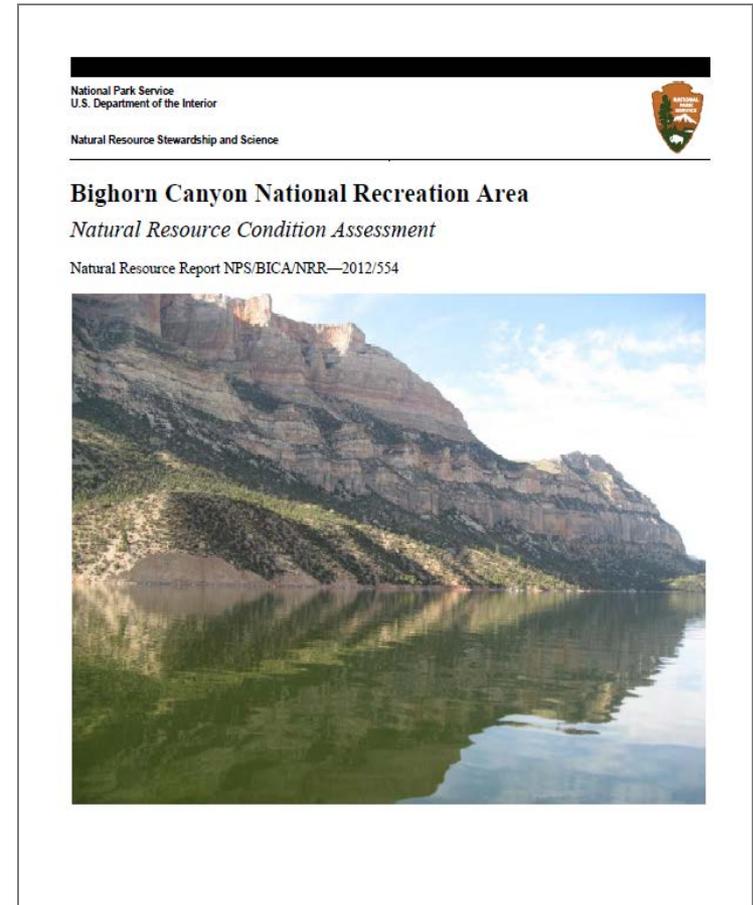


# SMU's Approach to NRCAs

What We've Found that Works

# Overview

- ▶ SMU approach to conducting NRCAs
  - Main steps in our process
- ▶ Various analyses and products
- ▶ Our insights on what creates a smoother process



# SMU NRCA Process

## Main Steps:

### 1. Project Scoping

- Conference calls with park and network staff
  - Begin discussions about important park resources
  - Plan park visit and on-site meetings
- Park visit – 2/3 day scoping workshop
  - Discuss key park resources (components) to be featured in NRCA
  - Framework development
  - Establish measures for assessment
  - Identify existing data sources
  - Field visit to view key resources
- Information exchange
  - Park and network share all relevant literature, data, and spatial files



# PAIS Draft Framework 12-20-2011

## Natural Resource Condition Assessment Framework

Component	Data Source	Measures (Significance Level)	Stressors	Reference Condition
<b>Biotic Composition</b>				
<b>Ecological Communities</b>				
Terrestrial Vegetative Communities	land classification, surficial geologic map, 2010 imagery, aerial photos of grazing	Native species richness (3), % coverage of grassland and dune veg (3), % of bare ground (3), extent of oak mott areas (3), presence vs. absence of non-native species (3)	Human disturbance (pedestrian/vehicle), altered fire regime, disease (insects/pests), drought, oil and gas exploration and development	Pre-intensive cattle ranching/grazing
Spoil Island Communities	<i>Potential data gap</i>	size of the islands (3), erosion and accretion rates (3), sediment composition (3), % of mineral earth (bare earth) (3), native species composition (veg.) (3), % vegetation cover (3)	predation, human disturbance, marine debris (hazmat), boat traffic and wakes (barges incl.), drought, excessive rainfall, oil and gas exploration and development, invasives (fire ants, plants)	Original spoil island as constructed by humans
Seagrass Community	Joe Meiman and network have completed recent work	Species composition (3), % cover (3), canopy height (3)	light attenuation, water transparency (similar to turbidity) water depth, total susp. Solids, chlorophyll A (more present results in more phyto plankton), physiochemical water quality parameters (DO, pH, Salinity, temp), nutrient loading in estuary	Undefined
<b>Birds</b>				
Colonial Waterbirds	surveys for 30+ years	Species abundance and diversity (3), species distribution (3), nesting success (3)	USACE maintenance (sediment) of rookery islands, potential wind farm development offshore, fire ants, human disturbance, predators, invasive plants	Undefined
Shorebirds (non-colonial)	shorebird monitoring (routine), piping plover ('05-'07)	Species abundance and diversity (3), species distribution (sediment determines feeding, site fidelity) (3), nesting success (fledgings per nesting pairs) (3)	erosion, human disturbance (pets off leash, recreational impacts - i.e. fishing line), predation, potential wind farm development offshore, oil spills, marine debris, predators, harmful algal blooms	Undefined
<b>Mammals</b>				
Small Mammals	Sm. Mammals Inventory (I&M)	distribution (3), density (3), species diversity and abundance (3)	invasive species, drought, oil and gas development/exploration, predation (raptors and coyotes), marine debris (hazmat)	Pre-grazing conditions
<b>Aquatics</b>				
Macroinvertebrates	Withers research (part of a bird project, looked at benthic community plots and density counts),.	distribution (3), density (3), species diversity and abundance (3)	Vehicle disturbance on dunes/beaches, flooding in wind blown tidal flats, chemical spills, algal blooms (red tide, brown tide), habitat loss, soil compaction, sea level rise, water quality and hydrology	Undefined
<b>Herptiles</b>				
Reptiles	Herp inventory, monitoring in parks in the future (maybe available for this nrca, fy12).	Species Abundance and diversity (3), species distribution (3), reproductive success (3), sex ratio (3)	flooding and salt-water innundation, erosion, human disturbance, vehicle strikes, chemical spills, hazmat, drought, predation, habitat loss, disease, oil and gas development/exploration	Pre-grazing/Undefined
Amphibians	Inventory Report	Species abundance and diversity (3), species distribution (3), reproductive success (3) age class structure (3)	flooding and salt-water innundation, erosion, human disturbance, vehicle strikes, chemical spills, hazmat, drought, predation, habitat loss, disease	Pre-grazing/Undefined
<b>Environmental Quality</b>				
Water Quality	WRD assessments, TCEQ, Joe Meiman	Dissolved oxygen (3), temperature (3), pH (3), salinity (3), turbidity (3), nutrients (3) (See Joe M for the suite of nutrients)	oil and gas exploration and development, boat traffic, dredging, spills, natural events (hurricanes - major innundations), depletion of seagrass, fish kills	Texas state water quality standards
Air Quality	University in CC, Naval base, NPS portable monitoring (OZONE)	OZONE (3), mercury (3), atmospheric dep. of N and S (3), particulate matter (3), visibility (3)	harmful algal blooms, power plants, oil and gas exploration and development, fires, vehicle emissions, fish kills	NAAQS, Texas state standards (TCEQ)
<b>Physical Characteristics</b>				
<b>Geologic &amp; Hydrologic</b>				
Coastal Dunes and Beaches	Actively collecting LIDAR data along TX coast (TX A&M CC, Gibeaut), NOAA sea level rise websites	shoreline position (3), dune position (3), sand volume (3), morphology parameters (from LIDAR) (3), elevation (3), <b>consult Gibeaut for measures</b>	Vehicle disturbance, dredging and dredge spoil, storm surges, loss of vegetation, human disturbance, marine debris, drought, oil spills, relative sea level rise, off shore sand mining (deprive shores of sediments), dams on rivers (restricting flow of sediment), proposed off shore wind farm	Undefined

# SMU NRCA Process

## 2. Inventory of park-provided information

- Analysts organize data/literature

## 3. Data & literature searches for additional sources

- Peer-reviewed literature search engines; outside resource experts
- Supplement park & network-provided info
- Ensuring all relevant information has been obtained

## 4. Review and synthesis of information for each resource

- Develop assessments for each component/resource
- Each serves as a stand alone document

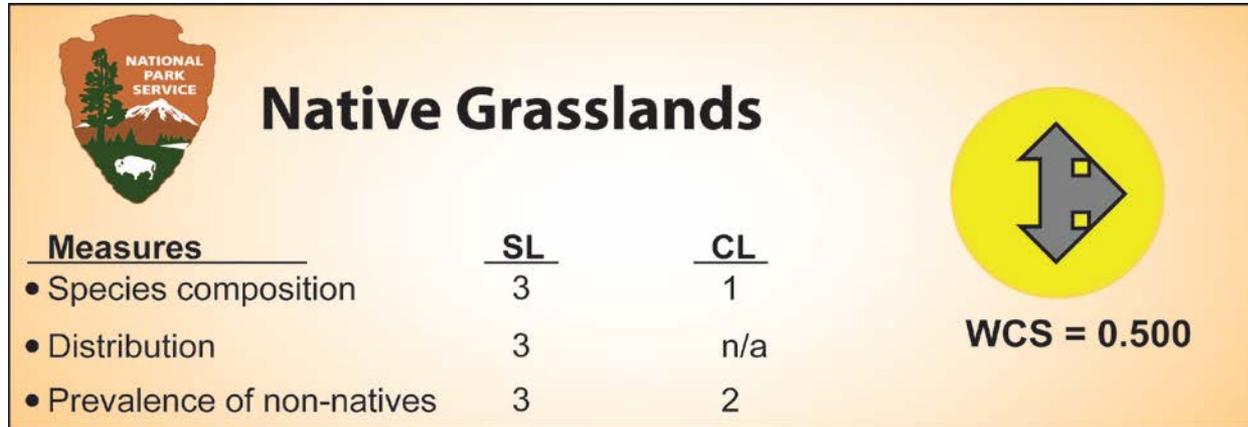
# SMU NRCA Process

## 5. Assessing current condition

*Based on:*

- Significance level (SL) of measures identified for each resource
  - How important a measure is in describing condition of a resource
  - 1-3 scale (low importance – high importance)
- Condition level (CL) of each measure based on existing evidence
  - Level of concern for the resource based on data and expert opinion
  - 0-3 scale (no concern – high concern)
- SL and CL computed to determine relative current condition
  - Weighted Condition Score (WCS)
- However, some parks prefer a qualitative discussion of current condition rather than a “calculated” representation
  - E.g., some Alaska projects

# Example Condition Graphic



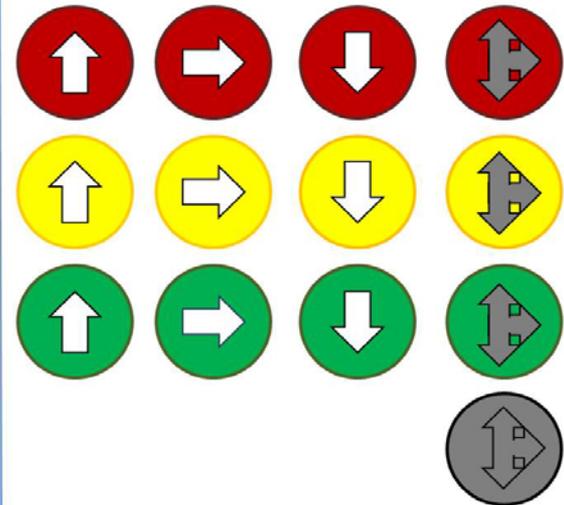
$$WCS = \frac{\sum_{i=1}^{\# \text{ of measures}} SL_i * CL_i}{3 * \sum_{i=1}^{\# \text{ of measures}} SL_i}$$

Significant Concern

Moderate Concern

Low Concern

Insufficient Data



Improving

Stable

Declining

Insufficient Data

TREND

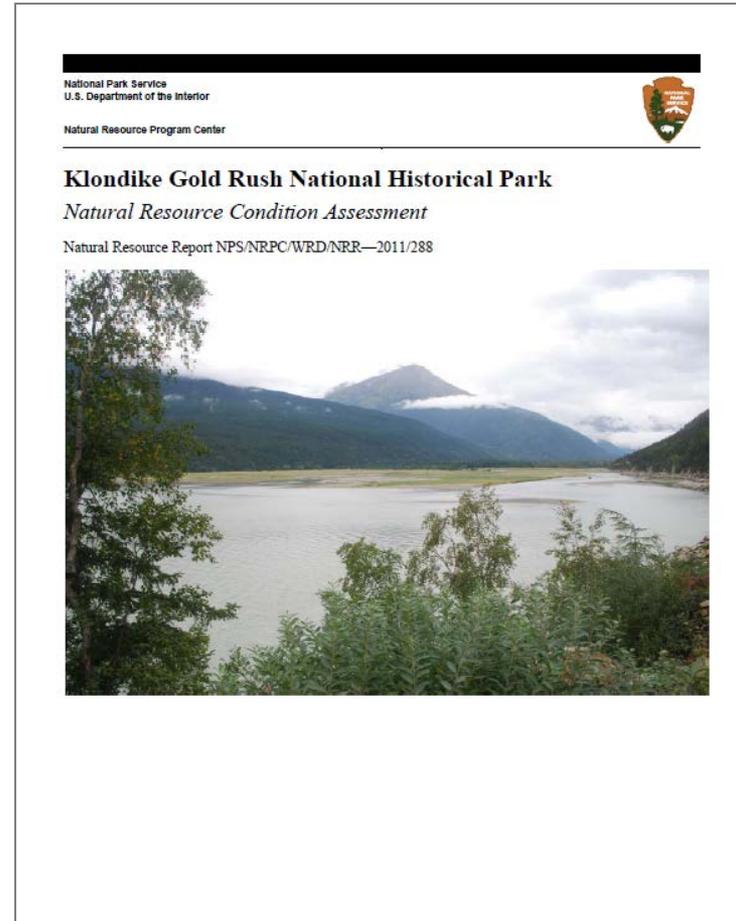
# SMU NRCA Process

## 6. Expert review of individual resource assessments

- Park review, network review, and outside expert review when appropriate
- Iterative review process of content, data interpretation, completeness, and condition designation.

## 7. Compilation of full draft report (Chapters 1-5)

- Soliciting park/network review of final report



# Resource Analyses and Products

- ▶ Geospatial and analytical products provided to parks
  - GIS dataset of all lakes from imagery (YUCH)
  - Viewshed analysis (BICA)
  - Erosion analysis (BICA)
  - Density analysis of juniper shrub community (BICA)
  - Mapping changes in vegetation communities over time (various parks)
  - Analysis of coastal change (1950 to 2005) and determination of potential beach landing sites (KEFJ)
- ▶ Condition assessment of key resources
- ▶ Overall summary and discussion within broader park context
  - Key data gaps
  - Component condition designations (*% of low concern vs. % of higher concern*)
  - Discussion of park-wide condition observations
    - Relationships among various park resources and their assessed conditions
    - How threats and stressors affect multiple components

# Condition Summary Table

Component	WCS	Condition
<b>Ecosystem Extent and Function</b>		
<i>Disturbance Regimes</i>		
Fire	0.333	
Wind and water erosion	N/A	
Flooding (Little Missouri)	0.666	
<b>Biological Composition</b>		
<i>Ecological communities</i>		
Native grasslands	0.500	
Juniper forests	N/A	
Floodplain forests	N/A	
Woody draws	0.500	
Upland shrubland communities	N/A	
Aquatic communities	N/A	
<i>Grazing animals</i>		
Prairie dogs	0*	

# Links to Published NRCAs

## All Reports: NPS Water Resources Completed NRCA Reports

<http://www.nature.nps.gov/water/nrca/reports.cfm>

### ▶ Published NRCAs by SMU:

- Bighorn Canyon National Recreation Area (BICA)
- Sitka National Historic Park (SITK)
- Yukon-Charley Rivers National Preserve (YUCH)
- Denali National Park and Preserve (DENA)
- Devils Tower National Monument (DETO)
- Jewel Cave National Monument (JECA)
- Klondike Gold Rush National Historic Park (KLGO)
- Missouri National Recreational River (MNRR)
- Wind Cave National Park (WICA)
- Wrangell-St. Elias National Park and Preserve (WRST)
- Knife River Indian Villages (KNRI) – *in press*
- Theodore Roosevelt National Park (THRO) – *in press*
- Fort Union Trading Post (FOUS) – *in press*

### ▶ NRCAs in progress:

- Guadalupe Mountains National Park (GUMO)
- Big Bend National Park (BIBE)
- Padre Island National Seashore (PAIS)
- Palo Alto National Historic Park (PAAL)
- Aniakchak National Monument and Preserve (ANIA)
- Katmai National Park and Preserve (KATM)
- Alagnak Wild River (ALAG)
- Lake Clark National Park and Preserve (LACL)
- Kenai Fjords National Park (KEFJ)

# What We've Found that Works Well

- ▶ In-depth, documented scoping process
  - Series of conference calls
  - 2-3 day on-site visit and discussions
  - Clearly defining relevant components, associated measures, reference conditions, experts on resources
  - Understand upfront park needs and management priorities
  - All documented in a Detailed Scope of Work document
  
- ▶ Recognizing that each park is unique, having different needs
  - Adaptable approach to accommodate individual park needs
    - Ex: BICA's mandate as a national recreation area
      - Component assessing visitor experience as affected by surface water hydrology
  - Ultimately, NRCA is for park benefit and use; strive to tailor project to be most useful/insightful for park managers

# What We've Found that Works Well

- ▶ Clearly outline roles and responsibilities of all involved
  - Park/network staff encouraged to be active in project development
  - Examples of NPS roles/responsibilities:
    - Liaisons for communication with outside experts
    - Connecting SMU analysts to wider range of information resources including NPS internal data/information
    - Participating in thoughtful review of resource assessments and full report
- ▶ Consistent, open, active communication
  - With NPS personnel and outside experts throughout the project
  - Anticipate any challenges before they become problems
  - Stay attuned to park needs and expectations

# Thank You!

We welcome any questions or comments  
from the group for discussion!

For more information  
regarding NRCAs, please  
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