North Atlantic Landscape Conservation Cooperative

Overview: Connecticut River Watershed Landscape Conservation Design

Encompassing New England's largest river system, the Connecticut River watershed boasts a diversity of habitats stretching from coastal salt marshes in Connecticut to alpine tundra in New Hampshire. It is home to a variety of fish, wildlife and plants—from iconic species like bald eagle and black bear to federally threatened and endangered species like the shortnose sturgeon, piping plover, and dwarf wedgemussel. It is also home to more than two million people living in Vermont, Connecticut, Massachusetts and New Hampshire.

The watershed is a lifeline for the Northeast. It nurtures farms and cities and provides jobs, food, clean water, storm protection, recreation and other natural benefits that support people and communities. It also plays an important ecological role, providing important habitat for migrating shorebirds, waterfowl, and fish. The extensive tidal habitat it encompasses is considered globally significant, representing the largest area of relatively undisturbed tideland in any large river in the Northeast.

To ensure the watershed will continue to thrive in the face of threats like pollution, development, climate change and other land use pressures, people at all levels and in all sectors need more and better information to guide decisions and actions to conserve these valued resources.

Mapping the Future of Conservation

The most effective long-term strategy for conserving a large landscape like the Connecticut River watershed is to keep it intact. Natural areas best support the needs of both human and wildlife communities if they are part of an interconnected network, with multiple pathways for migration, restoration, development and conservation. To that end, the *Connecticut River Watershed Landscape Conservation Design* project is a collaborative pilot effort to identify and map lands and waters in the watershed that make up the core of that interconnected network.

The project is led by a team of more than 30 diverse conservation partners representing private organizations, state agencies, and federal programs. Using the best available data on species and ecological systems, the team worked together to identify regional priorities and craft a conservation design in support of two shared goals:

- Sustain a diverse suite of intact, connected, and resilient ecosystems that provide important ecological functions and services that benefit society, such as clean water, flood protection, and lands for farming, forestry and recreation.
- Sustain healthy and diverse populations of fish, wildlife, and plant species for the continuing benefit and enjoyment of the public.

Handout 16
What is the Connecticut River Watershed Landscape Design?
The design is not a single product or map; rather, it is a package of data products individuals and communities can voluntarily use to make informed decisions about conserving important lands and waters. It also provides a broader regional context for these decisions and includes supporting data that address questions related to land use and management decisions, such as:

- Where do important ecosystems and species habitats occur and overlap?
- Where will climate change place the most stress on the landscape?
- Where is development most likely to occur in the coming decades?

The design provides a unified vision that considers the watershed's overall contribution to natural resource conservation in the Northeast and the individual value of resources within the watershed's mosaic of urban areas, conserved lands, working farms and working forests. Specific products and tools include:

- A network of *core areas* and the pathways that connect them, representing the highest priorities for terrestrial and aquatic communities. The network offers the greatest potential to support the quality of life and biodiversity in the entire watershed.
- Zones of influence around aquatic cores, highlighting lands where use is likely to impact streams, rivers, and lakes downhill and downstream.
- Information about future change – included as predictions of climate stress on ecosystems and species habitats – probability of development, and the potential effect of climate or development on the integrity of the biotic landscape.
- A watershed-wide prioritization of restoration opportunities for dam removal, culvert upgrades, and terrestrial wildlife road passage structures.

Informing Conservation Planning and Actions
The design can be used by a variety of stakeholders to inform community planning and conservation actions. Here are a few examples of how it can be applied at different scales:

- **Local –** Land trusts can use the design to help local landowners understand what makes a particular parcel valuable ecologically, and then choose what type of stewardship or protection best fits their vision for their lands.
- **State –** State wildlife agencies can use the design to efficiently and effectively identify areas in the watershed that should be further studied to confirm their conservation potential for species and habitat types of interest.
- **Federal –** The Silvio O. Conte National Fish and Wildlife refuge can use the design to prioritize within or among the Conservation Focus Areas identified as part of the ongoing planning process for that refuge.

The design does not supplant other regional or local planning efforts. Instead, it is intended to complement local knowledge and integrate it into a broader state, regional, and national efforts to sustain important natural resources in an era of changing landscape conditions.

For more information and resources on the Connecticut River Watershed Landscape Conservation Design, visit our online workspace.

Highlighted Products and Tools

Interconnected Ecosystems and Habitats

The core-connector network**:** a spatial representation of the underlying ecological network

- **Core areas** serve as the foundation of the conservation design. They reflect decisions by the Connecticut River Pilot Landscape Conservation Design planning team about the highest priority areas for sustaining the long-term ecological values of the watershed, based on currently available, regional-scale information.
- **Connectors** increase the resiliency of the core area network to uncertain changing land use and climate.
- Aquatic **buffers** upstream and upslope of the cores delineate areas where anthropogenic stressors such as development and pollution may have a strong impact on the ecological condition of the cores.
- The network can serve as a **starting point** for a regional conservation network that can be used in combination with other sources of information to direct action. It is designed to provide **strategic guidance** for conserving natural areas, and the fish, wildlife, and other components of biodiversity that they support within the Connecticut River watershed.

100% of the landscape: associated data layers map the ecological value of the entire landscape, and were used to build the cores and connectors

- **Landscape capability of 14 representative species**: an integrated measure of the potential capacity of lands and waters to provide habitat, based on a unique model developed for each species
- **Index of Ecological Integrity (IEI):** a measure of the ability of an area to sustain biodiversity and ecological functions over the long term, reflecting its intactness and resiliency to environmental change
- **The Nature Conservancy Terrestrial Resiliency**: relative long-term resiliency of a site based on connectivity to a diversity of landforms, elevations and wetlands
- **USGS stream temperature tolerance**: a measure of the relative sensitivity of stream temperatures to rising air temperatures.

Handout 16
Future Change

- **Probability of development:** the integrated probability of development occurring sometime between 2010 and 2080. It is based on an urban growth model that accounts for the intensity, amount and spatial pattern of development. The type and pattern of development is based on models of historical development and is influenced by factors such as existing secured lands and proximity to roads and urban centers.
- **Climate stress:** a measure of the magnitude of climate change stress at a site based on the climate conditions currently favorable to an ecosystem type and the predicted change in climate between 2010 and 2080.

Restoration

Terrestrial road passage structure impacts, Dam removal impacts, Culvert upgrade impacts: a measure of the relative ecological benefit of removing barriers to movement for terrestrial and aquatic organisms. These measures can inform decisions about which road or stream segments to prioritize for restoration.

Suggestions for Using the Products

The *Interconnected Ecosystems and Habitats* data provide an ecological valuation of areas, both inside and outside designated core areas, and thus they can be used to identify places of high ecological value outside of designated core areas that are also deserving of conservation attention.

The *Interconnected Ecosystems and Habitats* data can be used in combination with the *Future Change* data to identify important places for particular species or ecosystems that are relatively vulnerable to future development or climate change.

Priorities based on the *Interconnected Ecosystems and Habitats* data can be compared to resource priorities identified at the state or local level (e.g., from State Wildlife Action Plans, towns, and land trusts), to further rank areas for land protection.

The *Restoration* data may best be used to direct field surveys of road crossings, dams, or culverts of interest, during which complete and accurate assessments can be made. They can also be used in combination with the aquatic or terrestrial core-connector networks to identify places where road crossing improvements and restoration may have the added benefit of improving the integrity of the designated cores or connections between them.