

Climate & Stormwater

Targets. Systems. Scenarios.

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Elements of Adaptation

- 1. Targets**
- 2. Systems**
- 3. Scenarios**

Targets

Management Targets

- e.g., discharge volume limits, flow velocity, detention time, etc.

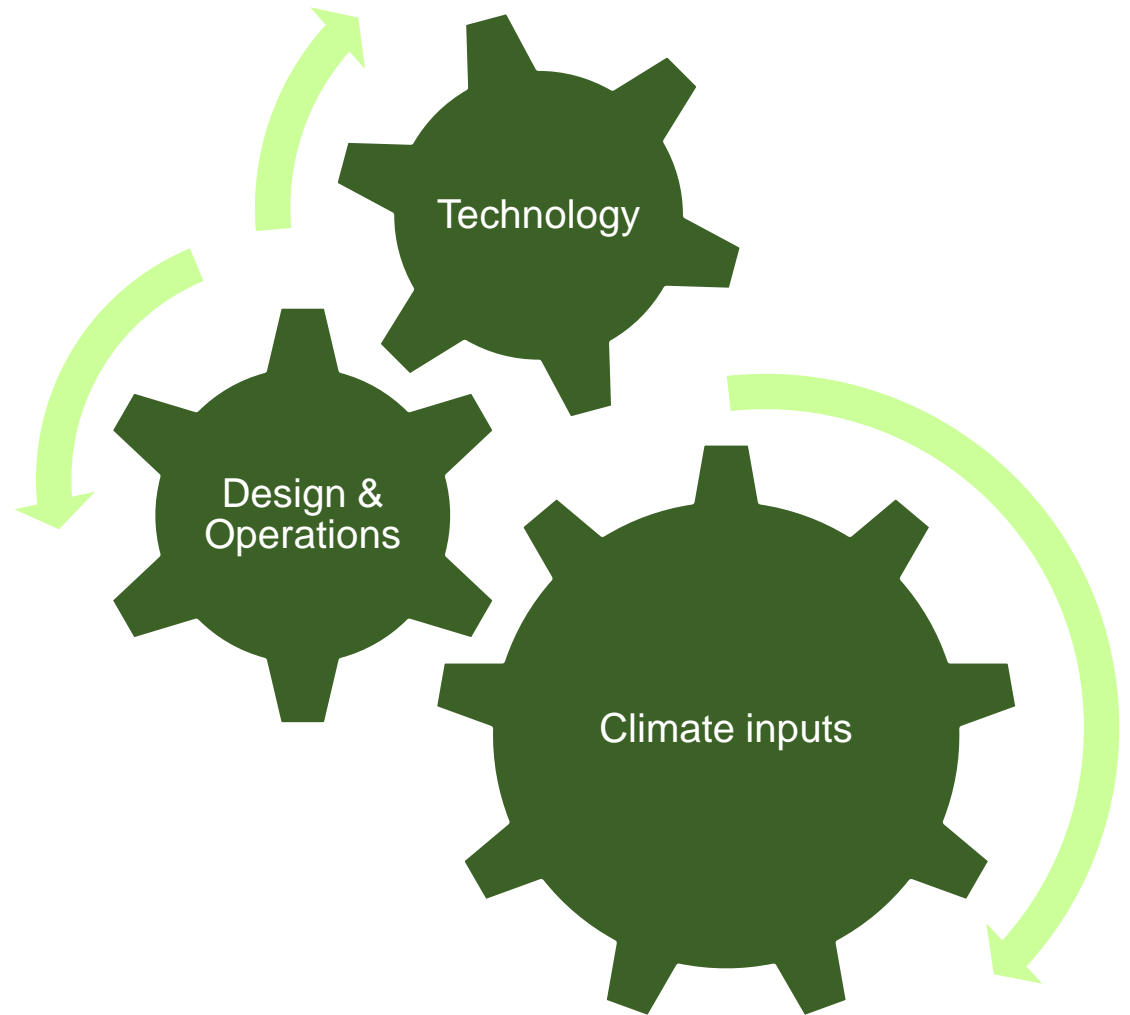
Ecological Thresholds

- e.g., temperature limits

Physical Limits

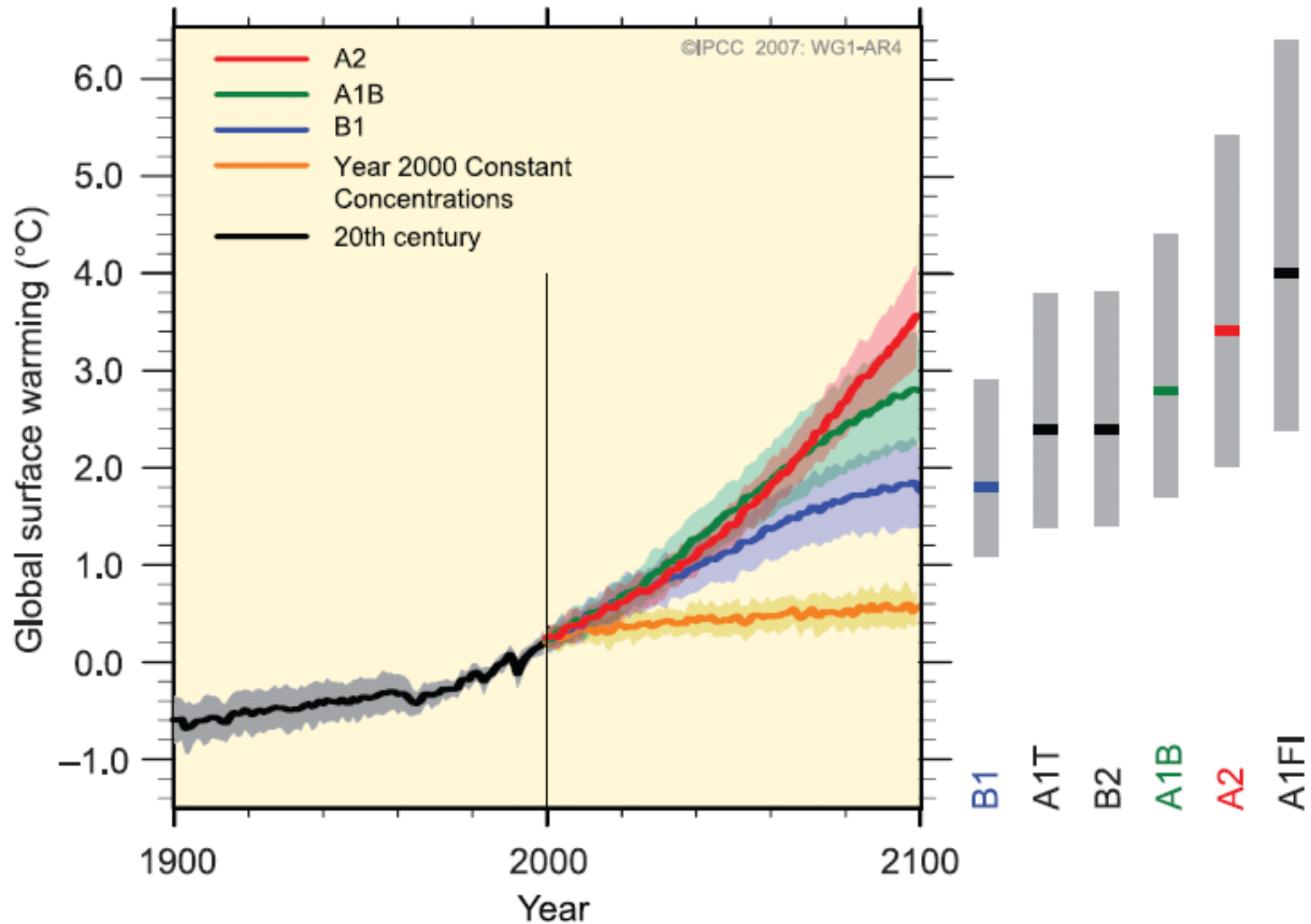
- e.g., material strength

Climate-Sensitive Systems

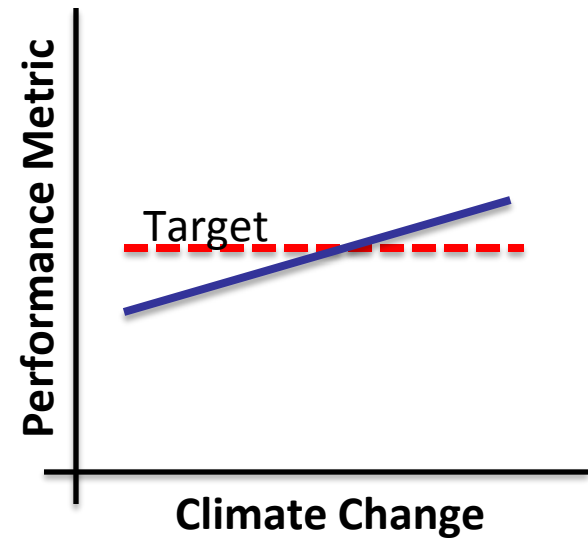
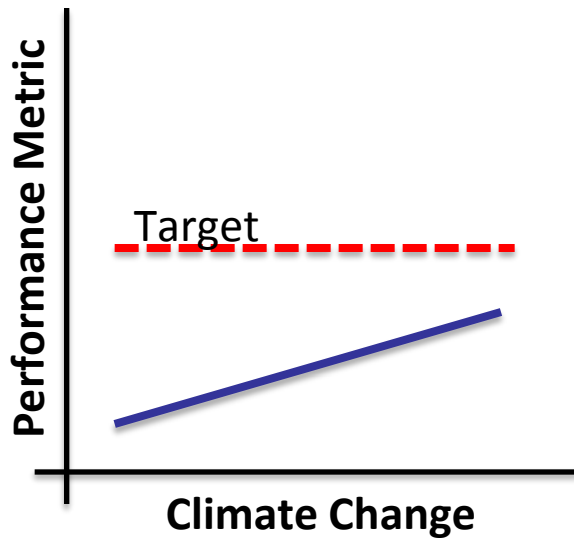
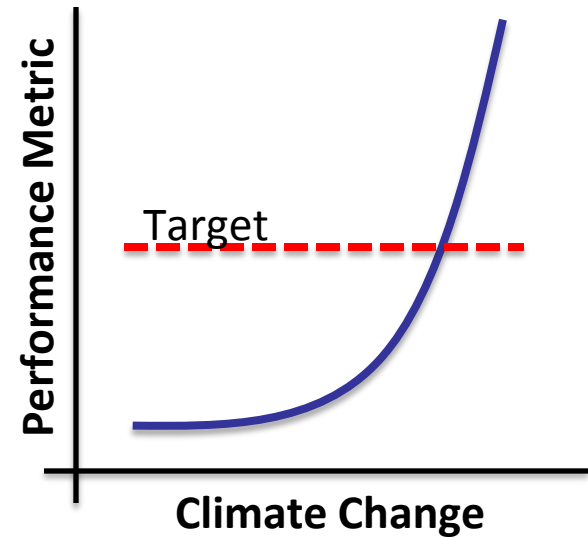
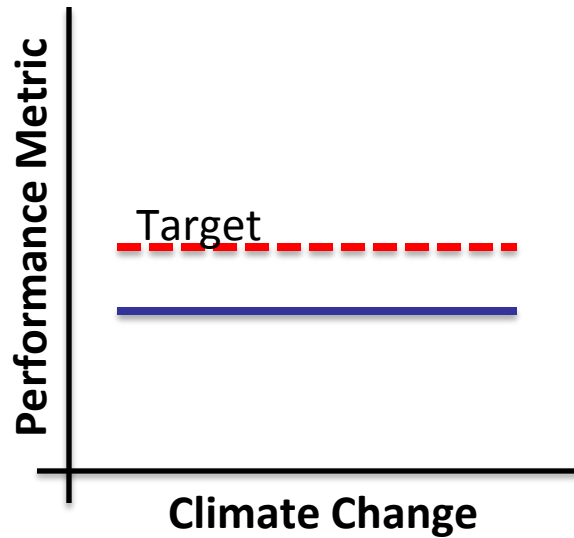


Climate Scenarios

MULTI-MODEL AVERAGES AND ASSESSED RANGES FOR SURFACE WARMING



Targets x Systems x Scenarios



Practical

Example #1

Chesapeake Bay



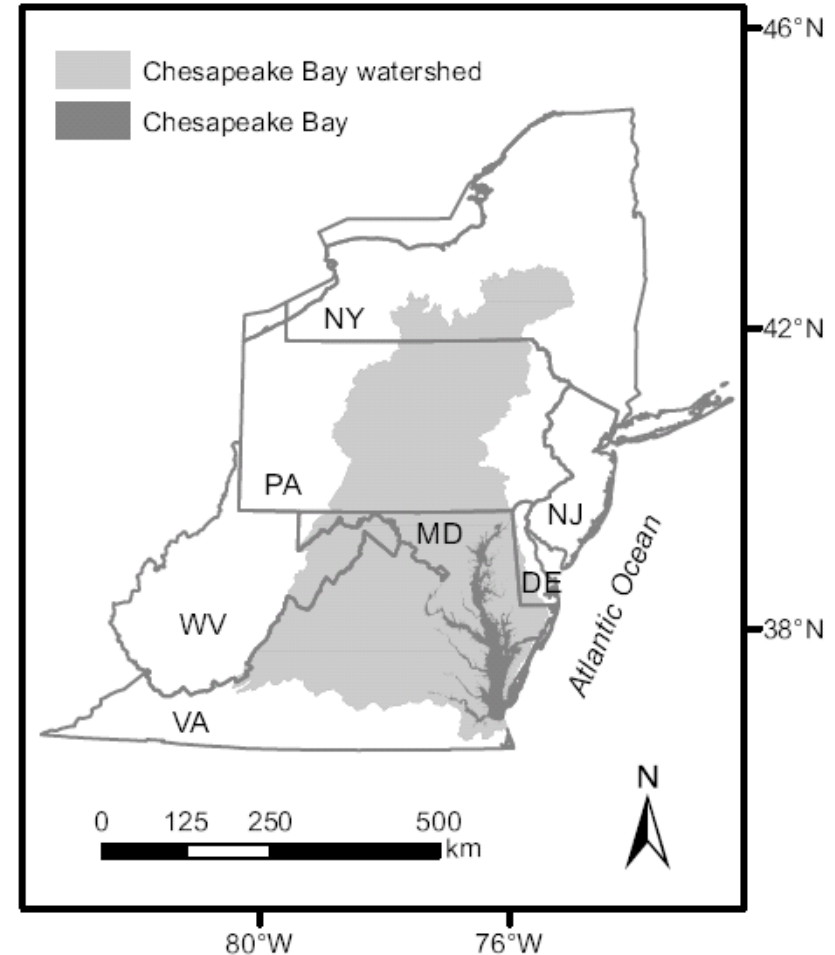
Chesapeake Bay Targets

Water Quality

- e.g., pollutant load allocations, discharge permits, designated uses, etc.

Living Resources

- e.g., SAV restoration, oysters, fisheries, wetlands, etc.



Chesapeake Bay Systems

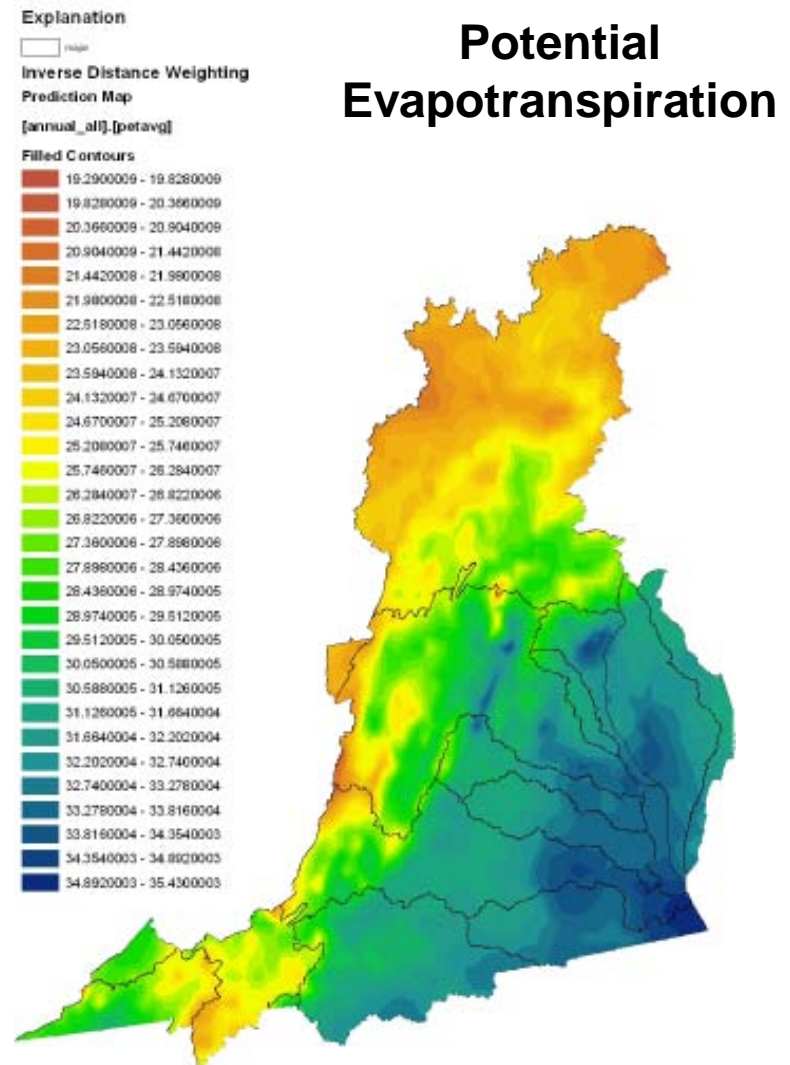
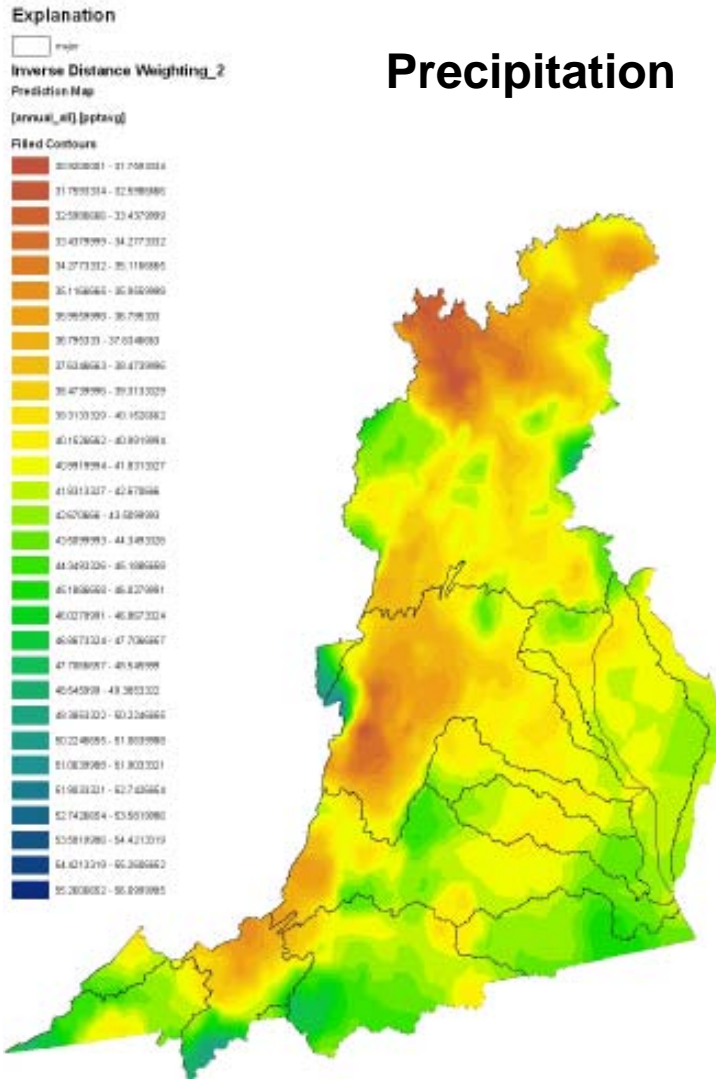
Water Quality

- BMPs
- Infrastructure
- Watersheds
- Estuary

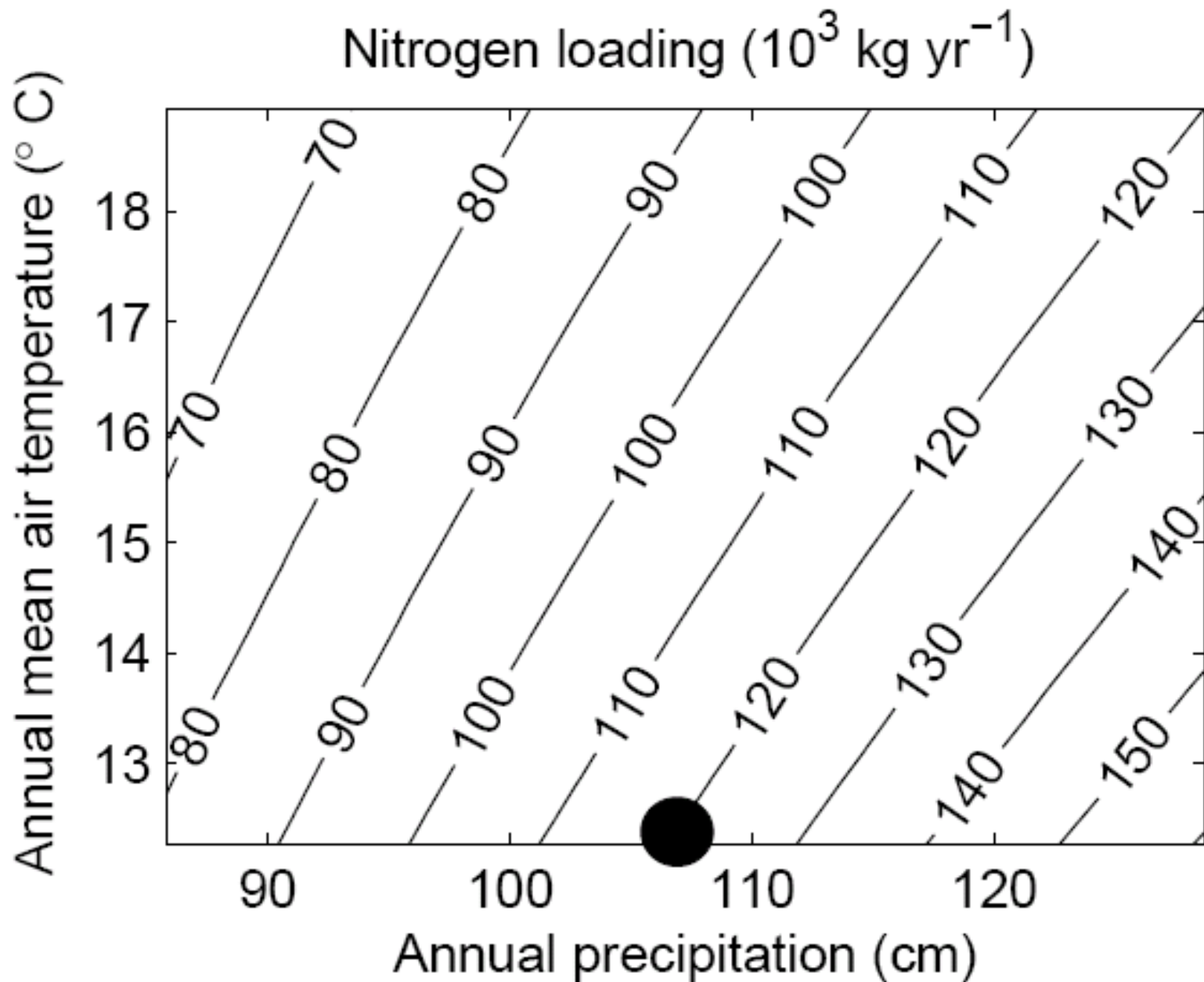
Living Resources

- Populations
- Communities
- Habitat

Bay Watershed Model



“Normal” based for 18 year simulation period based on meteorological data for 1984-2002

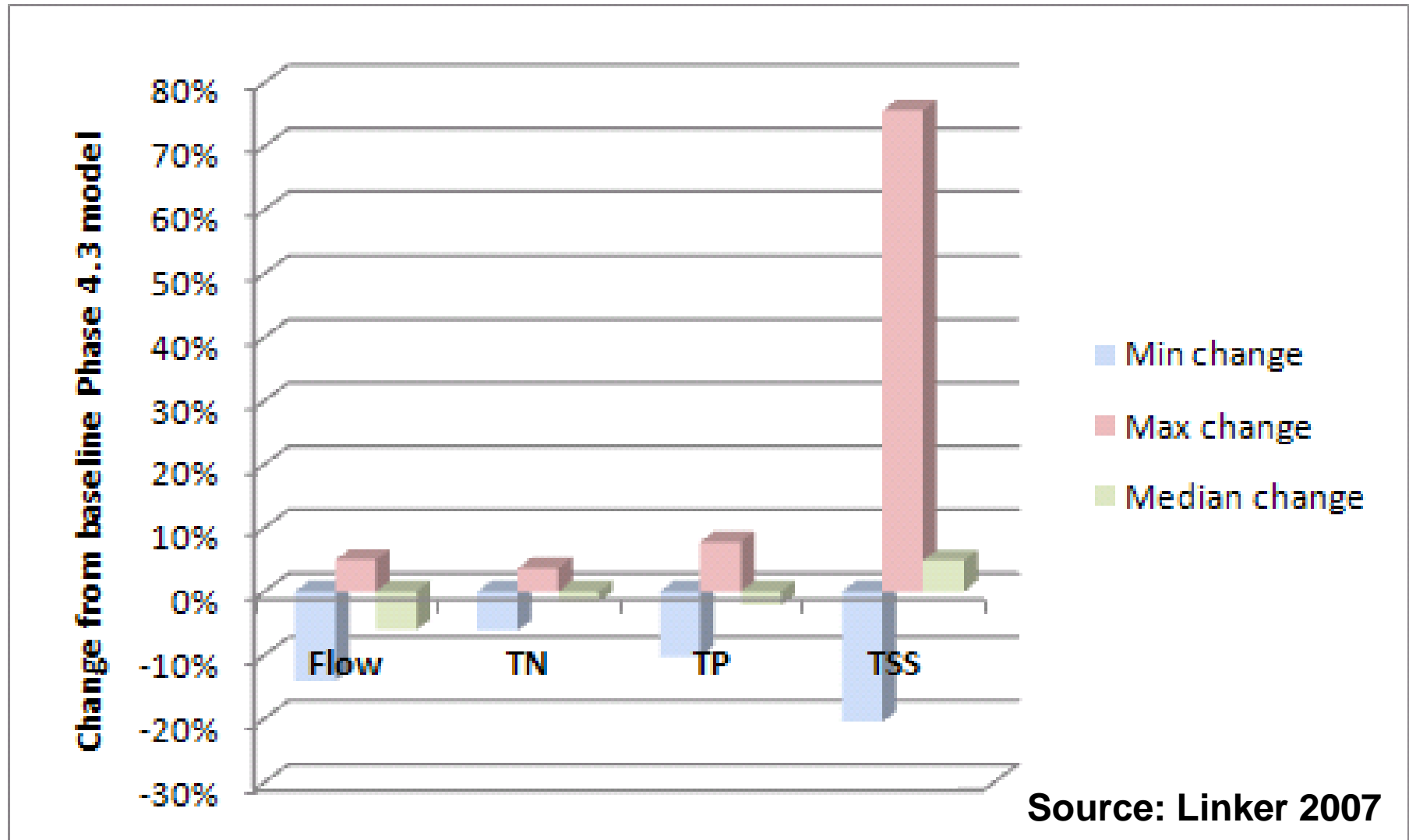


Chesapeake Bay Scenarios

Plausible conditions in 2100:

- Sea level: +0.5 to >1.0m
- Temperature: +2 to >8°C
- Annual precipitation: -10% to +20%
- Spring runoff: higher
- Summer runoff: lower

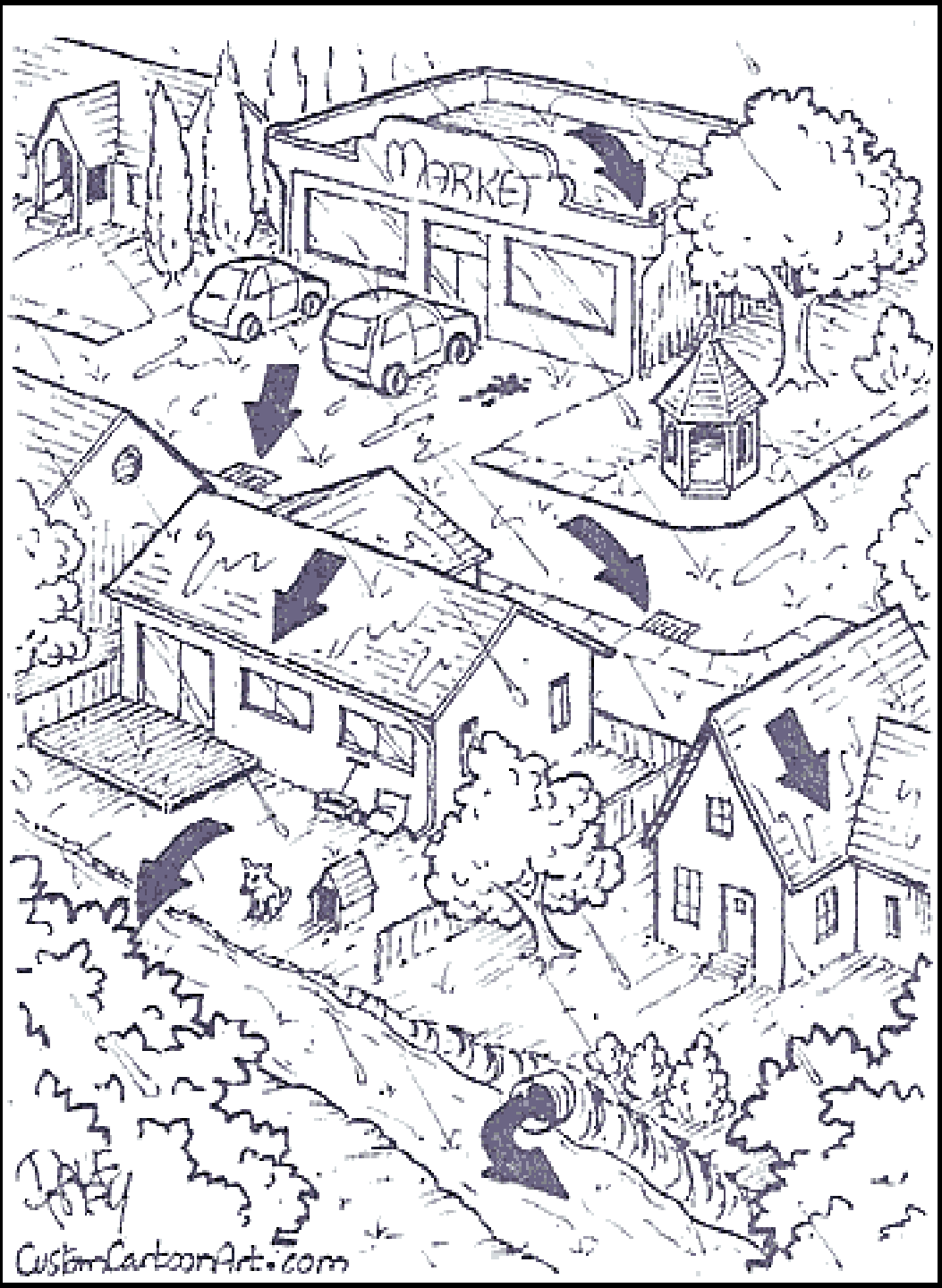
Consequences for Chesapeake Bay



Practical

Example #2

Runoff Management



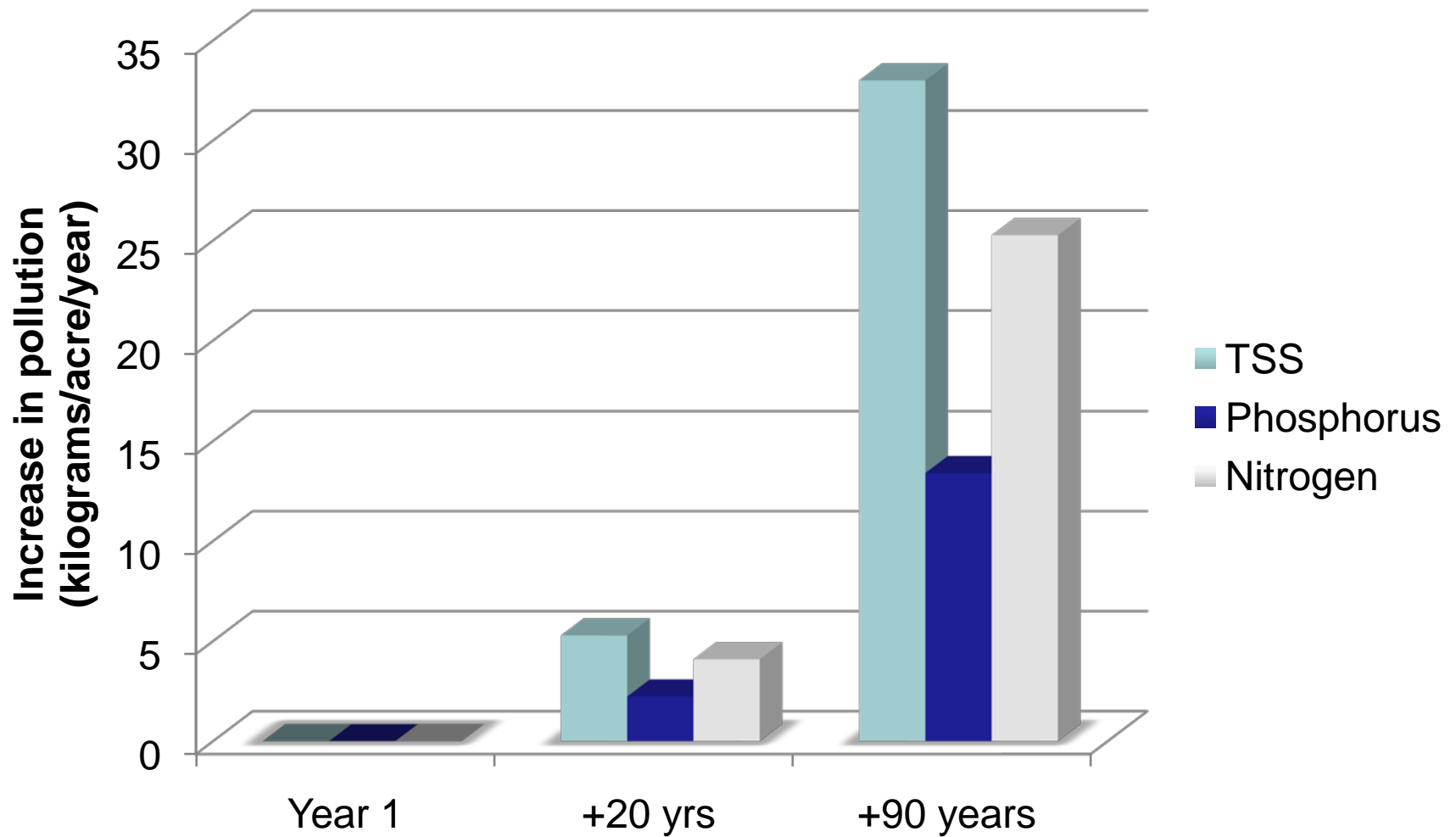
Base Redevelopment

1. **System:** Stormwater practices and permitting based on historic design storms
2. **Target:** Requirements to control runoff volume and water quality
3. **Scenario:** Increased frequency of high-intensity precipitation events



**South Weymouth Naval Air Station
...now Southfield, MA**
Precipitation intensity trends: +28% in
20 years, +127% in 90 years

Consequences



Take Homes Messages

- Climate change impacts are the product of management targets, systems, and scenarios
- Historic climatic assumptions jeopardize future performance
- Changing conditions can and should be anticipated to meet long-term performance goals.

Questions

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