Uncertain Threats to Saltmarshes of the Delaware Inland Bays

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Revised: December 13, 2006
Sudden Wetland Dieback on Atlantic and Gulf Coasts

- Widespread, sudden vegetation death
- Mostly *Spartina alterniflora* (low marsh)
- 1st noted ’68 in Louisiana
- Recent occurrences unprecedented
- Rate of recovery variable

Source: Ron Rosa CT DEP
Piney Neck Brown Marsh – Sudden Wetland Dieback
Possible Causes

- Fungal Pathogens
- Herbivore Fronts
- Trophic Changes (decreased predator populations)
- Eutrophication
- Toxicity
- Hydrologic Alteration
  - Changes in tidal cycles, amplitudes
  - Alteration through intense ditching
- Climate Change
  - Increased variability in precipitation (deluge & drought)
  - Change in rate of sea level rise
GPS Photo-Link Software Assigns Lat and Long to image file
Green Marsh –
Rehoboth Bay Back
Barrier
Piney Neck – I. R. Bay
Sudden Dieback Survey Results

- Present in all 3 Bays
- Varies greatly in intensity
  - Maybe present at low levels in the majority of marshes
  - Severe in a few different marshes
  - Natural autumn senescence partly obscuring definition
- Upland and in-site disturbance not apparently influential of presence
White’s Creek Area Marsh Browning Comparison – Indian River Bay

September 2002

September 2006
Back Barrier Marsh South of Indian River Inlet
Indian River Marsh – No Ditching
Sally Cove Marsh, Angola Neck – Rehoboth Bay
Dieback Distribution

- **Severe**
- **Brown**
- **Brown/Green**
- **Green**
- **Insufficient Data**

Area marked: Should be brown/green
Frequency of Dieback by Tidal Wetland Polygon

- Oblique photos did not allow area calculation
- 929 wetland polygons total
- 205 sufficiently observed (22%)
- Frequency by dieback intensity
Established Permanent Monitoring Sites

- 4 sites
- Photographs
- Measuring % live cover, dead cover
- Analyzing plant and soil samples for fungal pathogens and nematodes
Initial Laboratory Results

- No nematodes in roots
- Some fungal leaf spots, nothing pathogenic
- No teliospore pustules from *Puccinia*
- Disease probably not a cause
- Now testing for presence of heavy metals
Die Back in Other Regions

Virginia LTER -- Delmarva
Louisiana
Cape Cod, Massachusetts

2002

2004
Outcomes of the October 19th Meeting on Dieback in Delaware

- Summarize dieback literature
- Summarize climate, sea-level, and tidal prism data
- Document change in grass cover in plots in 2007, add plots
- Develop state-wide reporting protocol
- Collect remote sensing data
- Contact other researchers, managers involved in wetland loss, dieback
- Next Meeting: Dec 4th, St. Jones Reserve
Additional Marsh Stressors
Greater Snow Goose

- Long range migrant
- Winter’s in coastal mid-Atlantic & SE
- Forages in AG fields and marshes
Greater Snow Goose Population

From Menu et al. J. App. Ecol. 2002 and Environment Canada
Snow Geese Overgrazing: Assawoman Wildlife Area – Little Assawoman Bay
Small Watercraft
Cape Henlopen SP
Marshes near Lewes–Rehoboth Canal
Gordon’s Pond
Seal Island – Little Assawoman Bay

- September 2002
  - Snow Geese Devegetated
  - Future CIB Estuary Habitat Restoration Act Project
    - Stabilization, Goose Exclusion, Planting

- September 2006
Areas of Likely Snow Geese Damage

- Tidal Wetlands
- Damage

1,745 ac For LAB
745 ac
Management Implications

- Need to manage goose populations for sustainable ecosystems (set target population)
- Increase harvest should occur in DE, NJ, PA (Calvert et al. J. Wildl. Manage. 2005)
- Legalize electronic calls
- Consider providing incentives for hunters
Marsh Collapse?
Locations Experiencing Well Documented Rapid Salt Marsh Loss

- Jamaica Bay, New York (Hartig et al., *Wetlands* 2002)
- Blackwater National Wildlife Refuge, MD
- Louisiana Gulf Coast
- Venice Lagoon, Italy (Day et al., *J. Coastl. Rsrch.* 1998)
- Elkhorn Slough, CA (Van Dyke & Wasson, *Estuaries* 2005)
Mean Sea Level Rise

Current: 3.16 millimeters/year (1.04 feet/century)
1250–2000: 0.9 mm/year (Nikitina et al. 2000)

http://www.tidesandcurrents.noaa.gov/sltrends/sltrends.html
Questions

- What are the rates of saltmarsh gain/loss?
- What are the most important factors contributing to gain/loss?
- Will saltmarshes keep pace with accelerated rates of sea-level rise in the future?
- What management strategies are feasible given rapid loss?
Recommendations to the STAC

- Advise the Board on the nature of Sudden Dieback and recommend that they request that DNREC consider seeking additional funding to study the issue in the short term (1 – 2 years).

- The STAC should consider the sustainability of the Inland Bays’ salt marshes under a changing climate and hydrologic regime and discuss potential for research.
Acknowledgments

- Amy Jacobs, DNREC
- Bob Mulrooney & Nancy Gregory, UDCE
- Bill Moyer, Duffield Assc.
- EJ Chalabala & Josh Thompson CIB

Website: http://www.inlandbays.org/cib_pm/projects.php