GIS Tools Available Now to Support HH&C

or

Geospatial Integration of Hydrology & Hydraulics Tools for Multi-Purpose, Multi-Agency Decision Support

Timothy Pangburn, Joel Schlagel, Martha Bullock, Michael Smith, and Bryan Baker

2005 Tri-Service Infrastructure Systems Conference & Exhibition

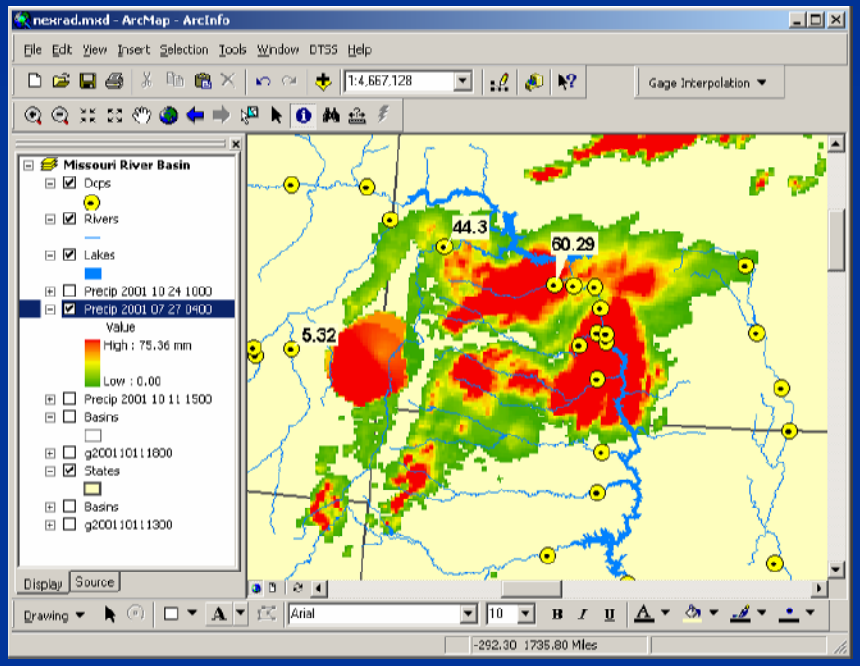
HH&C Track

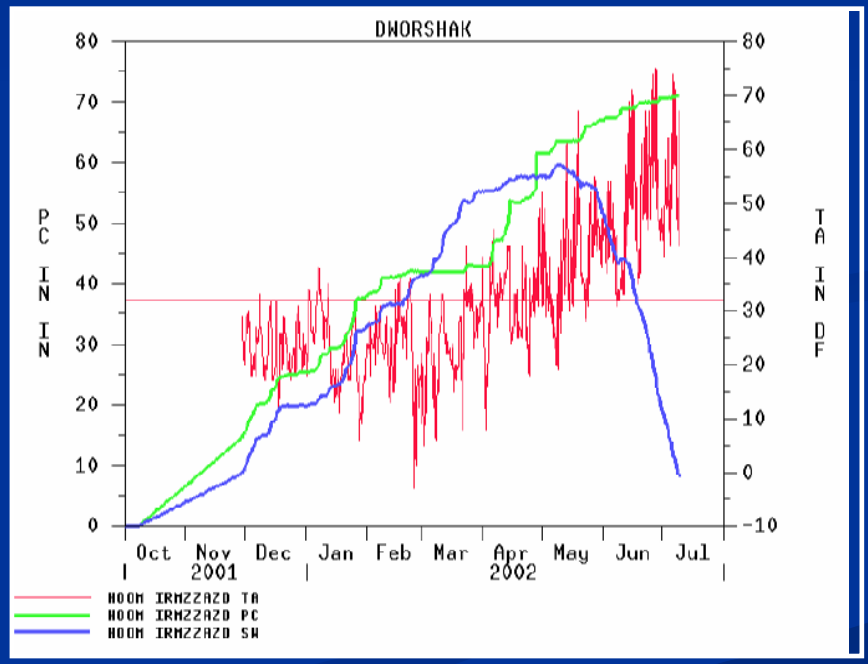
3 August 2005

Outline

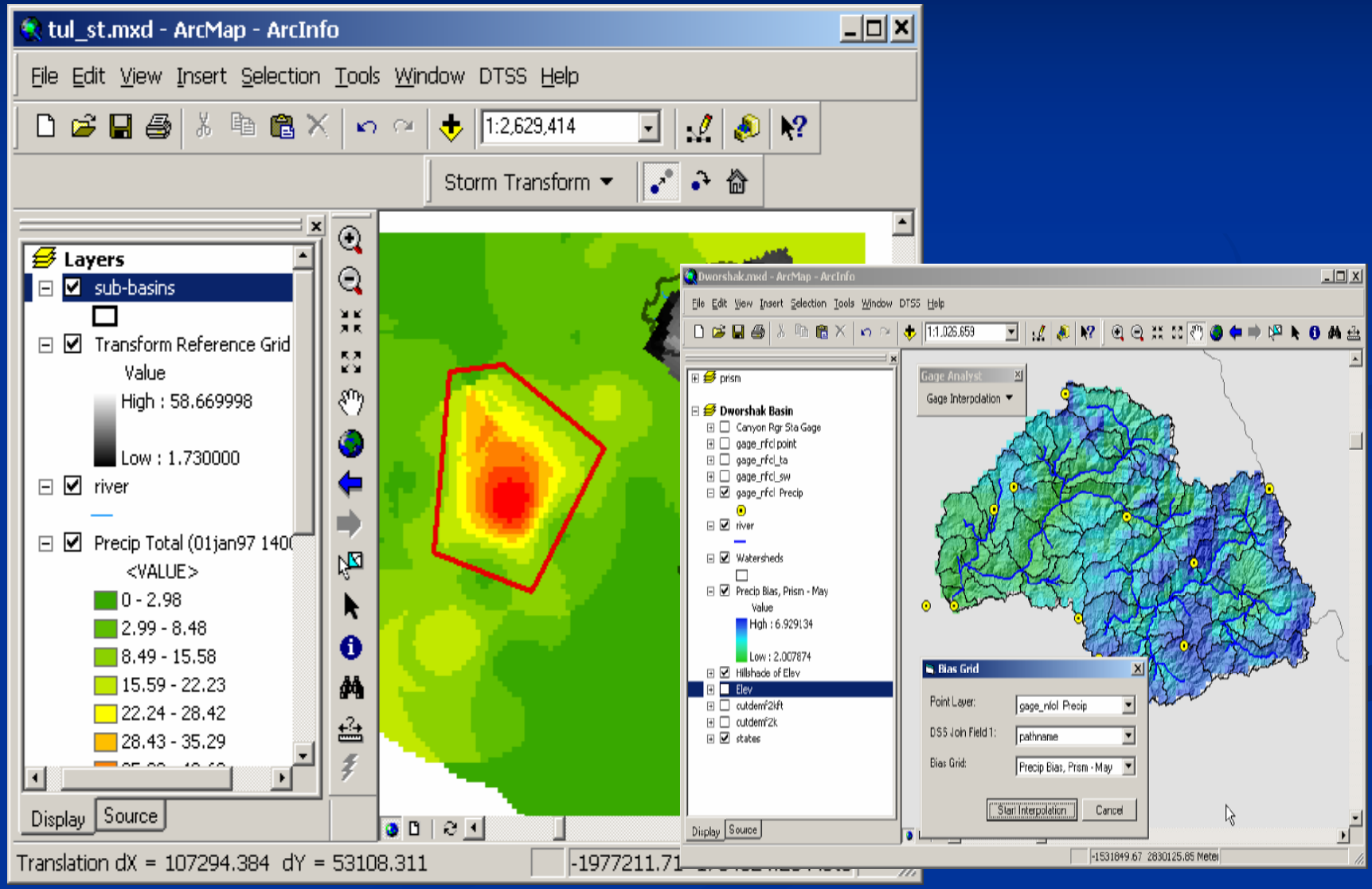
- ArcGIS Applications
  - Hydrologic Processors
  - Reservoir Inundation Calculator
- CorpsViewWeb
- CorpsMap
- NAE CWMS Applications
- Missouri River Geospatial Decision Support Framework
- Future Viewers

Distributed Input for Hydrologic Models using Object-Oriented Tools





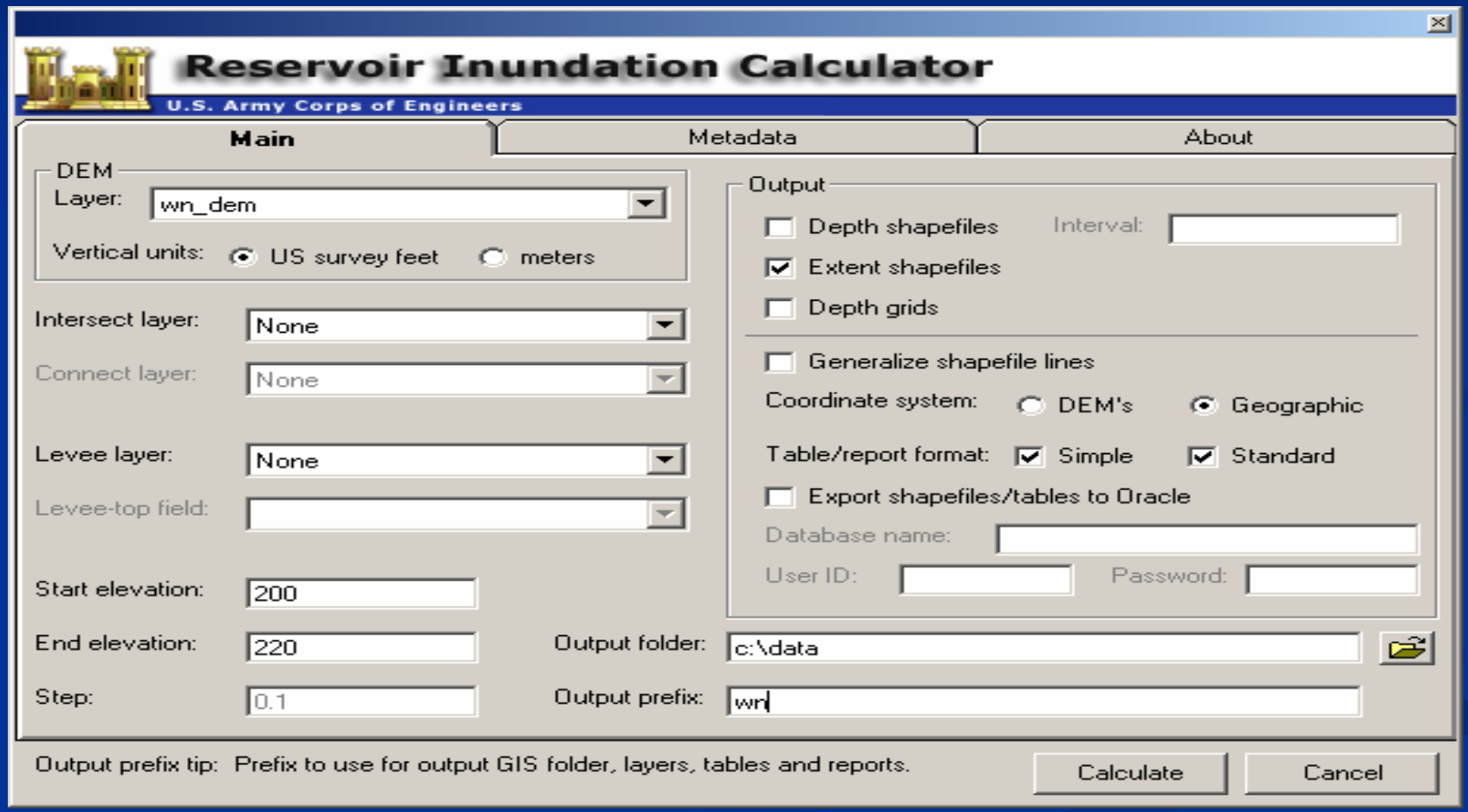
Object-Oriented Tools for Interpolation of Meteorological Parameters for Hydrologic Modeling



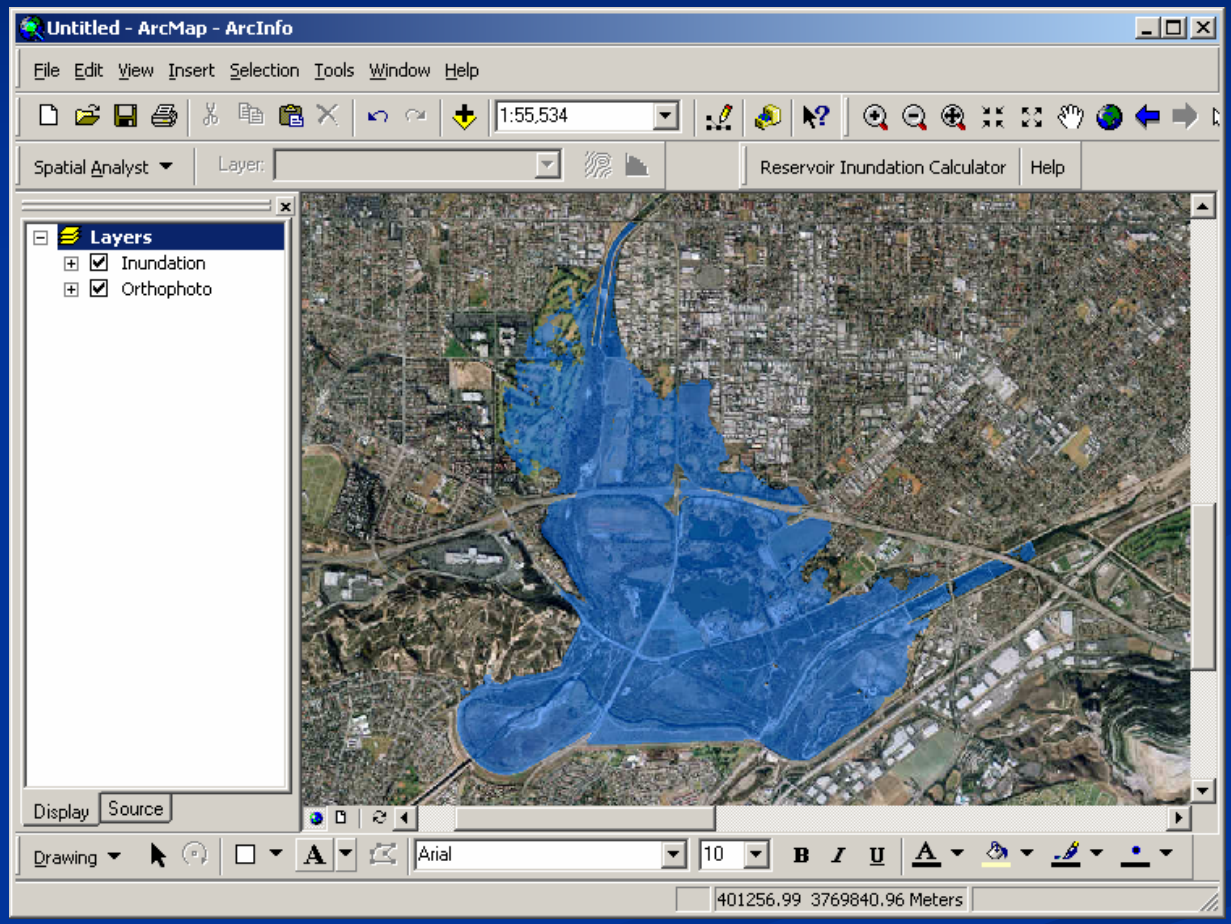
Reservoir Inundation Calculator Background

- Developed in collaboration with the US Army Engineer District, Los Angeles
- ESRI ArcGIS extension
- Calculates inundation GIS layers and area and capacity values for reservoir water levels

Reservoir Inundation Calculator Interface



Reservoir Inundation Calculator GIS Output Example



Reservoir Inundation Calculator Report Output Example

Great Day Reservoir, CA - Capacity Table
Survey date: July 15, 2004
Elevation in feet, Capacity in acre-feet

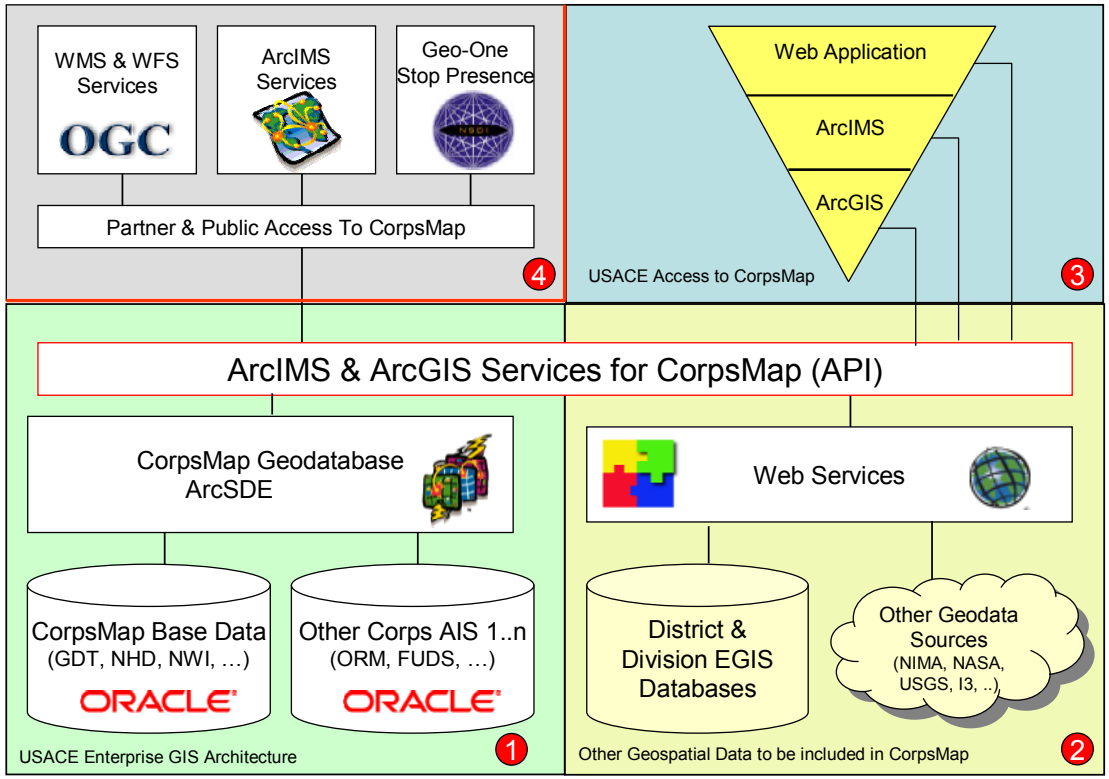
Elev	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
210	6717	6795	6873	6952	7032	7112	7193	7274	7357	7441
211	7527	7615	7703	7792	7882	7972	8062	8153	8245	8337
212	8430	8523	8616	8710	8805	8900	8996	9092	9189	9286
213	9384	9483	9582	9682	9782	9883	9985	10087	10189	10292
214	10396	10500	10606	10714	10823	10933	11044	11155	11267	11380
215	11493	11607	11721	11835	11951	12066	12183	12300	12418	12536
216	12655									

Report Details

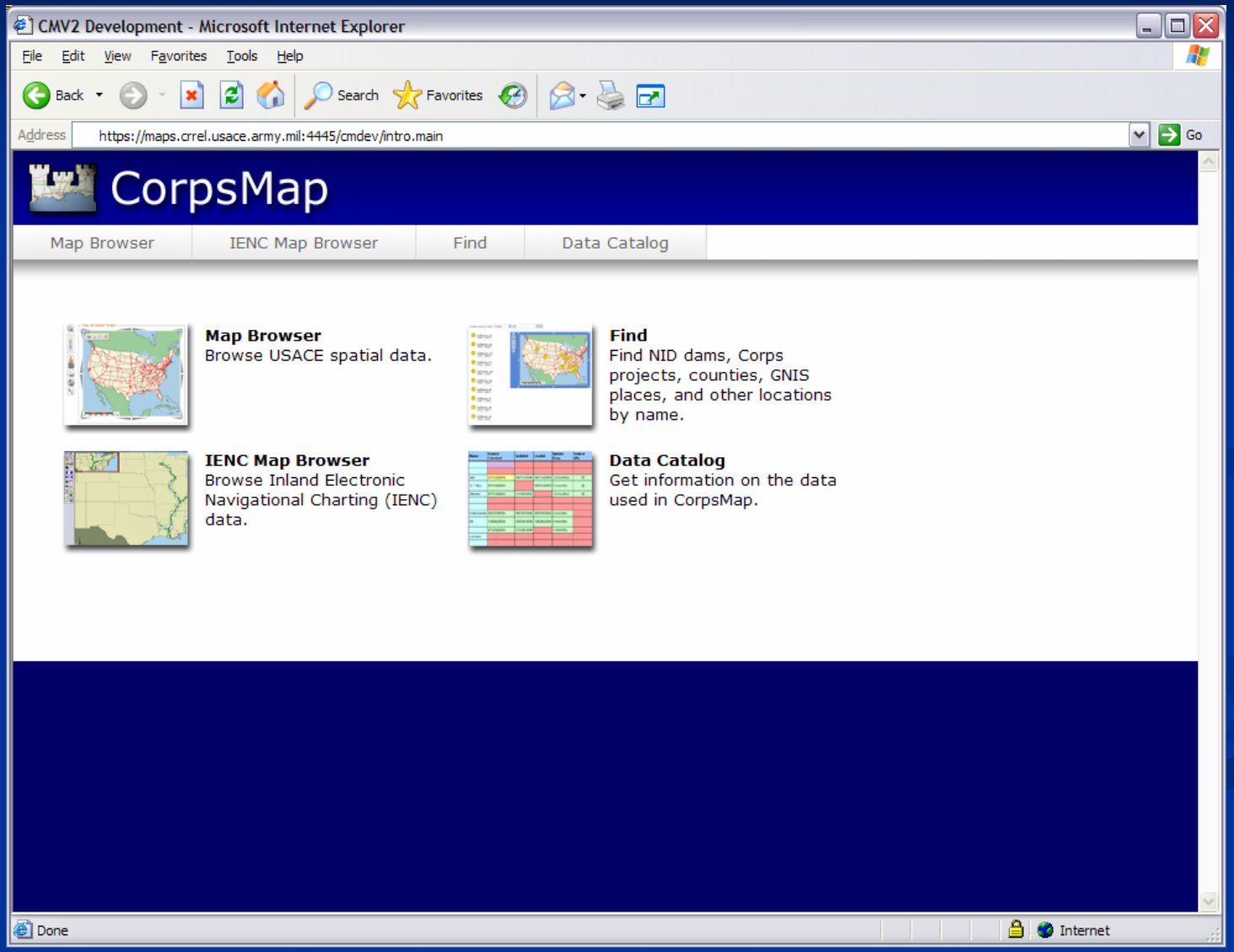
Reservoir name: Great Day Reservoir
Reservoir state: CA
Report created by: Tim Baldwin
Organization: US Army Corps of Engineers
Reservoir Inundation Calculator run date: September 29, 2004
Vertical datum of elevation used in Calculations: NGVD29
Survey date: July 15, 2004
Survey description: LIDAR
Survey source: Hard Working Surveyor Company

Output of ArcGIS Inundation Calculator visualized with CorpsView and integration with CWMS Real-time Conditions

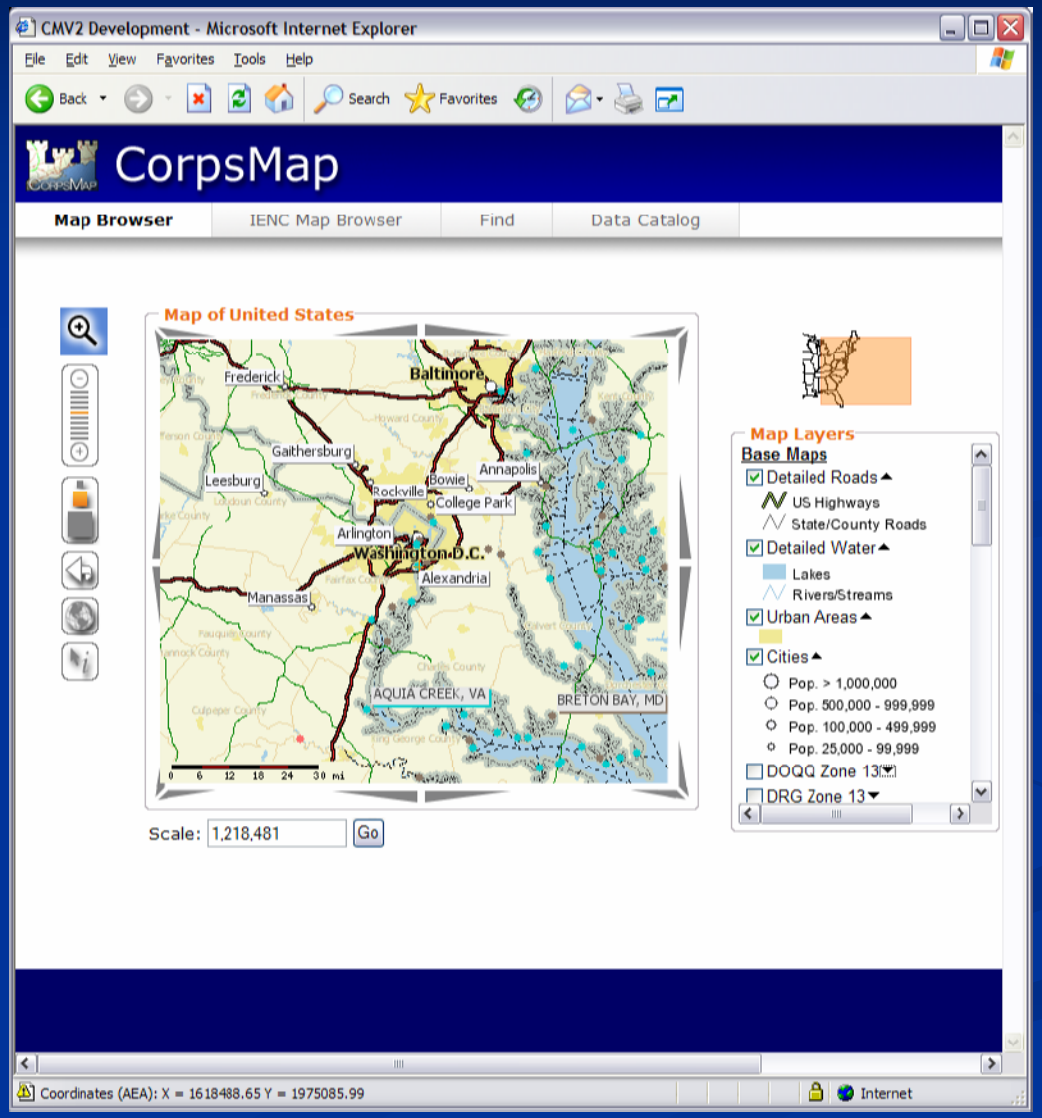
A Database Driven Remote Sensing & GIS Architecture for Basin-Wide Studies



CorpsMap Portal



CorpsMap Map Browser



NAE CWMS Oracle-driven Web Site / Real-time Data Map

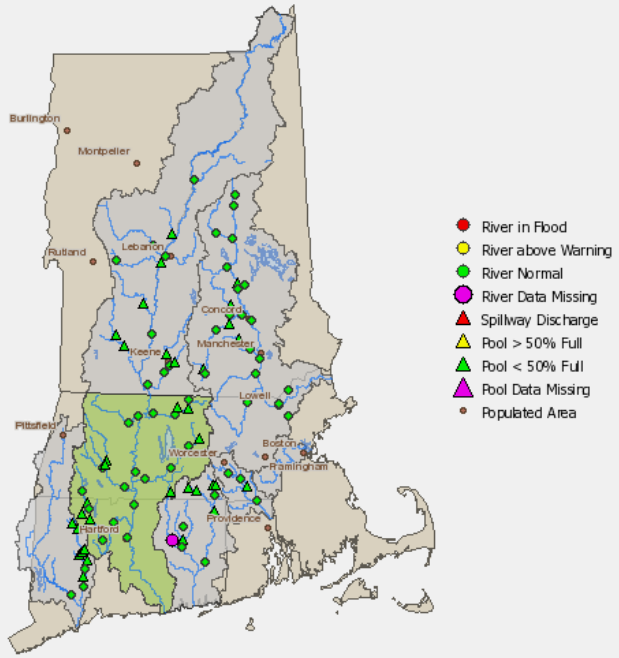
RRT Hydrologic Index

- Real Time Data Map
- Real Time Data List
- Project/Gate Data
- Release Schedule
- Precipitation Data
- Project Statistics
- Historic Floods
- Geotech
- Mapping
- RRT Home

New England District Corps of Engineers

Reservoir Regulation Team

Lower Connecticut

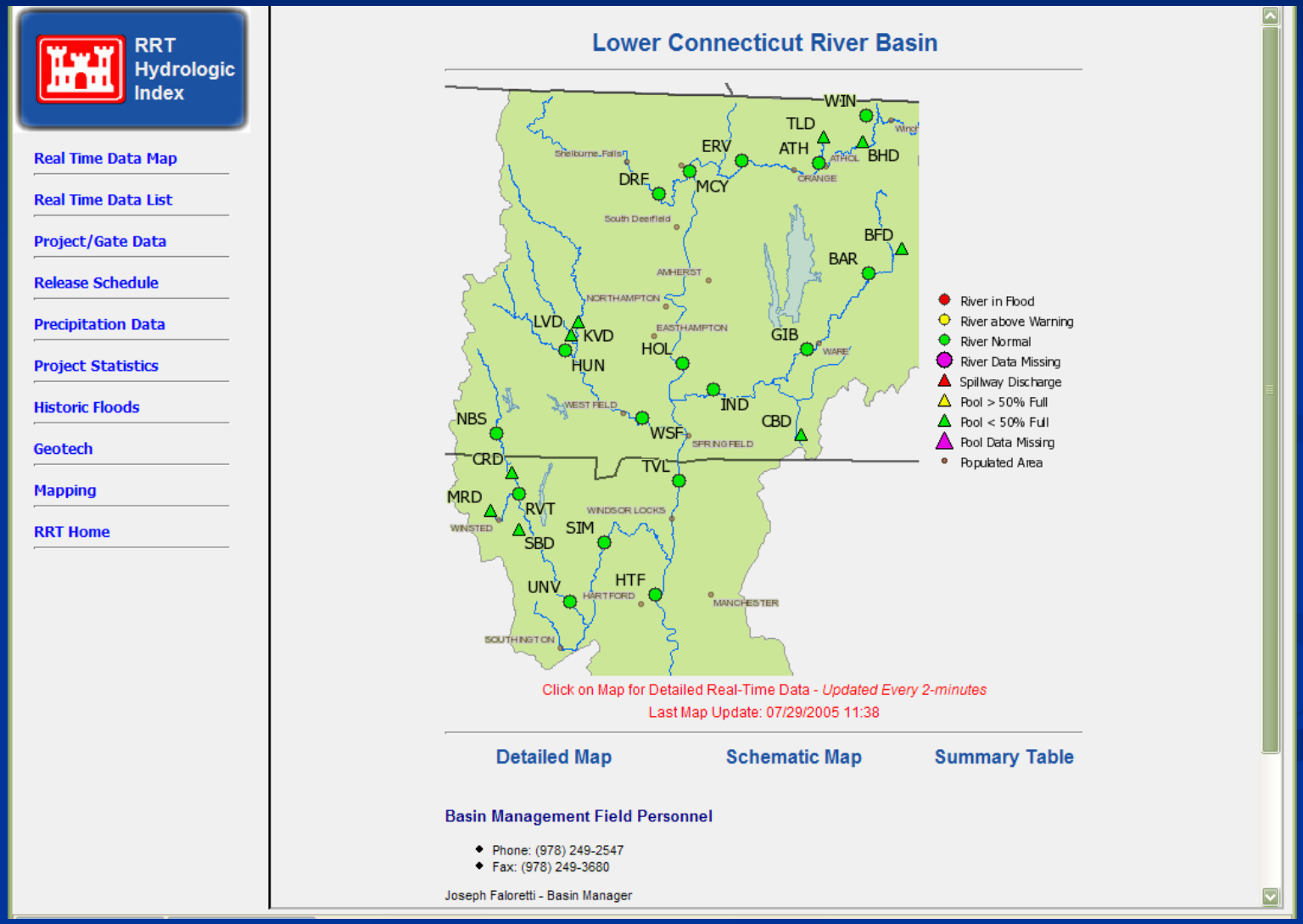


Click on Basin for Detailed Real Time Data -- *Updated Every 2-minutes*

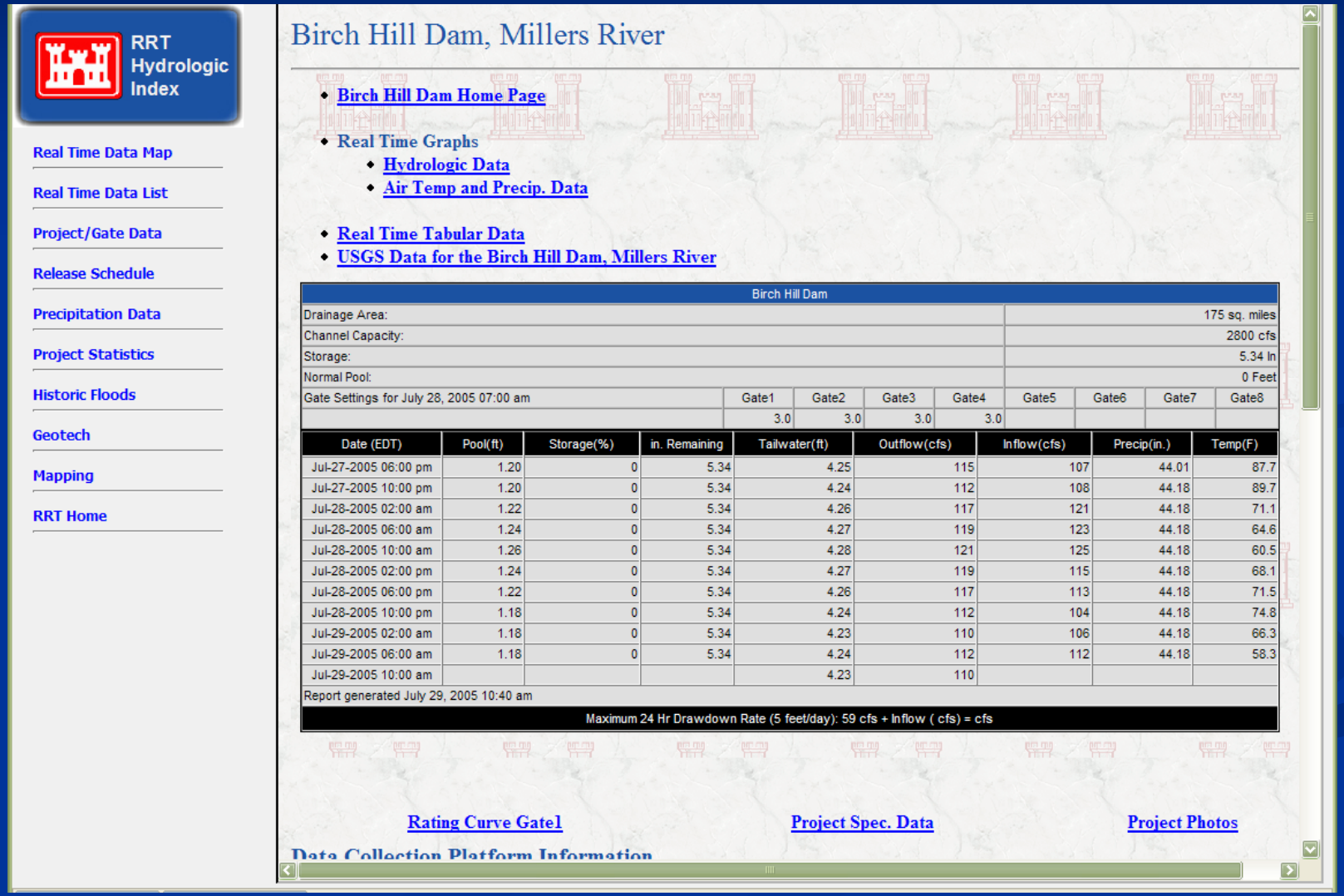
Last Map Update: 07/29/2005 11:37

Project Status **River Status** **Forecast Status** **Precip/Temp Status**

Individual Basin Display of NAE CWMS Web Site



Real-time and Historical CWMS Data Access



RRT Hydrologic Index

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Birch Hill Dam, Millers River

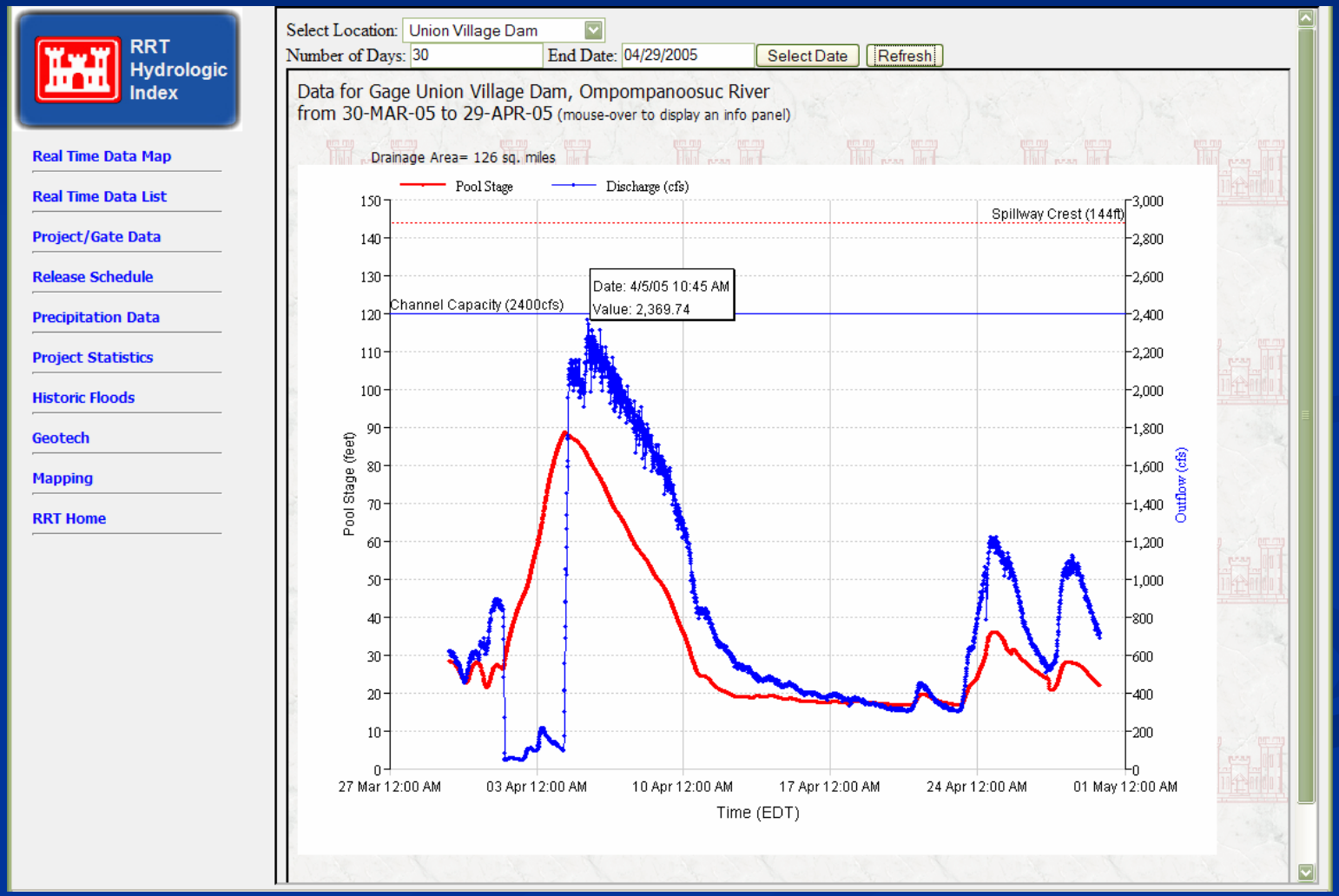
- Birch Hill Dam Home Page
- Real Time Graphs
  - Hydrologic Data
  - Air Temp and Precip. Data
- Real Time Tabular Data
- USGS Data for the Birch Hill Dam, Millers River

Birch Hill Dam									
Drainage Area:									175 sq. miles
Channel Capacity:									2800 cfs
Storage:									5.34 In
Normal Pool:									0 Feet
Gate Settings for July 28, 2005 07:00 am					Gate1	Gate2	Gate3	Gate4	Gate5	Gate6	Gate7	Gate8
					3.0	3.0	3.0	3.0				
Date (EDT)	Pool(ft)	Storage(%)	in. Remaining	Tailwater(ft)	Outflow(cfs)	Inflow(cfs)	Precip(in.)	Temp(F)				
Jul-27-2005 06:00 pm	1.20	0	5.34	4.25	115	107	44.01	87.7				
Jul-27-2005 10:00 pm	1.20	0	5.34	4.24	112	108	44.18	89.7				
Jul-28-2005 02:00 am	1.22	0	5.34	4.26	117	121	44.18	71.1				
Jul-28-2005 06:00 am	1.24	0	5.34	4.27	119	123	44.18	64.6				
Jul-28-2005 10:00 am	1.26	0	5.34	4.28	121	125	44.18	60.5				
Jul-28-2005 02:00 pm	1.24	0	5.34	4.27	119	115	44.18	68.1				
Jul-28-2005 06:00 pm	1.22	0	5.34	4.26	117	113	44.18	71.5				
Jul-28-2005 10:00 pm	1.18	0	5.34	4.24	112	104	44.18	74.8				
Jul-29-2005 02:00 am	1.18	0	5.34	4.23	110	106	44.18	66.3				
Jul-29-2005 06:00 am	1.18	0	5.34	4.24	112	112	44.18	58.3				
Jul-29-2005 10:00 am				4.23	110							
Report generated July 29, 2005 10:40 am												
Maximum 24 Hr Drawdown Rate (5 feet/day): 59 cfs + Inflow (cfs) = cfs												

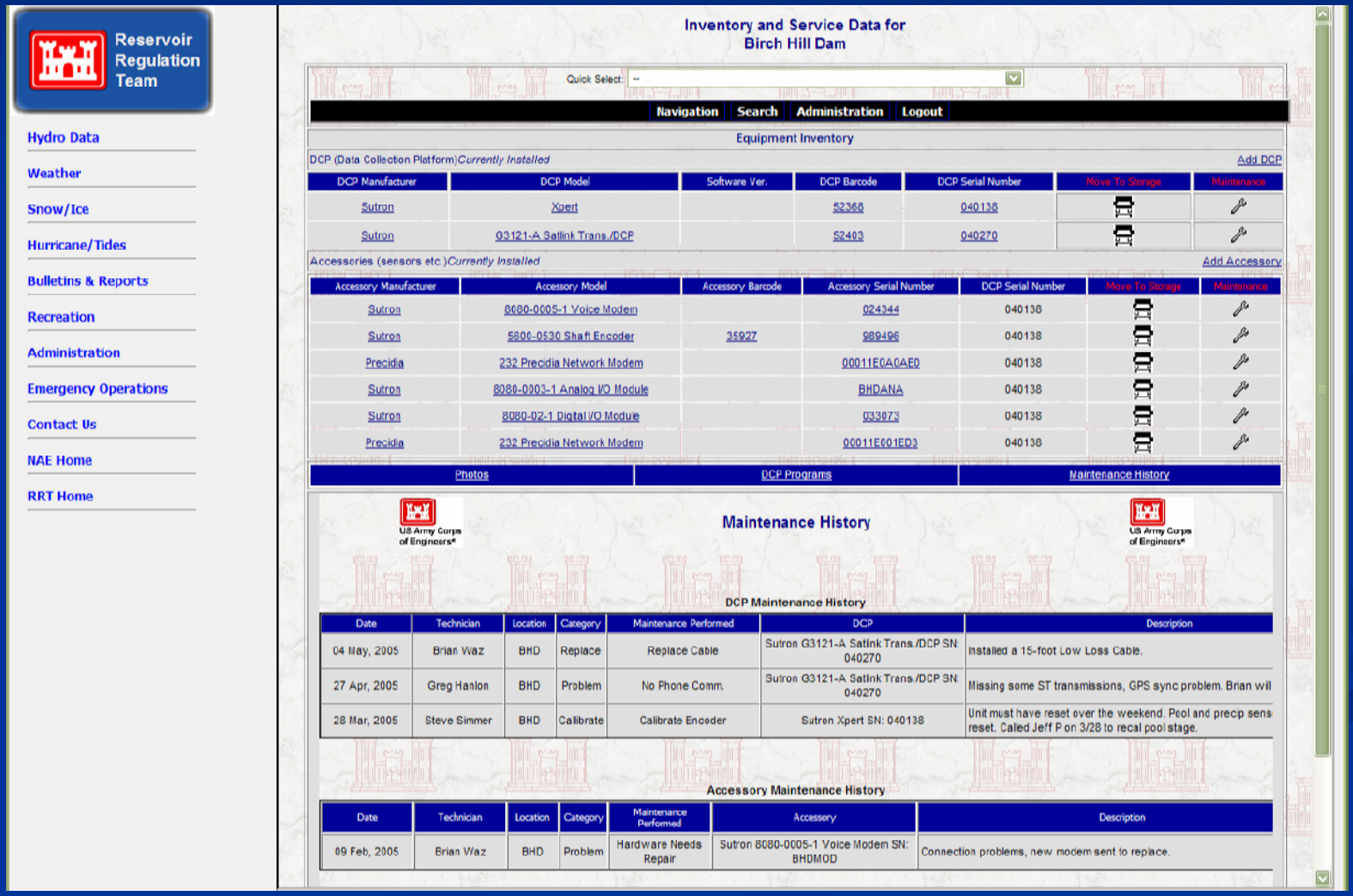
Rating Curve Gate1 Project Spec. Data Project Photos

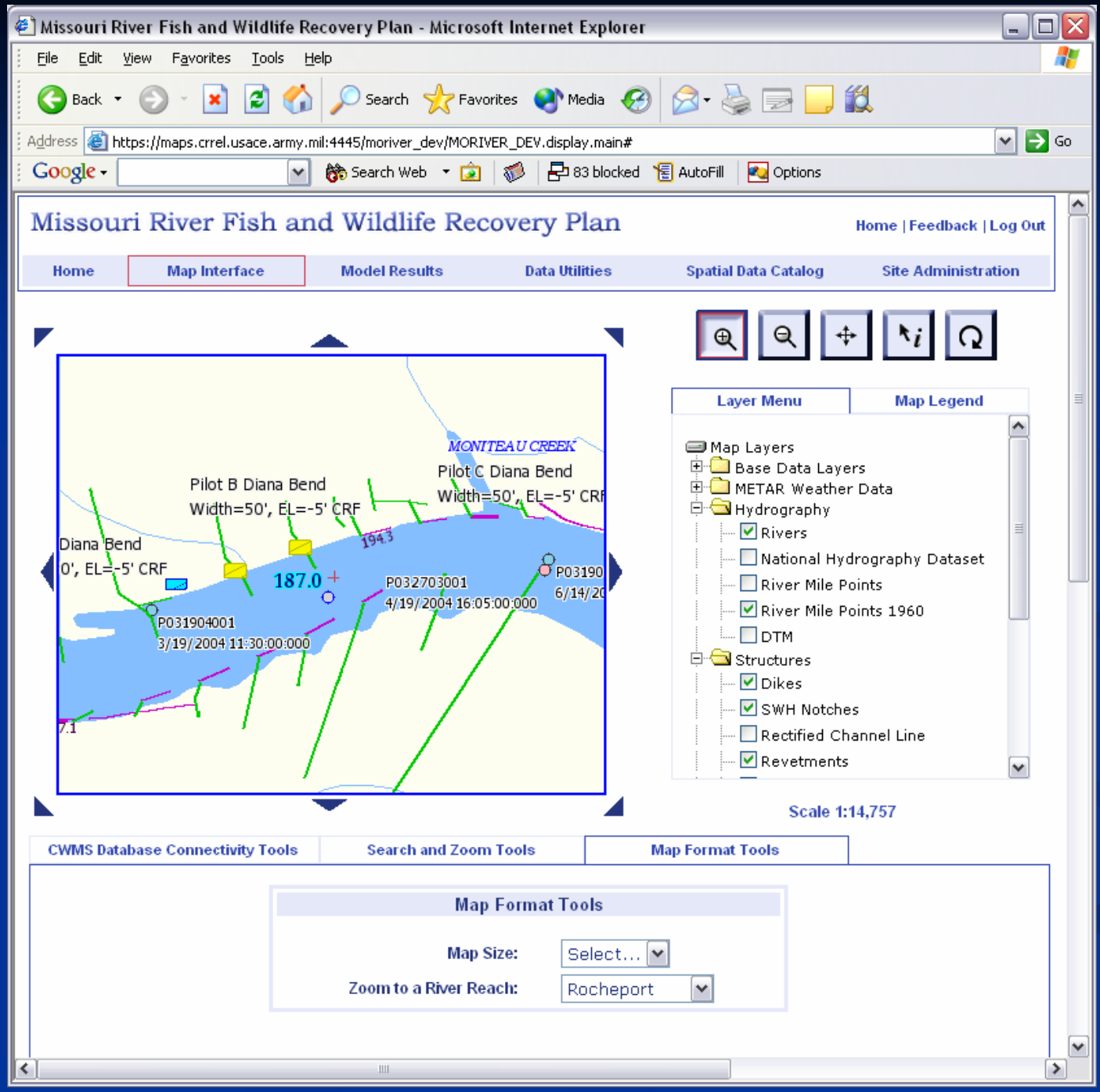
Data Collection Platform Information

Historical CWMS Data Plotting



Gage Management Utility – Maintenance History for Every Site




Missouri River Fish and Wildlife Recovery Plan - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
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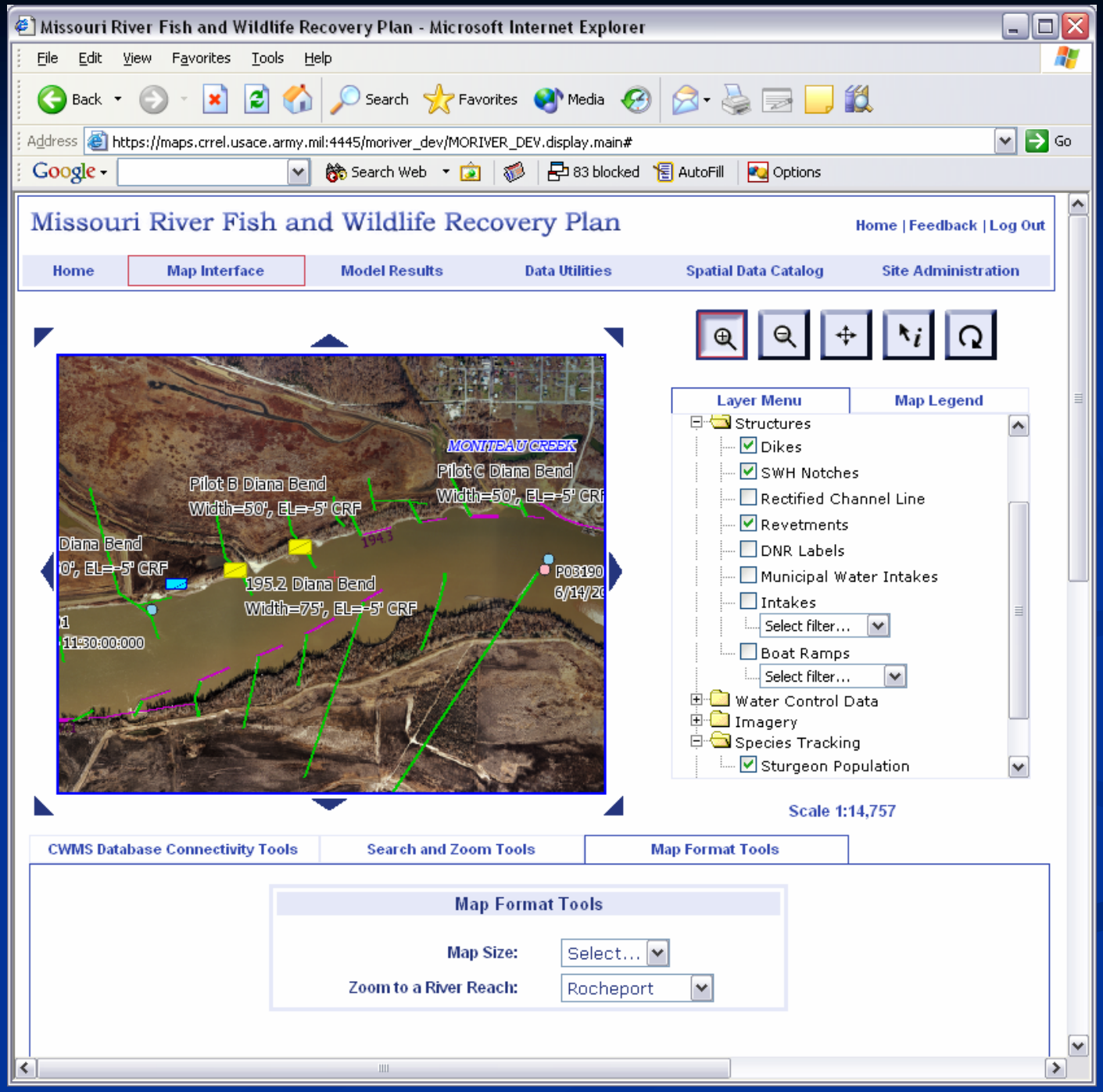
Go
Google Search Web 83 blocked AutoFill Options
Missouri River Fish and Wildlife Recovery Plan
Home | Feedback | Log Out
Home
Map Interface
Model Results
Data Utilities
Spatial Data Catalog
Site Administration
MONITEAU CREEK
Pilot B Diana Bend
Width=50', EL=-5' CRF
Pilot C Diana Bend
Width=50', EL=-5' CRF
Diana Bend
0', EL=-5' CRF
194.3
187.0
P032703001
4/19/2004 16:05:00:000
P031904001
3/19/2004 11:30:00:000
Layer Menu
Map Legend
Map Layers
Base Data Layers
METAR Weather Data
Hydrography
Rivers
National Hydrography Dataset
River Mile Points
River Mile Points 1960
DTM
Structures
Dikes
SWH Notches
Rectified Channel Line
Revetments
Scale 1:14,757
CWMS Database Connectivity Tools
Search and Zoom Tools
Map Format Tools
Map Format Tools
Map Size:
Select...
Zoom to a River Reach:
Rocheport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Map Interface
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MONTEAU CREEK
Pilot B Diana Bend
Width=50', EL=-5' CRF
Pilot C Diana Bend
Width=50', EL=-5' CRF
Diana Bend
0', EL=-5' CRF
195.2 Diana Bend
Width=75', EL=-5' CRF
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Layer Menu
Map Legend
Structures
Dikes
SWH Notches
Rectified Channel Line
Revetments
DNR Labels
Municipal Water Intakes
Intakes
Select filter...
Boat Ramps
Select filter...
Water Control Data
Imagery
Species Tracking
Sturgeon Population
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CWMS Database Connectivity Tools
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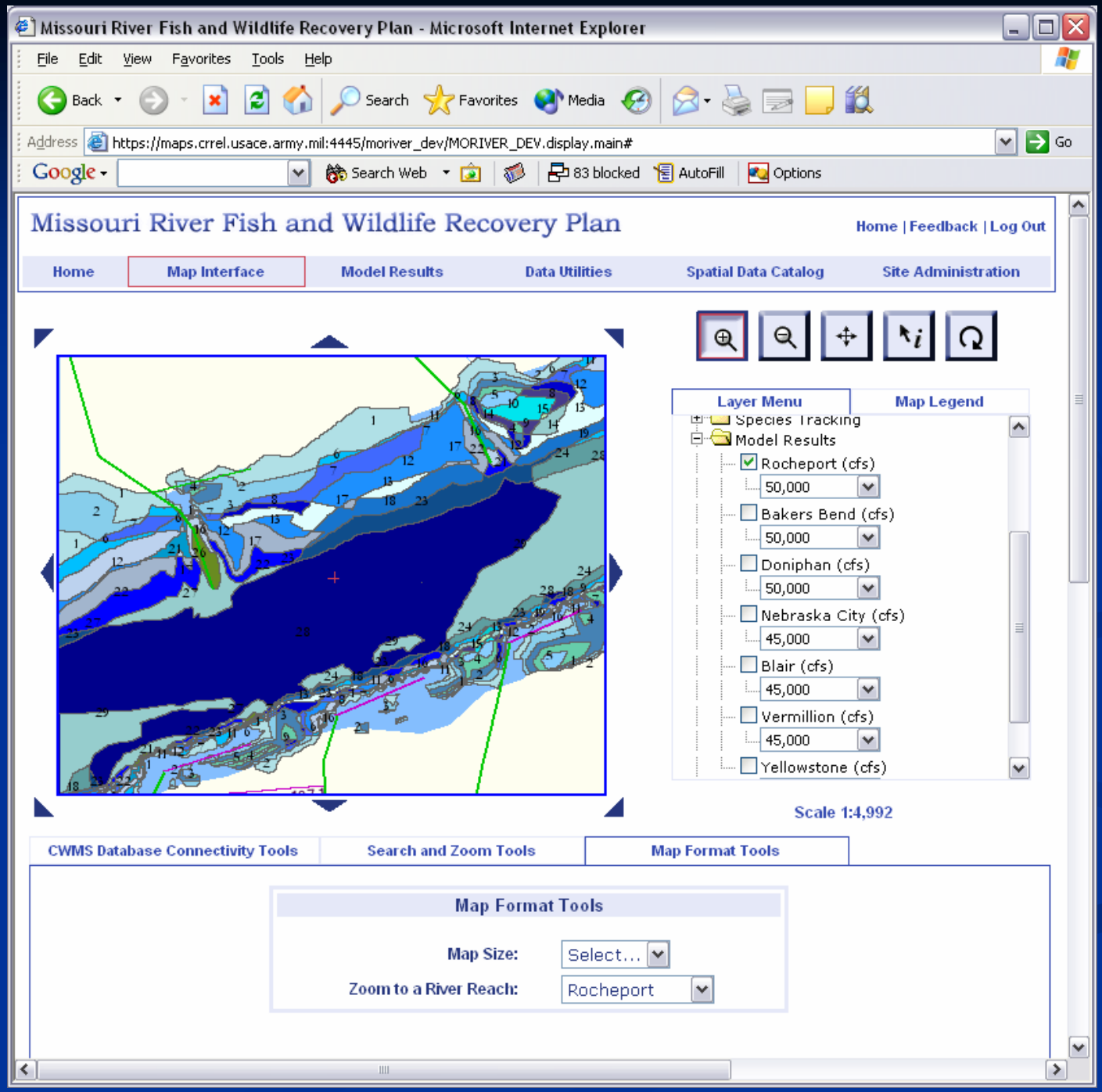
Map Format Tools
Map Format Tools
Map Size:
Select...
Zoom to a River Reach:
Rocheport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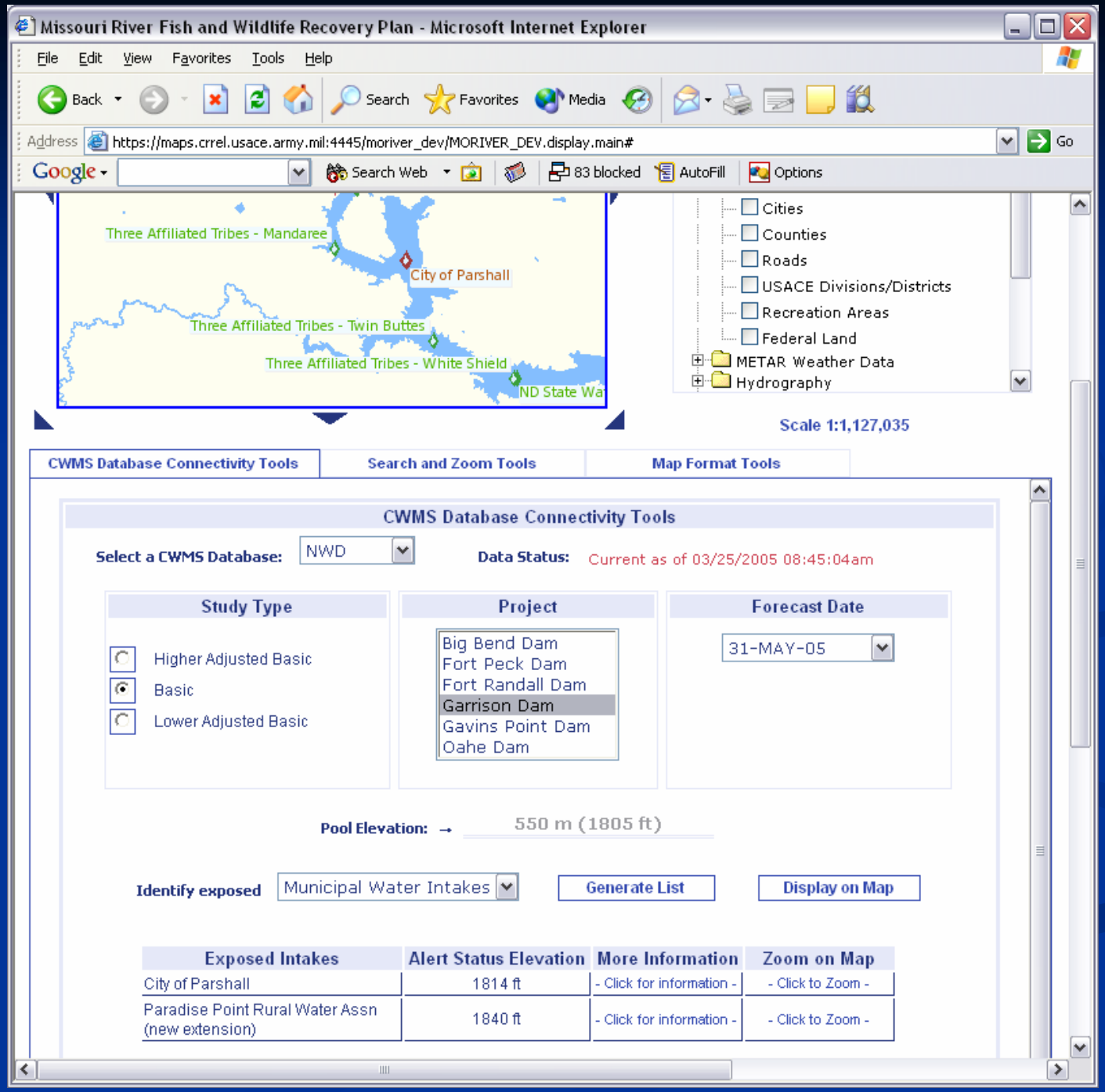
Site Administration
Layer Menu
Map Legend
Species Tracking
Model Results
Rocheport (cfs)
50,000
Bakers Bend (cfs)
50,000
Doniphan (cfs)
50,000
Nebraska City (cfs)
45,000
Blair (cfs)
45,000
Vermillion (cfs)
45,000
Yellowstone (cfs)
Scale 1:4,992
CWMS Database Connectivity Tools
Search and Zoom Tools
Map Format Tools
Map Format Tools
Map Size:
Select...
Zoom to a River Reach:
Rocheport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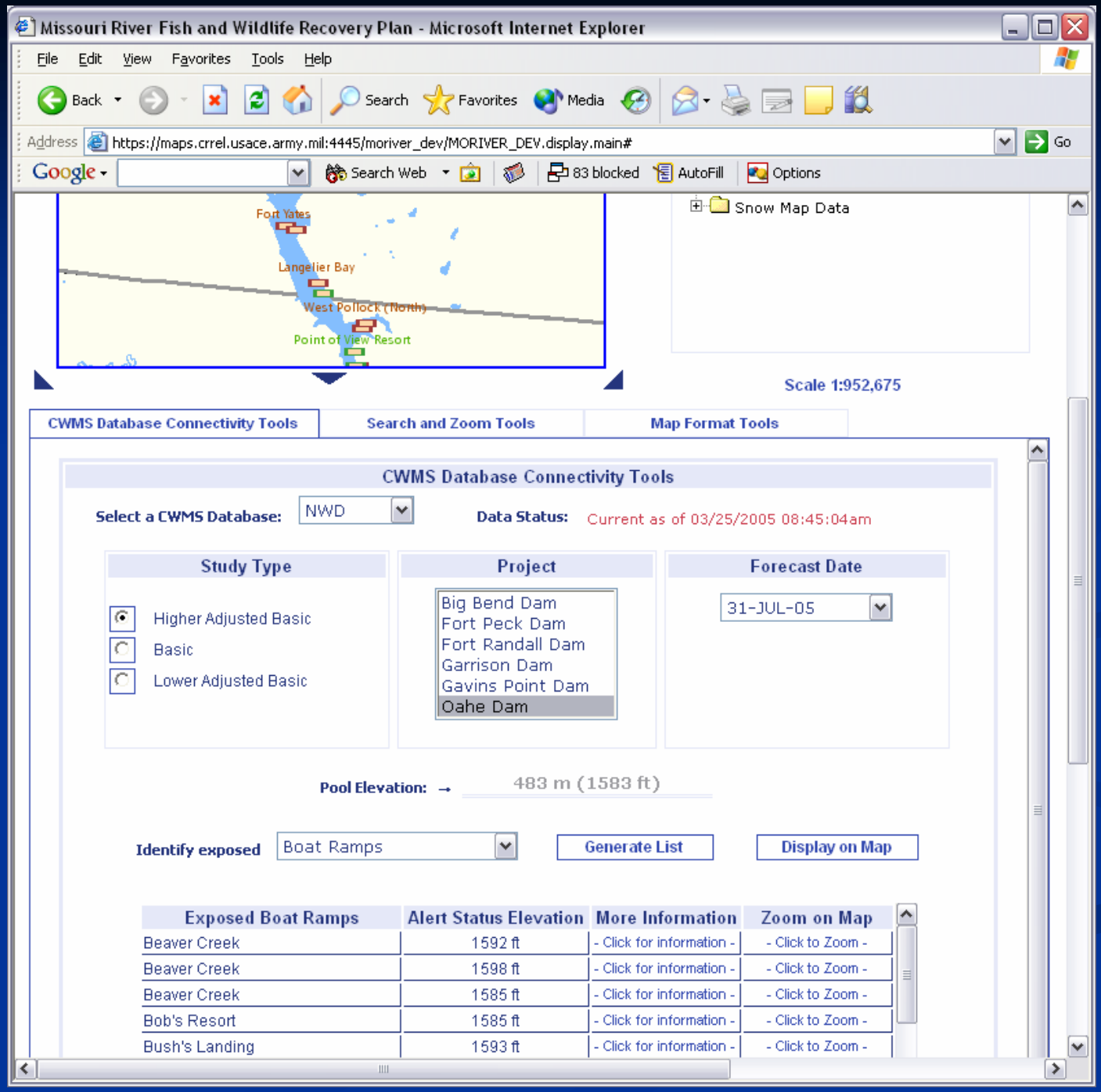
Google Search Web 83 blocked AutoFill Options
Three Affiliated Tribes - Mandaree
City of Parshall
Three Affiliated Tribes - Twin Buttes
Three Affiliated Tribes - White Shield
ND State Wa
Cities
Counties
Roads
USACE Divisions/Districts
Recreation Areas
Federal Land
METAR Weather Data
Hydrography
Scale 1:1,127,035
CWMS Database Connectivity Tools
Search and Zoom Tools
Map Format Tools
CWMS Database Connectivity Tools
Select a CWMS Database: NWD
Data Status: Current as of 03/25/2005 08:45:04am
Study Type
Higher Adjusted Basic
Basic
Lower Adjusted Basic
Project
Big Bend Dam
Fort Peck Dam
Fort Randall Dam
Garrison Dam
Gavins Point Dam
Oahe Dam
Forecast Date
31-MAY-05
Pool Elevation: → 550 m (1805 ft)
Identify exposed Municipal Water Intakes
Generate List
Display on Map
Exposed Intakes
Alert Status Elevation
More Information
Zoom on Map
City of Parshall
1814 ft
- Click for information -
- Click to Zoom -
Paradise Point Rural Water Assn (new extension)
1840 ft
- Click for information -
- Click to Zoom -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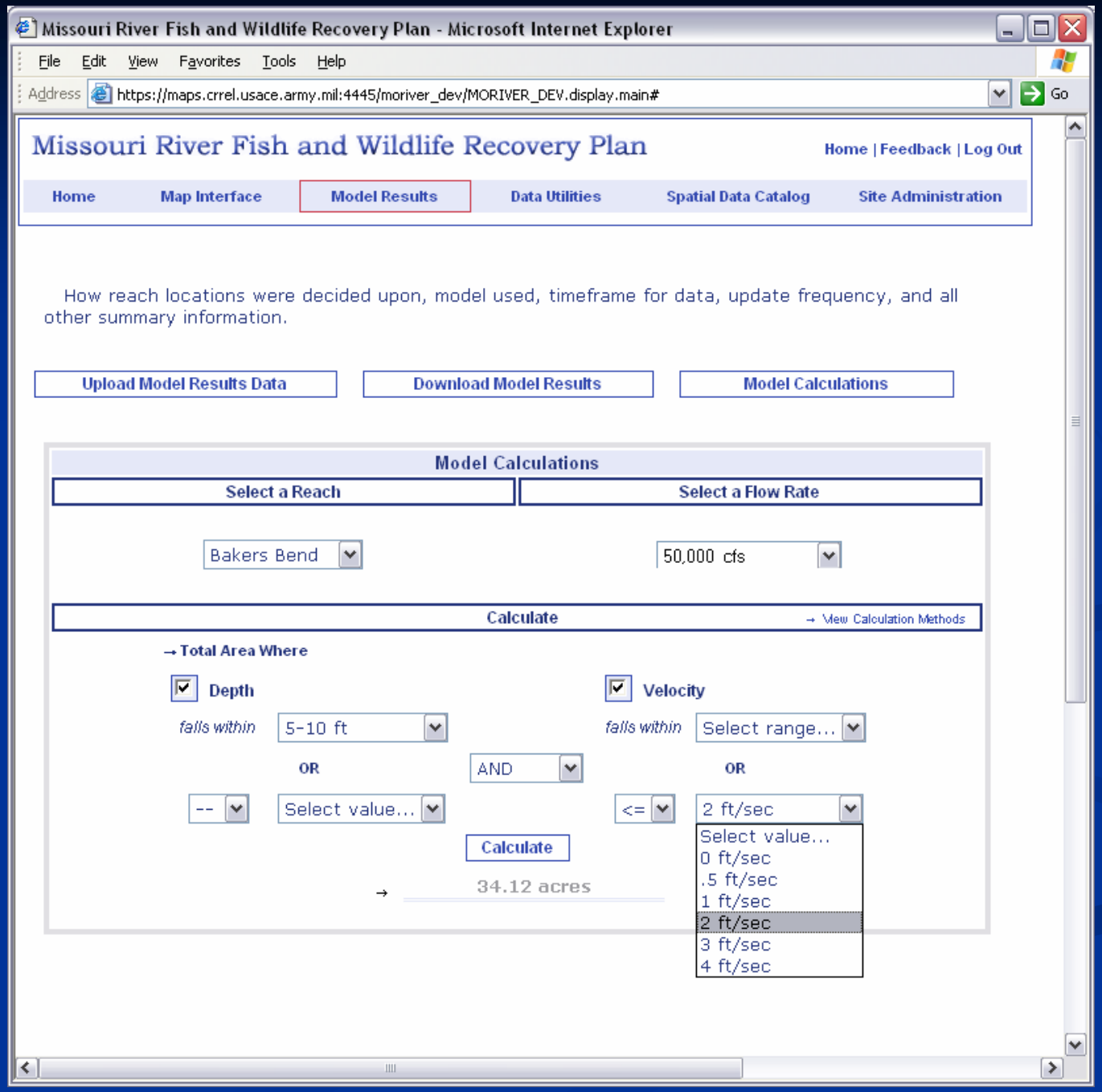
Fort Yates
Langelier Bay
West Pollock (North)
Point of View Resort
Snow Map Data
Scale 1:952,675
CWMS Database Connectivity Tools
Search and Zoom Tools
Map Format Tools
CWMS Database Connectivity Tools
Select a CWMS Database: NWD
Data Status: Current as of 03/25/2005 08:45:04am
Study Type
Higher Adjusted Basic
Basic
Lower Adjusted Basic
Project
Big Bend Dam
Fort Peck Dam
Fort Randall Dam
Garrison Dam
Gavins Point Dam
Oahe Dam
Forecast Date
31-JUL-05
Pool Elevation: →
483 m (1583 ft)
Identify exposed
Boat Ramps
Generate List
Display on Map
Exposed Boat Ramps
Alert Status Elevation
More Information
Zoom on Map
Beaver Creek 1592 ft - Click for information - - Click to Zoom -
Beaver Creek 1598 ft - Click for information - - Click to Zoom -
Beaver Creek 1585 ft - Click for information - - Click to Zoom -
Bob's Resort 1585 ft - Click for information - - Click to Zoom -
Bush's Landing 1593 ft - Click for information - - Click to Zoom -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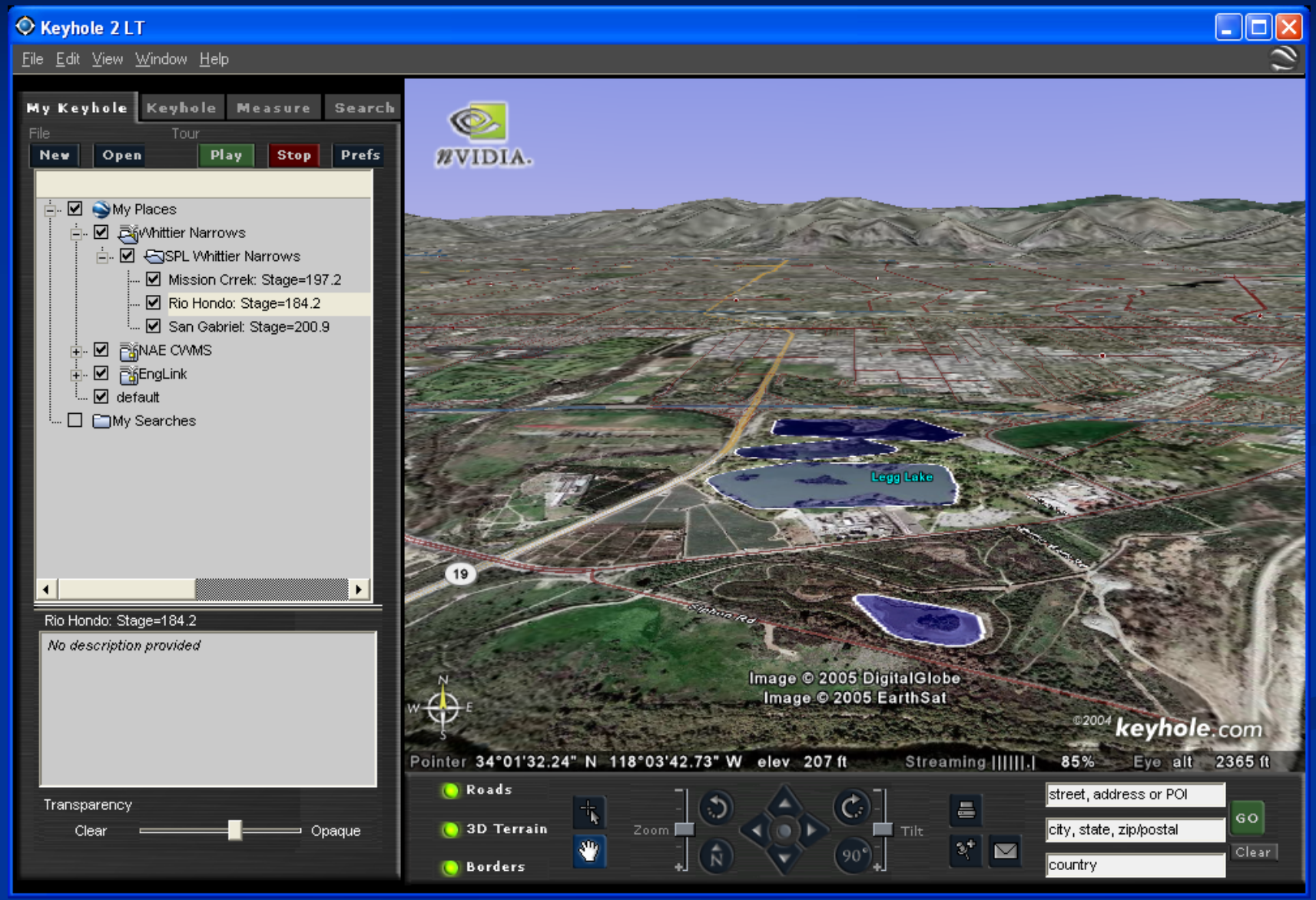
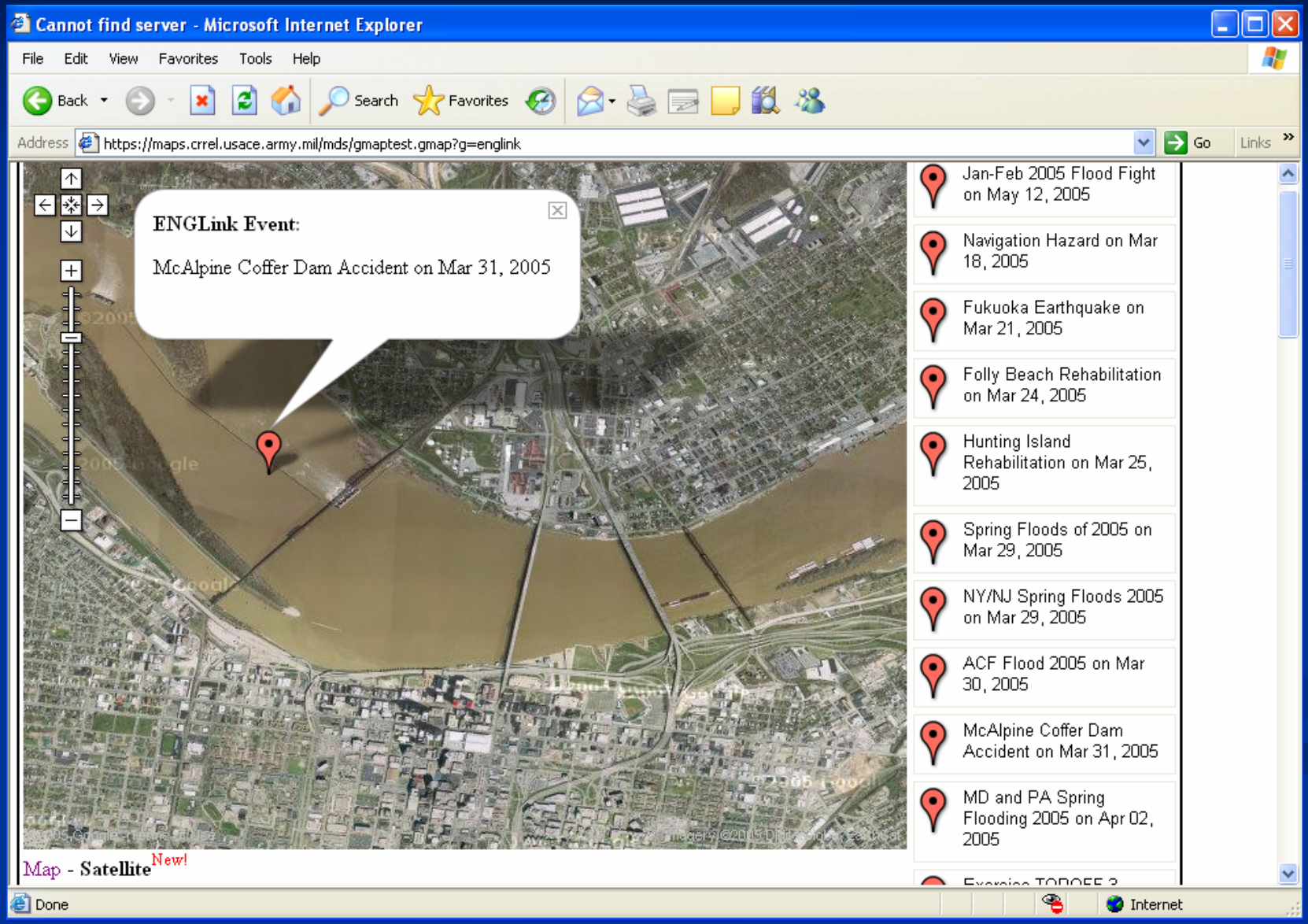
Home
Map Interface
Model Results
Data Utilities
Spatial Data Catalog
Site Administration
How reach locations were decided upon, model used, timeframe for data, update frequency, and all other summary information.
Upload Model Results Data
Download Model Results
Model Calculations
Model Calculations
Select a Reach
Select a Flow Rate
Bakers Bend
50,000 cfs
Calculate
→ View Calculation Methods
→ Total Area Where
Depth
falls within
5-10 ft
OR
AND
--
Select value...
Velocity
falls within
Select range...
OR
<=
2 ft/sec
Select value...
0 ft/sec
.5 ft/sec
1 ft/sec
2 ft/sec
3 ft/sec
4 ft/sec
Calculate
→
34.12 acres

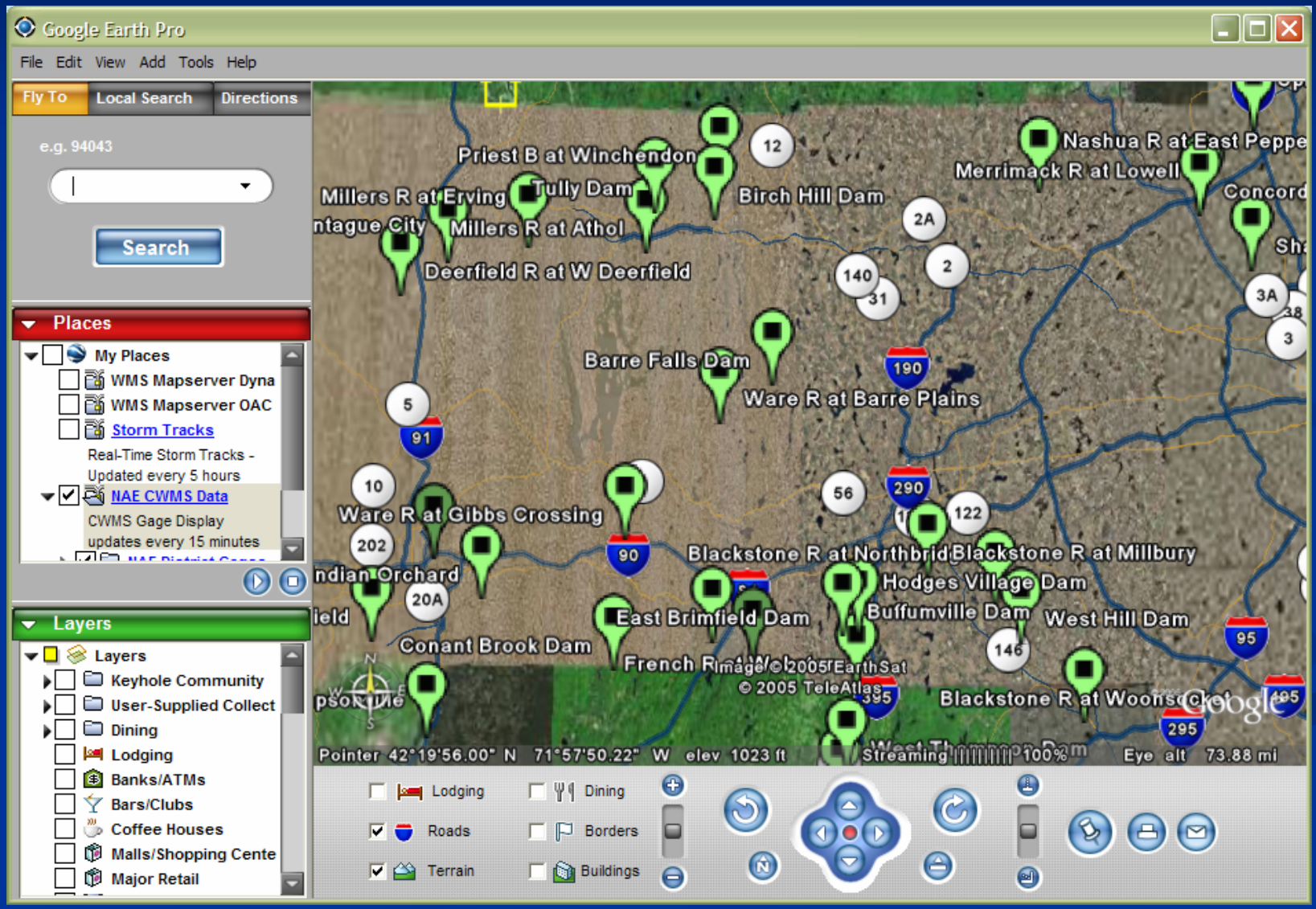
“Transforms The Web:” RS/GIS Absorbs



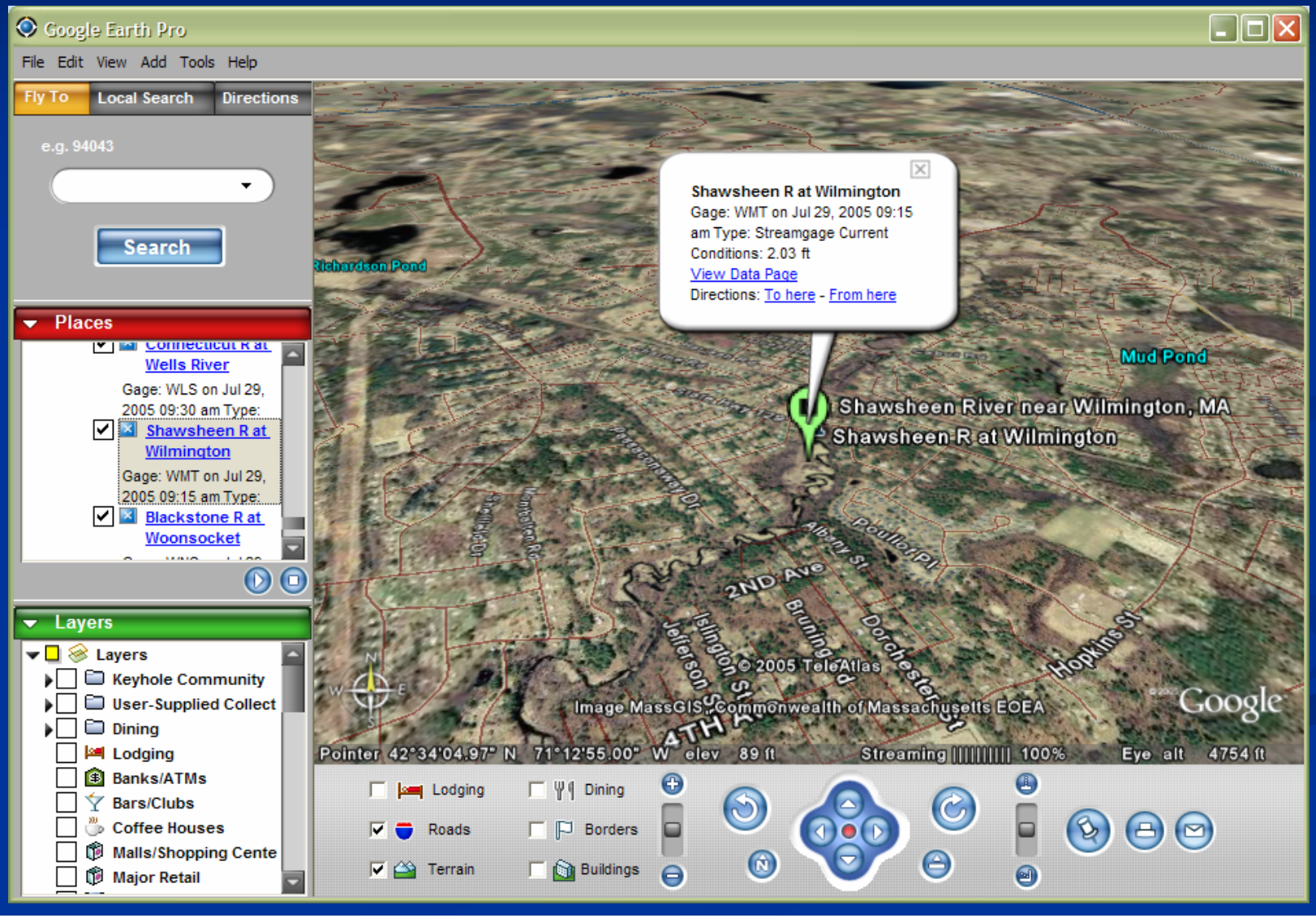
CorpsMap/EngLink – BYO BaseMap



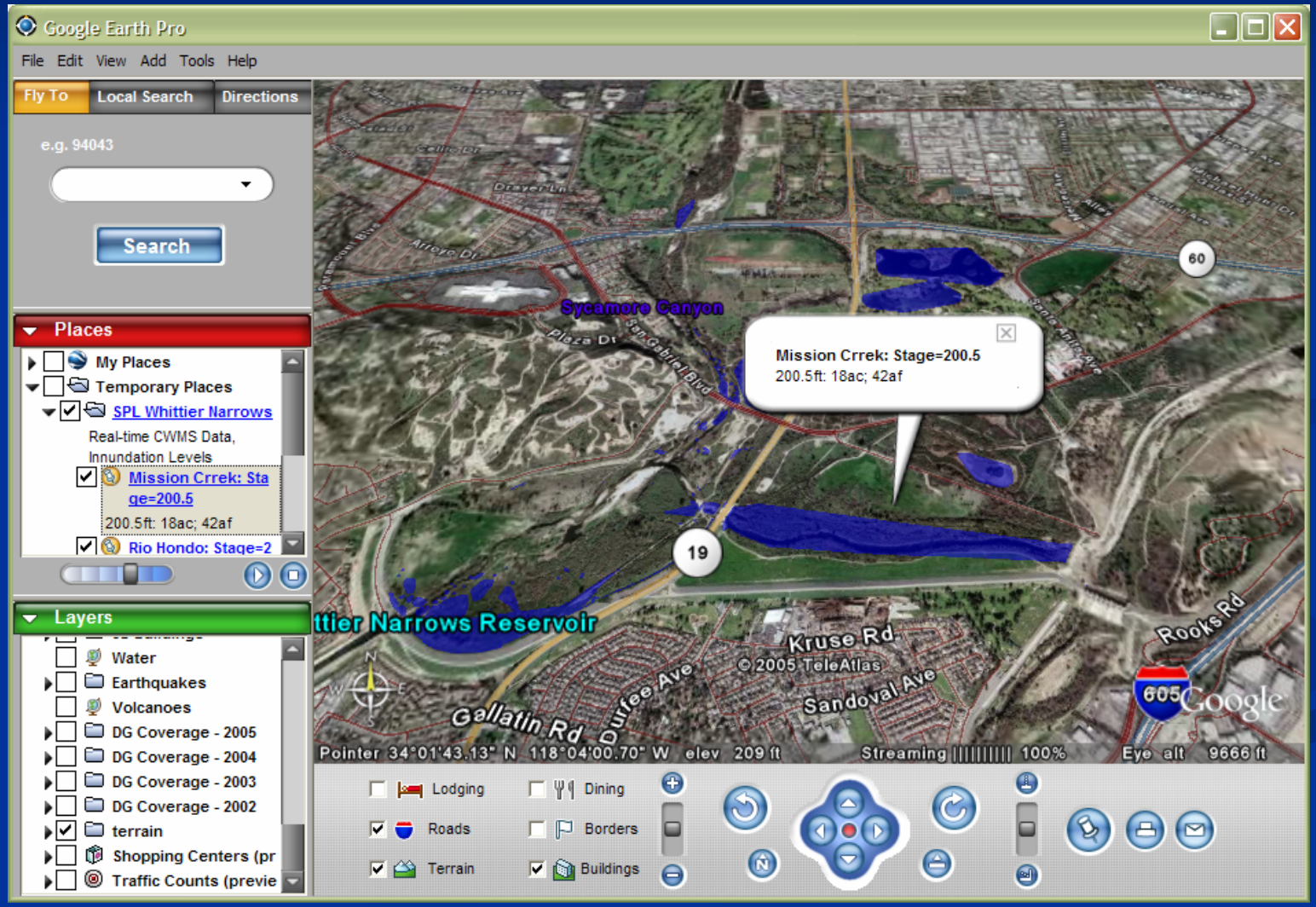
NAE CWMS Stations Mapped via Google Earth



Detail View of NAE CWMS Gage on Google Earth



Whittier Narrows Visualization at Higher Stage Levels



Comments/Questions?