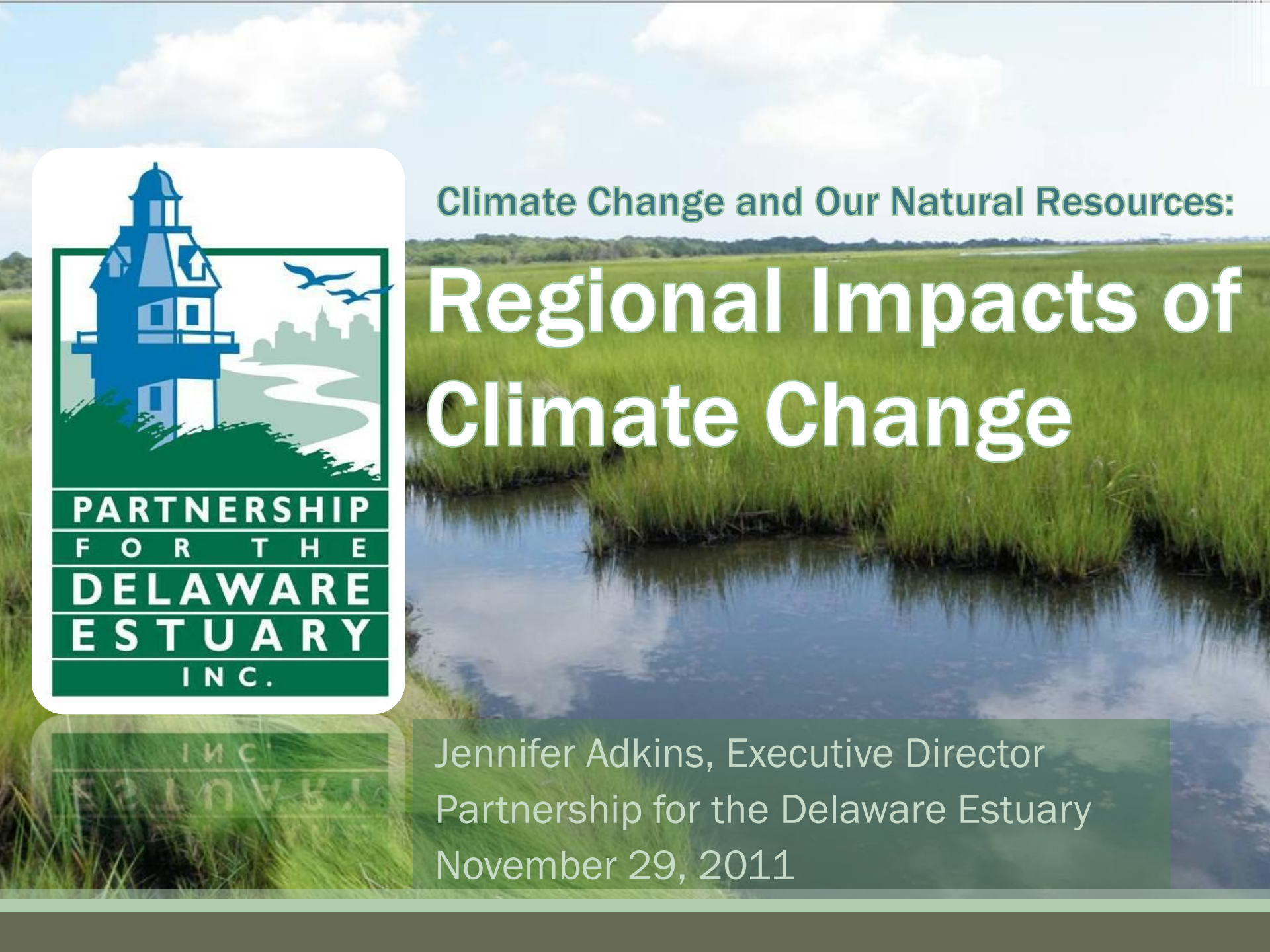


Climate Change and Our Natural Resources:

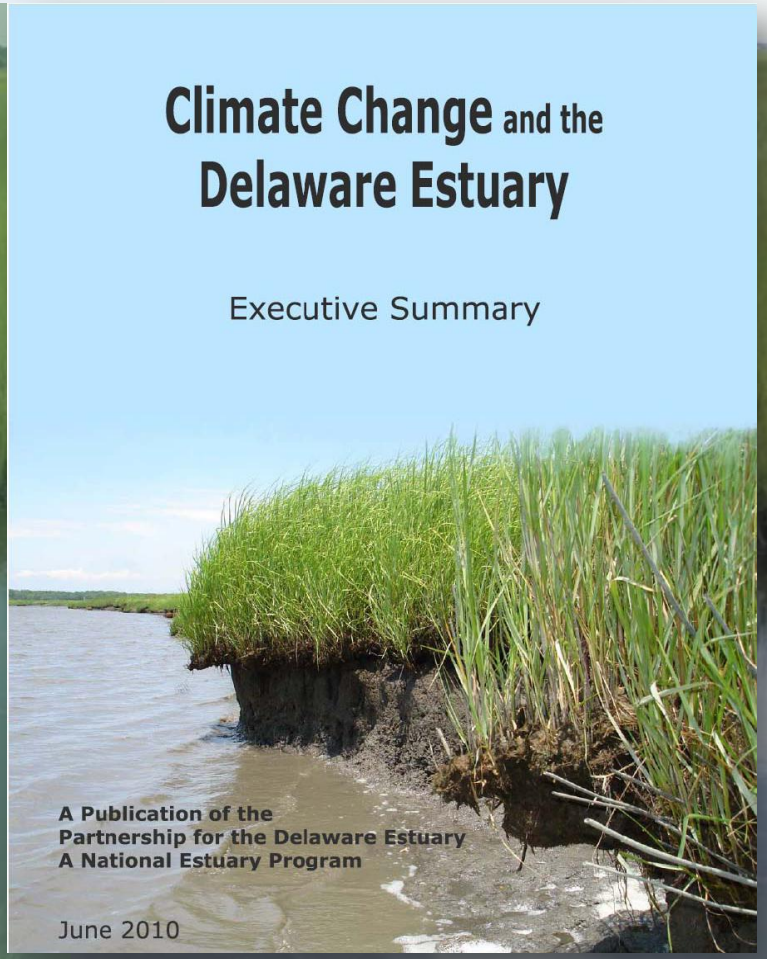
Regional Impacts of Climate Change

Jennifer Adkins, Executive Director
Partnership for the Delaware Estuary
November 29, 2011

Regional Climate Change Impacts

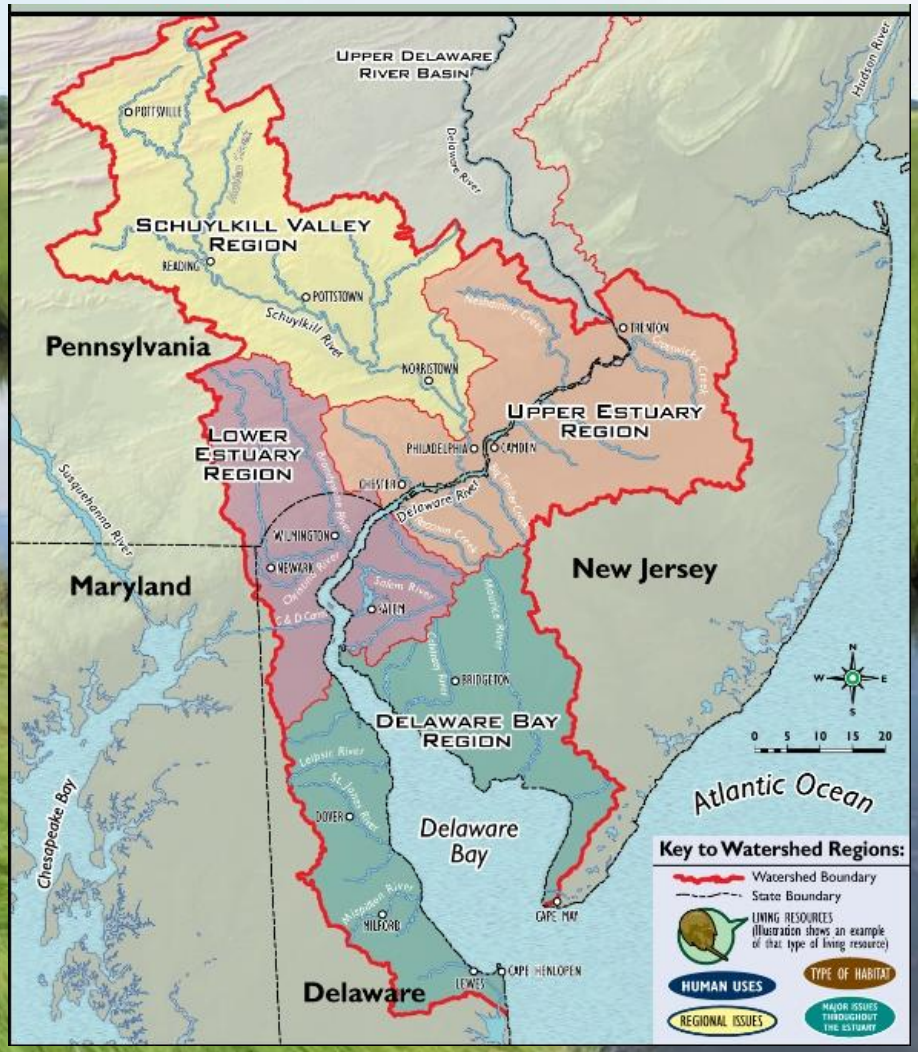
- Warmer temperatures
- More frequent /severe precipitation
- Increased rate of sea level rise
- More extreme heat days
- Fewer frost days

...these will combine to create stress on natural resources.



PARTNERSHIP FOR THE DELAWARE ESTUARY INC.

The Delaware Estuary Watershed

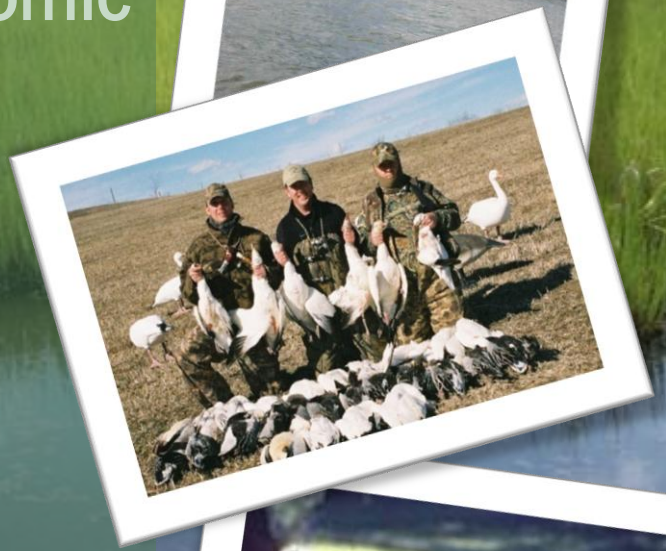


The Delaware Estuary

- Over 200 species of fish
- Largest breeding population of horseshoe crabs
- 2nd highest concentration shorebirds

The Delaware Estuary

- > $10 Billion in economic activity
- > $10 Billion in jobs
- > $12 Billion in ecosystem goods and services



The Delaware Estuary

- Drinking Water
- Bivalve Shellfish
- Tidal Wetlands

Drinking Water

The Delaware River, its bay, and tributaries provide a source of drinking water for

17 MILLION PEOPLE

--over 5% of the entire U.S. population.

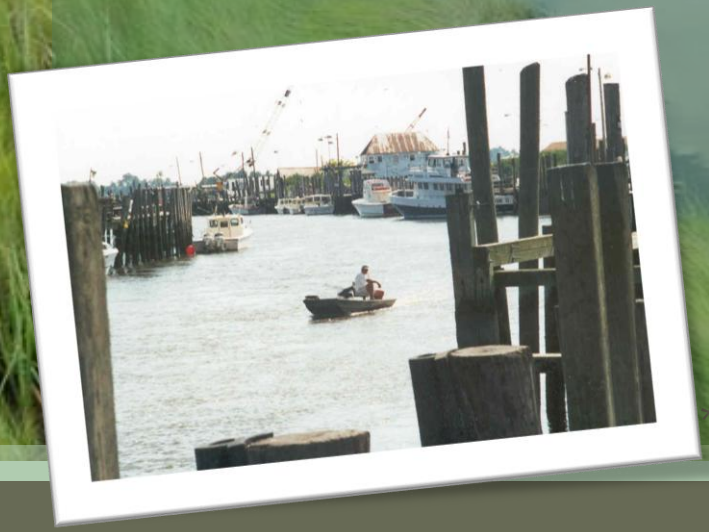
Bivalve Shellfish

Bivalves filter water, stabilize sediment, and recycle nutrients.

New Jersey's shellfish industry is worth

$790 MILLION*

a year.



**http://www.nj.gov/dep/newsrel/2010/10_0053.htm*

Tidal Wetlands

Tidal wetlands filter water, grow fish, sequester carbon, and protect coastal communities from floods and storms.

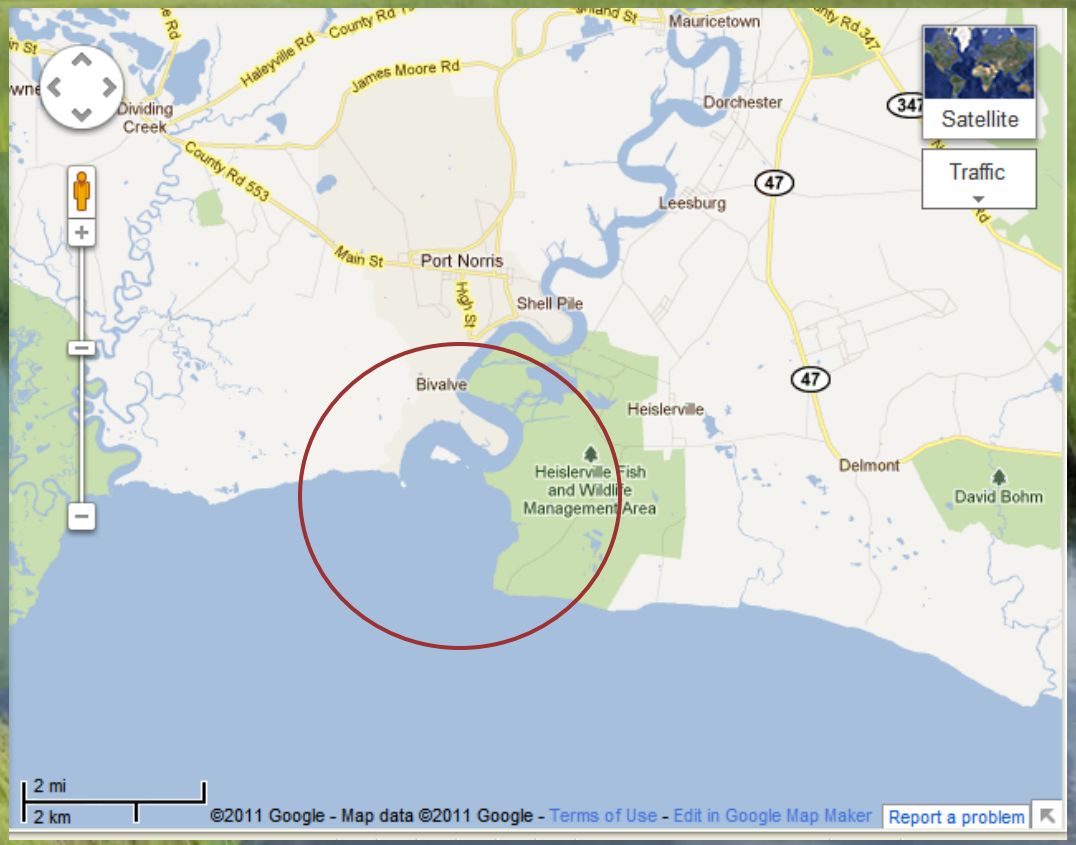
The Delaware Estuary's tidal wetlands provide ecosystem services values of

$1 BILLION *

a year.

How Will Climate Change Impact Tidal Wetlands?

Erosion due to sea level rise is the biggest threat to salt water tidal wetlands




3/10/1991
1991
2010
Miller Ave
Bivalve, NJ 08349
Bivalve
1991
Image U.S. Geological Survey
© 2011 Google
Google
Imagery Date: 3/9/1991
1991
39°13'31.28" N 75°01'47.17" W elev 3 ft
Eye alt 10450 ft


3/24/1995
1991
2010
Miller Ave
Bivalve, NJ 08349
Bivalve
1995
Image U.S. Geological Survey
© 2011 Google
©2010 Google
Imagery Date: 3/24/1995
1991
39°13'31.28" N 75°01'47.17" W elev 3 ft
Eye alt 10450 ft


12/30/2002
1991
2010
Miller Ave
Bivalve, NJ 08349
Bivalve
2001
Image © 2011 State of New Jersey
© 2011 Google
©2010 Google
Imagery Date: 12/31/2001
1991
39°13'31.28" N 75°01'47.17" W elev 3 ft
Eye alt 10450 ft


8/12/2006
Miller Ave
Bivalve, NJ 08349
Bivalve
2006
Image USDA Farm Service Agency
© 2011 Google
©2010 Google
Imagery Date: 7/15/2006
1991
39°13'31.28" N 75°01'47.17" W elev 3 ft
Eye alt 10450 ft

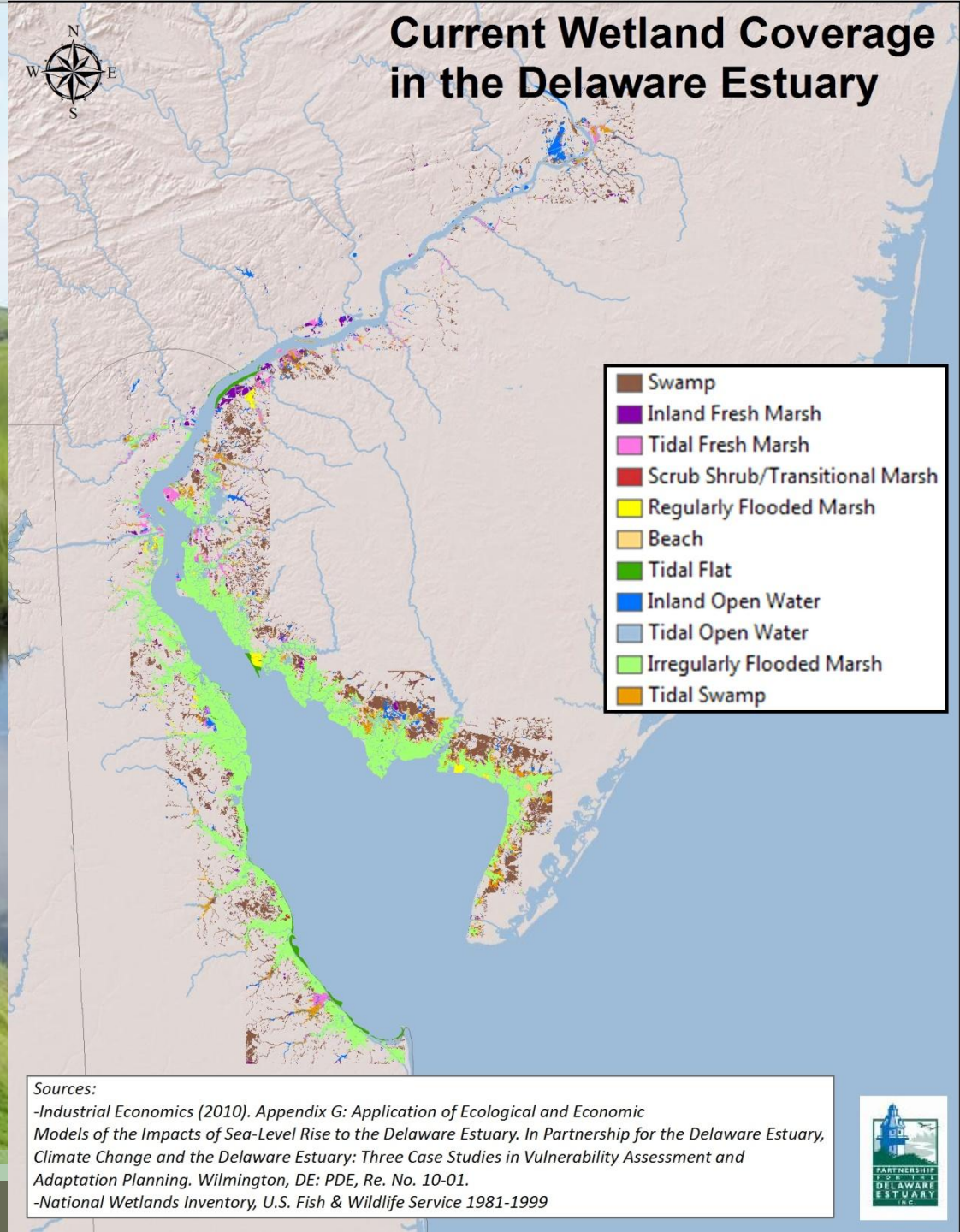

7/21/2010
1991
2010
Miller Ave
Bivalve, NJ 08349
Bivalve
2010
Image USDA Farm Service Agency
Image © 2011 GeoEye
© 2011 Google
©2010 Google
Imagery Date: 7/21/2010
1991
39°13'31.28" N 75°01'47.17" W elev 3 ft
Eye alt 10450 ft

Wetlands


If this much shoreline has eroded since 1991, what can we expect for wetlands 50 or 100 years in the future?

Wetlands

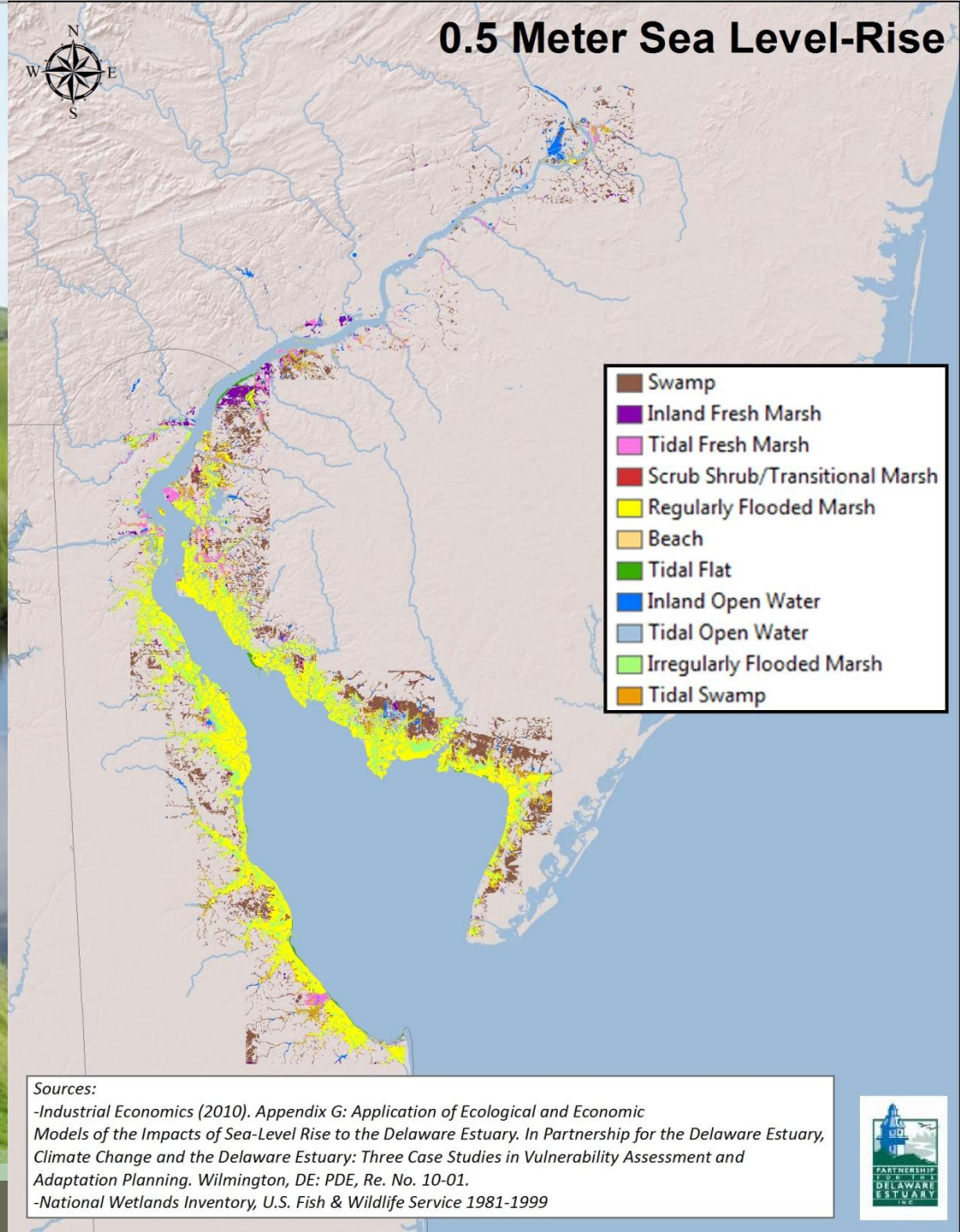
Current conditions. Light green means ‘irregularly flooded marsh.’



Sources:
-Industrial Economics (2010). Appendix G: Application of Ecological and Economic Models of the Impacts of Sea-Level Rise to the Delaware Estuary. In Partnership for the Delaware Estuary, Climate Change and the Delaware Estuary: Three Case Studies in Vulnerability Assessment and Adaptation Planning. Wilmington, DE: PDE, Re. No. 10-01.
-National Wetlands Inventory, U.S. Fish & Wildlife Service 1981-1999

Wetlands

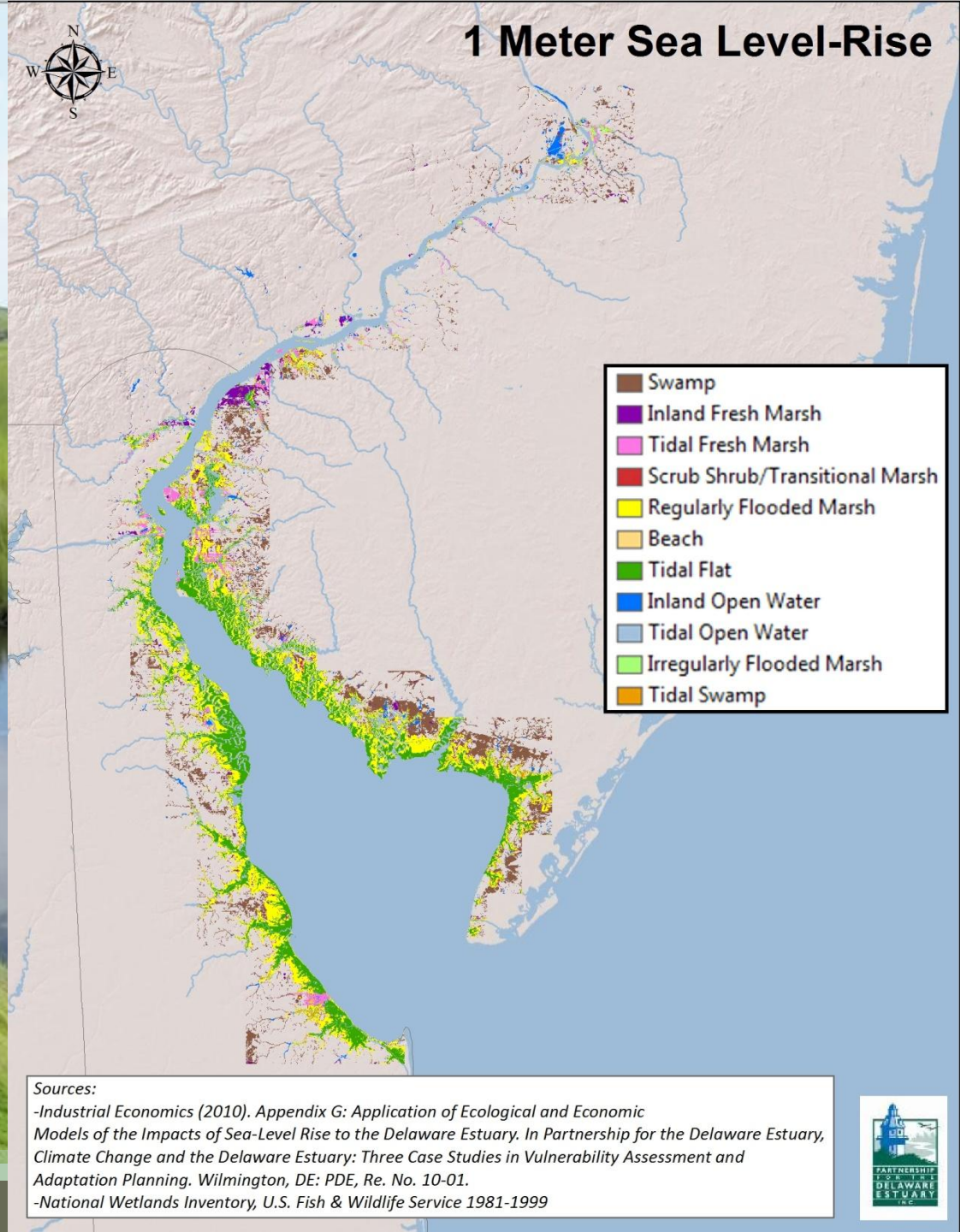
At 0.5 meter sea level rise. Yellow means ‘regularly flooded marsh.’



Sources:
-Industrial Economics (2010). Appendix G: Application of Ecological and Economic Models of the Impacts of Sea-Level Rise to the Delaware Estuary. In Partnership for the Delaware Estuary, Climate Change and the Delaware Estuary: Three Case Studies in Vulnerability Assessment and Adaptation Planning. Wilmington, DE: PDE, Re. No. 10-01.
-National Wetlands Inventory, U.S. Fish & Wildlife Service 1981-1999

Wetlands

At 1 meter sea level rise. Green means ‘tidal flat’ or mud flat.



Sources:
-Industrial Economics (2010). Appendix G: Application of Ecological and Economic Models of the Impacts of Sea-Level Rise to the Delaware Estuary. In Partnership for the Delaware Estuary, Climate Change and the Delaware Estuary: Three Case Studies in Vulnerability Assessment and Adaptation Planning. Wilmington, DE: PDE, Re. No. 10-01.
-National Wetlands Inventory, U.S. Fish & Wildlife Service 1981-1999

Wetlands

With 1 meter of sea level rise

40,000 acres

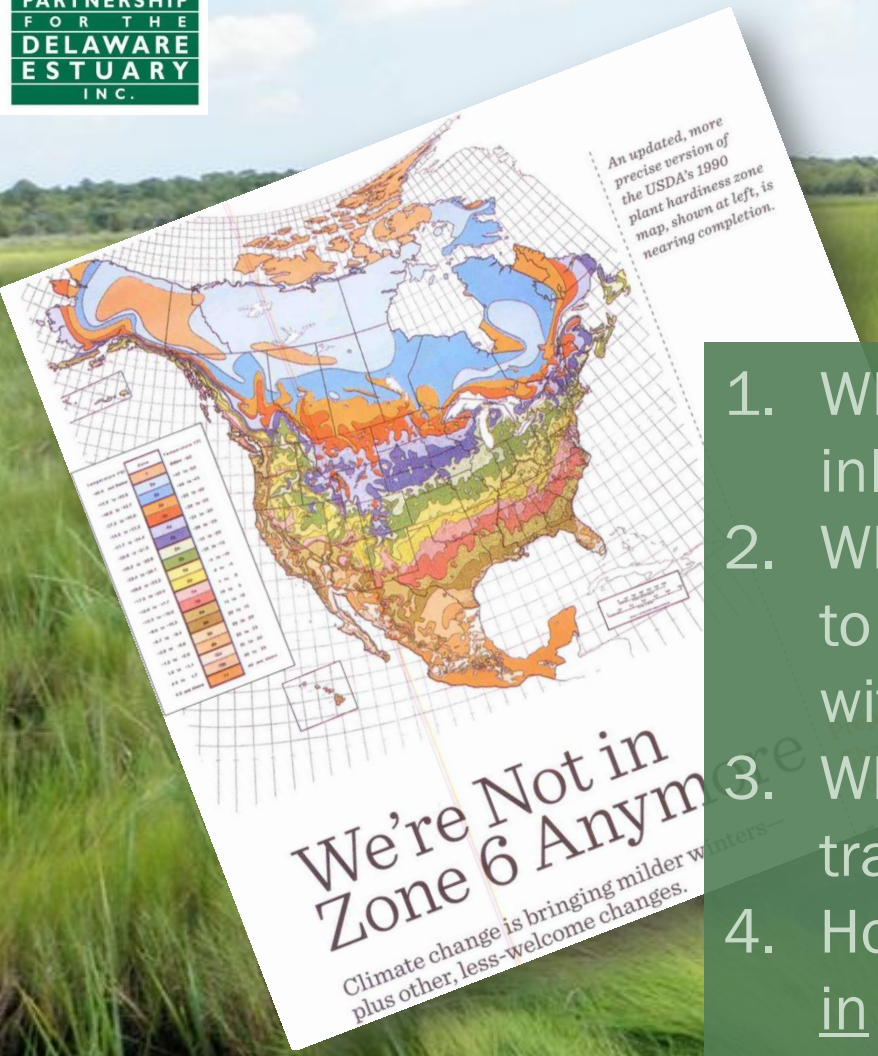
of tidal wetlands will be flooded by 2100.

Wetlands


40,000 acres
15 times the size if the Rutgers New Brunswick Campus .

Wetlands

Wetlands



We still don't know:

1. Whether/where wetlands can migrate inland.
2. Whether some wetlands will be able to keep pace with sea level rise without our help.
3. Whether freshwater wetlands will transition (or die?) with higher salinity
4. How many acres of wetlands are even <u>in</u> the Delaware Estuary, or how many acres we've already lost.


PARTNERSHIP
FOR THE
DELAWARE
ESTUARY
INC.
What can we do to help our natural resources adapt to a changing climate?

Delaware Estuary Living Shoreline Initiative

Using natural materials that slow erosion and attract assemblages of mussels, oysters and plants as intertidal reefs along the marsh edge

Delaware Estuary Living Shoreline Initiative

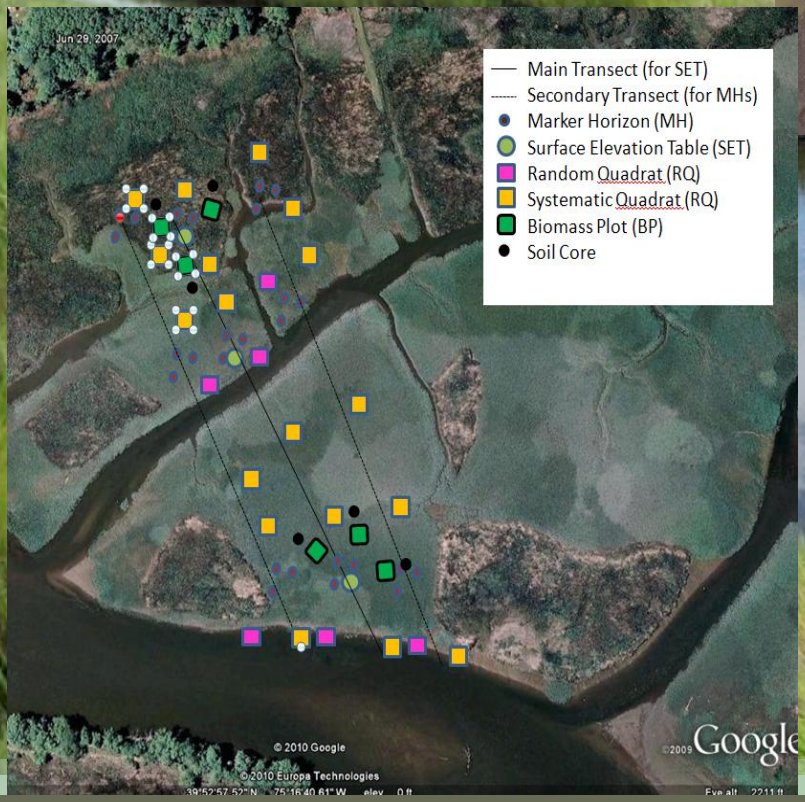
Delaware Estuary Living Shoreline Initiative

Delaware Estuary Living Shoreline Initiative

Delaware Estuary Living Shoreline Initiative

Delaware Estuary Living Shoreline Initiative

Wetland Assessment & Monitoring



Help Communities Weather Change with Green Infrastructure

Learn more at
www.DelawareEstuary.org

Jennifer Adkins, Executive Director
Partnership for the Delaware Estuary
Jadkins@DelawareEstuary.org