National Estuary Program Activities in the Barnegat Bay

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The Barnegat Bay NEP

- **1987: Barnegat Bay Study Act (Chapter 387)**
  "…require a study of the nature and impacts that extensive development was causing on the bay…"
- **1995: USEPA approves State's nomination to establish the BBNEP**
- **2002: BBNEP Management plan (CCMP)**
  Action plans: Water Quality and Water Supply; Habitat and Living Resources; Human Activities and Competing Uses; Public Participation and Education
- **2008: BBNEP 2008-2011 Strategic Plan**

2008-11 Strategic Plan

Environmental Priorities

- Reduce eutrophication & improve water quality.
- Address water supply & flow issues.
- Prevent habitat loss & support habitat restoration.
- Address fisheries declines.

(Take steps to make land use a priority.)

Barnegat Bay Development

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Urbanization: the major watershed stressor

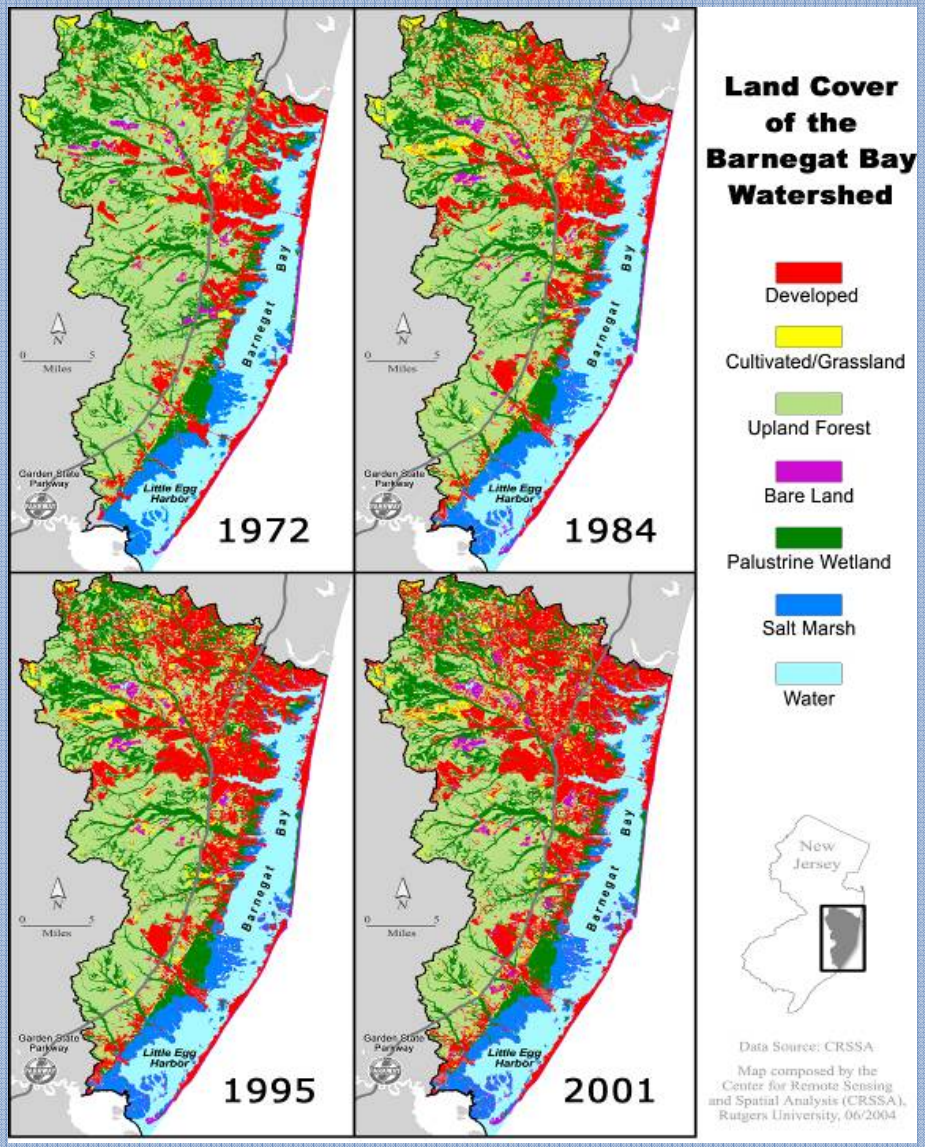
Current development is > 30%; a widely recognized tipping point for losing biodiversity, ecological functioning, and resources.

Urbanization

alters the patterns, quantities, and quality of surface and groundwater flows;

increases nutrients and contaminant loads; and

causes habitat loss, fragmentation, and alterations.



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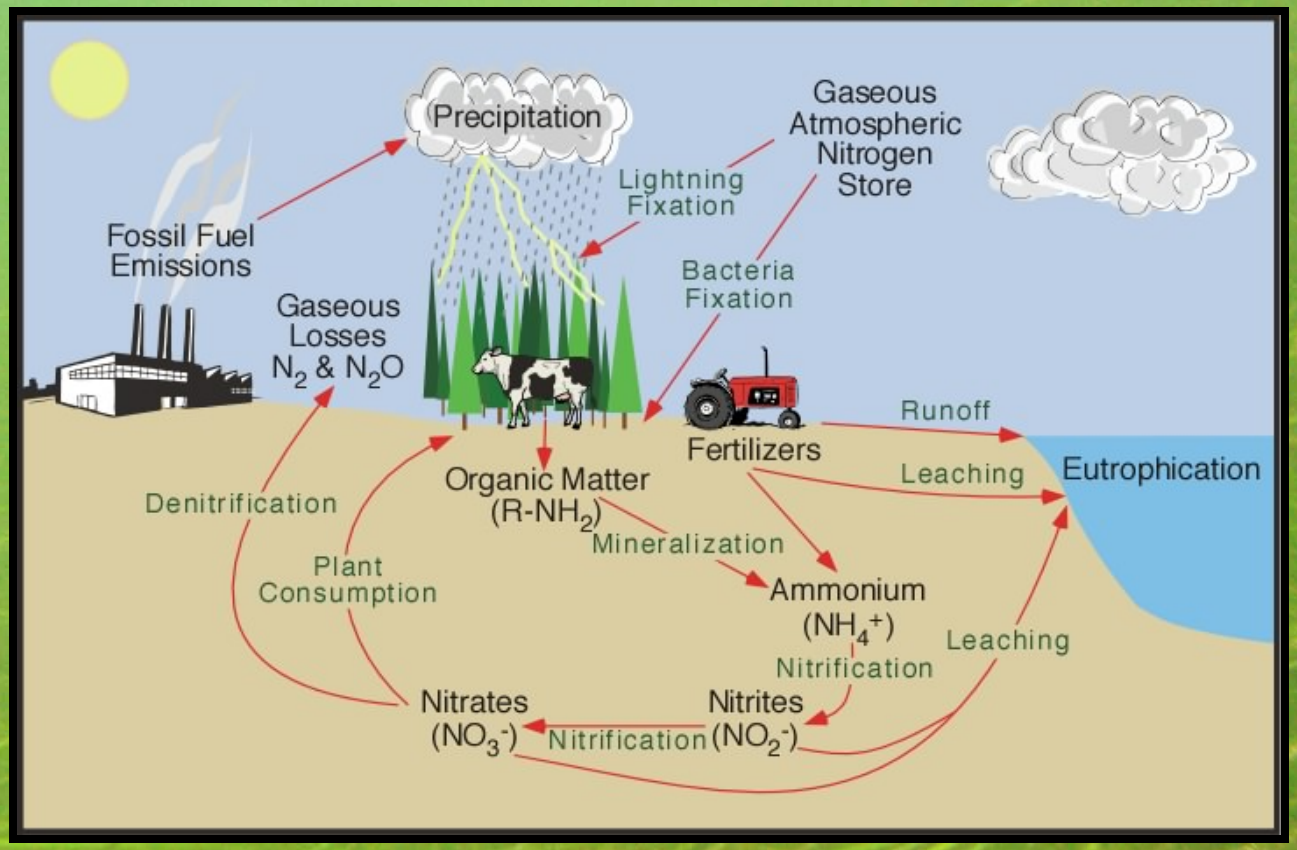
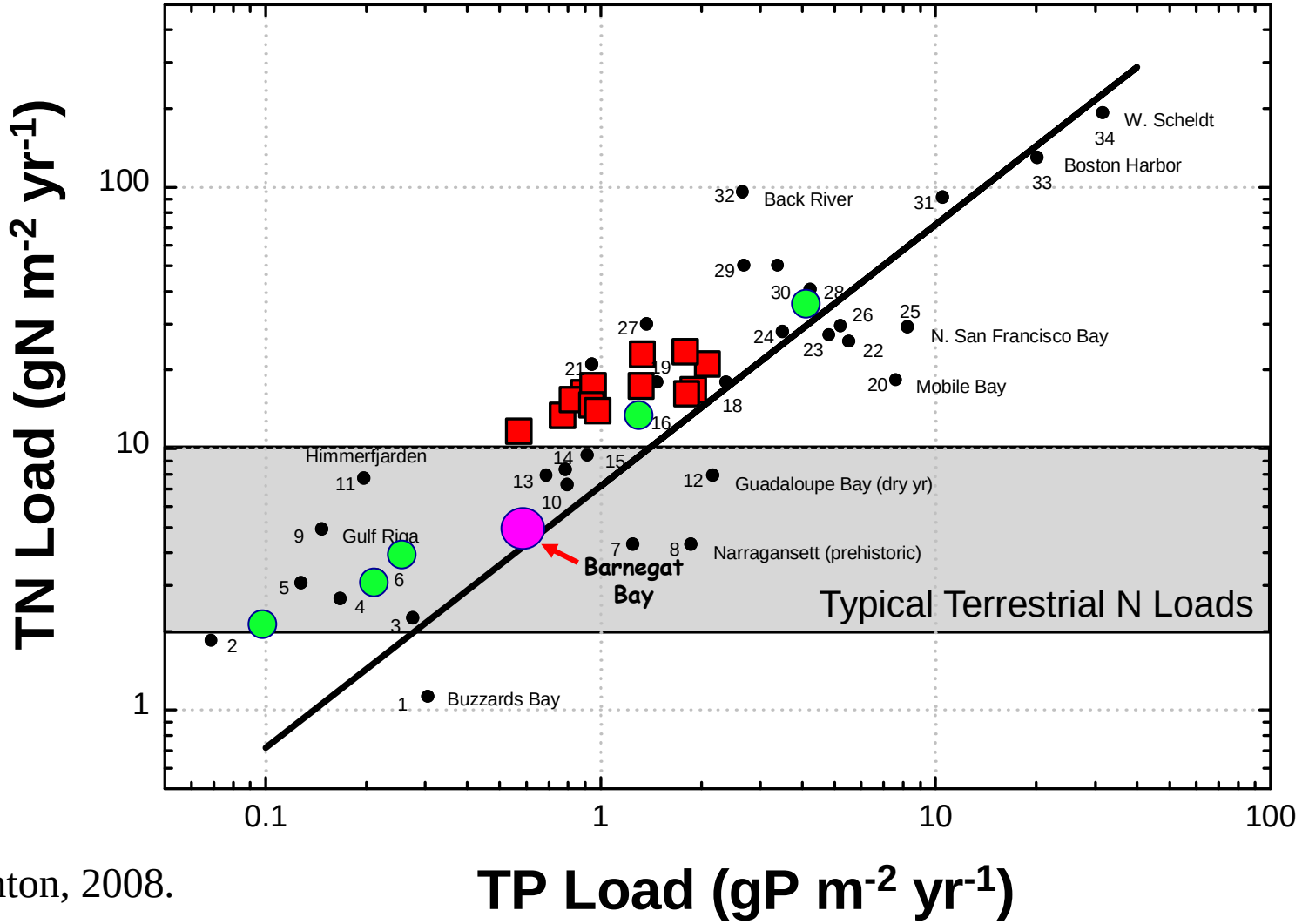
Reduce eutrophication



Eutrophication: an enhanced rate of biological production (usually due to excessive nutrient inputs, nitrogen and phosphorus).

Photo courtesy of Rutgers University

Nutrient Loads to Estuarine Systems



Boynton, 2008.

Reduce eutrophication & improve water quality

BBNEP/BBP-funded water quality projects…

USGS (7): water quality and nutrient assessment stream and well data, N-loading estimates

MU-UCI/others (2): bacterial-source tracking

Rutgers (3): water quality monitoring and/or stormwater projects

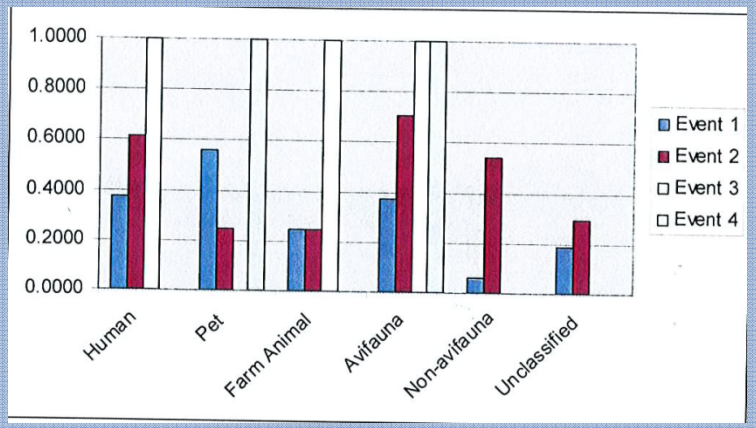
Improve water quality

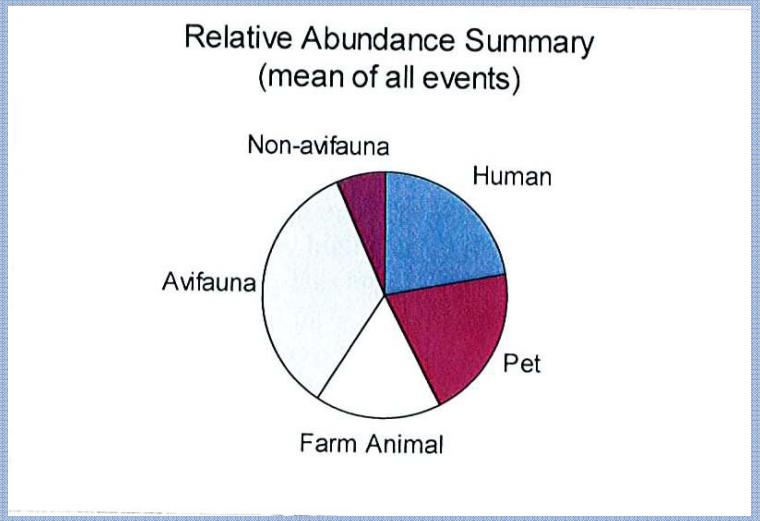
Silver Bay MST Study

Study estimated nutrient loadings from a landscape model and assessed antibiotic resistance in coliform bacteria to identify pollutant sources at 10 sites

Undeveloped sites (*e.g.*, near Cattus Island) had low nutrient inputs; 6 sites exhibited "development" signatures (*i.e.*, high human and/or pet bacterial types.

Additional work necessary to explicitly identify sources (*e.g.*, failed septic system or damaged sewer line, *etc*.) and needed management actions; **Regional WQMP**





Tiedemann *et al*., 2007; BEI and MU-UCI, 2007.

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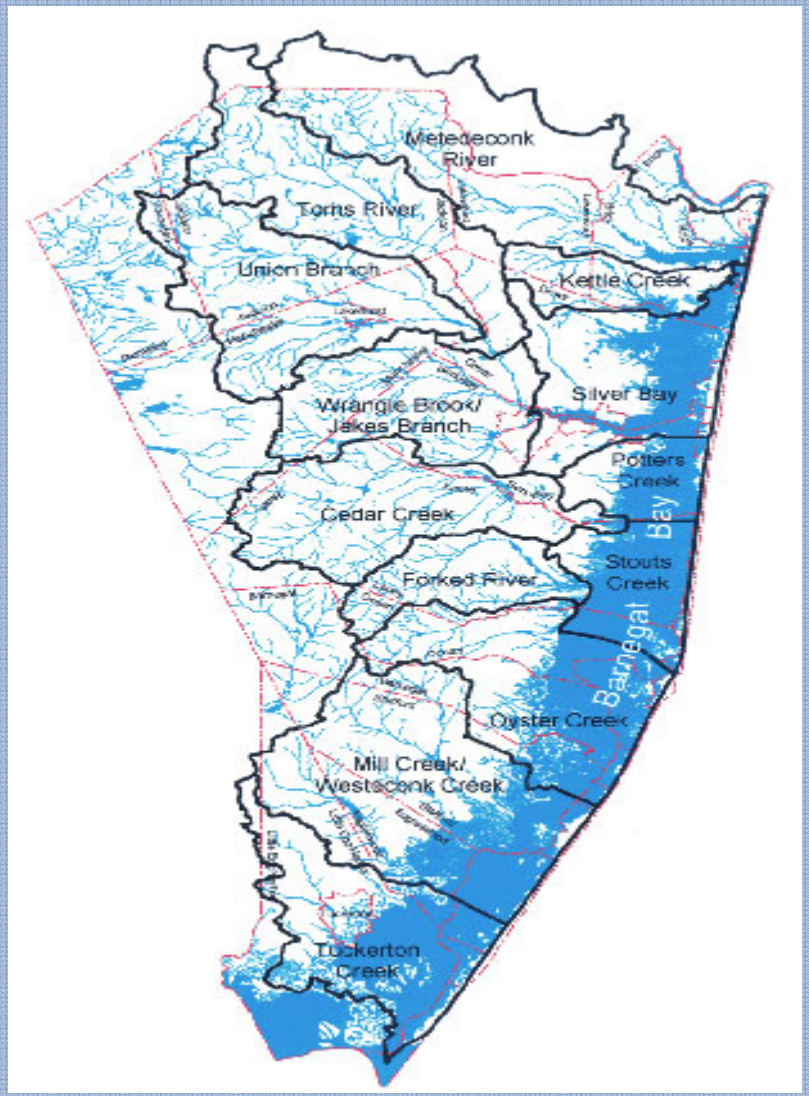
The Bay & its Watershed

Physiography

- Bay = 75 sq-miles
- Bay mean depth = 5 ft
- Watershed = 660 sq-miles

Hydrology

- Lagoon: little fw surface flow, < 3% of the tidal prism
- Tidal prism variable, unequal
- Tides: 3-5 ft; semidiurnal but variable (lunar, weather)
- Long, poorly known turnover time (27-71 days); SLR effects



Guo et al., 1997; Chant, 2001; Kennish, 2001

Address water supplies/flows

Better public recognition of:

1) limited local water supplies,
2) the need to conserve and reuse water.

Better understanding of the effects of altered flows:

1) groundwater withdrawals,
2) offshore sewage effluent diversions,
3) dams/reservoirs, and
4) Oyster Creek NGS.

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Build-out Analysis

Conclusions

- …the build-out analysis indicates that significant, additional development will occur in the watershed.

- This build-out analysis reinforces the idea that comprehensive water-shed-scale planning is needed to address future development impacts.

- **Lathrop and Conway, 2001**

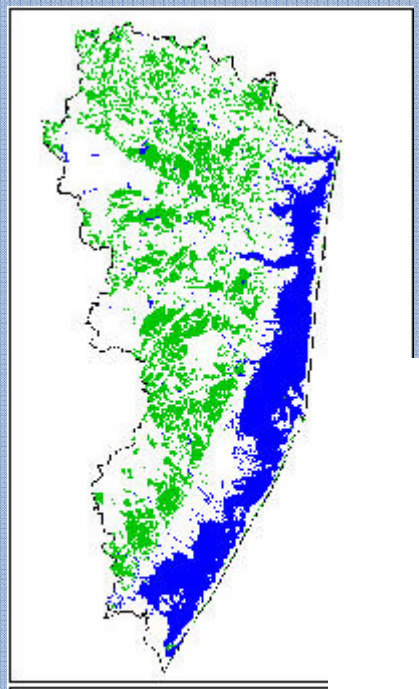
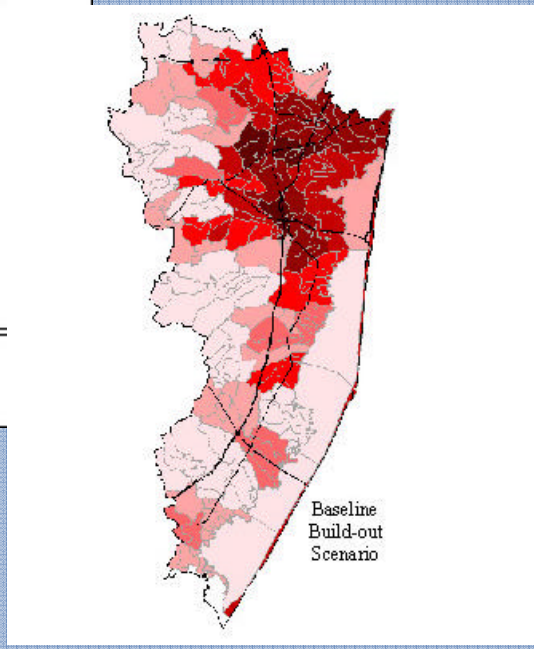


Figure 1. Land available for development.



Recent Land Use Change

Conclusions

- …the percentage of altered land use in the BB-LEH watershed exceeds 33% in 2006.

- The BB/LEH estuary system is continuing to experience a significant conversion of forested and wetland habitats to urban land cover and thereby exacerbating nutrient loading to the BB-LEH estuary.

- **Lathrop and Haag, 2007**

Assessment of Land Use Change and Riparian Zone Status in the Barnegat Bay and Little Egg Harbor Watershed: 1995-2002-2006

Intact forested riparian zone along the upper reaches of the Forked River.

Richard G. Lathrop[1]
Scott M. Haag[2]

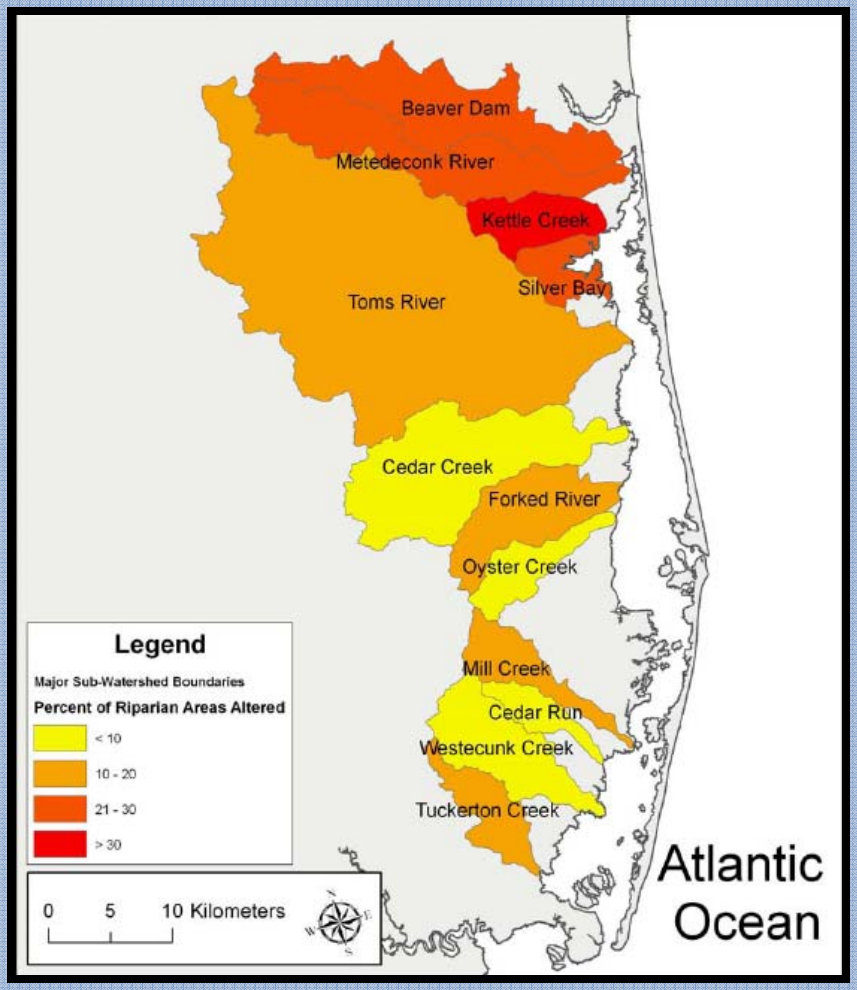
October 2007

Recent Land Use Change

Conclusions

- …a total of 1,920 acres of riparian habitat (was) converted to urban uses between 1995 and 2006.

- … the northern portion of BB/LEH estuary (i.e., the Metedeconk, Beaver Dam, Kettle Creek and Silver Bay sub-basins) have riparian zones … with > 20% riparian zones in altered land use.



- **Lathrop and Haag, 2007**

Prevent Habitat Loss

Marshes: Climate-change/SLR battleground

Wetland losses may be substantial

Submerged Aquatic Vegetation

Barnegat Bay: most of NJ's SAV

Photo courtesy of Rutgers University

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Address Fishery Declines

Complex, interacting causes

- Water quality degradation
- Habitat loss and alteration
- Overfishing
- Boating
- OCNGS
- Others

Sue Scott/MarLin Network

Habitat Alteration Effects

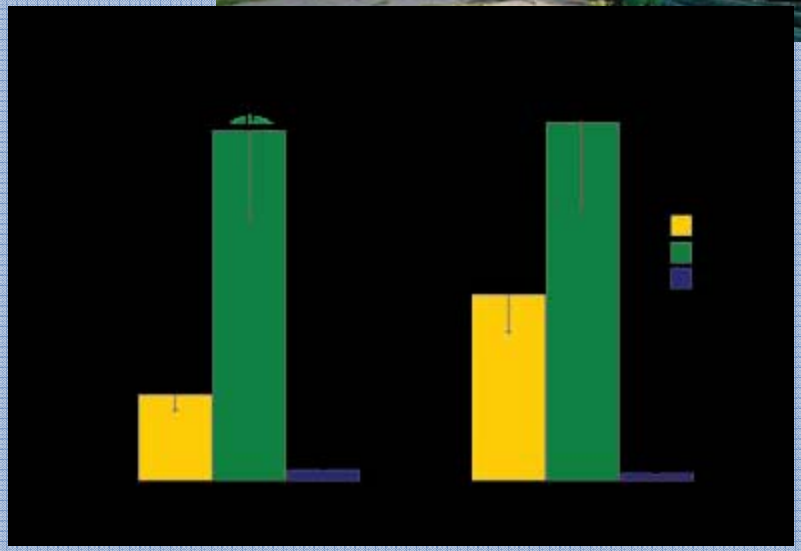
The impact of artificial shorelines on species diversity, secondary production and habitat quality in Barnegat Bay

>36% of the natural shoreline in Barnegat Bay has been bulkheaded

Faunal communities along bulkheads

... differed from those of natural shorelines.

... are not as biologically rich as in natural shoreline habitats and may function differently; the “nursery role” of these areas appears altered.



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Climate-ready estuary?

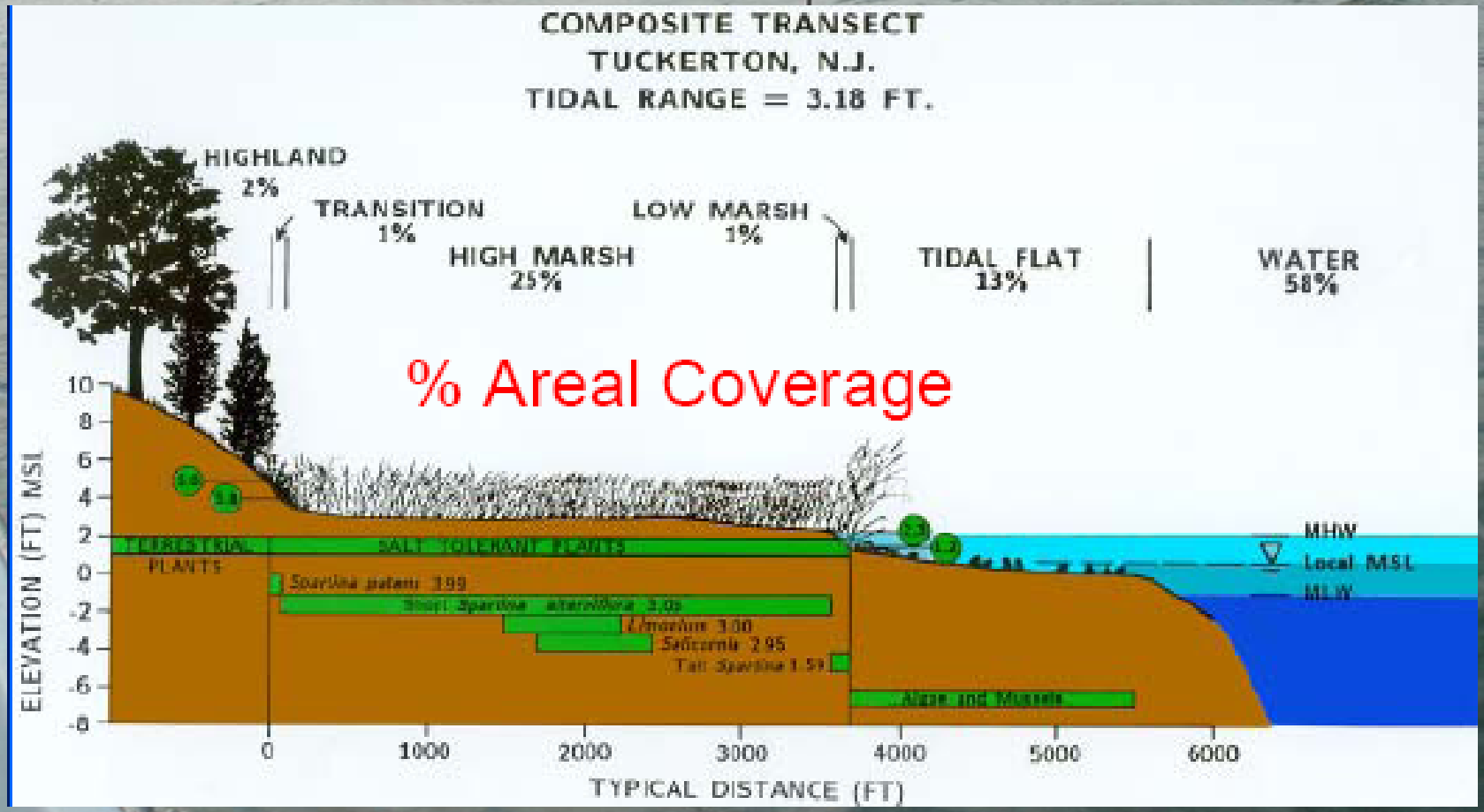

Photo courtesy of Rutgers University

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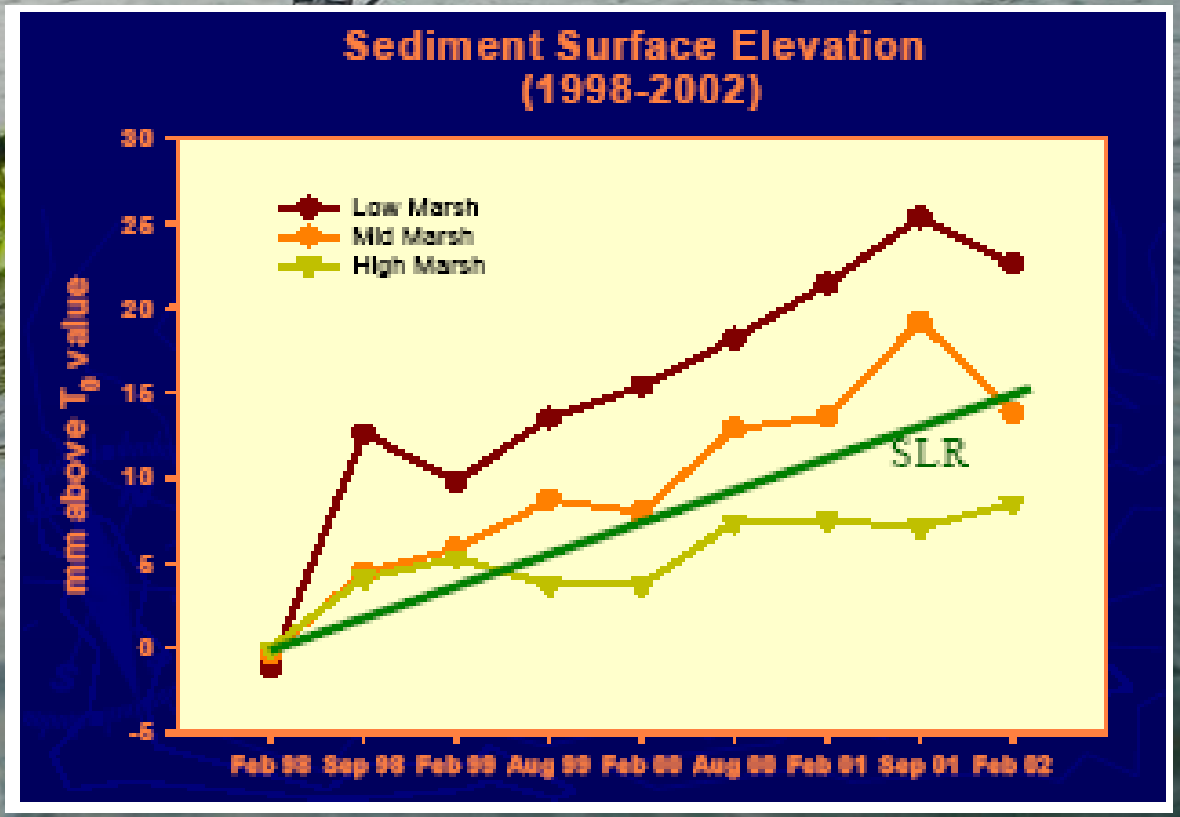

Photo courtesy of Rutgers University

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The future of the bay?

- **Better recognition**:

  Bay is changing and increasingly at risk.

  Region's economy is a function of bay health.

  Bay is a harbinger of the Jersey Shore.

- **Current protections inadequate**
- **Sustainable funding mechanism(s) needed**
- **Increased investment**

The Barnegat Bay: Jewel of the Jersey Shore?

Yes, but only if we work together!

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Barnegat Bay Partnership
Research Educate Restore
USGS
science for a changing world
Ocean County College
NRCS Natural Resources Conservation Service
American Littoral Society
Coastal Conservation
Ocean County Soil Conservation District
New Jersey Natural Resources Conservation Program
Ocean County Mayors' Association
New Jersey Marine Sciences Consortium
Sea Grant
New Jersey
Urban Coast Institute
Monmouth University
where leaders look forward
Jacques Cousteau
National Estuarine Research Reserve
United States Environmental Protection Agency
Marine Trades Association of New Jersey
1972
Ocean County New Jersey
Ocean County Health Department
US Army Corps of Engineers
ShoreBuilders
Association of Central New Jersey, Inc.
The Ocean County Utilities Authority
Clean Water
New Jersey
U.S. Fish & Wildlife Service
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