The Effect of Climate Change On Wetlands

Wetland Environments Conference  May 16, 2011

Rose Paul, The Nature Conservancy
OVERVIEW

- Climate Change in the Champlain Basin
- Implications for wetlands and people
- What can you do to help wetlands adapt?
With support from Argosy Foundation and Kelsey Trust

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Climate Change in the Champlain Basin

General Approach

1. How has climate changed in the Champlain Basin so far?

2. How is it likely to change in the future?

3. How is this likely to affect aquatic habitats and species, shorelines, property?
Climate Change in the Champlain Basin

www.climatewizard.org
Climate Wizard

Emission Scenarios

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Climate Variables

- Average **Annual** T and Total **Annual** P
- Average **Seasonal** T and Total **Seasonal** P
- Average **Monthly** T and Total **Monthly** P

Time Periods

- Past Climate: 1901 - 2002
- Modeled Data: 1950 - 2099
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Observations (Weather Stations)

Average Annual Air Temperature → Warmed 1.7 °F 1895 to 2008
Annual Precipitation → Average for 1976-2005 3” greater than the average for 1900 to 1950
Seasonal → Warmer during fall and winter
Climate Change in the Champlain Basin

Predictions

Average Annual Air Temperature

→ 1-11 F warmer by 2100

Annual Precipitation

→ 4-6” more by 2100 (10-15%)

Annual & Seasonal Patterns

→ More heavy storms, less snow, more warming in winter?
Predicted Changes in Northeast Average Summer Temperature


www.climatechoices.org
Climate Change in the Northeast 2010 - 2100


www.climatechoices.org
Lake Champlain Wetlands
166 wetlands >50 acres
Potential Lake Changes

• Lake Level
• Ice Cover
• Lake Water Temperature
• Nutrient Loading
**Lake Level**

**Total annual precipitation:**

3” higher after ca. 1970

**Lake Champlain level:**

1 foot higher after ca. 1970
Potential Effects on WETLANDS from lake level rise

- Greater shoreline hardening?
- Where can wetlands migrate to?
- Net loss of wetland acres?
- Shoreline development regs....
Lake Champlain Ice-In Dates: 1816-2005

14 days later over 190 years

33 times lake has not frozen over (*)
78% since 1950; 54% since 1970

Data from NWS Burlington, http://www.erh.noaa.gov/er/btv/climo/lakeclose.html

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Potential Effects on WETLANDS from less ice cover

- Greater wave action in winter?
- Lakeshore wetlands can help mitigate erosion

Burlington Free Press
Potential Effects on RIVERINE Wetlands

• Earlier ice out, ice jams
• Winter flooding?
• Greater bank erosion, sedimentation, turbidity
Potential effects on wetlands from increased temperatures and nutrients

- Warming temps and less ice cover = longer period of summer stratification
- Stratification favors bouyant cyanobacteria (bluegreen algae)
- Warming, higher precipitation may lead to increased nutrient loading
- This combination may lead to increased algal blooms

Will new invasive wetland plants gain a foothold?
ACTIONS YOU CAN TAKE

• Plant trees along shorelines! shade, CWD, food, bank stabilization, nutrient filtering, wildlife travel corridors….

• Conduct river geomorphic assessments & culvert assessments

• Allow rivers to move freely! Flooding the floodplains = less erosive energy

• Re-connect rivers and wetlands for aquatic animals

• Floodplain and shoreline regulations? setbacks, shoreline hardening

• Capture stormwater, sediment
ACTIONS YOU CAN TAKE

• This is not new thinking…
• We’ve been doing this all along…
• We need to accelerate the pace!
nature.org/vermont

Questions?