Chapter 4

Conservation at Multiple Scales

2015

4. Conservation at Multiple Scales

Introduction

This chapter explains how conservation is organized in this Wildlife Action Plan.

Vermont's list of Species of Greatest Conservation Need (SGCN) comprises 133 vertebrate species 200 invertebrate species (such as the Tawny Emperor Butterfly, Cobblestone Tiger Beetle, and Giant Floater mussel) and 813 plants (vascular and bryophytes). Developing individual conservation plans for each of these species would have been exhausting and impractical. Moreover, implementing so many individual plans would be impossible due to insufficient staffing, resources and funds. In short, it would be monumentally inefficient.

Fortunately, an efficient approach exists. It consists of designing and implementing conservation at multiple scales. This is commonly referred to as the "coarse filter-fine filter" approach and is widely accepted by scientists, wildlife managers and planners. The underlying concept is that if examples of all coarse-filter features are conserved at the scale at which they naturally occur, many of the species they contain—from the largest trees and mammals to the smallest insects—may also be conserved (Hunter 1991; NCASI 2004; Schulte et al. 2006). The coarse-filter approach is well documented in the scientific literature (Jenkins 1985; Noss 1987; Hunter et al. 1988; Hunter 1991; Noss and Cooperrider 1994; Haufler et al. 1996; Jenkins 1996; Poiani et al. 2000; USDA 2004). Habitat management historically practiced by Fish and Wildlife agencies to create young forests and shrublands that benefit dozens of "shrub and early-successional species" including Moose, American Woodcock and Ruffed Grouse is an example of a 'habitat-scale' coarse filter.

To most efficiently conserve all our SGCN, this Wildlife Action Plan focuses on three scales of conservation:

1. **Landscapes**: Include the features that contribute to ecological function at the state and regional levels, including a network of large, connected habitat blocks and another of aquatic habitats and riparian areas. Species requiring large habitat blocks, mixes of forest, wetlands and waters and connections between them will benefit most from landscape-level conservation but most other SGCN can also benefit.
2. **Habitats and Natural Communities**: Include the range of naturally occurring and anthropogenic habitats (such as young forest and grasslands). Terrestrial natural communities follow the classification system developed by Sorenson and Thompson (2005) which ties in with the ecological systems classification developed for the Northeast Association of Fish & Wildlife Agencies (Gawler 2008) for the 13 northeastern states. Aquatic communities follow the classification developed by Langdon et.al. (1998).
3. **Species and Groups of Species**: these are the SGCN for which we have identified specific conservation needs that would not be covered sufficiently by conservation efforts at the other two scales.

Not all species, however, are best conserved by coarse-filters alone. For example, species dependent on multiple habitats at different times during their life cycles, those that occur in small geographic areas, those with highly specialized needs or unique threats, those that travel across large geographic areas and those that are particularly rare often require focused attention. To ensure that the needs of these species are also addressed, fine filter conservation strategies are also needed. Species-specific conservation reports can be found in Appendix A.

Efficiency in conservation effort can be realized by first identifying landscape conservation priorities that will effectively capture many natural communities, habitats, and species found within them. Natural community and habitat level conservation can effectively capture many of the remaining species. And finally, species-specific conservation action will be required for those species that are not captured at landscape or habitat/natural community scales. Typically, these are species that are very rare, are declining across their range, aggregate for breeding, and/or require large home ranges.

Given the species focus of the congressional requirements for Wildlife Action Plan development, we began at the species level by assessing SGCN individually (Appendix A). Then SGCN were organized by taxonomic group and by the habitats they use. This resulted in conservation strategies at the three levels listed above (and in table 4.1).

Table 4.1 Organization of Conservation Information in this Report

Level	Organization	Location in this Action Plan
1-Species	6 group summaries (amphibians & reptiles, birds, fishes, invertebrates, mammals and plants) 133 individual species and 15 invertebrates group reports	Chapter 5 Appendix A
2-Habitats & Natural Communities	125 communities & cultural habitats grouped into 24 summaries	Appendix B
3-Landscapes	Statewide and regional conservation strategies Landscapes Landscape Report	Chapter 1 Chapter 6 Appendix F

Selection of Classification Systems

We delineated landscapes based on the following elements: Interior Forest Blocks, Connectivity Blocks, Surface Waters and Riparian Areas, Riparian Areas for Connectivity, Physical Landscape Diversity Blocks, and Wildlife Road Crossings. Landscape conservation is discussed in chapter 6 and Appendix F of this Wildlife Action Plan.

Though great strides have been made in developing vegetation classification systems that function at the site, landscape, region and national scales (Barnes 1979, Allen and Starr 1982, Forman and Godron 1986, Cleland et. al 1997, Grossman et. al 1998), they are incomplete. In particular, no system satisfactorily integrates aquatic and terrestrial communities and cultural habitats[1] used by wildlife nationwide.

In lieu of a unified habitat classification system, Vermont's Action Plan technical teams selected the best features of five peer-reviewed vegetation classification systems that can be crosswalked with those used in other states to support broader scale conservation efforts—regionally, nationally, and internationally. Forest Cover Types (Eyre 1980) and U.S Forest Service Forest Inventory & Analysis Types (USDA 2003) were used for early successional stage forests. Natural Communities (Thompson and Sorenson 2000) were the basis for most terrestrial vegetation. "A Classification of the Aquatic Communities of Vermont" by Langdon et al. (1998) was adapted for aquatic community designations and cultural habitats[1] were adapted from Reschke (1990). Landscape scale communities were adapted from Poiani et.al. (2000).

One hundred twenty-five aquatic and natural community types, cultural habitats and land cover types, capturing most of the habitat required by SGCN were selected from the five systems (table

[1] Cultural habitats are communities and sites that are either created and/or maintained by human activities or are modified by human influence to such a degree that the physical condition is substantially different from what existed prior to human influence (adapted from Reschke 1990).

4.2). Each was assigned to one of 22 categories. Because Lake Champlain and the Connecticut River harbor most of the fish diversity in Vermont, these two waterbodies were broken out from the taxonomy to provide for a more targeted assessment. Technical teams then developed assessment summaries for each that include descriptions and general locations; current conditions; desired conditions based on the needs of associated SGCN; priority problems; conservation strategies to address problems (along with the identification of potential conservation partners and funding sources); and a listing of relevant plans and planning processes pertinent to a habitat type.

Our terrestrial classification is designed to roll up to the Northeast Terrestrial Habitat Classification System (Gawler 2008) with standardized terminology and compatible habitat classifications. It allows the Action Plan to describe the aspects of conservation which are particular to Vermont, while facilitating conservation at a broader regional level. A Companion to the Terrestrial and Aquatic Maps has been published by The Nature Conservancy (Anderson et al. 2013). It includes profiles of each habitat type in the Northeast, distribution maps, state acreage figures, SGCN identification concern, and an assessment of overall conditions in the region. Habitat conservation summaries can be found in Appendix B.

Habitat Succession, Species of Greatest Conservation Need & the Action Plan

Plant succession produces cumulative change in the types of plant species occupying a given area through time. Succession is complicated by factors such as disturbance (large and small), local conditions, seed banks and soil legacies (Oliver 1981). A highly simplified timeline begins when land is cleared. Pioneer species typically return first followed by other species generally better adapted to the new and changing conditions created by the previous suite of species. Given sufficient time and appropriate conditions the area moves roughly through early, middle, and late successional stages—often referred to as mature or old growth. A disturbance, if sufficiently large, can re-set the clock anytime and succession begins again. The best-known examples are forest succession but it occurs in virtually all vegetated areas. For example, lichen communities on granite mountaintops experience successional changes (Wessels 2002).

Succession can significantly impact habitat for Species of Greatest Conservation Need and other wildlife as in the edge habitat example noted earlier. Generally, as succession moves from early (young forests) to late stages some wildlife will lose out (e.g., Spruce Grouse, American Woodcock, Cottontail Rabbit) and others will benefit (e.g., American Marten, Northern Goshawk). Others still prefer a mix of successional stages in appropriate configurations (e.g., Black Bear, Canada Lynx).

Over the past two centuries the mix of successional stages available to Vermont's wildlife has changed dramatically in both distribution and abundance. Though precise estimates (current and historic) are unavailable, prior to 1800 a significant percentage of Vermont's forests were in late-successional stages (>150-300 years and older) and forest stands provided greater structural diversity. One-hundred years later young forests (early-successional stages of 1-15 years) dominated the state and today mid-successional forests (60-100 years) are most abundant. Wildlife populations have responded in turn. Vermont's SGCN list contains relatively few species requiring mid-successional forests and more that thrive in early and late-successional representations.

Because the loss of late-successional forests in the eastern U.S. occurred prior to the advent of modern wildlife biology and the current scarcity of later-successional stages (particularly northern hardwood forest types) our understanding how wildlife utilized these stages is not as advanced as our knowledge of wildlife in early successional stages. Historic records and research in late-successional areas elsewhere indicate that the distribution and abundance of some wildlife species was much greater when late-successional forests were in greater abundance—even if these species

can survive without them. Given the lack of this condition on the landscape it is advisable to increase its availability to wildlife.

The habitat, community and landscape summaries that follow in Chapter 6 and Appendix B address the habitat needs of Species of Greatest Conservation Need that use vegetation types in one or more successional stages. Conservation strategies address these particular successional stage needs as well as those of species that prefer a mosaic of successional stages.

Table 4.2: Landscape, Community, Habitat & Cover Type Categories

* Categories marked with an asterisk "*" are considered major categories for the purposes of organizing this report (24 in all). Conservation summaries were developed addressing characteristics and location, current and desired condition, SGCN using this habitat category, priority problems impacting this category, conservation strategies to address the problems and a list of other plans and planning entities with significant interest in this area.

*Landscapes

Interior Forest Blocks
Connectivity Blocks
Surface Waters and Riparian Areas
Riparian Areas for Connectivity
Physical Landscape Diversity Blocks
Wildlife Road Crossing

Aquatic Communities

***Riparian Areas**

***Riverine** (Langdon et.al. 1998)
- Brook trout community
- Brook trout-slimy sculpin community
- Blacknose dace-slimy sculpin community
- Blacknose dace-bluntnose minnow community
- Blacknose dace-creek chub community
- Tessellated darter-fallfish community
- Blacknose dace-slimy sculpin community
- White sucker-tessellated darter community

***Lower Connecticut River**
(Atlantic salmon-American shad community)

***Lower Lake Champlain Tributaries**
(Redhorse-lake sturgeon community)

***Lakes & Ponds**
- Dystrophic lakes
- Meso-eutrophic lakes
- Oligotrophic lakes
- High elevation acidic lakes

***Lake Champlain**

Cultural Habitats

(Reschle 1990)

***Building & structures**

***Mine & Gravel Pits**

***Grassland & Hedgerows**
- Grasslands
- Hedgerow
- Old field/shrub
- Orchard

*Young Forests

(Successional Stages, Forest Cover Types, Eyre 1980, US Dept of Agriculture 2003)

Stages: Seedling/Sapling Sapling/Pole Timber, Pole Timber

Cover types

Boreal Conifers
- Balsam fir
- Black spruce
- White spruce

Boreal Hardwoods
- Aspen
- Pin cherry
- Paper birch

Spruce-Fir
- Red spruce
- Red spruce-balsam fir
- Paper birch-red spruce-balsam fir

Pine and Hemlock
- Eastern white pine

Table 4.2 continued: Terrestrial Natural Communities (Thompson & Sorenson 2005)

Open or Shrub Wetlands

*Open Peatlands
- Alpine peatland
- Dwarf shrub bog
- Black spruce woodland bog
- Pitch pine woodland bog
- Poor fen
- Rich fen
- Intermediate fen

*Marshes & Sedge Meadows
- Deep bulrush marsh
- Deep broadleaf marsh
- Shallow emergent marsh
- Sedge meadow
- Cattail marsh
- Wild rice marsh

*Wet Shores
- Calcareous riverside seep
- River cobble shore
- Lakeshore grassland
- Riverside sand or gravel shore
- Outwash plain pondshore
- River mud shore
- Rivershore grassland

*Shrub Swamps
- Buttonbush basin swamp
- Alder swamp
- Alluvial shrub swamp
- Sweet gale shoreline swamp
- Buttonbush swamp

Forested Wetlands

*Floodplain Forests
- Silver maple-ostrich fern riverine floodplain forest
- Lakeside floodplain forest
- Silver maple-sensitive fern riverine floodplain forest
- Sugar maple-ostrich fern riverine floodplain forest

*Hardwood Swamps
- Red maple-black ash swamp
- Red maple-northern white cedar swamp
- Calcareous red maple-tamarack swamp
- Red or silver maple-green ash swamp
- Red maple-black gum swamp
- Red maple-white pine-huckleberry swamp

*Softwood Swamps
- Northern white cedar swamp
- Spruce-fir-tamarack swamp
- Black spruce swamp
- Hemlock swamp

*Seeps & Vernal Pools
- Vernal pools
- Seeps

Open Upland Communities

*Upland shores
- Riverside outcrop
- Lake sand beach
- Lake shale or cobble beach
- Erosional river bluff
- Sand dune

*Outcrops & Upland Meadows
- Alpine meadow
- Boreal outcrop
- Serpentine outcrop
- Temperate acidic outcrop
- Temperate calcareous outcrop

*Cliffs & Talus
- Boreal acidic cliff
- Boreal calcareous cliff
- Temperate acidic cliff
- Temperate calcareous cliff
- Open talus

Upland Forests & Woodlands

*Spruce-Fir Northern Hardwood Forest
- Subalpine krummholz
- Montane spruce-fir forest
- Lowland spruce-fir forest
- Montane yellow birch-red spruce forest
- Boreal talus woodland
- Cold-air talus woodland
- Red spruce-northern hardwood forest
- Red Spruce-Heath Rocky Ridge Forest

*Northern Hardwood Forest
- Northern hardwood forest
- Rich northern hardwood forest
- Mesic red oak-northern hardwood forest
- Hemlock forest
- Hemlock-northern hardwood forest
- Northern hardwood talus woodland

*Oak-Pine-Northern Hardwood Forest
- Limestone bluff cedar-pine forest
- Mesic maple-ash-hickory-oak forest
- Mesic Clayplain Forest
- White pine-red oak-black oak forest
- Dry oak forest
- Dry Red Oak-White Pine Forest
- Pine-oak-heath sandplain forest
- Dry oak-hickory-hophornbeam forest
- Red cedar woodland
- Red pine forest or woodland
- Pitch pine-oak-heath rocky summit
- Dry oak woodland
- Sand-Over-Clay Forest
- Temperate Hemlock Forest
- Temperate Hemlock-Hardwood Forest
- Transition Hardwoods Limestone Forest

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