

## Climate Change Vulnerability Assessment Cheat Sheet

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$$\text{Vulnerability} = (E * S) - AC$$

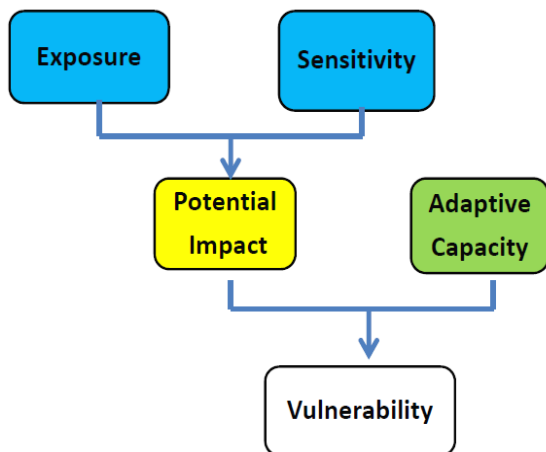
**Vulnerability:** Climate change vulnerability is the degree to which a resource (e.g., species, habitat) is susceptible to, and unable to cope with, the adverse impacts of climate change (IPCC 2007). It explores *what* things are most vulnerable and *why* are they vulnerable.

**Vulnerability (V)** to climate change considers:

**Exposure (E):** the amount of change in climate a resource is likely to experience (e.g., how many degrees temperature is projected to rise)

**Sensitivity (S):** whether and how a resource is likely to be affected by a given change in climate (e.g., how temperature affects species health and distribution)

**Adaptive Capacity (AC):** the ability of a resource to accommodate or cope with change; intrinsic traits (e.g., phenotypic plasticity of individuals) and extrinsic factors (e.g., degree of habitat fragmentation) both influence the ability of a resource to cope with changes in climate



### Vulnerability Components

#### Factors to consider for assessing *Exposure*:

- primary factors (e.g., temperature, precipitation)
- secondary factors (e.g., snowpack, sea level rise, wildfire)
- non-climate stressors (e.g., development, invasive species)

#### Factors affecting *Sensitivity*:

- narrow environmental tolerances or thresholds
- dependence on interactions with other species
- specialized habitat requirements
- additional stressors

#### Factors that can influence *Adaptive Capacity*:

- dispersal ability
- life history diversity
- integrity, continuity, extent
- institutional or management capabilities

## Examples of Reducing Vulnerabilities and/or Enhancing Adaptive Capacity<sup>1</sup>

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### 1. Decreasing EXPOSURE (i.e., how to limit change itself)

- Reducing greenhouse gas emissions to reduce rate and extent of global change
- Protecting resources and infrastructure from flood damage, sea level rise, and/or storm surge
- Planting riparian tree canopy to provide shading over open water to moderate exposure to warmer air temperatures
- Increasing use of permeable pavements and other low-impact approaches to decrease runoff and/or increase groundwater recharge, helping limit drought and flooding

### 2. Decreasing SENSITIVITY (i.e., how to limit impacts)

- Reducing or eliminating invasive species that outcompete native species for limited water resources
- Actively planting drought-tolerant species in an area projected to get drier
- Reducing frequency and/or timing of grazing during vulnerable periods (e.g., during drought periods)
- Increasing upland water storage (e.g., relocating beavers, installing beaver mimic dams) to help keep water in the system

### 3. Enhancing ADAPTIVE CAPACITY (i.e., how to spread risks):

- Diversifying water supply sources and/or increasing storage capacity
- Focusing protection efforts on areas with many climatic microhabitats and/or “enduring features” (e.g., geophysical features) that will support future diversification
- Maintaining or enhancing biological diversity across a range of functional groups to improve the ability of a system to recover from disturbances
- Increasing landscape connectivity to facilitate species movements over the landscape in response to changing conditions

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<sup>1</sup> Examples modified from Gregg et al. 2011; Hansen and Hoffman 2010; and Stein et al. 2014.

