Climate Change Adaptation & Conservation - A New Paradigm

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Climate Change Adaptation

Helping human and natural systems cope with:

- the direct effects of climate change

- human responses to climate change

Mendenhall Glacier, Alaska

Waymart Wind Farm

Has Climate Change Begun?

- The first 8 years of this century are among the top 10 warmest on record.

- Sea surface temperatures this year are the highest ever recorded.

- The past three years have had the smallest amount of arctic sea ice ever recorded.

- Sea level is rising 80% faster than predicted due to climate change.

Maybe It's Natural?

- We're in a period of **decreased** solar output

- CO_2 hasn't been this high in 800,000 years

- CO_2 is rising 10x faster than it has in at least 22,000 years

- CO_2 fingerprints show the CO_2 is from us

Hubbard Glacier, Alaska

How Will Species Respond?
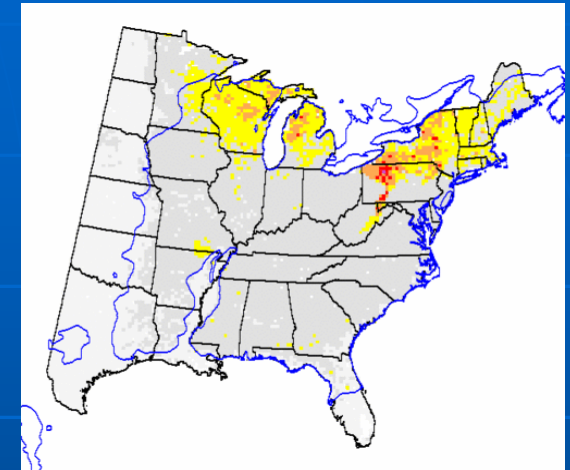
"I don't mind"

Climigration
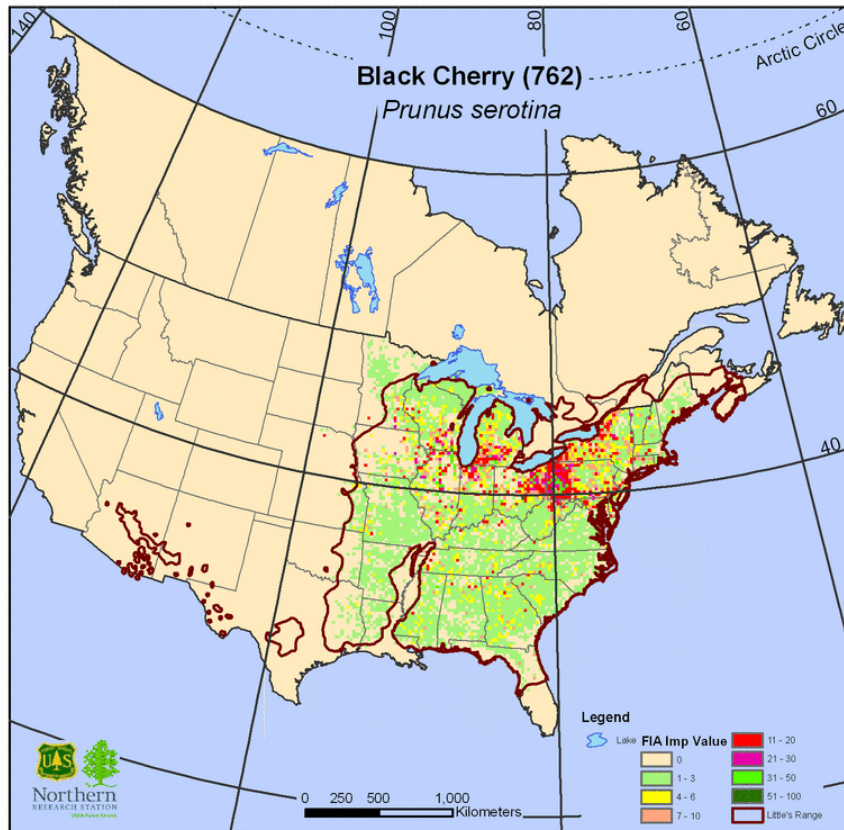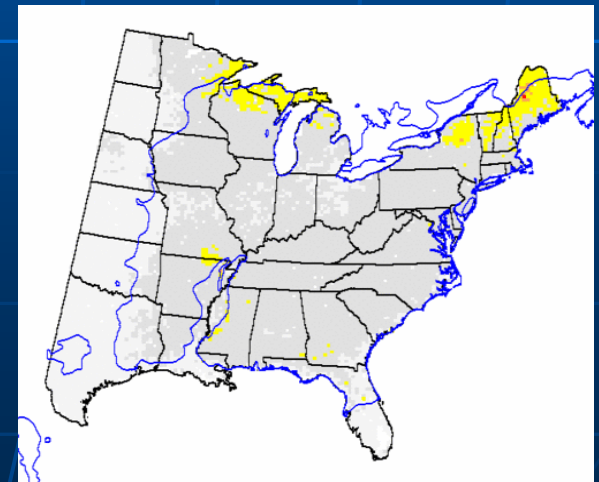
Extinction

Are Species Being Affected Yet?

Black Cherry

Doubling of CO_2

Tripling of CO_2

Current distribution

(Source: USFS)

Invasive Species

Kudzu

Woolly Adelgid

Conservation . . .

. . . used to be focused on preservation and restoration

. . . must now be based on future conditions

Determine which species will be most affected

Climate Change Vulnerability Index

- Factors considered:
  - Dispersal ability
  - Genetic variation
  - Documented response to climate change
  - Habitat vulnerability & specificity
  - Others

Pennsylvania Natural Heritage Program

NatureServe

Shift Emphasis to Monitoring

- Knowing where things are now or where they once were is no longer as important as evaluating how they're responding to climate change

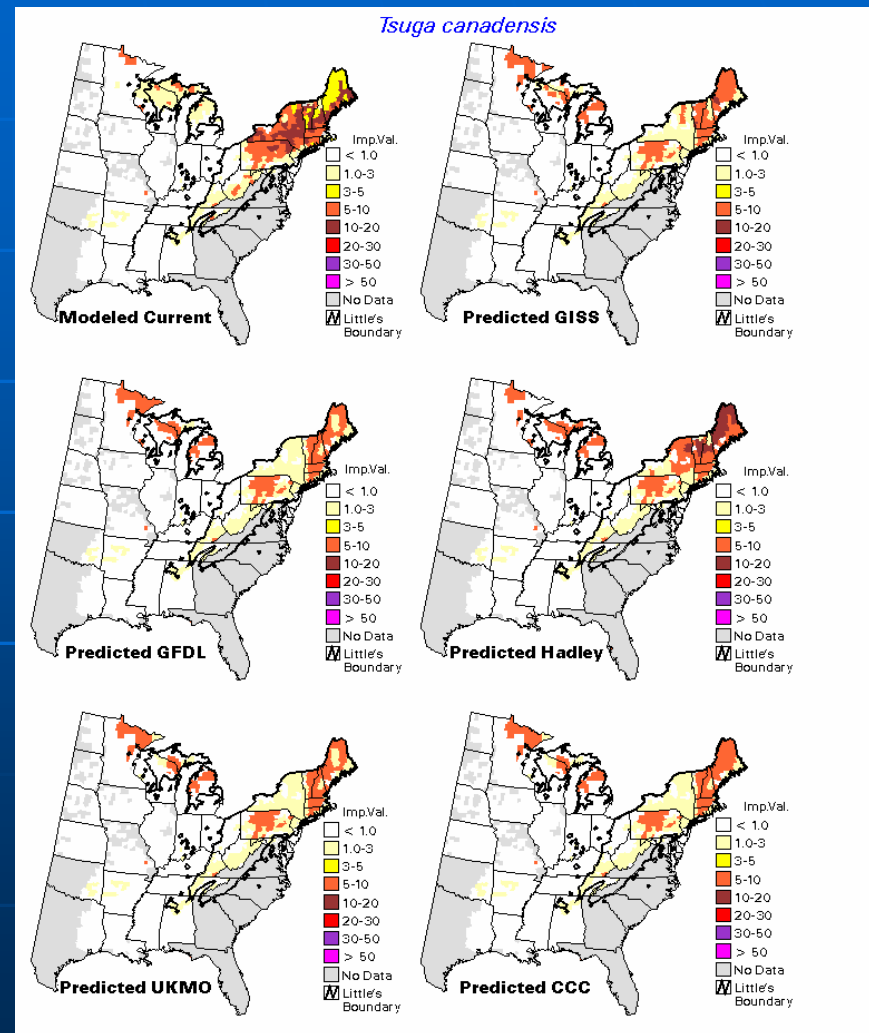- Major federal focus and likely to be well funded in the future

Predict Distribution Changes

• Maps predict where favorable conditions will exist for a species

•Species move - habitats & communities don't

•No guarantee that a species will move

Tsuga canadensis

Prasad, A. M. and L. R. Iverson. 1999-ongoing. A Climate Change Atlas for 80 Forest Tree Species of the Eastern United States [database]. http://www.fs.fed.us/ne/delaware/atlas/index.html, Northeastern Research Station, USDA Forest Service, Delaware, Ohio.

Identify Priority Conservation Areas

• Refuges & corridors

• Public lands will be a critical component

• Can help to prioritize grants for acquisition, easements, etc.
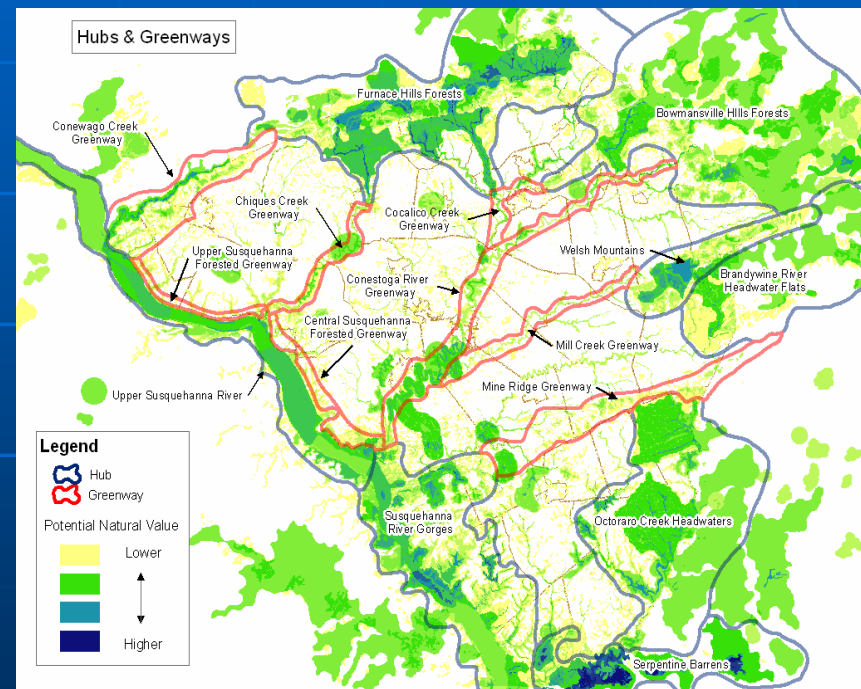
Preserve Ecosystem Function
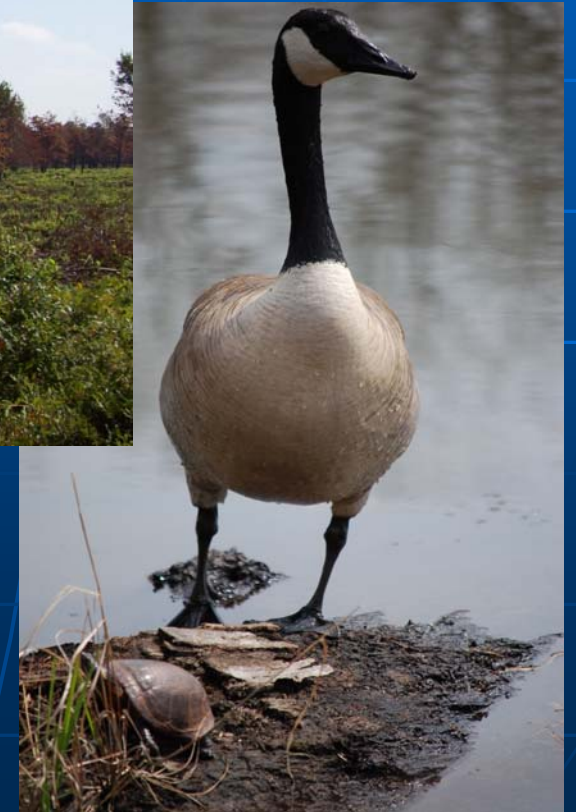
Maintain Ecosystem Resilience

Work Across Borders

- Geographic

- Organizational

- Internal

The New Approach to Conserving PA's Biodiversity

- Identify those species most at risk

- Shift emphasis from inventory to monitoring

- Model distribution changes

- Identify priority conservation area

- Manage for ecosystem function & resilience

- Work across borders

Questions?