Internet Map Server Demonstration

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USGS science for a changing world

Building an Integrated Ecological Spatial Database for the Grand Canyon using SDE, IMS, and Oracle

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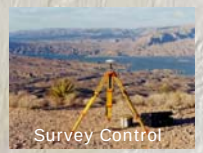
ABSTRACT

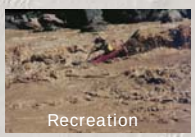
The Grand Canyon Monitoring and Research Center (GCMRC) measures the effects from Glen Canyon Dam operations on the status and trends of resources along the Colorado River from Glen Canyon Dam to Lake Mead. The goals of the GCMRC are to develop monitoring and research programs as well as related scientific activities that evaluate short- and long-term impacts of the Glen Canyon Dam on the biological, cultural, and physical resources of the Colorado River Ecosystem (CRE). An integrated ecological spatial database was required for the archiving, organizing, distribution and analysis of spatial and tabular data collected within the CRE. The consolidation of disparate datasets from numerous sources provided a unique challenge. To address this challenge, spatial and temporal keys were used to organize the data in a single, comprehensive database using ESRI's Spatial Database Engine (SDE) and Oracle Database Management System. The flexible database structure offered by SDE and Oracle allowed the use of a variety of query and analysis tools including Internet Map Server, SQL, web-based forms, OBDC and GIS client connections.

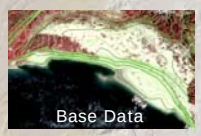
SUBJECT AREAS

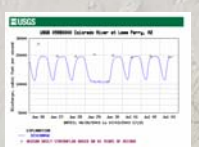
Terrestrial Biology

Sediment Transport


Survey Control


Recreation


Base Data

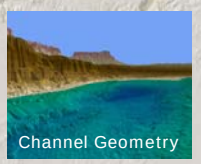

Hydrology

Aquatic Food Base

Water Quality

Exotic Fish

Climate


Channel Geometry

SPATIAL DATABASE ENGINE/ORACLE DATABASE MANAGEMENT SYSTEM

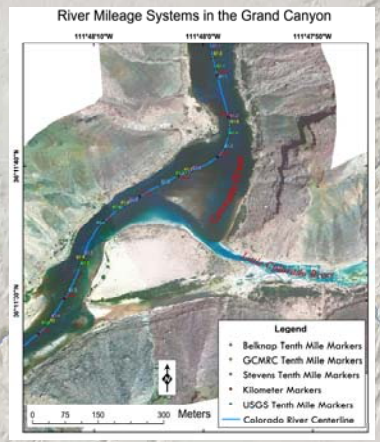
Subject Areas Datasets organized by:

Spatial Key

All datasets are given a spatial key by tying to river reach, kilometer marker, and river side. Historic river mile systems converted to kilometers using cross-reference tables.

Temporal Key

All datasets are given a temporal key based upon field trip launch date or specific date/time.



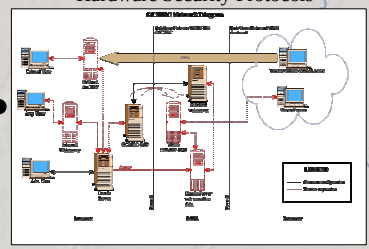
NAU Geology

Study Areas Requiring Special Security Protocols

Native Fish

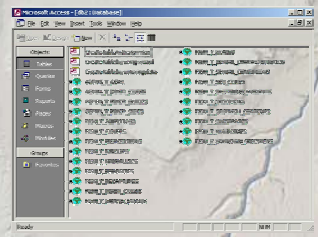
Cultural Resources

Hardware Security Protocols



QUERY/ANALYSIS TOOLS

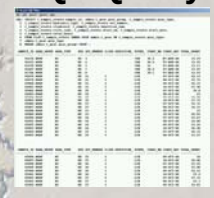
ODBC Connection



Deer Creek

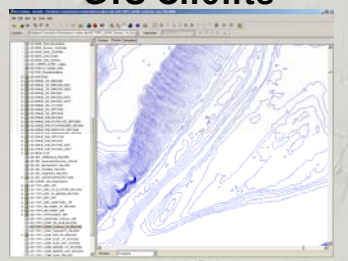
Internet Map Server

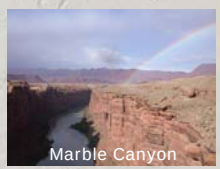
SQL Query



Web-based Forms

GIS Clients




Marble Canyon

Oracle Database Management System

- Centralized repository for tabular and spatial data
- Backup and Archive
- Robust tabular query

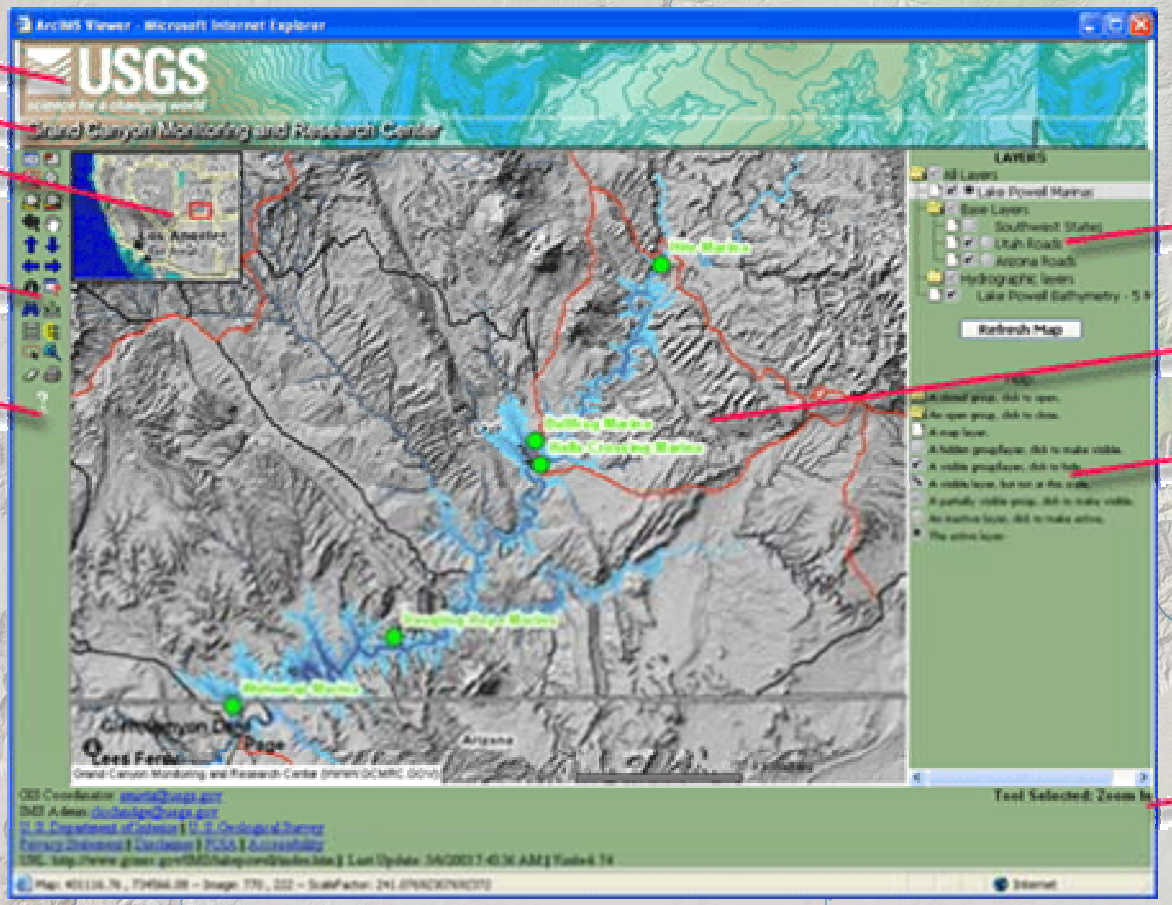
Spatial Database Engine

- Connection to Oracle
- Allows storage of large datasets
- Robust query and display

Minimum Required Specifications

- Internet Explorer 5.0 or newer
- Netscape 4.6 or newer
- Mac – Safari 1.0
- Internet Connection – 28.8kb/sec

Overview


Link to USGS web site
Link to the GCMRC web site
Overview Map
Tool bar
Help page (This page)
List of layers
Map
Layer help
Active tool
USGS

IMS Tools

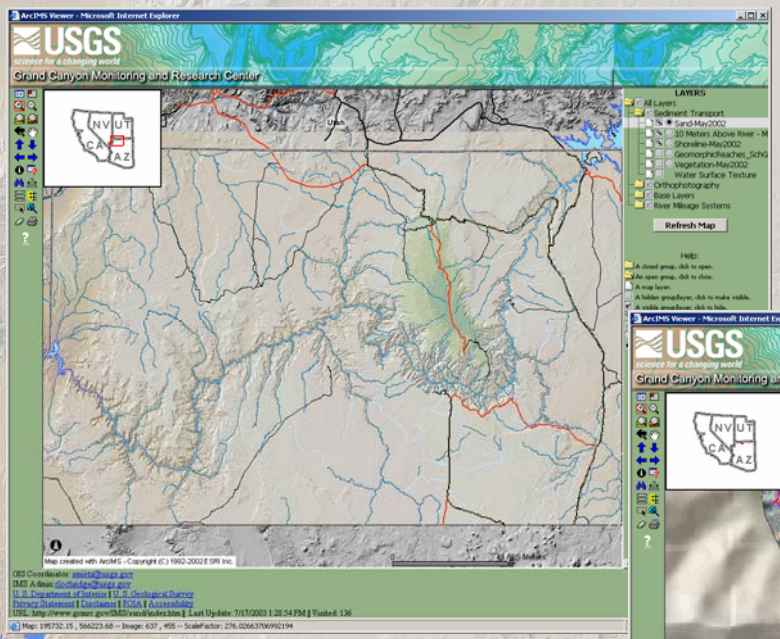
For addition info on help go to (or click the ?):
http://www.gcmrc.gov/IMS/IMS_Help/IMS_Help.htm

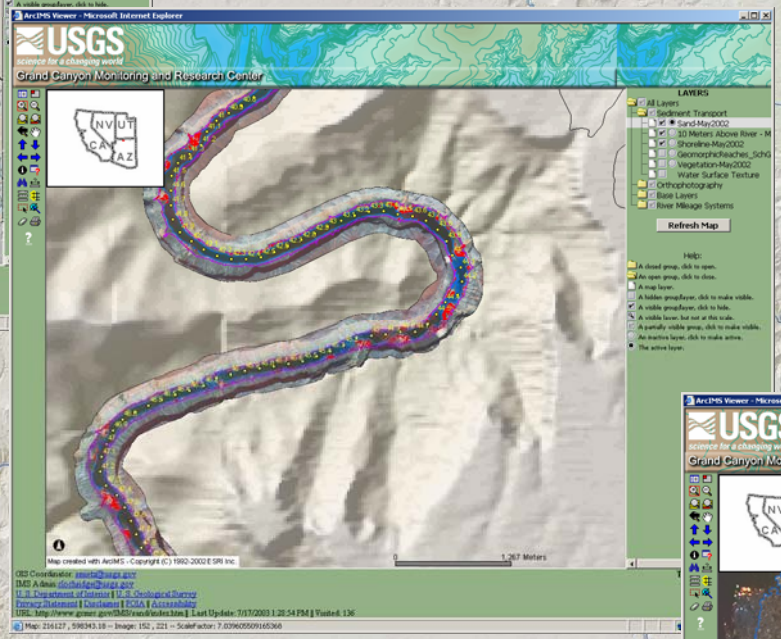
Demo of IMS - Web

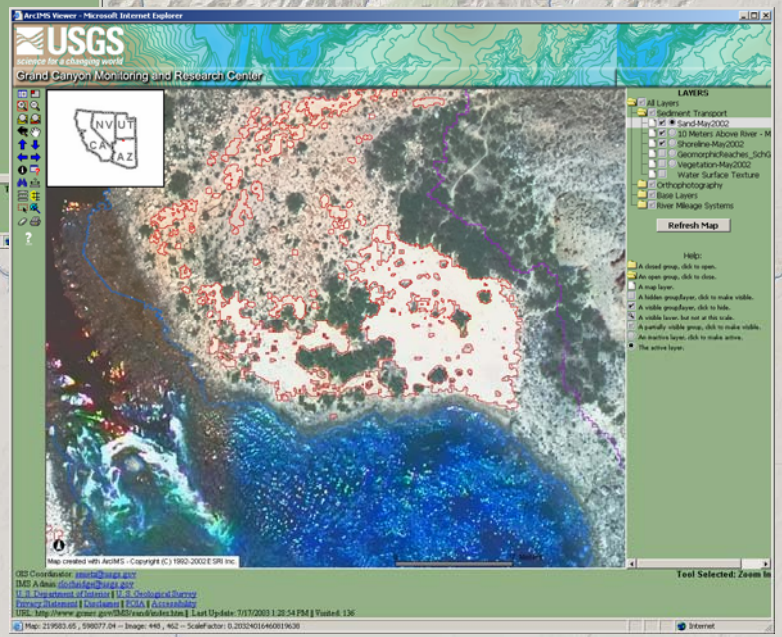
http://www.gcmrc.gov/IMS/IMS.htm

- Pan/ZoomIn/ZoomOut
- Identify Tool Query
- Select by area Query
- Tabular Query of Habitat
- Measure Tool

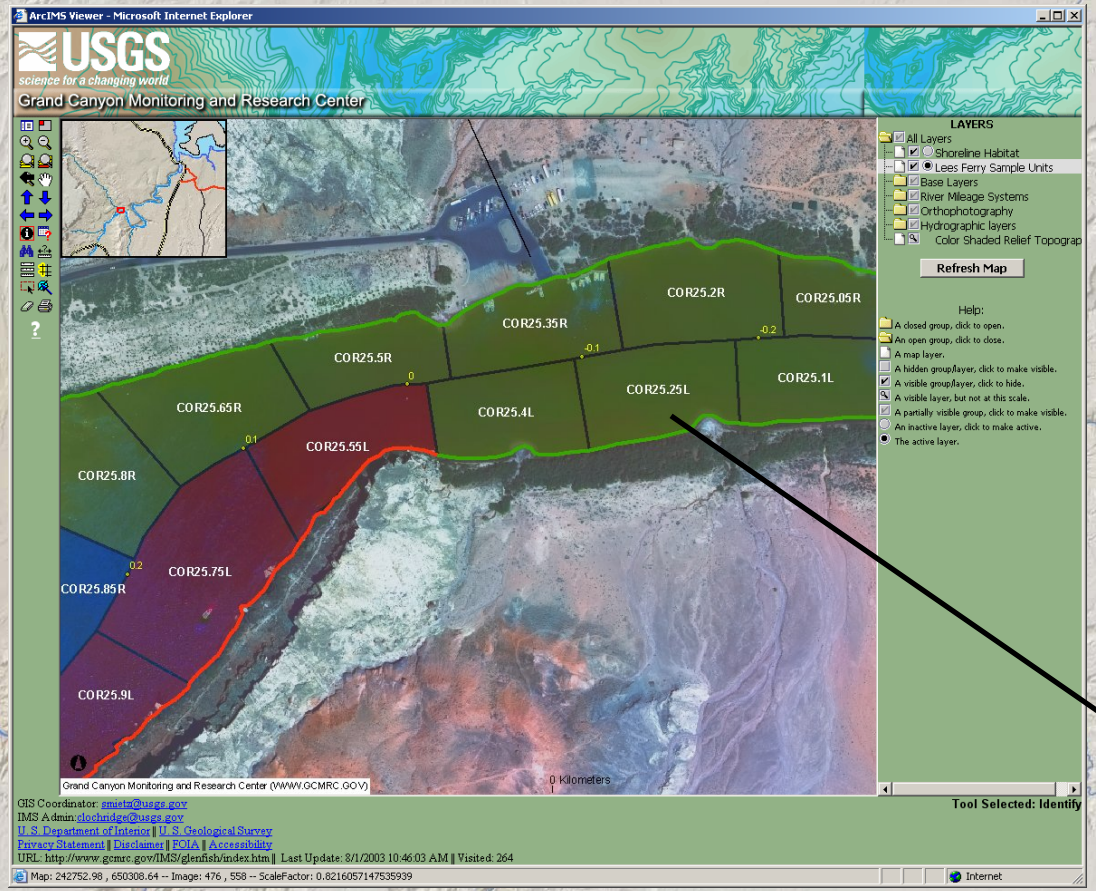
Pan/ZoomIn/ZoomOut



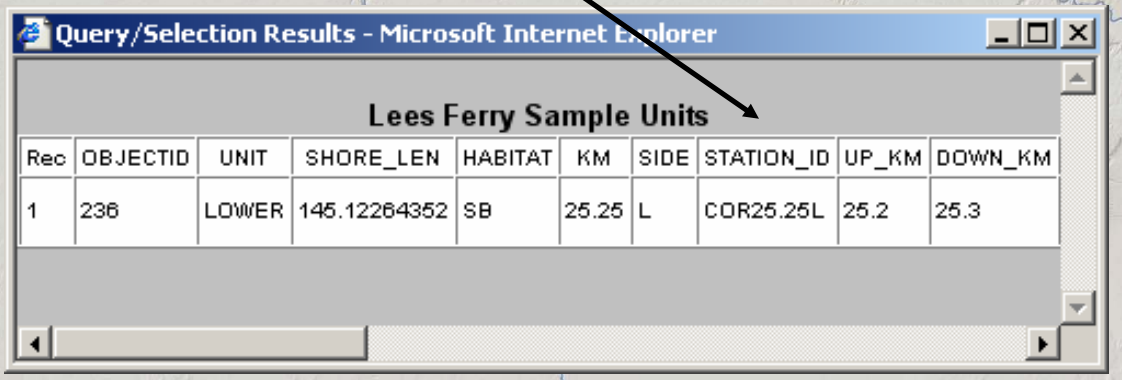




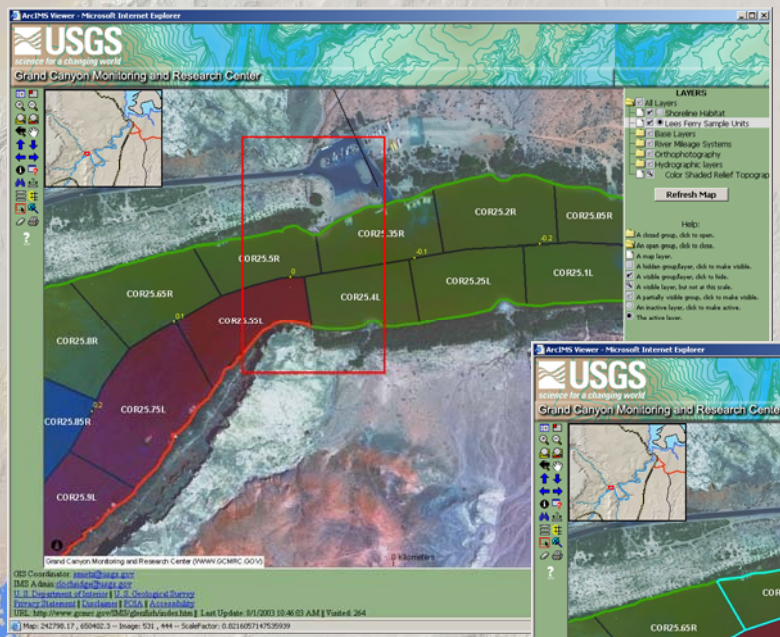
Identify Tool Query

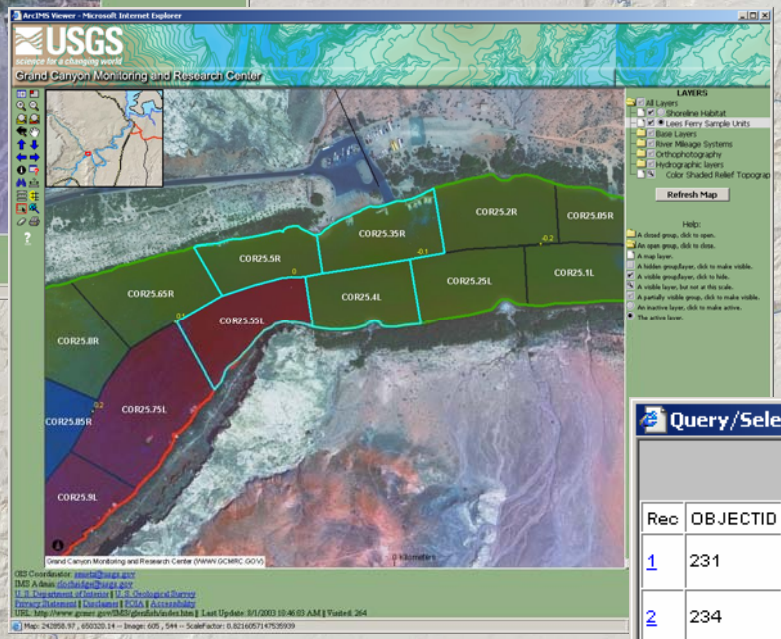


Identify Feature Attributes



Select by Area Query





Query/Selection Results - Microsoft Internet Explorer

Lees Ferry Sample Units

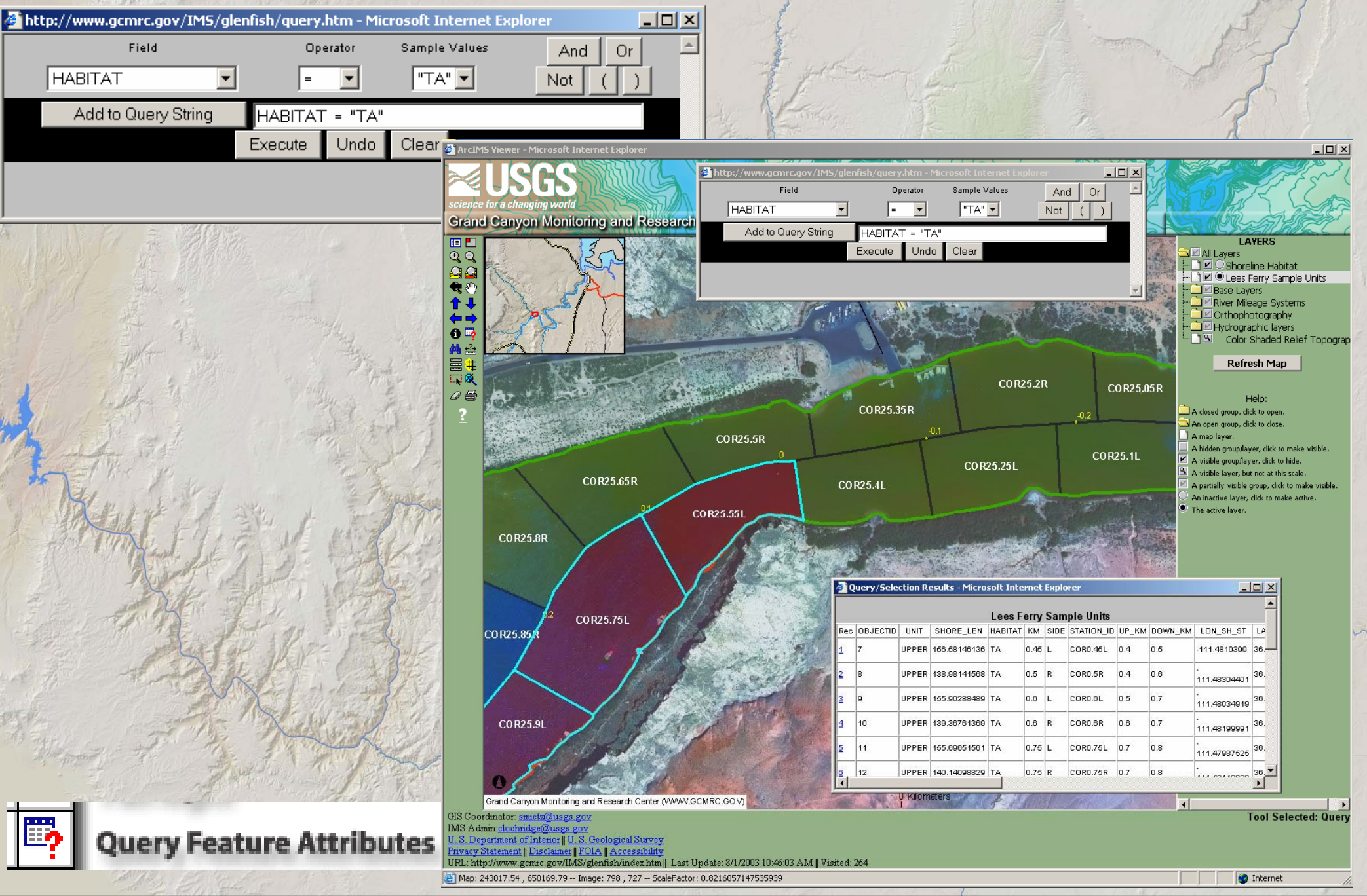
Rec	OBJECTID	UNIT	SHORE_LEN	HABITAT	KM	SIDE	STATION_ID	UP_KM	DOWN_KM
1	231	LOWER	164.79561799	SB	25.35	R	COR25.35R	25.3	25.4
2	234	LOWER	165.43547122	SB	25.5	R	COR25.5R	25.4	25.6
3	240	LOWER	144.17427229	SB	25.4	L	COR25.4L	25.3	25.5
4	243	LOWER	166.64010042	TA	25.55	L	COR25.55L	25.5	25.6

Zoom to these records

Select an Area

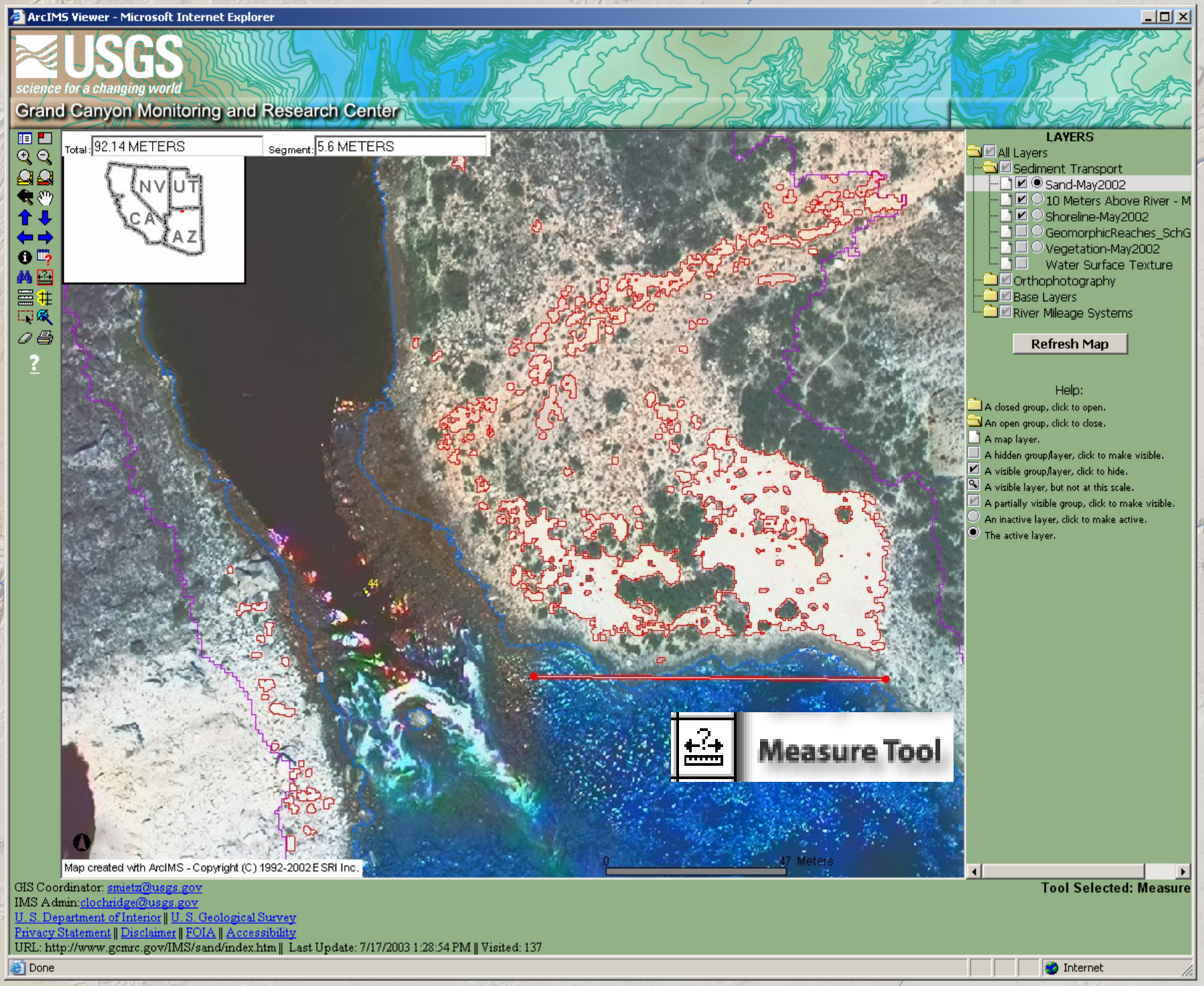
Select by Line/Polygon

Tabular Query of Habitat



Query Feature Attributes

Measure Tool

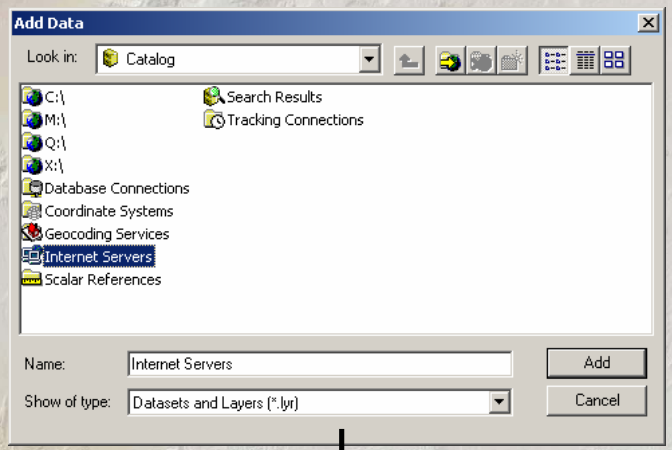


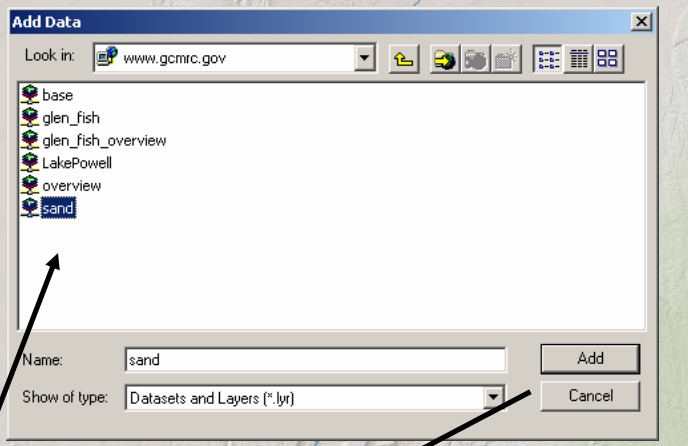
Demo of ArcMap Service

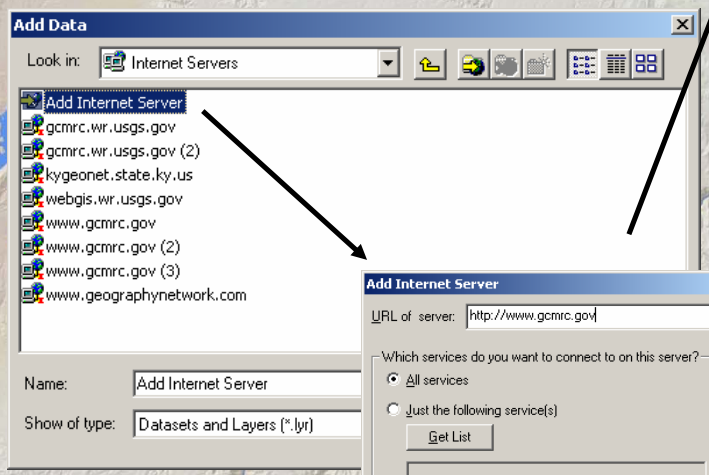
- Connect to service
- Identify Multiple Layers
- Query Builder
- Buffer Wizard
- Download data
- Create map

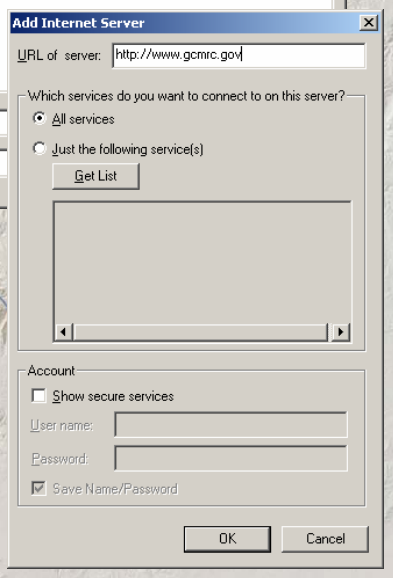
Connect to service

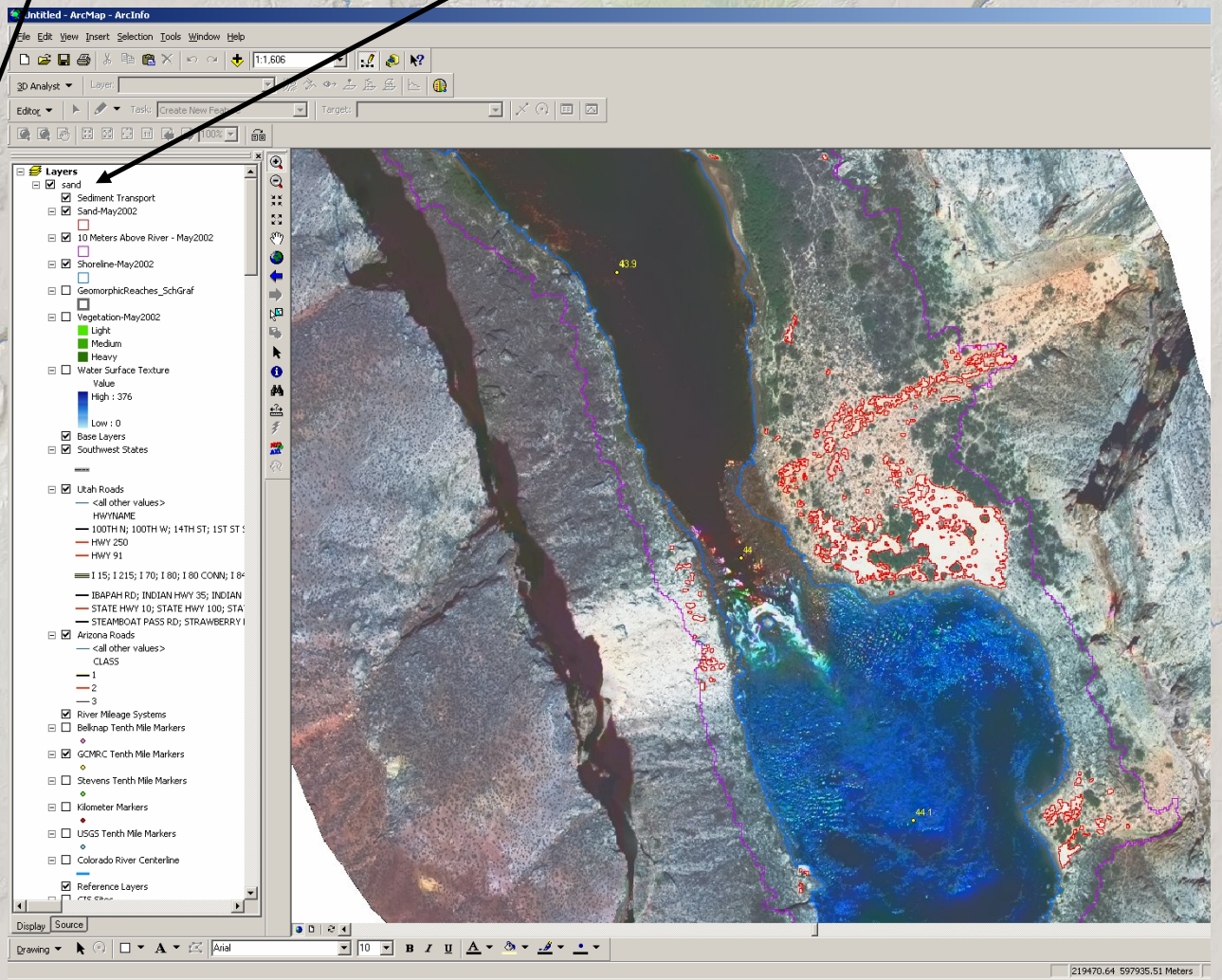
Add Data





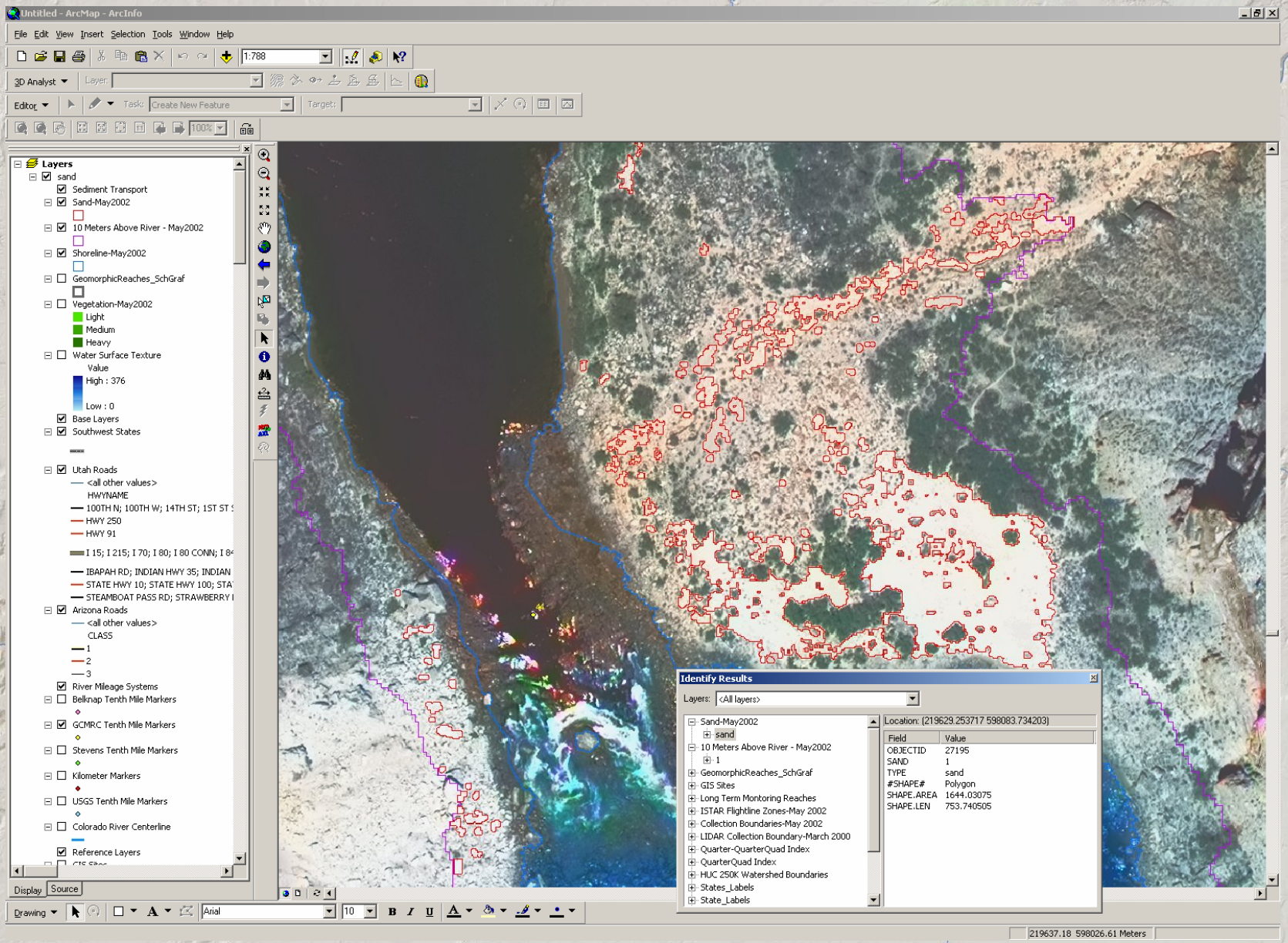






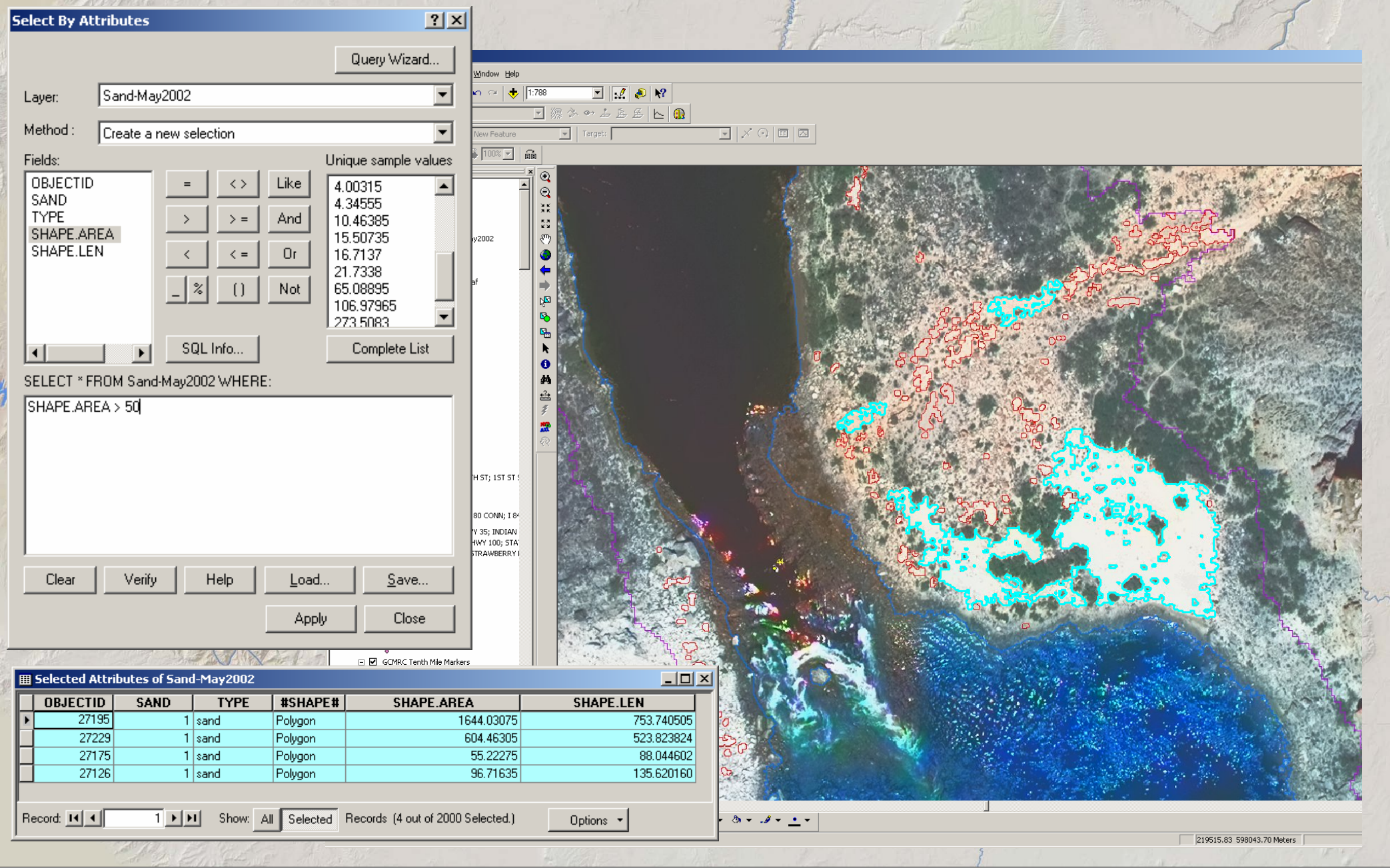
Identify Multiple Layers

Identify Tool

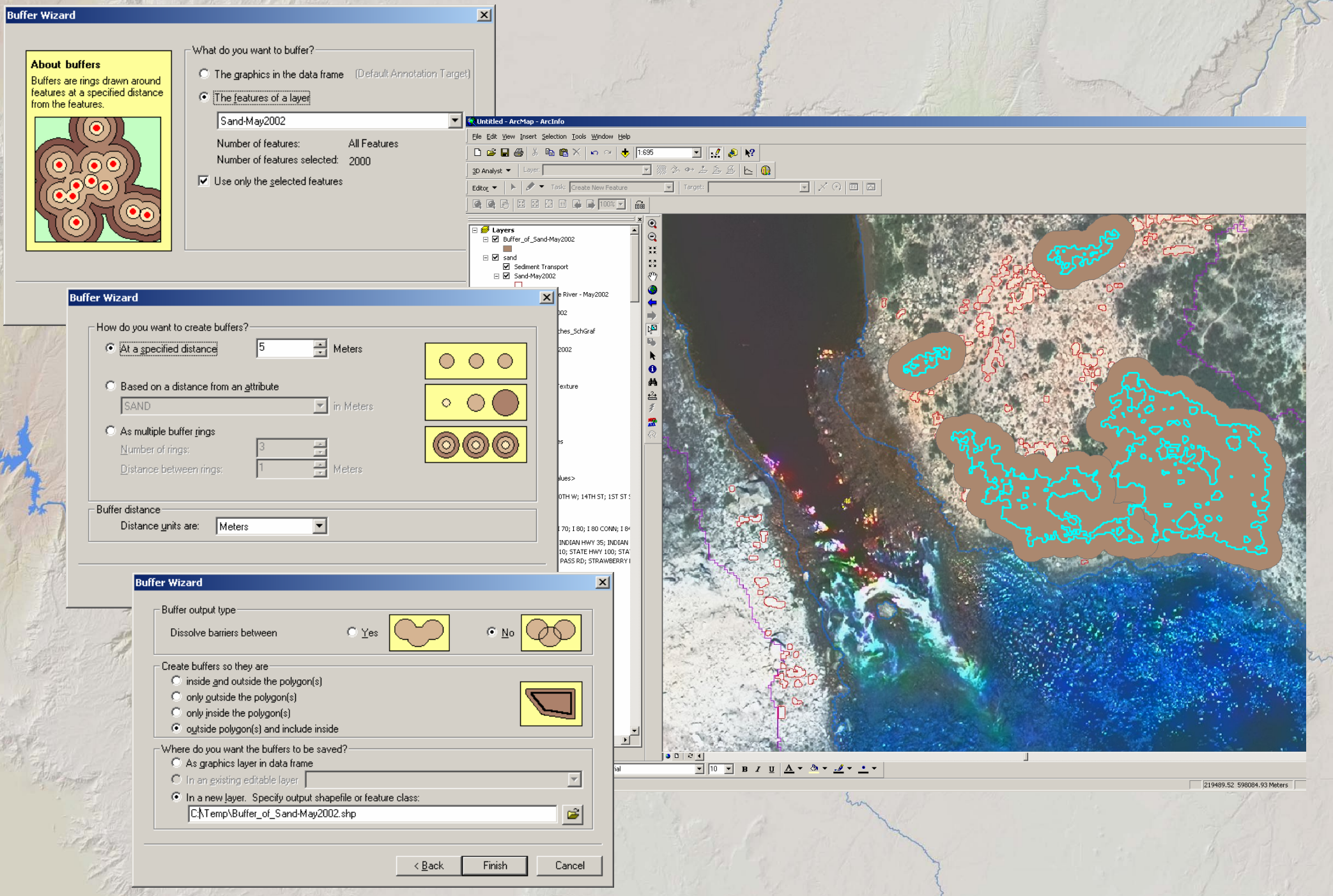


Query Builder

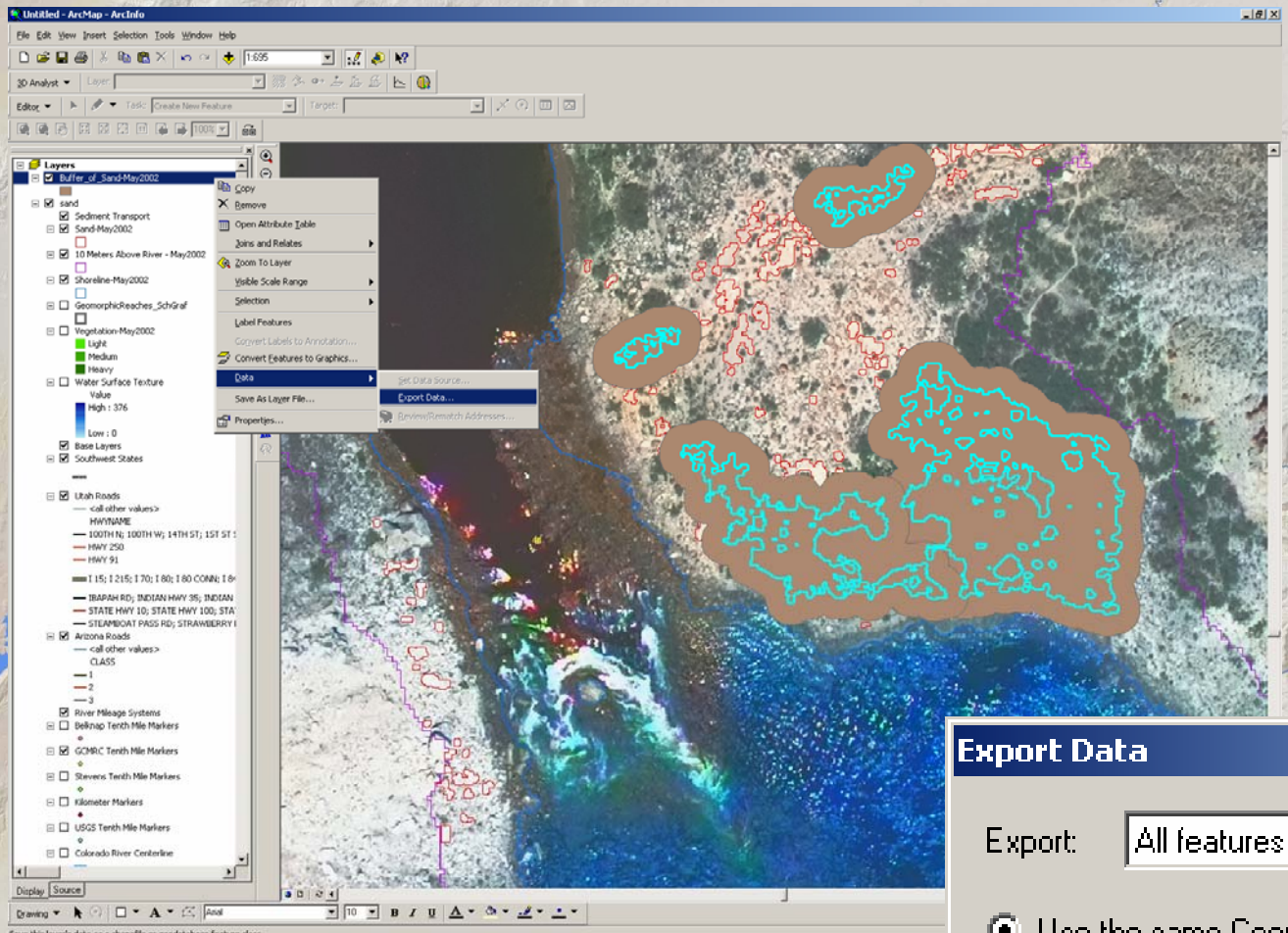
Select by Attributes

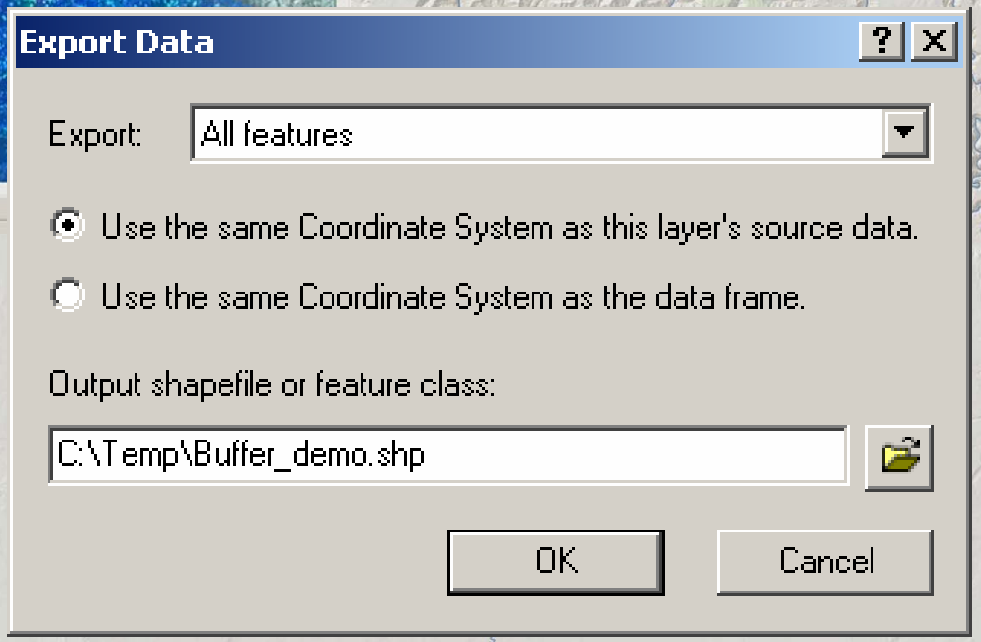


Buffer Wizard

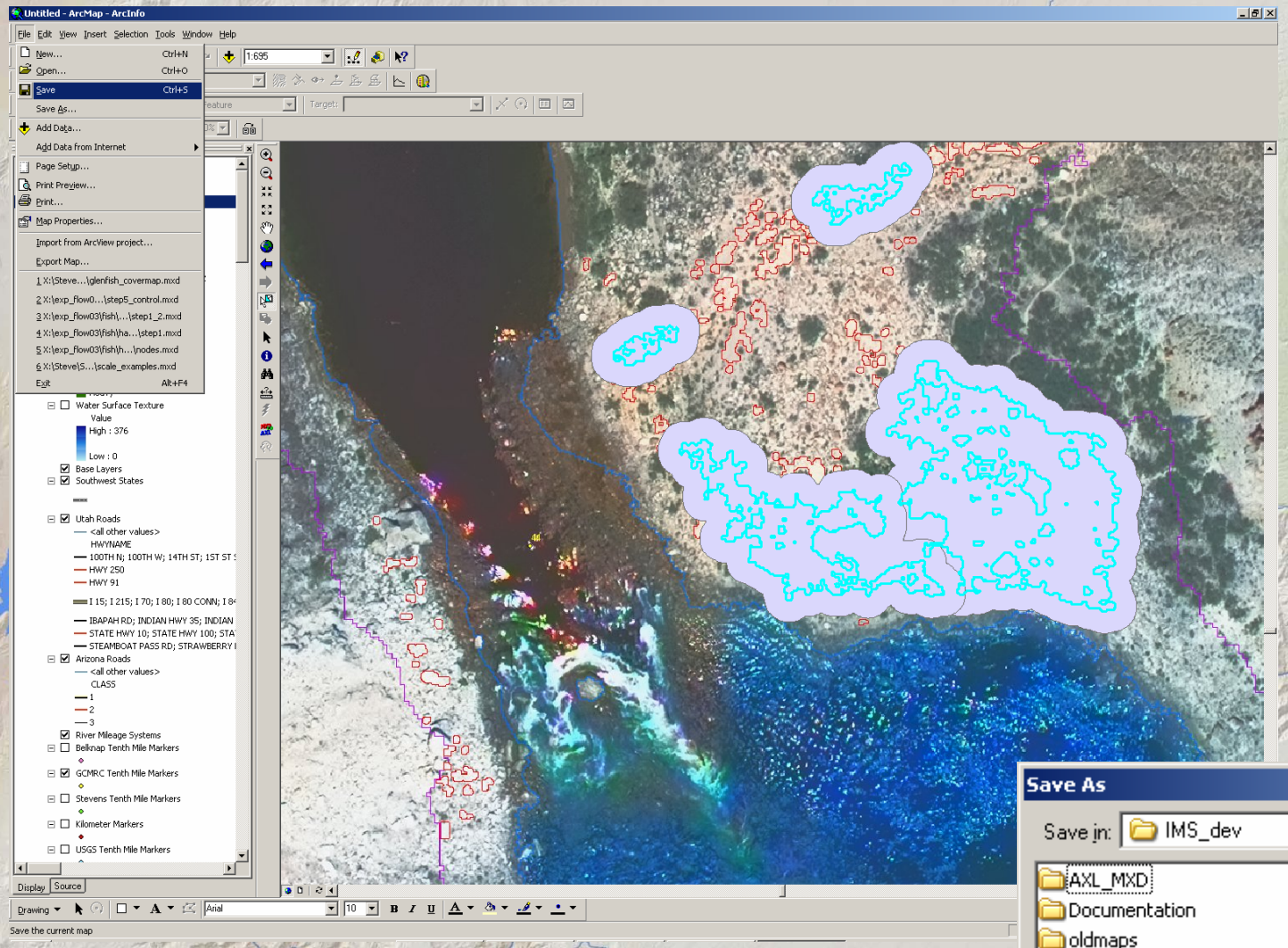


Download Data





Create Map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Open... Ctrl+O
Save Ctrl+S
Save As...
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Add Data from Internet
Page Setup...
Print Preview...
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Map Properties...
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Export Map...
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Low : 0
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Utah Roads
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Arizona Roads
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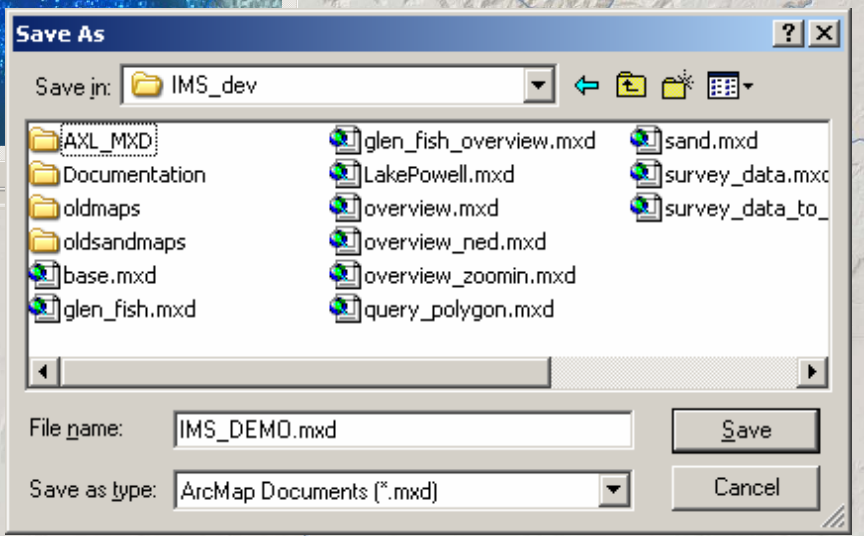
GCMRC Tenth Mile Markers
Stevens Tenth Mile Markers
Kilometer Markers
USGS Tenth Mile Markers
Display Source
Drawing
Save the current map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Save
Cancel

Future Expansion

1. More project-specific maps
2. Metadata server customization
3. Feature-linked metadata
4. Downloadable data layers
5. Publication of GCMRC IMS services
6. Training for Staff, cooperators, AMWG/TWG members
7. Latitude/Longitude and Stateplane Coordinates cursor locations at bottom of map

Future Expansion con't

8. Zoom to River Mile button
9. River Mile Query Tool
10. Bookmark function on web like Arcmap