

# Building a Climate Resilient National Capital Region

## Resilience and Adaptation to Climate Risks Workbook

This Workbook is provided as a Reference Document for those organizations participating in the *Building a Climate Resilient National Capital Region* webinars and workshops taking place during 2013-2014.

The Workbook outlines the 8-step process utilized by both NASA and GSA during their respective workshop activities, which can be executed outside of a formal workshop setting.

The Workbook comprises several documents:

- PDF containing:
  - A. Characterize Risk of Climate Variables on Systems / Assets / Capabilities section
  - B. Develop Potential Adaptation Strategies section
  - C. Integration & Implementation Approaches section
  - D. Excel Spreadsheet used to document information from Section A – Characterize Risk
  - E. Example - completed Characterize Risk spreadsheet
  - F. Excel Spreadsheet used to document information from Section B – Adaptation Strategies
  - G. Example - completed Adaptation Strategies spreadsheet
  - H. Word document used to document information from Section C – Integration
  - I. Examples – completed Integration documents
- Excel spreadsheets for Sections A and B
- Word document for Section C



# Resilience and Adaptation to Climate Risks

## WORKBOOK

### A. Characterize Risk of Climate Variables on Systems / Assets / Capabilities

**Task:** Learn how to characterize the risk of climate variables (e.g., sea level rise or increasing temperatures) on selected subsystems, assets or capabilities using the information provided in the climate handout and workshop presentations. Please note that you are NOT “fixing” the impact on this step, just describing it.

**Deliverables:** Completed templates for multiple assets.

1. Conduct inventory of systems & assets

#### Step 1 – Conduct inventory of systems & assets

- Choose the subsystems and assets to be discussed
- Determine areas of expertise needed to have meaningful discussion

2. Identify current and future climate hazards

#### Step 2 – Identify current and future climate hazards

- Review the historic, current, and projected climate variables

3. Characterize risk of climate on systems & assets

#### Step 3 - Characterize risk of climate variables on systems and assets

- Start with **one subsystem or asset** and **one climate variable**
- Use the **Template Guidance** and **tables** that follow
- Document answers on the template (one asset per template)
- Separate into smaller groups to address multiple assets

#### ===== TEMPLATE GUIDANCE – CHARACTERIZE RISK =====

**Overarching System** [built, natural resource, people/community]

**Subsystem / Asset / Capability** [e.g., resource, structure, chillers, access roads, wetlands, underground IT conduit, endangered bird species, ability to recruit work force, ability to communicate during emergencies, network, animal, plant, ability to work outdoors, service to employees]

**Useful Life** [if built, in years]

**Climate Variable** [e.g., sea level rise, temperature, precipitation changes, storm surge, etc. You may choose to represent the climate variables in a different way – e.g., increasing temperatures can be represented by high heat days or a heat wave; changing precipitation as heavy downpours, etc.]

You are trying to determine which climate variable impacts your asset the most? Which impacts your asset the least? Is there a combination of climate variables that could impact your capability?]

**Note: each climate variable should be addressed separately, if possible, for each subsystem or asset**

**Diagram of Climate Variable Impact on Asset [flow chart / diagram]**

Using the space provided, diagram or create a flow chart that depicts **how** the climate variable impacts the asset / capability. An asset / capability can be impacted in multiple ways by a single climate variable. For example, a heavy downpour can lead to different types of flooding depending upon the location and vulnerability of the asset / capability. What happens? What does the climate variable cause? How does it affect the activities that rely on the asset / capability?

**Description of Climate Variable Impact on Asset [TEXT]**

**Current** Describe impact of climate variable on asset / capability. For example:

- a) Specific event, if relevant
- b) Impact
- c) Consequence
- d) Threats that arose
- e) Opportunities that arose
- f) Was or is there a critical threshold?

**Note: you may choose to continue across the template row through “Type of Response” column and then return to evaluate impacts in future timeframes and follow the template across**

**2020s**<sup>1</sup> [what might the impact be during this timeframe?]

**2050s** [what might the impact during this timeframe?]

**2080s** [what might the impact during this timeframe?]

In answering questions about future impacts, assume that NO adaptation strategies have been implemented.

**Critical Threshold of Asset [# or TEXT]**

Document whether there is a critical point at which the system or asset is directly or indirectly affected by changes in climate hazards (e.g., temperature or precipitation).

- Particular temperature or elevation threshold (e.g., physical or biological factors, design standards, operational capacity)
- Specific climate change impacts (e.g., sea level rise exceeding a levee height, increased water temperature impacting a species)

**Existing Adaptation Actions to Mitigate Climate Impact on Asset [TEXT]**

Describe current actions/work-arounds being taken to address the climate impact. Is the loss of this asset acceptable? Are there alternatives to using this asset? If so, what are they? Can this activity be performed elsewhere? If so, where?

**Current Management Status [TEXT]**

Is this asset and/or climate impact currently described or managed in a plan? If so, which one? Which organization is responsible for managing or taking action?

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<sup>1</sup> 30-year average centered on the specified decade; e.g., 2050s represents 2040 to 2069.

===== TEMPLATE GUIDANCE – CHARACTERIZE RISK continued =====

**Likelihood of Climate Impact Occurrence [RATING – Low, Moderate or High Likelihood, Virtually Certain/Already Occurring]**

“Likelihood of occurrence” is defined as the likelihood that a given climate variable (e.g., temperature rise) will impact a system or asset (e.g., flooding of airfield), assuming that NO adaptation strategies have been implemented. **Please note that this is NOT a question about whether the climate will change; it’s a question about the likelihood of the IMPACT occurring.**

Likelihood of Climate Impact Occurrence	
Rating	Definition
Low likelihood	Low likelihood of the impact occurring to the system or asset
Moderate likelihood	Moderate likelihood, with some uncertainty remaining, that the impact will occur to the system or asset
High likelihood	High likelihood of the impact occurring to the system or asset
Virtually certain/already occurring	Nearly certain likelihood of a climate variable impact occurring to the system or asset (e.g. increased temperatures by the end of the century will increase stress on HVAC systems) and/or climate variable may already be impacting system or asset

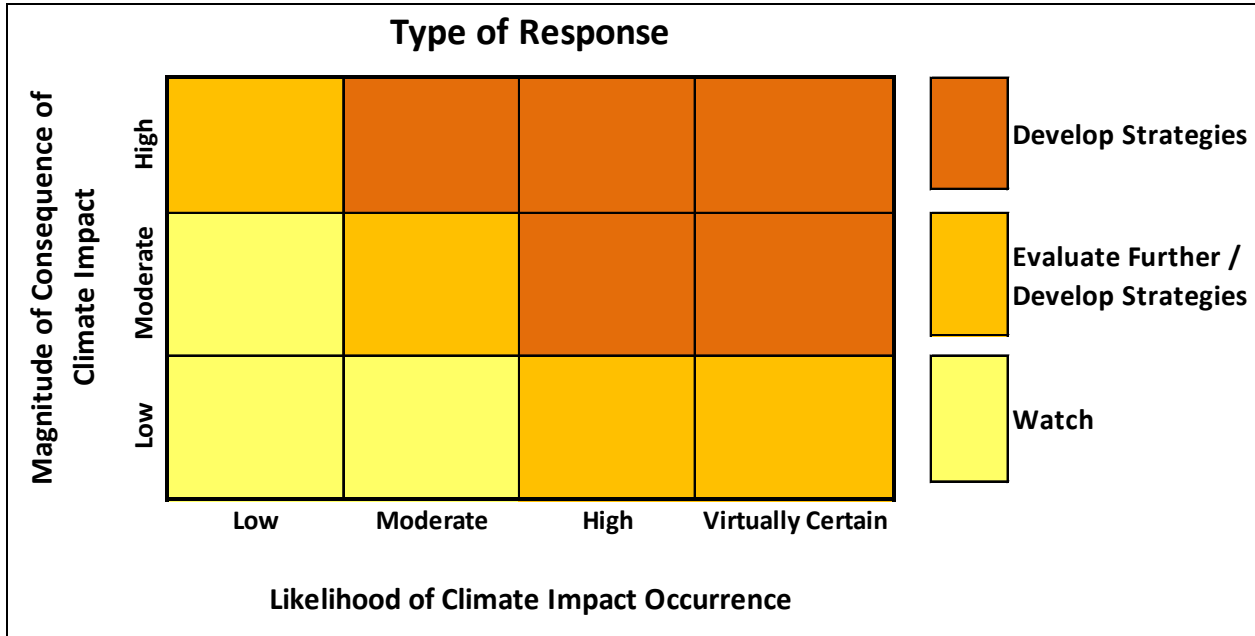
**Magnitude of Consequence of Climate Impact [RATING – Low, Moderate, High]**

"Magnitude of consequence of climate variable" can be examined across multiple areas: internal operations; capital and operating costs; # of people affected; and impact to the economy, health, and the environment. Some examples are provided below --- **go with your gut reaction.**

Magnitude of Consequence of Climate Impact		
Low	Moderate	High
<ul style="list-style-type: none"> <li>– No to little interruption to critical services/operations</li> <li>– None to a small number of people affected</li> <li>– No potential for injuries to employees</li> <li>– No pollution or toxin release above current operations</li> <li>– Insignificant impact on biodiversity or ecosystems</li> <li>– No or minor impact on cultural/historical sites</li> </ul>	<ul style="list-style-type: none"> <li>– Moderate disruption of service (including number of people impacted and duration of disruption), but easily repaired</li> <li>– Substantial sections of the facility affected</li> <li>– Some potential for injuries to employees</li> <li>– Minor pollution release above current operations, but can be mitigated or cleaned-up</li> <li>– Long-term impact on some biodiversity or specific ecosystems (including beach erosion), including possible permanent damage</li> <li>– Moderate, but not permanent, impact on a cultural/historical site</li> </ul>	<ul style="list-style-type: none"> <li>– Significant disruption or loss of service/operations that can either a) not be easily repaired or b) would last for a prolonged period of time</li> <li>– Significant portion of the community affected</li> <li>– Significant potential for injuries to employees</li> <li>– Significant pollutants released above current operations.</li> <li>– Substantial long-term impact on biodiversity or ecosystems, including the potential for significant permanent damage</li> <li>– Permanent damage or destruction of a cultural/historical site</li> </ul>

**Type of Response [RATING – Watch, Evaluate Further/Develop Strategies, Develop Strategies]**

Based upon the responses to the tables - *Likelihood of Climate Impact Occurrence* and *Magnitude of Consequence of Climate Impact*, document the Type of Response that appears in the colored matrix.



## B. Develop Potential Adaptation Strategies

**Task:** Learn how to brainstorm, discuss, and develop potential adaptation strategies. Potential strategies can involve internal and external stakeholders. Determine implementation steps and opportunities for funding and partnerships.

**Deliverables:** Completed templates for multiple assets.

4. Develop initial adaptation strategies

### Step 4 – Develop initial adaptation strategies

Develop potential adaptation strategies.

5. Identify implementation approaches & funding

### Step 5 – Identify implementation approaches & funding

Determine implementation approaches and steps, including linking adaptation strategies to key planning, funding, institutional, and science research cycles. Discuss institutional or policy barriers and opportunities.

6. Identify opportunities for partnership & coordination

### Step 6 – Identify opportunities for coordination

Determine potential partners across the region.

- Choose **one asset** and **one climate variable**
- **Brainstorm** possible strategies and discuss what you need to know in order to execute the strategy. Observations have shown that sometimes that “big” strategy needs to be preceded by smaller information gathering steps – e.g., has anyone else done this? Do we have all the information we need to proceed?
- Use the **Template Guidance** and **tables** that follow to document each possible strategy on a separate **Adaptation Strategies spreadsheet**
- Once you have completed one spreadsheet, continue to address additional climate variables and assets

#### ===== TEMPLATE GUIDANCE – ADAPTATION STRATEGIES =====

**Overarching System [TEXT]** Transfer information from “A” template

**Climate Variable [TEXT]** Transfer information from “A” template

**Subsystem / Asset / Capability [TEXT]** Transfer information from “A” template

**Useful Life [TEXT]** Transfer information from “A” template

**Title/Basic Goal of the Strategy [TEXT]**

**Strategy / Implementation Steps [TEXT]**

Describe the strategy and implementation steps in as much detail as possible, including:

- What are the steps? The sub-steps?
- Does something need to be done in advance of starting the strategy --- data gathering, research, education, policy changes.....?
- Who owns the process?
- Who makes the Go / No Go decision?
- Are external stakeholders involved?
- Would it be several projects over multiple years? A single investment?
- Would it represent an add-on to something already underway?

Some questions to consider during brainstorming:

- Are the “existing adaptation actions” documented a viable long-term solution to the climate impacts?
- How well can the system or asset accommodate changes in climate? (e.g., is the infrastructure designed to address a range of future climate conditions?)
- Is the asset / system already under stress? (e.g., slow loss of habitat, aging infrastructure, etc.?)
- Are there options / things that can be done to accommodate the changes in climate? Are they costly? Would it take a long time?

===== **TEMPLATE GUIDANCE – ADAPTATION STRATEGIES continued** =====

- Are there barriers to a) a system’s ability to accommodate changes in climate or b) implementing adaptation strategies?
  - Legal or regulatory system requires plans, policies, regulations or design standards be based on historic climate conditions
  - Number of competing uses for a system is high
  - Number of organizations involved in managing a system is high
  - System has biological, geographic or physical barriers that limit its flexibility (e.g., temp threshold, lack of space)
  
- How will you know you are successful? How can you measure success?

**Type of strategy [TEXT]**

Choose one of the categories from the table below. If another type should be included, please document.

**TYPE OF ADAPTATION STRATEGY**

Adaptation Strategy	Examples
<b>Maintenance &amp; Operations</b>	<ul style="list-style-type: none"> <li>● Raising critical infrastructure which sits in basements or on ground floors</li> <li>● Increasing cleaning of drains and gutters to reduce flooding (process change)</li> <li>● Integrating “green” designs such as green roofs on buildings which house key infrastructure to reduce the building’s energy needs (both mitigation and adaptation)</li> <li>● Modifying networks (such as roads and telecommunications) to reflect changes in sea level rise, storm surge, and flooding</li> </ul>
<b>Capital Investments</b>	<ul style="list-style-type: none"> <li>● New infrastructure</li> <li>● Installation or increase in the height of flood barriers</li> <li>● Relocation of critical elements or the entire infrastructure to higher ground</li> <li>● Changes in construction materials</li> <li>● Retrofits to existing infrastructure or the construction of new infrastructure</li> </ul>
<b>Policy</b>	<ul style="list-style-type: none"> <li>● Zoning (e.g., land use)</li> <li>● Federal, state, local, agency policy changes</li> <li>● Emergency management</li> <li>● Joint operations for water, energy, transportation and communications with surrounding administrative and political units, such as requiring facilities located within flood zones to elevate electrical equipment above existing or projected flood levels</li> </ul>

**Primary Implementer / Organization [TEXT]**

Name of primary implementer and organization; if appropriate, name internal and external organizations.

**Other Stakeholders to Implement or Impacted [TEXT]**

Include other stakeholders who should be involved in implementation or might be impacted by the strategy.

**Estimated Cost of Strategy [# or TEXT]**

Use the **ESTIMATED COST OF STRATEGY** table as a guide; understand this might be difficult.

**ESTIMATED COST OF STRATEGY**

Symbol	©	©©	\$	\$\$	\$\$\$	\$\$\$\$
COST	Low / no cost strategy; process change	<\$500K	<\$1M	\$1M - \$5M	\$5M - \$50M	>\$50M

**Funding Available? [TEXT]**

If you are aware of available funding or the ability to augment existing funding, please note.

**Funding Source [TEXT]**

List potential funding source and timing of such a source - internal or external.

**Leveraged Partnerships [TEXT]**

Who could you partner with or are partnering with on this issue (internal or external)?

### C. *Integration & Implementation Approaches*

**Task:** Based upon your system area (O&M, IT, design, energy, environmental, etc.) discuss and answer the questions and draft ideas based upon the questions on the template and below.

**Deliverables:** Notes.

7. Integrate into management and planning

#### **Step 7 – Integrate into management and planning**

Integrating new types of information into existing activities, plans or processes is often preferable to developing a new plan or process. Recommendations are necessary in order that appropriate policy be developed.

**System Area [TEXT]**

**Person filling out Form [TEXT]**

**Title of Specific Plan or Decision-Making Process [TEXT]**

If you named a particular **plan or decision-making process**, answer Questions 1 and 3.

If you identified **no** particular plan or decision-making process, answer Questions 2 and 3.

1. Discuss and document how you could make changes to the way you currently execute your PLAN / PROCESS to integrate consideration of climate information and adaptation strategies.
  - What could you do starting next week? What are the first steps? Do you need someone's approval? Who? Do you need input from others before you can start? Is this one-time input or do you need to establish an ongoing exchange? Are there institutional or policy barriers? Can you do this right away or does policy need to be changed? Who decides that policy?

Keep in mind the following when discussing your plan or process:

  - Which organization is responsible? How is it used to direct operations or management? Who uses the plan? What is the update cycle? What is the funding cycle?
2. Discuss and document how you could make changes to the way you currently execute your tasks to incorporate consideration of climate data and adaptation strategies.
  - What could you do starting next week? What are the first steps? Do you need someone's approval? Who? Do you need input from others before you can start? Is this one-time input or do you need to establish an ongoing exchange? Are there institutional or policy barriers? Can you do this right away or does policy need to be changed? Who decides that policy?
3. Could the solutions / recommendations provided above apply to other Centers and to NASA's future management and planning (e.g., plans, processes)?



**Overarching System:**  
**Subsystem / Component / Capability (e.g., asset, structure, network, animal, plant, ability to work outdoors, service to employees):**  
**Useful Life (if built):**

**A. Characterize Risk of Climate Variables on Systems / Assets / Capabilities** (Steps 1 - 3)

Climate Variable	Diagram <u>how</u> the climate variable(s) impacts the asset / capability. What happens? What does the climate variable cause? How does it affect the activities that rely on the asset / capability?					
	Description of Climate Variable Impact on Asset / Capability	Critical Threshold of Asset / Capability	Existing Adaptation Actions to Mitigate Impact on Asset / Capability	Current Management Status	Likelihood of Climate Impact Occurrence	Type of Response -Dev Strategy- -Evaluate/Dev Strategy- -Watch-
Current						
2020s			X			
2050s			X			
2080s			X			

E. Example - completed Characterize Risk spreadsheet

Overarching System: NATURAL RESOURCES							
Subsystem / Component / Capability (e.g., asset, structure, network, animal, plant, ability to work outdoors, service to employees): STORMWATER QUALITY							
Useful Life (if built):							
A. Characterize Risk of Climate Variables on Systems / Assets / Capabilities (Steps 1 - 3)							
<b>Climate Variable</b>  High Intensity Precipitation	<b>Diagram <u>how</u> the climate variable(s) impacts the asset / capability. What happens? What does the climate variable cause? How does it affect the activities that rely on the asset / capability?</b>						
	1. Increased number of downpours leads to additional erosion and sediments in runoff. Leads to increased number of possible days of violating TSS limits. Requires additional time from resource managers and regulatory agencies in addressing the stormwater quality problems. Could lead eventually to some operational limitations. 2. Deteriorating water quality in receiving waters may impact fish and plant habitat.						
	EXAMPLE						
	Description of Climate Variable Impact on Asset / Capability	Critical Threshold of Asset / Capability	Existing Adaptation Actions to Mitigate Impact on Asset / Capability	Current Management Status	Likelihood of Climate Impact Occurrence	Magnitude of Consequence	Type of Response -Dev Strategy- -Evaluate/Dev Strategy- -Watch-
	Current : Flooding, low spots, erosion; creates issues for meeting stormwater quality regulations/limits	Total Suspended Solids (TSS) limits	Erosion and sediment controls; storm water Best Management Practices (BMPs); permitting; inspections; benchmarks on nitrates, suspended solids, metals, and chemicals	Managed, but exceeding capacity to maintain infrastructure	Already occurring	Moderate	Develop strategies
2020s: Intensity of impacts to worsen; may have issues meeting Total Suspended Solid (TSS) limits and other regulations	TSS limits, nitrate limits, metals	X	X	Virtually Certain	Moderate	Develop strategies	
2050s: Increased issues meeting stormwater quality regulations	New regulations	X	X	Virtually Certain	High	Develop strategies	
2080s: Increased issues meeting stormwater quality regulations; potential fines/limits on Center functioning due to inability to meet regulations	New regulations	X	X	Virtually Certain	High	Develop strategies	

<b>Overarching System:</b>		<b>Climate Variable:</b>	
<b>Subsystem / Component / Capability (e.g., asset, structure, network, animal, plant, ability to work outdoors, service to employees):</b>			
<b>Useful Life (if built):</b>			
<b>B. Develop Potential Adaptation Strategies</b>			
<b>Title/Basic Goal of the Strategy:</b>			
<b>Potential Adaptation Strategies and Implementation Approaches (Steps 4-5)</b>			<b>Potential Funding &amp; Partnerships (Steps 5-6)</b>
<b>Implementation Steps</b>	<b>Sub-steps</b>		
1		<b>Type of Strategy</b>	<b>Funding Source</b>
2		<b>Primary Implementer / Organization</b>	<b>Leveraged Partnerships</b>
3		<b>Other Stakeholders to Implement or Impacted</b>	
4		<b>Estimated Cost of Strategy</b>	
5		<b>Funding Available?</b>	

<b>Overarching System: NATURAL RESOURCES</b>		<b>Climate Variable: HIGH INTENSITY PRECIPITATION</b>		
<b>Subsystem / Component / Capability (e.g., asset, structure, network, animal, plant, ability to work outdoors, service to employees): STORMWATER QUALITY</b>				
<b>Useful Life (if built):</b>				
<b>B. Develop Potential Adaptation Strategies</b>				
<b>Title/Basic Goal of the Strategy:</b> Maintain regulation-standard stormwater quality (primary); possibly address water shortages in periods of drought (secondary)				
<b>Potential Adaptation Strategies and Implementation Approaches</b> (Steps 4-5)			<b>Potential Funding &amp; Partnerships</b> (Steps 5-6)	
<b>Implementation Steps</b>	<b>Sub-steps</b>			
1. Evaluate ecosystem to assess plantings, buffer zones, drainage patterns.	1. evaluate drainage pattern now to identify problem spots for erosion. 2. determine if current erosion could be addressed with new plantings or whether stormwater can be diverted to reduce erosion potential	EXAMPLE	<b>Funding Source:</b> CoF, end of year \$	
2. Identify point sources, including transformers and POL tank containments, capacity limits and secondary containment (policy for integrated backup power)	1. assess GIS layer to inventory point sources 2. determine if current secondary containment systems need to have increased capacity		<b>Primary Implementer / Organization:</b> FMOD	<b>Leveraged Partnerships:</b> GSA, local universities (landscape architecture), Federal SEP funding
3. Identify non-point sources (building runoff, parking lots, streets)	1. assess current GIS coverage to calculate impervious surface 2. determine if any current impervious areas can be eliminated or made pervious		<b>Other Stakeholders to Implement or Impacted:</b> Environmental Office, Planning, Mission Orgs	
4. Assess Low Impact Development (LID) techniques for possible application. Coordinate with group looking at drought potential -- possibility of storing stormwater from downpours for usage during droughts??	1. Increase buffer zones between sources and outflows to allow for recharge to groundwater. 2. Create less impervious surfaces and more vegetative buffers in parking lots 3. Determine if construction		<b>Estimated Cost of Strategy:</b> \$	
		<b>Funding Available?:</b> No		

## Integration & Implementation Approaches

System Area: \_\_\_\_\_

Person(s) filling out form: \_\_\_\_\_

Title of Specific Plan or Decision-Making Process: \_\_\_\_\_

If you named a particular **plan or decision-making process**, answer Questions 1 and 3.

If you identified **no** particular plan or decision-making process, answer Questions 2 and 3.

1. How could you make changes to the way you currently execute your PLAN / PROCESS to integrate consideration of climate information and adaptation strategies?
  - What could you do starting next week?
  - What are the first steps?
  - Do you need someone's approval? Who?
  - Do you need input from others before you can start? Is this one-time input or do you need to establish an ongoing exchange?
  - Are there institutional or policy barriers?
  - Can you do this right away or does policy need to be changed? Who decides that policy?

## H. Word document used to document information from Section C - Integration (pg 2 of 2)

2. If you have no PLAN / PROCESS, how could you make changes to the way you currently execute your tasks to incorporate consideration of climate data and adaptation strategies??
  - What could you do starting next week?
  - What are the first steps?
  - Do you need someone's approval? Who?
  - Do you need input from others before you can start? Is this one-time input or do you need to establish an ongoing exchange?
  - Are there institutional or policy barriers?
  - Can you do this right away or does policy need to be changed? Who decides that policy?
  
3. Could the solutions / recommendations provided above apply to other Centers and to NASA's future management and planning (e.g., plans, processes)?

## Integration & Implementation Approaches

*[Answers in italics]*

**Plan or Process Community of Practice:** *Natural Resources Management*

**Title of Specific Plan(s) Discussed:** *INRMP (Integrated Natural Resource Management Plan)*

**Group Participants:**

1. How could you make changes to the way you currently execute and plan your tasks to incorporate consideration of climate data and adaptation strategies?
  - *Consider climate variables in considering plan status*
  - *Put more focus on mission-critical assets in future INRMP*
    - What could you do starting next week?
    - What are the first steps?
      - *Reestablish weather station (localized data)*
    - Do you need someone's approval? Who?
      - *Office of the Chief Information Officer needed to share Master Plan*
    - Do you need input from others before you can start? Is this one-time input or do you need to establish an ongoing exchange?
      - *Need input from IT / Emergency Operations Center / IH*
    - Are there institutional or policy barriers?
      - *Need funding*
      - *IT for weather comm/not for INRMP*
    - Can you do this right away or does policy need to be changed? Who decides that policy?
      - *Center leadership for timber health management*
        - *Ex. Thinning to reduce competition may not be aesthetically pleasing*
        - *No climate change evaluations currently incorporated*
        - *2015: new timber inventory (trees/acres, plant comms, species), manage harvesting, T&E evaluations, plantings, land use changes*
2. With regard to your plan or process, describe the following:
  - Which organization is responsible? *Natural Resources (Environmental & Hygiene Office)*
  - How is it used to direct operations or management? *Annual work plan derived (prescribed burns, plantings, invasive species control (fire risk))s*
  - Who uses the plan? *Environmental & Hygiene Office*
  - What is the update cycle? *Annually for work plan development*
  - What is the funding cycle? *Annual*
3. Make recommendation(s) about how to integrate *dynamic climate information and adaptation strategies* into your plan or process. Could this apply to other Centers and to NASA's future management and planning (e.g., plans, processes)?

*Consider data trending - plantings assessments, fire loading (when to increase harvesting), prescribed burns, fire lane placement (refresh once a year - how much is actually needed?), etc.*

## I. Examples - completed Integration documents (pg 2 of 2)

### Integration & Implementation Approaches

*[Answers in italics]*

**Plan or Process Community of Practice:** *Workforce and Community*

**Title of Specific Plan(s) Discussed:** *Emergency Management Plan*

**Group Participants:**

1. How could you make changes to the way you currently execute and plan your tasks to incorporate consideration of climate data and adaptation strategies?
  - a. What could you do starting next week?
  - b. What are the first steps?
  - c. Do you need someone's approval? Who?
  - d. Do you need input from others before you can start? Is this one-time input or do you need to establish an ongoing exchange?
  - e. Are there institutional or policy barriers?
  - f. Can you do this right away or does policy need to be changed? Who decides that policy?

*Emergency Management Plan: update by May*

- *Add a telework exercise (annually)*
  - *Reference Wild Land Fire Protection Plan and Heat Stress Program Plan*
  - *Take what you learn into your home and local community - are you ready? (ready.gov)*
  - *Include background on sea level rise and temperature in plan update/section for future Emergency Managers*
  - *Transmission Data Line: reach out to XXXX to discuss use of the line*
  - *Are there places in the communities where we can have alternate work locations?*
  - *Training needs to be updated on telework to include community alternate work locations when those are identified*
2. With regard to your plan or process, describe the following:
    - a. Which organization is responsible? *Emergency Management*
    - b. How is it used to direct operations or management? *It is the governing document in emergencies*
    - c. Who uses the plan? *NASA and most tenants*
    - d. What is the update cycle? *5 years (reviewed every year)*
    - e. What is the funding cycle? *CMO*

3. Make recommendation(s) about how to integrate *dynamic climate information and adaptation strategies* into your plan or process. Could this apply to other Centers and to NASA's future management and planning (e.g., plans, processes)?

*Include in document update section*