

Conducting Vulnerability Assessments & Building Federal Agency Climate Change Preparedness Capacity

*Federal Environmental Symposium
October 30, 2019*

Daniel Kreeger

Executive Director

Association of Climate Change Officers

dkreeger@ClimateOfficers.org

Learn. Collaborate. Advance.



Agenda

- Key terms and definitions
- Preparing for a vulnerability assessment
 - Establishing scope
 - Reviewing climate data
- Conducting a vulnerability assessment
- Assessing Workforce Capacity to Engage in Climate Preparedness
- Building Organization-wide Climate Literacy & Competency



Learning Objectives

- Clarifying relevant terminology
- Understanding the importance of doing cross-sector, cross-discipline and whole community analysis
- Understanding the basics of risk analysis framework and risk management approaches (i.e. defining criticality, prioritizing vulnerabilities), and incorporating climate change into risk analysis activities, strategies and portfolios
- Learning how historical data on climate hazards and community indicators are accessed and used (including socioeconomic and health data)
- Evaluating gaps in data and vulnerability knowledge
- Learning about vulnerability assessments and natural catastrophe modeling, and the resources necessary to undertake vulnerability assessment work
- Grasping timeframes and frequency of different climate hazards, aligning these with decision making processes, and effectively communicating about these issues



DEFINITIONS & CONCEPTS



Federal Environmental Symposium

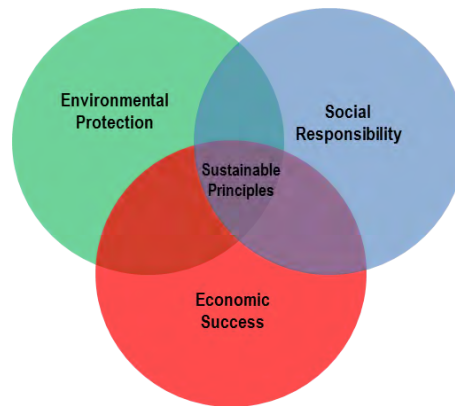
Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 4 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Sustainability

Meeting the needs of the present
without compromising the ability of
future generations
to meet their own needs



Vulnerability Assessment

A process to identify key assets and services that are or may become compromised by climate-related hazards

A proactive way to:

- Consider a full range of climate scenarios and system responses,
- Incorporate climate variability and uncertainties,
- Prioritize critical assets and services at risk from these threats, and
- Inform response strategies

Burks-Copes et al., in review



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

Slide 6 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Climate-Related Hazards

The **events or occurrences** that have the **potential** to **cause harm** to people, assets, services, or ecosystems



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 7 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

A Hazard



NOAA



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 8 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Climate Hazards Lead to Impacts & Implications

Climate Hazards

- Higher Air Temperatures
- Drought
- Loss of snowpack
- Melting ice sheets
- Ocean acidification
- Melting permafrost
- Land subsidence
- Sea level rise
- Ocean warming
- Flooding
- Increased storm surges
- More frequent & extreme events

Impacts & Implications

- Public health impacts
- Supply disruptions
- Failed infrastructure
- Crop failures
- Regulatory response
- Stakeholder activism
- Legal liability & tort litigation
- Reduction of insurance coverage or increase in cost
- Property value degraded
- Species loss
- Natural resource shortages
- Mass immigration & refugees
- Security destabilization



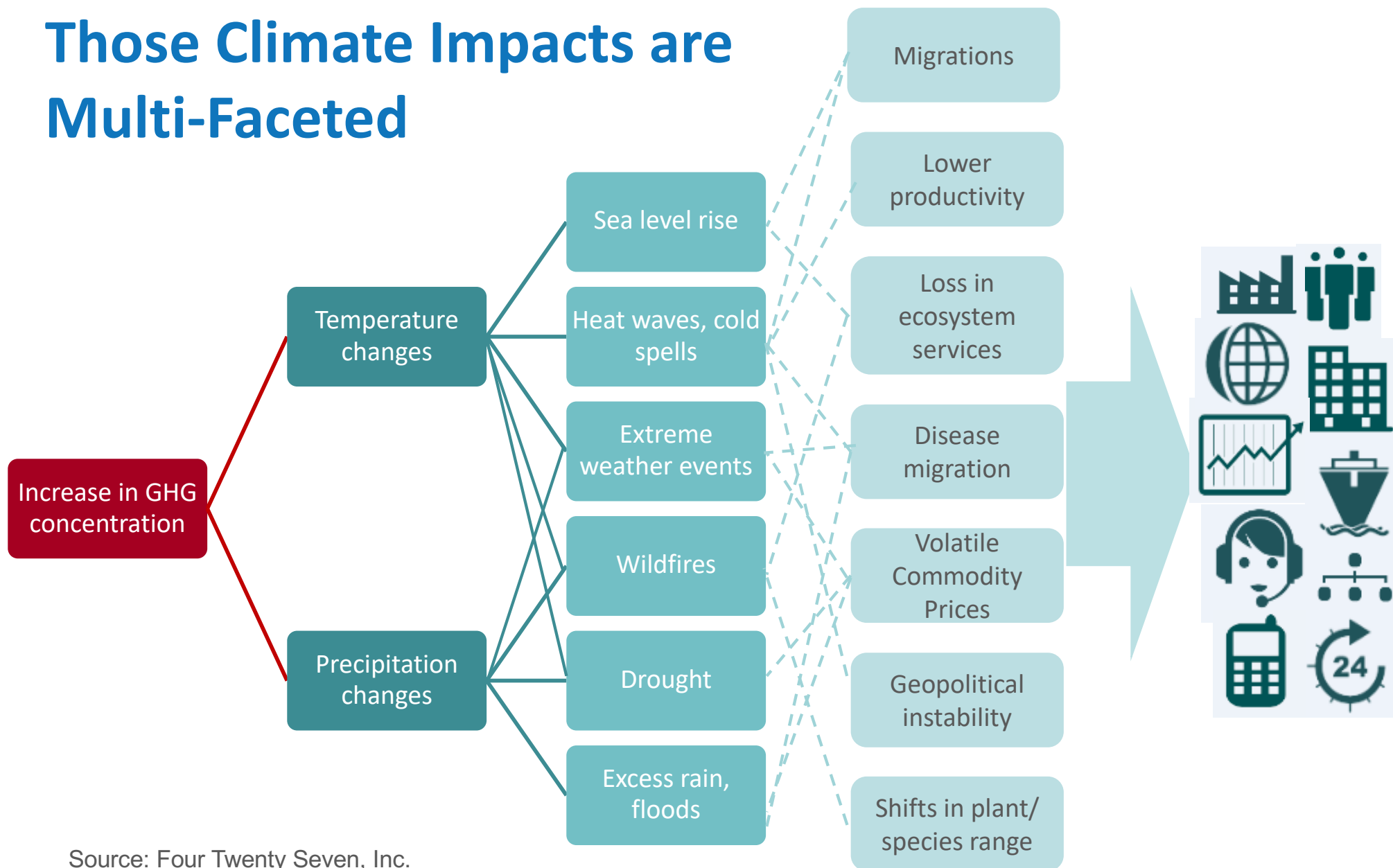
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 9 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Those Climate Impacts are Multi-Faceted



Source: Four Twenty Seven, Inc.



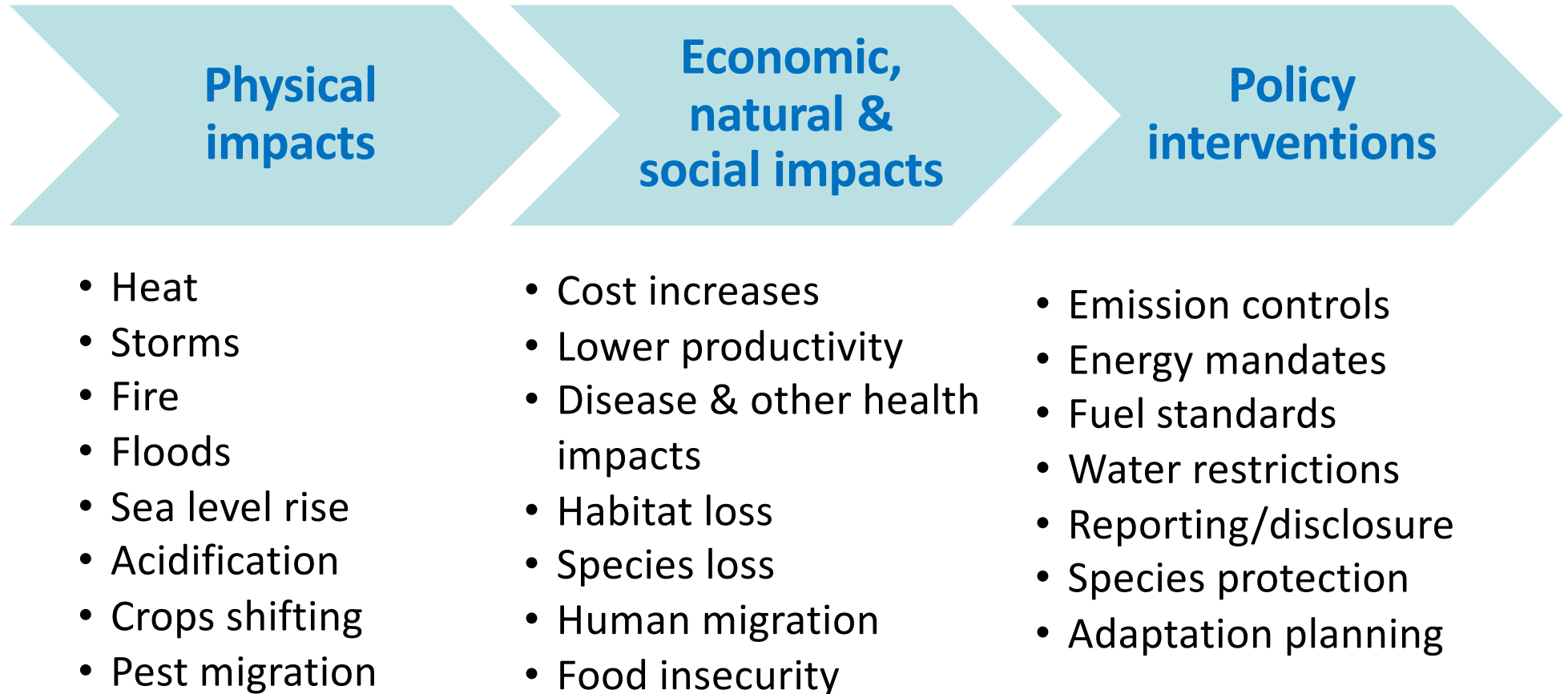
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

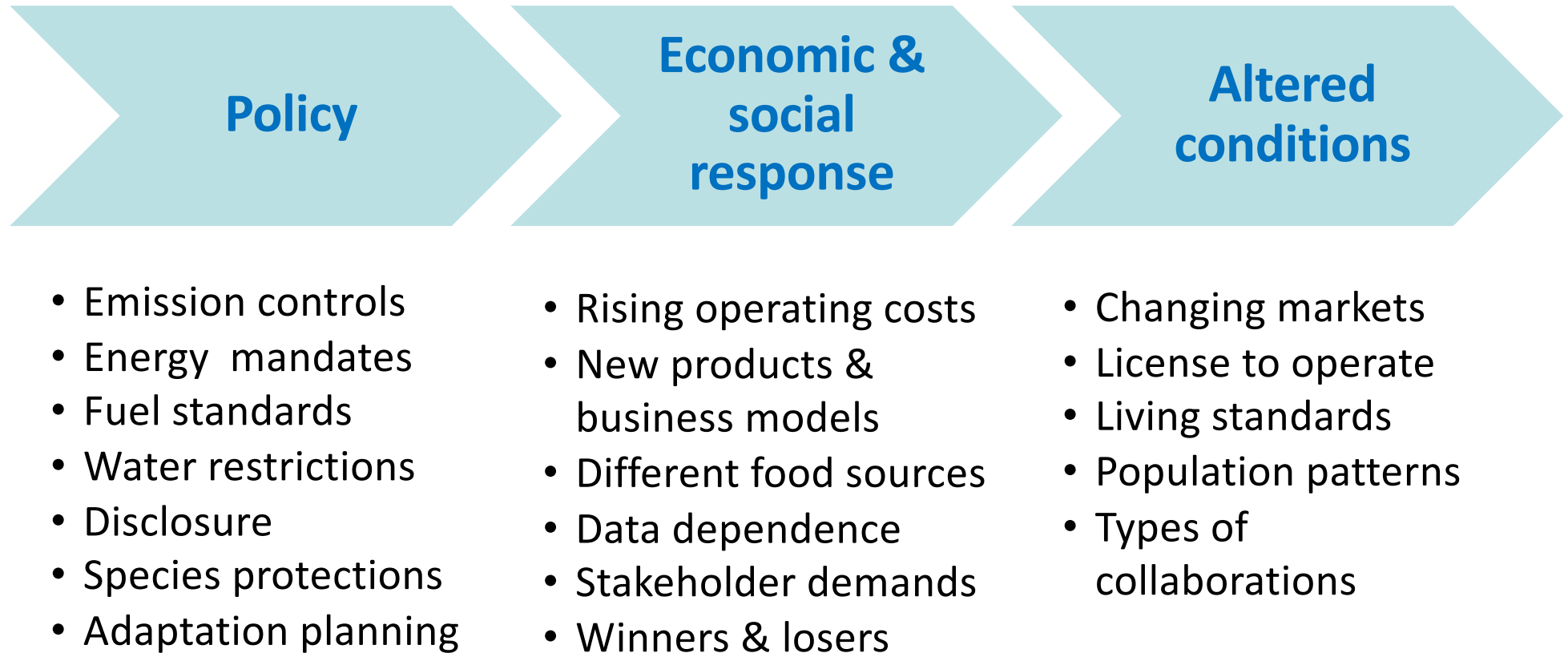
Slide 10 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Impacts Lead to Policy



AND ... Policy Leads to Other Implications



Systems

The **built, natural, and human networks** that provide important **goods and services** within a community or region



Built: facilities, buildings and transportation infrastructure such as roads and bridges.

Human: public health clinics, courts, government, etc.



Natural: ecological networks, fish, wildlife and natural resources, e.g. water.



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 13 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

System Failure

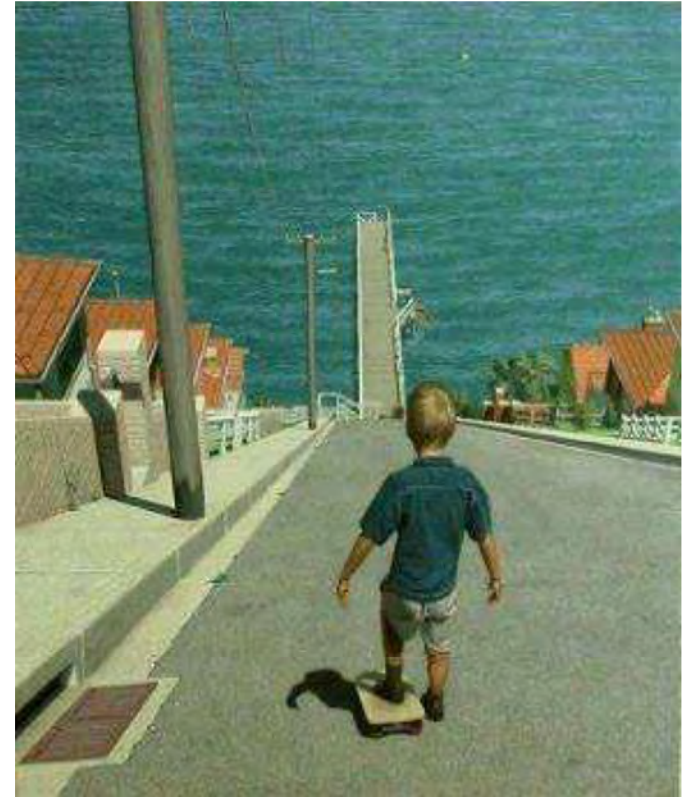
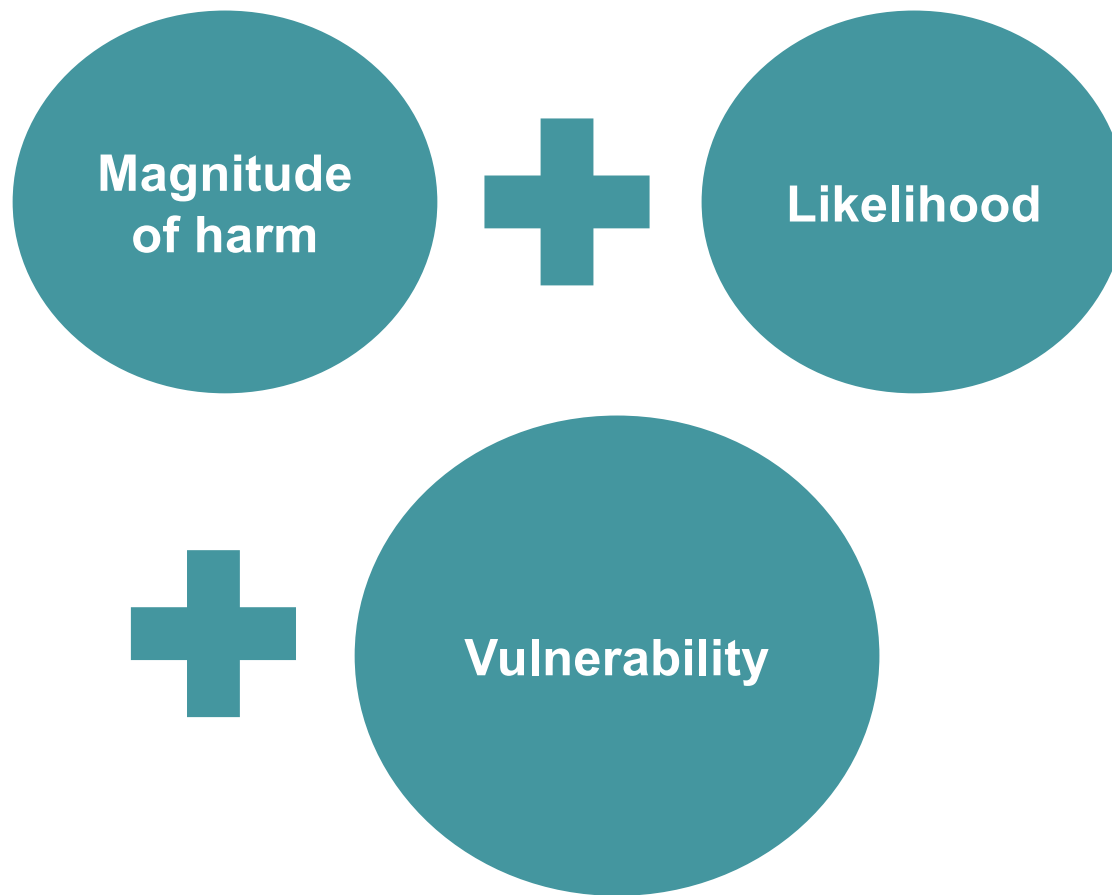


Federal Environmental Symposium
Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 14 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Risk



IPCC, 2007

Slide 15 of 78



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Vulnerability

The degree to which a system is susceptible to, or unable to cope with, the adverse effects of climate change over time, both variability and extremes



Exposure

The **nature and degree** to which a system's people, assets, and ecosystems are **subjected to** climate-related **hazards** where they could be adversely affected



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 17 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Sensitivity (Fragility)

The degree to which a system, population, or resource **is affected by climate impacts** (including extreme weather) or changing climate conditions

+/- change in asset performance or service production because of climate-related hazards



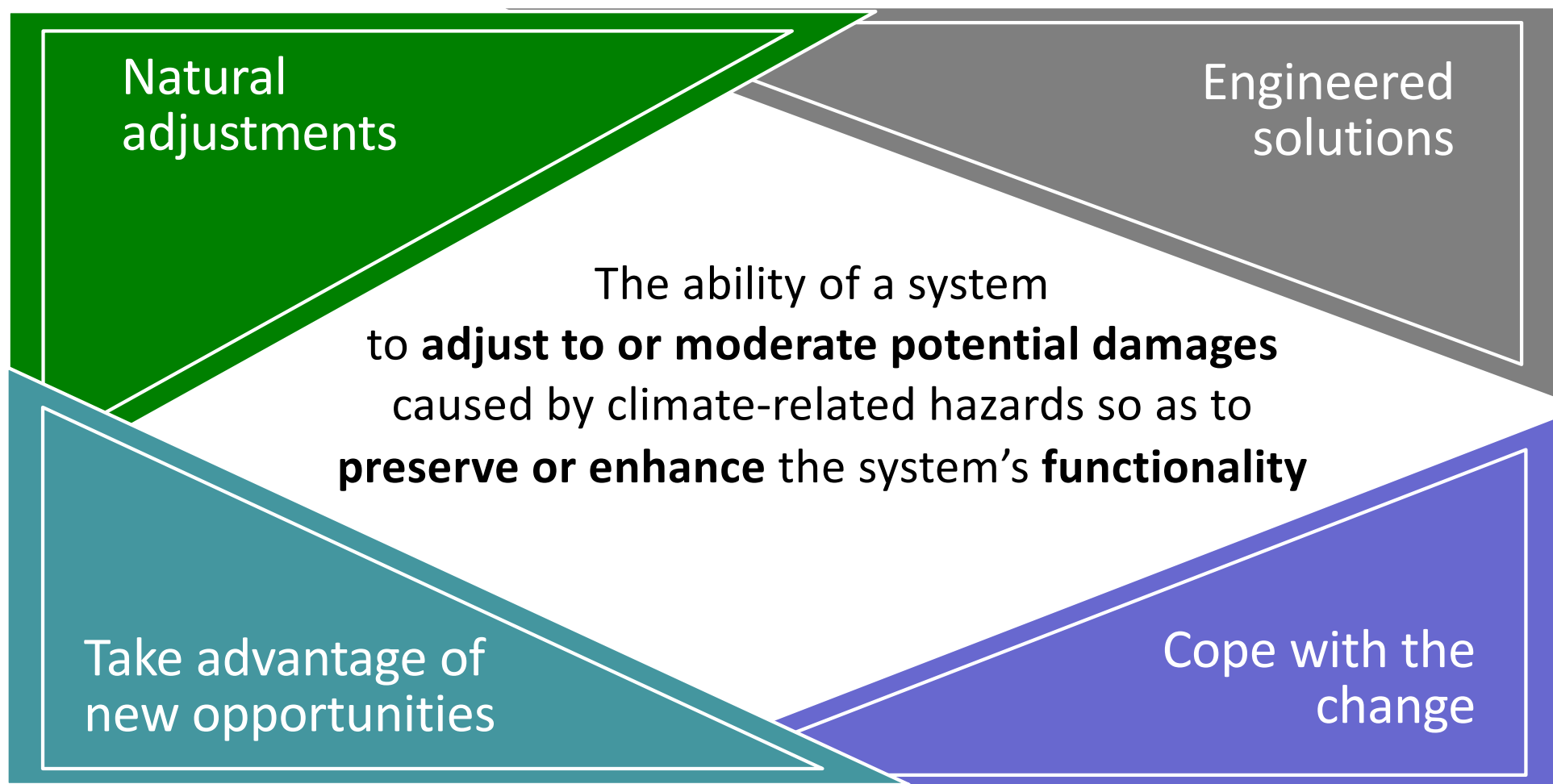
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 18 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Adaptive Capacity



Burks-Copes et al., 2014

Slide 19 of 78



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Adaptation

Adjustment in natural or human systems **to a new or changing environment** that exploits beneficial opportunities or moderates negative effects



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

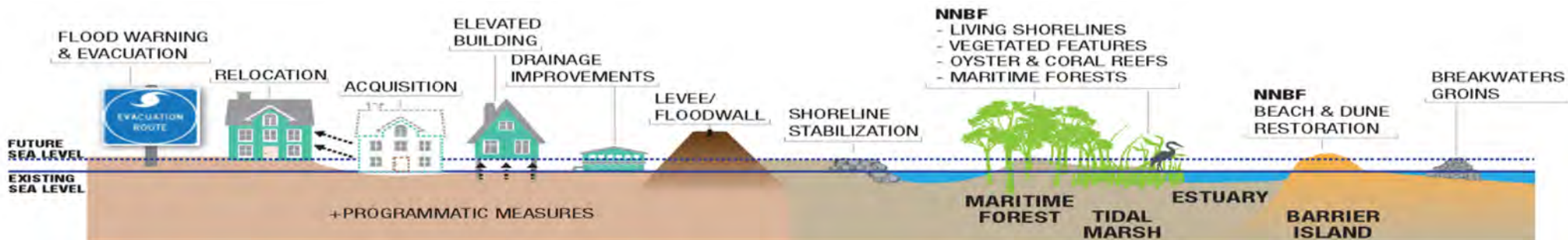
Slide 20 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Resilience

A capability to **prepare** for, **withstand**, **recover**, and **adapt** to significant threats with minimum damage to social well-being, the economy, and the environment

Resilience often incorporates multiple lines of defense



Slide 21 of 78



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Exploring Vulnerability Assessment & Risk Management



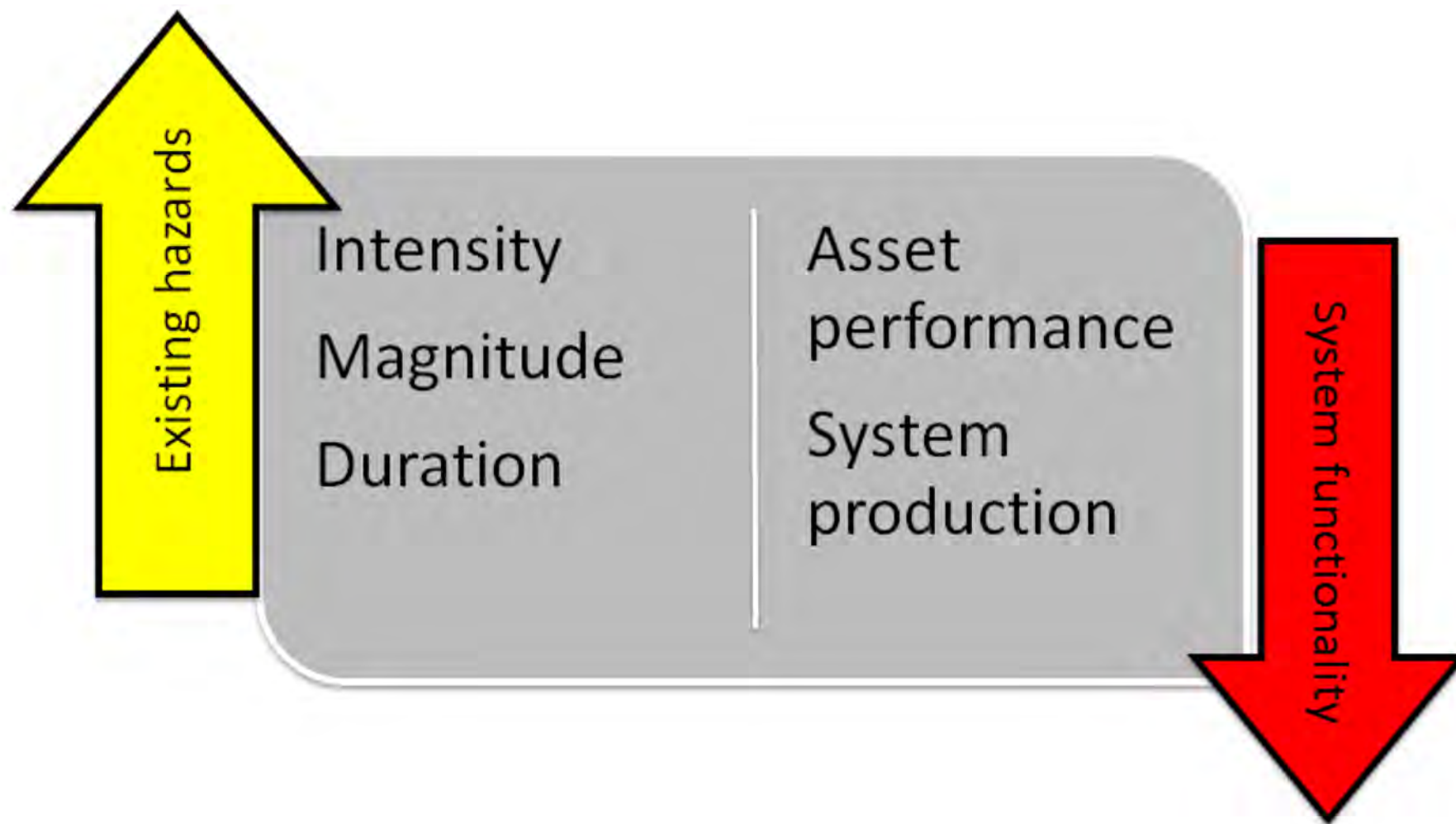
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 22 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Climate Change is a Threat Multiplier



Basic Risk Management Concepts

Risk Avoidance

**Easiest way to manage:
avoid it altogether!**

Although avoidance is a simple method to manage potential threats, the strategy also results in lost revenue or mission potential.

Risk Mitigation

**Lessen the negative consequences or
impact of specific, known risks**

Most often used when business risks are unavoidable. Risk of capital waste can be reduced, but a degree of risk remains.

Risk Transfer

**Usually takes place by paying
a premium to an insurer**

Federal agencies generally play the insurer of last resort, but often pay private sector insurers to administer (e.g. TRICARE, NFIP)

Tip to Remember:

The Four T's ...
Terminate, Treat,
Transfer & Tolerate

Risk Acceptance

**Ignoring the risk, or accepting it
without mitigation or transfer actions.**

Agencies may incur a certain level of risk when anticipated benefits are perceived to be greater than the potential risks.



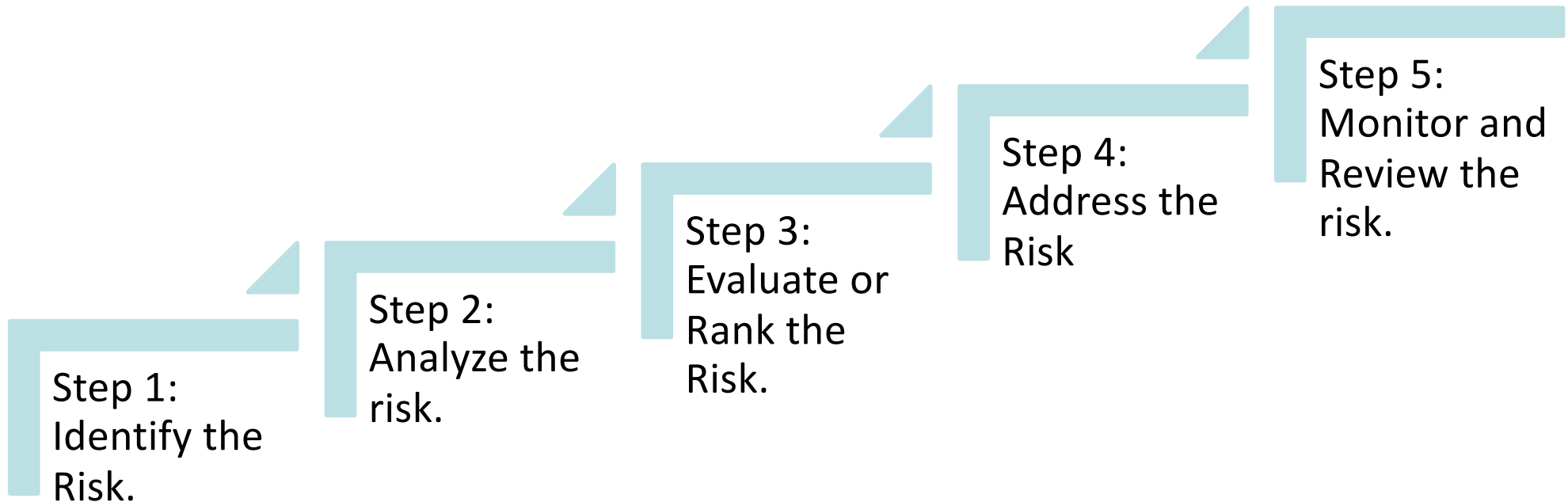
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 24 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Risk Management Process

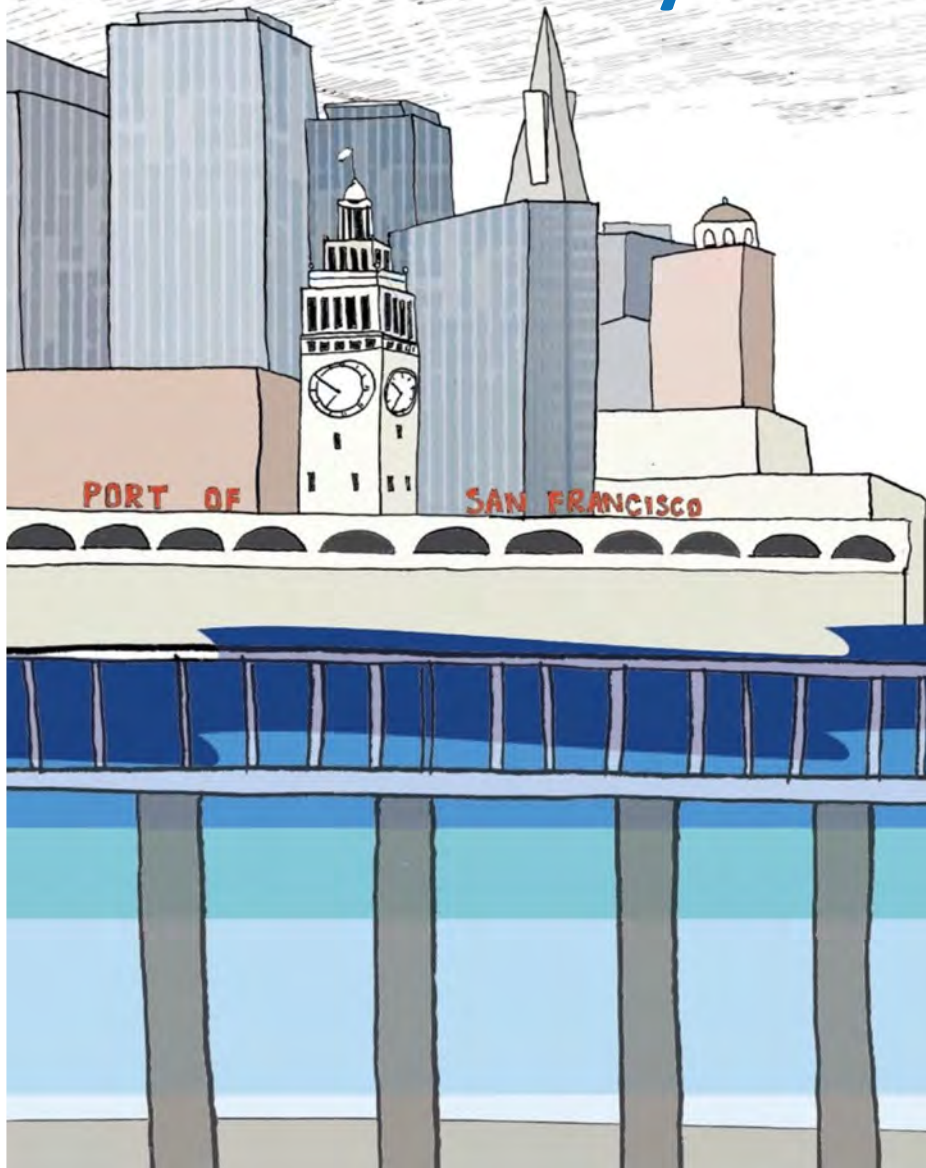


Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

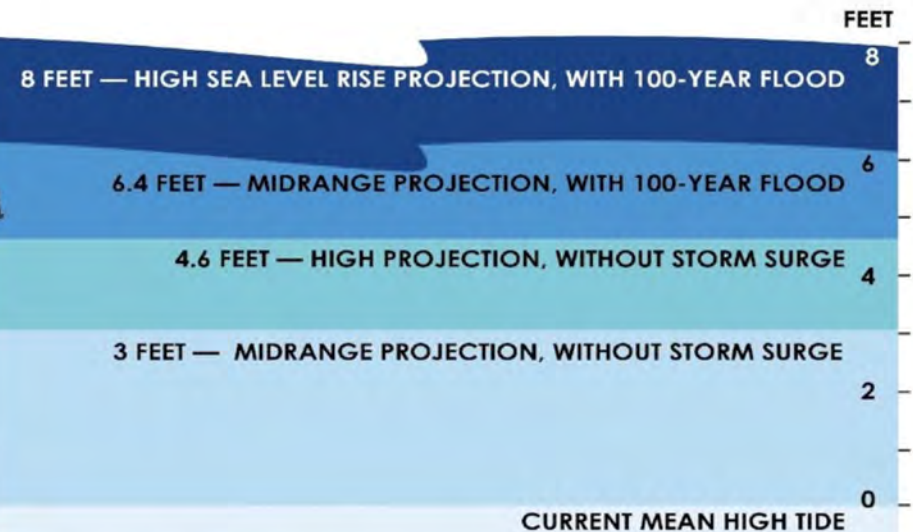
Slide 25 of 78

Non-Stationarity: The “New Normal”



The past no longer predicts the future; novel events are likely

- New circumstances require a **paradigm shift** in how we work, live, travel and play
- Adaptation must be continuous: we must adapt to the 2020 projections, then **re-adapt** to be prepared for 2030, 2040, 2050 and beyond



Slide 26 of 78



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Risk Management Process



Preparing to Conduct a Vulnerability or Change Assessment



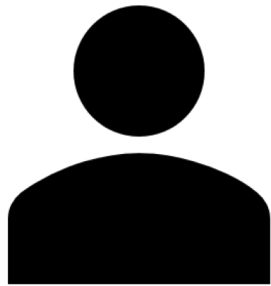
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 28 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Recruit Participants



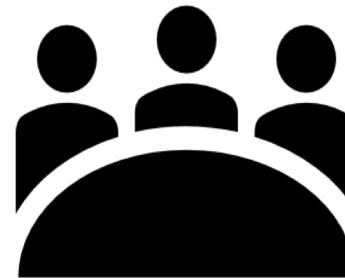
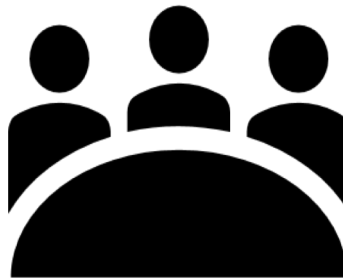
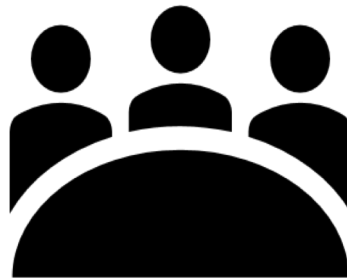
Sponsor



Champions



Team



Stakeholders



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 29 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Gather Input

- Community and/or organizational values
- Key assets and services
- Known and potential climate hazards
- Experts
- Concerns



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 30 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Evaluate Feasibility

- Are the potential climate impacts significant enough to garner support for climate planning and action?
 - Are stakeholders interested?
 - Are there opposing forces within the community?
- Consider logistical factors such as study/project/ community size, resource availability, and governing authorities



Clarify Purpose and Scope

- Define purpose and objectives
 - Who is the target audience?
 - What outputs are needed? How will they be used?
 - What level of detail is required?
 - What actions might result from the assessment?
- Choose timeframe(s) of interest: 2025? 2030?
- Leverage resources to identify exemplars
 - CakeX.org
 - Climate Resilience Toolkit
 - Cal-Adapt



Prioritize

- Select criteria to identify and rate “most critical” assets, services and dependencies
 - Reflect organizational values
 - Think outside traditional “boundaries” or “jurisdictions”
 - Enable comparison
- Use to prioritize which assets/services to assess
- Select metrics
 - Relevant to evaluating an asset or service’s vulnerability
 - Accurate, available, actionable



What Scope Makes Sense for Your Assessment?

PURPOSE	TARGET AUDIENCE	INTENDED OUTCOMES	LIKELY SCOPE	TYPE OF CRITERIA FOR DETERMINING MOST CRITICAL ASSETS AND SERVICES



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 34 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Who Should Participate?

STAKEHOLDER GROUPS	ROLE	INTERNAL/ EXTERNAL	ISSUES/ CONCERNS	NOTES

Slide 35 of 78



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

ACCO

ASSOCIATION OF CLIMATE CHANGE OFFICERS

Reviewing Climate Data



Federal Environmental Symposium

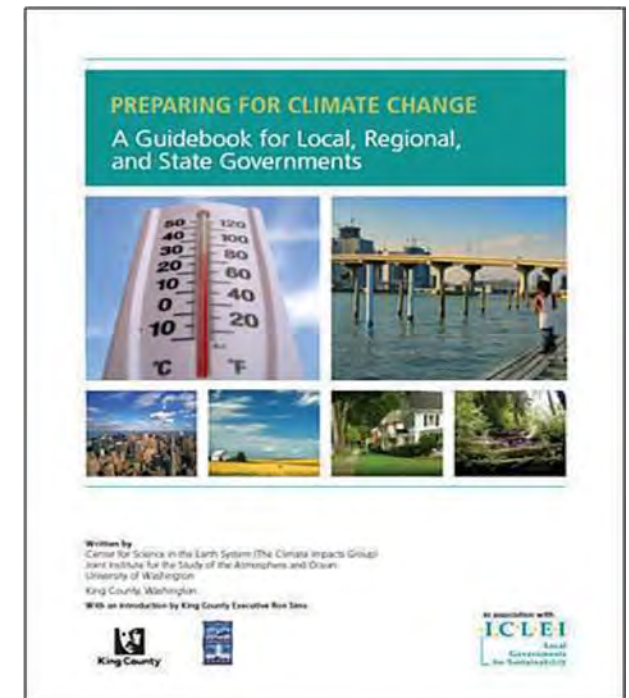
Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 36 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Assessing Your Intersection with Climate Change

- Do weather and climate represent a threat to assets you value?
- How could climate change affect your most critical assets and services?
- Will projected impacts pose a risk to your organization, business or community?
- What does this change mean for your organization or community? Risk? Opportunity? Both?



<http://cses.washington.edu/db/pdf/snoveretalgb574.pdf>



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

Slide 37 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Assessing Vulnerability & Risk



Federal Environmental Symposium

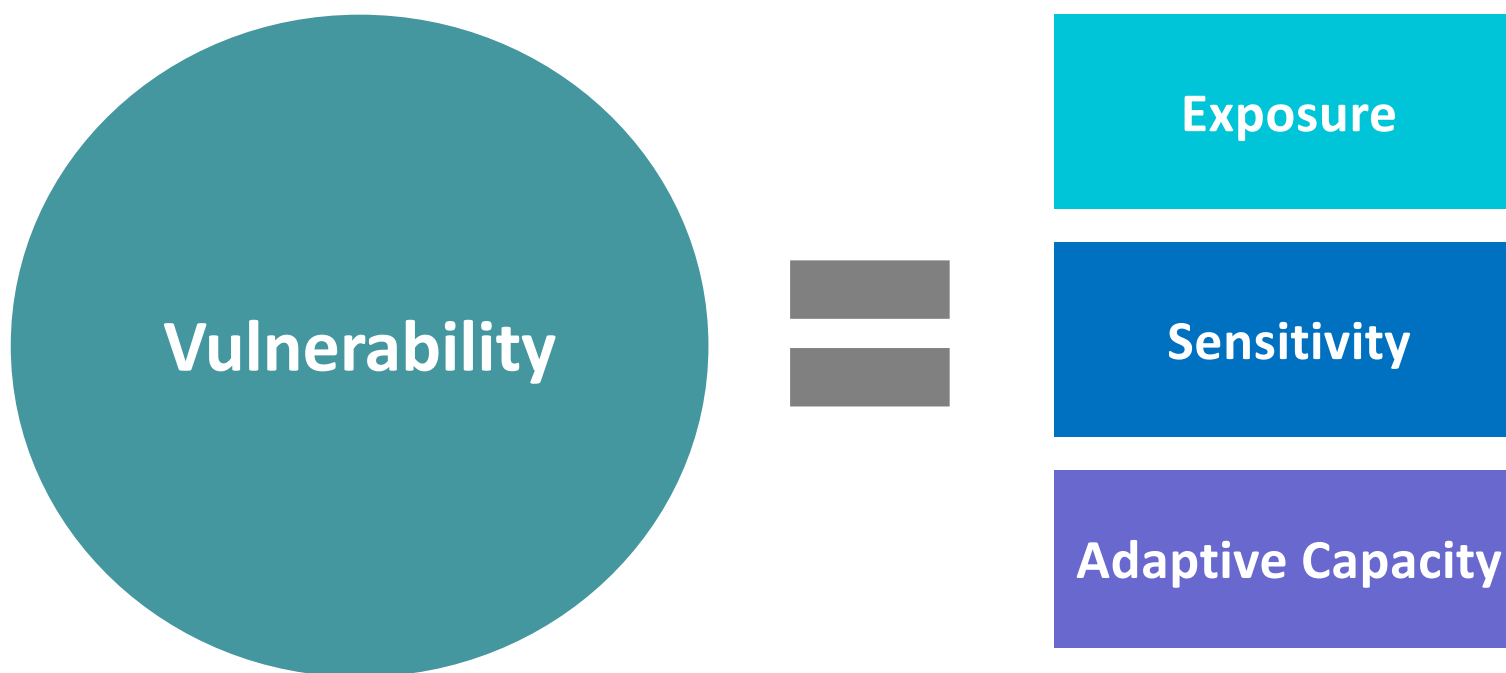
Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 38 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

How Vulnerable are Your Most Critical Assets to Current or Future Climate-Related Hazards?

- Identify both climate and non-climate stressors
- Consider potential tipping points
- Evaluate elements of vulnerability



Measure Exposure to Climate Hazards

- Check local or regional projections for relevant hazard(s)
- Check if asset/service will be exposed in relevant timeframe
- Estimate the **degree**, **magnitude**, and **frequency** with which asset or service will be exposed to the hazard
 - Now
 - In the future (“new normal”)



Assessing Exposure Over Time



Exposure may be chronic (gradual sea level rise) or acute (hurricanes)

Yes: extreme exposure – no protection exists

Yes: moderate exposure – some protection exists, but not enough to completely avoid impacts

Yes: minor exposure – protection exists, but is insufficient to fully defend the asset

No: the asset is not exposed, and no impacts will occur



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 41 of 78

Measure Sensitivity to a Climate Hazard

- Estimate the changes to the asset's performance or production due to the climate-related hazard
 - Now
 - In the future
- Types of information that help gauge the degree of sensitivity
 - Specific design standards or criteria
 - Design elements in the surrounding geography or the larger facility



Assessing Sensitivity Over Time



Sensitivity is generally a **qualitative** evaluation, but structural evaluations & projections can help quantify

Yes: complete failure of infrastructure, habitat or service provision

Yes: temporary operational failure of infrastructure, habitat or service provision

Yes: reduced capacity of infrastructure, habitat or service provision

No: no impact



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

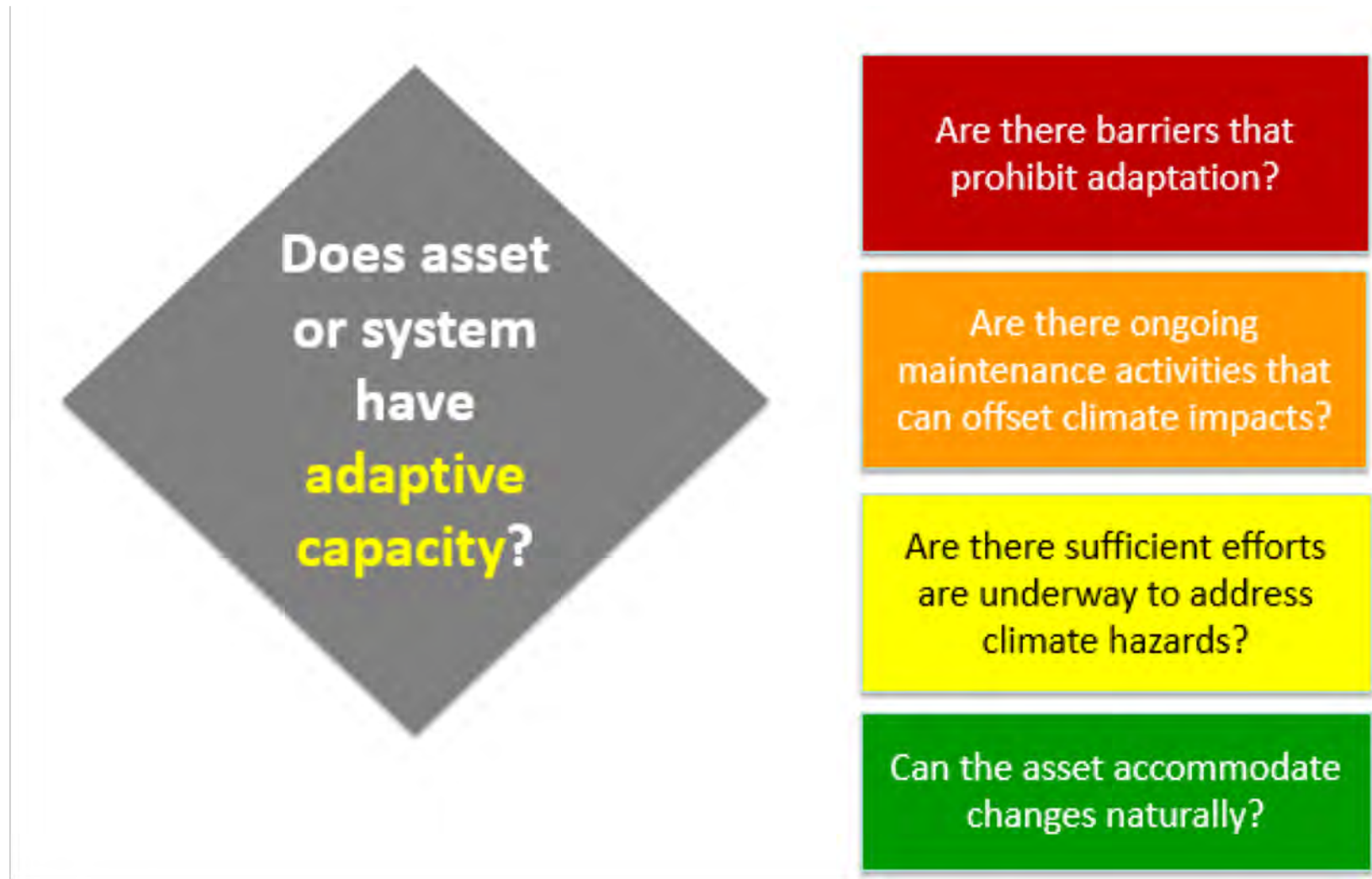
Slide 43 of 78

Measure Adaptive Capacity

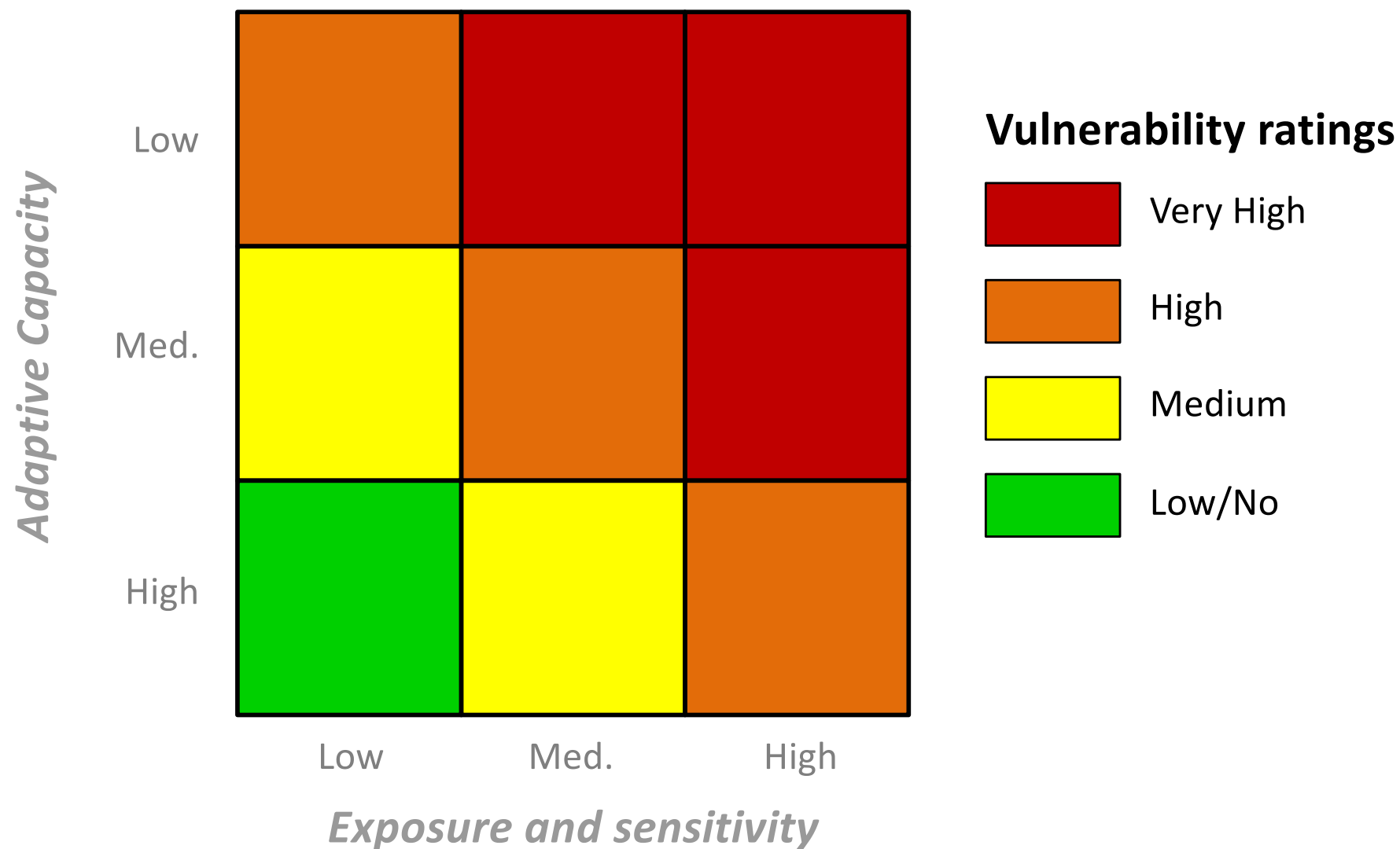
- Evaluate the asset's or system's ability to **adjust** to or **moderate** potential **damages** from the climate hazard
- Consider:
 - Can the asset/service already handle changes in climate?
 - Are there barriers to its ability to accommodate changes in climate?
 - Is the rate of projected climate change likely to be faster than adaptability?
 - Are efforts already underway to address impacts of climate change related to the asset/service?



Assessing Adaptive Capacity Over Time



Grading Vulnerability



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 46 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Generating a Report

- Introduction and executive summary
 - Background and context (mission, attributes, and current effects)
 - Purpose and scope, goals and objectives
- Methods
 - Climate-related hazards and future projections
 - Assessment protocol & description of tools utilized
 - Data sources
- Results
 - Description of potential vulnerabilities
 - Description of knowledge gaps
- Discussion & path forward



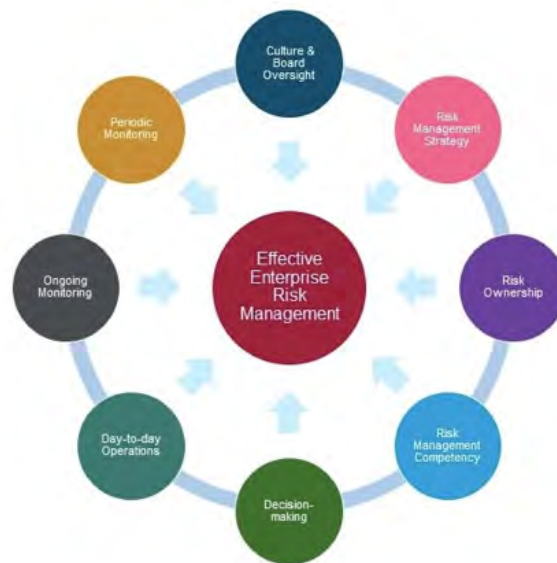
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

Slide 47 of 78

Understanding the Art & Science of Enterprise Risk Management



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 48 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Incorporating Climate Risk into an Agency's Enterprise Risk Management is Crucial

- Establishes a common language for articulating risks
- Enhances agency resilience
- Allows for greater pursuit of mission related opportunities
- Improves resource deployment
- Achieves efficiencies of scale and leverages capability
- Improves disclosure and stakeholder engagement



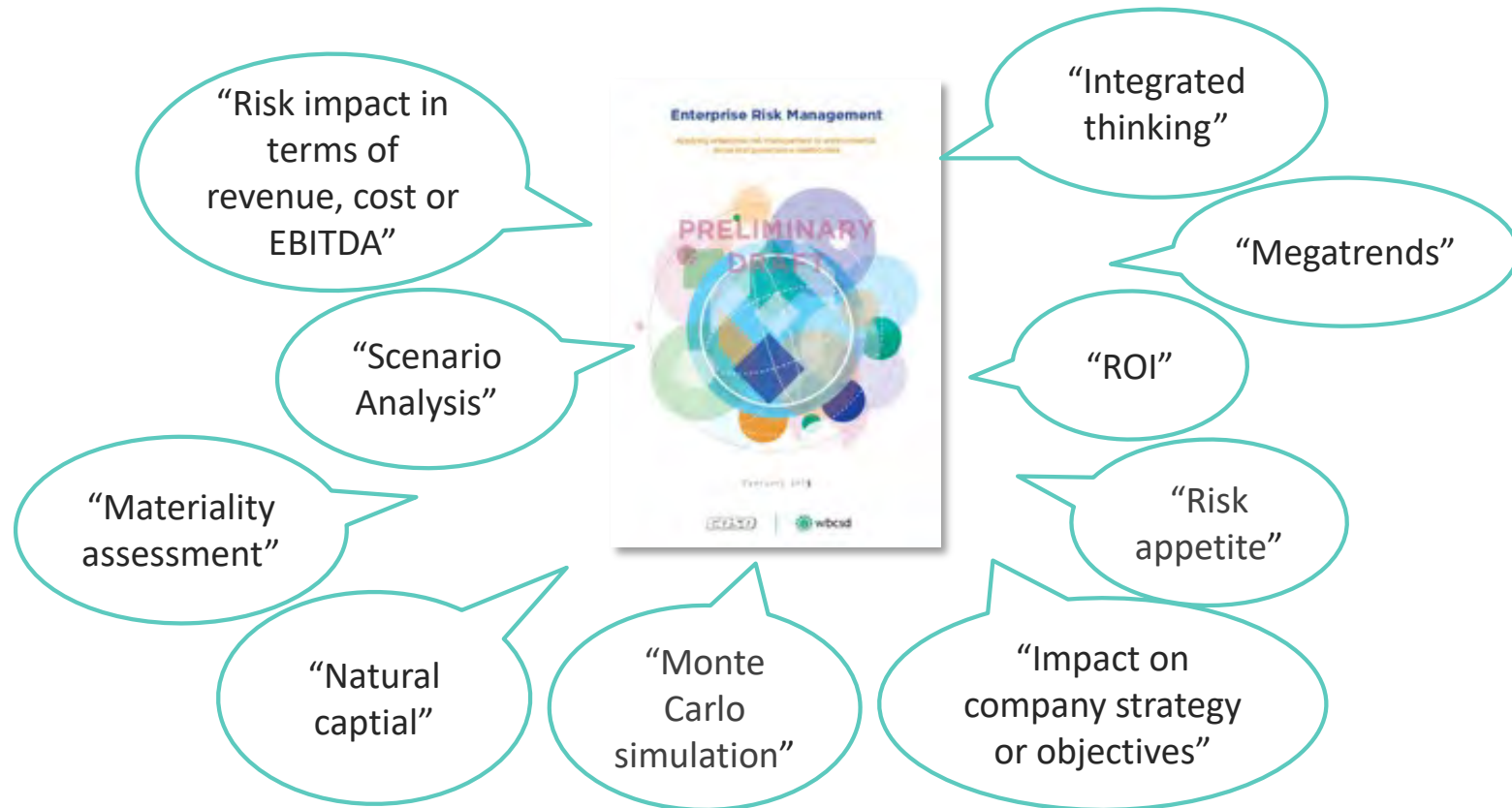
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 49 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Provides a Common Language for Articulating Risks



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 50 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Enhances Organizational Resilience

A organization's medium and long term viability and resilience will depend on the ability to anticipate and respond to risks that threaten its strategy, mission and/or business objectives.



Federal Environmental Symposium

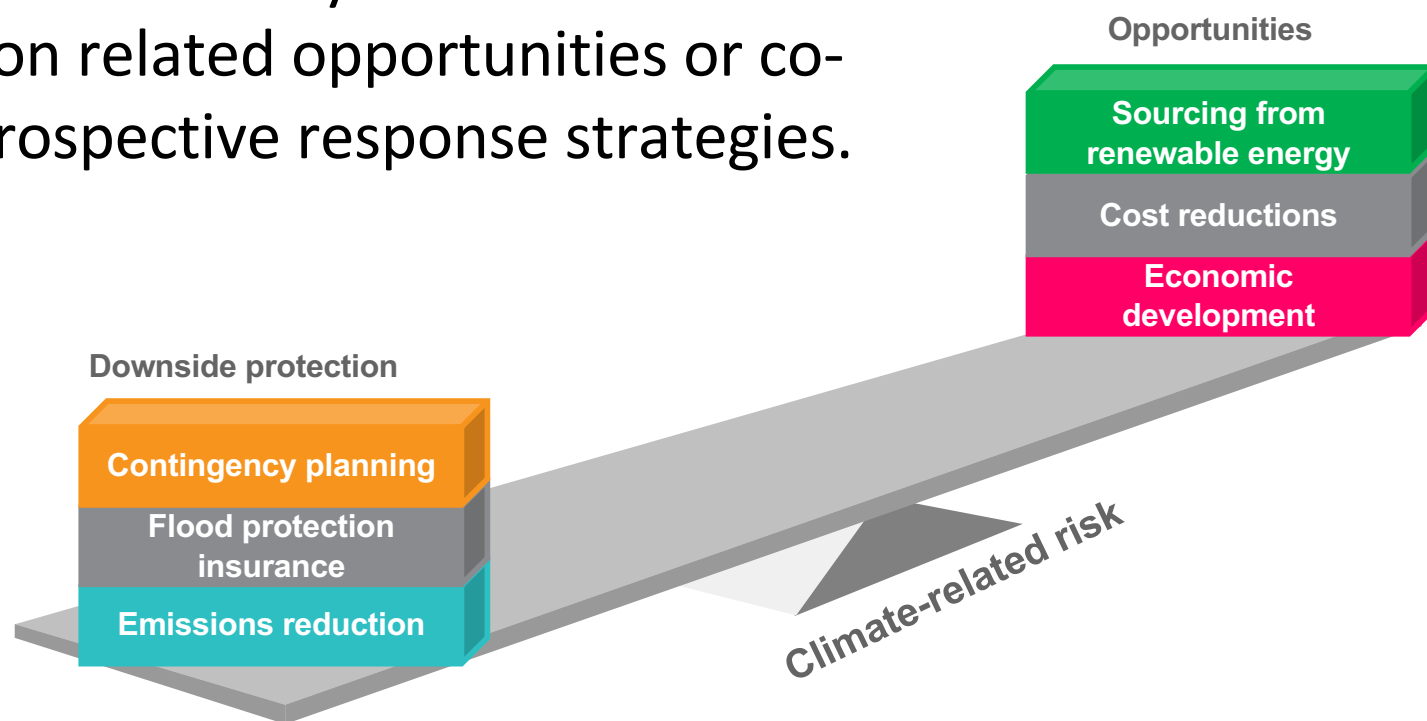
Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 51 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Allows for greater pursuit of opportunity

By considering both positive and negative aspects of climate-related risks, management can identify trends that lead to new mission related opportunities or co-benefits of prospective response strategies.



Federal Environmental Symposium

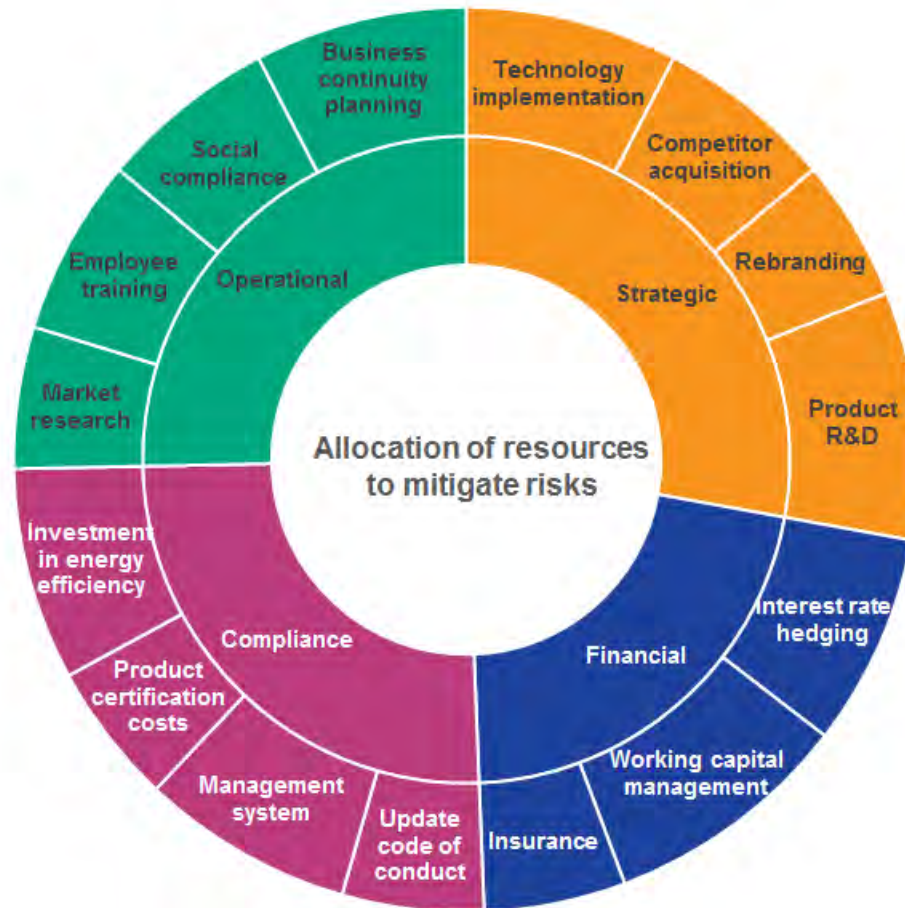
Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 52 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Improves resource deployment

Obtaining robust information on climate risks allows management to assess overall resource needs and help optimize resource allocation



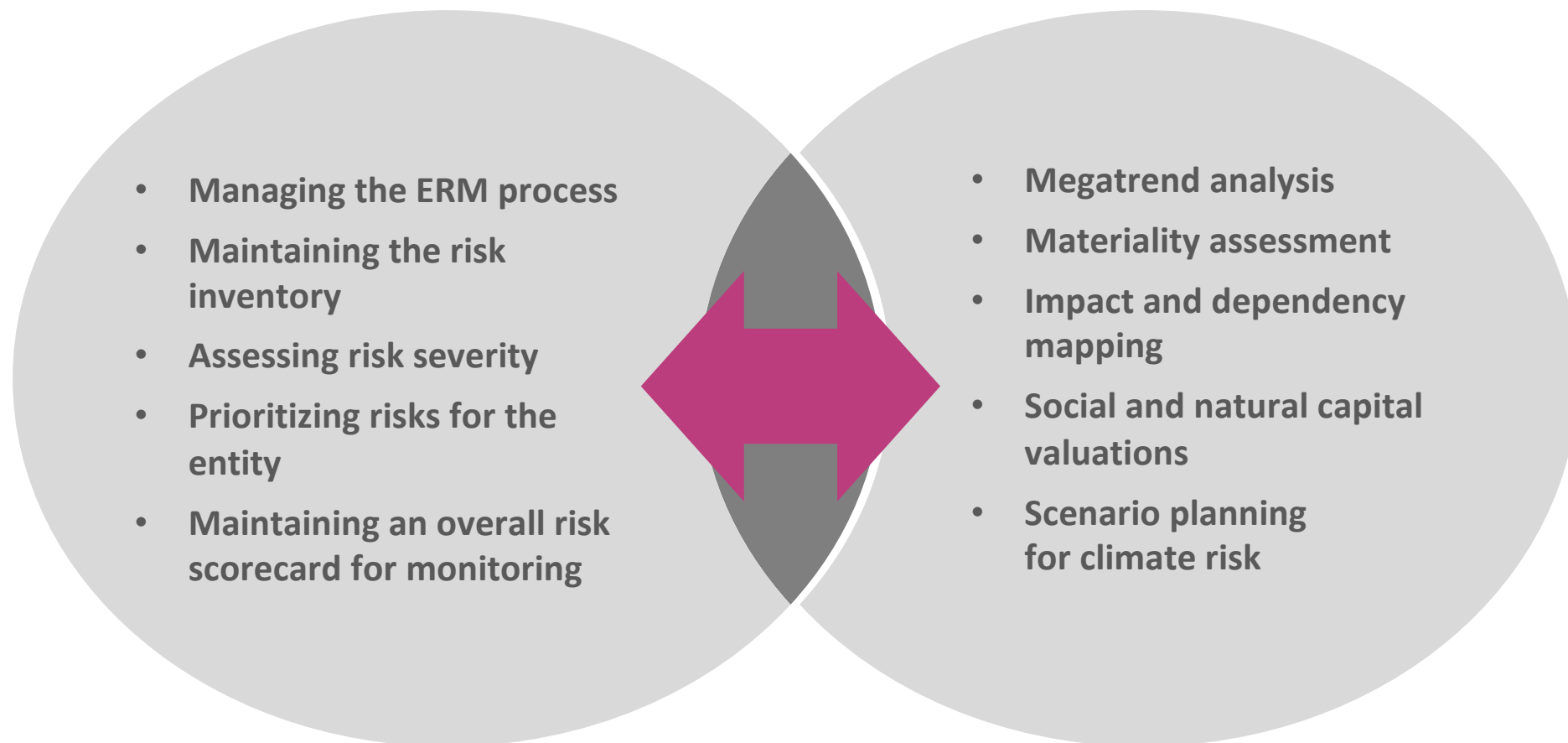
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 53 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Achieve efficiencies of scale; leverage capabilities



Improves disclosure

Improving management's understanding of climate related risks can provide the transparency and disclosure investors, external stakeholders and the general public expect and provide consistency with jurisdictional reporting requirements.



Investors



Regulators



Employees



Customers



NGOs



Communities



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

Slide 55 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

ERM requires a balance of “Art” and “Science”



Art

Understanding the risks and their likely impacts on the business requires an astute and often intuitive understanding of risk, strategy and human behavior.



Intuition

People acumen

Business acumen

Industry experience

“Gut feeling”



Federal Environmental Symposium

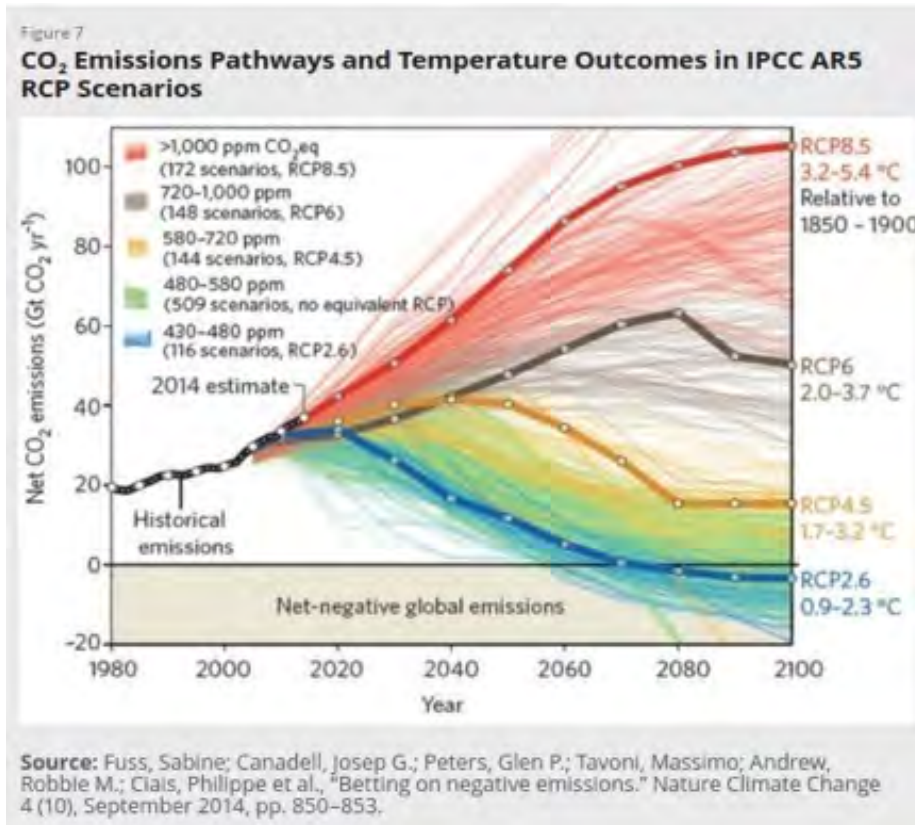
Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

Slide 56 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

ERM requires a balance of “Art” and “Science”



Science

Formal tools and techniques are important in order to systematically identify, evaluate and monitor business risks and the impacts of any risk management strategies or initiatives.



Decision trees

Monte Carlo

Value at Risk (VaR)

Stress testing

Scenario analysis

Forecasting

Modeling uncertainty

Risk quantification

From www.fsb-tcfd.org



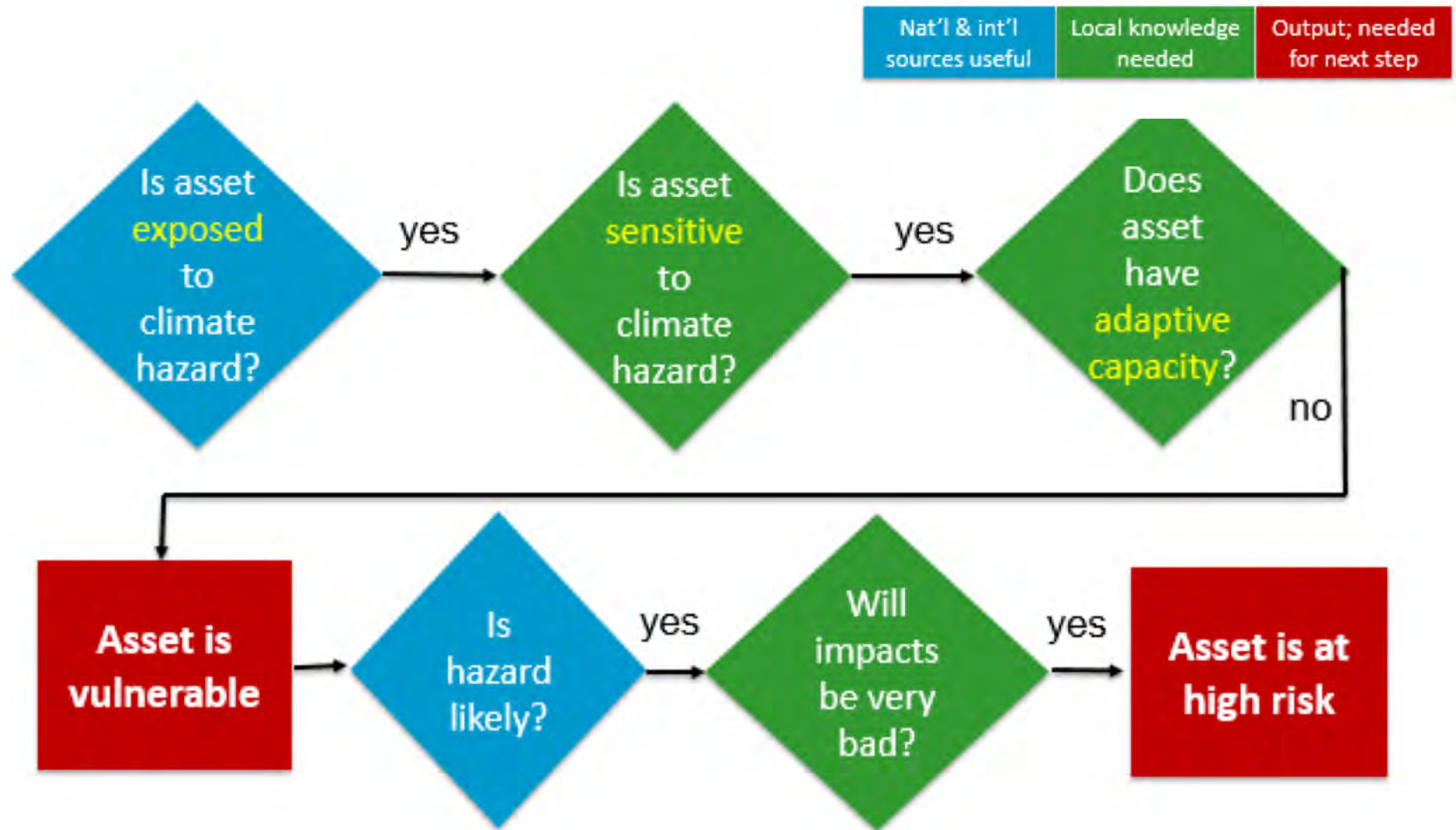
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 57 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

How Vulnerability Relates to Risk



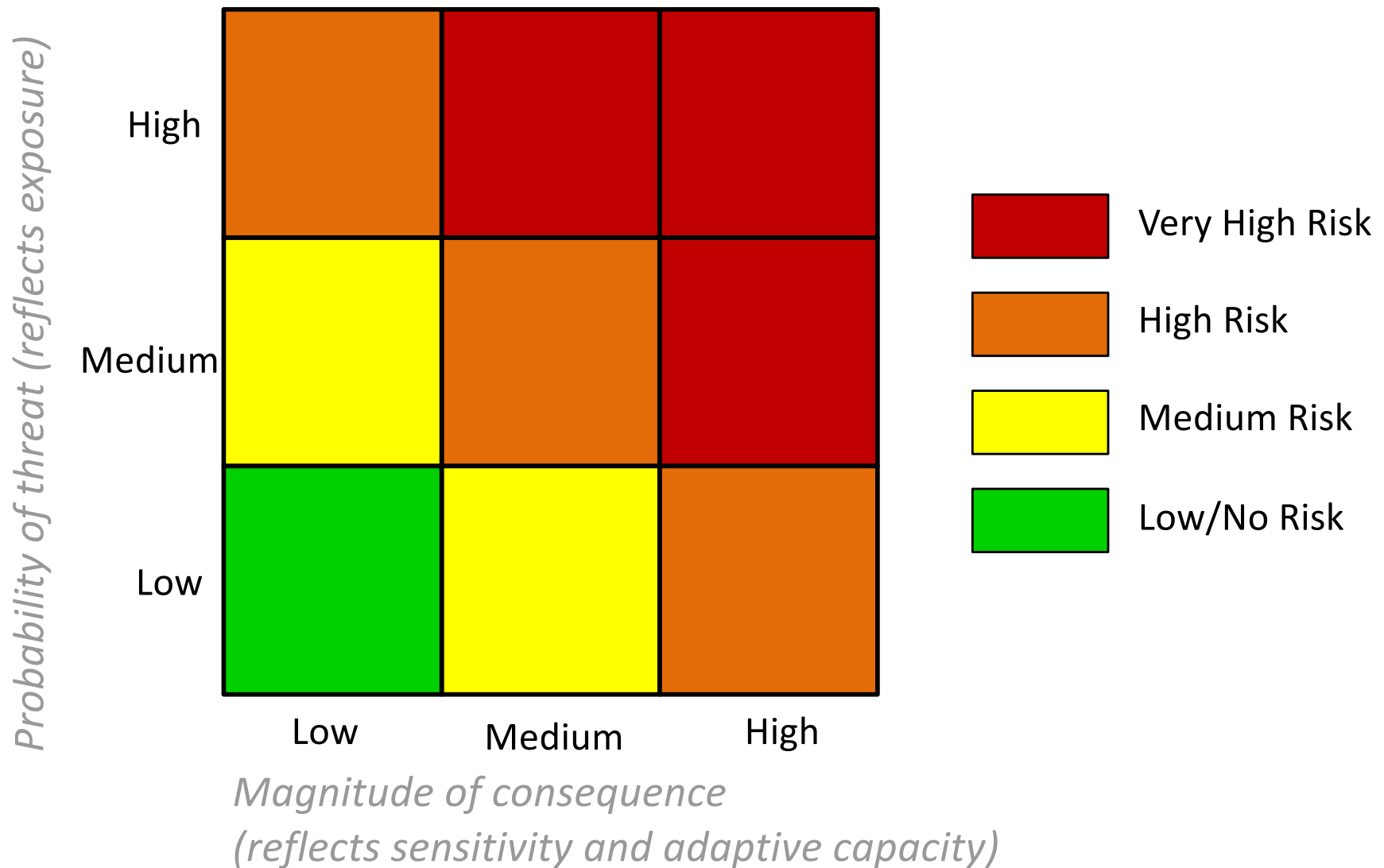
Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 58 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Grading Risk



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 59 of 78

Federal Agency Workforce Capacity to Engage in Climate Preparedness



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 60 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Research Conducted on Behalf of DHS & CISA

Critical to ensure that critical infrastructure workforce and leadership is positioned to implement resilience and adaptive planning strategies

Project Goal: Assess the workforce capacity to effectively engage in preparedness in the nation's critical infrastructure sectors

Project Scope: All infrastructure operators and government bodies (at all levels) overseeing infrastructure

Timeline: Began in 2016, initial phase concluded in February 28, 2019

Report Abstract: Available upon request (dkreeger@ClimateOfficers.org)

Read about DHS' 16 critical infrastructure sectors at
<https://www.dhs.gov/cisa/critical-infrastructure-sectors>



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

Slide 61 of 78

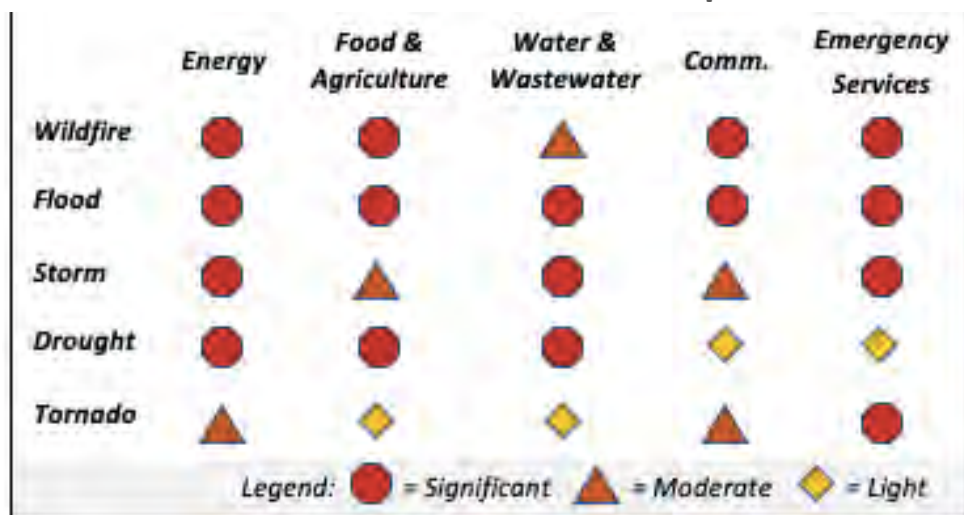
ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Overview of the 5 Sectors Selected

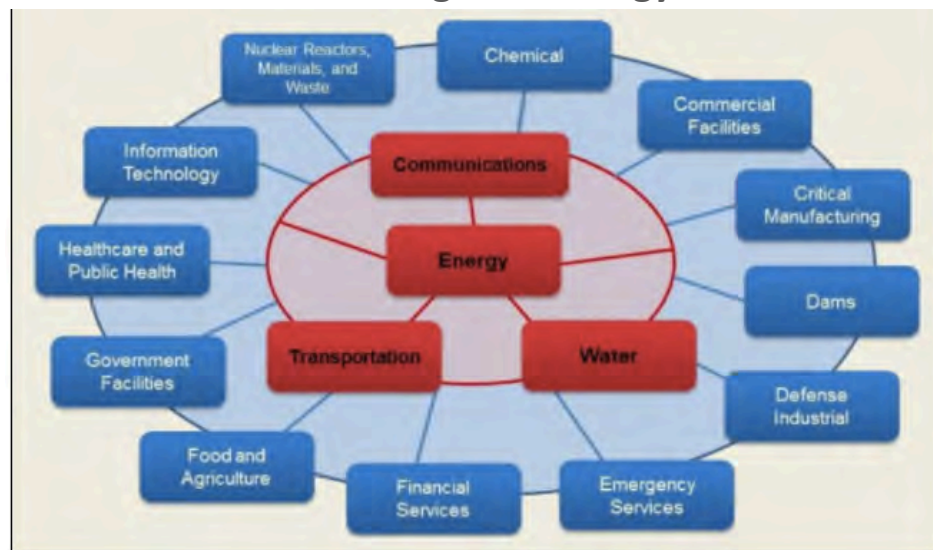
These sectors were chosen based on a number of factors:

- 1) their susceptibility to climate risks such as flooding, drought, and wildfire;
- 2) the need for these sectors to remain functional during and immediately after such disasters and extreme weather events;
- 3) the interconnected nature of these sectors

Degree of Exposure of Critical Infrastructure Sectors to Climate Related Impacts



Critical Infrastructure Sectors are Co-Dependent, but all Hinged to Energy *



* Energy Sector, DOE, DHS. 2015, <https://www.dhs.gov/sites/default/files/publications/nipp-ssp-energy-2015-508.pdf>



Federal Environmental Symposium

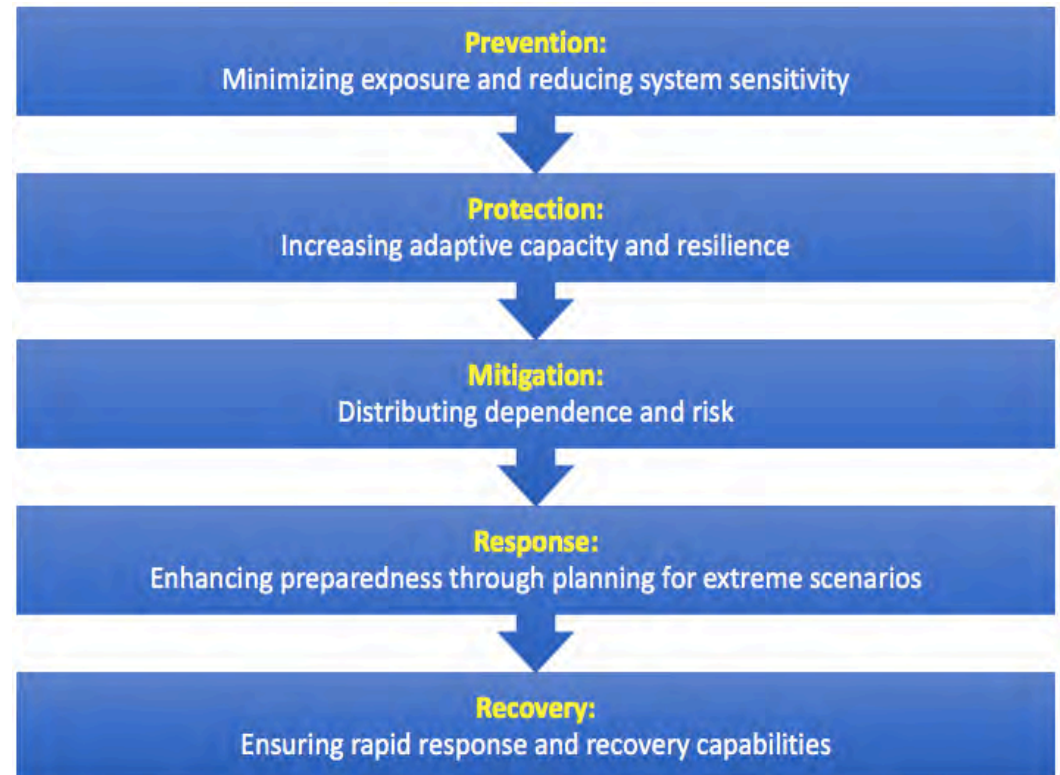
Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 62 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Presidential Preparedness Directive (PPD-21)

Issued February 2013, established a framework for advancing a national unity of effort to strengthen and maintain secure, functioning, and resilient critical infrastructure



“Critical infrastructure must be secure and able to withstand and rapidly recover from all hazards. Achieving this will require integration with the national preparedness system across prevention, protection, mitigation, response, and recovery.”

<https://www.dhs.gov/sites/default/files/publications/PPD-21-Critical-Infrastructure-and-Resilience-508.pdf>



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

Slide 63 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Research Findings:

Governance & Leadership Structure

- More than half of participants reported multiple people across a large number of division, departments or business units were responsible for some part of climate preparedness and resilience across their organization.
- Most reported no centralized leadership structure
 - Leadership generally shared across organizational departments or teams
- Virtually no recognizable dominant patterns of governance or leadership within Federal agencies or governments of any level



Research Findings:

Nature of Job & Performance Expectations

- Employers are not making a distinction between the leaders of climate and resilience initiatives and those with support roles across the climate and resilience planning space.
- Participation in multi-stakeholder initiatives and continuing education
- Virtually no professional credentials related to resilience are currently required for climate preparedness outside of emergency management roles



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency

Climate Change Preparedness Capacity (October 30, 2019)

Slide 65 of 78



Research Findings:

Training Requirements & Preferred Credentialing

- No distinction in training or credentialing of primary leaders and those involved supporting climate preparedness in organizations
- Small number of survey respondents reported requiring some aspect of continuing education, professional development or other training related activities



Research Findings:

Formal Planning & Organizational Barriers

- Majority of respondents reported that their organizations had not developed or actively sustained a comprehensive adaptation, resilience, or climate preparedness plan
- Increasing number of organizations reported an initial effort to conduct climate vulnerability assessments and similar evaluations
- Most significant barriers noted include:
 - **budgetary restrictions,**
 - **competing institutional priorities,**
 - **deficiency of technical skills, and**
 - **lack of standardization and established/accepted best practices.**



Key Themes in the Project Findings

- Preparedness and resilience is resulting from reaction
- Evolving across agencies and sectors at wildly different paces and with very different practices
- Key challenges to deploying resiliency measures
 - Science literacy and preparedness competencies must be systemically advanced
 - Standardization and leveraging of data and risk



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 68 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Research Findings:

Key Competencies Identified by Stakeholders

Technical Skills

- Finance / Disaster Finance
- Law, Insurance, and Liability
- Project and Logistical Management
- Public Policy and Participation
- Risk / Emergency Management
- Systems Thinking

Behavioral Skills

- Collaboration
- Communication and Facilitation
- Initiative & Motivation

ACCO's Takeaway

Despite an increased emphasis and focus on preparedness across regions and critical infrastructure sectors, ACCO found virtually no mandates from employers or credentialing bodies upon decision-makers and practitioners.

Though there is a general recognition that the current state of employer expectations and credentialing body standards needs to mature, there is no policy requirement or market signal that compels those behaviors.



ACCO's Initial Conclusion

Based upon the research conducted, ACCO proposed to DHS a focused effort to address the following three areas:

1. Advancing workforce standardization and professional development resources
2. Support sectoral and regional collaboration
3. Enhancing accessible data, codes/standards and decision-support resources



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 70 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Core Competencies for Climate Change Officers and Professionals

Strategic execution competencies:

Largely skills-based and include supporting organizational change, helping to mitigate risk, engaging stakeholders, being actively involved in policy efforts beyond the walls of the organization and maintaining other external partnerships.

Organizational knowledge and experience:

Strategic planning, decision-making, compliance, enterprise risk management, asset management, the management of value and supply chains, corporate communications and corporate social responsibility, and organizational governance.

Foundational knowledge and skills:

Science literacy, environmental literacy, knowledge of the policy landscape, and management acumen.



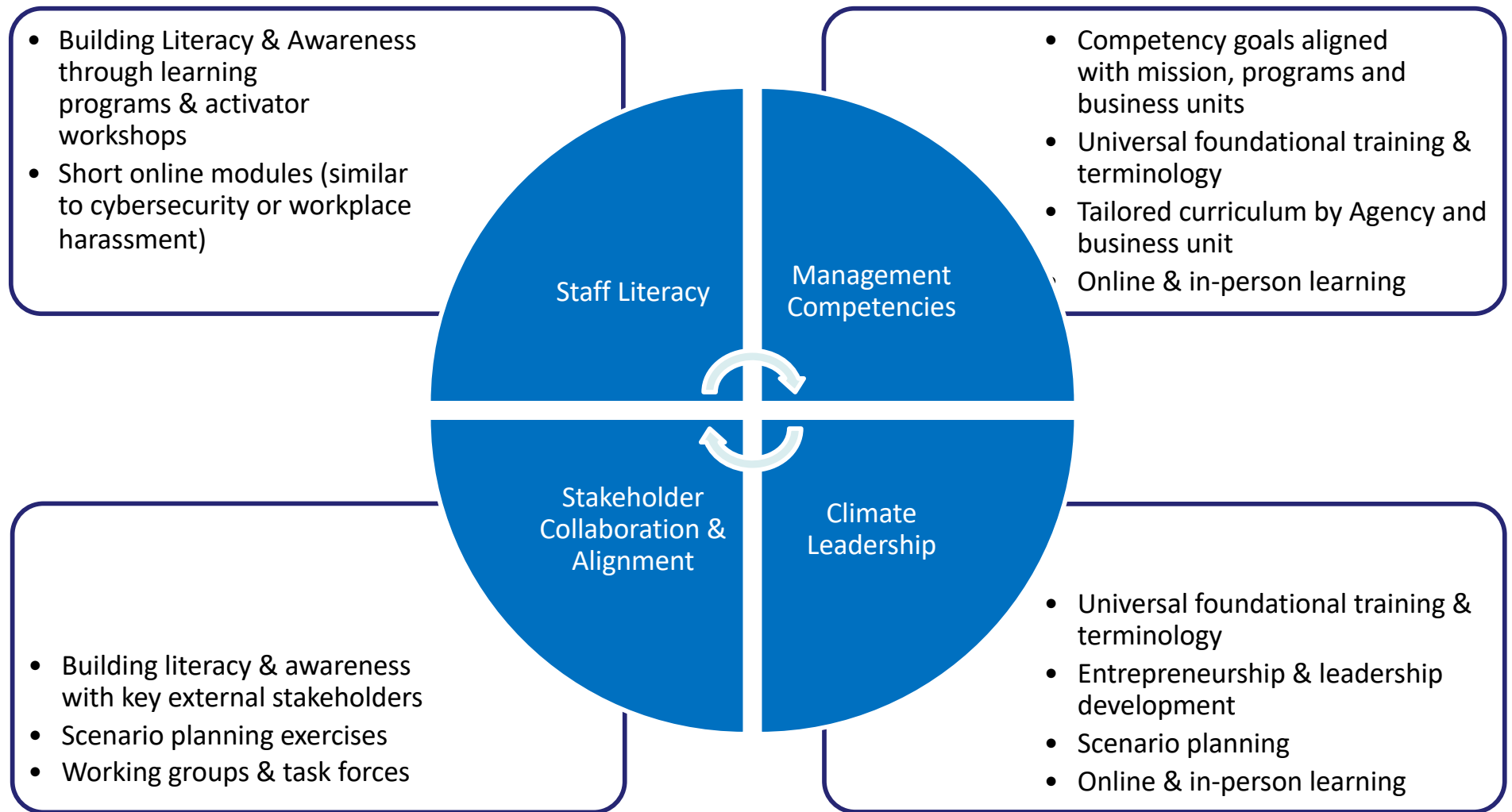
Roles to Consider across Agencies & Sectors

Each role/function can potentially require a unique set of competencies and knowledge:

- Siting
- Design & Engineering
- Planning
- Budget & Finance
- Project Management
- Executive Leadership
- Facilities Management
- IT & Communications
- Regulatory / Policymaking
- Risk & Continuity



Putting an Agency-Wide Climate Smart Workforce Capacity Plan Together: 4 Key Areas



Putting an Agency-Wide Climate Smart Workforce Capacity Plan Together: Who Needs to Know What?

Foundational Knowledge & Skills	Organizational Knowledge & Experience	Strategic Execution Competencies
<ul style="list-style-type: none"> • Science Literacy • Environmental and Economic Literacy • Understanding of the Policy Landscape • Management Acumen 	<ul style="list-style-type: none"> • Strategic Planning • Decision-Making • Compliance & Enterprise Risk Management • Asset Management • Value and Supply Chains • Communications & Social Responsibility • Governance 	<ul style="list-style-type: none"> • Enterprise Risk Mitigation • Supporting Change Within the Organization • Stakeholder Engagement • Reaching Beyond the Organization

Related Literature:

- Core Competencies for Climate Change Officers and Professionals
<https://accoonline.org/core-competencies>
- Institutionalizing Climate Change into Decision-Making
<https://accoonline.org/insights/2017/5/18/part-6-building-and-mobilizing-a-climate-smart-army>
- Advancing the Occupation and Growing the Supply of Climate Leaders
<https://accoonline.org/insights/2017/4/3/part-4-advancing-the-occupation-and-growing-the-supply-of-climate-leaders>

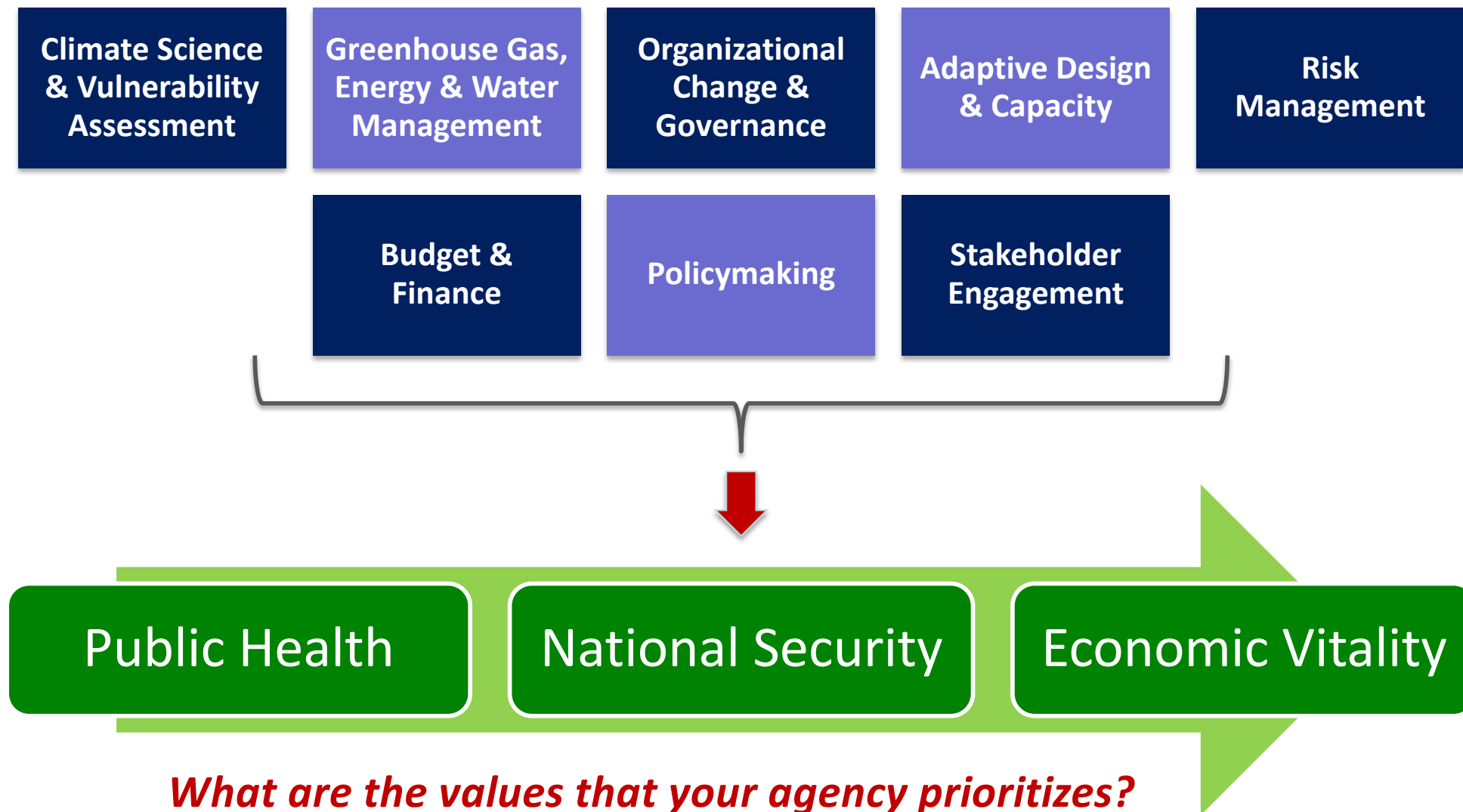


Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 74 of 78

Getting Climate into the DNA of Decision-Making



Institutional Leadership & Capacity is being Reviewed

S&P Global
Ratings

RatingsDirect®

Summary:

Charles County, Maryland; General Obligation

Primary Credit Analyst:

Nora G Wittstruck, New York (1) 212-438-8589; nora.wittstruck@spglobal.com

Secondary Contact:

Krystal Tena, New York + 1 (212) 438-1628; krystal.tena@spglobal.com

Rationale

S&P Global Ratings assigned its 'AAA' long-term rating to Charles County, Md.'s \$58 million general obligation (GO) consolidated public improvement bonds of 2019. At the same time, we affirmed our 'AAA' long-term rating on the county's GO debt outstanding. The outlook is stable.

Very strong management

We believe the management team adheres to its policies and procedures in a meaningful way, including regularly monitoring its compliance with stated metrics.

We view the county's proactive and multipronged approach to climate change as indicative of the management team's overall long-term planning strategy. The county has identified ways to mitigate greenhouse gas emissions and improve the county's sustainability efforts, including eventually transitioning to powering county facilities with solar energy and working with the University of Maryland to create a resiliency plan to model the effects of sea-level rise on the location of county assets. The county is also partnering with the Maryland Climate Leadership Academy to credential local government officials; more than 20 county staff are enrolled.

WWW.STANDARDANDPOORS.COM/RATINGSDIRECT

OCTOBER 25, 2019 3



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 76 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS

Final Thoughts

- Consider what your neighbors and peers are doing – unintended consequences abound
- Never waste a good crisis!
- Manage regrets –
 - Budgets drive the train, so ask yourselves, “What level of regret are you willing to accept?”
 - Then make a choice and own it
- No answer is final under the new normal
- Human capital is the key!



Questions?

Daniel Kreeger

Executive Director

Association of Climate Change Officers

dkreeger@ClimateOfficers.org

202-997-8673



Federal Environmental Symposium

Conducting Vulnerability Assessments & Building Federal Agency
Climate Change Preparedness Capacity (October 30, 2019)

Slide 78 of 78

ACCO
ASSOCIATION OF CLIMATE CHANGE OFFICERS