

## CLIMATE CHANGE

*Addressed by 5 management objectives, 11 action plans*

The 2010 CCMP action plans were created with the awareness that climate change impacts must be factored into all aspects of watershed management activities. While recognizing that aggressive reductions in emissions are critical to avoid severe climate change impacts, it is also clear that climate change currently is underway and significant impacts are inevitable.

The primary guiding principle behind PREP's climate adaptation planning work is to identify and implement actions that maintain or increase the resiliency of the Region's ecosystems and human communities to cope with climate change impacts. PREP's approach emphasizes that the most sustainable and cost-effective adaptation options are those that work in partnership with natural processes and recognize the dynamic nature of coastlines, estuaries, and river systems. Thus, proactive measures are emphasized over reactive measures, and strategies to keep infrastructure out of harm's way are encouraged over highly engineered responses to climate change threats.

Climate change research suggests the Region will experience increased rainfall and severe storms, rising sea levels, lower snowfall amounts, and warming average air temperatures in the New England region (New Hampshire Climate Change Policy Task Force, 2009). The impacts on resources may include:

- Changes in saltmarsh and wetland footprints due to sea level rise and increased rainfall
- Changes in low flows and peak flows in rivers and streams
- Accelerated geomorphic changes to streams, rivers and shorelines and failure of associated infrastructure due to flooding
- Increased impacts from stormwater runoff due to extreme rainfall events
- Increased average and seasonal temperature of water- and land-based ecosystems
- Modification of habitat due to changing salinity, streamflow, temperature and inundation patterns
- Increased susceptibility of environments to invasive species
- Increased demand for drinking water and irrigation water
- Increased vulnerability of developed areas to inundation and saltwater intrusion into fresh groundwater due to sea level rise

In order to respond to these potential impacts, the New Hampshire Climate Change Task Force recommends not only reducing energy use and greenhouse gas emissions and increasing carbon sequestration, but also adapting to climate change to reduce social and environmental impacts and costs. The Maine Climate Action Plan recommends a similar suite of measures aimed at reducing greenhouse gas emissions. The Maine State Planning Office is in the process of leading an effort to develop specific climate change adaptation strategies that the state and local municipalities should pursue. The Nature Conservancy recommends strategic protection of susceptible lands and ecosystems, regional planning which integrates climate change impacts into land use strategies, and decreasing anthropogenic stressors that can exacerbate ecosystem changes brought about by climate change (Grubin, et al, 2009).

As the above agencies recommend, the CCMP recognizes the need for adaptation strategies that anticipate and account for predicted climate change in the Piscataqua watershed. Reducing the impact of climate change in the Region requires a broad range of activities such as,

- Evaluating coastal inundation and flooding risks
- Identifying vulnerable road/stream crossing infrastructure
- Identifying and protecting areas that allow for marsh migration
- Implementing changes in land use planning and regulation to respond to these risks
- Protecting in-stream flows during droughts
- Protecting forestlands and marsh lands that sequester carbon
- Protecting migration routes for species whose habitat may shift.

Other actions that indirectly further adaptation to anticipated climate change impacts include removal of hydrologic restrictions, land protection, buffer protection and restoration, wetland restoration, low-impact development and impervious surface limitations.

*"...THE TYPES OF HEAVY RAINFALL EVENTS THAT HAVE OCCURRED IN THE NORTHEAST IN RECENT YEARS WILL BECOME INCREASINGLY COMMON... RAISING THE RISK OF FLOODS."*

*-NORTHEAST CLIMATE IMPACTS ASSESSMENT CLIMATE CHANGE REPORT, 2006*