

***Rising to the Urgent
Challenges
of a Changing Climate –
the USFWS Strategic and
Action Plans for Climate
Change***



**“The supreme reality of our time is...the vulnerability of our planet.”
-- John F. Kennedy, 35th President of the United States, 1963 --**

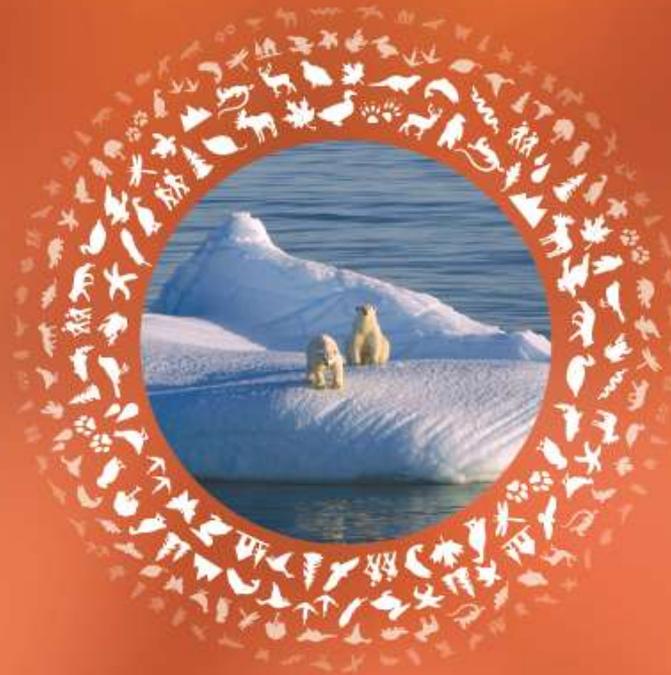


U.S. Fish & Wildlife Service

DRAFT

Rising to the Challenge

Strategic Plan for Responding to Accelerating Climate Change

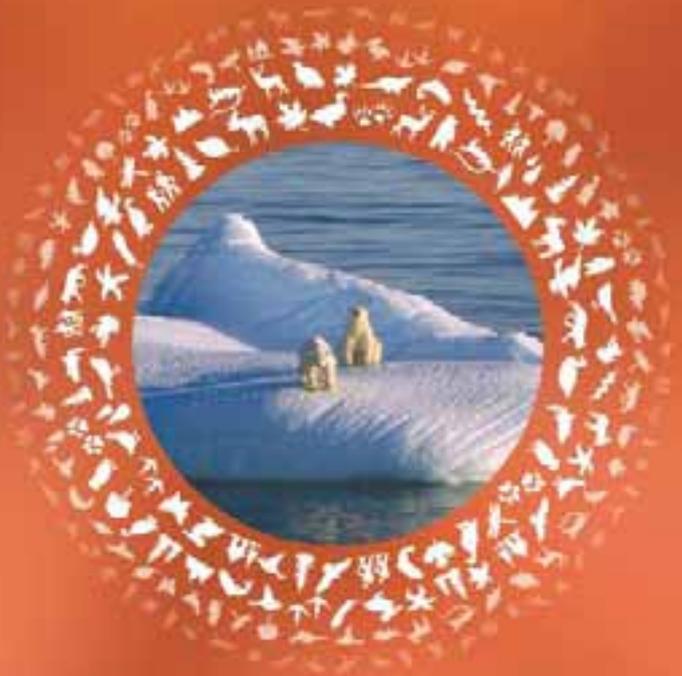


DRAFT

U.S. Fish & Wildlife Service

Rising to the Challenge

Strategic Plan for Responding to Accelerating Climate Change



- Public Review – ended Nov 18
- Process for compiling comments under development
- Encourage your partners to review

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Adaptation / 18

Goal 1: We will develop long-term capacity for biological planning and conservation design and apply it to drive conservation at broad, landscape scales. / 18

Goal 2: We will plan and deliver near-term and long-term landscape conservation actions that support climate change adaptations by fish, plants, wildlife, and habitats of ecological and societal significance. / 20

Goal 3: We will develop monitoring and research partnerships that make available complete and objective information to plan, deliver, evaluate, and improve actions that facilitate fish and wildlife adaptations to accelerating climate change. / 23

Mitigation / 24

Goal 4: We will change our business practices to achieve carbon neutrality by the Year 2020. / 24

Goal 5: To conserve and restore fish and wildlife habitats at landscape scales, we will build our capacity to understand, apply, and share biological carbon sequestration science; and we will work with partners to sequester atmospheric greenhouse gases in strategic locations. / 25

Engagement / 25

Goal 6: We will engage Service employees; our local, state, national, and international partners in the public and private sectors; our key constituencies and stakeholders; and everyday citizens in a new era of collaborative conservation in which, together, we seek solutions to the impacts of climate change and other 21st century stressors of fish, wildlife and habitats. / 25

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On the cover:
Polar Bears.
Courtesy of National Geographic

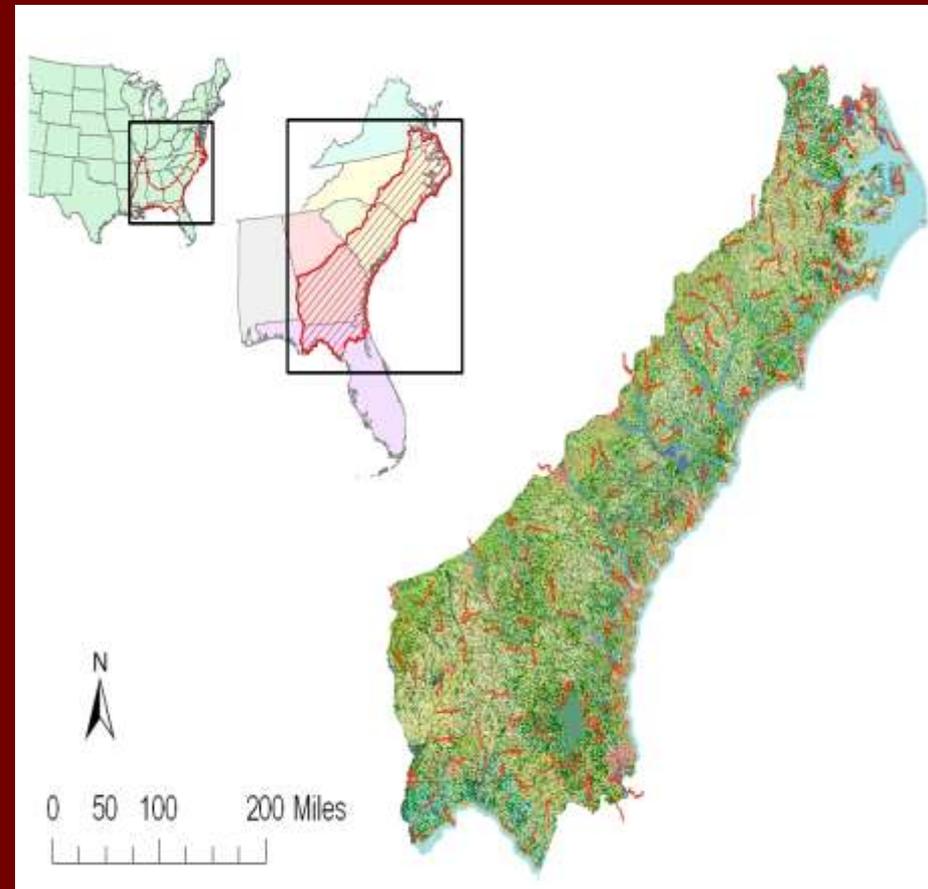
Content

- Fish and Wildlife Adaptation
 - 3 goals: biological planning, conservation action, monitoring and research
- Mitigation
 - 2 goals: Carbon neutral, carbon sequestration
- Engagement
 - 1 goal: communication internal and external to better build partnerships and inform people

Develop a National Fish and Wildlife Adaptation Strategy (FWS lead)

This may be the most consequential and crucial conservation endeavor of the 21st Century and we commit ourselves to an intensive 5-year collaboration, to develop a National Fish and Wildlife Adaptation Strategy (NFWAS).

Achieving this will require unprecedented collaboration among private, state, tribal, federal, and international organizations.

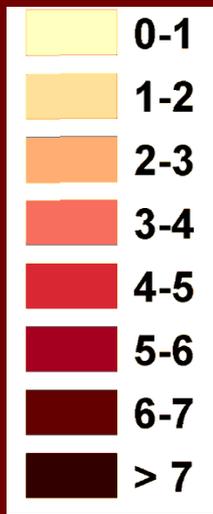


Very early in development

- Should have action plan elements of
 - Population objectives and dynamics
 - Species vulnerability
 - Habitat fragmentation
 - Genetics
 - Species – habitat relationships
 - Specific climate data and predictions

Develop climate models (USGS)

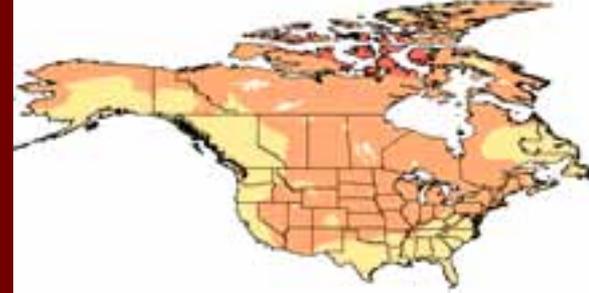
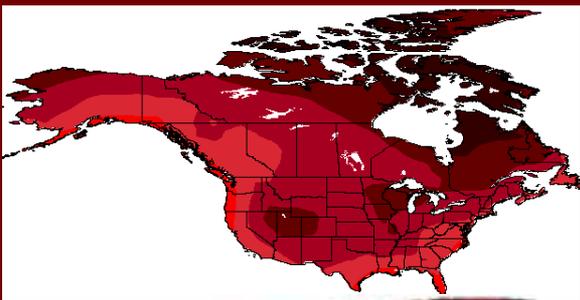
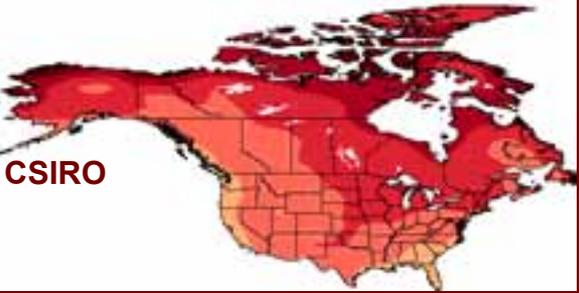
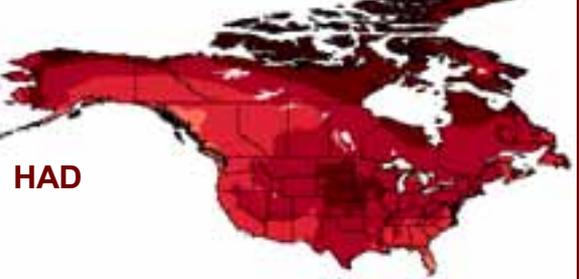
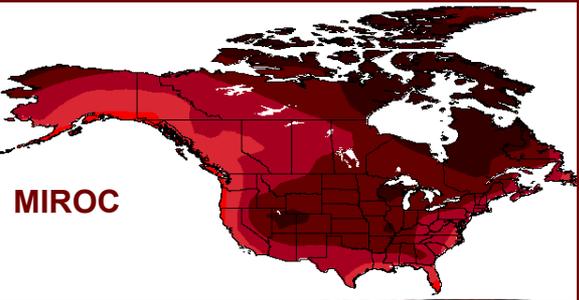
Projected Change in monthly mean temperature
(Degrees C)
1961 – 1999 vs 2077 – 2099



A2

A1B

B1

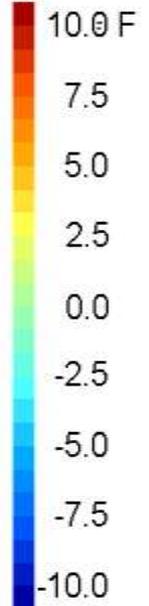


Coarse scale at state level

a1b Mean Temperature Departure 2010 - 2060



Legend



June 2009 report – regional details



**Global Climate Change
Impacts in the United States**

U.S. Global Change Research Program

HIGHLIGHTS

- How has climate already changed?
- How is it likely to change in the future?
- How is climate change affecting us now where we live and work?
- How is it likely to affect us in the future?

globalchange.gov/usimpacts

Key Findings:

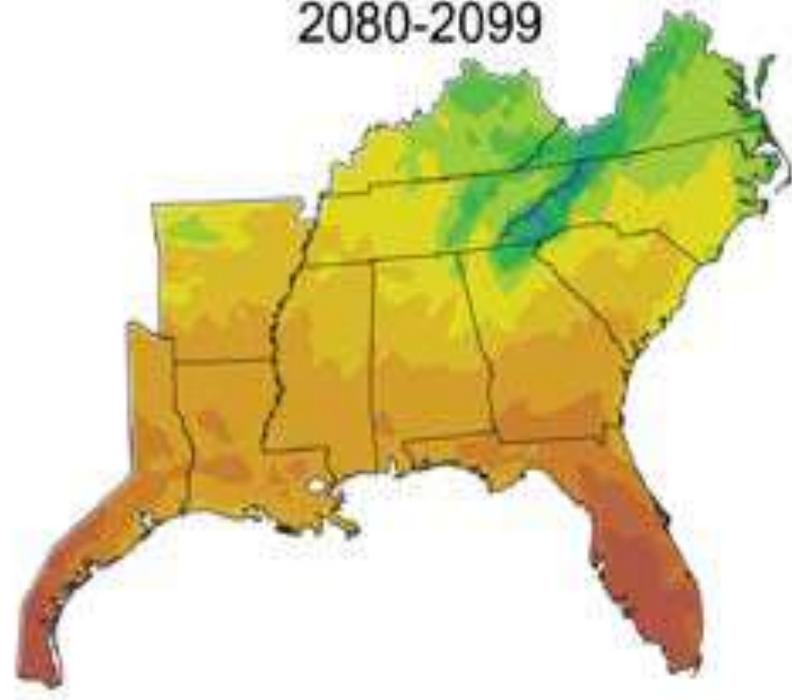
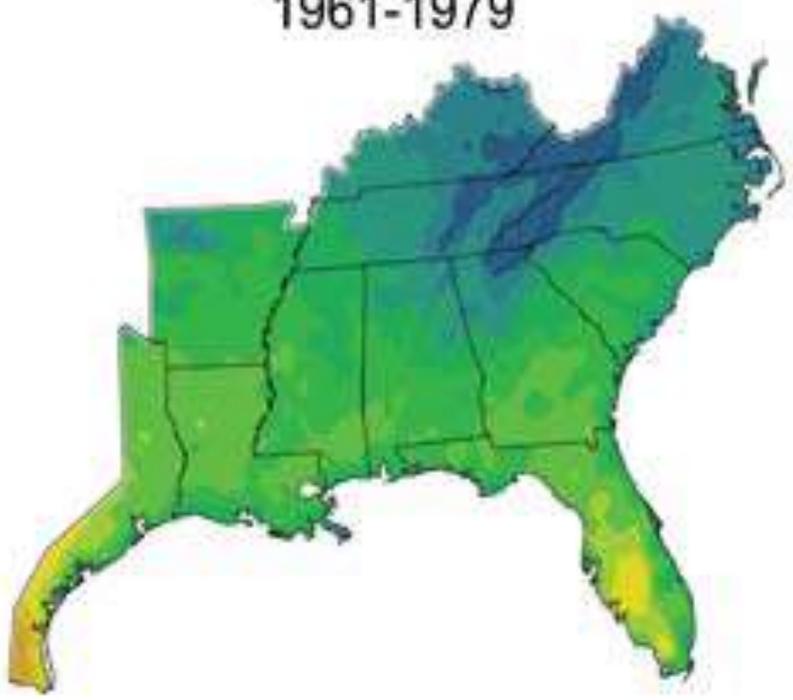
Climate is already changing, affecting the U.S. in noticeable ways

Future changes depend on emission choices made now and over the next few decades

Some amount of adaptation will be required; but mitigation has the potential to limit the risk of the most severe consequences

1961-1979

2080-2099



0 15 30 45 60 75 90 105 120 135 150 165 180 >180

Number of Days per Year

Focus - Regional Climate Team



Priorities: Fish and Wildlife Adaptation,
Carbon Sequestration, Mitigation,
Engagement



SE Climate Team agenda

- Relative to Fish and Wildlife Adaptation
 - Species vulnerability and management issues
 - Eastern freshwater
 - GIS work – SLAMM, barrier islands, forest change
 - Biofuels production
 - Incorporation of climate change language to FWS documents and plans
 - Landscape Conservation Cooperatives (LCCs)
 - Regional Climate Science Partnerships
 - “The Regional Science Hub”

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SE Climate Team agenda

- Relative to Carbon Sequestration
 - *Using carbon sequestration opportunity as a habitat restoration tool*
- Relative to Offsetting our carbon footprint
 - Fleet and Buildings
- Relative to Engagement
 - *Communications* (internal and external)
 - Legislative affairs

Discussion topics:

- Eastern Water issues



- Species vulnerability



CCAP - Eastern Water Team

- *The NWRS Chief, AD-FHC, and RD-6 and RD4 will (a) convene eastern and western, intra-agency workgroups to assess FWS needs relative to water issues and climate change; and (b) identify 2 Refuges and 1 Hatchery where water quality or quantity is a key climate vulnerability and **recommend funding redirections** to address those needs and, thereby, provide explicit examples for future needs. NWRS Chief will provide a progress summary (April 1, 2009) and a final report (September 1, 2009).*

General agreement

- A theme common to both the eastern and western regions is that **climate change represents a *substantial additional impact on aquatic habitats, flow regimes, and water resources that are being stressed*** from increasing water demands, population growth, land-use change, habitat fragmentation, invasive species, and natural climate variability.
- Regardless of climate change, **there's a need for the Service to more aggressively address the vulnerability of water resources in all aspects of Service activities.**



General Recommendations to Directorate

- **Water Resource Inventories and Assessments** (WRIAs) needed for baseline
- **Need to initiate/expand water quantity and quality monitoring** on Service lands, including both surface and ground water and biotic sampling
- **Climate models that are downscaled**
- **Vulnerability assessments of listed species**

General Recommendations to Directorate (con't)

- **Identify and protect the most critical habitats and key habitats vulnerable to climate change and drought.**
- **Identify the role of aquatic invasive species** in climate change impacts
- **Need to identify water-related issues on landscapes/ecosystems outside of FWS lands** vulnerable to climate change
- **Need Basin-wide studies**

NWR and Hatchery

- . . .selections are made based on a ranking criteria and scoring methodology developed by the eastern workgroup.
- The ranking criteria are a series of questions distributed by each Service region represented in the workgroup (Regions 3, 4, 5) to their refuge and hatchery field stations.

Eastern Water Team

- Agassiz and Cahaba River National Wildlife Refuges and the Neosho National Fish Hatchery (Regions 3, 4, 5)

Agassiz NWR

- Climate change is expected to increase the importance of Agassiz NWR wetland habitats to migratory and breeding waterfowl as areas in the western and central Prairie Pothole Region experience decreased precipitation. The Refuge is currently experiencing water quality and spring flooding issues related to nearby land-use patterns and ditching. These issues will likely be exacerbated by climate change. The Refuge proposes to create conservation buffers along critical inflows into the Refuge to reduce flooding and improve water quality. The estimated cost is \$2,750,000.



Cahaba River NWR

- Climate change is likely to further exacerbate current threats from poor water quality, decreased water quantity, urban sprawl, dams, and commercial timber and mining operations. The Refuge proposes a phased expansion of the size of the station by 234,700 acres at an estimated cost of \$508,930,000 and an annual increase of \$3.3M in operations budget.

Neosho NFH

- The Hatchery is currently experiencing reduced water flow, and this reduction is expected to be exacerbated by climate change. The Hatchery has proposed to dig additional wells to augment water supply. The estimated cost will be \$300,000, with an additional \$100,000-150,000 needed in annual operations. The workgroup recommends that a hydrological study of the area be conducted to appraise the feasibility of **additional wells as a solution to the Hatchery's** water supply issues.

A photograph of a forest with tall, thin trees and a stream in the foreground. The text is overlaid on the image in a bold, italicized, yellow font with a black outline. The background is a solid red color.

The Eastern Water Team will continue, with priorities to improve ranking system, and to help integrate recommendations into Service capacity.

Vulnerability

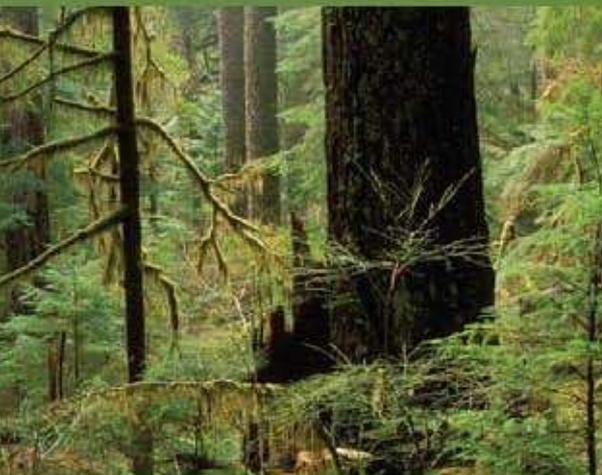
- The **IPCC** defines vulnerability as:
“the extent to which climate change may damage or harm a system”

Vulnerability

- The **IPCC** adds that vulnerability:
“depends not only on a system’s sensitivity, but also on its ability to adapt to new climate conditions”

Other Terms

- Adaptive capacity – ability to adjust. . .
- Sensitivity – degree to which a system is affected
- Exposure – **degree to which a system's** location influences vulnerability
- Uncertainty – expression of the degree to which a value is unknown. . .



THE STATE OF THE BIRDS
United States of America
2009

Example – State of the U.S. Birds

- 1. Breeding Habitat Obligate (or Habitat Specialization): "species that are obligates to a single habitat type, including a single type of forest within the broader forests category." A species gets a "1" if it is categorized as an obligate in the 2009 SOTB database. (No change from previous scoring.)



2. Migration Status:

- **"Species whose migration distance and timing makes them unable (or unlikely) to adapt to temporal shifts in critical resource timing."** A species gets a "1" if it is a long-distance migrant that uses daylength as a primary cue for migration timing, and therefore may become temporally decoupled from resource peaks on the breeding grounds or during critical stopover.



3. Dispersal ability:

- "Species whose poor dispersal ability, or lack of ability to shift distributions (e.g. geographic barriers, narrow elevations) makes them unable (or unlikely) to adapt spatially to shifting conditions, habitats, or resources." Examples of continental species getting a "1" include: lekking grouse, species with island-like distributions (e.g. alpine, saltmarsh, highly colonial breeders, others?).

4. Niche specialization:

- "Species highly specialized on resources (food, nest sites, microhabitats) that are likely to be disrupted or depleted due to climate change."



5. Reproductive Potential (or Life-history Traits):

- "Species whose life-history traits (combinations of low annual reproductive effort, long generation time, extreme "K selection") will limit their ability to adapt to climate change events."

6. Habitat susceptibility:

- "Species that are obligate to a short list of "sub-habitats" that are believed to be (from published models and literature) at highest risk of disappearance or severe degradation due to climate change." Looking for greater resolution here, we decided to score a "2" for species restricted to:
 - alpine tundra
 - sedge-dominated arctic tundra
 - coastal salt-marsh
 - beach-nesting high elevation tropical forest (Hawaii, Caribbean islands) low islands

Bird examples

- SE highest - - seabirds, beach birds, water
 - Oystercatcher
 - Northern Gannet
- SE lowest - - Warblers, sparrows
 - Field Sparrow, Chipping Sparrow
 - “High” low: Louisiana Waterthrush

Puerto Rico and Virgin Islands

- Highest – some endemics, waterbirds
 - Puerto Rican Parrot, Elfin-woods Warbler, Yellow-shouldered Blackbird, Flamingo
- Lowest – mostly landbirds
 - Doves, Quail-doves (?), “High” lows: hummingbirds

Species vulnerability and management issues within LCCs

- National effort species vulnerability
 - “Test” at Cape Romain for NatureServe
- Defenders of Wildlife guidelines
 - Jean Brennan seminar; possible “test” of field decision model for South Atlantic FWS
- FWS national leadership State of the Birds, development of species assessment, focus of 2011 report



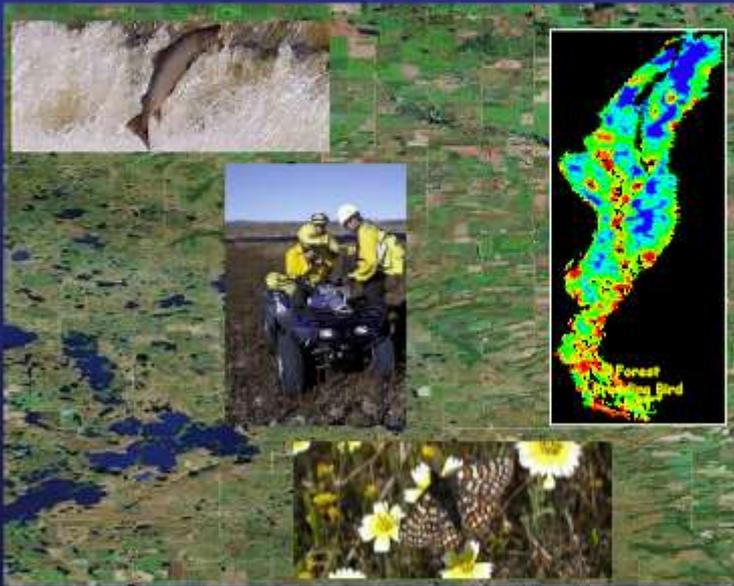
How do we get this to the ground
for best management decisions?



IS SHC part of the Answer? Yes, SHC = outcome-based adaptive management practiced at landscape scales

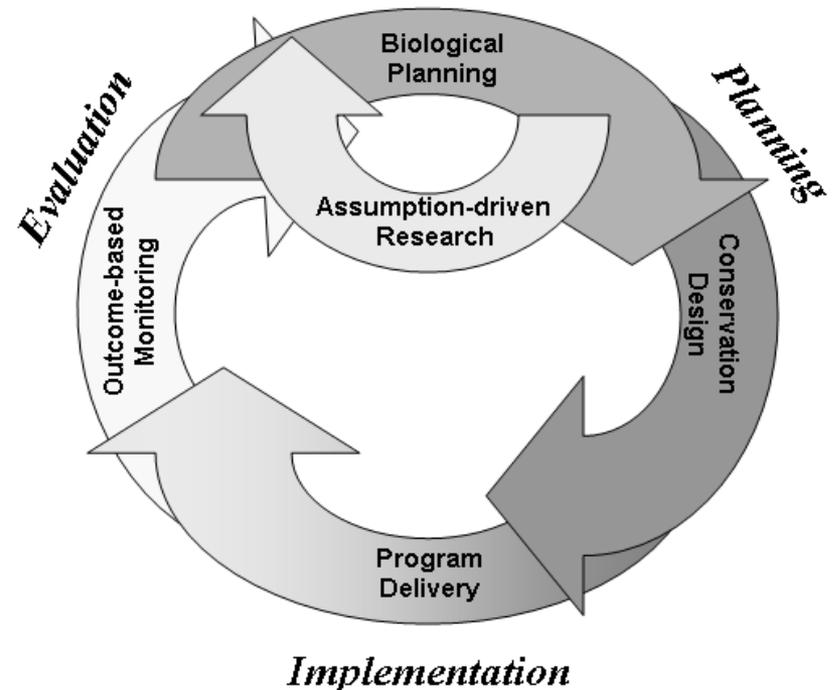
Strategic Habitat Conservation

*Final Report of the
National Ecological
Assessment Team*



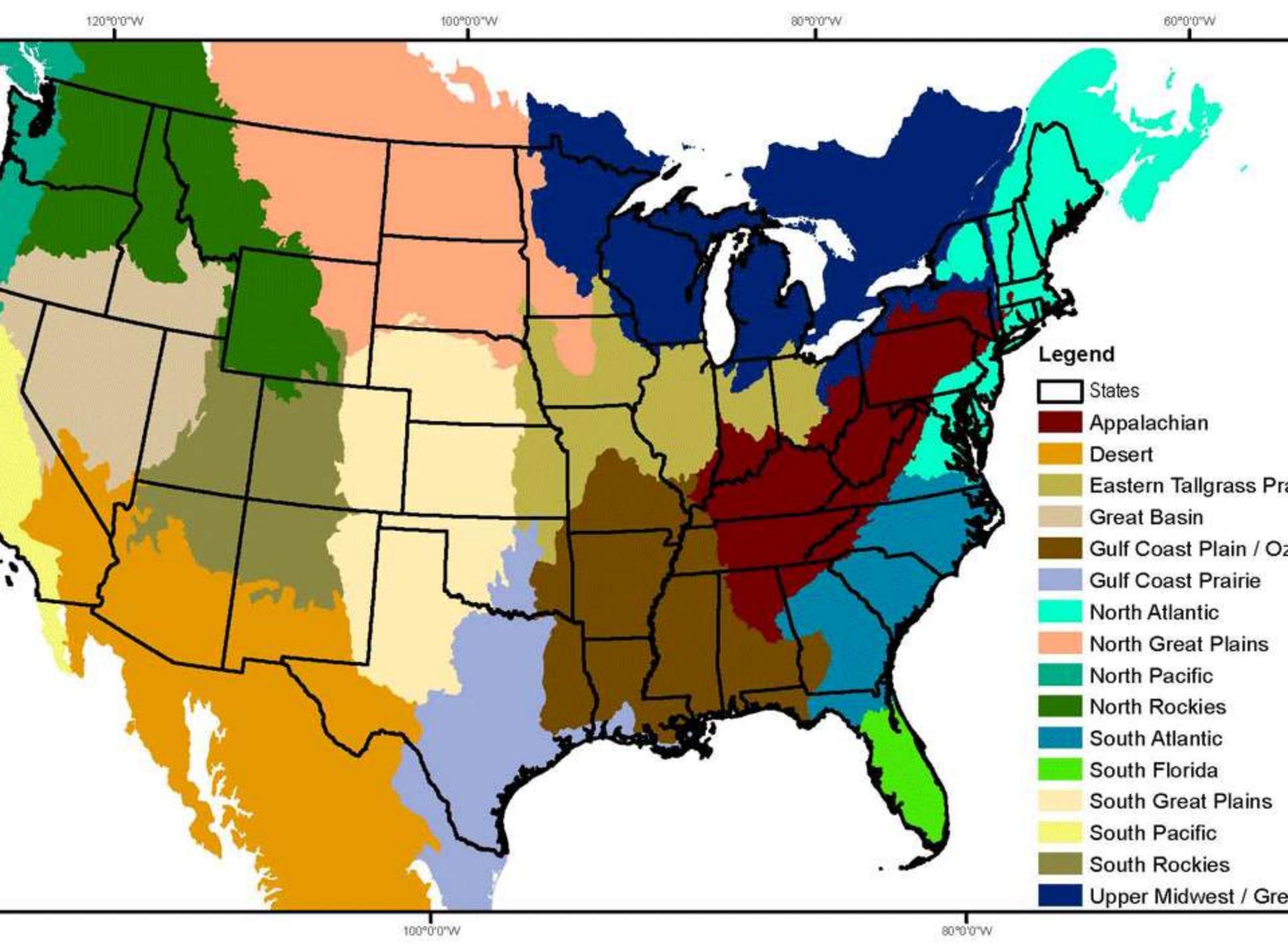
July 2006

Bureaus (and partners) collaborate in biological planning, conservation design, monitoring and research in a true Service-USGS partnership.



The End





Species traits that contribute to climate change vulnerability

- Range size and relative abundance
- Vulnerable habitat (coastal zone, mountain top)
- Dispersal ability
- Migration status (phenology considerations)
- More



Regional Science Hubs

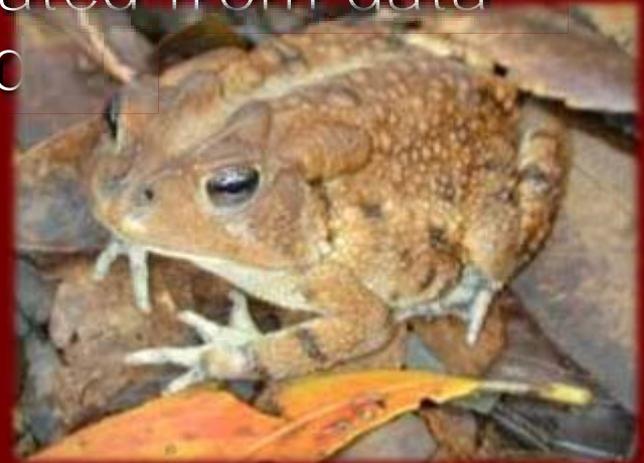
- These regional climate science hubs will work with a variety of Adaptive Application Partnerships (AAPs) to provide natural resource managers with tools and information that will help them anticipate and adapt conservation planning to climate change. The forecasting products produced by these regional hubs will enable fish, wildlife, and land managers to design suitable adaptive management approaches for their programs. USGS defines AAPs as science and conservation action partnerships that continually advance resource management with a combination of scientific knowledge and lessons learned from the field.

Regional Science Hubs

- The regional climate science hubs will focus primarily on stepping down various scenarios of global climate change models to scales relevant to the wildlife conservation needs within the region. Additionally, the regional climate science hubs will assess regional climate-related trends and predictions in temperature, precipitation, and moisture and apply this information in broad-scale ecological and biological response models to forecast regional changes in ecological systems, species distribution and population responses within a region.

SE Regional Science Hub Pilot

- **Demonstration project:** integrates climate change science with habitat and species response models to assess impacts on avian and aquatic species
- Cast predictive models calibrated from data gathered during recent decades
 - NOAA Climate data
 - Remote sensing data
 - USGS - BBS & MAPS data
 - Downscaled climate models
 - Watershed modeling



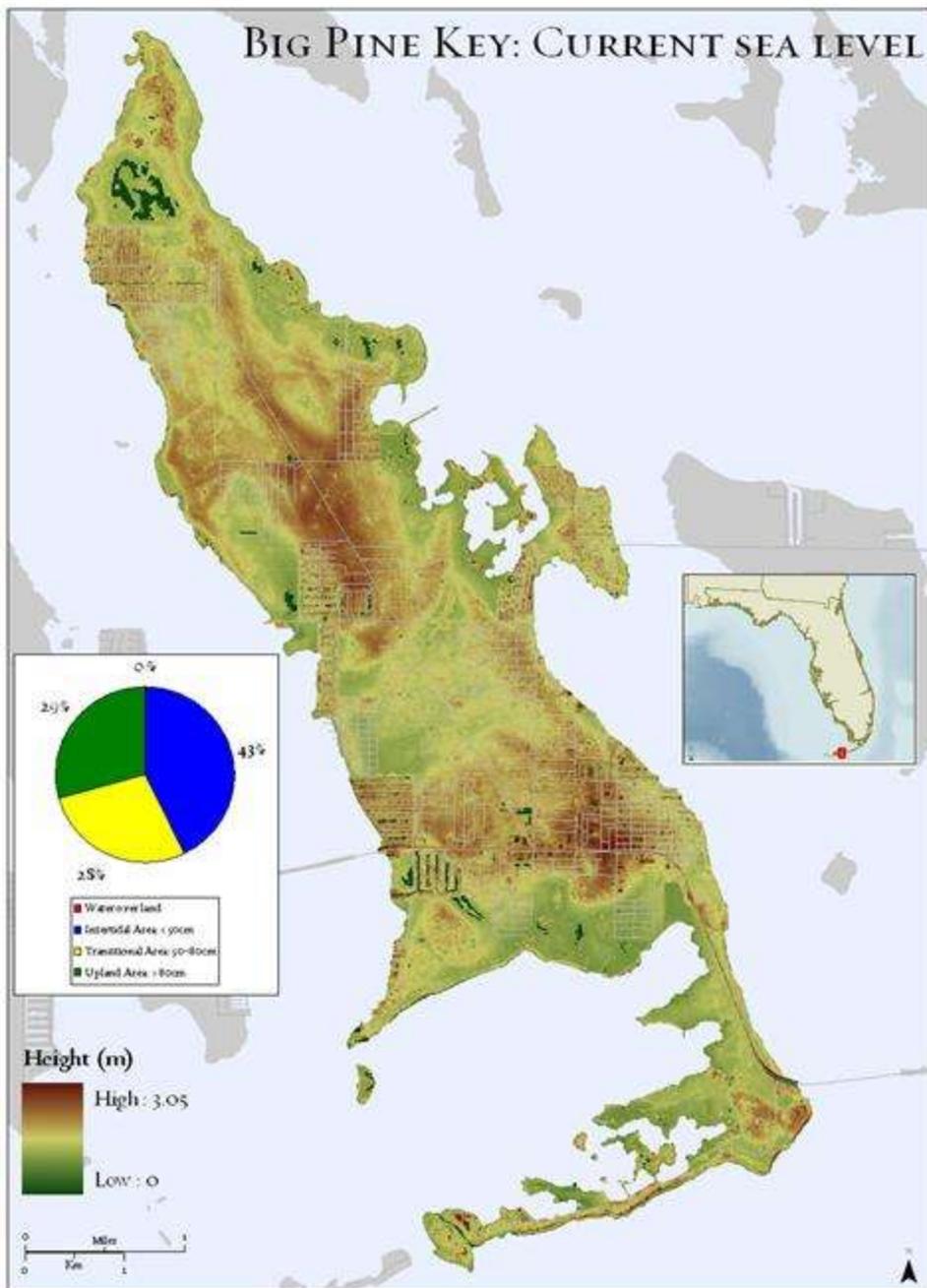
Alligator River



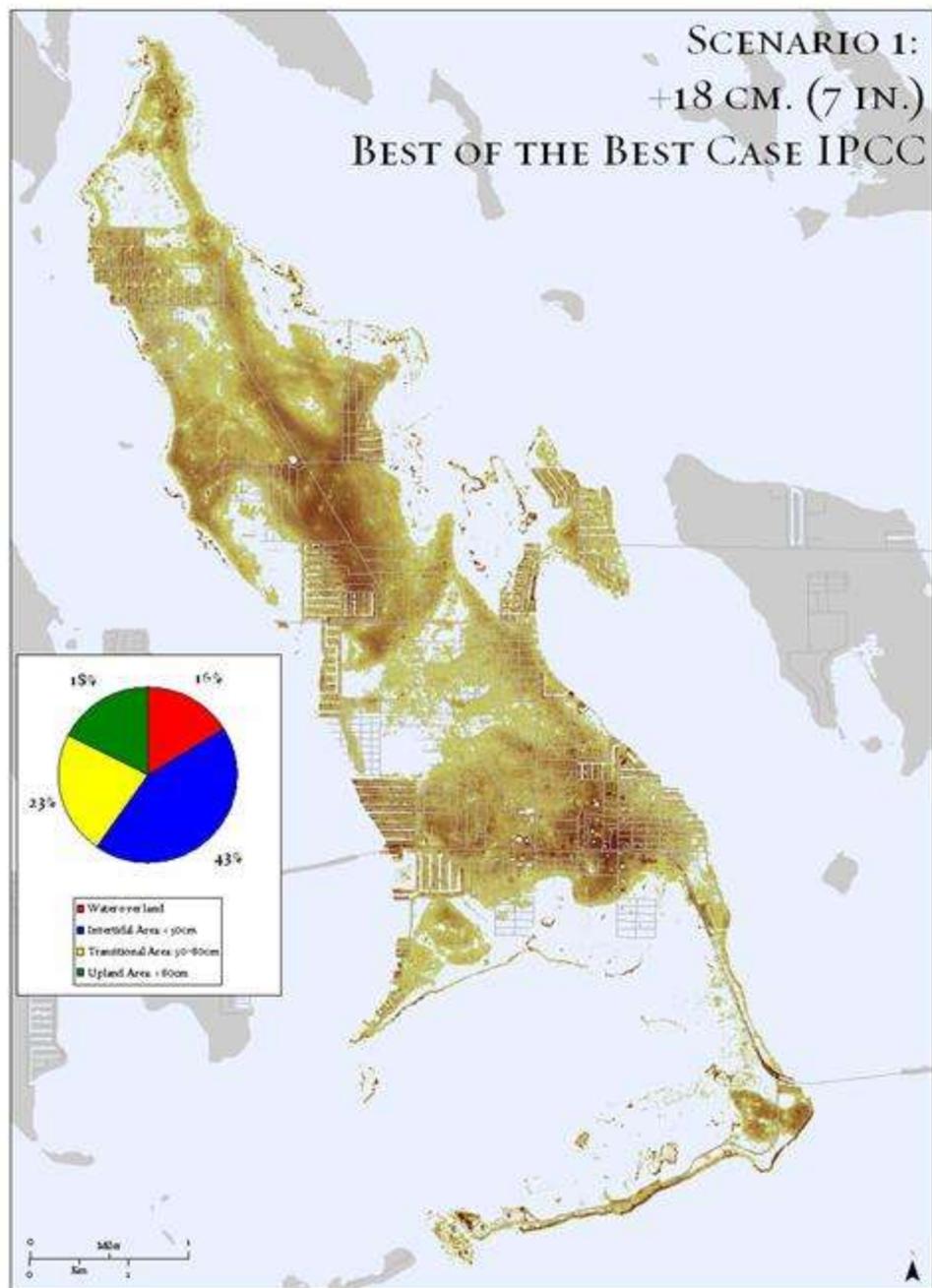
National Climate Change and Wildlife Science Center (NCCWSC)

The NCCWSC will establish a network of university-based regional climate science hubs that focus on climate change impacts on fish and wildlife and ecosystems at regional scales.

BIG PINE KEY: CURRENT SEA LEVEL

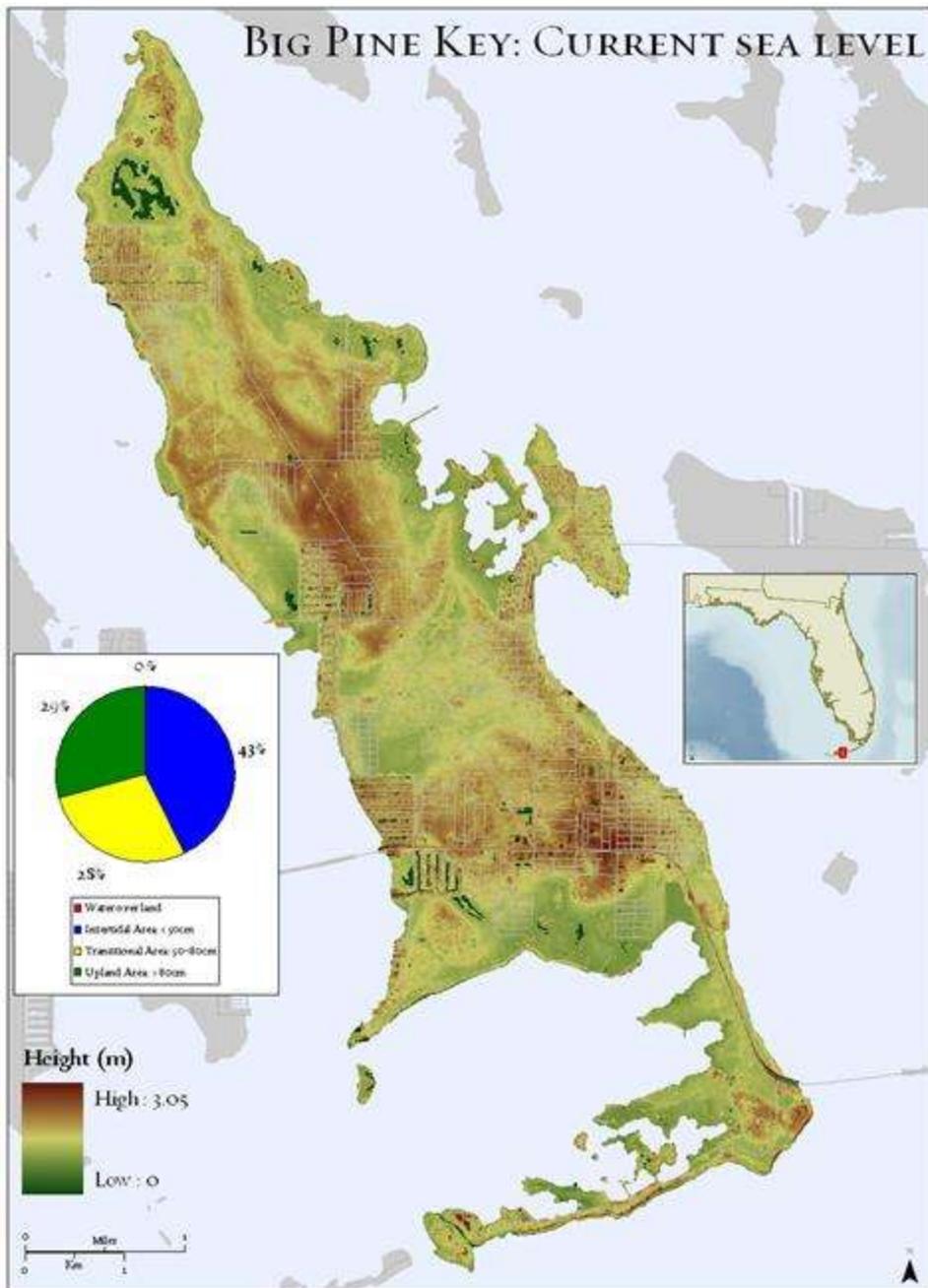


SCENARIO 1: +18 CM. (7 IN.) BEST OF THE BEST CASE IPCC

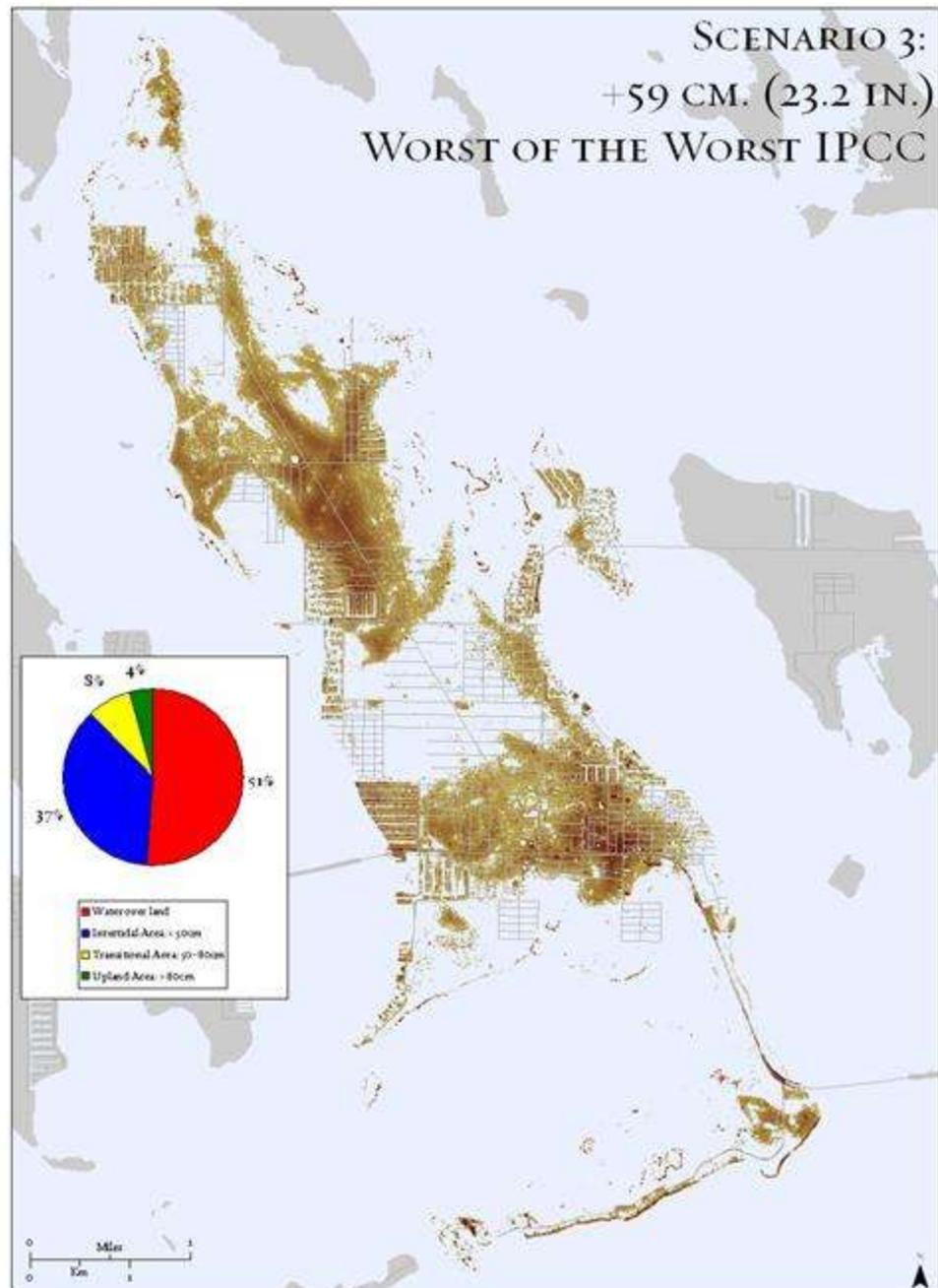


Courtesy of Chris Bergh, The Nature Conservancy

BIG PINE KEY: CURRENT SEA LEVEL



SCENARIO 3: +59 CM. (23.2 IN.) WORST OF THE WORST IPCC



Courtesy of Chris Bergh, The Nature Conservancy

