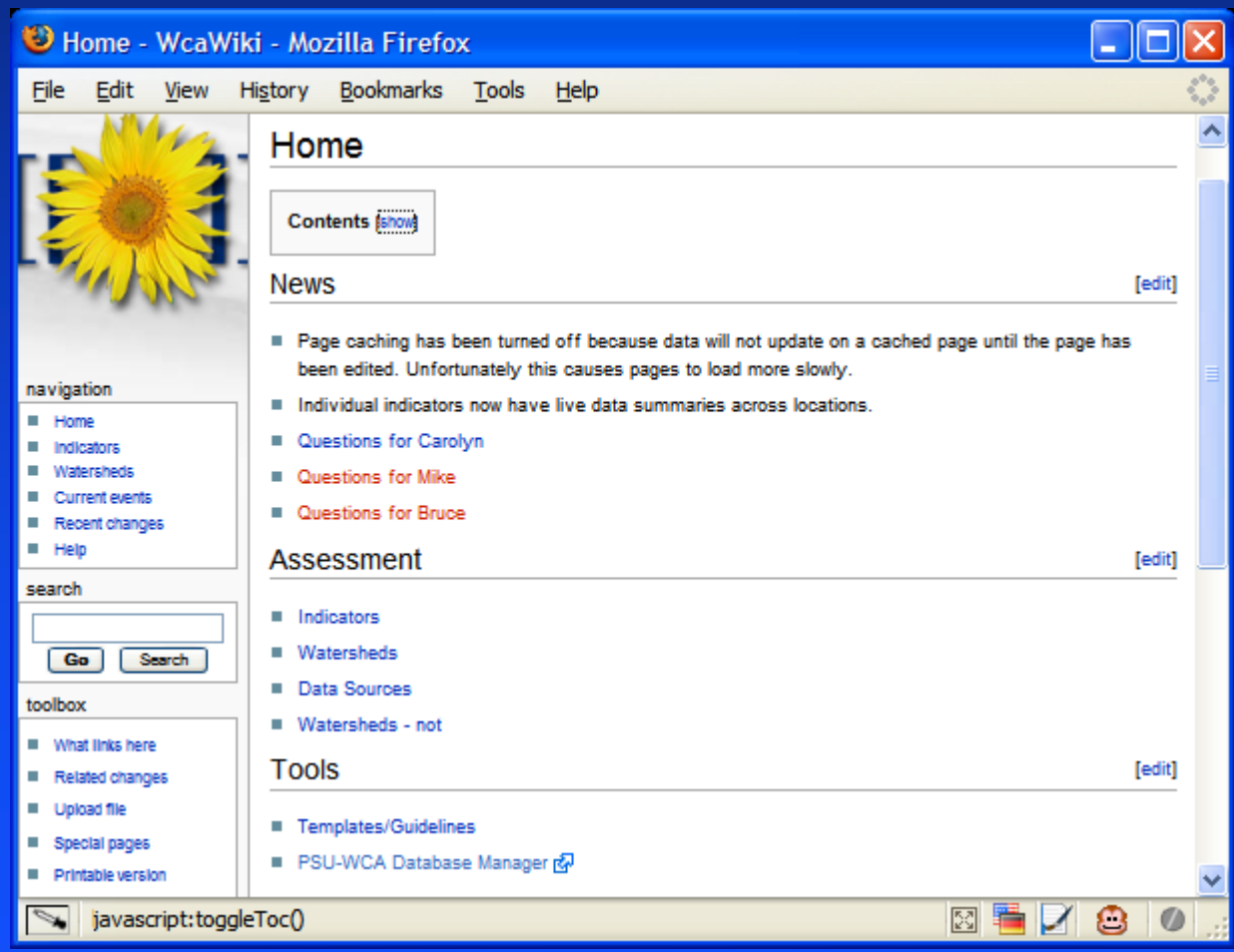
WCA Wiki

- Information “Commons”
- Literature Deconstruction Repository
- Project Documentation



WCA Wiki

- Hyper-linking
- Searchable
- Change History
- Page Watch
- RSS News Feed
- Help System

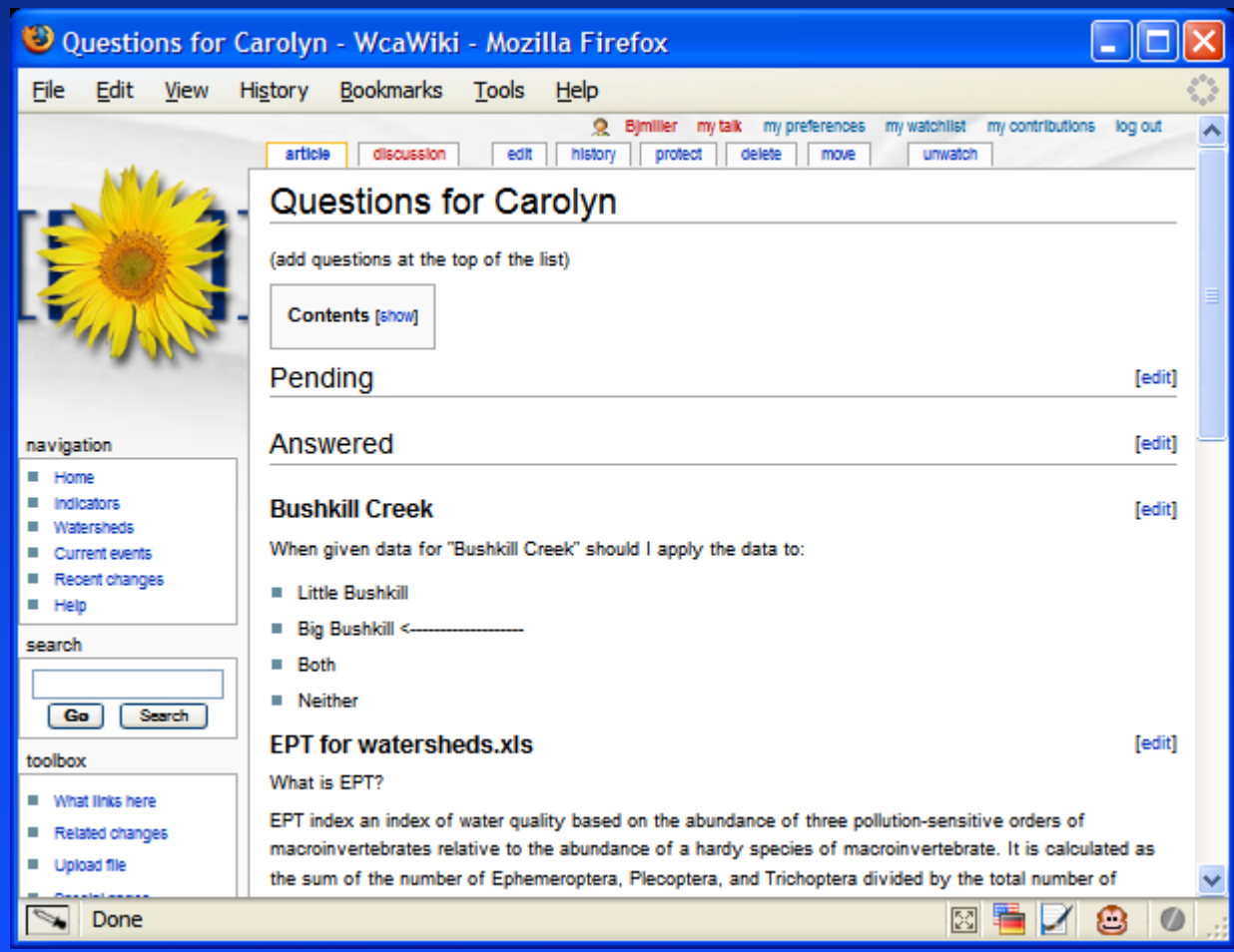


WCA Wiki - Home

- News/Discussions
- Indicators
- Watersheds
- Data Sources
- Tools

News/Discussions

- Announcements
- Clarifications
- To-Do's
- Comments



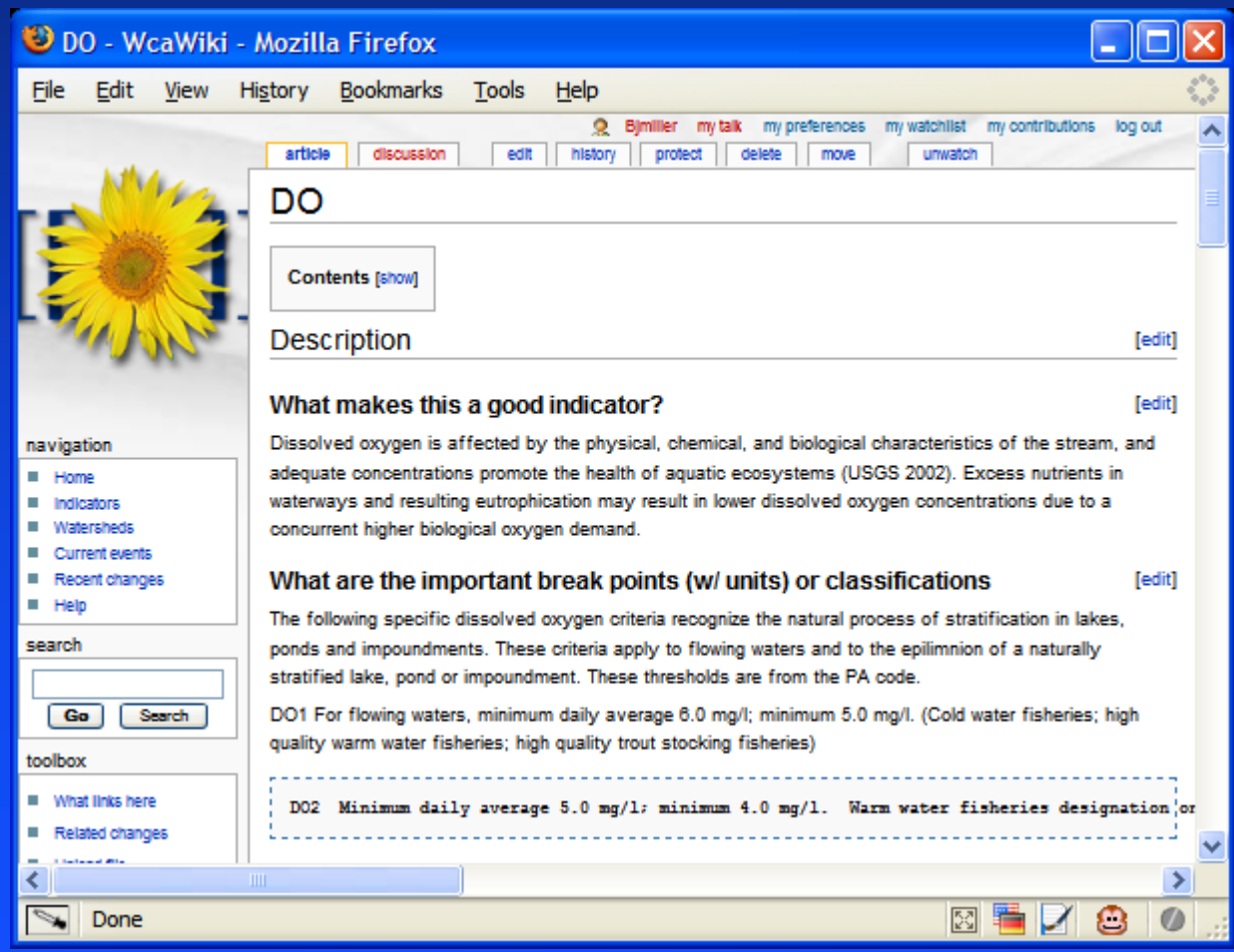
Indicators List

Literature Deconstruction

- Metadata
- Discussion
- Data (potential indicators)

Indicator Page

- Description / Definition
- Why Important
- Break points
- Discussion

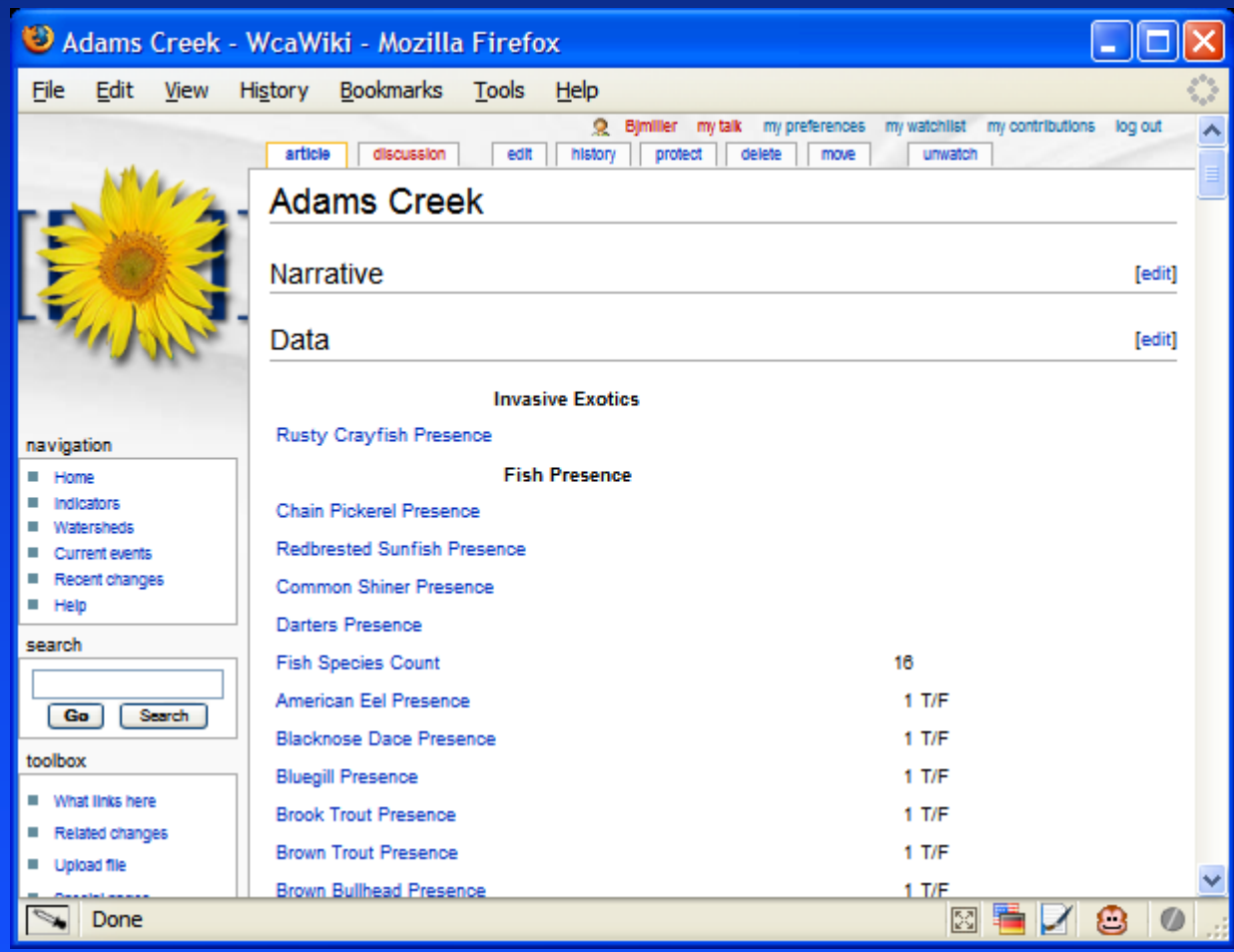


Indicator Page

- Metadata
- Data

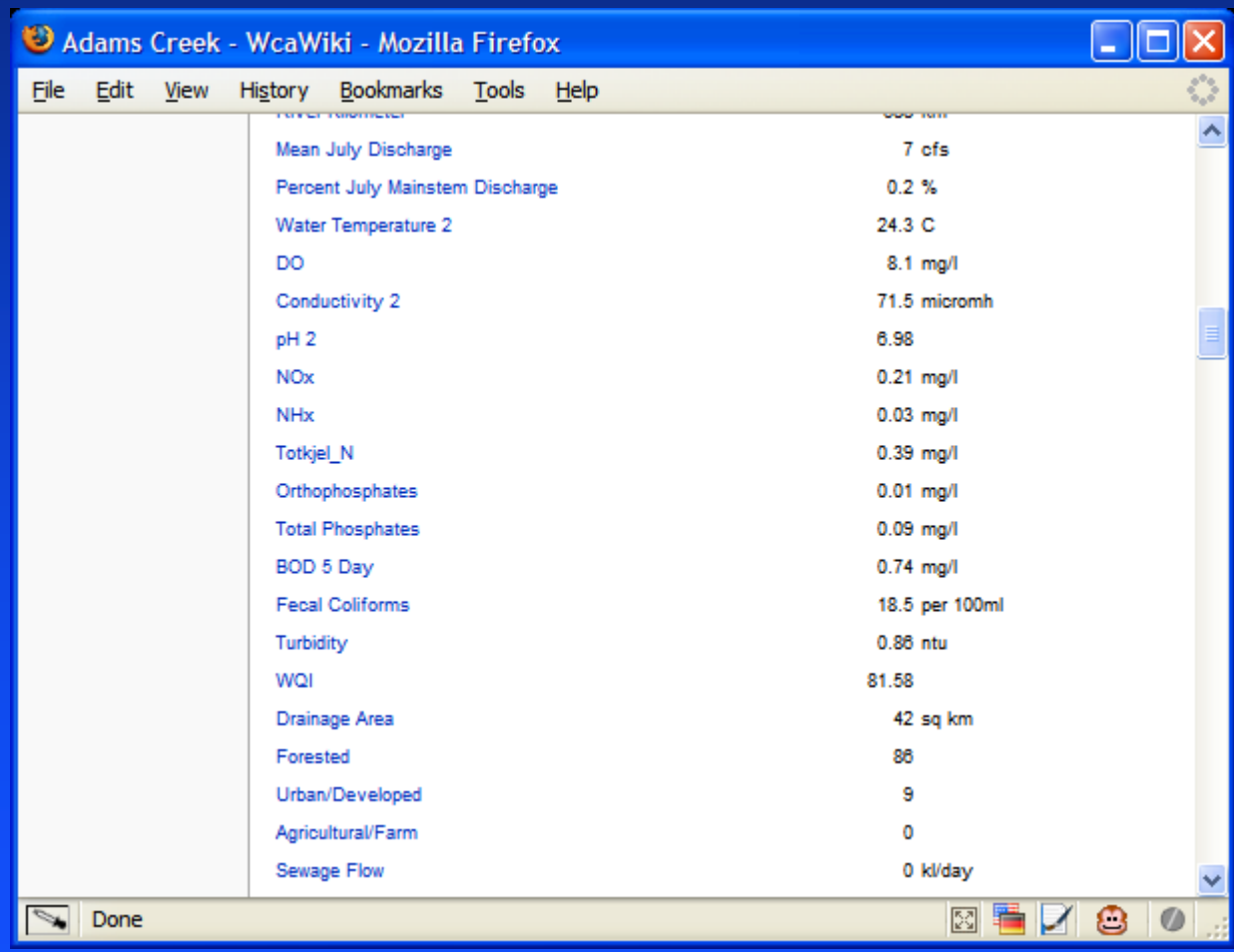
Watershed Page

- Discussion
- Data



Watershed Page

- Data



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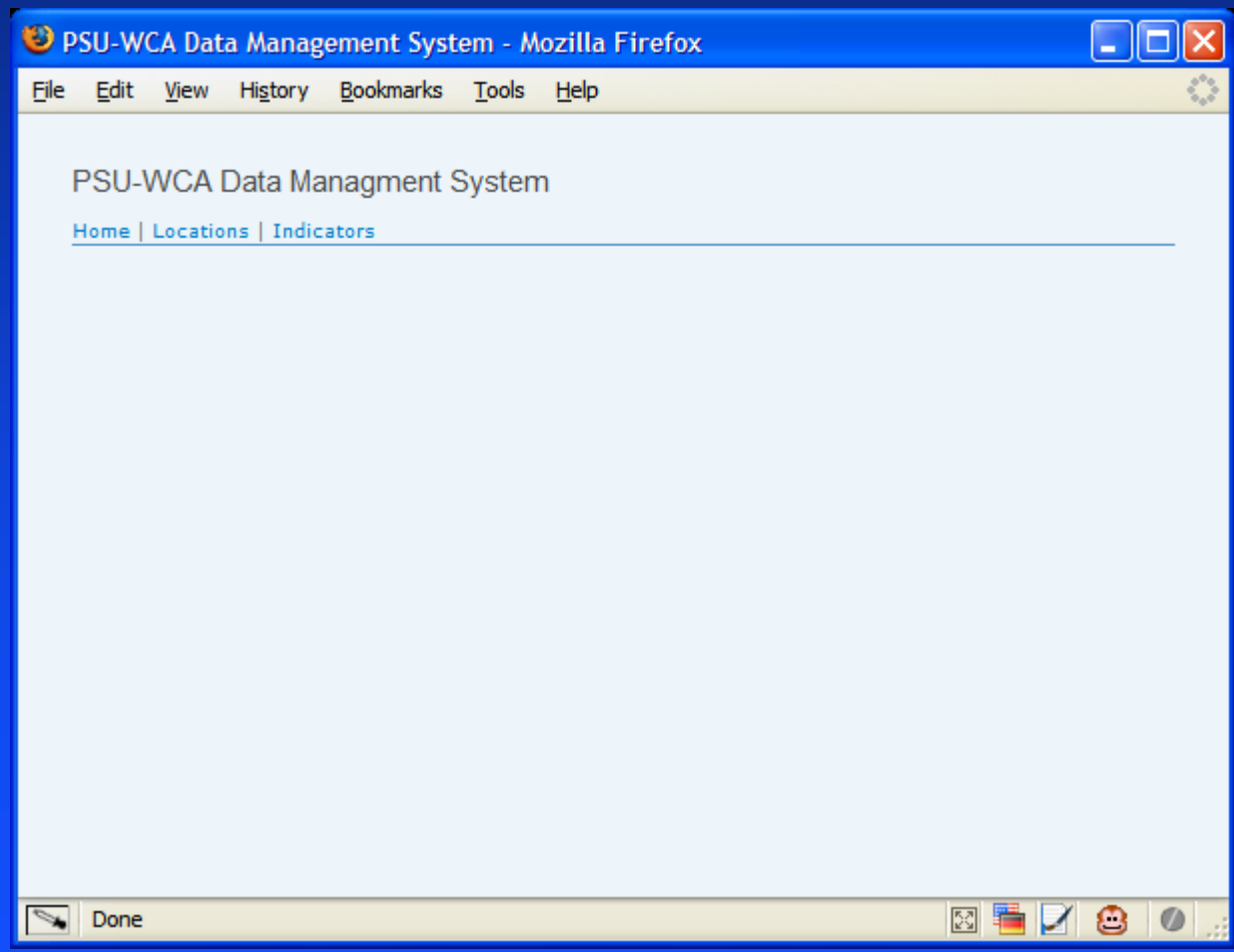
Data Entry

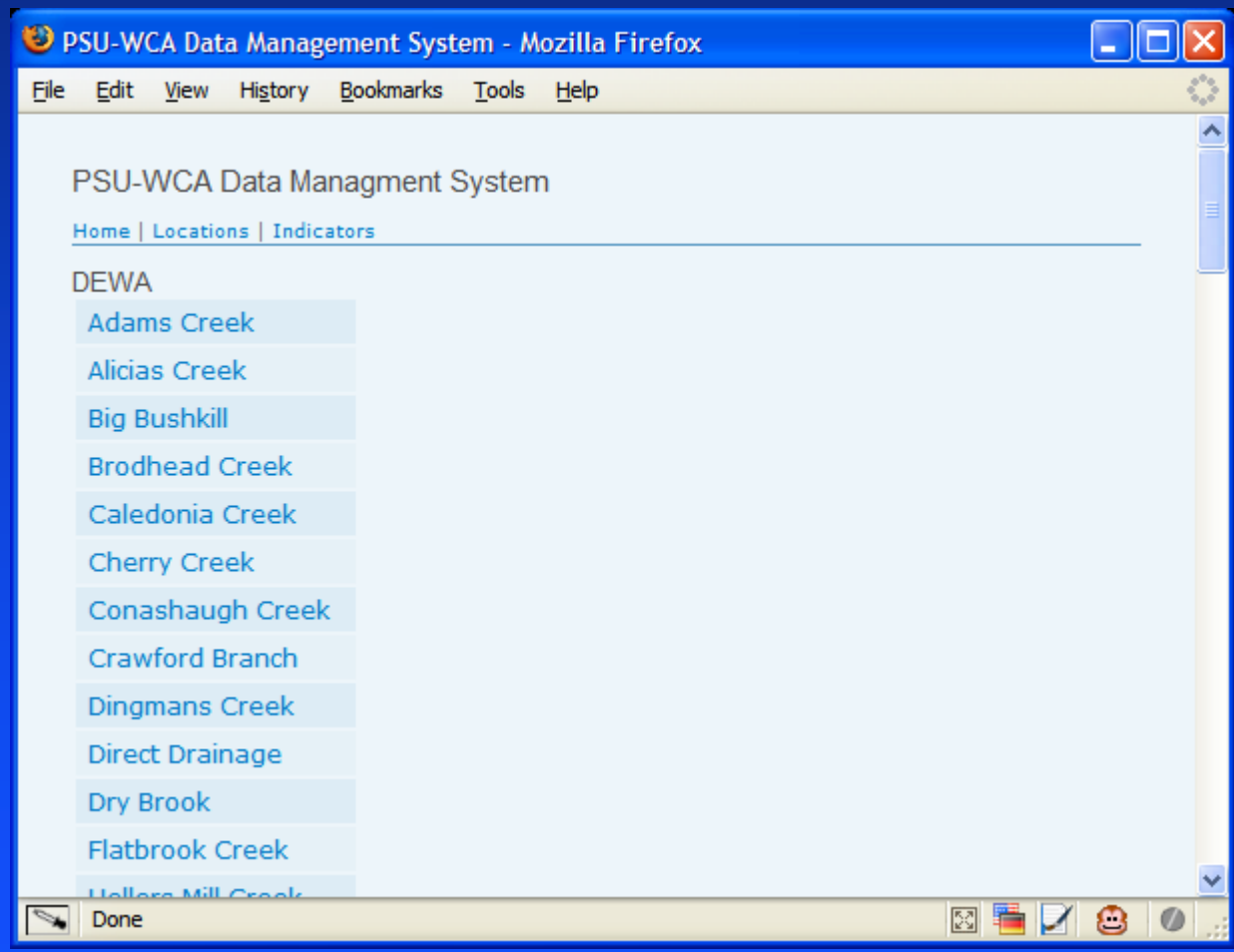
Data Entry – Home Page

- PHP script
- MySQL
- Data is integrated with the Wiki



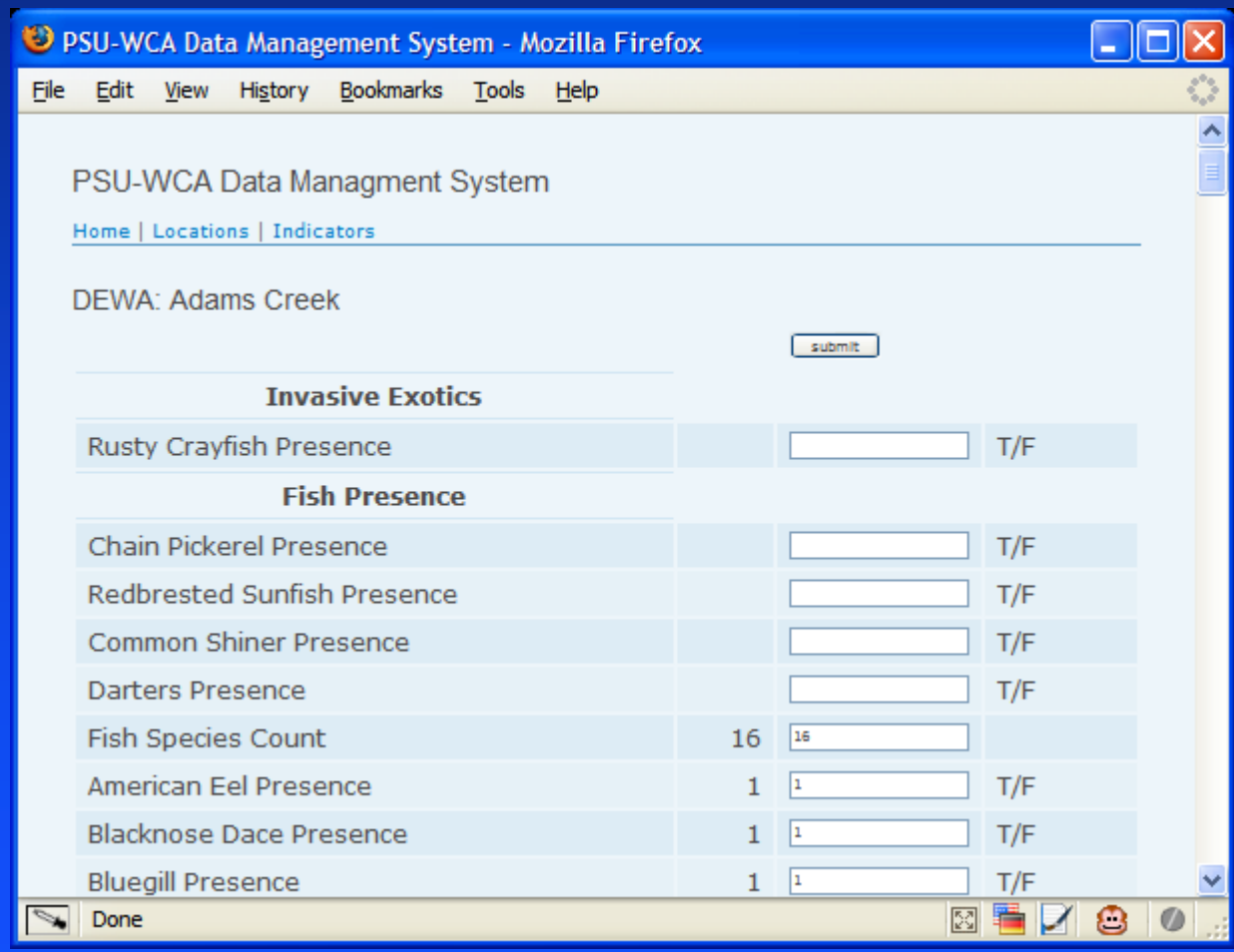
Data Entry – Locations List

- Hyper-linked list of locations



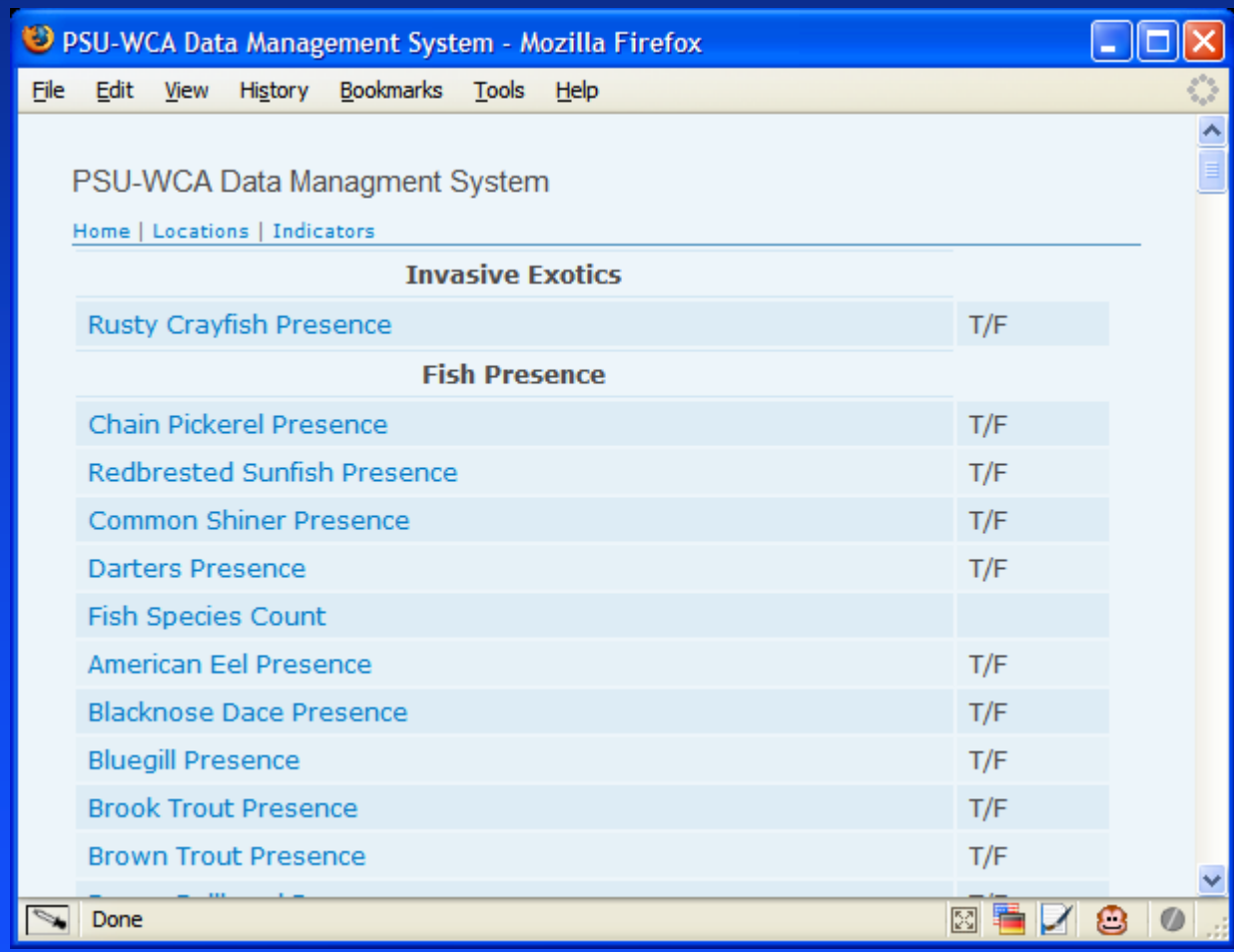
Data Entry – Adding/Editing Data by Location

- Ordered by indicator group and indicator weight



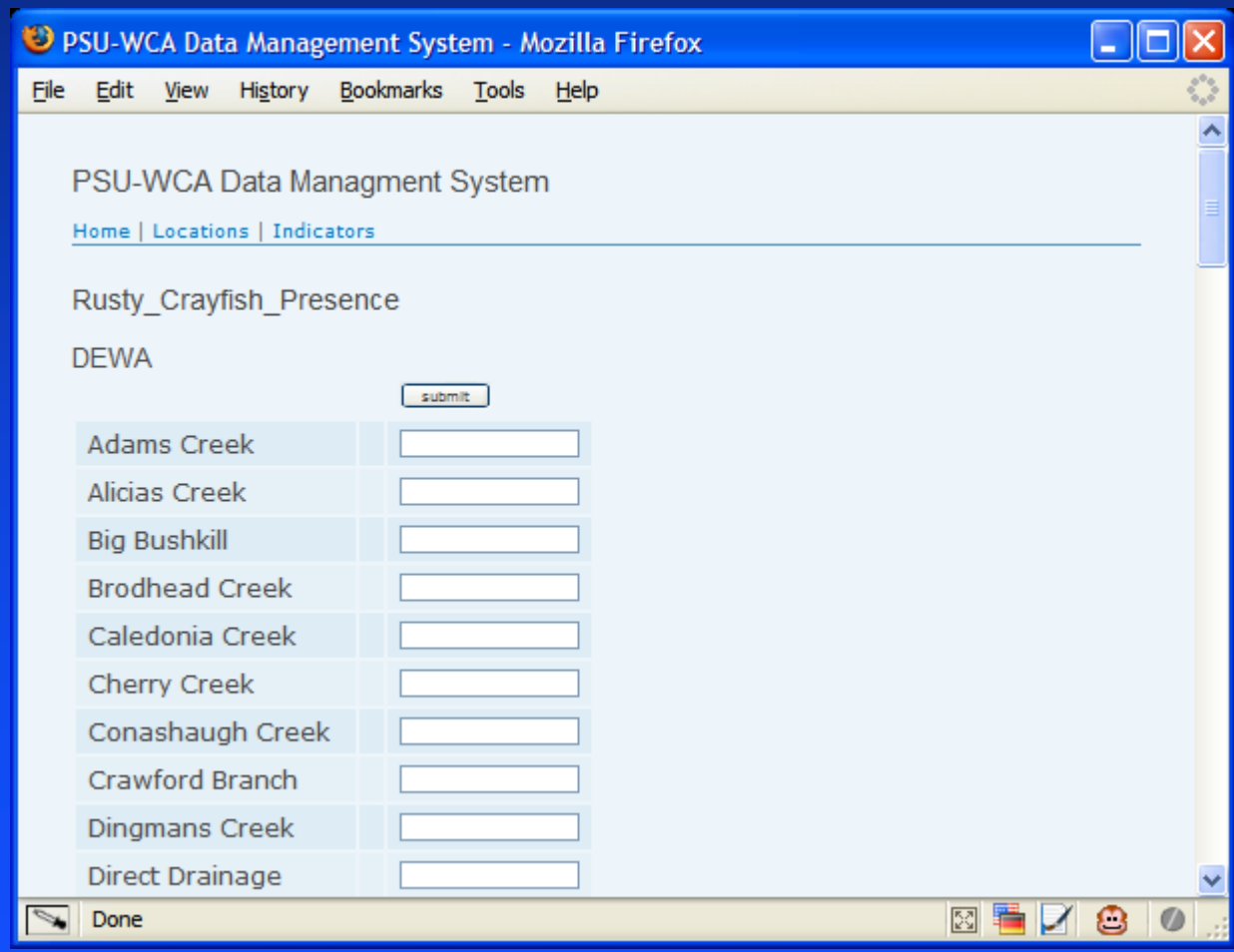
Data Entry – Indicators List

- Hyper-linked list of indicators



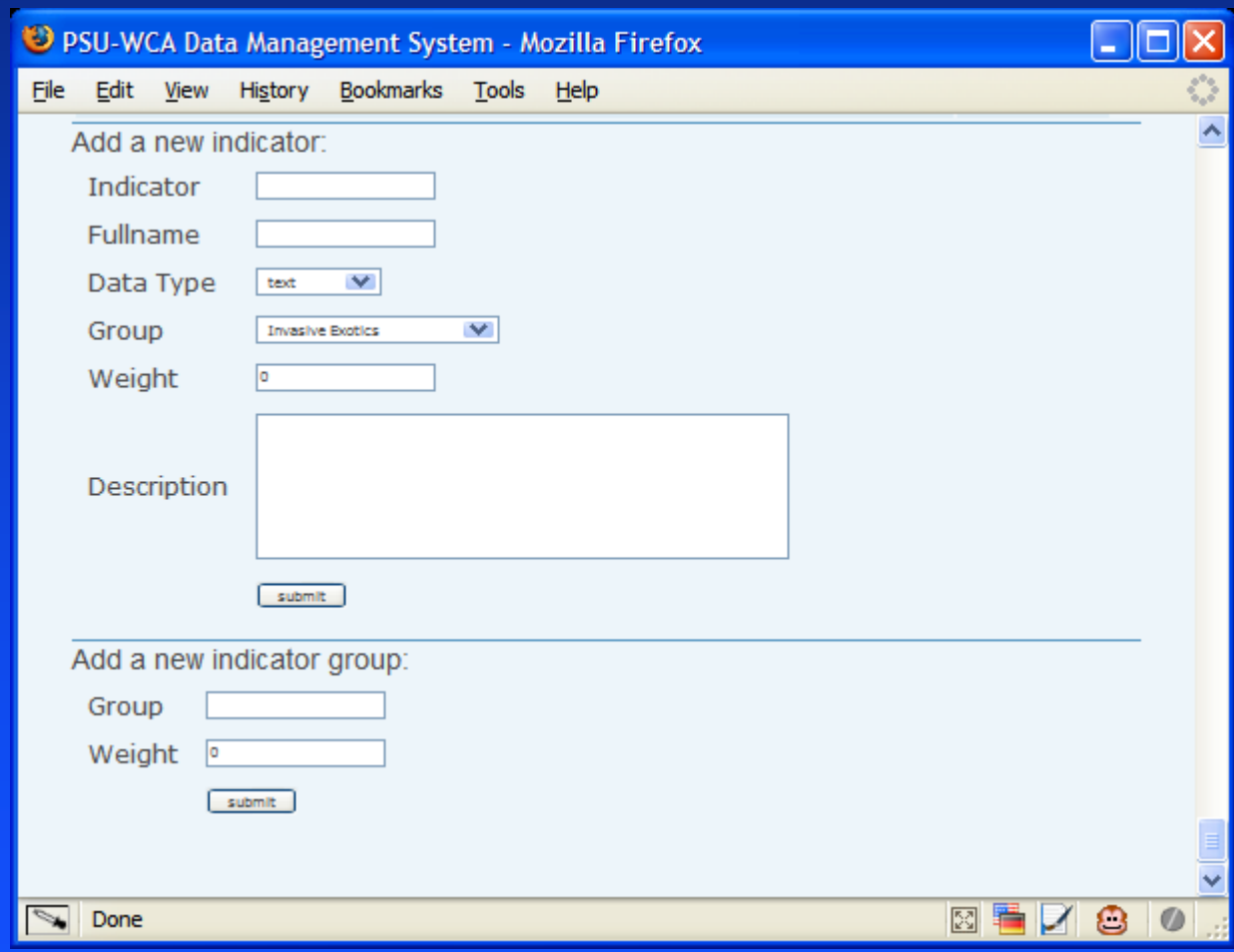
Data Entry – Adding/Editing Data by Indicator

- Ordered by park and watershed name



Data Entry – Adding an Indicator

- Automated database restructuring
- Control over grouping and ordering



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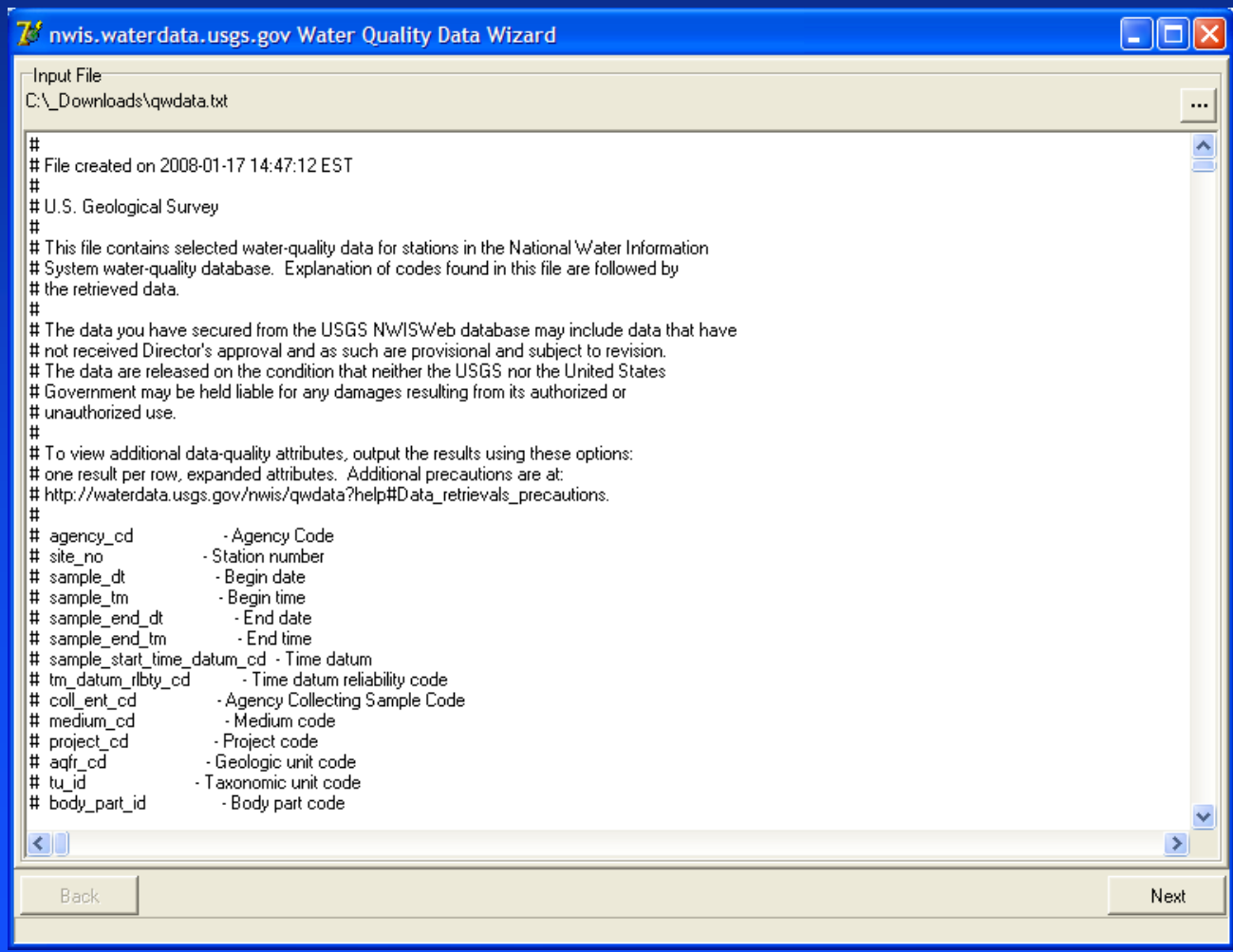
Data Aggregation

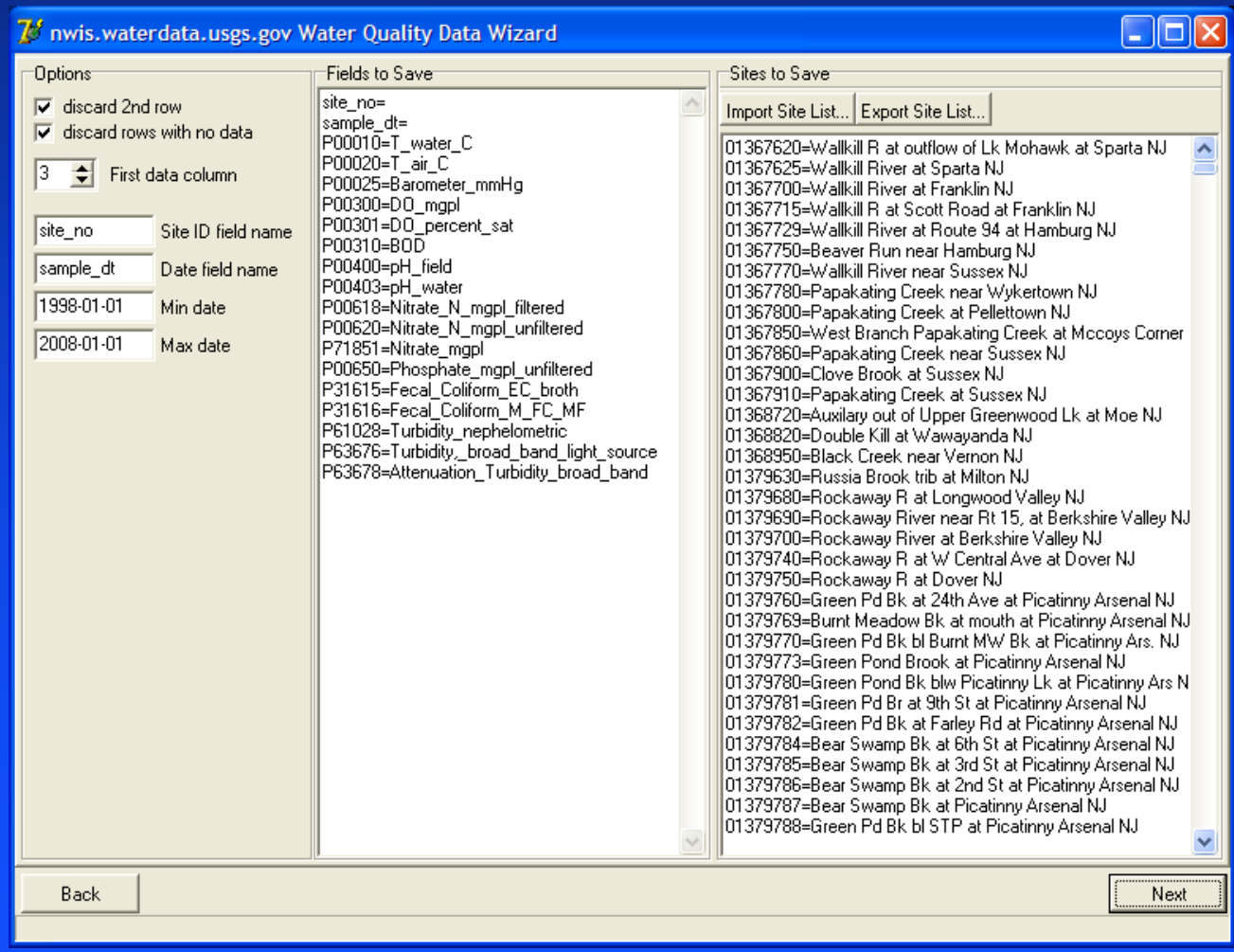
Water Quality Data Wizard

- Raw data from USGS – NWIS web site



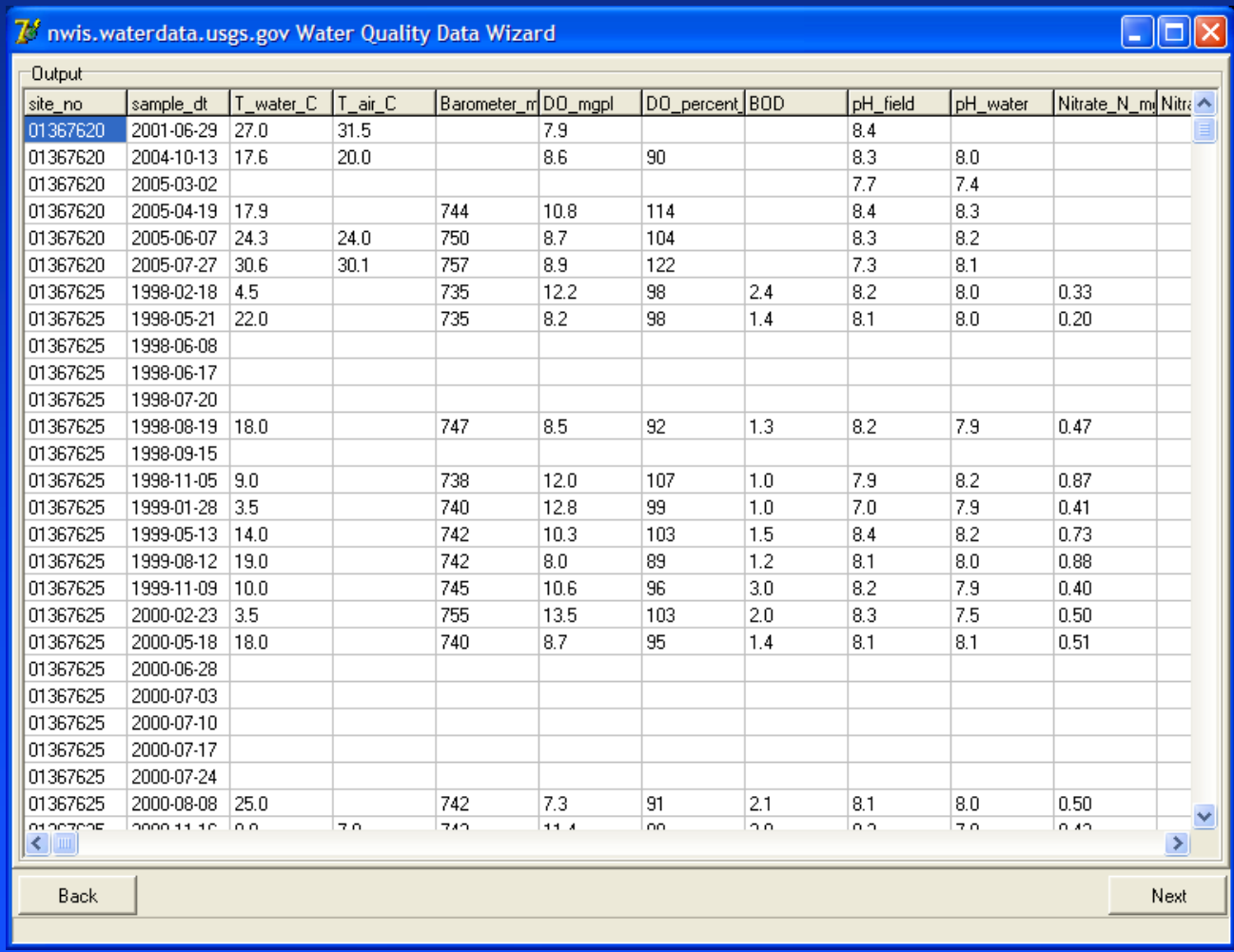
Water Quality Data Wizard

- Configuration
- Auto-saved



Water Quality Data Wizard

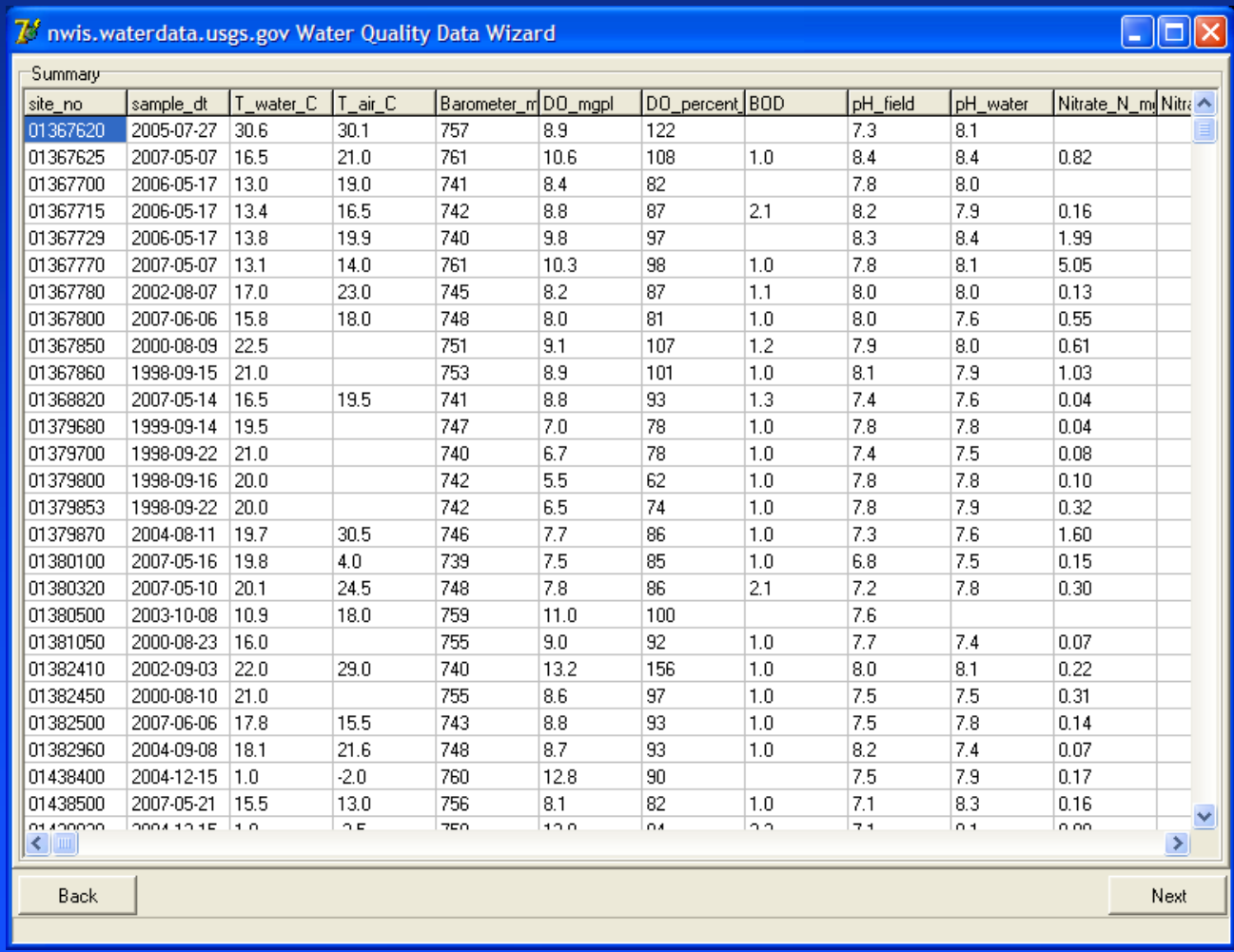
- Parsed data
- Meaningful field names
- Filtered by gauge
- Filtered by date
- Empty rows eliminated



site_no	sample_dt	T_water_C	T_air_C	Barometer_m	DO_mgpl	DO_percent	BOD	pH_field	pH_water	Nitrate_N_m	Nitra
01367620	2001-06-29	27.0	31.5		7.9			8.4			
01367620	2004-10-13	17.6	20.0		8.6	90		8.3	8.0		
01367620	2005-03-02							7.7	7.4		
01367620	2005-04-19	17.9		744	10.8	114		8.4	8.3		
01367620	2005-06-07	24.3	24.0	750	8.7	104		8.3	8.2		
01367620	2005-07-27	30.6	30.1	757	8.9	122		7.3	8.1		
01367625	1998-02-18	4.5		735	12.2	98	2.4	8.2	8.0	0.33	
01367625	1998-05-21	22.0		735	8.2	98	1.4	8.1	8.0	0.20	
01367625	1998-06-08										
01367625	1998-06-17										
01367625	1998-07-20										
01367625	1998-08-19	18.0		747	8.5	92	1.3	8.2	7.9	0.47	
01367625	1998-09-15										
01367625	1998-11-05	9.0		738	12.0	107	1.0	7.9	8.2	0.87	
01367625	1999-01-28	3.5		740	12.8	99	1.0	7.0	7.9	0.41	
01367625	1999-05-13	14.0		742	10.3	103	1.5	8.4	8.2	0.73	
01367625	1999-08-12	19.0		742	8.0	89	1.2	8.1	8.0	0.88	
01367625	1999-11-09	10.0		745	10.6	96	3.0	8.2	7.9	0.40	
01367625	2000-02-23	3.5		755	13.5	103	2.0	8.3	7.5	0.50	
01367625	2000-05-18	18.0		740	8.7	95	1.4	8.1	8.1	0.51	
01367625	2000-06-28										
01367625	2000-07-03										
01367625	2000-07-10										
01367625	2000-07-17										
01367625	2000-07-24										
01367625	2000-08-08	25.0		742	7.3	91	2.1	8.1	8.0	0.50	

Water Quality Data Wizard

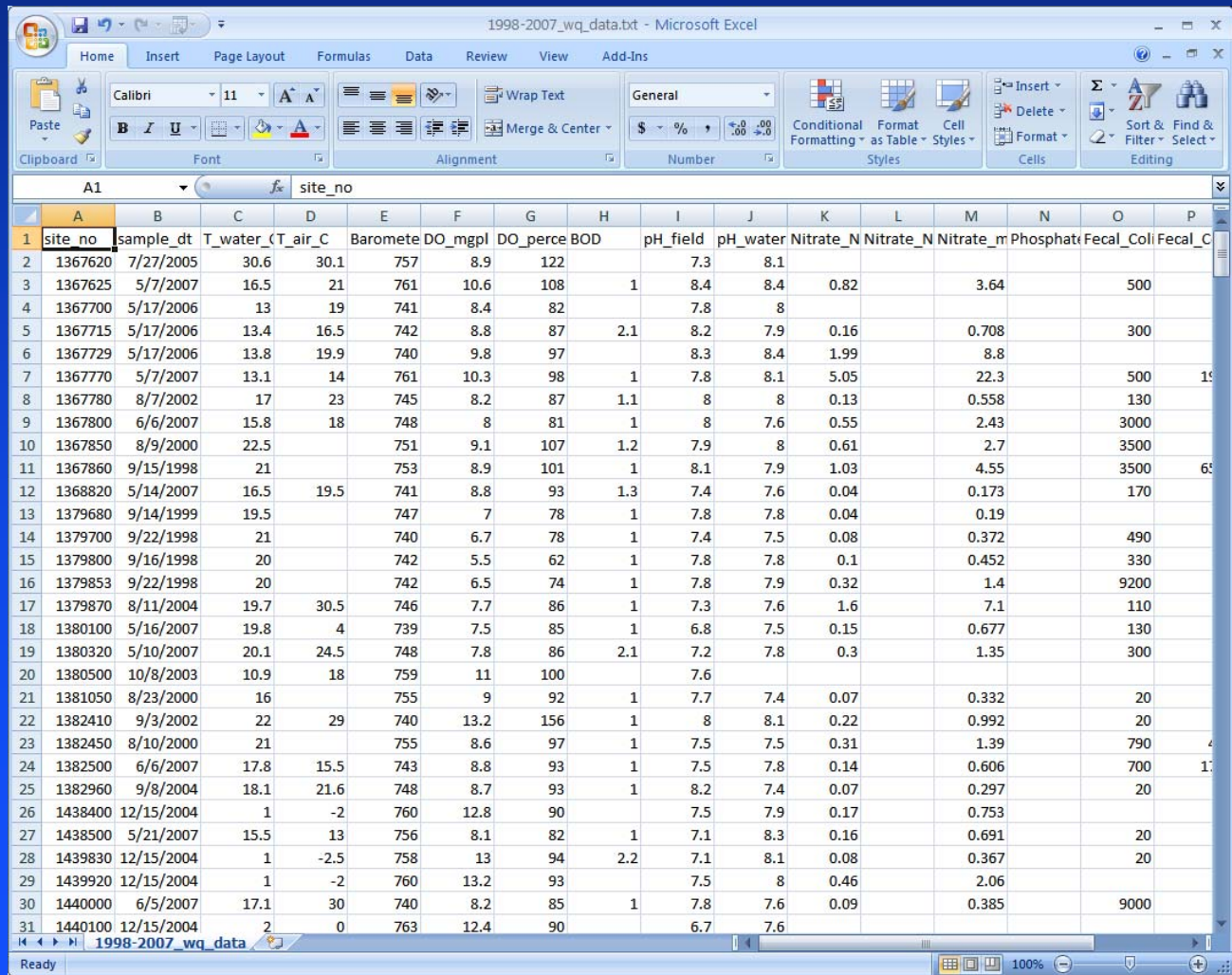
- Data aggregation
- Most recent data by gauge



site_no	sample_dt	T_water_C	T_air_C	Barometer_m	DO_mgpl	DO_percent	BOD	pH_field	pH_water	Nitrate_N_m	Nitra
01367620	2005-07-27	30.6	30.1	757	8.9	122		7.3	8.1		
01367625	2007-05-07	16.5	21.0	761	10.6	108	1.0	8.4	8.4	0.82	
01367700	2006-05-17	13.0	19.0	741	8.4	82		7.8	8.0		
01367715	2006-05-17	13.4	16.5	742	8.8	87	2.1	8.2	7.9	0.16	
01367729	2006-05-17	13.8	19.9	740	9.8	97		8.3	8.4	1.99	
01367770	2007-05-07	13.1	14.0	761	10.3	98	1.0	7.8	8.1	5.05	
01367780	2002-08-07	17.0	23.0	745	8.2	87	1.1	8.0	8.0	0.13	
01367800	2007-06-06	15.8	18.0	748	8.0	81	1.0	8.0	7.6	0.55	
01367850	2000-08-09	22.5		751	9.1	107	1.2	7.9	8.0	0.61	
01367860	1998-09-15	21.0		753	8.9	101	1.0	8.1	7.9	1.03	
01368820	2007-05-14	16.5	19.5	741	8.8	93	1.3	7.4	7.6	0.04	
01379680	1999-09-14	19.5		747	7.0	78	1.0	7.8	7.8	0.04	
01379700	1998-09-22	21.0		740	6.7	78	1.0	7.4	7.5	0.08	
01379800	1998-09-16	20.0		742	5.5	62	1.0	7.8	7.8	0.10	
01379853	1998-09-22	20.0		742	6.5	74	1.0	7.8	7.9	0.32	
01379870	2004-08-11	19.7	30.5	746	7.7	86	1.0	7.3	7.6	1.60	
01380100	2007-05-16	19.8	4.0	739	7.5	85	1.0	6.8	7.5	0.15	
01380320	2007-05-10	20.1	24.5	748	7.8	86	2.1	7.2	7.8	0.30	
01380500	2003-10-08	10.9	18.0	759	11.0	100		7.6			
01381050	2000-08-23	16.0		755	9.0	92	1.0	7.7	7.4	0.07	
01382410	2002-09-03	22.0	29.0	740	13.2	156	1.0	8.0	8.1	0.22	
01382450	2000-08-10	21.0		755	8.6	97	1.0	7.5	7.5	0.31	
01382500	2007-06-06	17.8	15.5	743	8.8	93	1.0	7.5	7.8	0.14	
01382960	2004-09-08	18.1	21.6	748	8.7	93	1.0	8.2	7.4	0.07	
01438400	2004-12-15	1.0	-2.0	760	12.8	90		7.5	7.9	0.17	
01438500	2007-05-21	15.5	13.0	756	8.1	82	1.0	7.1	8.3	0.16	

Water Quality Data Wizard

- Exports tab-delimited text
- Imports into Excel, Access, ArcGIS, etc.



1998-2007_wq_data.txt - Microsoft Excel

	site_no	sample_dt	T_water_(	T_air_C	Baromete	DO_mgpl	DO_perce	BOD	pH_field	pH_water	Nitrate_N	Nitrate_N	Nitrate_m	Phosphat	Fecal_Coli	Fecal_C
2	1367620	7/27/2005	30.6	30.1	757	8.9	122		7.3	8.1						
3	1367625	5/7/2007	16.5	21	761	10.6	108	1	8.4	8.4	0.82		3.64		500	
4	1367700	5/17/2006	13	19	741	8.4	82		7.8	8						
5	1367715	5/17/2006	13.4	16.5	742	8.8	87	2.1	8.2	7.9	0.16		0.708		300	
6	1367729	5/17/2006	13.8	19.9	740	9.8	97		8.3	8.4	1.99		8.8			
7	1367770	5/7/2007	13.1	14	761	10.3	98	1	7.8	8.1	5.05		22.3		500	1
8	1367780	8/7/2002	17	23	745	8.2	87	1.1	8	8	0.13		0.558		130	
9	1367800	6/6/2007	15.8	18	748	8	81	1	8	7.6	0.55		2.43		3000	
10	1367850	8/9/2000	22.5		751	9.1	107	1.2	7.9	8	0.61		2.7		3500	
11	1367860	9/15/1998	21		753	8.9	101	1	8.1	7.9	1.03		4.55		3500	6
12	1368820	5/14/2007	16.5	19.5	741	8.8	93	1.3	7.4	7.6	0.04		0.173		170	
13	1379680	9/14/1999	19.5		747	7	78	1	7.8	7.8	0.04		0.19			
14	1379700	9/22/1998	21		740	6.7	78	1	7.4	7.5	0.08		0.372		490	
15	1379800	9/16/1998	20		742	5.5	62	1	7.8	7.8	0.1		0.452		330	
16	1379853	9/22/1998	20		742	6.5	74	1	7.8	7.9	0.32		1.4		9200	
17	1379870	8/11/2004	19.7	30.5	746	7.7	86	1	7.3	7.6	1.6		7.1		110	
18	1380100	5/16/2007	19.8	4	739	7.5	85	1	6.8	7.5	0.15		0.677		130	
19	1380320	5/10/2007	20.1	24.5	748	7.8	86	2.1	7.2	7.8	0.3		1.35		300	
20	1380500	10/8/2003	10.9	18	759	11	100		7.6							
21	1381050	8/23/2000	16		755	9	92	1	7.7	7.4	0.07		0.332		20	
22	1382410	9/3/2002	22	29	740	13.2	156	1	8	8.1	0.22		0.992		20	
23	1382450	8/10/2000	21		755	8.6	97	1	7.5	7.5	0.31		1.39		790	
24	1382500	6/6/2007	17.8	15.5	743	8.8	93	1	7.5	7.8	0.14		0.606		700	1
25	1382960	9/8/2004	18.1	21.6	748	8.7	93	1	8.2	7.4	0.07		0.297		20	
26	1438400	12/15/2004	1	-2	760	12.8	90		7.5	7.9	0.17		0.753			
27	1438500	5/21/2007	15.5	13	756	8.1	82	1	7.1	8.3	0.16		0.691		20	
28	1439830	12/15/2004	1	-2.5	758	13	94	2.2	7.1	8.1	0.08		0.367		20	
29	1439920	12/15/2004	1	-2	760	13.2	93		7.5	8	0.46		2.06			
30	1440000	6/5/2007	17.1	30	740	8.2	85	1	7.8	7.6	0.09		0.385		9000	
31	1440100	12/15/2004	2	0	763	12.4	90		6.7	7.6						

1998-2007_wq_data

Ready

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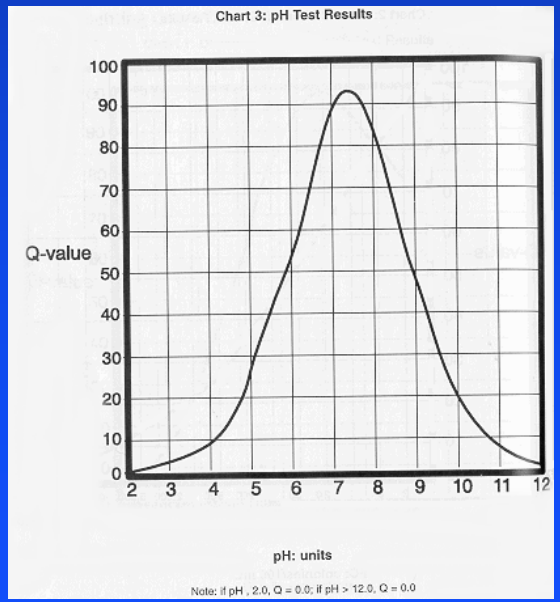
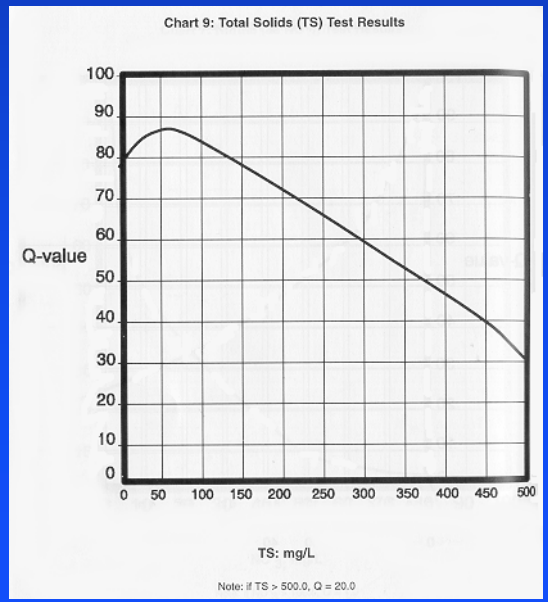
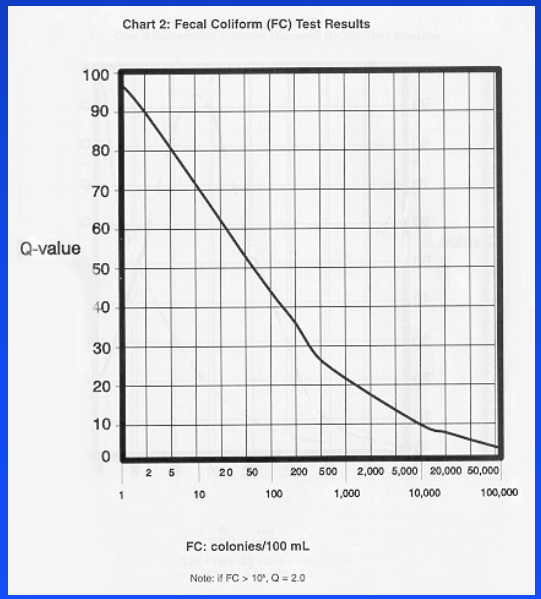
Data Assessment

Water Quality Index (WQI)

- Weighted sum of 9 indicator Q-values
- Variables are independent
- Each indicator has its own Q-value curve







WQI Components

- Biological Oxygen Demand (BOD)
- Dissolved Oxygen (DO)
- Fecal Colliforms
- Nitrate
- pH
- Temperature Change
- Total Dissolved Solids
- Total Phosphate
- Turbidity

WQI Model

- Represent Q-value curves with fuzzy curves

WQI Model

- Represent Q-value curves with fuzzy curves
- Evaluate each indicator against its fuzzy curve

WQI Model

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- Aggregate results of indicators with data using a special weighted average function

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WQI Model

- Represent Q-value curves with fuzzy curves
- Evaluate each indicator against its fuzzy curve
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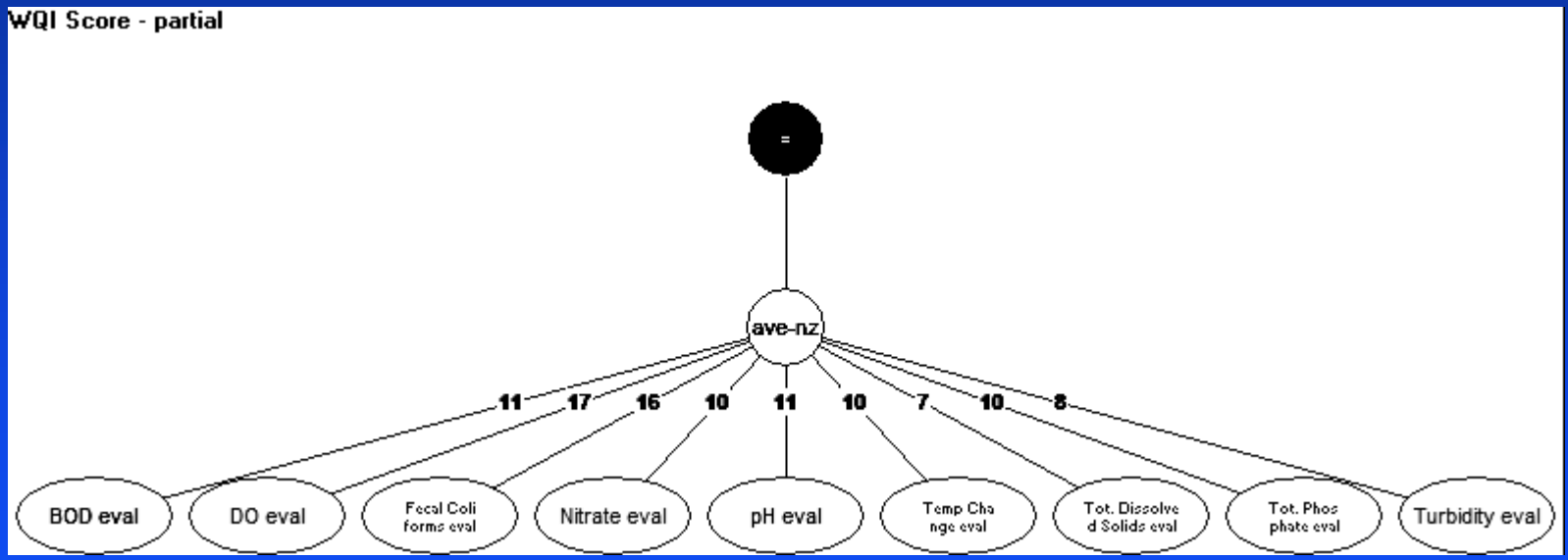
- Classify the results aggregation with a fuzzy argument
- Map the results of the individual indicators and the aggregation

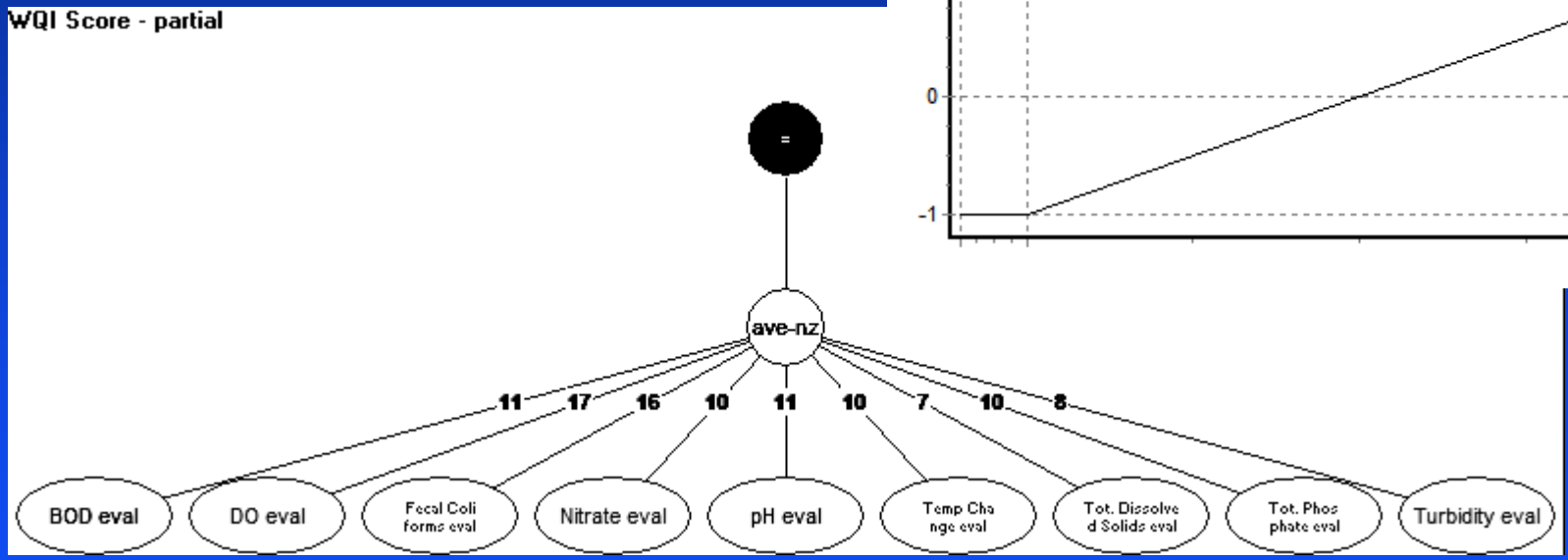
WQI Model

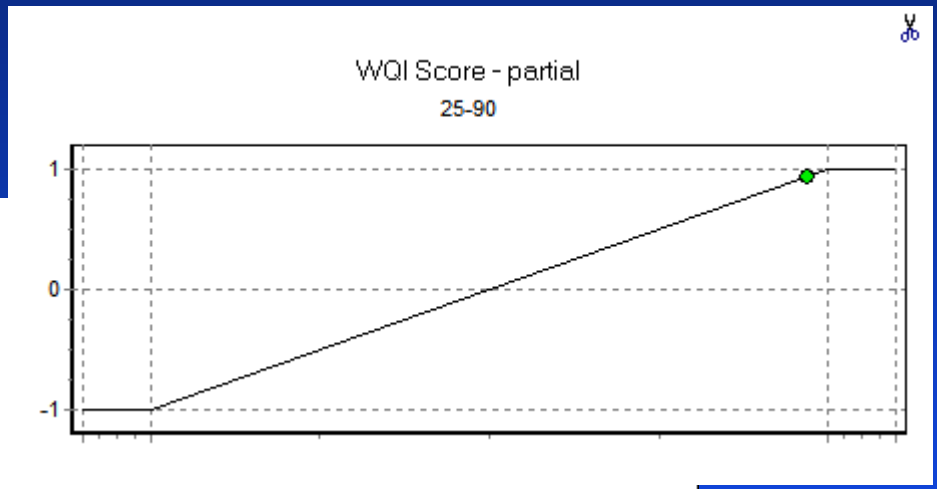
- Represent Q-value curves with fuzzy curves
- Evaluate each indicator against its fuzzy curve
- Aggregate results of indicators with data using a special weighted average function
- Classify the results aggregation with a fuzzy argument
- Map the results of the individual indicators and the aggregation
- Map the “holes” – missing data

WQI Model


WQI Score - partial
=
ave-nz
11
17
16
10
11
10
7
10
8
BOD eval
DO eval
Fecal Coli forms eval
Nitrate eval
pH eval
Temp Cha nge eval
Tot. Dissolve d Solids eval
Tot. Phos phate eval
Turbidity eval

WQI Model

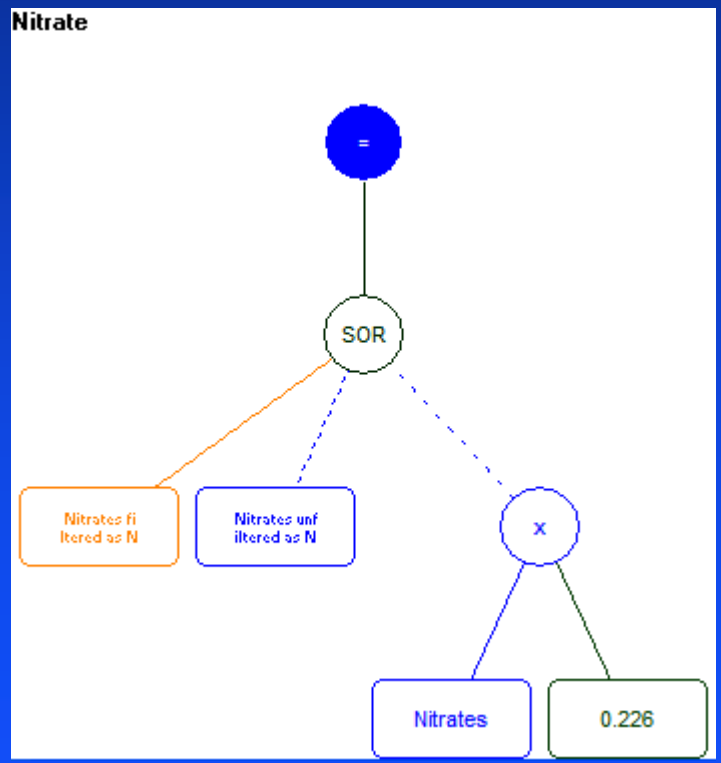

WQI Score - partial
=
ave-nz
11
17
16
10
11
10
7
10
8
BOD eval
DO eval
Fecal Coli forms eval
Nitrate eval
pH eval
Temp Cha nge eval
Tot. Dissolve d Solids eval
Tot. Phos phate eval
Turbidity eval


WQI Score - partial
25-90
1
0
-1

Results Synthesis

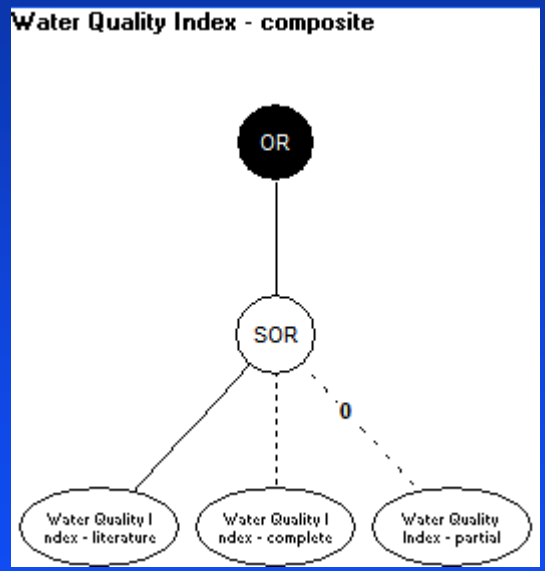
Selector of Multiple Inputs for Single Indicator

- Chooses first (left to right) route that has sufficient data
- Place methods in order of preference (best source/method first)

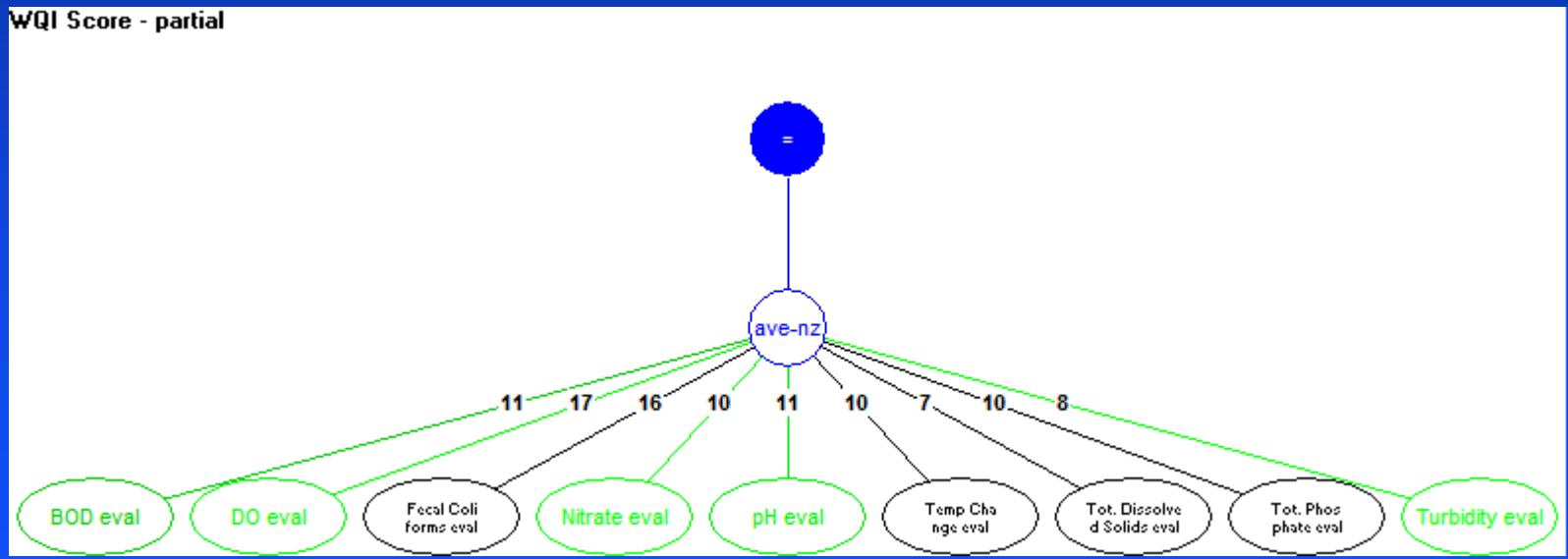


Selection from Multiple Evaluation Methods

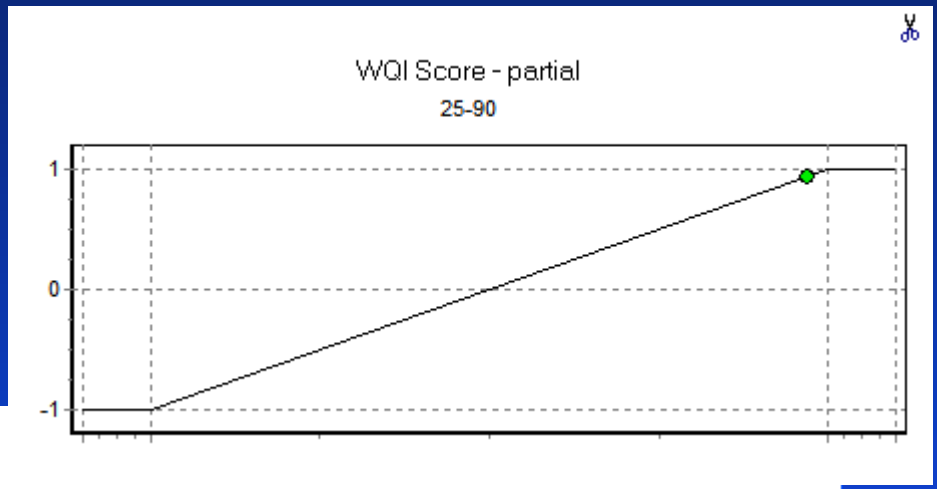
- Preferred method first
- Third method allows missing data

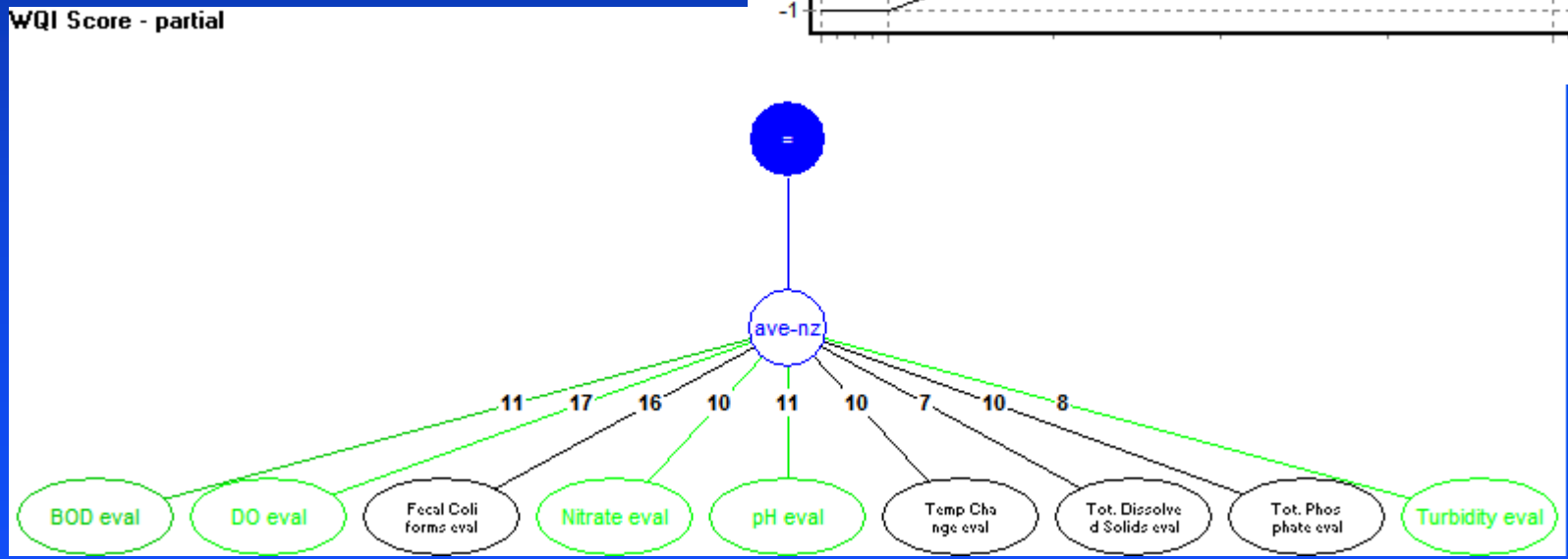


WQI Score – Partial Data

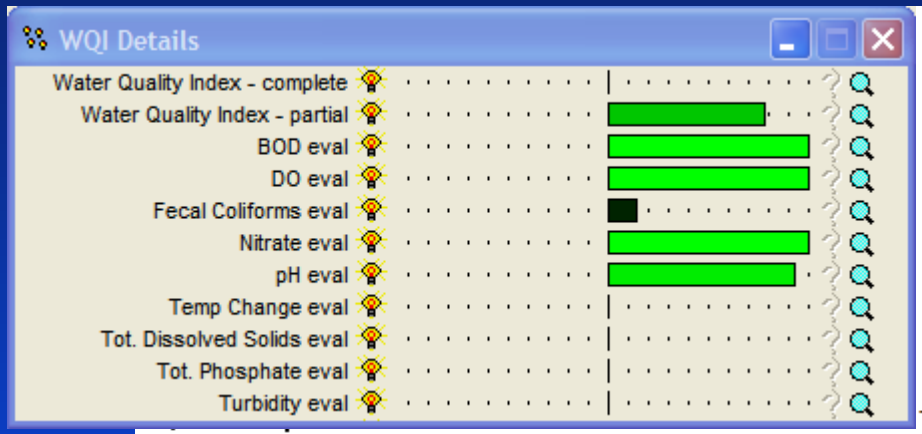


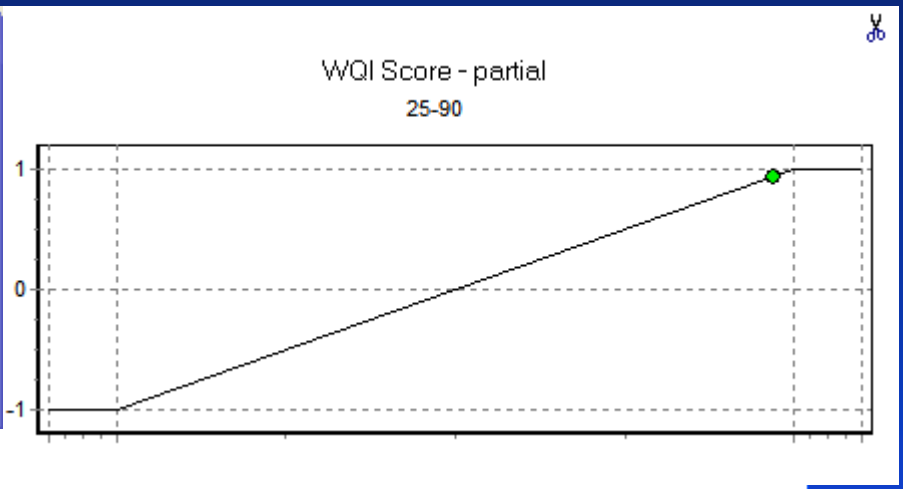
WQI Score

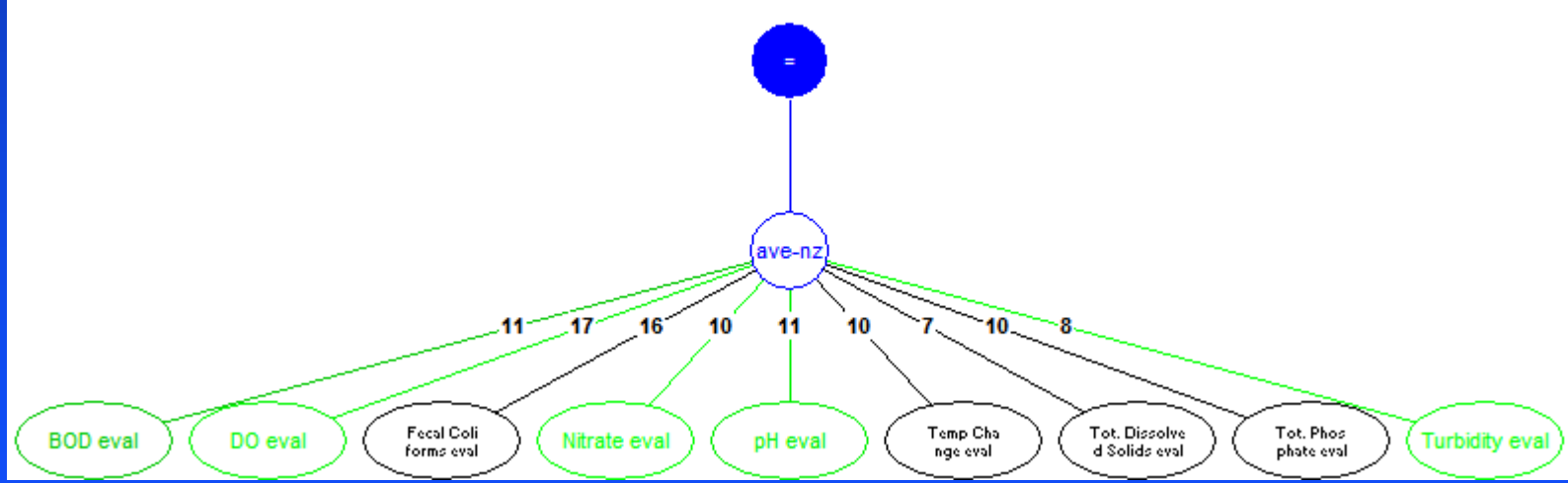

WQI Score - partial
25-90
1
0
-1


WQI Score - partial
=
ave-nz
11
17
16
10
11
10
7
10
8
BOD eval
DO eval
Fecal Coli forms eval
Nitrate eval
pH eval
Temp Cha nge eval
Tot. Dissolve d Solids eval
Tot. Phos phate eval
Turbidity eval

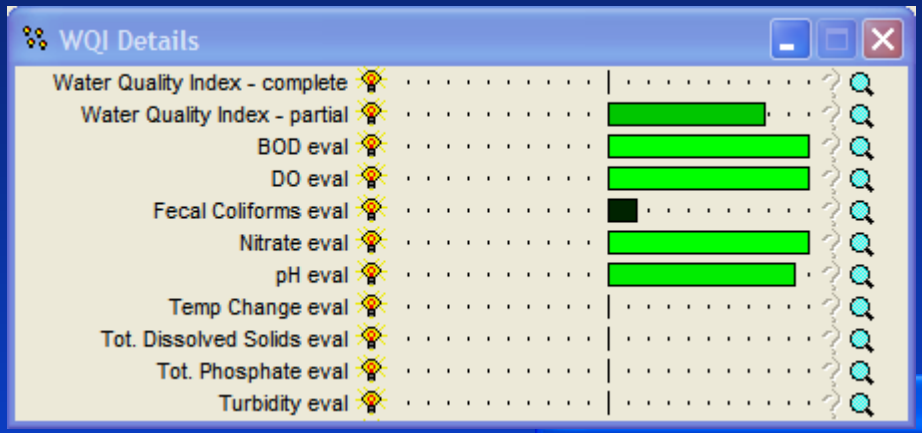
WQI Score


WQI Details
Water Quality Index - complete
Water Quality Index - partial
BOD eval
DO eval
Fecal Coliforms eval
Nitrate eval
pH eval
Temp Change eval
Tot. Dissolved Solids eval
Tot. Phosphate eval
Turbidity eval

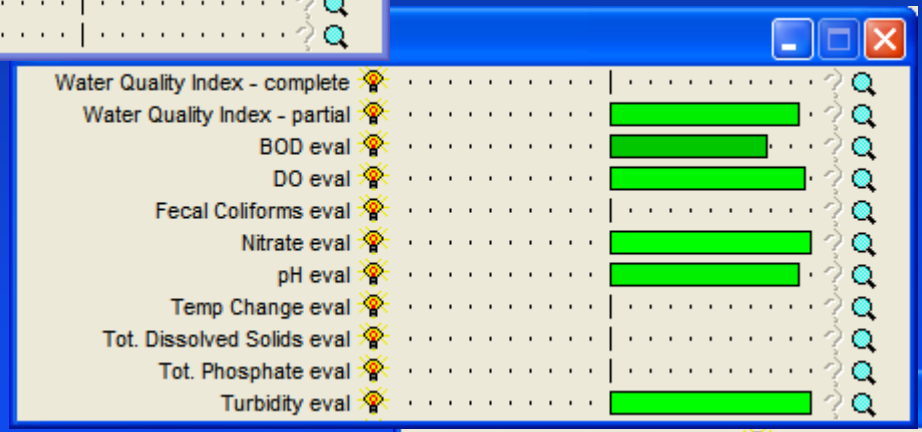

WQI Score - partial
25-90
1
0
-1

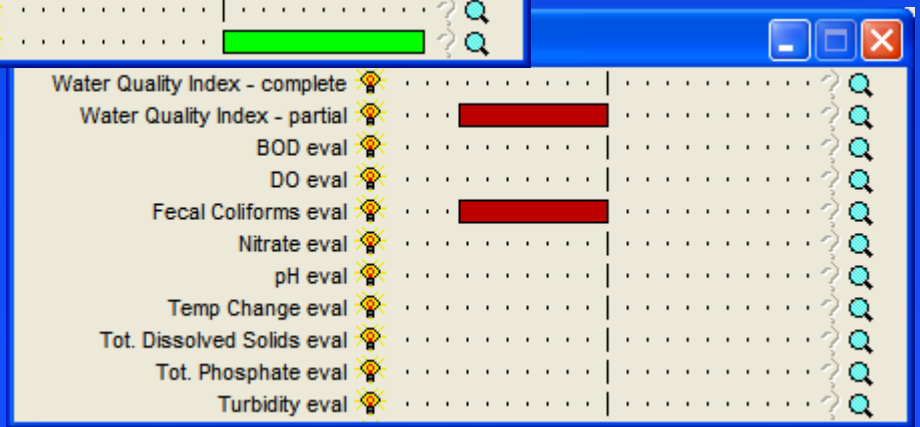

=
ave-nz
11
17
16
10
11
10
7
10
8
BOD eval
DO eval
Fecal Coli forms eval
Nitrate eval
pH eval
Temp Cha nge eval
Tot. Dissolve d Solids eval
Tot. Phos phate eval
Turbidity eval

WQI Score



- Same gauge
- Different times





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Results Display

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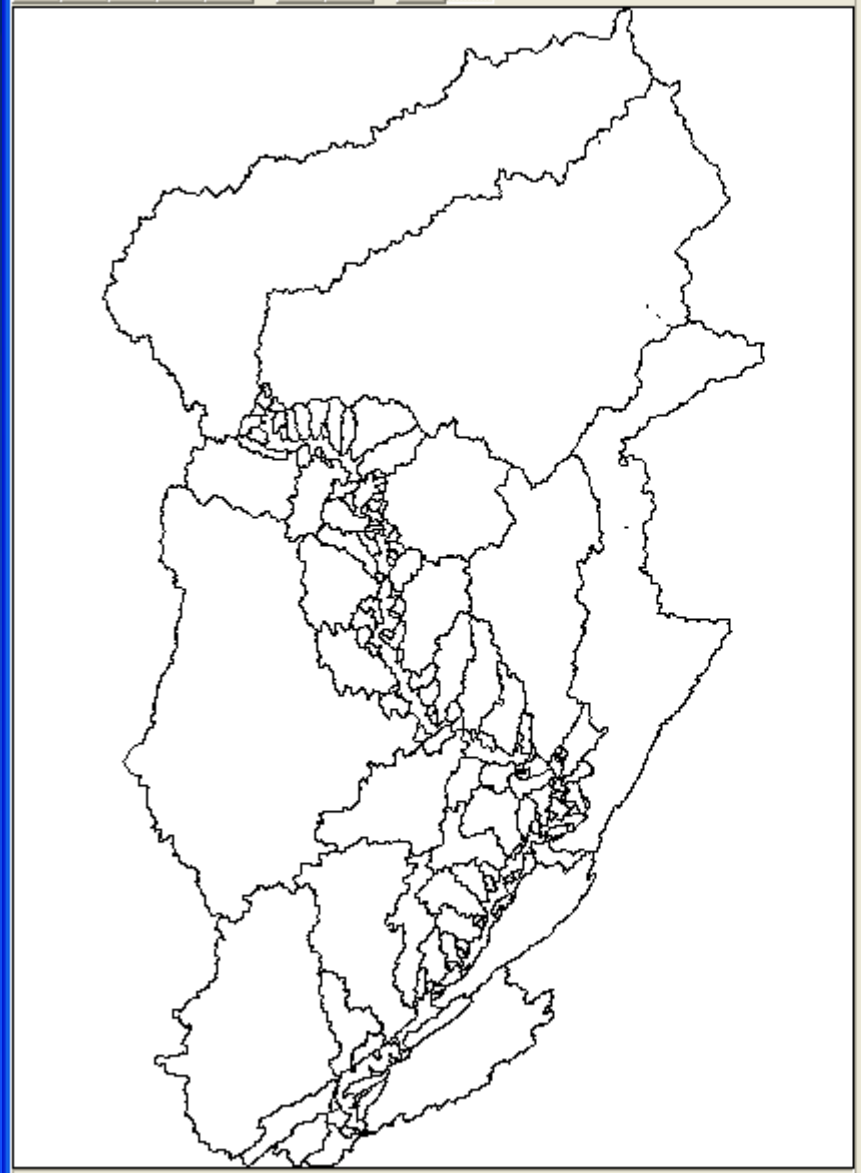
GeoNetWeaver 2007.12.19 - beta

File Setup Map Knowledge Base Results Help



geoProject: WQI
Result Set: 25 Sept 2007

Results

Aggregation: none

Topic Displayed on Map:

Antecedents:

Legend | Stats | Results | Inputs | Watershed_fina

Name	Value	Data %
BOD eval		
Data Sufficiency		
DO eval		
Fecal Coliforms eval		
Nitrate eval		
pH eval		
Temp Change eval		
Tot. Dissolved Solids eval		
Tot. Phosphate eval		
Turbidity eval		
Water Quality Index - complete		
Water Quality Index - partial		

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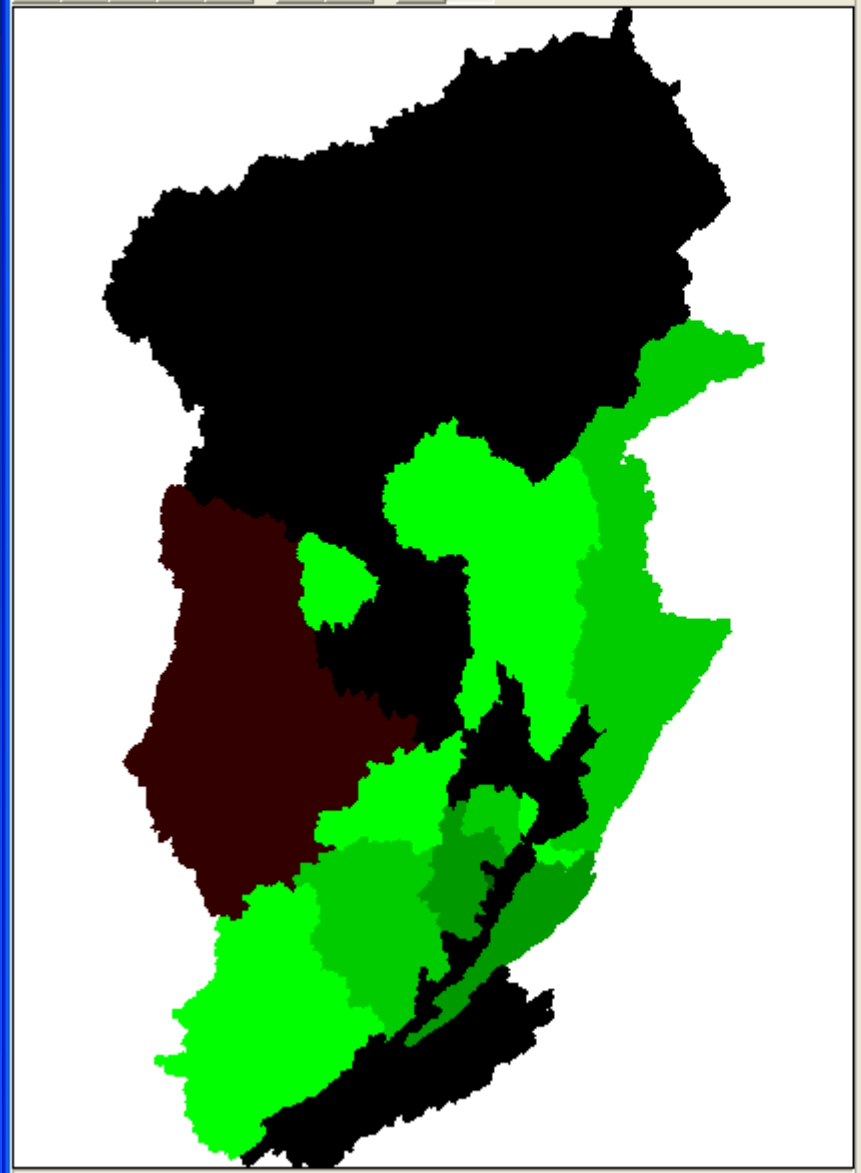
File Setup Map Knowledge Base Results Help



Results

Aggregation

none

Topic Displayed on Map

Water Quality Index - partial

Antecedents

Legend | Stats | Results | Inputs | Watershed_fina

Name	Value	Data %
BOD eval		
Data Sufficiency		
DO eval		
Fecal Coliforms eval		
Nitrate eval		
pH eval		
Temp Change eval		
Tot. Dissolved Solids eval		
Tot. Phosphate eval		
Turbidity eval		
Water Quality Index - complete		
Water Quality Index - partial		

geoProject: WQI
Result Set: 25 Sept 2007

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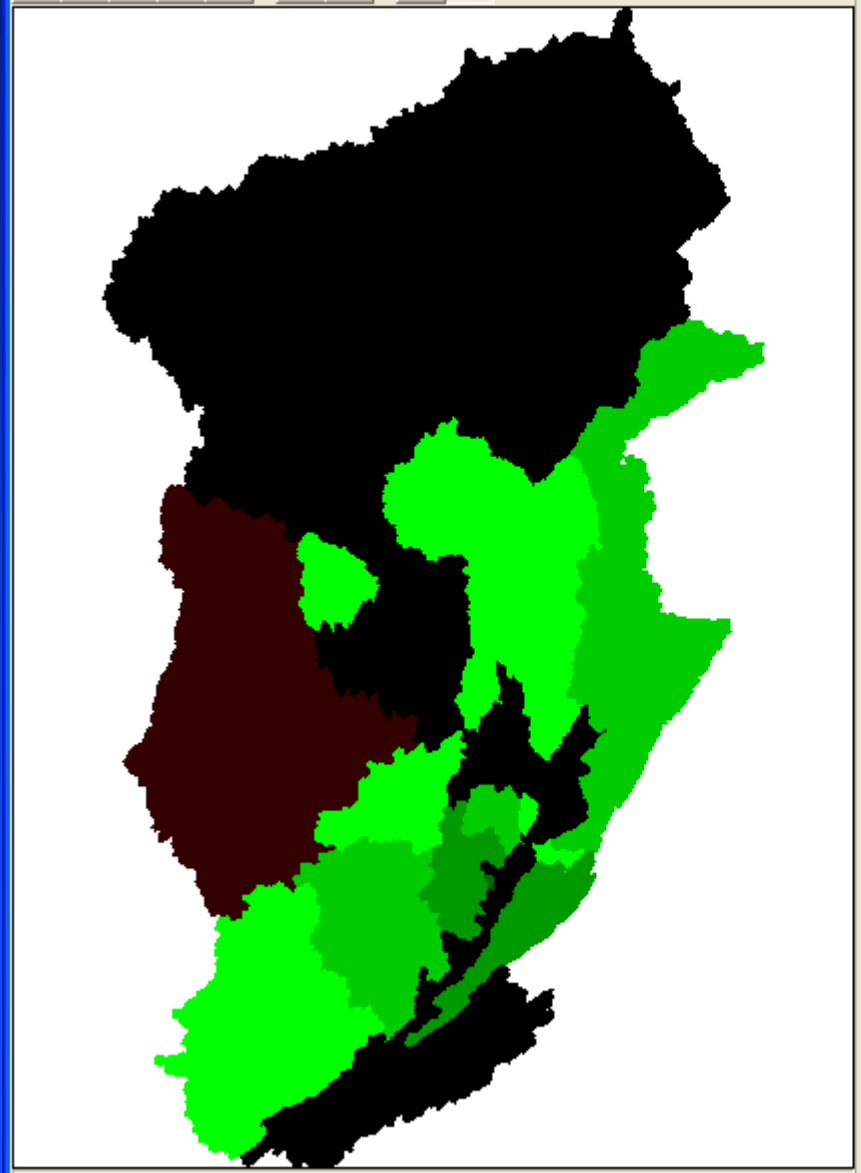
File Setup Map Knowledge Base Results Help



Results

Aggregation

none

Topic Displayed on Map

Water Quality Index - partial

Antecedents

Legend | Stats | Results | Inputs | Watershed_fina

Data Dissatisfaction

Water Quality Index - partial

True

-

False

geoProject: WQI
Result Set: 25 Sept 2007

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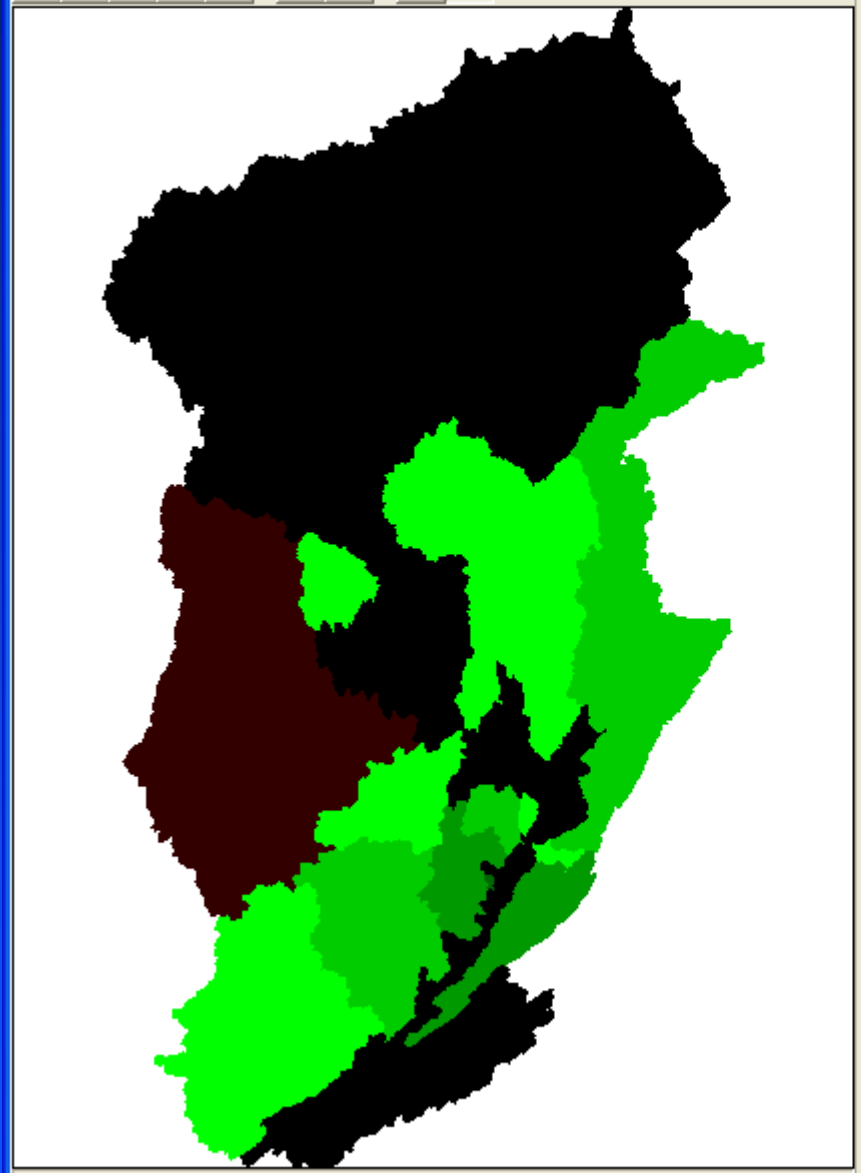
File Setup Map Knowledge Base Results Help



geoProject: WQI
Result Set: 25 Sept 2007

Results

Aggregation: none

Topic Displayed on Map: Water Quality Index - partial

Antecedents:

Legend | Stats | Results | Inputs | Watershed_fina

Name		Data %
BOD eval	-	0
Data Sufficiency	-0.778	17
DO eval	-0.231	100
Fecal Coliforms eval	-	0
Nitrate eval	1.000	100
pH eval	-1.000	100
Temp Change eval	-	0
Tot. Dissolved Solids eval	-	0
Tot. Phosphate eval	-	0
Turbidity eval	-	0
Water Quality Index - complete	-	67
Water Quality Index - partial	-0.130	38

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File Setup Map Knowledge Base Results Help

Results

Aggregation

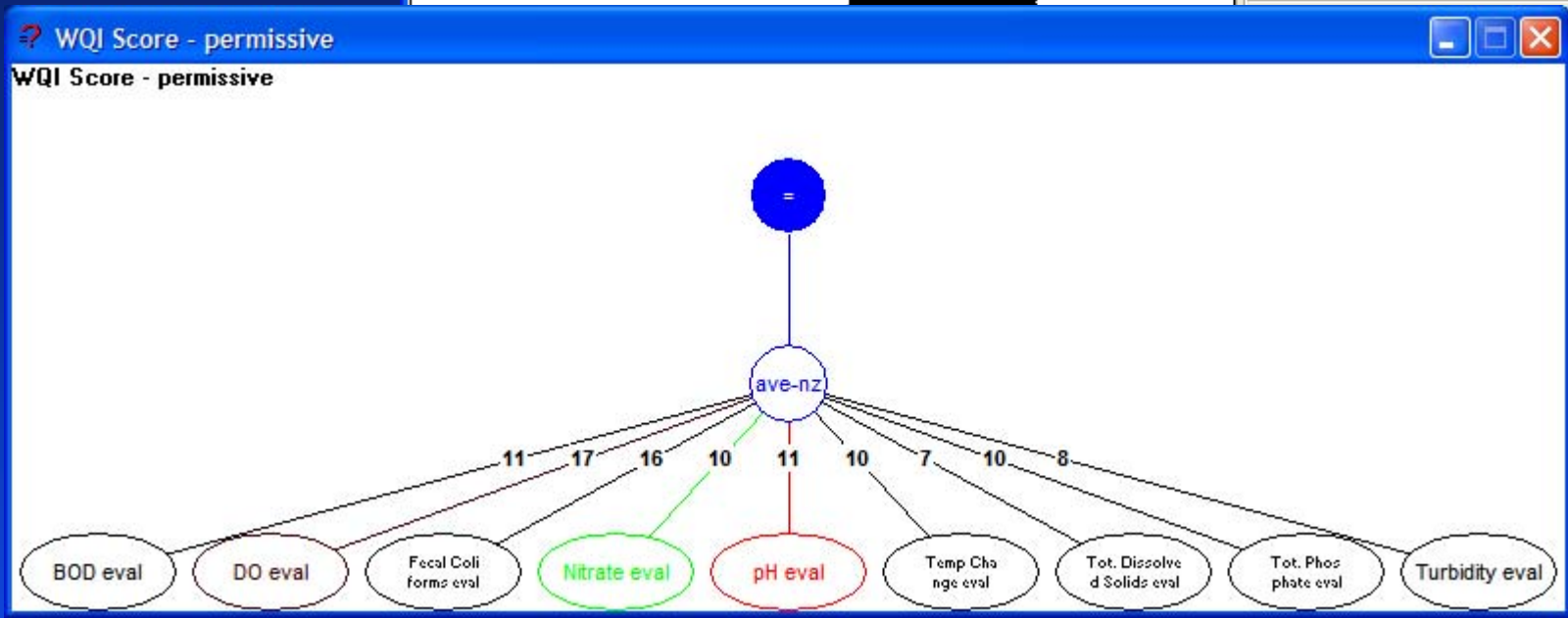
none

Watershed_fina

		Data %
	-	0
	-0.778	17
	-0.231	100
	-	0
	1.000	100
	-1.000	100
	-	0
	-	0
	-	0
	-	0
lete	-	67
Water Quality Index - partial	-0.130	38

geoProject: WQI
Result Set: 25 Sept 2007

WQI Score - permissive



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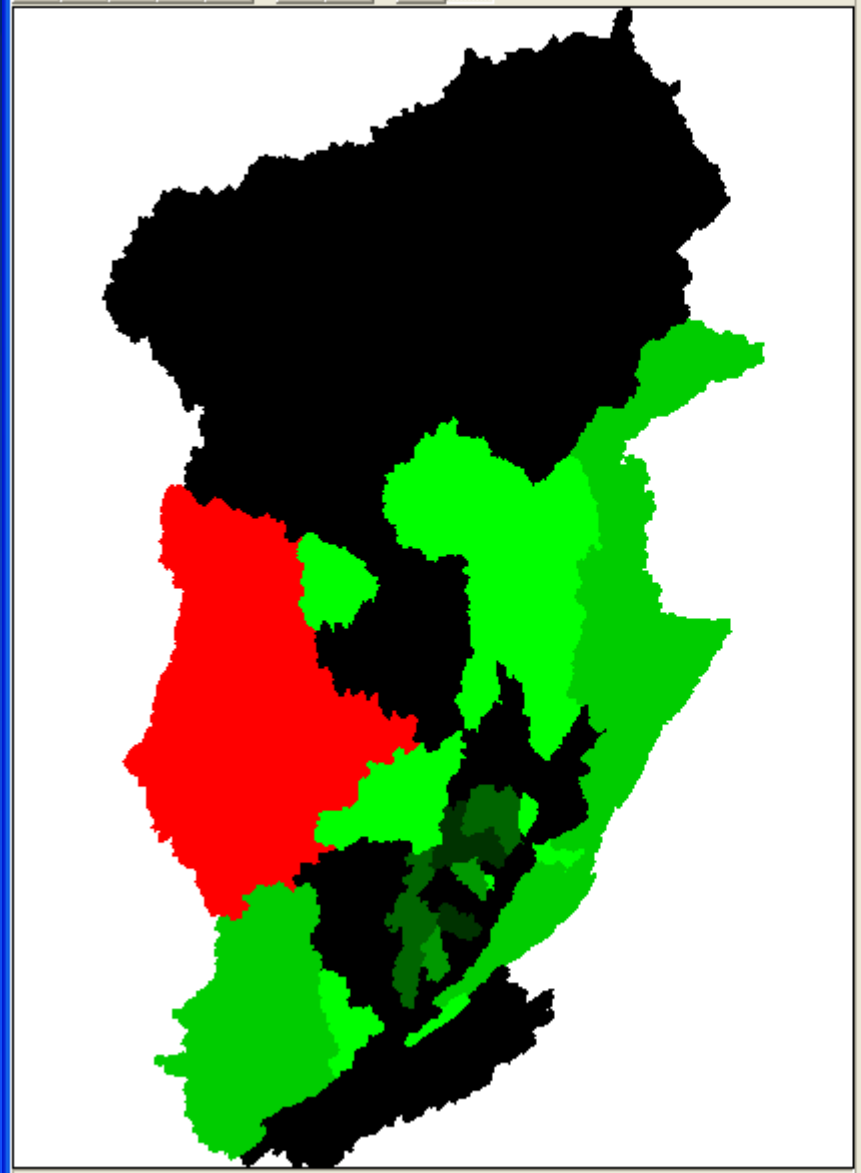
GeoNetWeaver 2007.12.19 - beta

File Setup Map Knowledge Base Results Help



Results

Aggregation: none

Topic Displayed on Map: pH eval

Antecedents:

Legend | Stats | Results | Inputs | Watershed_fina

Name		Data %
BOD eval	-	0
Data Sufficiency	-0.778	17
DO eval	-0.231	100
Fecal Coliforms eval	-	0
Nitrate eval	1.000	100
pH eval	-1.000	100
Temp Change eval	-	0
Tot. Dissolved Solids eval	-	0
Tot. Phosphate eval	-	0
Turbidity eval	-	0
Water Quality Index - complete	-	67
Water Quality Index - partial	-0.130	38

geoProject: WQI
Result Set: 25 Sept 2007

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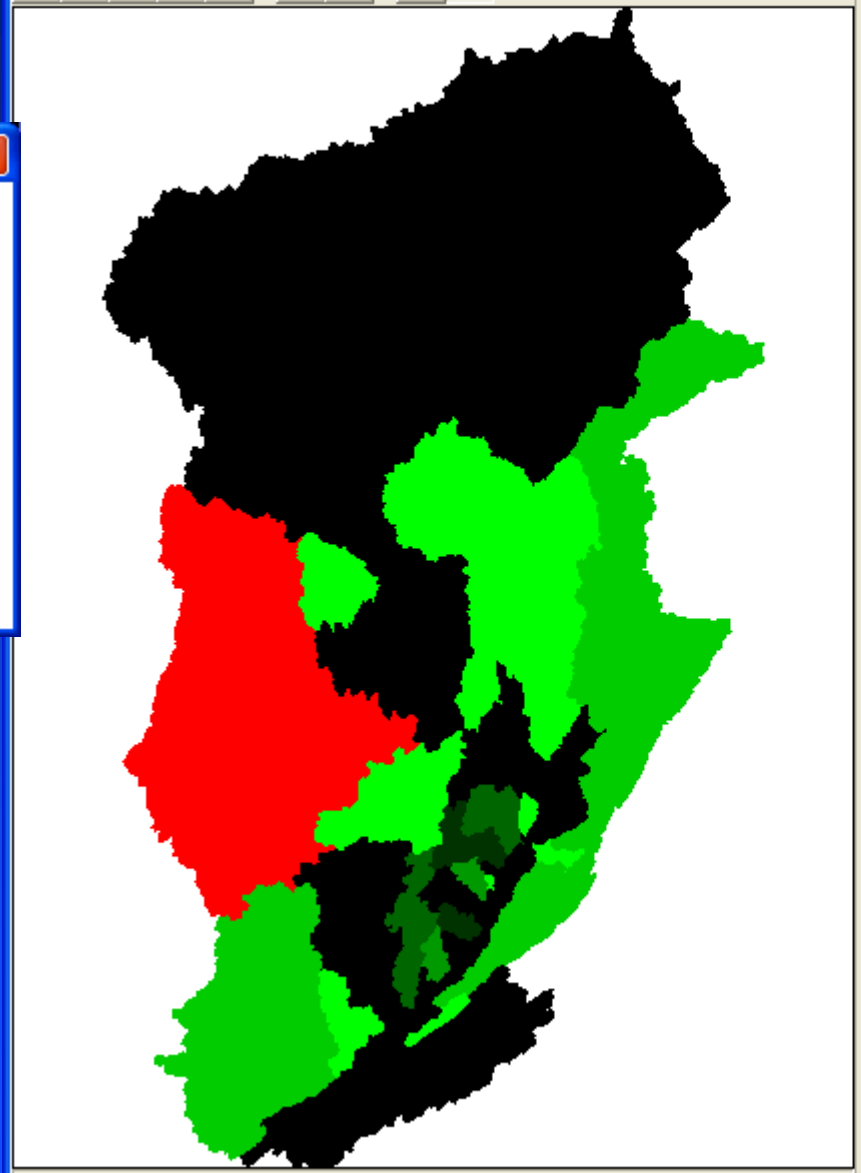
File Setup Map Knowledge Base Results Help



geoProject: WQI
Result Set: 25 Sept 2007

Results

Aggregation: none

Topic Displayed on Map: pH eval

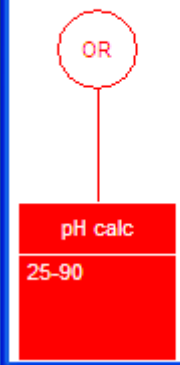
Antecedents:

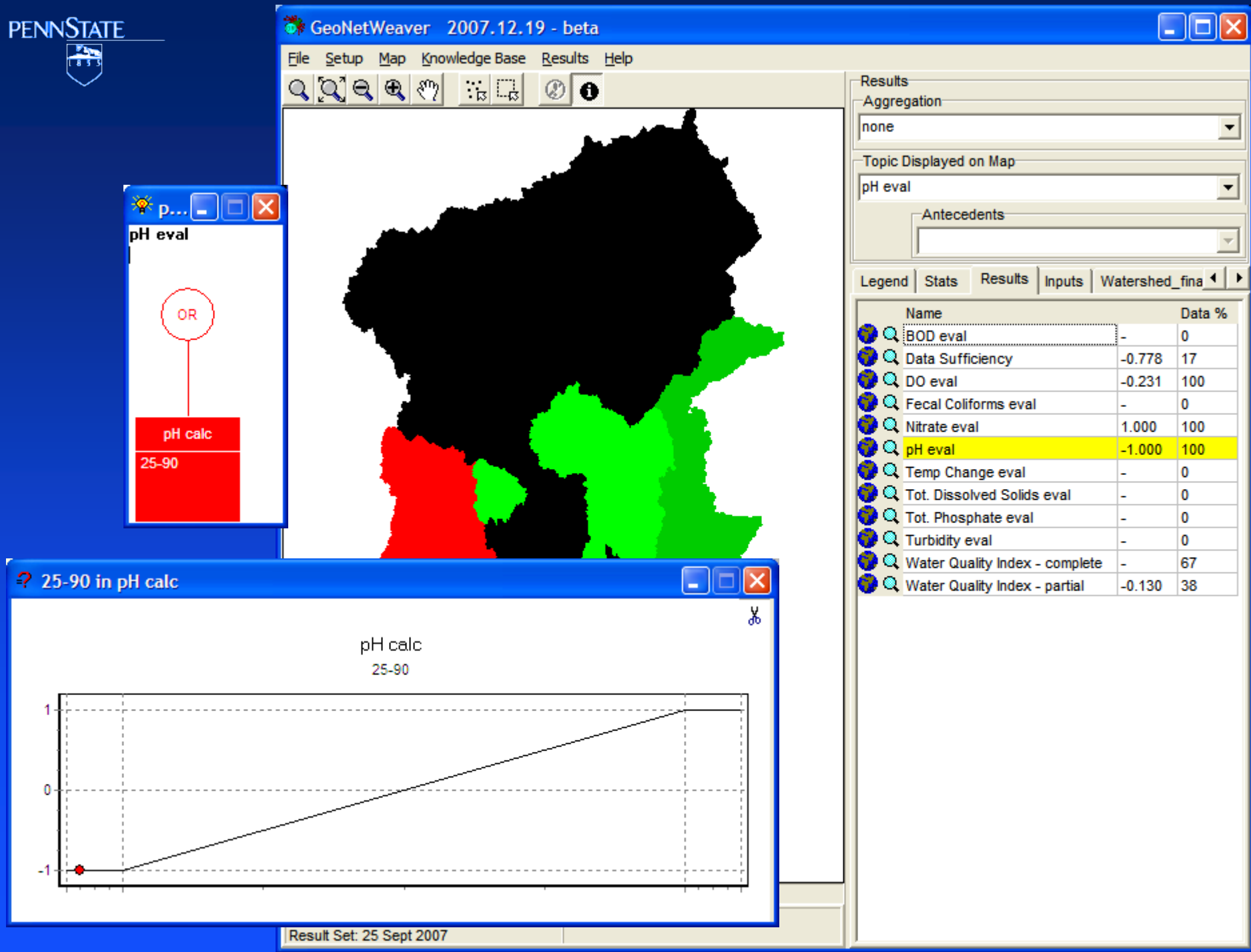
Legend | Stats | Results | Inputs | Watershed_fina

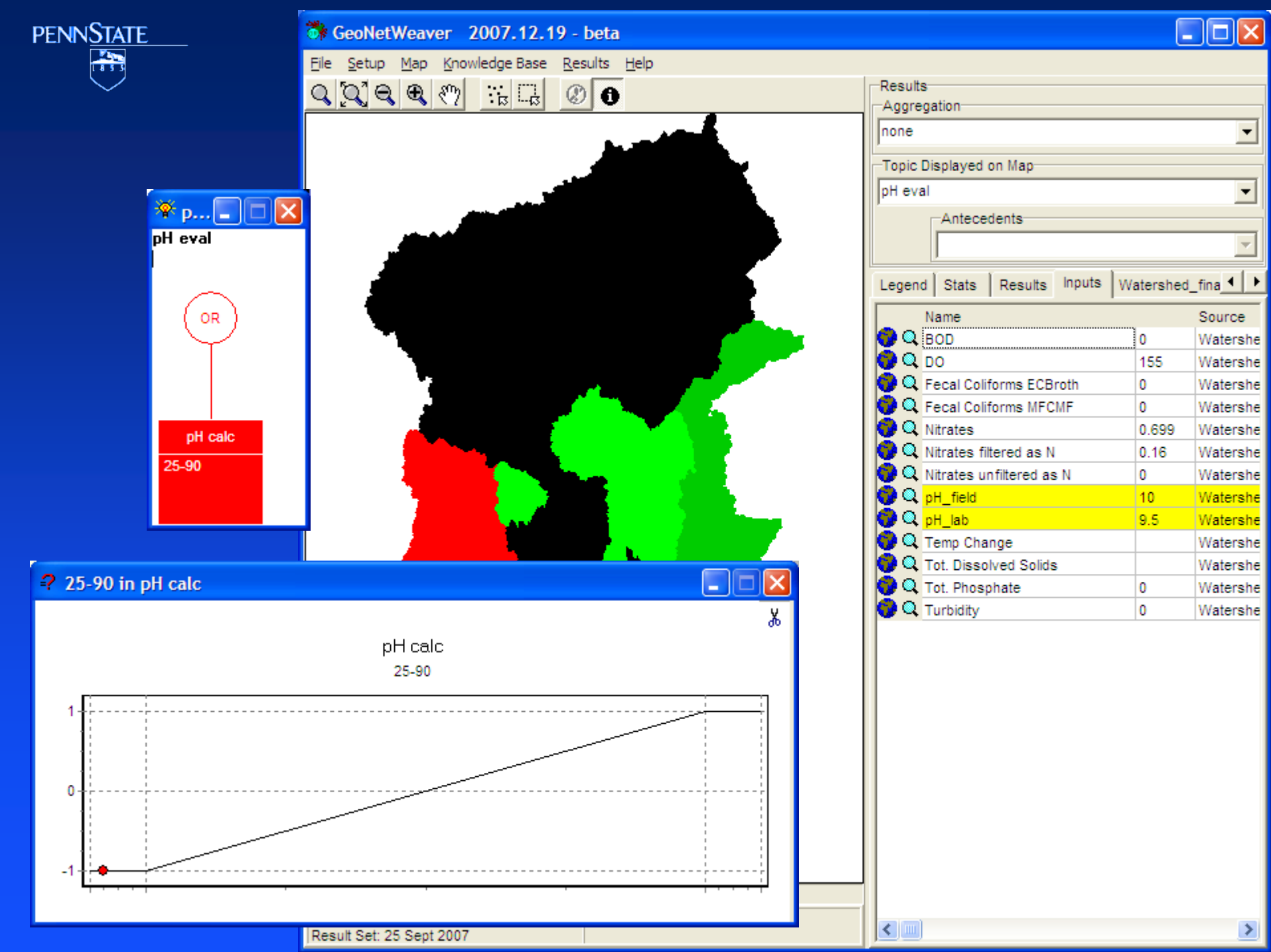
Name		Data %
BOD eval	-	0
Data Sufficiency	-0.778	17
DO eval	-0.231	100
Fecal Coliforms eval	-	0
Nitrate eval	1.000	100
pH eval	-1.000	100
Temp Change eval	-	0
Tot. Dissolved Solids eval	-	0
Tot. Phosphate eval	-	0
Turbidity eval	-	0
Water Quality Index - complete	-	67
Water Quality Index - partial	-0.130	38

p...

pH eval




PENNSTATE
GeoNetWeaver 2007.12.19 - beta
File Setup Map Knowledge Base Results Help
Results
Aggregation
none
Topic Displayed on Map
pH eval
Antecedents
Legend Stats Results Inputs Watershed_fina
Name Data %
BOD eval - 0
Data Sufficiency -0.778 17
DO eval -0.231 100
Fecal Coliforms eval - 0
Nitrate eval 1.000 100
pH eval -1.000 100
Temp Change eval - 0
Tot. Dissolved Solids eval - 0
Tot. Phosphate eval - 0
Turbidity eval - 0
Water Quality Index - complete - 67
Water Quality Index - partial -0.130 38
p...
pH eval
OR
pH calc
25-90
25-90 in pH calc
pH calc
25-90
1
0
-1
Result Set: 25 Sept 2007


PENNSTATE
GeoNetWeaver 2007.12.19 - beta
File Setup Map Knowledge Base Results Help
Results
Aggregation
none
Topic Displayed on Map
pH eval
Antecedents
Legend Stats Results Inputs Watershed_fina
Name Source
BOD 0 Watershe
DO 155 Watershe
Fecal Coliforms ECBroth 0 Watershe
Fecal Coliforms MFCMF 0 Watershe
Nitrates 0.699 Watershe
Nitrates filtered as N 0.16 Watershe
Nitrates unfiltered as N 0 Watershe
pH_field 10 Watershe
pH_lab 9.5 Watershe
Temp Change Watershe
Tot. Dissolved Solids Watershe
Tot. Phosphate 0 Watershe
Turbidity 0 Watershe
p...
pH eval
OR
pH calc
25-90
25-90 in pH calc
pH calc
25-90
1
0
-1
Result Set: 25 Sept 2007

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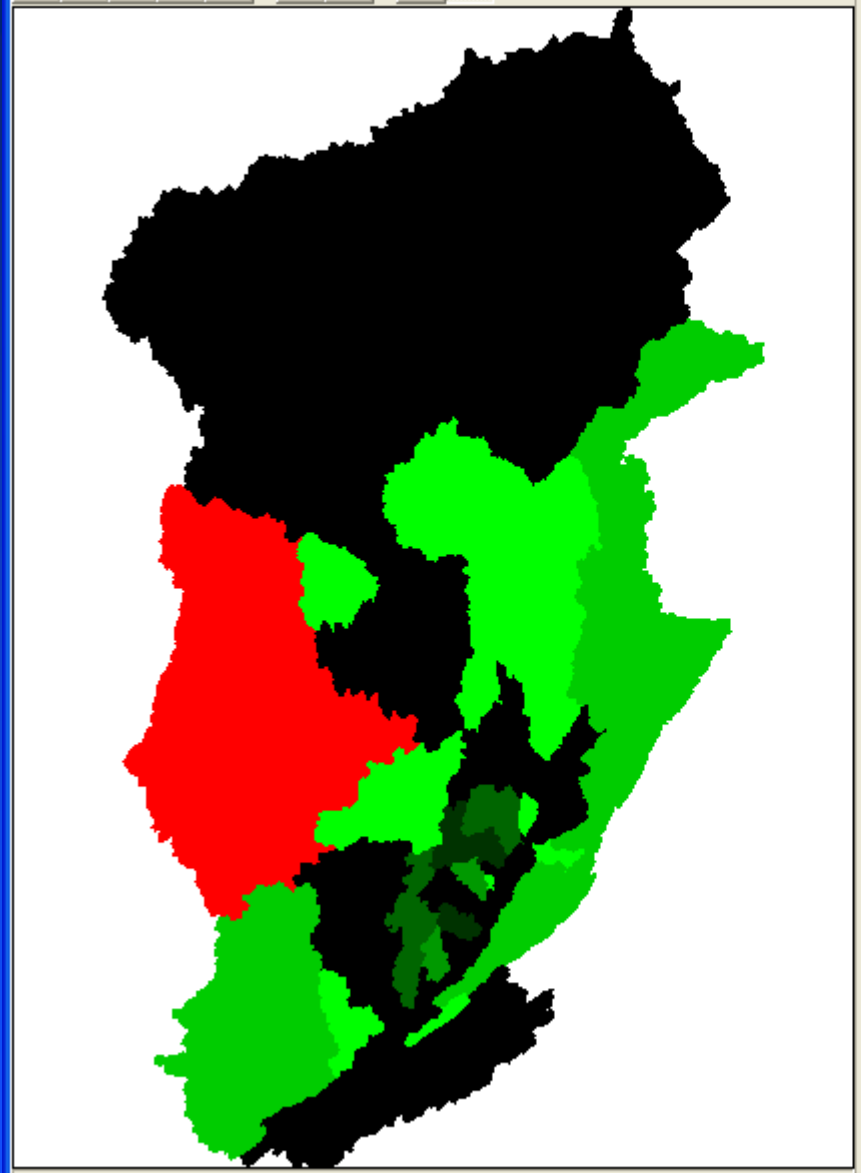
GeoNetWeaver 2007.12.19 - beta

File Setup Map Knowledge Base Results Help



geoProject: WQI
Result Set: 25 Sept 2007

Results

Aggregation: none

Topic Displayed on Map: pH eval

Antecedents:

Legend | Stats | Results | Inputs | Watershed_fina

Name		Source
BOD	0	Watershe
DO	155	Watershe
Fecal Coliforms ECBroth	0	Watershe
Fecal Coliforms MFCMF	0	Watershe
Nitrates	0.699	Watershe
Nitrates filtered as N	0.16	Watershe
Nitrates unfiltered as N	0	Watershe
pH_field	10	Watershe
pH_lab	9.5	Watershe
Temp Change		Watershe
Tot. Dissolved Solids		Watershe
Tot. Phosphate	0	Watershe
Turbidity	0	Watershe

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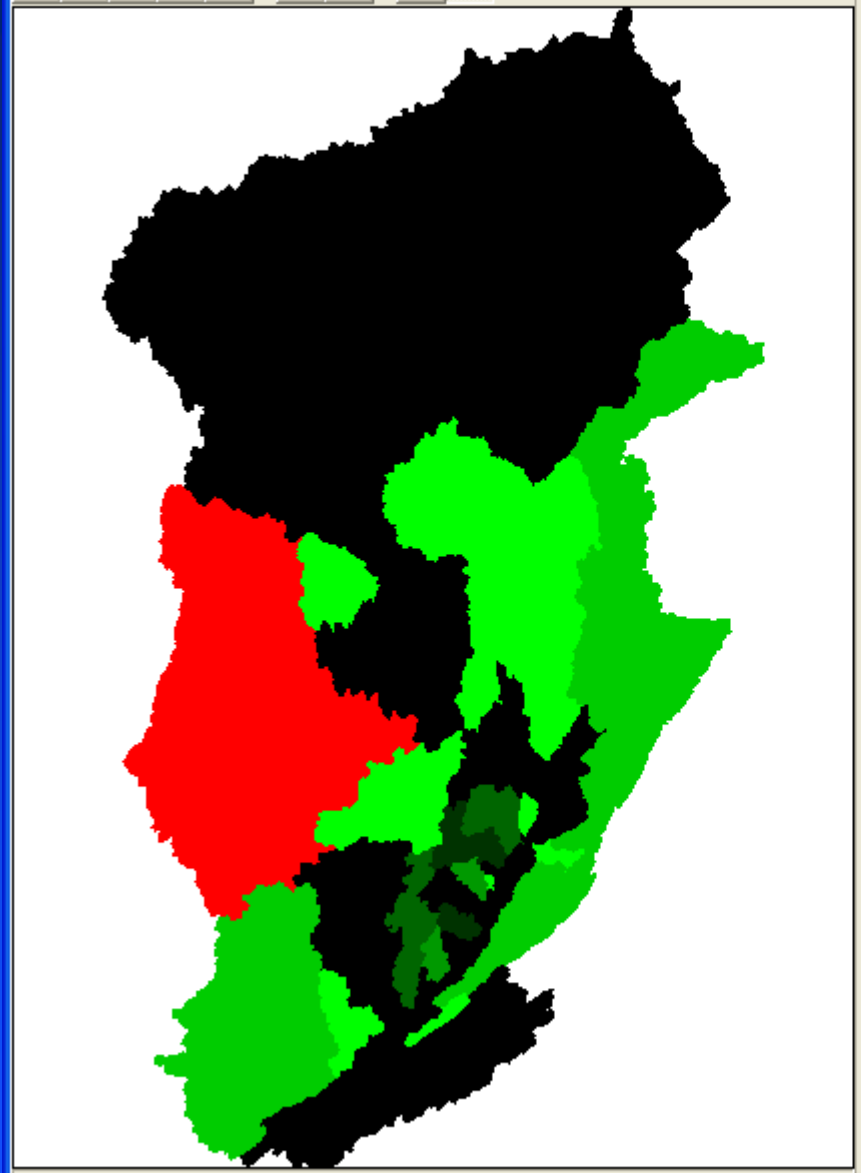
GeoNetWeaver 2007.12.19 - beta

File Setup Map Knowledge Base Results Help



Results

Aggregation: none

Topic Displayed on Map: pH eval

Antecedents:

Legend | Stats | Results | Inputs | Watershed_fina

Data Dissatisfaction

pH eval

True

-

False

geoProject: WQI
Result Set: 25 Sept 2007

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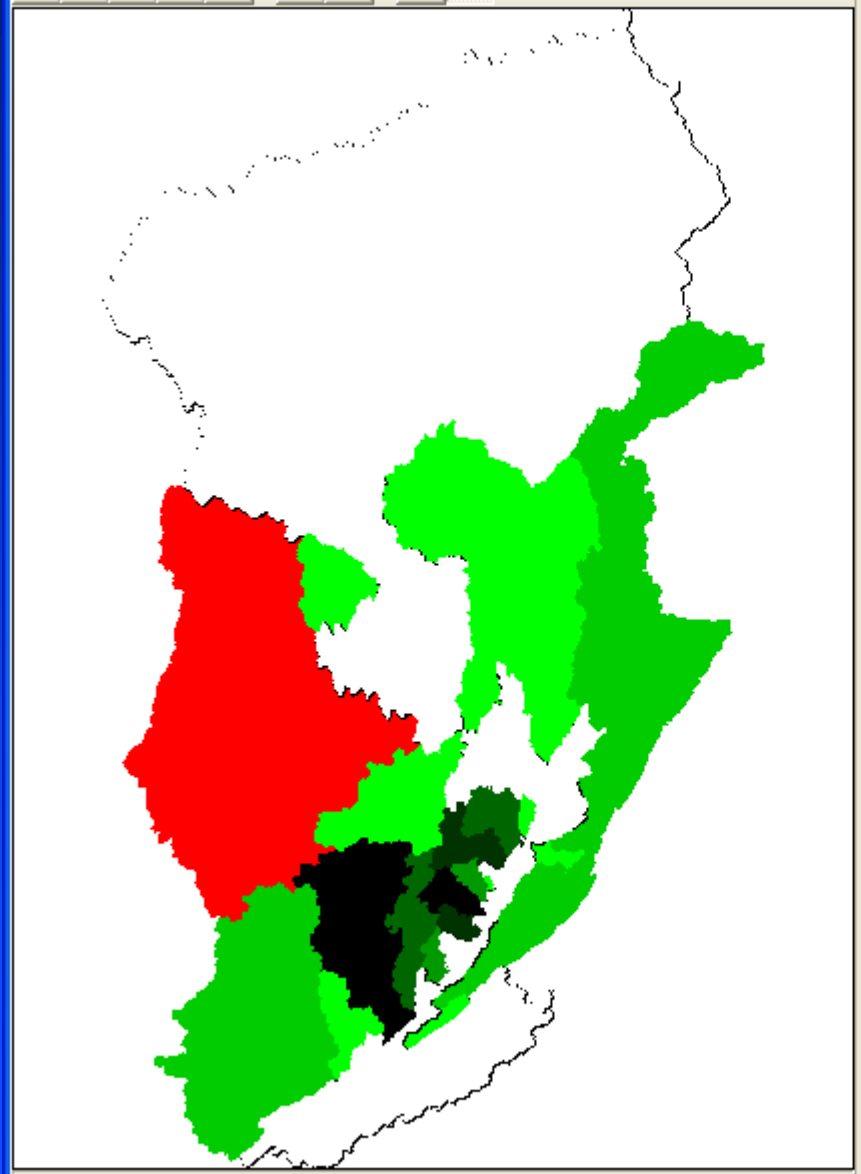
GeoNetWeaver 2007.12.19 - beta

File Setup Map Knowledge Base Results Help



Results
Aggregation
none
Topic Displayed on Map
pH eval
Antecedents

Legend | Stats | Results | Inputs | Watershed_fina

Data Dissatisfaction

pH eval
True
-
False

geoProject: WQI
Result Set: 25 Sept 2007

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WCA Models in Development

Water Quality (chemical/physical)

- Water Quality Index
- Watersheds Hydrologic Flow
- Mainstem Hydrologic Flow
- Impoundments

Water Quality (biologic)

- Fish Indices of Biotic Integrity
- Fish (native vs non-native & natural vs recreational goals)
- Macroinvertebrate Indices
- Periphyton
- Rare Aquatic Species

Terrestrial

- Change in Forest Cover
- % Watershed in Natural Condition
- Road Density
- Road Stream Crossings
- % Impervious Surface
- Riparian Forest Fragmentation
- % Core Forest
- % Edge
- % Perforated Forest
- Rare Communities/Species
- Invasive Species
- Human Stressors

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Conclusion

Conclusion

- Makes the most of the available data
- Consistency across landscape
- Easily modify/extend models
- Reusable as new data is acquired
- Dynamic view of analysis and data requirements

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Remember…

Remember…

"… you go to assessment with the data you have, not the data you might want or wish to have …"

Paraphrase of D. Rumsfeld, 2006-04-07

Contact Info

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- NetWeaver/GeoNetweaver – rules-of-thumb.com
- EMDS - www.institute.redlands.edu/emds