Resilience and Adaptation to Climate Risks Workshop: Stennis Space Center Area

Breakout Session #1

October 16-18, 2012

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Resilience and Adaptation to Climate Risks Workshop:
Stennis Space Center Area

Tuesday

1. Conduct inventory of systems & assets
2. Identify current and future climate hazards
3. Characterize risk of climate on systems & assets
4. Develop initial adaptation strategies
5. Identify implementation approaches & funding
6. Identify opportunities for partnership & coordination
7. Integrate into management and planning
8. Monitor and reassess

Wednesday

Thursday

Breakout Session #1

Breakout Session #2

Breakout Session #3
Breakout Session Tools

Breakout Session Guide
- Tasks, deliverables, time allocated
- Reference tables
- Report back guidance

Resources
- Facilitators
- System leads and Scribes
- Subject matter experts ---- EACH OTHER ----
- Templates
- Flip charts
- Report back PowerPoint templates
Activities & Deliverables

This afternoon ....

• Take information on mission, systems and assets
• Apply current and future climate hazard knowledge
• **Characterize risk of climate change on systems and assets**
• **Deliverables**: Completed templates for multiple assets. Information to be used in Breakout Session #2.

**Breakout Groups:**
- Built Systems
- People / Community Systems
- Natural Resource Systems

**WEDNESDAY AM**
Report Back: Potential climate impacts on system and assets
Take Systems / Asset / Capability

Built
- Test Stands
- Fleet
- Canal system
- Bridge system
- Horizontal infrastructure

Natural Resources
- Waterways (surface & storm water systems)
- Soil and groundwater
- Landscaped Grounds
- Wooded & Natural
- Archaeology
- Wildlife
- Air
- Landfill
- AST/UST
- Clean up sites
- Energy management

People / Community
- SSC civil servants
- SSC contractor team
- SSC provided services
  - Health & Safety
  - Emergency Response & Management
  - Security
  - Communications
- Family
- Community

Emergency Operations Center
- Medical clinic
- Fire department
- Security
- EMCS
- Incident command post and emergency operations center
Review and Use Climate Handout

2. Identify current and future climate hazards

The Climate Science Context

Scientists have collected weather and climate data and indicators of longer-term climate patterns (such as sea cores and tree rings) from the entire globe. Based on analyses of these data, plus a growing understanding of physical processes that control climate, scientists have developed sophisticated models that project future climate changes. Many climate models project that climate change will accelerate this century. The US Global Change Research Program’s expert summaries these results at http://www.globalchange.gov/publications/reports/scientific-assessments/as-impacts. NASA climate scientists are an important part of this international research effort. NASA is a key player in modeling climate variables and collecting both earth-based and space-based data used to develop and validate climate models and identify climate impacts.

Sternini Area Climate and Weather Today

The climate at Sternini Space Center and its surrounding area is classified as humid subtropical. Average temperatures in the area range from around 49°F in January to about 82°F in July. Annual precipitation is about 64 inches and is relatively evenly distributed throughout the year. Local weather hazards that affect the center include hurricanes and thunderstorms. Several hurricanes affected Sternini operations in recent history – Betsy in 1965, Camille in 1969, and Katrina in 2005.

Future Climate Projections

Based on local temperature and sea level records, scientists from NASA’s Goddard Institute for Space Studies adjusted regional climate models to make projections more specific and useful for Sternini. This “downscaling” process can provide a more precise projection for a specific location (in this case, the Sternini Space Center area) than modeling for an entire region, such as the southern U.S. Using these models, scientists project higher average annual temperatures and rising average sea levels for the Sternini area. While little change is expected in average annual precipitation, storms may be more intense, leading to increased risks of flooding.

The Case for Adaptation

Because of its location on the Gulf Coast, sea level rise and storm surge may be the biggest threats to SSC. The area has always been subject to hurricanes, and the associated high winds and flooding. The combination of rising sea level and severe storms could produce catastrophic impacts on SSC, and the surrounding high profile infrastructure assets, human capital, and natural resources. Land subsidence in the area worsens the impacts of rising seas and storm surges. Projected changes in the frequency of some extreme events like hot and cold days (see tables below) may also lead to large impacts. Most people are likely to notice the impacts of extreme events — more heat waves, more downpours, more flooding — rather than the gradual rise in average annual temperatures and sea levels. The Center’s future is intricately connected with broader social, economic, and environmental trends expected throughout the region, so SSC stewards developing adaptation strategies will also need to work together with regional decision-makers on the Gulf Coast.

A Note on Interpreting Climate Projections

Model projections suggest a significant and progressive long-term warming trend for the Sternini area, but they cannot provide an exact temperature for a future date. For example, while it is inappropriate to assert that the average temperature at SSC will be 70°F in 2043, it is appropriate to say that between 2040 and 2070, temperatures may increase 2.5 to 4.5 degrees above the average baseline temperature.

<table>
<thead>
<tr>
<th>Temperature and precipitation projections reflect a 20-year average centered on the specified decade, sea levels are averages for the specific decade. Data for 1971-2000 from Waliser and Protopopov. MS provide a baseline for Temperature (66°F) and for Annual Precipitation (64.3 inches). Sea level data are for Waliser. Temperature projections are rounded to the nearest half degree, precipitation projections are to the nearest 5%, and sea level rise to the nearest inch. Shown are the central range values ± 2.5% of the rainfall across the GCMs and GHG emissions scenarios. Data are from the NASA-NOAA National Climatic Data Center.</th>
<th>Qualitative Changes in Extreme Events During This Century</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event</td>
<td>Direction of Change</td>
</tr>
<tr>
<td>Hot Days</td>
<td>↑</td>
</tr>
<tr>
<td>Intense Precipitation</td>
<td>↑</td>
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<tr>
<td>River Flooding</td>
<td>↑</td>
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<tr>
<td>Drought</td>
<td>↑</td>
</tr>
<tr>
<td>Intense Winds</td>
<td>↑</td>
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<tr>
<td>Based on global-climate model simulations, published literature, and expert judgment</td>
<td></td>
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</tbody>
</table>
For each relevant climate variable (e.g., sea level rise, storm surge, temperature)......

Describe climate variable impact on asset
- Current
- 2020s
- 2050s
- 2080s

Remember: 30 yr average centered on decade; e.g., 2050s represents 2040-2069

What are the current actions/work arounds?

Current management status?

Document your answers on the Template
Don’t Forget About Thresholds


C Rosenzweig & W D Solecki (eds.) (2001 (July)) Climate Change and a Global City: The Potential Consequences of Climate Variability and Change
Don’t Forget About Thresholds

American Pika
(Ochotona princeps)

78 degrees

$T = \text{temperature}$

$N = \text{number of Pika}$

Express (publication of the, The Washington Post) 7 May 2009, page 4

Rapid-Response Climate Assessment to Support the FWS Status Review of the American Pika

Andrea J. Bay, Joseph F. Barnes, Klaus Wolter, and Jon Eischeid

NSA Earth System Research Laboratory, University of Colorado at Boulder, Cooperative Institute for Research in Environmental Sciences

January 29, 2010
Determine “Type of Response”

“Watch”
“Evaluate Further / Develop Strategy”
“Develop Strategy”

Even “watch” could have activities that need to happen – e.g., monitoring
Report Back Guidance

- Give yourself enough time to prepare your System group for the brief back
- 10 - 15 minute presentation from each system
- **Focus on:**
  - **Summary** of main climate hazards
  - **Examples** of impacts, current work-arounds, etc.
  - What **plans** or **processes** were identified?
  - **Summary** of types of response.
  - **System Owner**: how will you continue the risk characterization process going forward?

Please hold on to all of the templates completed or drafted in your breakout group. They will be used in Breakout Session #2.
Registration Breakdown

- **Built Systems** (e.g., facility maintenance/operations, facility users or managers, utilities/energy/water managers or users, equipment owners) - 28%

- **Mission and Mission Support/Management** (e.g., science, engineering, research, program management, strategic planning) - 18%

- **Natural Resources** (e.g., environmental compliance, natural resources management/maintenance/use, wetlands management) - 17%

- **People/Community** (e.g., worker safety/health, emergency planning/response, human resource management, communications) - 37%
<table>
<thead>
<tr>
<th>People / Community</th>
<th>Natural Resources</th>
<th>Built</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Owner</strong></td>
<td>Ron Magee</td>
<td>David Lorance</td>
</tr>
<tr>
<td><strong>System Scribe</strong></td>
<td>Jeannie Frederick</td>
<td>Kelly Boyd</td>
</tr>
<tr>
<td><strong>Facilitator</strong></td>
<td>Erik Tucker</td>
<td>Kim Gotwals</td>
</tr>
<tr>
<td><strong>Climate Science Rep</strong></td>
<td>Cynthia Rosenzweig</td>
<td>Radley Horton</td>
</tr>
<tr>
<td><strong>Climate Variable and Asset in 1st Breakout Session</strong></td>
<td>Temperature changes (e.g., heat stress) on outdoor work</td>
<td>Precipitation changes on pine trees (acoustical buffer) – e.g., drought, invasive species, etc.</td>
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