Developing Resilient Communities in a Changing Climate:

What's Maine In For, and What's In It for Maine Municipalities?

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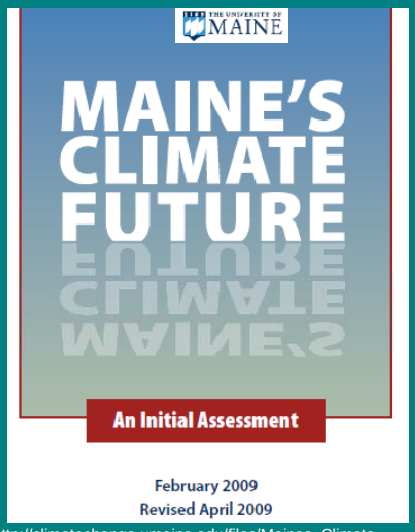
Maine DEP

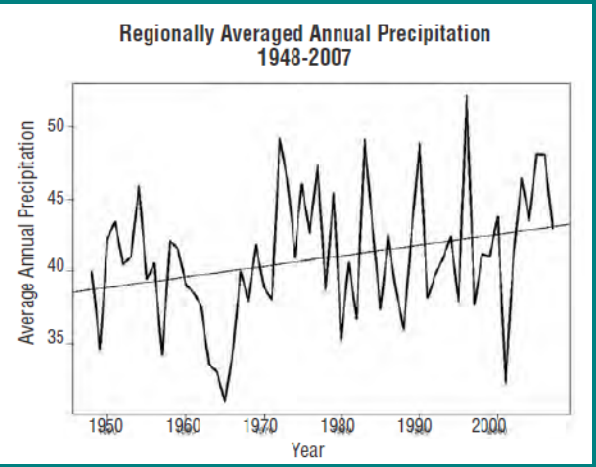
Summary of Maine-specific Data



http://climatechange.umaine.edu/files/Maines_Climate_Future.pdf

- Key Finding: climate change isn't going to happen; it is happening around us

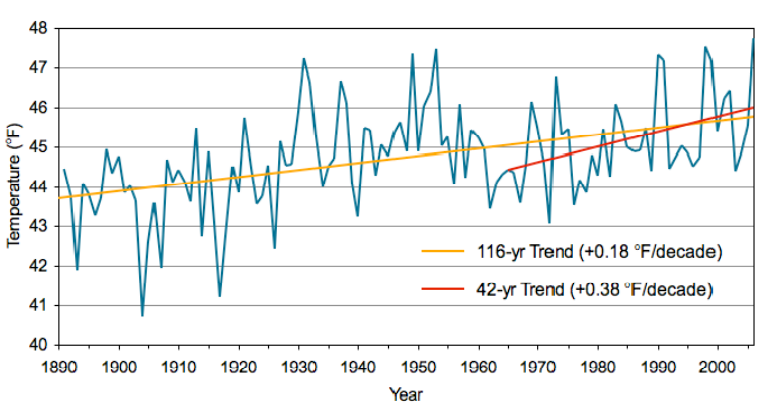
Precipitation is Increasing Year by Year



Source: Trends in Extreme Precipitation Events for the Northeastern United States 1948-2007. University of New Hampshire 2010.

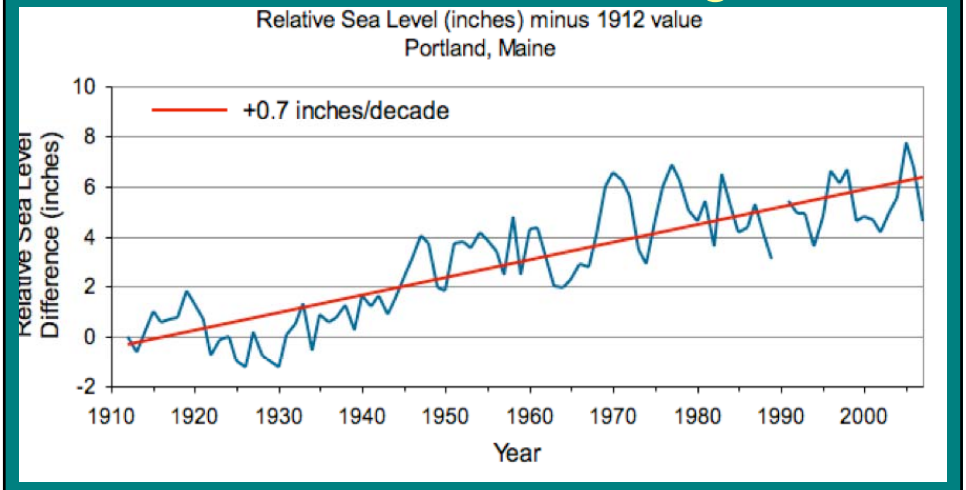
George Thomas Rd., Chesterville

Temperature is Changing



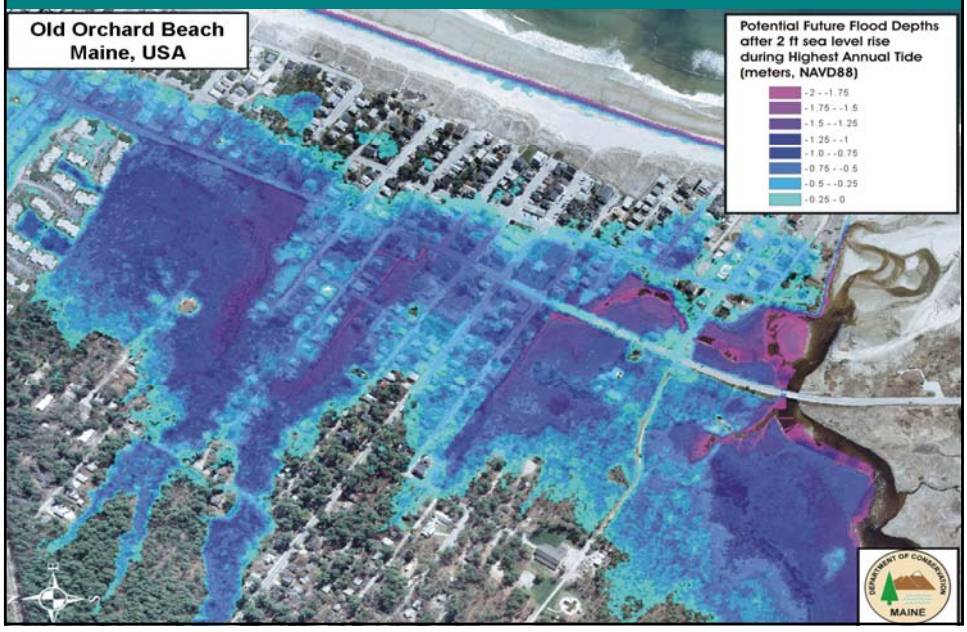
Time series of annual mean temperature recorded in Portland, Maine over the period 1891-2006. The orange line is the linear regression applied to the entire 116-yr time series, and the red line is the linear regression applied 42-yr time series 1965-2006.

Sea Level is Rising



Relative sea level (inches) measured at the Portland Harbor tidal gauge, 1912-2007. The 1912 value has been subtracted from annual values to illustrate the change insea level relative to the start of the record. The red line is the linear regression applied tothe time series and is used to calculate the rate of change, 0.7 inches/decade. Source: Wake and Burakowski 2009: 19.

Coastal Communities at Risk



More Intense Storms

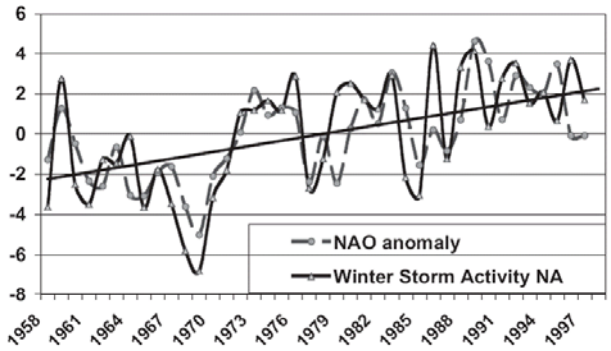
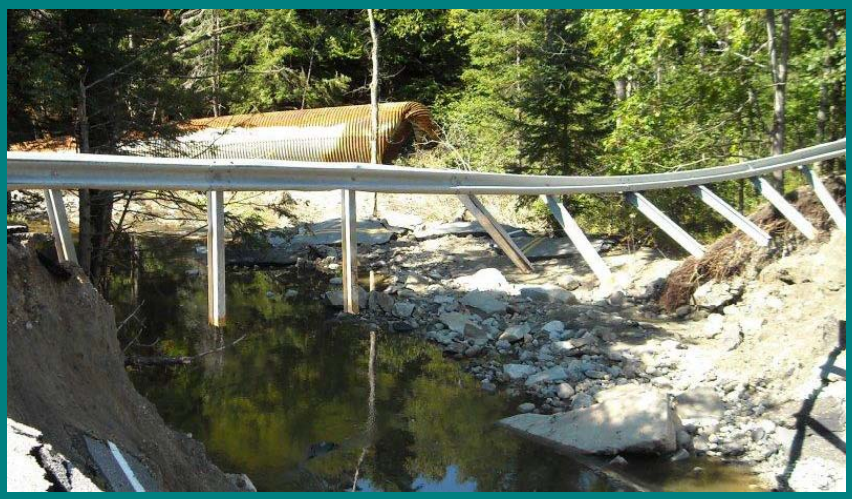


Fig. 2 Storm activity anomalies (m) in the 1958–97 NCEP/NCAR reanalysis (thick line) and NAO index anomalies (Hurrell, 1996) (dashed line). Both parameters are smoothed with a 5-year moving average window and normalized for the purpose of easier comparison. Straight line: storm activity linear regression.

Lozano, I. and Swail, V., 2002, The link between wave height variability in the North Atlantic and the Storm Track Activity in the Last Four Decades, *Atmosphere-Ocean*, v. 40, p. 377-388.
http://www.frontier.iarc.uaf.edu/~datkinson/NOAA_proposal_biblio/SwailAndLorenzo.pdf

Basic Infrastructure in Jeopardy



Managing for Change: Building Maine's Resilience, Building Our Capacity

"A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment."

Dealing with Climate Uncertainty

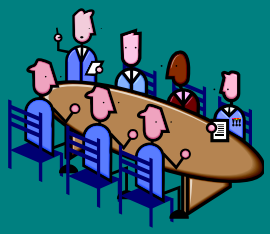
- What's coming?
- When?
- Gradual or sudden?
- Shouldn't we wait until we know more?
- How much will it cost?
- What if it doesn't happen?

Could This Happen to You?

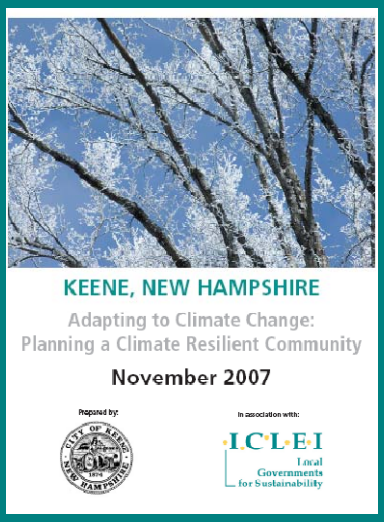
We Hope Not, but Just in Case, We Assess Our Risk and Choose Things Like:

- Safety Standards
- Traffic Laws
- Auto & Liability Insurance
- Driver Education
- Investment in Safer Roads
- User Restrictions
- Alternative Transportation

Local Assessment and Planning are the Keys for Maine

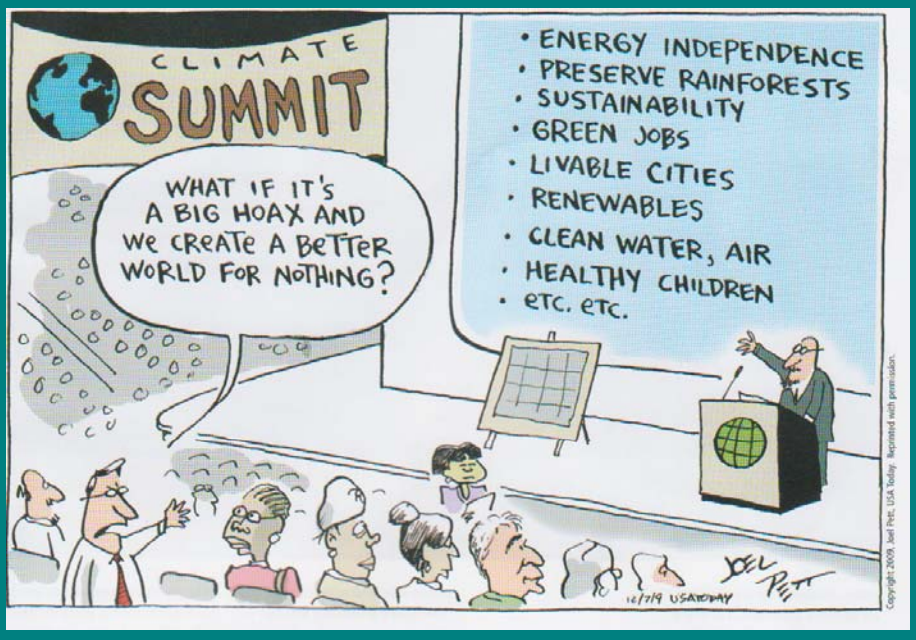


Comprehensive Local Effort



- Extensive longer-term process
- Aligned with other municipal priorities
- "No regrets" approaches: doing things that are valuable in any case

http://www.ci.keene.nh.us/sites/default/files/Keene%20Report_ICLEI_FINAL_v2_1.pdf



Tools for Local Planning

- State and others develop and disseminate tools to allow local and regional planning authorities to implement their own adaptation work
- Emphasis on inter-local collaboration
- Adaptation resilience planning in local comprehensive plans
- Tools for local land use and ecosystem resilience planning

Maine Municipalities Planning for Climate Change

- Sea Level Adaptation Working Group (SLAWG): OOB, Biddeford, Saco, and Scarborough; SMRPC; Maine Geological
  - Inter-local agreement
  - Development of model ordinances
  - Planning across boundaries
  - http://www.smrpc.org/Sea%20Level%20Adaptation/Sea%20Level%20Adaptation%20Working%20Group%20Page.htm
- City of Ellsworth and Hancock CPC
- City of Portland

Public Infrastructure

- Transportation
- Water management: stormwater, drinking water, wastewater
- Public buildings and facilities
- Schools

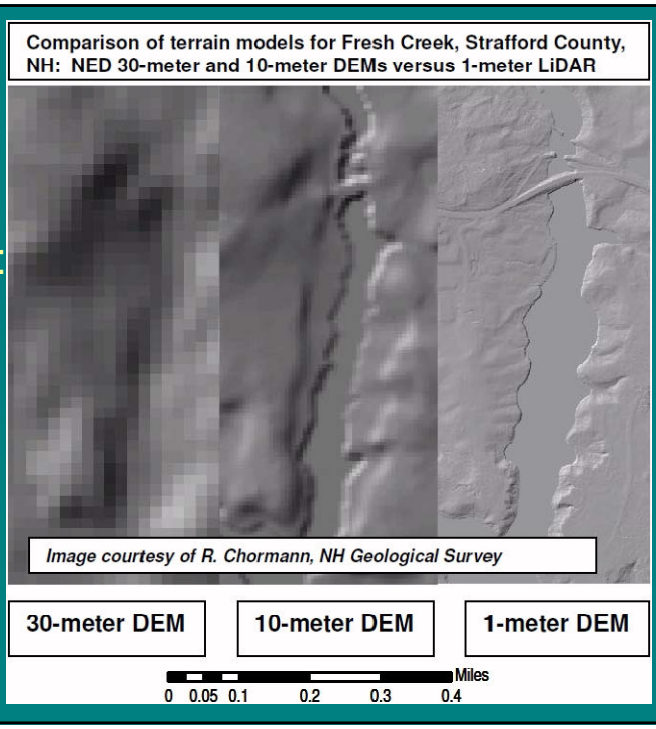
Moosehead Messenger 5/2/10

Inventory of Infrastructure at Risk

- Where roads intersect surface waters: assess vulnerability to increased flows
- Overlay info on roads, culverts, struts, etc. onto NOAA and FEMA maps of floodways, inundation zones.

Porter, March 2010

New Techniques to Assess Vulnerability: LiDAR



Reviewing Regulations and Standards

- Design standards for engineering stormwater
- Assess rules for applicability under new climate conditions

Photo: Emily Guerin / For The Forecaster Workers install new water mains, storm water drains and sewers along Washington Avenue in Portland,

Emergency Management Strategies

- Specific evaluation of emergency response capacity under extreme weather conditions
  - Hospitals and health care facilities
  - Local road systems / evacuation routes
  - Communications capacity
- Increase system redundancy through intra-local and regional planning

Emergency Access Rerouting And Wastewater Improvements

State Route 9, Ocean Park, Old Orchard Beach
April 16, 2007, approximately 10:00 am
Image courtesy of Bill Edwards and NOAA NWS

Ocean Park Route 9 sewer pump station – potential inundation, HAT + 2 ft sea level [P. Slovinsky, MGS]

Public Health and Welfare

- Needs of special populations
- Weather events: heat, storm
- Infectious and vector-borne disease
- Respiratory effects: asthma, woodsmoke

Planning for Likely Temperature Changes

- Increases in the number and severity of summer heat events
- Health care capacity for increased prevalence of disease from previously cold-inhibited vectors like deer tick
- Elderly and other particularly at risk

Local Actions to Address Public Health Challenges of Climate Change

- Engage local health providers to provide climate health information to patients
- Include public health issues in adaptation planning
- Identify special populations at risk

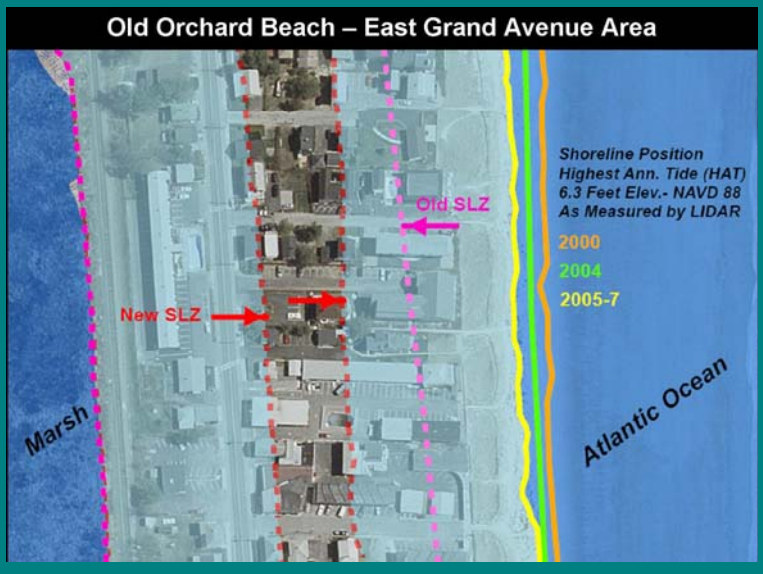
Housing, Development and the Local Economy

- Economic risks

Local Actions to Address Housing and Development Challenges

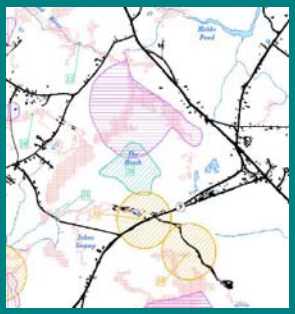
- Evaluate need to revise shoreland zoning and floodplain maps, local development standards
- Assess climate vulnerability (heat, flood risk, loss of ventilation due to “buttoning up”) of public and private housing stock
- Compare costs of action *vs* inaction for the local economy

Limiting Development at Risk



Change to the Local Natural Environment

- Marshes and wetlands
- Wildlife habitat
- Local conservation lands



Serious Questions and Tough Choices

- How do we balance the rights of property owners with the need to allow for wetland expansion or migration?
- How should a municipality pay for local risk / vulnerability assessment?
- What opportunities does adapting to climate change offer our community?
- Is our emergency response system up to the likely challenges of increased stormwater?

Top 5 Adaptation Actions Municipalities Can Take

1. Initiate local assessment and planning
2. Assess risks and vulnerabilities
3. Identify how local human and natural environments are climate-connected
4. Help build local resilience / capacity
5. Continue to do everything you can to lower GHG emissions

Quick History of State Efforts

- New England Governors / Eastern Canadian Premiers, 2001
- Mitigation legislation, 2003
  - Statutory GHG reduction targets: back to 1990 levels by 2010, further 10% by 2020
  - Stakeholder process
  - Report with recommendations 2004
  - Bi-annual reporting on implementation
  - Likely to achieve targets

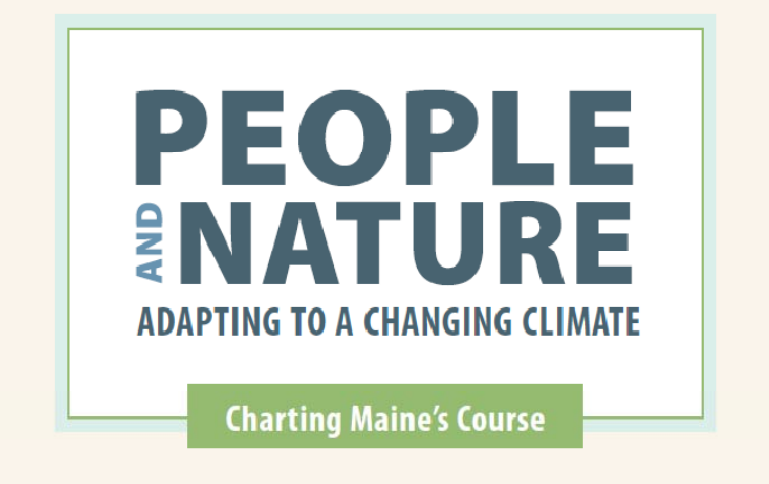
Quick History (continued)

- Legislative Adaptation "Resolve," 2009
  - Stakeholder Process once more
  - Context of potential Federal legislation: will need a state "adaptation plan" to get $$
  - Report February 2010
  - 60+ recommendations, mostly involving planning, research, and monitoring: moving forward
  - Requires a formal state plan by January 2012

Adaptation Principles to Live By

- CC affects everyone
- Adaptation planning in Maine must involve all
- Adaptation is an ongoing and evolving effort
- We must keep natural systems resilient
- Reduce existing stresses: natural & human systems
- There will be positive opportunities
- Prepare for both acute and incremental impacts
- Avoid unfairly passing the burden of inaction to future generations
- Use existing policies & programs
- Some are more vulnerable than others
- Keep reducing GHG emissions

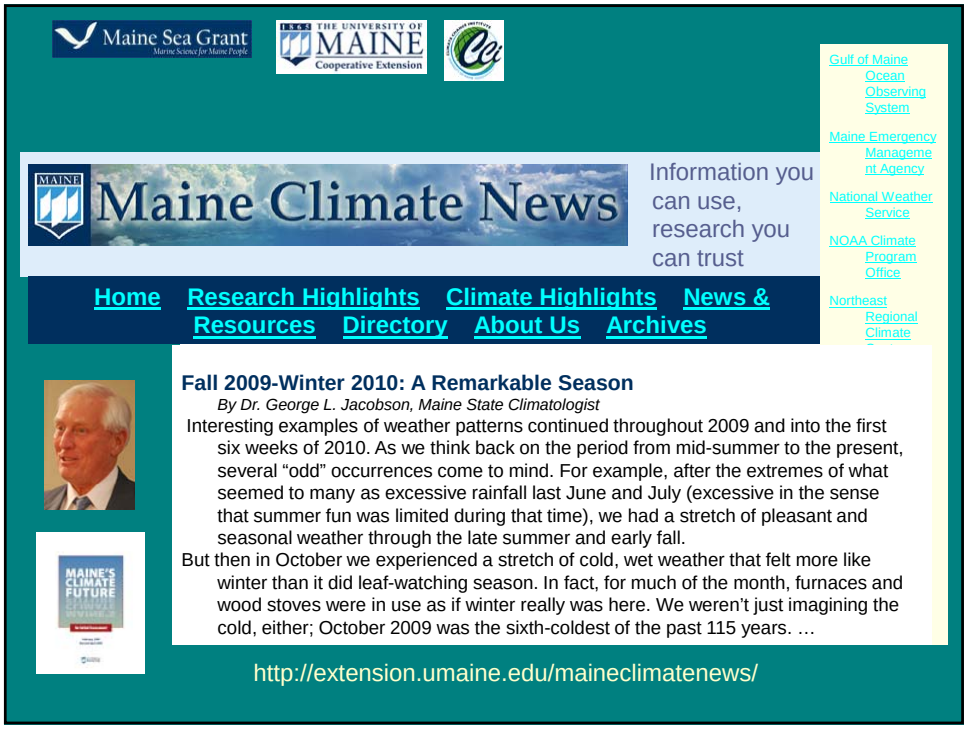
2010 Climate Adaptation Interim Report



http://www.maine.gov/dep/oc/adapt/Report_final.pdf

Initial Recommendations

- Most focus on planning, monitoring, research, and inventory / assessment
- Most able to be implemented with existing resources, and/or by state agencies or the University, and/or voluntarily
- Report anticipates a more detailed State Adaptation Plan in 2012: uncertain at present



Thank you for attending.

This webinar presentation and information on future webinars will be available on-line at http://www.maine.gov/spo/landuse/techassist/webinars.htm

For additional information on today's topic – See SPO's Climate Change website at http://www.maine.gov/spo/landuse/techassist/climatechange.htm

We welcome your comments and suggestions for future webinars and speakers. Contact ruta.dzenis@maine.gov or 624-6218