National Park Service

Park Facility Management Division
Facility Management Program

Managing Real Property – Spatially Enabling Executive Decision Support for FM

DIT

February 2010

Background -

The National Park Service Organic Act 16 U.S.C.1

- *"...to promote and regulate the use of the...national parks...which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."*

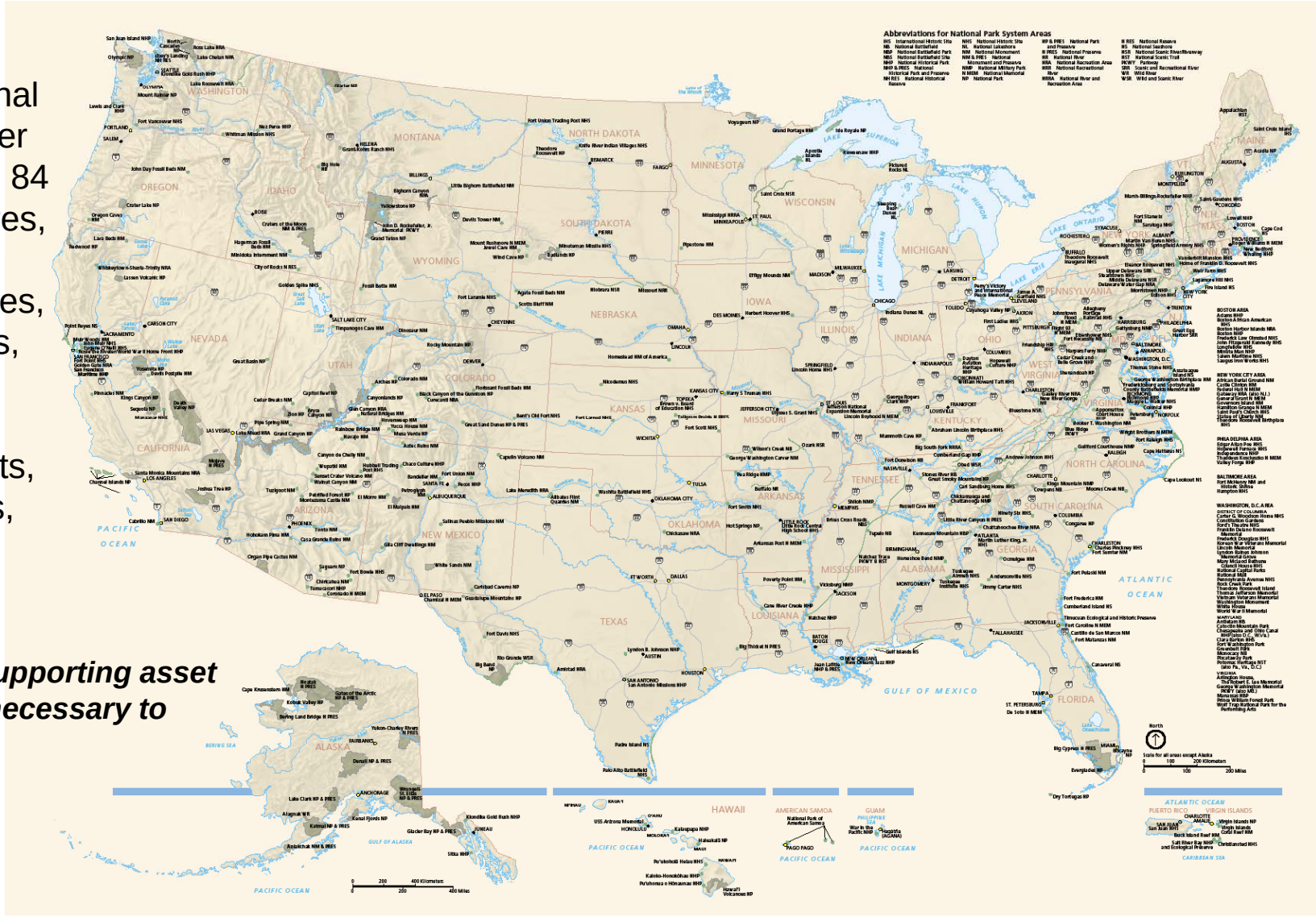
Mount Rushmore National Memorial – Mount Rushmore Sculpture

Dry Tortugas National Park – Fort Jefferson

To fulfill its mission, NPS established an extensive system of parks across the nation and territories.

- 392 National Parks cover more than 84 million acres, including historic sites, battlefields, recreation areas, monuments, seashores, trails, and highways.

Including the supporting asset infrastructure necessary to operate them.



Over time, these assets have fallen into disrepair

- As the backlog has accumulated, the costs to maintain National Park Service assets have been deferred over time.
  - Higher visitation rates, aging facilities, new parks, and increased operational requirements have affected the ability of national parks to maintain their physical infrastructure.
  - Overall, resources have not been sufficient to meet needs, and assets have not been maintained well. As a result, the NPS today faces a significant backlog of maintenance needs.

- The emphasis on effective management of Federal real property has increased over the last several years. Over 30 federal agencies control real property assets worldwide, including facilities and lands

Legislative requirements increase the need for more effective real property management of Federal assets

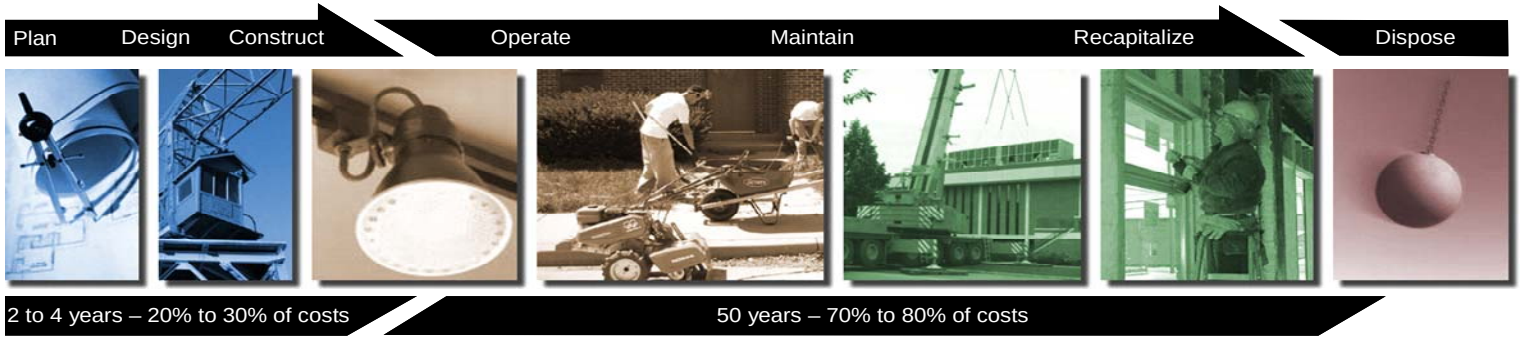
Important legislative drivers include:

- PL98-540 (1984)
  - NPS must implement a maintenance management system
- FASAB, Standard No. 6
  - Requirements for reporting DM
- GPRA (1993)
  - Linking Budgets with Performance

- Executive Order 13327 (2004)
  - Every Federal agency is required to have an asset management plan (AMP)
- NPS Director's Order #80
  - An asset management strategy includes:
    - Asset inventory and condition assessment (API ratings)
    - Real property asset management planning processes (AMPs)
    - Implementation and execution of AMP (using life cycle principles)

Construction is only a small portion of the total cost of an asset over its lifetime

- Traditionally, NPS managers focused on obtaining project funding, with minimal attention to the out year implications of the project on the park's recurring operational budget.
- Rather than making strategic investments in preventative maintenance and component renewal, NPS let assets deteriorate over time until the next influx of project funding became available.
- Today's managers are becoming more sophisticated about the long-term implications of today's decisions and are adapting to consideration of the costs of an asset over its entire lifecycle.

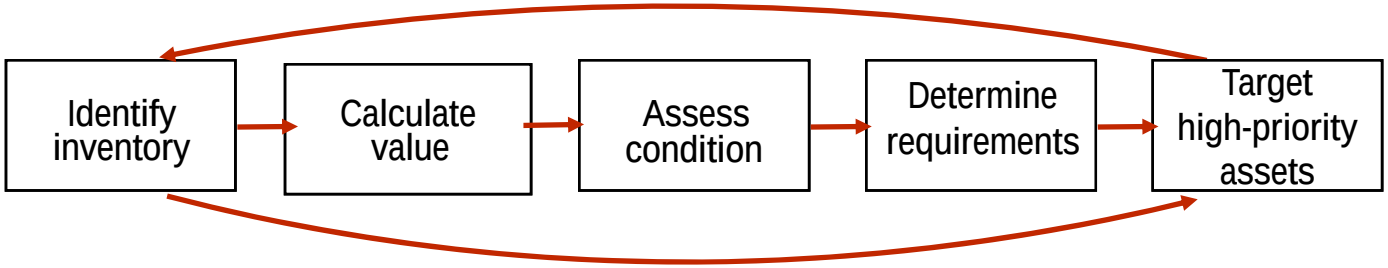


Planning & Design	Construction
$145,080	$970,920
$1,116,000	
30% of life cycle costs	

Operations	Maintenance (RM & PM)	Component Renewal
$429,800	$1,255,016	$863,412
$2,548,228		
70% of life cycle costs		

NPS is implementing an asset management program to improve an sustain the condition of its portfolio

- This program addresses key asset management questions:
  - What assets does NPS own?
  - What is the Current Replacement Value (CRV) of the portfolio?
  - What is the condition of the portfolio?
  - What is required to bring the portfolio up to acceptable condition and properly sustain it over time?
  - Which assets are the highest priority and where should parks focus resources?



- The results of these efforts has been the collection in enormous volume of asset attribute data

The NPS is charged with managing an asset portfolio, valued at over $103 billion, with a limited budget and a significant deferred maintenance backlog

National Park Service Asset Inventory
As of September 30, 2009

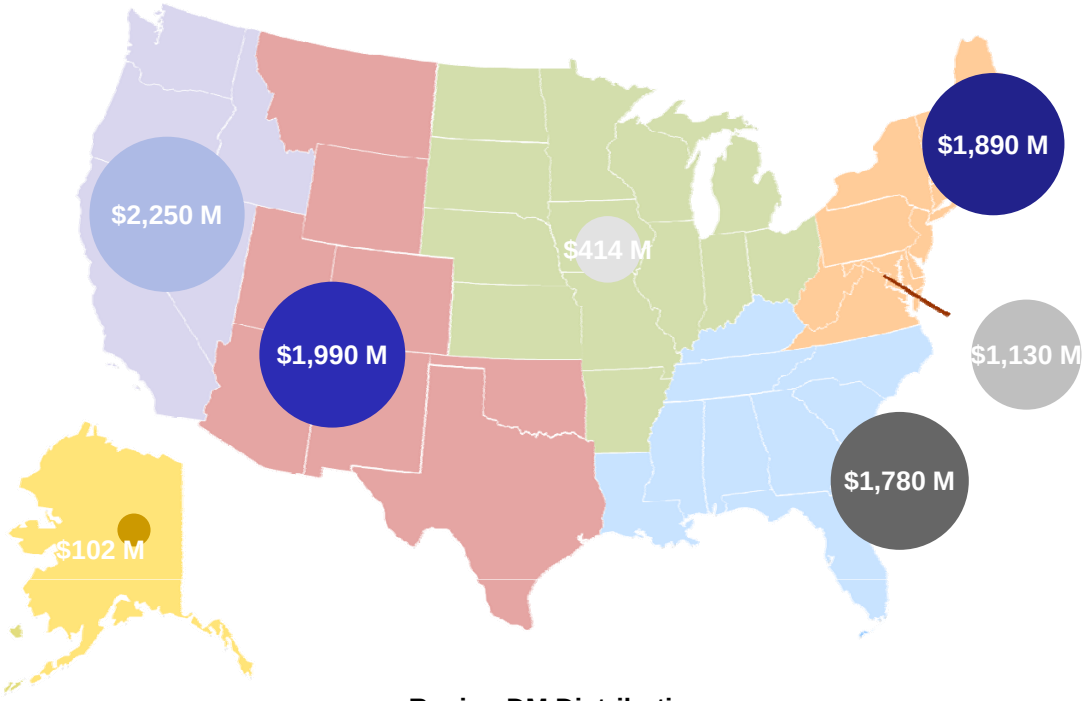
	Count	Deferred Maintenance	Current Replacement Value
Buildings	24,164	$ 2,037,543,472	$ 11,822,312,860
Housing	5,643	$ 230,795,427	$ 1,698,150,390
Trails	6,139	$ 483,580,214	$ 2,655,904,778
Campgrounds	6,927	$ 551,808,309	$ 18,170,124,644
Water Systems	1,661	$ 332,484,080	$ 2,211,334,881
Wastewater Systems	2,025	$ 237,332,362	$ 1,055,400,478
Paved/Unpaved Roads	7,994	$ 2,978,644,061	$ 19,475,200,496
All Other	27,414	$ 2,736,611,604	$ 46,453,270,732
Total	81,967	**$ 9,588,799,528**	**$ 103,541,699,259**

The NPS faces complex challenges in managing its large and diverse facility asset portfolio

Large asset portfolio	69,000+ assets
Various asset types	Roads, Trails, Buildings, Housing, Utility Systems (water/wastewater), Monuments, Marinas, Memorials, Maintained Landscapes, Maintained Archaeological Sites, etc.
Decentralized management across NPS	392 different park units (“companies”); many like individual cities or municipalities.
Diverse geographic location of assets	Across all terrain types
Huge deferred maintenance backlog	$9,589M
Inherited & aging infrastructure	As assets age, they require more maintenance

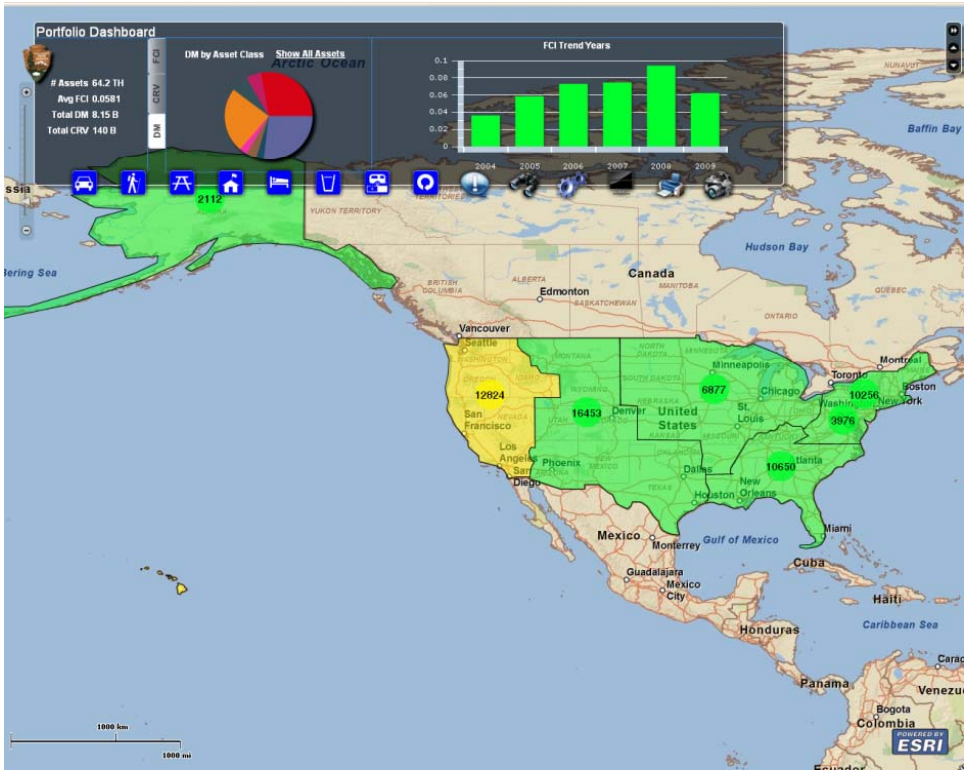
Business Challenges

- Maintenance Backlog or Deferred Maintenance (DM) has grown to more that $9.5 Billion
- Portfolio DM will continue to grow due to annual deterioration and inflation costs, outpacing the available annual funding for Deferred Maintenance (DM)
- NPS challenged with developing a Servicewide Strategy that demonstrates effective and efficient use of Federal funds for the management of NPS Facilities – creation of performance targets that illustrate the NPS' priority assets' facility condition levels improving over time.



Region DM Distribution

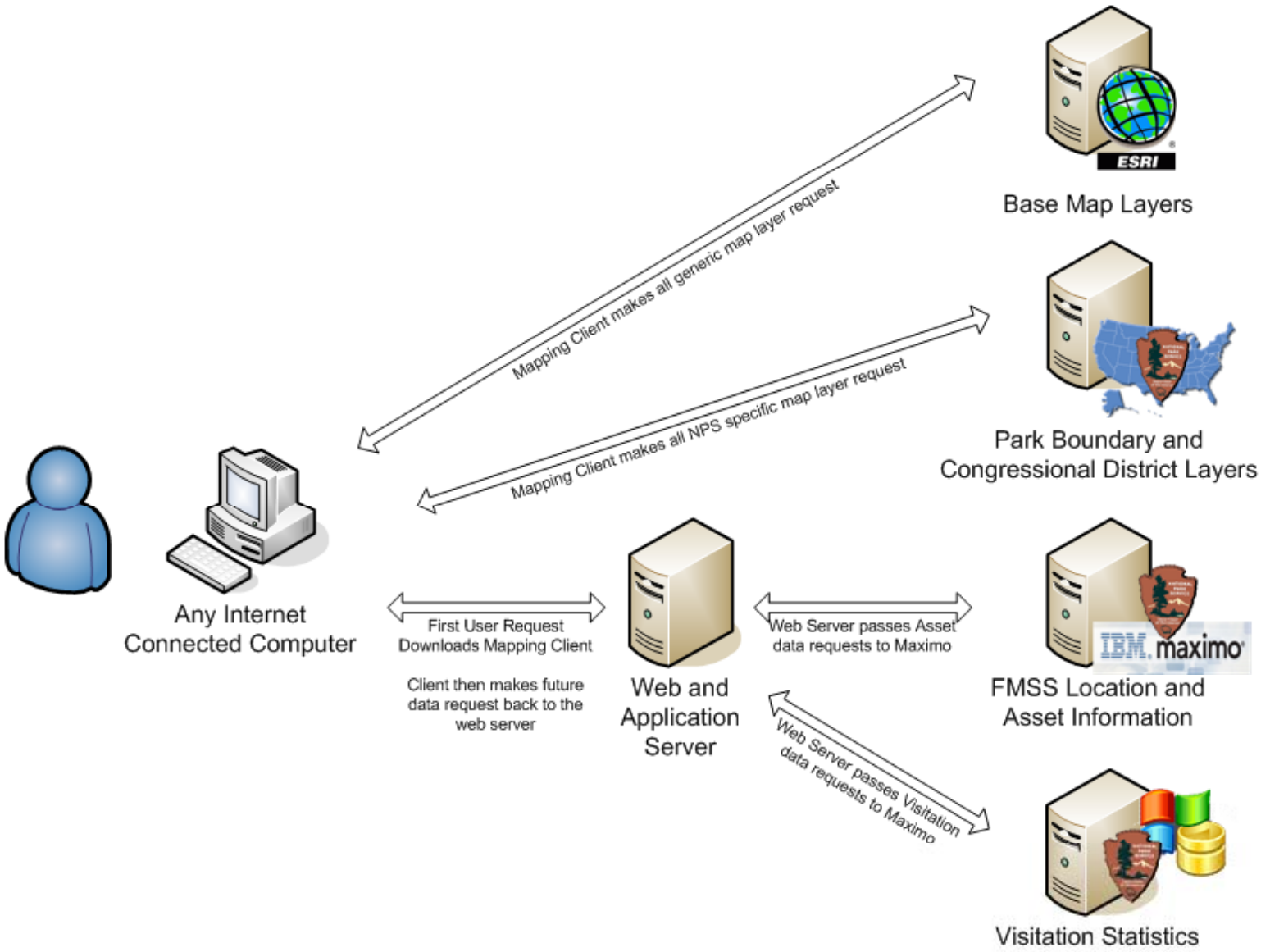
Opportunity



- Develop rational, justifiable benchmarks for substantiating investment decisions.
- Leverage over nine years of investment in data collection, data quality and business practice development, apply funding strategies and scenario modeling in a visual context for understanding of funding impacts across the Asset Portfolio
- Use visualizations to make data driven, informed decisions on funding requests and allocations

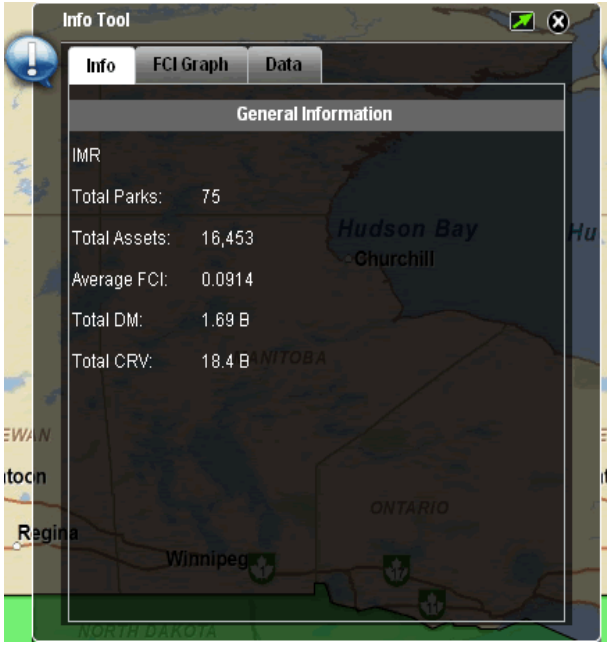
Results

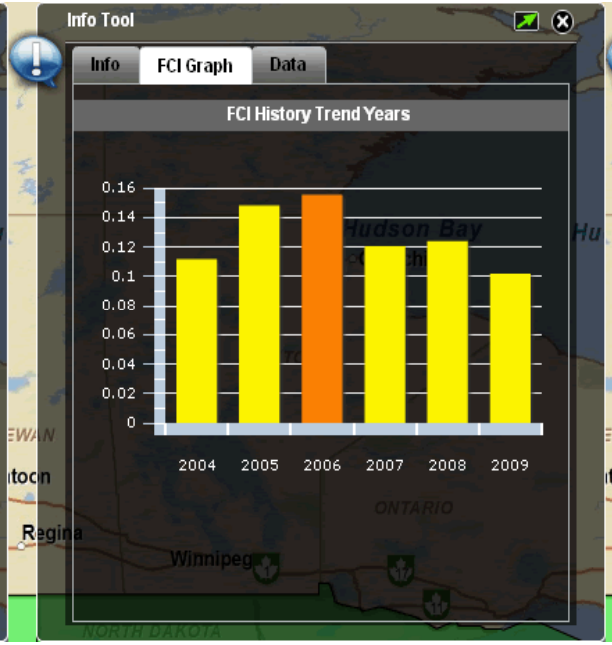
- Proof of Concept – Executive Dashboard and Deferred Maintenance Scenario Modeling Tool
  - Dashboard and data visualization to facilitate DM funding scenario modeling formulations across NPS Portfolio
  - Leverage data integration with the Facility Management Software System (FMSS)
  - Establish baseline for future requirements and business intelligence surrounding NPS Facilities Management
  - Drill down to Park and Location level data
- Technologies
  - ESRI Flex API Web Viewer
  - ArcGIS Server
    - Mapping Services from ESRI
    - Mapping Services from NPS GIS
  - IBM Maximo – Facility Management Software System (FMSS)
  - Web Services
    - Maximo MEA
    - Visitation Statistics from NPS Public Use Statistics Office
    - Project information from PMIS (Project Management Information System)

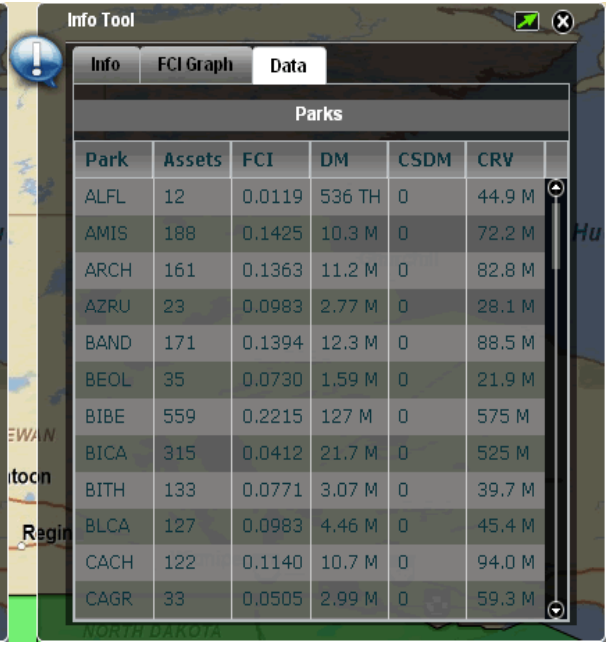

ESRI
Base Map Layers
Mapping Client makes all generic map layer request
Mapping Client makes all NPS specific map layer request
Park Boundary and
Congressional District Layers
Any Internet
Connected Computer
First User Request
Downloads Mapping Client
Client then makes future
data request back to the
web server
Web and
Application
Server
Web Server passes Asset
data requests to Maximo
IBM maximo
FMSS Location and
Asset Information
Web Server passes Visitation
data requests to Maximo
Visitation Statistics

Information Tool:

- Display FMSS Summary Data at Regional Level
  - General Information
  - Graph of Historic Trends in FCI
  - Park level summary data







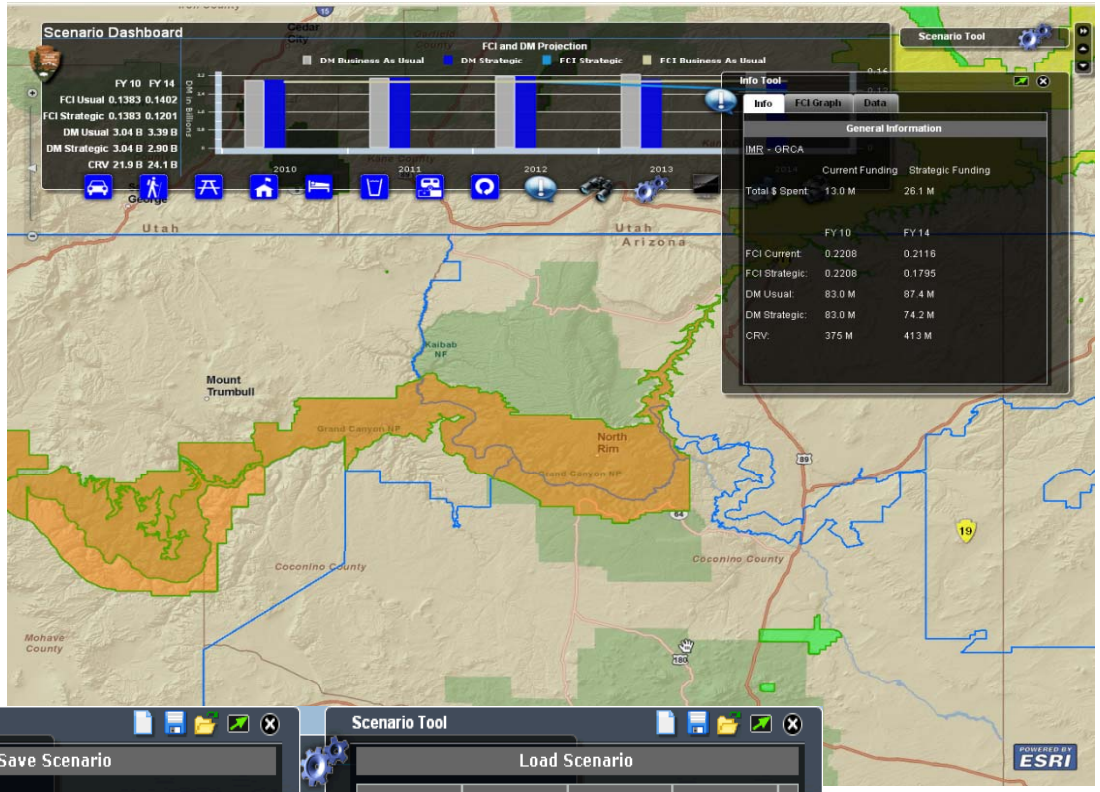
Park	Assets	FCI	DM	CSDM	CRV
ALFL	12	0.0119	536 TH	0	44.9 M
AMIS	188	0.1425	10.3 M	0	72.2 M
ARCH	161	0.1363	11.2 M	0	82.8 M
AZRU	23	0.0983	2.77 M	0	28.1 M
BAND	171	0.1394	12.3 M	0	88.5 M
BEOL	35	0.0730	1.59 M	0	21.9 M
BIBE	559	0.2215	127 M	0	575 M
BICA	315	0.0412	21.7 M	0	525 M
BITH	133	0.0771	3.07 M	0	39.7 M
BLCA	127	0.0983	4.46 M	0	45.4 M
CACH	122	0.1140	10.7 M	0	94.0 M
CAGR	33	0.0505	2.99 M	0	59.3 M

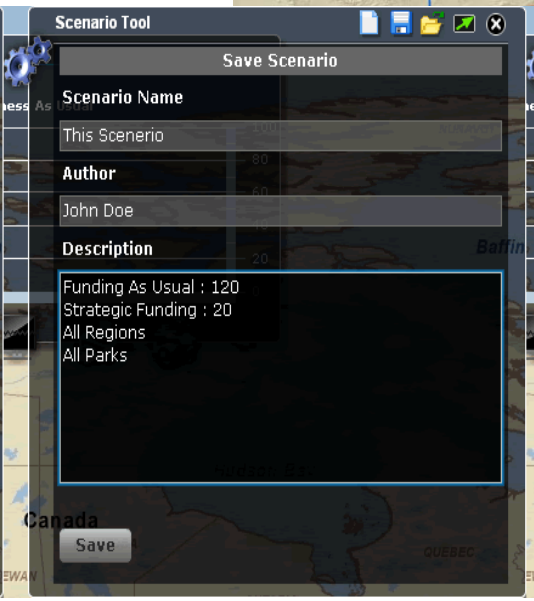
Data Detail Information

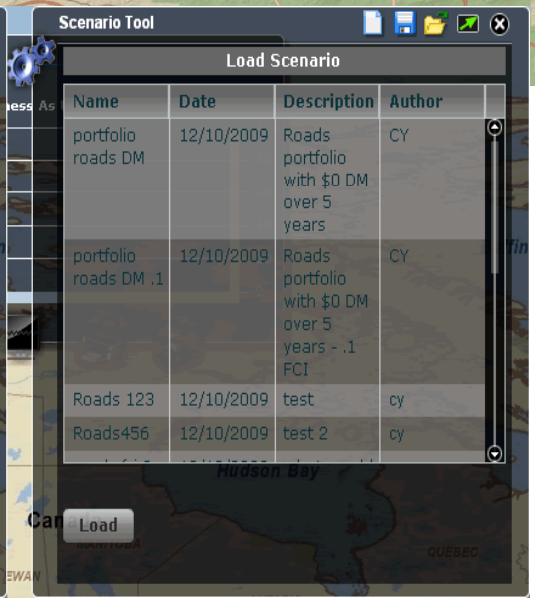
- Region/Park/Location Specific summary view
  - General Summary Info
  - FCI Graph –Trend in Years
  - Data – Asset Records/ Work Order Details

Scenario Tool

- Define Parameters
  - Period
  - Growth Rate
  - Acceptable FCI (MDI)
  - Current and Strategic Funding
  - "What would it take"

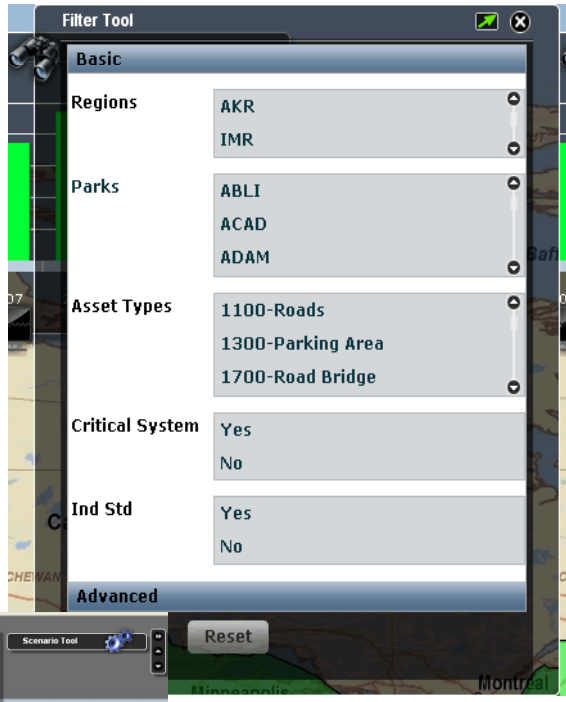


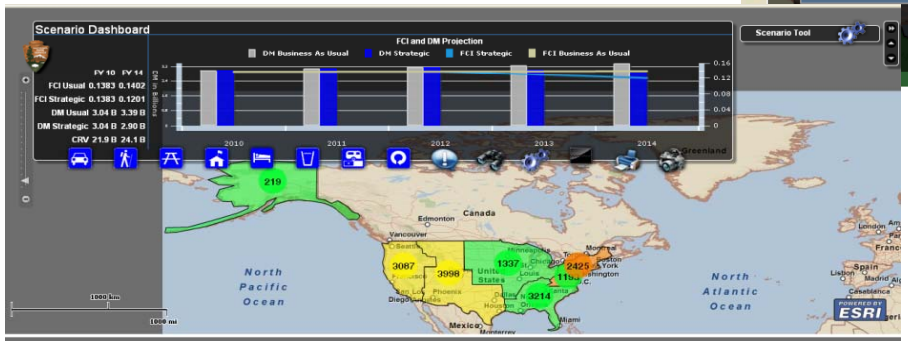


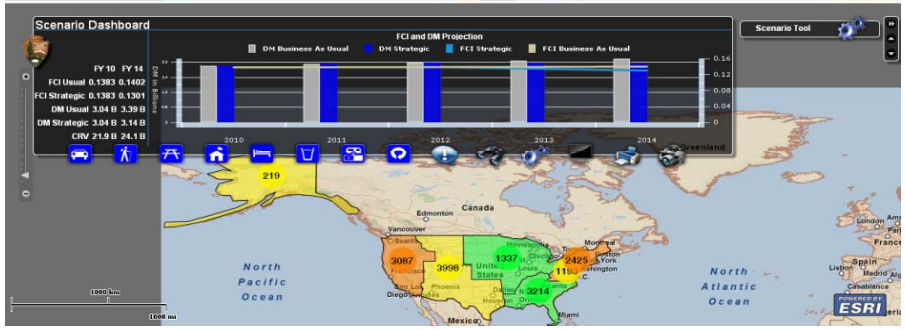


Features

- Filter Tool
  - Define Characteristics
  - Locations/Regions/Types
- Snapshot
- Print
- Split Screen







Next steps

- Additional functionality
  - Extend scenario modeling: CRV; CSDM; ARRA
  - Incorporate additional decision support data/layers
    - Visitation statistics
    - Congressional data
    - PMIS (Project Management Information System)
    - FFS – Financial System
- Develop requirements for additional business tools
- Extended data integration
- Further collaboration with e-GIS on development of map services
- Integration with other business units
- Identification of operational level capabilities

Thank You

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