



Assateague Island National Seashore

Established in 1965

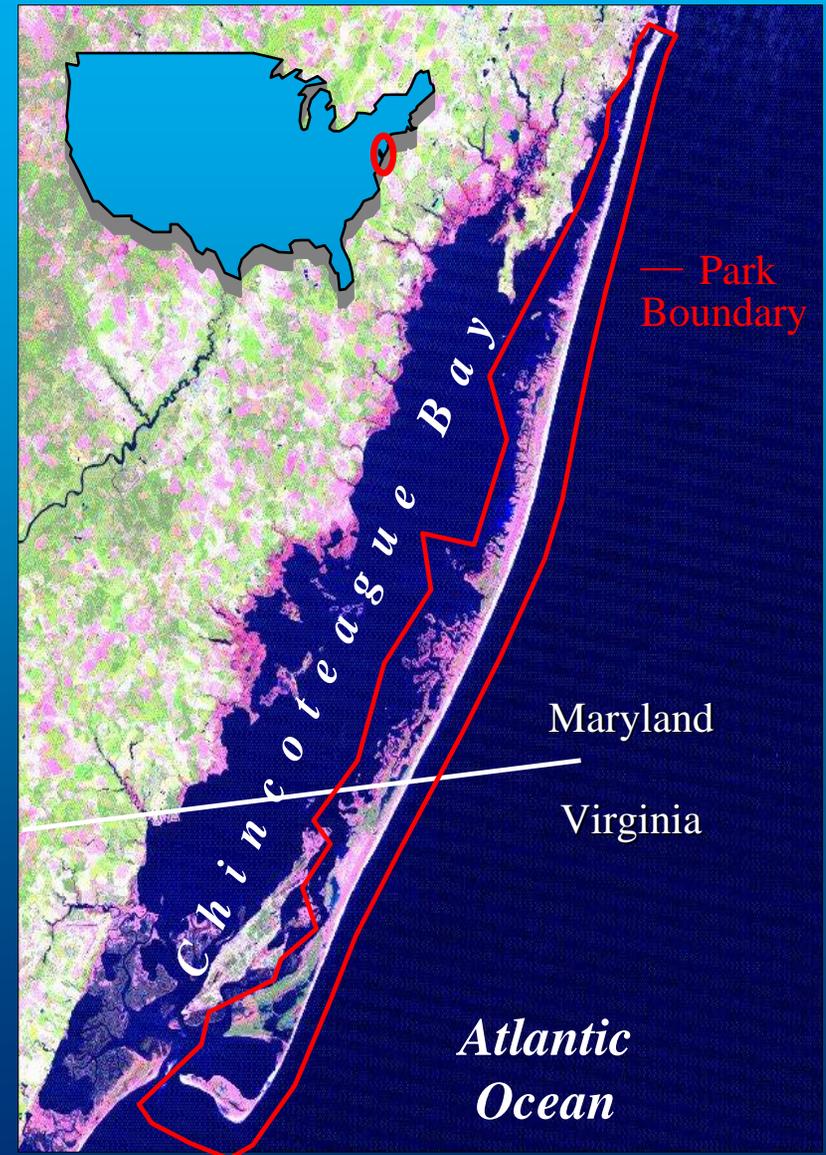
...to preserve the outstanding Mid-Atlantic coastal resources and natural ecosystem conditions and processes upon which they depend while providing high quality resource-compatible recreational opportunities.



Assateague Island



- Three agencies with differing missions manage parts of Assateague Island
 - National Park Service
 - US Fish and Wildlife Service
 - State of Maryland
- 57 km long; varies from less than 1 km to nearly 4 km wide
- Approximately 19,700 hectares
 - 7,000 hectares land
 - 12,700 hectares water



Assateague Island National Seashore



Scenario Planning and Climate Change Response



- **Overview of Scenario Planning**
- **Climate Change Scenario Planning at ASIS**
 - Context for Planning
 - Planning Process
 - Results & Findings
- **Application of Scenario Planning**
 - General Management Plan
 - Climate Change Response
- **Conclusions**

Scenario Planning



- **Pioneered by Shell and used to successfully navigate 1970s crisis**
- **Refined and applied by Global Business Network**
- **Widely utilized by business, government agencies, and NGOs**

Environmental Protection Agency

Packard Foundation

World Bank

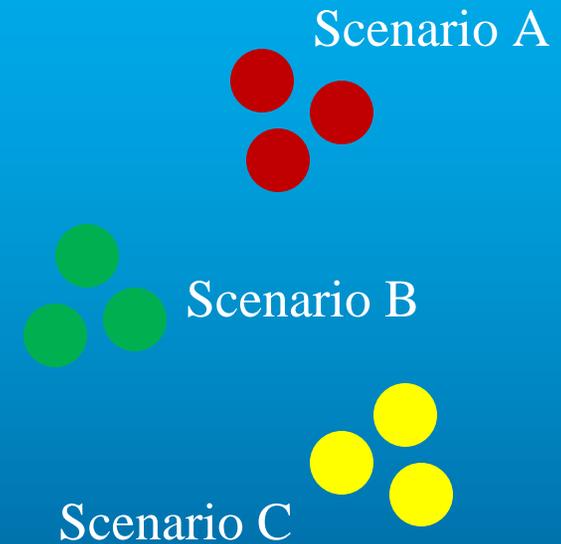
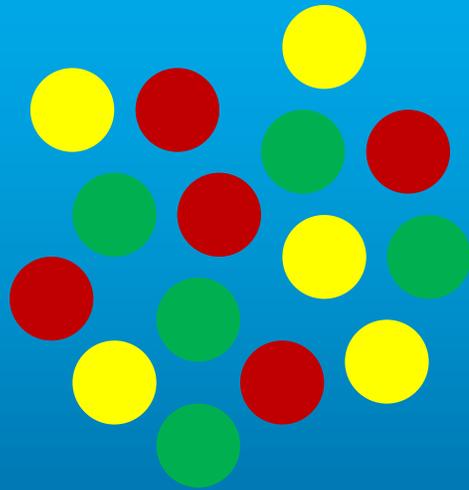
Microsoft

Nissan

AT&T



Scenario Planning



Observed trends & events can be overwhelming, seemingly conflicting, and even paralyzing when taken one by one.

Scenarios help relate and cluster these trends and events into broad patterns and organize them into logical frameworks

Scenario Planning



“A scenario is a coherent, internally consistent and plausible description of a possible future state of the world. It is not a forecast; rather, each scenario is one alternative image of how the future can unfold.”

-- IPCC, 2006

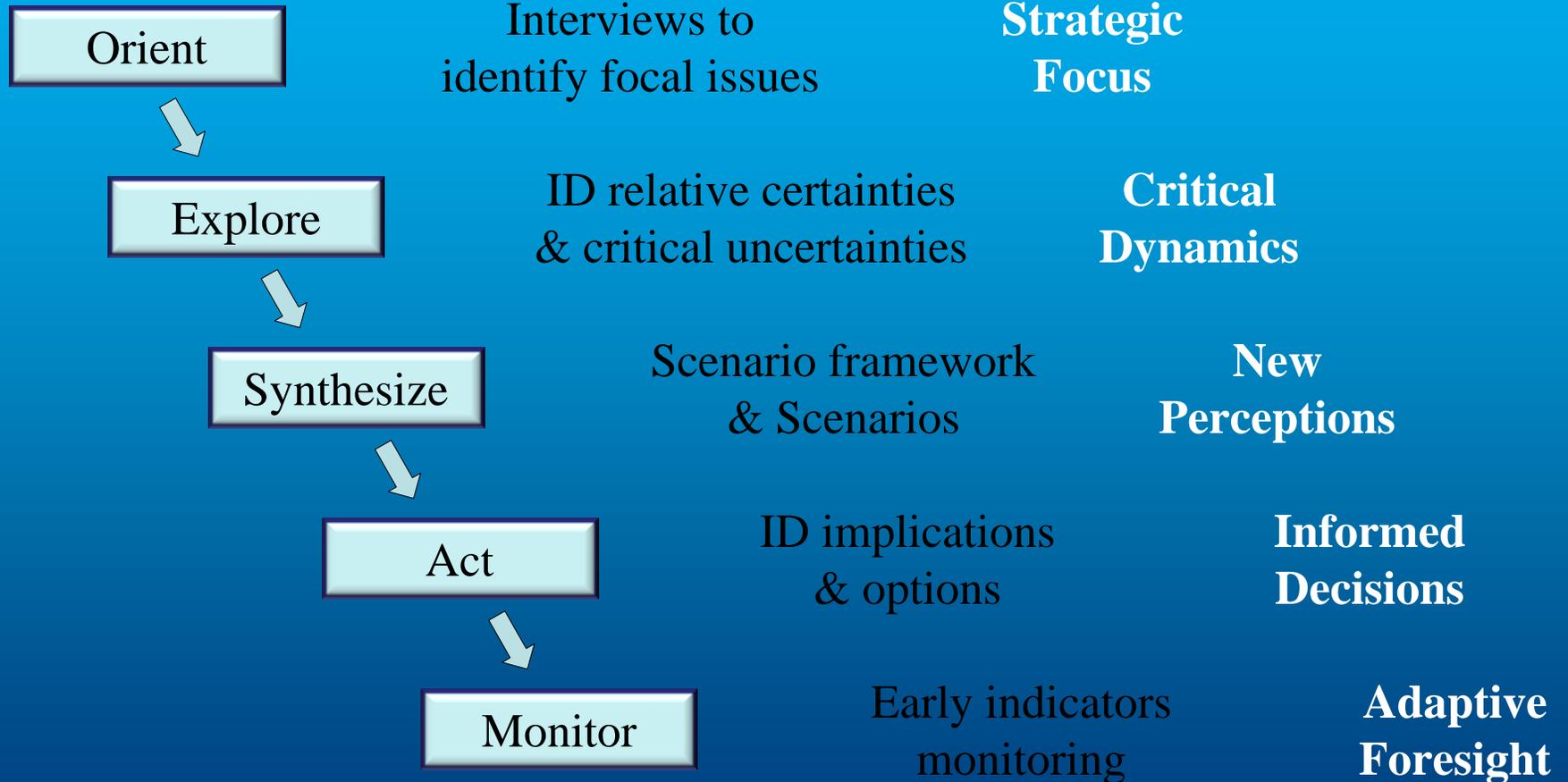
Scenarios

- Focus on uncertainties
- Clarify risks
- Logical pictures of the future
- Encourage flexibility

Forecasts

- Reinforce certainty
- Conceal risks
- Single-point linear projections
- Foster inertia

Scenario Planning



Climate Change Scenario Planning at ASIS



Why Assateague ?

- **Initiating General Management Plan revision**
- **Vulnerable to global climate change**
 - Coastal barrier ecosystem
 - Mid-Atlantic location
- **Good information base**
 - Geomorphic change
 - Habitat dynamics
 - Species response
- **Existing Challenges**



ASIS Scenario Planning Process



Core Team Orientation

Convene Core Team

Introduction to Scenario Planning

High-level Climate Change scenarios

Discovery Phase

Collect relevant scientific info

Identify potential stressors & impacts

Synthesis of findings for workshop

Planning Workshop

Presentation of high level CC scenarios

Identify and describe climate scenarios

Consider dynamics and implications

Findings & Report

Reflections, insights, and potential next steps

Core Team Orientation



Factors influencing the social and political landscape

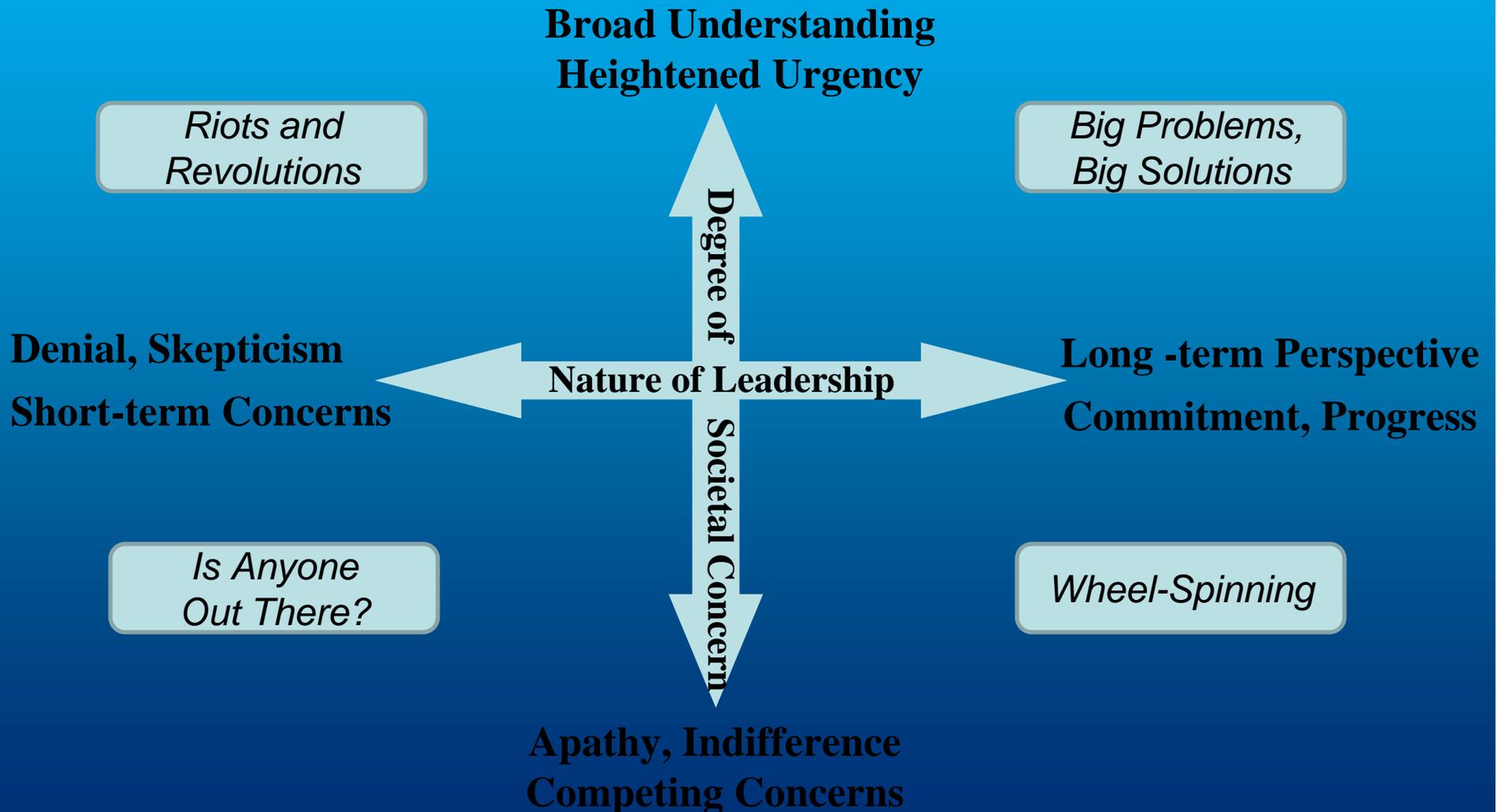
- Leadership
- Mood/position of Administration
- Public reaction to rates of climate change
- Degree of cooperation between agencies, sectors
- Intensity of impacts on the average American
- Degree to which climate change is/becomes a partisan issue
- The public's sense of their ability to make a difference
- Societal concern about the fate of natural systems



Core Team Orientation



The Bigger Picture



Discovery Phase



Climate Drivers - *Temperature*

General Change Expected:

Increase in temperature, but not uniform

Increase in warm events / decrease in cold events

Rate of Change Expected & Reference Period:

1.0 to 1.9 °C (1.8 to 3.5 °F) increase by 2040

Size of Expected Change Relative to Recent Changes:

Moderate to Large

Synoptic Signs:

Trend to milder winters with lengthening period of above freezing temperatures

Increase in frequency of thaws in winter as seen by emergence of subtropical high

Confidence:

Virtually certain that temperature will increase; predictions for rate and magnitude vary, but consistently call for an ecologically significant rise in temperature

Discovery Phase



Potential Resource Impacts

<i>ESTUARINE ECOSYSTEMS</i>		
Sector	Specifics	Impacts
Native Flora	Salt marsh	<ul style="list-style-type: none"> • Upland shift or loss due to inundation from SLR, increased coastal flooding, storm surge, and/or changes in hydrology • Species shifts from hydrologic, salinity changes
	Sea grasses	<ul style="list-style-type: none"> • Die-outs or shifts in latitudinal range due to increase in water temperature • Increased potential for disease • Increased turbidity from sediment run-off during intense rainfall events
	algae	<ul style="list-style-type: none"> • May outcompete SAV with increased temperatures and nutrients from more runoff
	species range/presence	<ul style="list-style-type: none"> • Shifts due to increase in air and water temperature and summer heat index, greater swings in seasonal precipitation, and increased coastal flooding • Habitat loss from SLR driven inundation
Hydrology	freshwater inflow; number and type of inlets; bathymetry	<ul style="list-style-type: none"> • Altered tidal ranges from new inlets • Increased / decreased salinity in estuary • Altered currents and rates of flushing

Scenario Planning Workshop



Moving Target

- Episodic change by wave-driven washover
- Island size decreases while estuarine & marine area increases
- Recurring Infrastructure impacts

Sand Bar

- Rapid rate of geomorphic change
- Inlet formation / fragmentation
- Habitat simplification and loss of biodiversity
- Infrastructure not possible

More Intense

Storm

Low / Moderate

Sea Level Rise

Significant

Shifting Sands

- Similar to today's dynamic environment, but with increased stress
- Terrestrial and aquatic habitats relatively stable

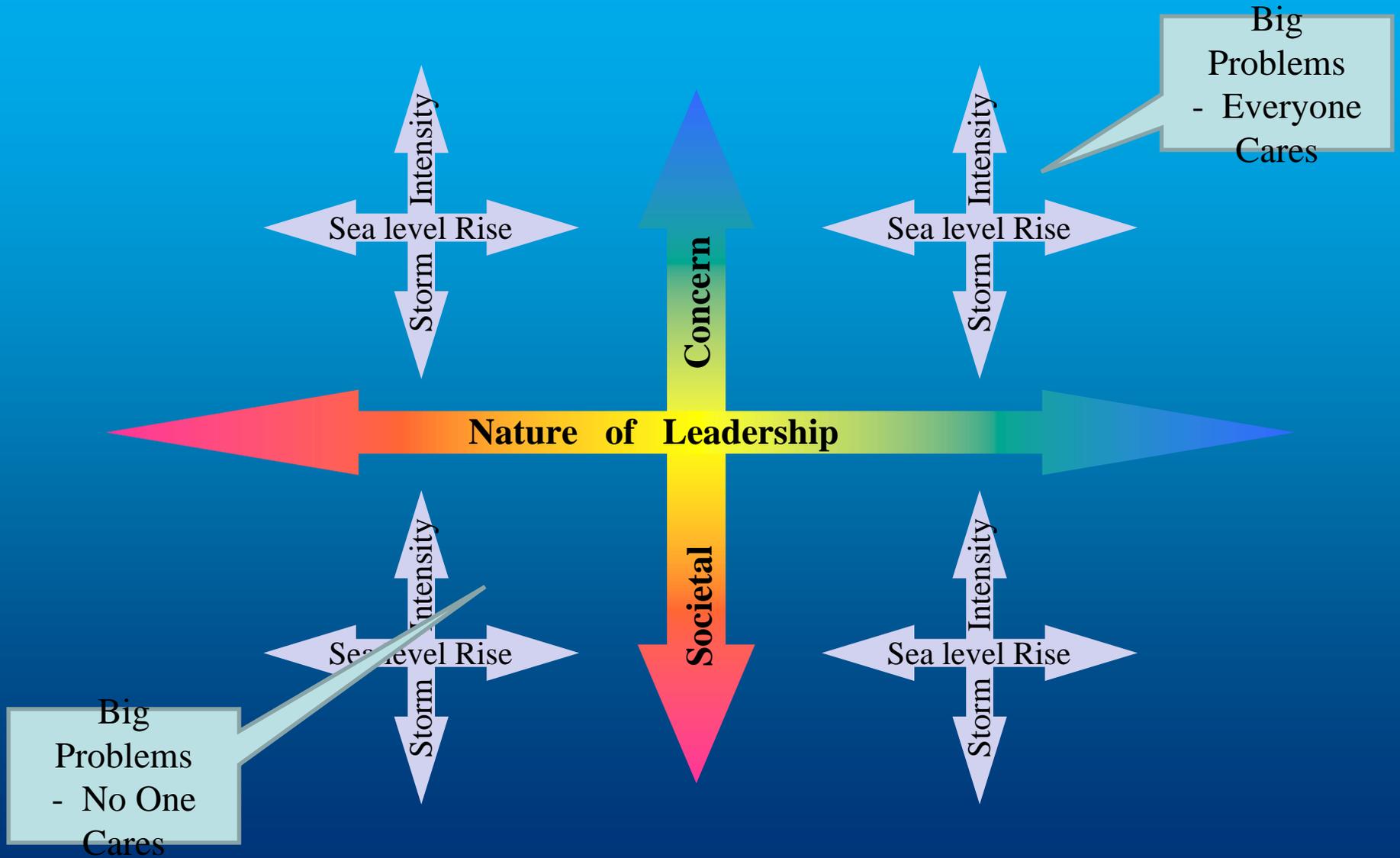
Drowning Island

- Loss of land mass from SLR
- Individual storm events "reset" landscape
- Recovery of system between extreme events likely

Intensity

Less Intense

Scenario Planning Workshop



Scenario Planning Workshop



High Level Scenario

Big Problems, Big Solutions

Local Scenario

Sand Bar

“Sand Bar” is a world where climate change concerns are at the forefront of social and political conversations, and where significant action is possible. ASIS is subject to more intense storms, coupled with significant rises in sea-level – a combination that leads to dramatic changes in resources, land use, visitor experiences, and recreational opportunities.

Opportunities for Continued Exploration

- Resource Changes
- Land Use Changes
- Visitor Access and Experience
- Research and monitoring
- Staff Expertise and Training
- Communication and Outreach

Application of Scenario Planning



Resiliency

- Changes to infrastructure - moveable, consolidated, and innovative
- Sediment supply to mitigate jetty impacts; potential need to augment salt marsh
- Easements, land exchanges, new boundaries may be needed to protect/replace resources
- Continue efforts to reduce existing stressors
- Continue to protect critical habitats

Capacity Building

- Collaborate with state, federal, and local partners in infrastructure development & public education and outreach
- Develop necessary specialized expertise
- Landscape/regional approaches to habitat conservation
- Educate and train park staff

Research and Study

- Freshwater systems; maritime forest
- Stressors and vulnerabilities of ecosystem
- Ecological integrity and resiliency
- Adaptation strategies
- Social science – visitors and changing uses
- Geomorphic response to sea level rise and more intense storms

Indicator Monitoring

- Relative sea level rise
- Island geomorphology
- Species richness
- Fresh surface and ground water
- Landscape level change
- Migration phenology

Application of Scenario Planning



Create a Shared Context

- Provide park staff with a shared context for thinking about climate change
- Stimulate discussion and creative thinking
- Recognize the impacts on all park operations
- Incorporate climate change into all park planning



Application of Scenario Planning



Support of General Management Planning

- Help develop and assess alternatives that consider changing climate
- Support the development of a flexible and adaptive management framework
- Help integrate consideration of societal realities
- Provide a shared context for considering climate change by planning team
- Facilitate a coordinated, regional approach to park management
- Help develop communication tools to get public buy-in for alternatives



Application of Scenario Planning



Provide Context for Infrastructure and Transportation

Most scenarios suggest a much more dynamic physical environment

- Clear need for a less ‘place-based’ approach to infrastructure
- Tradition methods of access are unlikely to be sustainable
- Plan for compatibility with coastal processes



Application of Scenario Planning



Identify Vulnerabilities and Enhance Resiliency

Certain resources stood out as being highly vulnerable under multiple scenarios

- Salt marsh
- Fresh surface and ground water
- Maritime forest



Application of Scenario Planning



Assess Visitor Use and Experience

Accelerated landscape dynamics suggested by scenarios will alter public use and experience

- More difficult and limited access
- Reduced opportunities for traditional recreational activities
- Potential for decreased visitation... and revenue



Application of Scenario Planning



Identify Research and Monitoring Gaps

Scenarios can help assess the adequacy of existing knowledge and monitoring systems and help identify priority information needs

- Predictive and probabilistic models for coastal change
- Improved understanding of species and habitats at risk
- Early warning indicators



Application of Scenario Planning



Enhance Public Education and Outreach

Scenarios create compelling stories with local context for communicating with the public about climate change

- Context for discussing GMP alternatives
- Basis for new visitor center exhibits
- Insights for developing climate change communication strategies





In Summary...



Special Thanks to Leigh Welling, the USGS, Courtney Schupp, and
Global Business Network

U.S. Department of the Interior
National Park Service

Assateague Island National Seashore

