Facility Management for the 21st Century

The National Park Service Approach to Asset Management

Great Lakes Park Training Institute
February 2005

Speaker – Betsy Dodson
To Meet Mission, NPS Maintains Extensive Infrastructure Across the Nation

- 388 National Park areas cover more than 84 million acres in almost every state.
- The infrastructure of NPS has evolved over time in response to its mission.
  - Provides visitor access
  - Allows park exploration
  - Enhances the use of park lands
  - Protects and sustains natural and cultural resources
Facility Management Program

Boardwalks and Trails
Fortifications
Rods
Maintained Landscapes
Natural Areas
Park Facility Management Division

NPS has Large, Diverse Asset Inventory

- Roads
- Parking Areas
- Bridges
- Tunnels
- Trails
- Corrals
- Campgrounds
- Picnic Areas
- Buildings
- Housing Units
- Apartments
- Out-Buildings
- Water Systems
- Wastewater Systems
- Heating and Cooling Plants
- Electrical Systems
- Radio Systems
- Phone Systems
- Computer Systems
- Fuel Systems
- Dams
- Waterways
- Marinas
- Docks
- Boat Launches
- Monuments
- Ruins
- Fortifications
- Swimming Areas
- Lighthouses
- Railroad Track beds
- Locomotives
- Rolling Stock
- Trestles
- Airstrips
- Amphitheatres

National Park Service Asset Inventory

<table>
<thead>
<tr>
<th>Category</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic Structures and other Buildings</td>
<td>17,458</td>
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<tr>
<td>Monuments</td>
<td>685</td>
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<tr>
<td>Miles of Trails</td>
<td>18,491</td>
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<tr>
<td>Miles of Roads (paved and unpaved)</td>
<td>12,401</td>
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<tr>
<td>Employee Housing Units</td>
<td>5,105</td>
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</tbody>
</table>

The asset inventory enables the park experience.
Over Time, Inventory of Assets has Fallen into Disrepair

- Increases in visitation rates
- Aging facilities
- New operational requirements
- Insufficient Resources
- Inconsistent documentation of the extent and condition of the asset inventory.
- Difficult to articulate the business case for properly operating and maintaining NPS assets.

*In 1998, GAO reported a backlog of $4.9 billion in needed maintenance within the parks.*
Legislation, Regulations & Directives

• Public Law 98-540
  – Amendment to the Volunteers in Parks Act of 1969, amended October 24, 1984

• FASAB No. 6
  – Accounting standard for property & equipment

• Public Law 103-62 (S.20)
  – The Government Performance and Results Act of 1993
Technology Initiation

- Y2K Opportunity – technology driven CMMS – how we chose the product
  - Multi disciplinary, multi bureau
  - Reduced choices by system needs vs. products
- Created Asset Management Process as part of CMMS specs
- Director’s Order #80
  - Developed to establish NPS policies, requirements, and standards for implementing Public Law 98-540 (October 24, 1985), which amended the *Volunteers in the Parks Act of 1969*. 
Approach Focuses on Stewardship and Asset Management

- **Stewardship Mentality**
  - What do I own?
  - What is its value?
  - What is its condition?
  - How will I sustain it over time?

- **Asset Management is forever**
  - Plan/Design
  - Acquire/Construct
  - Maintain
  - Recapitalize (Reinvestments)
  - Dispose (as necessary)
The Asset Management
Asset Information is Documented in the Facility Management Software System (FMSS)

- FMSS is a COTS solution that:
  - Tracks condition and maintenance data
  - Calculates and stores FCI and API
  - Manages work at the park level
  - Serves as a programmatic tool at headquarters
- FMSS enables a fully integrated asset management process for making better decisions about project approval and funding.
NPS is Implementing Business Practices, Training and Support to Improve Asset Management

• Business practices and system rules developed at the national level.
  – Information roll-up

• Integrated training curriculum incorporates curriculum design, delivery, and retention for Service-wide distribution, using qualified instructors and distance learning opportunities
  – Focus on basic facility management concepts, computerized maintenance systems, advanced practices, superintendent and administrative uses of the FMSS, and industry standards
  – Help Desk 24hr response, email or phone-single point of information
Enterprise Environment

• Technology and an internet based system-issues/problems
  – Load balancing
  – Connectivity
  – Signature security
  – User restrictions

• NPS vision
  – Enterprise Environment
  – Partnerships
  – Single data entry
Technology Enhancements

Expanding into other technology to better manage the parks
– Work Tracking
– Resource Protection-Job Plans
– PM’s
– Blue prints and drawings
– GIS & GPS
– Handheld Technology
– API
– Condition Assessment
– WBS linkage
Work
Tracking

Facility Management Software System

Open Work Orders By Due Date
Rocky Mountain National Park

Number of Workorders in this report: 3,291

<table>
<thead>
<tr>
<th>Supervisor</th>
<th>Description</th>
<th>Location</th>
<th>Status</th>
<th>Target Start Date</th>
<th>Target Completion</th>
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<tbody>
<tr>
<td>Paquette, David</td>
<td>ESUT 04 East Side Equipment Rental - NOTE</td>
<td>15737</td>
<td>AFFR</td>
<td>10/1/2003</td>
<td>9/30/2004</td>
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<td>ESUT 04 Water Lab Analysis Work</td>
<td>ROMO</td>
<td>AFFR</td>
<td>10/1/2003</td>
<td>9/30/2004</td>
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<td>Buttery, Douglas</td>
<td>CRBU 0-0733 Bathroom Sink Leak</td>
<td>14751</td>
<td>AFFR</td>
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<td>8/12/2002</td>
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<td>CRRU TRR Maintain Repair Signs</td>
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<td>AFFR</td>
<td>10/1/2001</td>
<td>9/30/2002</td>
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<td>CRBU Point &amp; Maintain Picnic Tables GL Hog At</td>
<td>ROMO</td>
<td>AFFR</td>
<td>6/1/2002</td>
<td>9/30/2002</td>
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<tr>
<td></td>
<td>CRBU TOCG Point &amp; Maintain Picnic Tables</td>
<td>14012</td>
<td>AFFR</td>
<td>6/1/2002</td>
<td>9/30/2002</td>
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<tr>
<td></td>
<td>CRDD Portico Pit Stockpile &amp; Manage Materials</td>
<td>53733</td>
<td>AFFR</td>
<td>10/1/2001</td>
<td>9/30/2002</td>
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<td></td>
<td>CRDD Boneyard Stockpile &amp; Maintain Materials</td>
<td>14729</td>
<td>AFFR</td>
<td>10/1/2001</td>
<td>9/30/2002</td>
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<td></td>
<td>CRBU 0-0392 Ladies Restroom Stall #4</td>
<td>35805</td>
<td>AFFR</td>
<td>8/12/2002</td>
<td>8/19/2002</td>
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<tr>
<td></td>
<td>CRDD North Inlet Trailhead Sign * Tomahatu Cre</td>
<td>14699</td>
<td>AFFR</td>
<td>8/19/2002</td>
<td>8/26/2002</td>
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<tr>
<td></td>
<td>CRBU 0-0392 Ladies Restroom At KVC, First St</td>
<td>35865</td>
<td>AFFR</td>
<td>8/19/2002</td>
<td>8/26/2002</td>
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<tr>
<td></td>
<td>CRBU 0-1043 The Left Side Door Stays Locked</td>
<td>14859</td>
<td>AFFR</td>
<td>8/19/2002</td>
<td>8/26/2002</td>
</tr>
<tr>
<td></td>
<td>CRBU 0-0465A Electrical Switch for The Lights</td>
<td>14712</td>
<td>AFFR</td>
<td>8/19/2002</td>
<td>8/26/2002</td>
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<tr>
<td></td>
<td>CRBU 0-0734 Chink Walls/Seal Hole/Bea Gate Set</td>
<td>14752</td>
<td>AFFR</td>
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<td>8/28/2002</td>
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<td>CRDD Never Summer Rocks Road Rest Room #2</td>
<td>12701</td>
<td>AFFR</td>
<td>8/30/2002</td>
<td>9/6/2002</td>
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</table>
Open Work Orders By Lead Craft [Detail]

Great National Park

Number of Workorders in this report: 18

Lead Craft: Boss, Big, Q
Selection Criteria: Location: ALL
Target Completion between: 10/1/1999 and 8/15/2002

Note: Requires valid values in the Park Alpha & Lead Craft fields on the WORKORDER.

Date Printed: 8/15/2002 11:05AM

Page 1 of 5

W/O#: 1007 - Maintain Culverts/Drainage Structures One-way Road
Location: 0001041 - One-Way Motor Road

Detailed Description of Work:
This WO is for culvert/drainage structure cleaning. The frequency for culvert cleaning is every 3 months. The park has 83 culverts that are to be maintained. There is a safety plan (#001) and a Job Plan (#000000101) and a PM (1001) associated with this WO.

Reported By: CTHOMPSON
Phone: Status: INFRG
Target Start Date: 11/30/2000
Estimated Hours: 0.0
Target Completion: 1/8/2001

W/O#: 1016 - Service for HVAC units for the visitor center
Location: 0001006 - VC Visitor Center

Detailed Description of Work:
Preventative maintenance for all HVAC units located in the Visitor Center.

Reported By: MAXTMAN
Phone: Status: APPR
Target Start Date: 6/11/2001
Estimated Hours: 0.0
# Resource Protection – Job Plans

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<td>9</td>
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</tr>
<tr>
<td>10</td>
<td>10</td>
<td>Conduct comprehensive inventory</td>
<td>10</td>
<td>Close tower to all until repairs are made.</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>20</td>
<td>Analyze need for protection and stabilization</td>
<td>20</td>
<td>Stabilize tower until repairs can be made.</td>
<td>20</td>
</tr>
<tr>
<td>12</td>
<td>30</td>
<td>Develop long term interpretive and management plans for preservation of museum items in</td>
<td>30</td>
<td>Minimize rodent intrusion</td>
<td>30</td>
</tr>
<tr>
<td>13</td>
<td>40</td>
<td>Maintain access road</td>
<td>40</td>
<td>Serve as COR and project manager for contract.</td>
<td>40</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>combined effort with park staff (GMF/CFP)</td>
<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>15</td>
<td>40</td>
<td>Prepare funding request (PMIS) for repair/rehab</td>
<td>40</td>
<td>Review interp plans and exhibits.</td>
<td>60</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>of tower with Resource Management staff.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>60</td>
<td>Review funding request for interp of fire tower and museum items.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>18</td>
<td></td>
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<td></td>
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<tr>
<td>21</td>
<td>INTERPRETATION</td>
<td></td>
<td>INTERPRETATION</td>
<td></td>
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<tr>
<td>22</td>
<td>60</td>
<td>Review files on Fire Tower history, construction</td>
<td>50</td>
<td>Help garner public support for the preservation</td>
<td>70</td>
</tr>
<tr>
<td>23</td>
<td>use photos, documentation, etc.</td>
<td>80</td>
<td>and restoration of tower and museum items</td>
<td>80</td>
<td>Prepare advisory notice for visitors the area around the tower is closed during repairs.</td>
</tr>
<tr>
<td>24</td>
<td>70</td>
<td>Develop long term interpretive and management</td>
<td>via information posted and updated on website.</td>
<td>80</td>
<td>Prepare advisory notice for visitors the area around the tower is closed during repairs.</td>
</tr>
<tr>
<td>25</td>
<td>plans for preservation of museum items in</td>
<td>90</td>
<td>Update website to include notice and status of repairs.</td>
<td></td>
<td></td>
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<tr>
<td>26</td>
<td>combined effort with park staff (GMF/CFP)</td>
<td></td>
<td></td>
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<tr>
<td>27</td>
<td>80</td>
<td>Prepare funding request (PMIS) for development</td>
<td>100</td>
<td>Work with Harper’s Ferry to prepare scope of work, review contractor’s submittals for exhibit</td>
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<tr>
<td>28</td>
<td>of interpretive displays and exhibits of fire tower</td>
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## Preventive Maintenance

### Job Plans

![Job Plan Interface](image)

### Jobplans Info

<table>
<thead>
<tr>
<th>Job Plan Number</th>
<th>Description</th>
<th>Frequency</th>
<th>Frequency Unit</th>
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</thead>
<tbody>
<tr>
<td>HC-018A</td>
<td>AIR COND SPLIT SYSTEM, DX, AIR COOLE</td>
<td>1</td>
<td>YEARS</td>
</tr>
<tr>
<td>HC-018Q</td>
<td>AIR COND SPLIT SYSTEM, DX, AIR COOLE</td>
<td>3</td>
<td>MONTHS</td>
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<tr>
<td>HC-019A</td>
<td>AIR COND SPLIT SYSTEM, DX, AIR COOLE</td>
<td>1</td>
<td>YEARS</td>
</tr>
<tr>
<td>HC-019Q</td>
<td>AIR COND SPLIT SYSTEM, DX, AIR COOLE</td>
<td>3</td>
<td>MONTHS</td>
</tr>
<tr>
<td>HC-020A</td>
<td>AIR HANDLING UNIT, 3 TONS TO 24 TONS</td>
<td>1</td>
<td>YEARS</td>
</tr>
<tr>
<td>HC-020Q</td>
<td>AIR HANDLING UNIT, 3 TONS TO 24 TONS</td>
<td>3</td>
<td>MONTHS</td>
</tr>
<tr>
<td>HC-021A</td>
<td>AIR HANDLING UNIT, 25 TONS TO 50 TON</td>
<td>1</td>
<td>YEARS</td>
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</table>
Blueprints and Drawings – Technical Information Center (TIC)
GIS & GPS

Park Facility Management Division
Handheld Technology

Reduce paper and data entry time.

Increase accuracy.
### Question 2a - Natural Resource Preservation for Asset Priority Index - API

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Description</th>
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<tr>
<td>1) Asset Status</td>
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<tr>
<td>2) Resource Preservation</td>
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<tr>
<td>a) Natural</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Cultural</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Visitor Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Park Operations</td>
<td></td>
<td></td>
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<tr>
<td>5) Asset Substitutability</td>
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</tr>
</tbody>
</table>

**Fundamental purpose of the asset is to preserve natural resource programs/study of science and/or the Park’s General Management Plan (1).**

- **High**
  - Asset plays a direct role in a park’s natural resource programs/study of science and/or the Park’s General Management Plan.

- **Medium**
  - Asset indirectly supports natural resource programs/study of science and/or the Park’s General Management Plan.
  - Asset that limits the impact of visitor use, damage, or that is important to the park or the region.

- **Low**
  - Asset that limits the impact of visitor use, damage, or that is important to the park or the region.
  - Where threats from visitor use cannot be avoided, the restoration and replacement of the asset will be required.

- **None**
  - No asset is required.

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*Park Facility Management Division*

*Facility Management Program*
Condition Assessment

• Web page for contractors
• Annual
• Comprehensive
Work Break Down Structure (WBS) Link

FMSS Data
- Asset-1111
- VisitorCenter
- Asset Type 4100 (building)

Equipment/Feature-2222
- Asset - 1111
- Asset Type 4100
- Component - Roof System - B30

RS Means Cost Data
- B Shell
- B30 Roof System
- B3010 Roof Covering
- B3010-060 Clay Tile
- B3020 Roof Drainage

Update screen shots
- Equipment/Feature-2223
  - Belongs to: 2222
  - Asset Type 4100
  - Component - Roof System - B30
  - Sub Component - Roof Covering - B3010

- Equipment/Feature-2224
  - Belongs to: 2222
  - Asset Type 4100
  - Component - Roof System - B30
  - Sub Component - Roof Drainage - B3020
The NPS Asset Management Approach has Achieved Significant Results

In just two years, many significant repair and rehabilitation projects have been implemented – enhancing visitor and employee safety and the park experience for all.

- Over 140 building rehabilitation projects implemented
- 60 fire suppression and safety projects completed
- 196 water, waste water and sewer systems upgraded and repaired
Many Park Assets Have Received Needed Repairs…
NPS is Making Great Strides in Building a Long-term Asset Management Program

- Implementing industry-leading COTS software as enabling technology
- Establishing an inventory and condition assessment on all assets
- Developing long-term and annual goals for deferred maintenance backlog reduction
- Increasing funding for condition assessments
- Tie into component renewal
- Life Cycle Management
Managing a Typical Asset Over a 50 Year Life Cycle is an Extraordinary Cost

Construction is just a small portion of the total life cycle cost.

<table>
<thead>
<tr>
<th>Life cycle costs</th>
<th>Y2000</th>
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<th>Y2002</th>
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<tr>
<td>70%</td>
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</table>

NPS owns and manages more than 60,000 assets!
For example, the Redwood Information Center is More Costly After the Initial Construction

Costs over 50-year life cycle

- Operational Maintenance $2,013,425
- Preventive / Recurring Maintenance $355,852
- Component Renewal $226,801
- Total life-cycle costs $2,596,078

The total life cycle costs of managing and sustaining the Redwood Information Center are 167% more than the replacement (or construction) cost.

- The Current Replacement Value of the Redwood information Center is $971,104.
Facility Management Program

Park Facility Management Division

Facility Condition

- Good
- Fair
- Poor

Scheduled Maintenance
Repair
Rehabilitation
Replacement

Time - Increasing Risk

Facility Life Cycle Curve with No Maintenance Performed


Application of Scheduled Maintenance
NPS is Leading the Public Sector by Implementing an Asset Management Program to Account for Life-cycle Costs

• NPS is building a robust asset management program to manage the life cycle of all of its assets.
  – Identify and assess the condition of all assets
  – Prioritize importance of assets according to park mission
  – Plan and execute needed maintenance based on need of repair and priority
  – Promote life-cycle asset management strategies

• NPS is using technology to implement the asset management program
The NPS Asset Management Program Will Assure a Positive Park Experience for All

- Asset management is a necessary element in enhancing the National Park experience.
- Maintaining park infrastructure is important for protecting park exploration.
  - Improvements in park facilities and infrastructure will enable park enjoyment for years to come.
  - The American public will have the opportunity to experience more areas of the parks as repair projects are completed.
Park Facility Management Division