2010

The Condition of Casco Bay and Its Watershed (2010 State of the Bay Presentation)

Curtis C. Bohlen PhD
Casco Bay Estuary Partnership

State of the Bay 2010

The Condition of Casco Bay and Its Watershed

Curtis C. Bohlen, PhD
Director, Casco Bay Estuary Partnership

Casco Bay Estuary Partnership

- One of 28 National Estuary Programs
- Hosted by USM's Muskie School
- A 23 member local advisory board
- Direct federal dollars to local priorities

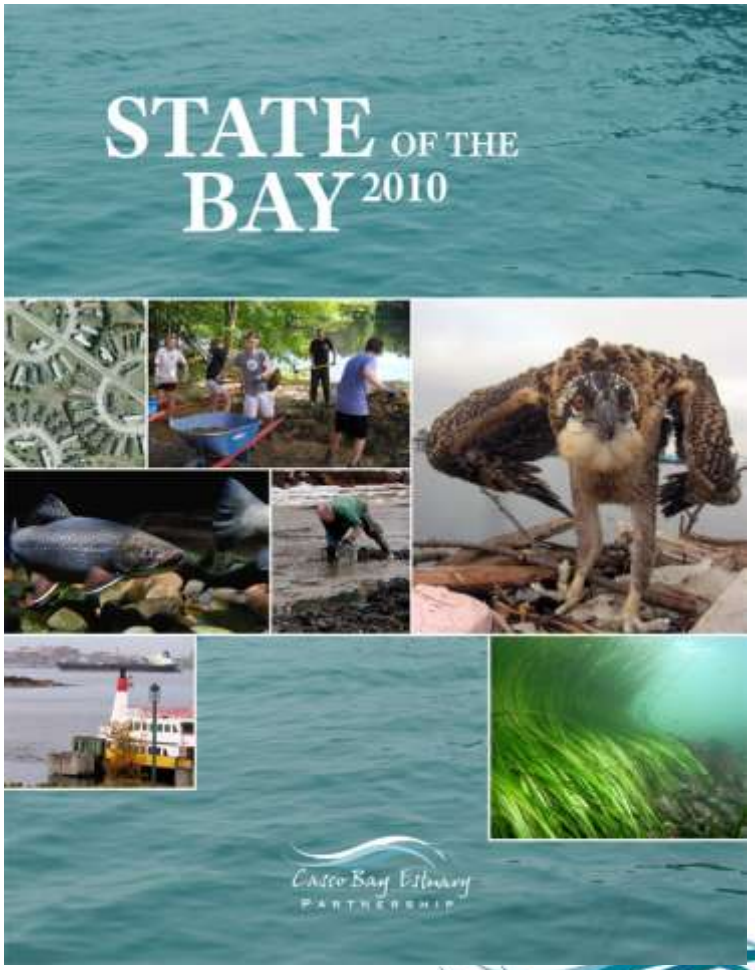
Casco Bay Estuary Partnership

Our Approach

- Casco Bay Estuary Partnership is a catalyst for action
- Many Partners
  - Private sector
  - Citizens and civic organizations
  - Governments and government agencies
  - Academia
- Focused, collaborative
- Credible data and information
- Strategic direction
- We build consensus, facilitate communications and attract funds for protection of the Bay

Why State of the Bay?

- Periodic reporting is an obligation of National Estuary Programs
- CBEP issues a "State of the Bay" report once every 5 years
- A set of 18 "indicators"
- Findings intended to provide understanding of the condition of the Bay
- Help provide direction not only for CBEP but for all members of the greater Partnership



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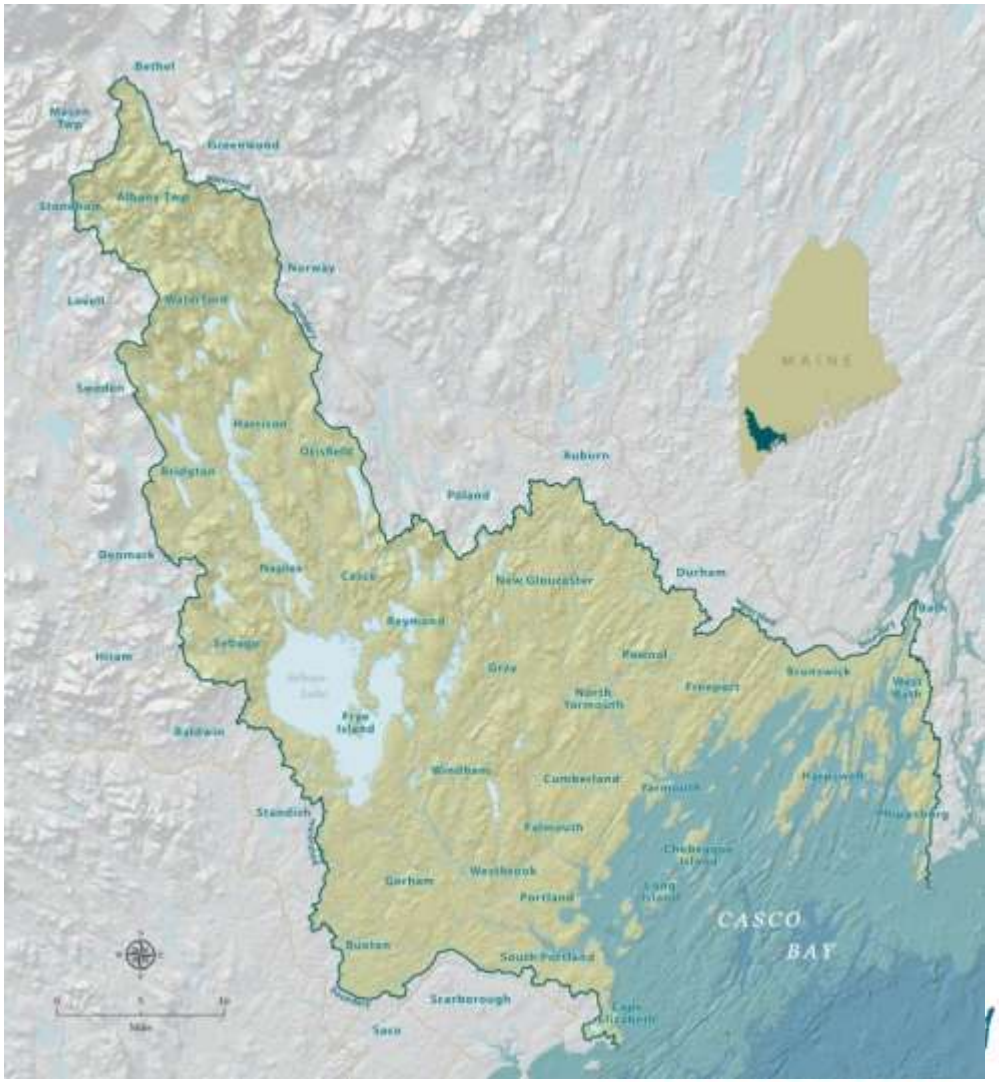
Casco Bay Watershed

- 985 Square Miles
- 42 Municipalities
- About 200 Square Miles of Water
- More than 575 miles of shoreline
- ~ 785 islands, islets and ledges
- 3% Maine's land area ~17% of population (2000 census)



Upstream From Casco Bay

- Mostly forest
  - ~ 67% Upland Forest
  - ~ 5% Wetland
  - ~11% Developed
  - Only about 6% impervious surfaces
- ~230,000 people in the watershed (2000 census)
- Population Density ~ 255 people per square mile

  (Sixth lowest population density among NEPs)

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Casco Bay

- A marine dominated coastal embayment
- Tidal water exchange is (usually) much greater than river flow
- Conditions in Casco Bay reflect BOTH
  - Activities on land and
  - Large scale marine processes
- Details of water flow are not well understood

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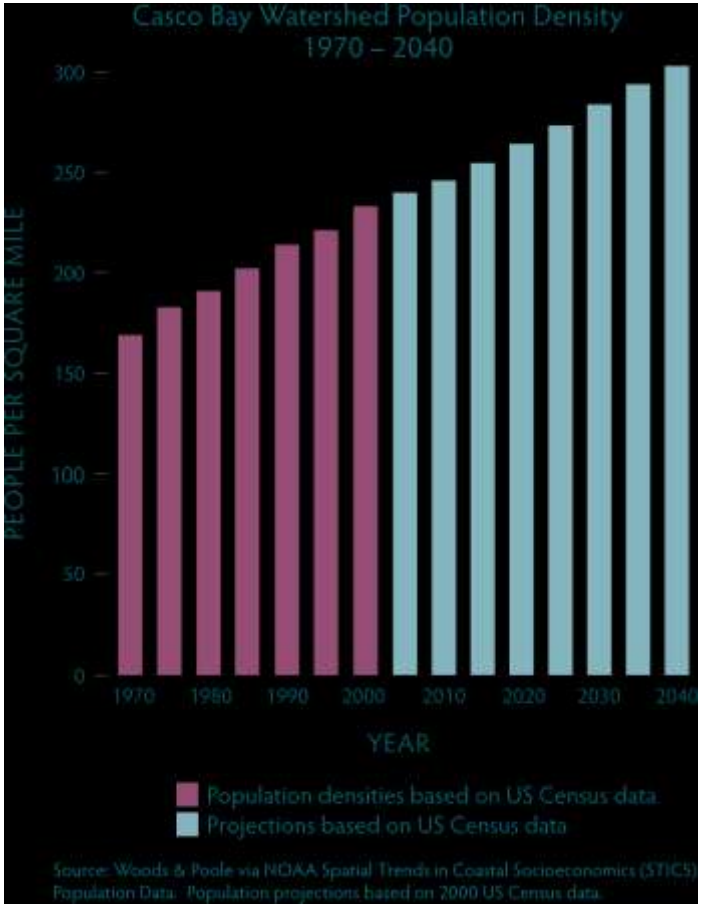
Population



- Population in the Casco Bay Watershed has been growing ~ 1% per year
- Projections suggest continued moderate population increases

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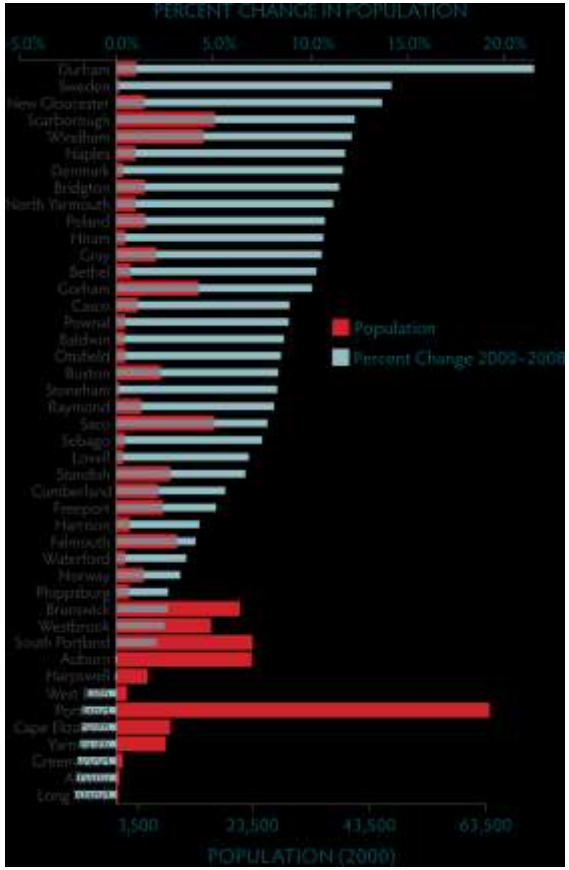
Population Growth is Suburban

- While overall growth is moderate, rates vary significantly around the region
- Growth is concentrated in suburban and exurban towns
- Larger Towns tend to be growing more slowly or even losing population



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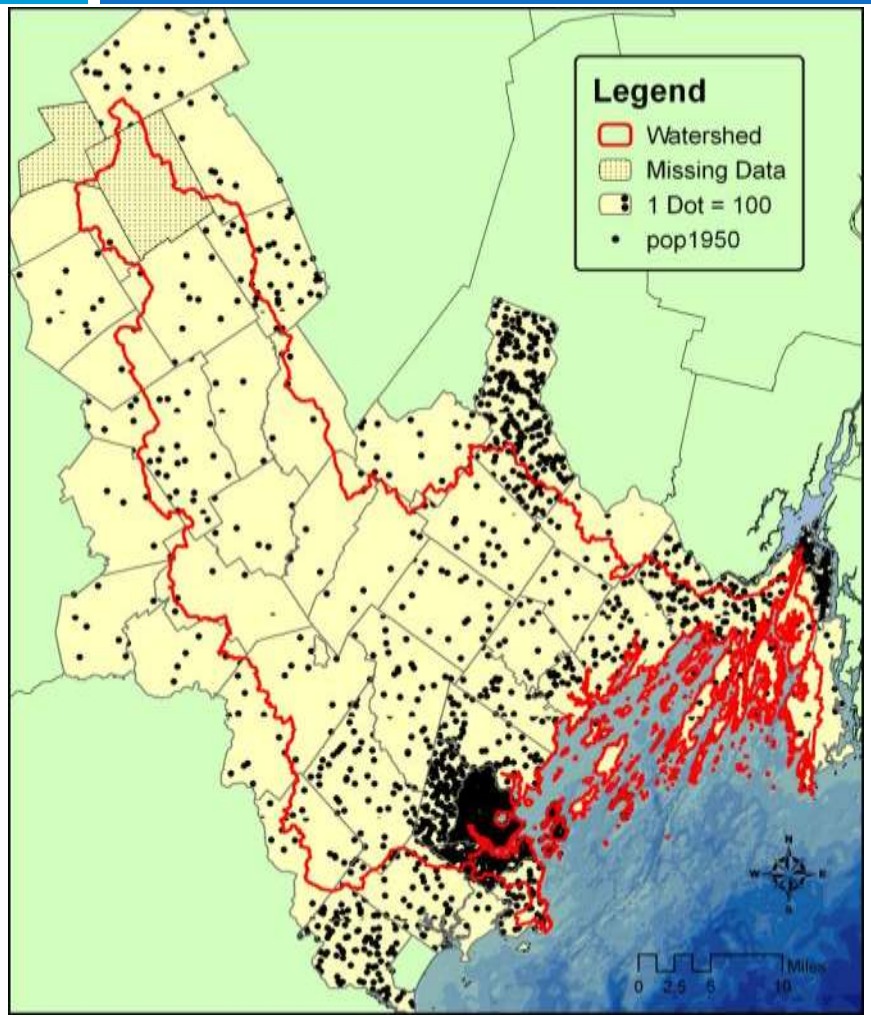
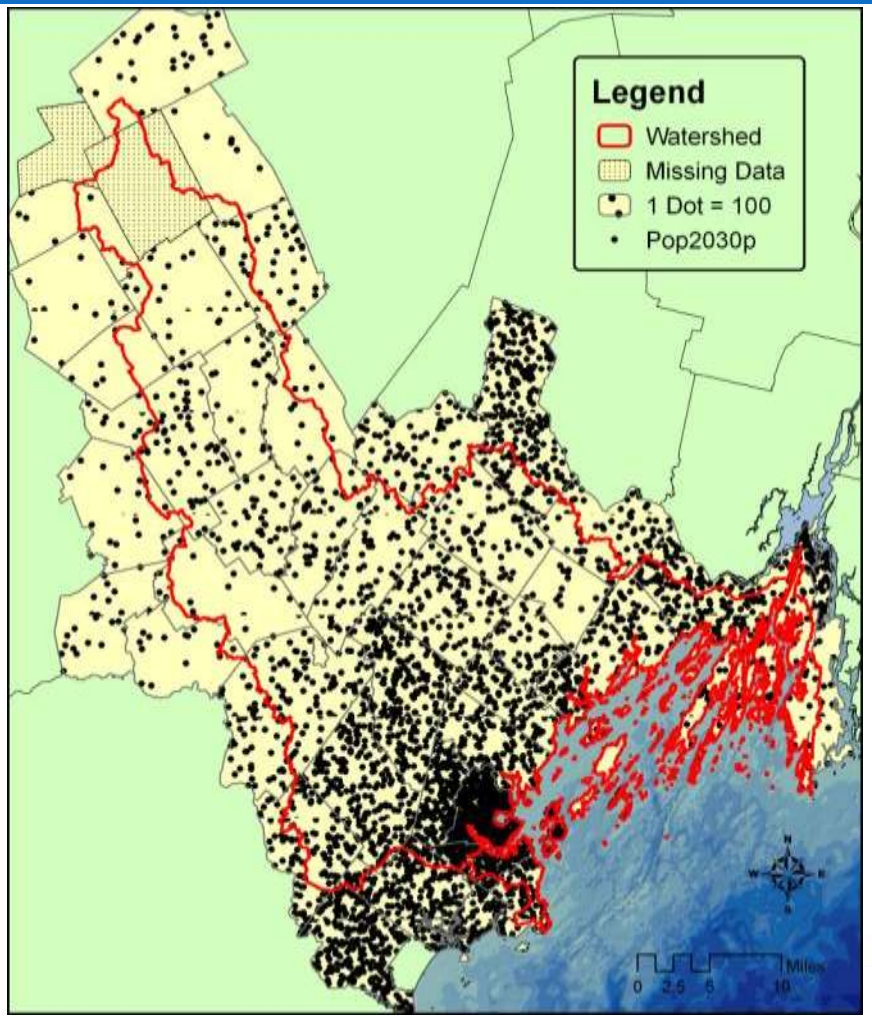
Dramatizing Change: Population 1950 - 2030



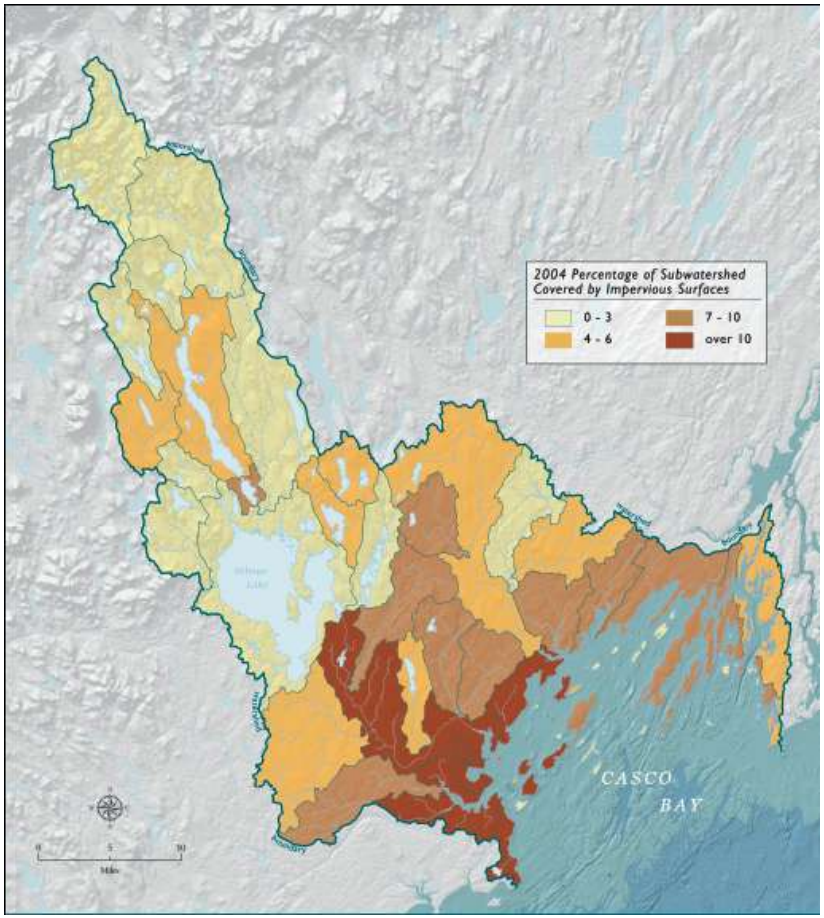


1950 : ~ 229,500

2005: ~ 363, 000

2030: ~405,500

Impervious Surface



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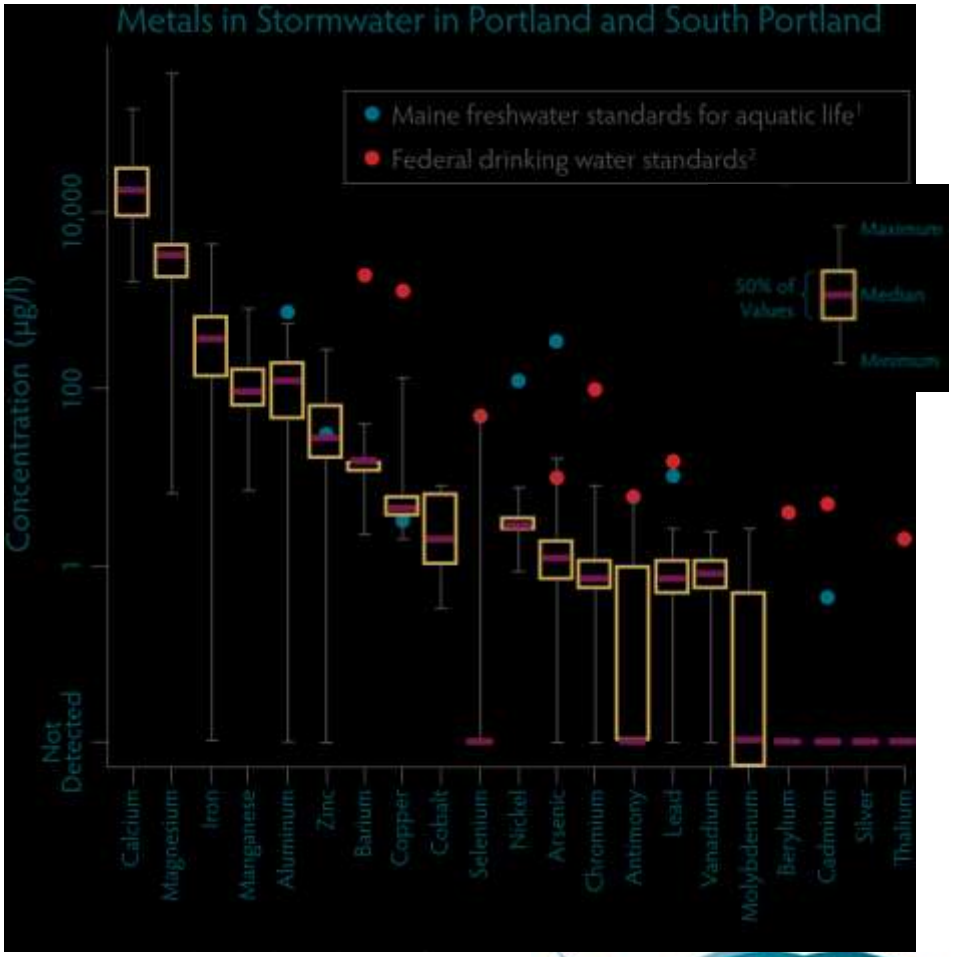
Toxics in Stormwater

- 2006 study of 21 locations in Portland and South Portland
  - Copper:
    - Most sites exceeded Maine WQ criteria
  - Zinc:
    - Almost half of sites exceeded Maine WQ criteria
  - PAHs:
    - Found at levels of concern in about half the samples



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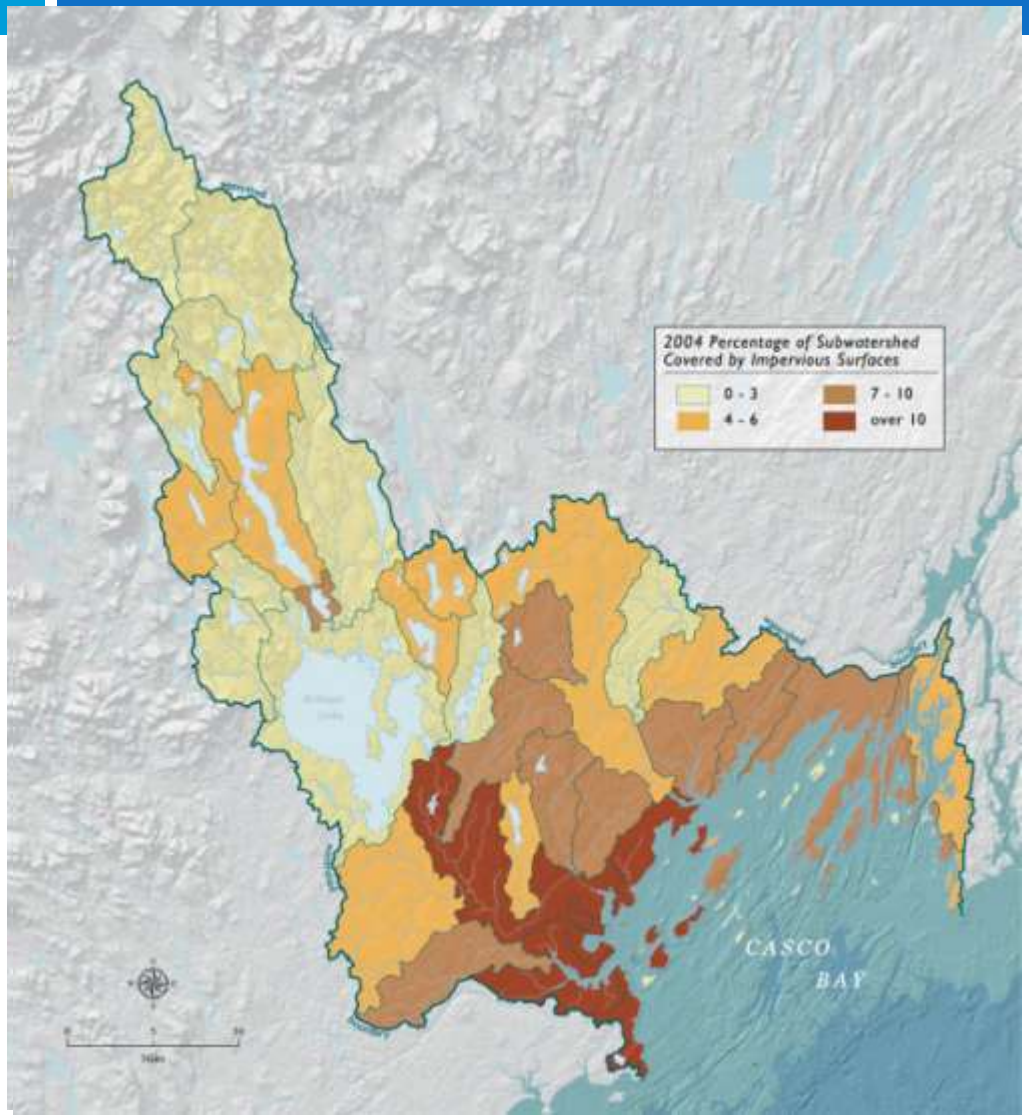
Our Impaired Waters are Suburban



- A close relationship between impaired streams and watershed imperviousness

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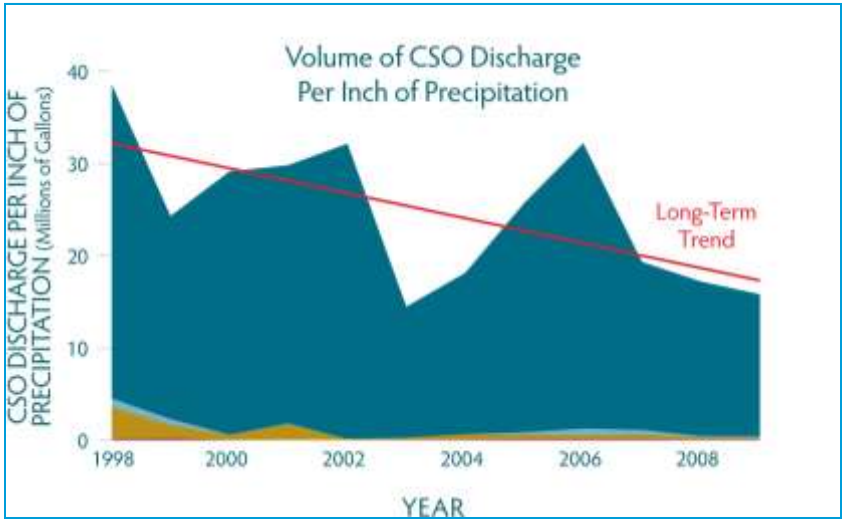
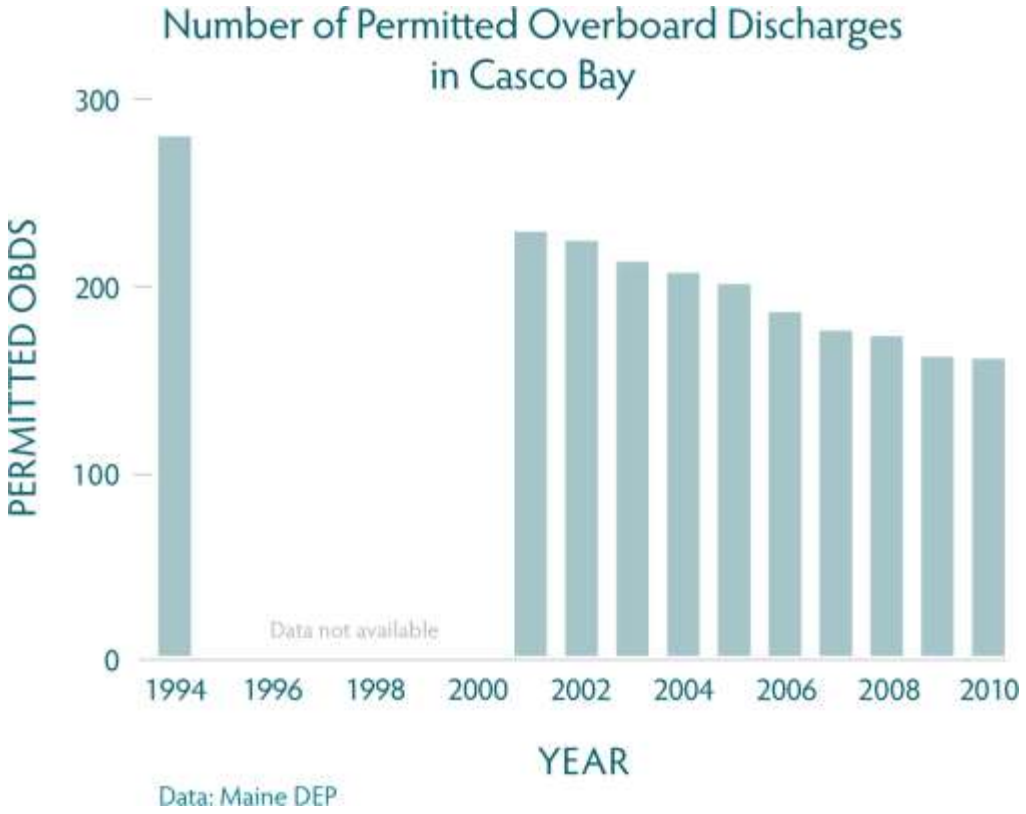
Combined Sewer Overflows



- Over the last two decades, the number of CSO outfalls has dropped from 80 in to 45 at the end of 2009.
- Total CSO discharges have not dropped consistently over the past decade because recent years have been wet.
- Discharge per inch of annual rainfall:
  - A decade ago
    - ~30 million gallons
  - Today
    - ~ 17 million gallons
- Models suggest that Portland's remediation efforts have reduced CSO volumes by ~ 28 percent since 1997.

“Overboard Discharges”



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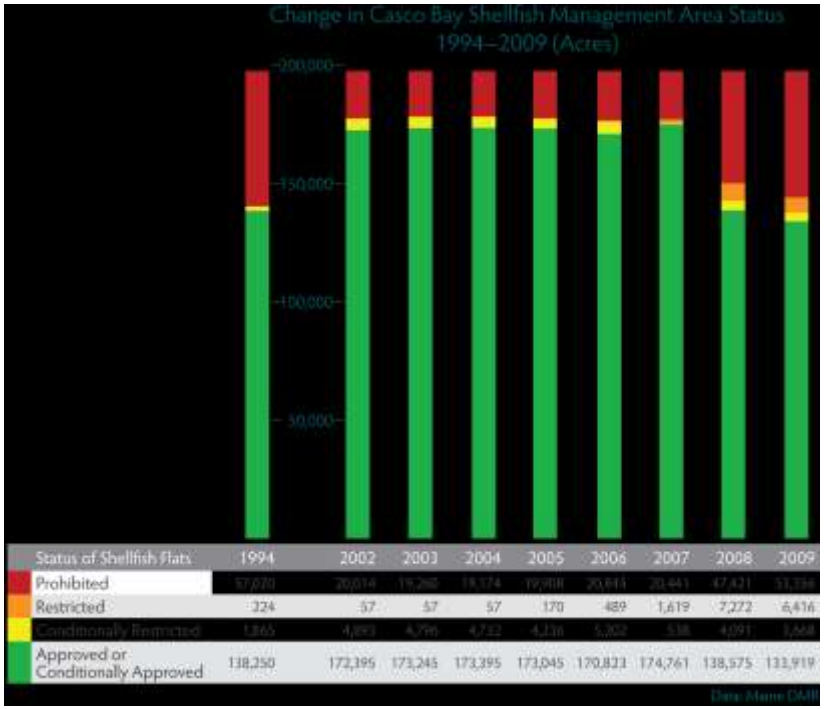
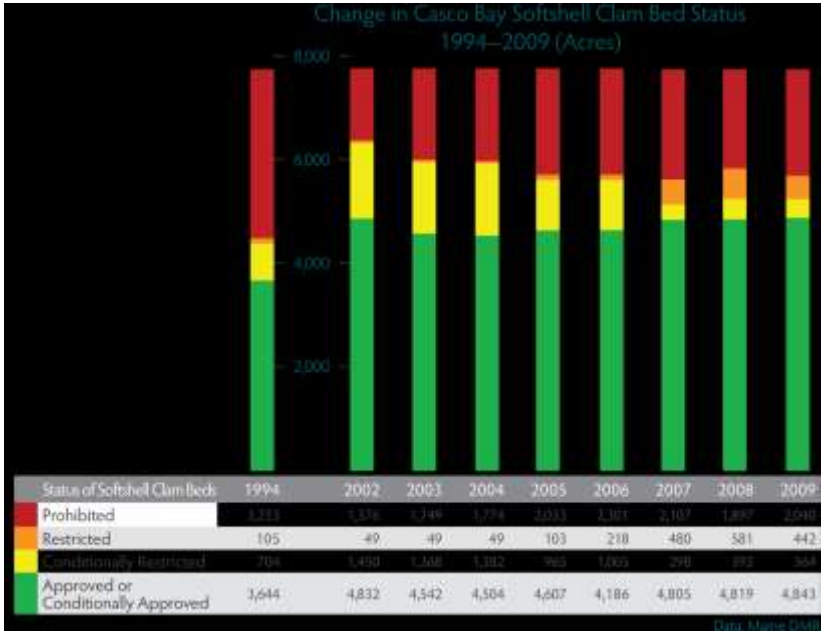
Shellfish Beds



The Area of DMR's shellfish management areas that are permanently closed has gone up in recent years



But the affect on actual clam Flats has been less severe.

~ ¼ of flats are permanently closed

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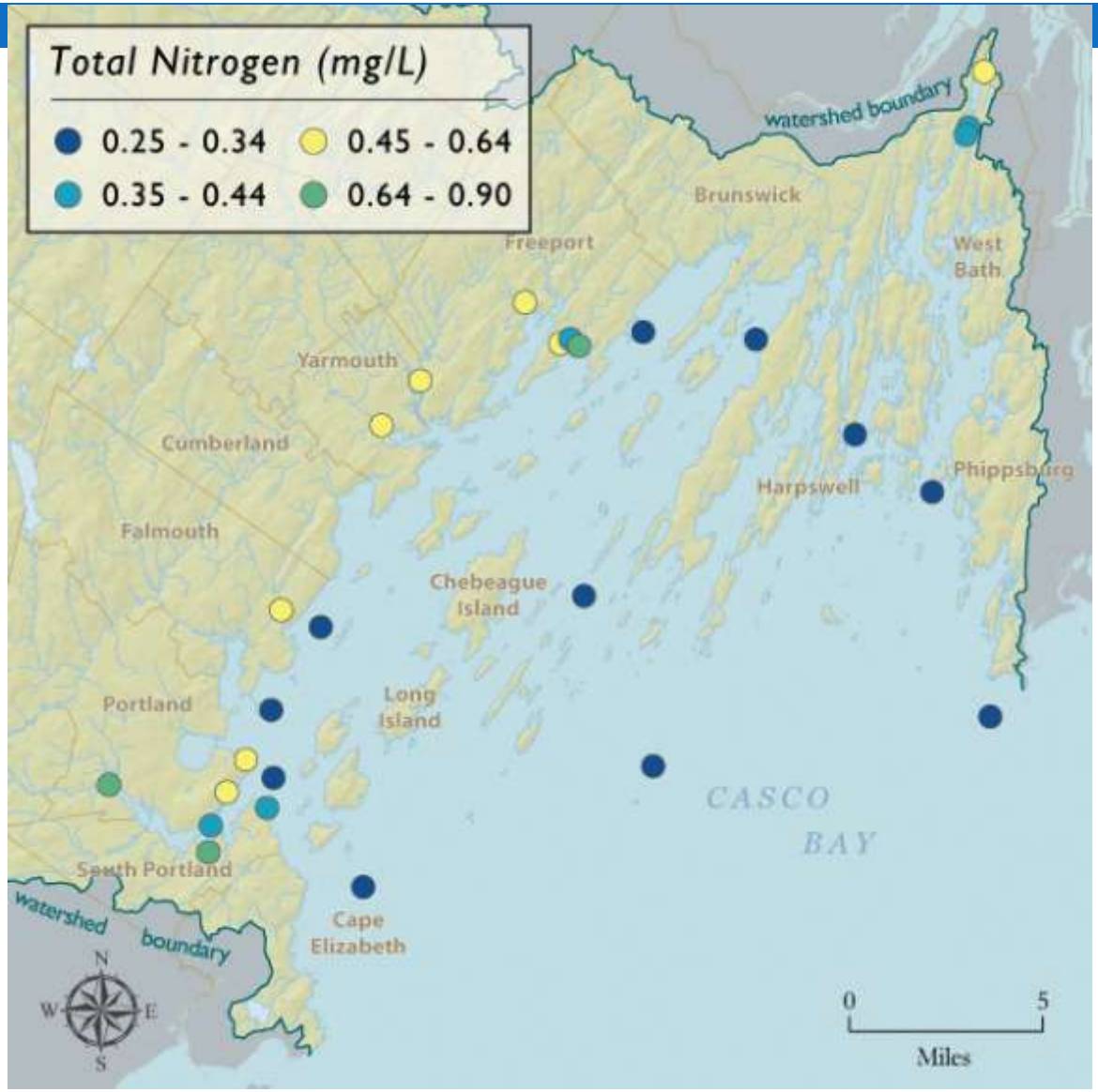
Casco Bay Water Quality



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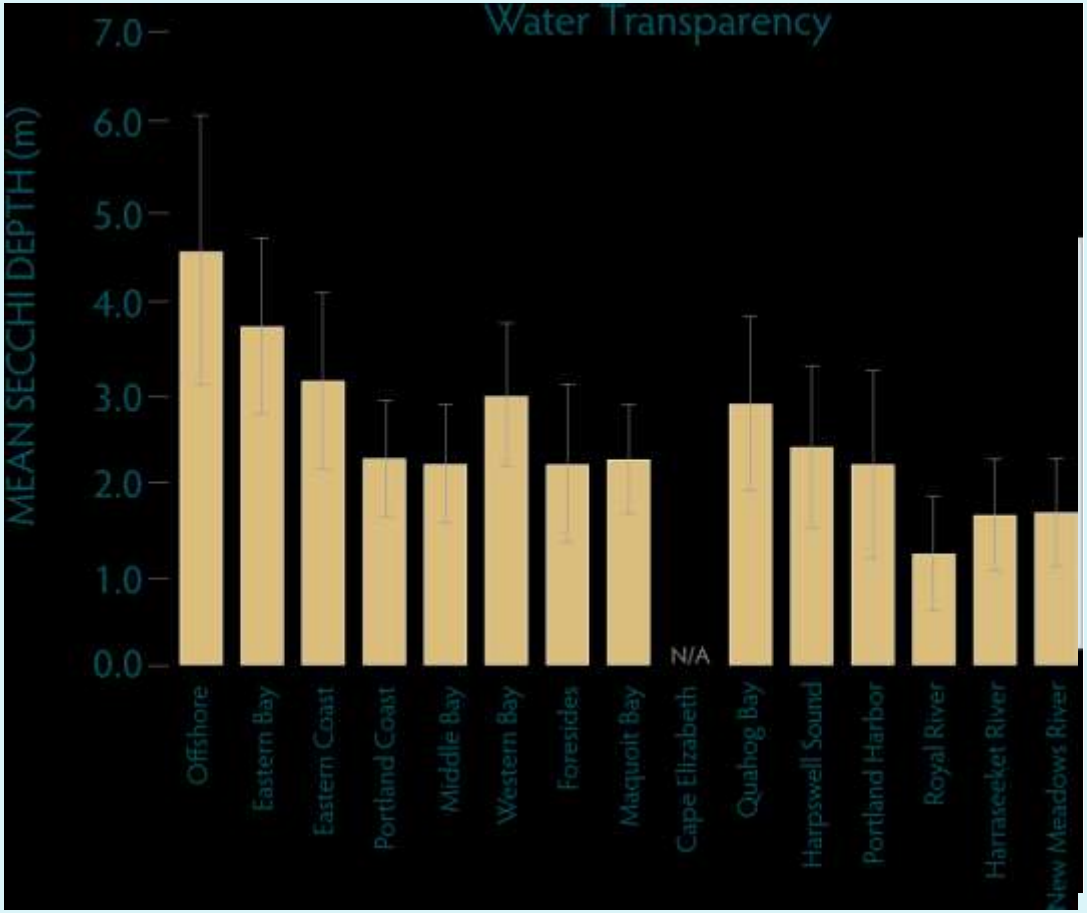
Geography of Water Quality



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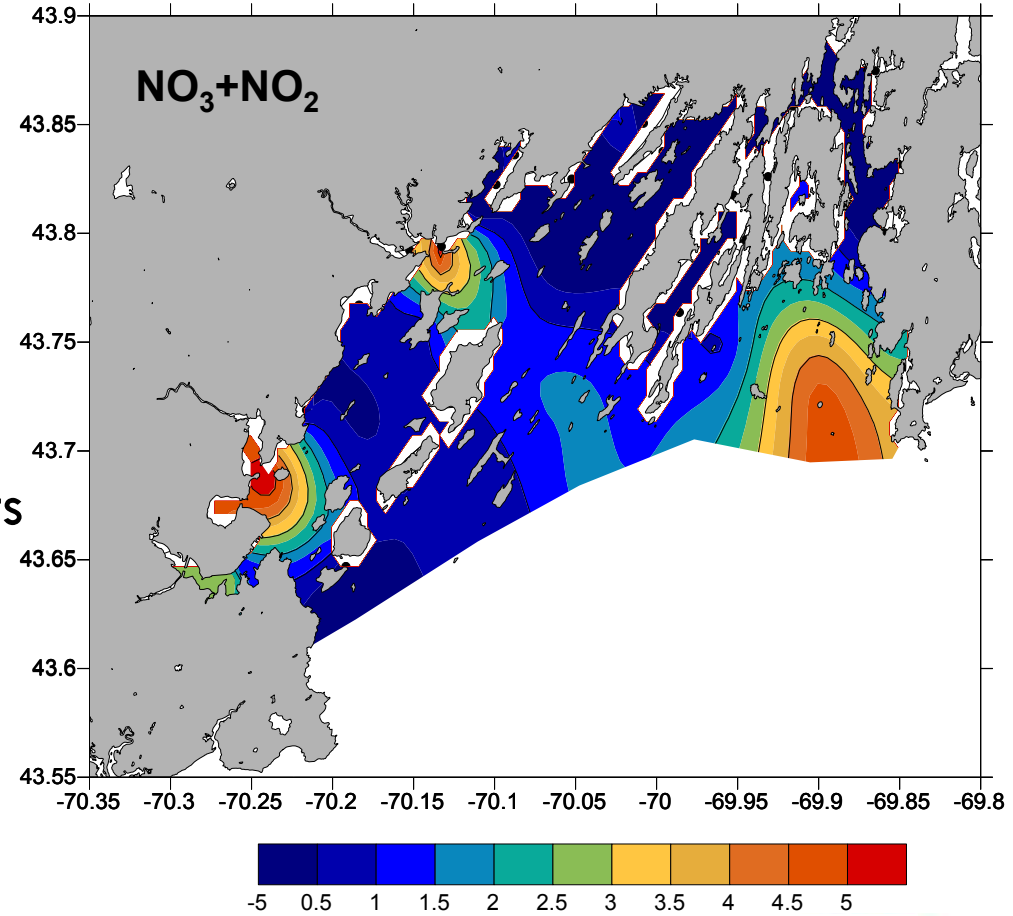
Nutrients Entering Casco Bay

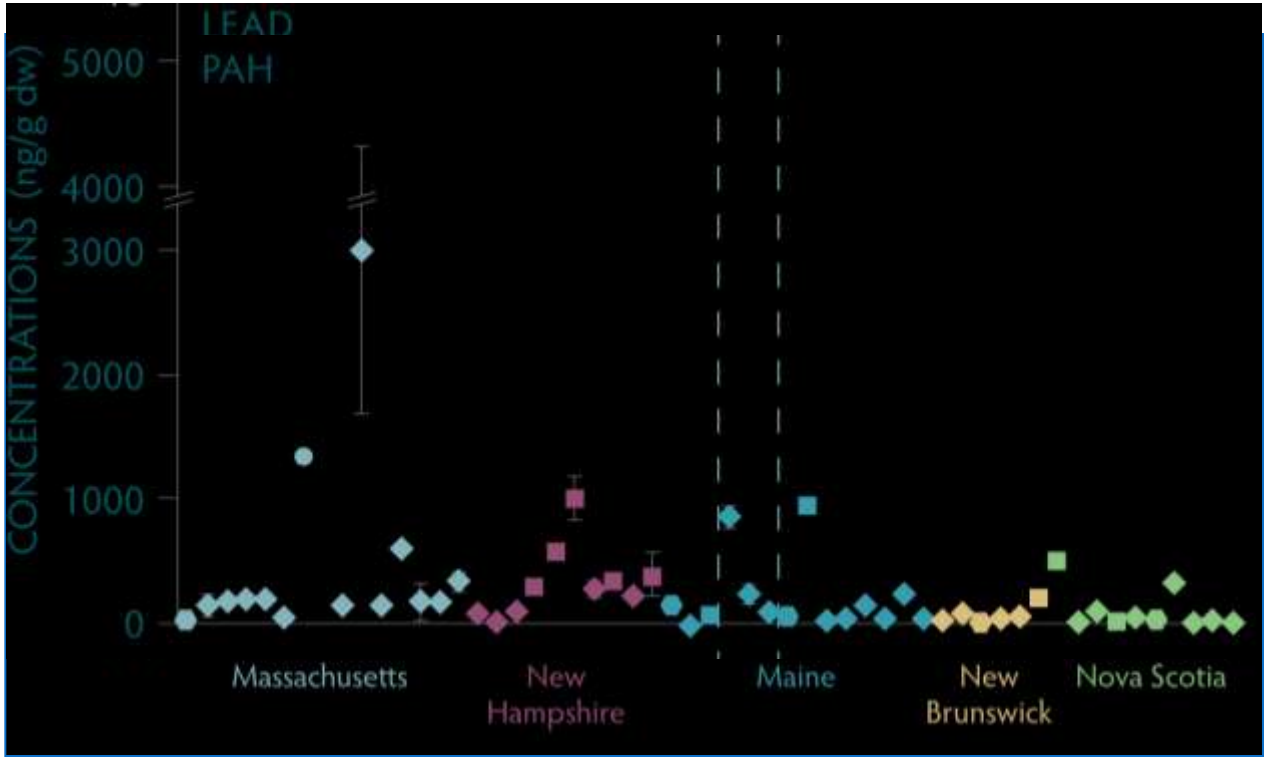
- Spatial patterns in nutrient concentrations suggest significant nutrient inputs from
  - Rivers
  - Sewage treatment plants
  - Kennebec river plume
- Other data also points towards input from airborn pollutants



Nutrient Concentrations in Casco Bay, May 10-11, 2007

Partnership

Indicator 9: Mussels (Regional)



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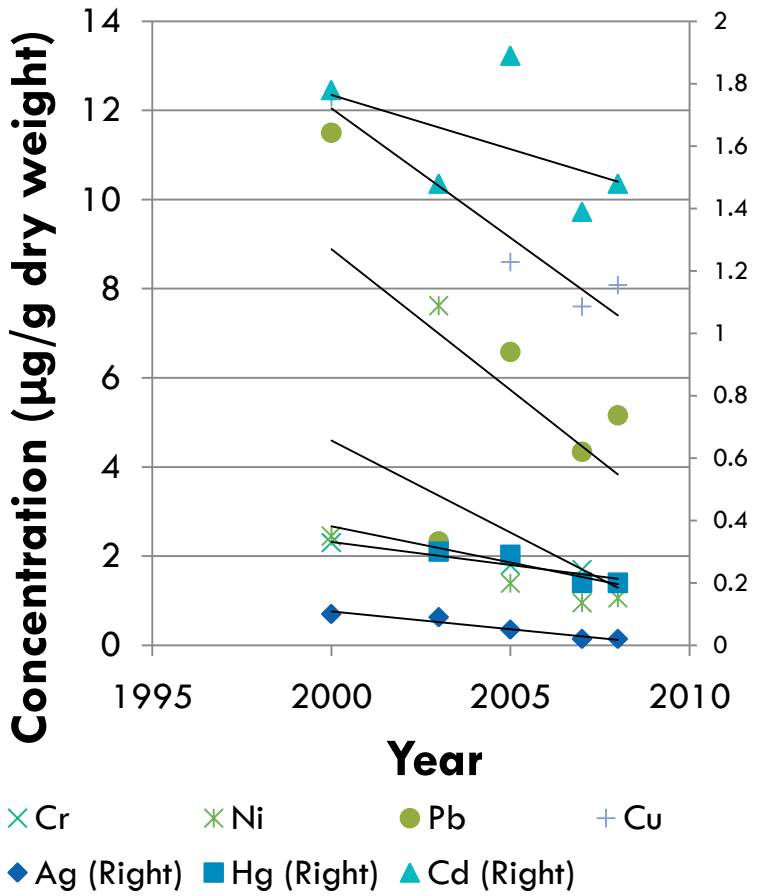
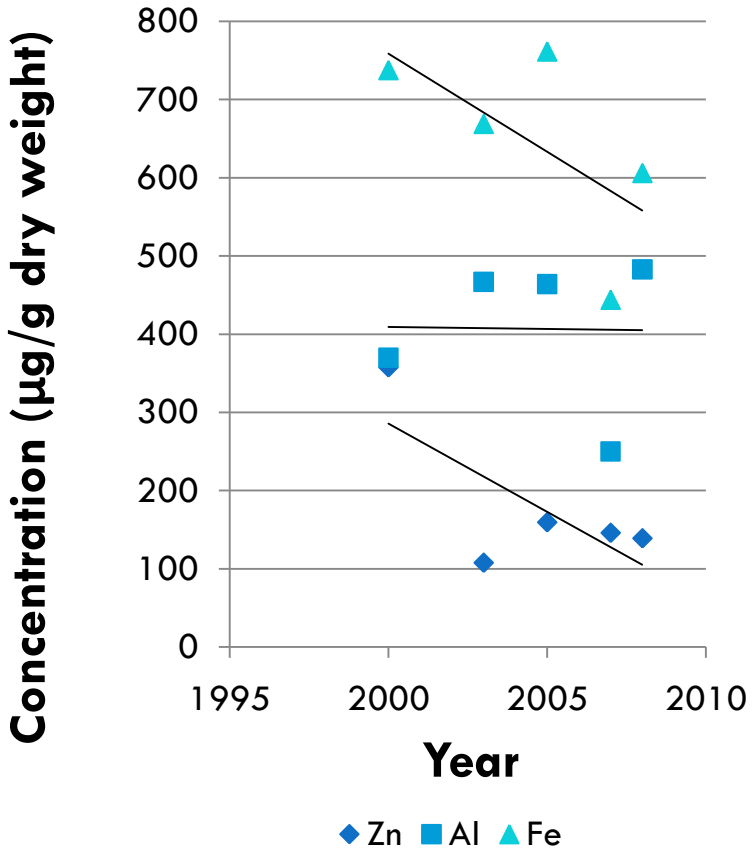
Metals in Portland Harbor Mussels





Gulfwatch Data from Portland Harbor

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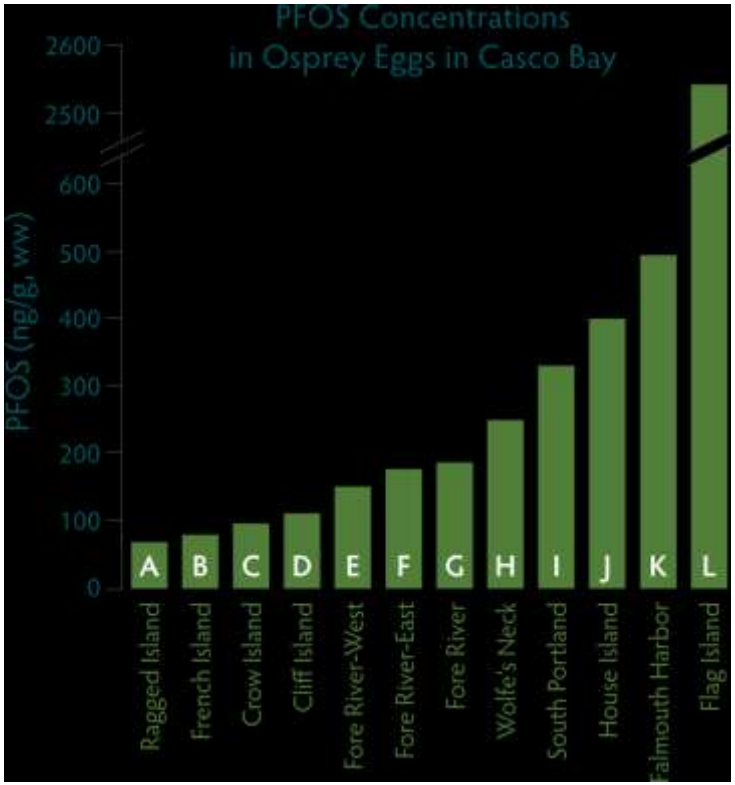
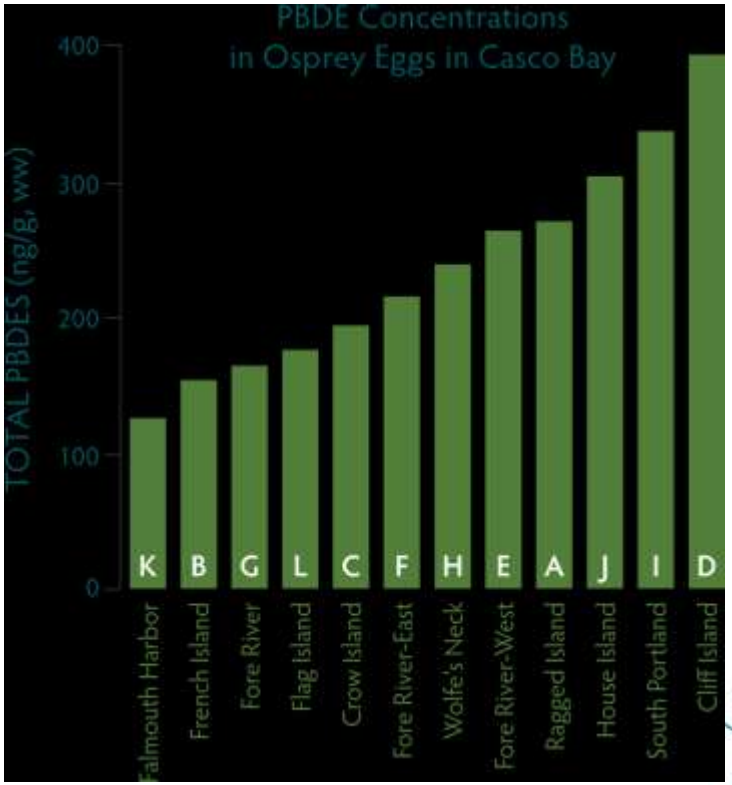
Toxics in Osprey Eggs

"Toxics of Emerging Concern"





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A Forested Watershed, but Little Interior Forest

- ~ 69 percent of the Casco Bay watershed is forested
- 17.5 percent is high quality forest interior habitat.
- Remaining forest is fragmented
- Fails to provide good habitat for forest interior species

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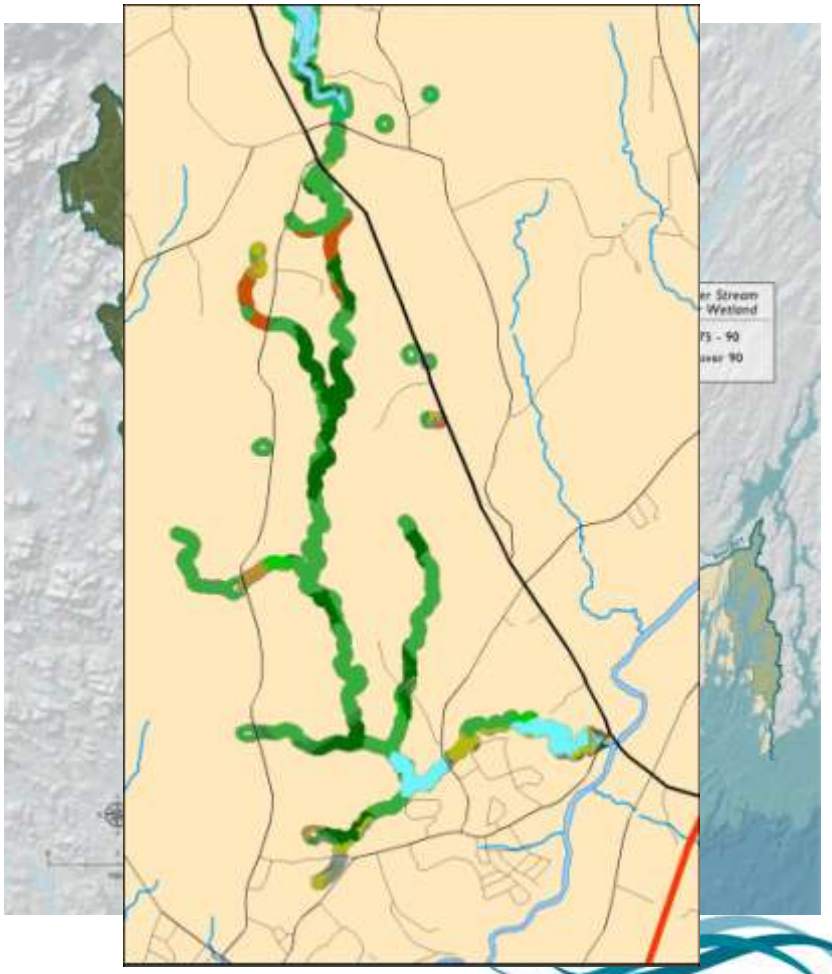
Riparian Habitat Mirrors Forest Cover



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Protected Lands

Level of Protection	Number of Parcels	Total Acres Protected	Percent of Casco Bay Watershed
Conservation Land	438	15,694	7.5%
Open Space (no protection)	306	7,494	3.6%
Recreational Land	110	1,917	0.9%
TOTAL	854	25,105	12.0%

Year	Number of Sites	Area Permanently Protected (acres)	Percent of Study Area
1997	246	7,300	3.5%
2005	341	10,900	5.2%
2010	438	15,694	7.5%

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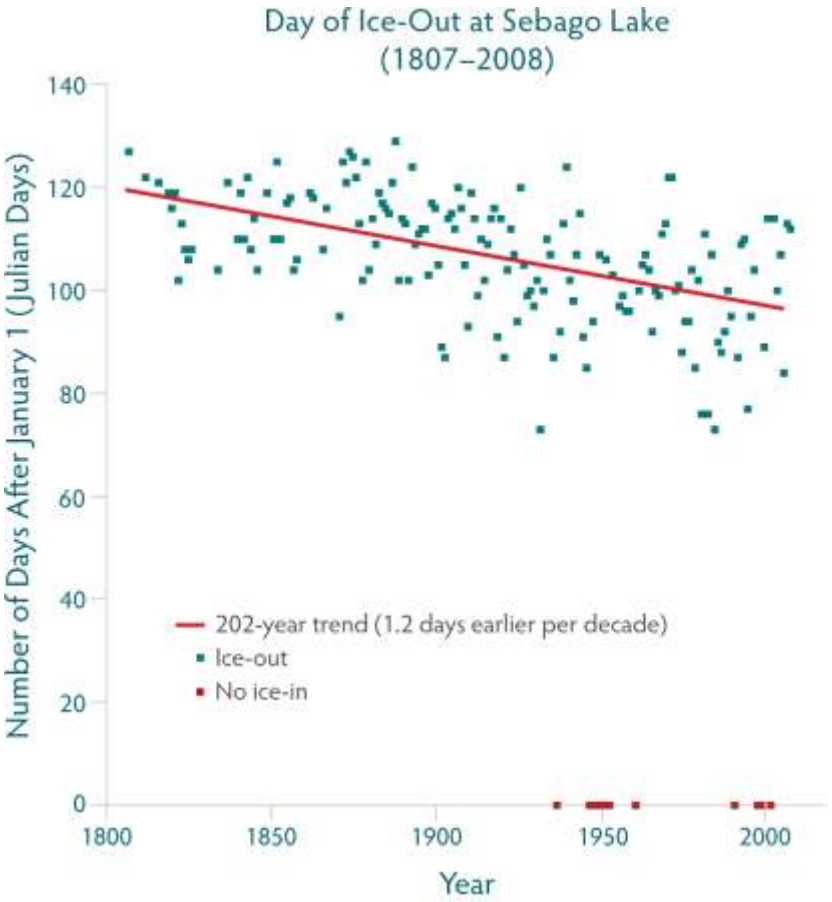
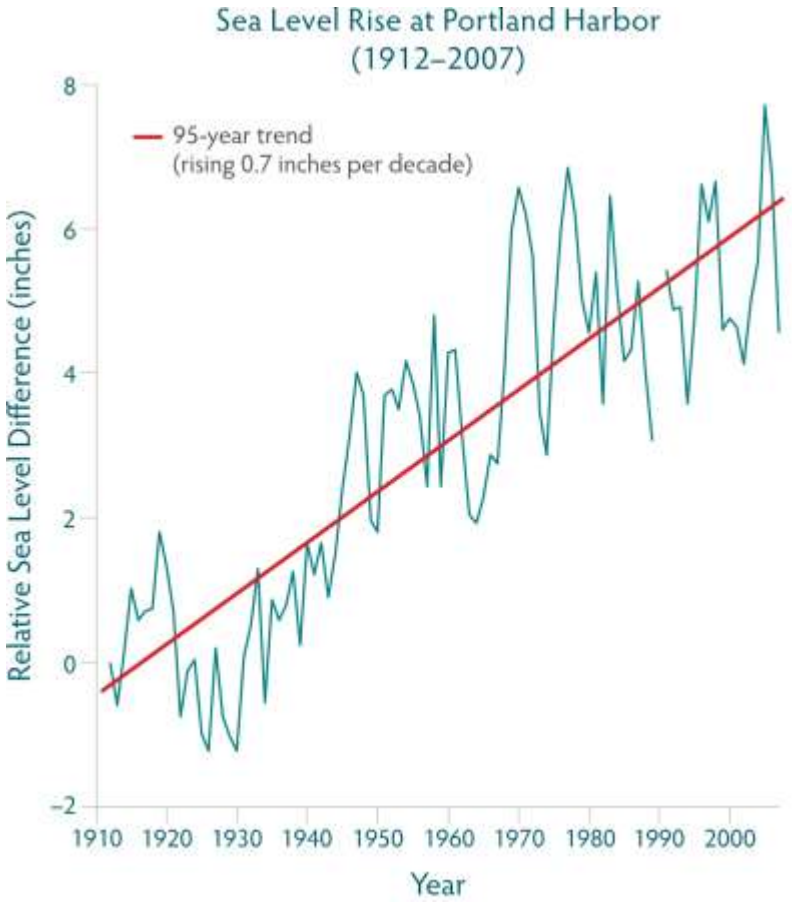
Climate Change and Sea Level Rise





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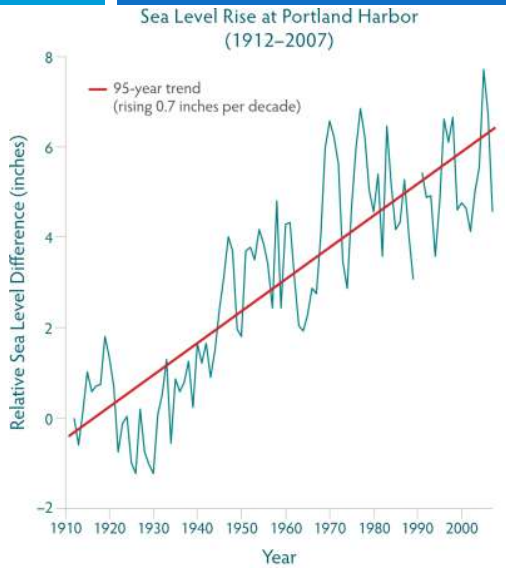
Sea Level Rise Projections



Emissions Scenario	Lower		Higher	
Year	2050	2100	2050	2100
1998 stillwater elevation (ft)	8.9	8.9	8.9	8.9
Subsidence of coastline	0.024	0.043	0.024	0.043
Changes in ocean circulation	NE	0.52	NE	0.79
Global average sea level	0.66	1.6	1.4	4.6
Total stillwater elevation[1] (ft)	9.5	11.1	10.3	14.3
Change (ft)	0.5	1.2	1.4	4.4

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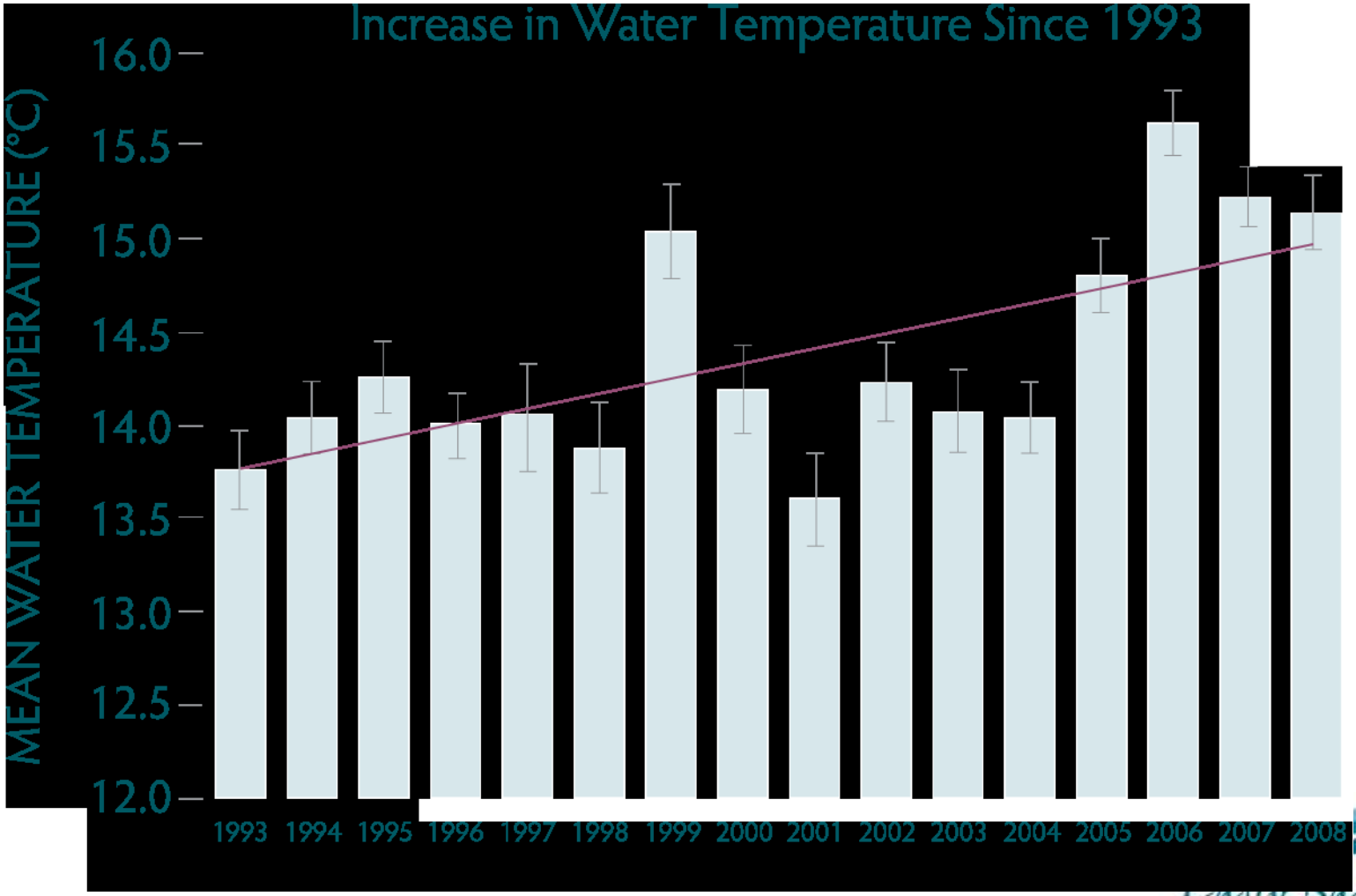
Indicator 7: Water Temperature



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Casco Bay

- Remains relatively healthy
- Protected by
  - Strong marine influences
  - Relatively low population density
  - A watershed that is still largely forested

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Issues on the Horizon

- Water quality inshore
- Concentrations of nutrients in near shore waters
- Fecal contamination; ~ ¼ of all clam flats permanently closed
- Many toxics are declining; others remain high
- Climate change and ocean acidification
- Suburbanization

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Thank You!

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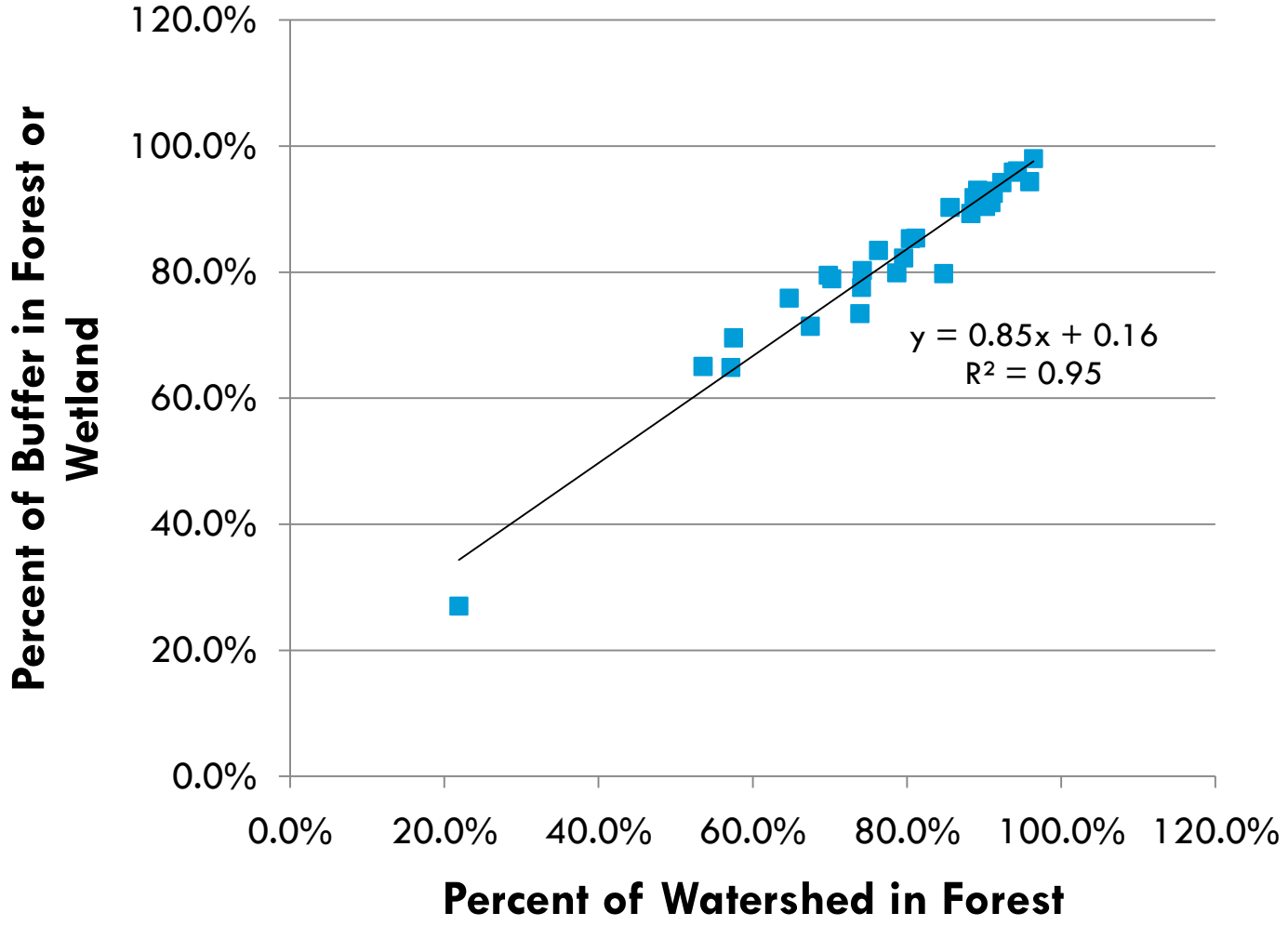
Riparian Habitat Mirrors Forest Cover



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