

# LAKESHORE & RIVERSHORE

## CLIMATE ASSESSMENT

This habitat includes beaches and shorelines along both lakes and rivers, but not habitats associated with floodplain terraces that typically receive regular floodwaters from spring meltwaters and/or storm runoff. These habitats are somewhat adapted to scouring, and typical vegetation consists of grasses, sedges, and shrub species on a sand or gravel substrate. Many rivershore natural communities and ecosystems no longer experience large storm flooding because of the influence of dams. However, annual flooding and two to three year recurrence interval floods do still occur in the lowest floodplain terraces.



## POTENTIAL CHANGES TO HABITAT

- Changes in precipitation patterns, such as longer periods of drought, unpredictable large storms, higher flows, and run-off events.
- Increased mechanical alteration of habitat, including erosion, higher energy flooding, and ice scour along rivershores.
- Increased risk from invasion by invasive species.
- High wind and excessive wave energy along lake beaches and shorelines.

## WHAT DOES THIS MEAN?

Almost all predicted changes in these habitats are associated with increasing unpredictability in the patterns of large storms, increased precipitation and runoff, and resulting changes in hydrology (Aldous et al 2011, Kingsford 2011, Grubin et al 2009). Associated changes in habitats may include increased erosion of beaches and shorelines, longer duration and higher energy flooding, early or late ice-out on lakes, and ice scour along rivershores. Additionally, high wind during storms may erode lake beaches and shorelines because of increased wave energy and duration.

Increased stress, new deposits of mineral soil, eroded surfaces and edge habitat may lead to increases in invasive species which specialize in disturbed edge habitats. Flooding events may also disperse invasive species into new areas, and increased sediment deposition could facilitate their establishment on previously unsuitable substrates.

One possible human response to increased flooding is to build additional dams and other infrastructure designed to control and/or channel storm effects. If such structures significantly alter hydrology either up or down stream, there are likely to be impacts on shoreline habitats. Similarly, existing and historic infrastructure designed to manage historic flows (e.g., old/ageing culverts, historic dams, shoreland riprap), may in fact exacerbate runoff impacts and damage to human health

and property. For example, ageing and failing dams and culverts present higher risks during flood events to downstream resources and human infrastructure.

## HOW DOES THIS AFFECT WILDLIFE?

Several specialist species may be affected by increasing and highly variable precipitation. For example, tiger beetles that use cobble or sandy shores exposed during low water may be impacted by large storm flows or drought, particularly during sensitive life cycle stages. Sandy riverbanks provide nesting habitat for bank swallows, and high river flows and erosion events at sensitive nesting times could impact breeding success or destroy colonies entirely.

### General Strategies to Address these Vulnerabilities:

*See the full [Climate Change Adaptation Plan](#) for strategy descriptions*

- S1: Conserve Areas for Habitat Expansion and/or Connectivity
- S2: Habitat Restoration and Management
- S4: Protect Riparian and Shoreland Buffers
- S5: Invasive Species Plan
- S6: Comprehensive Planning
- S7: Stormwater Policy and Flood Response
- S8: Revise Water Withdrawal Policies

### Specific Strategies:

1. Create goals and guidelines for shoreline buffers to help stabilize banks for more frequent or higher volume flows.
2. Where possible, encourage an increase in the percentage of shore in native forest or shrubland to protect the water body from temperature increases due to high runoff events especially in hot summers.
3. Plant trees along stream banks where they have been eliminated to help shade streams and strengthen banks.
4. Encourage and advocate for land-use policies that increase development setbacks from shorelines and that prevent any further development on river floodplain/floodways.
5. Explore possible buyout programs to reduce development on sensitive shorelines.
6. Incentivize buffers along shorelines, such as a reduction in property tax for permanently protecting a shoreline buffer of 300 feet or more.
7. Prohibit shoreline armoring and protect large lake shoreland natural vegetative buffers.
8. Encourage regulation of beach construction to minimize loss of shoreline buffers.
9. Provide educational materials to lakefront property owner showing ways in which simple efforts of property management can change erosion, storm water runoff, etc.

This Climate Assessment is a section of the **Ecosystems and Wildlife Climate Change Adaptation Plan (2013)**, an *Amendment to the NH Wildlife Action Plan*, developed by New Hampshire Fish and Game with the help of many conservation partners. The full plan can be found at [http://www.wildlife.state.nh.us/Wildlife/Wildlife\\_Plan/climate.html](http://www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/climate.html). (Photo by Ben Kimball)