Residential and Commercial Development

The International Union for the Conservation of Nature broadly defines the 'residential and commercial development' threat (IUCN 1) as wildlife impacts from human settlements or other non-agricultural land uses with a substantial footprint. This threat is further assigned to the following categories:

- Housing & urban areas such as cities, towns, and settlements including non-housing development typically integrated with housing.
- Commercial & industrial areas such as factories and other commercial centers. Commercial centers are typically selling a product or service, while industrial areas focus on manufacturing a product. Threats from these activities, such as level of pollution, vary by location and practice.
- Tourism & recreation areas with a substantial footprint.

Risk Assessment Summary

Residential and commercial development affects 115 SGCN species and 22 habitats. Among the 200 threats identified within this category, 28 were ranked as high, 92 as medium, and 80 as low (See Table 4-14). In the 2005 Wildlife Action Plan, development was the highest ranking threat to species and habitats. This threat was downgraded in the 2015 ranking, which was likely the result of a modification of the threat ranking methodology, and/or the economic downturn known as the Great Recession.

During the 2015 ranking process, expert reviewers were instructed to limit the assessment of risk to a 10 year time horizon and consider the risk from future development only (see Appendix E), whereas in 2005 impacts from past development and an unlimited time horizon were used to evaluate this threat, which likely resulted in development being the highest rank threat. Changes in 2015 methodology were made to adhere to a more uniform approach that was adopted by the Northeast states.

In addition to the change in methodology leading to a reduction in the development threat, New Hampshire, the region and the nation experienced an economic crisis that resulted in a collapse in the housing market. Norton et al. (2014) reported that during "the decade between 2000 and 2010, New Hampshire's growth rate fell to 6.5 percent, still the highest rate in the Northeast, but the state's slowest decade of growth since before World War II…For the forecast years beyond 2010, New Hampshire population growth rates are expected to continue to decline – with 3.3 percent growth from 2010 to 2020 and a modest 3.8 percent growth from 2020 to 2030 according to the New Hampshire Office of Energy and Planning's 2012 population projections."

The reduction in development was reflected in the number of standard wetland dredge and fill permits, which after reaching a high of 939 in 2006 dropped to a low of 485 in 2011. Subsequently, they rebounded to 581 applications in 2014. A similar trend occurred in the number of projects that NHFG reviewed for their potential to impact threatened and endangered wildlife; however, a sharp increase to pre-recession levels was recorded for 2014. Although improvements in the economy are leading to increases in residential and commercial development, NH housing markets are not predicted to return to levels experienced in the last two decades of the 20th century due to an aging population and loss of young workers (Norton et al 2014).

Despite the reduction in housing and commercial growth, many species of wildlife and habitats will continue to be threatened by development, especially in southern counties where rapid growth is expected to continue. Economic development programs aimed at attracting tourists, such as ATV trail development and ski area expansion, will continue to expand the footprint of development in the northern counties.

Known Wildlife Exposure Pathways

Housing and urban areas, and commercial and industrial development

Wildlife and habitat impacts associated with housing and urban areas, and commercial and industrial development, are similar enough to treat as a single category. Development is a widespread threat for habitats and species, both wetland and terrestrial. Species or habitats with a limited distribution, complex habitat requirements, and/or low population sizes often are at greatest risk. Impacts can be very extensive and serious or catastrophic for some species (i.e., timber rattlesnake, New England cottontail, Karner blue butterfly, Blanding's and spotted turtles, and salt marsh birds), in the short-term or immediately. Development of uplands surrounding salt marshes, freshwater marshes, and shrub wetlands is likely to be extensive, serious to catastrophic, and occur in the short-term. Impacts are generally somewhat or well-documented.

Development results in the loss of habitat required by native wildlife and the fragmentation of remaining blocks of habitat. Organisms may be killed during or after construction. All habitats and species are impacted by development but to varying degrees. Large forest blocks are being subdivided and remaining patches are becoming highly fragmented, especially in southern New Hampshire. As a result, area-sensitive species will decline and local populations will become more vulnerable to local extirpations. Early successional shrublands in southern New Hampshire are ephemeral by nature but are rapidly being developed and fragmented, leaving the New England cottontail at serious risk.

Thirty-two percent of New Hampshire's land area is protected, which is a 4% increase from the 28% reported in the 2005 Wildlife Action Plan (TNC and SPNHF 2014). Nevertheless, the largest land protection gains were in Northern counties (e.g. Androscoggin headwaters) and percentages of land protected in Southern counties and within certain habitats such as Appalachian–oak-pine and floodplains remain low. As an example, approximately 6% of the state is identified as 100-year floodplain, yet only 21% of floodplain is currently protected or in public ownership (TNC and SPNHF 2014). Species also remain vulnerable, with nearly two-thirds of documented rare plant and animal occurrences in the Granite State on unprotected land (TNC and SPNHF 2014).

At the current rate of protection and development, many more species will become rare, and several rare species are likely to be extirpated from the state. Loss and fragmentation of habitats resulting from development are not restricted to a particular habitat or species; however, some are at greater risk due to limited distribution, low population densities (e.g., Karner blue butterfly, timber rattlesnake), life history characteristics (e.g., low reproductive rates, late age of maturity, large home ranges), ease of development (e.g., pitch-pine barrens), or the intersection of development pressure and the distribution of the habitat type in New Hampshire. Filling of freshwater or estuarine wetlands can have immediate severe impacts on local flora and fauna. The NHDES reports a cumulative 1,600 acres of wetlands lost in association with permitted projects from 1997-2012 (NHDES 2013). Currently, freshwater wetlands (see Marsh & Shrub wetlands and Peatlands profiles), salt marshes, rivers, and streams are regulated by NHDES (RSA 482-A and Wetlands Bureau Administrative Rules). Vernal pools, although regulated by RSA 482-A, are vulnerable to filling due to small size and ephemeral hydroperiods. The greatest threat

wildlife requires a relatively undeveloped upland buffer to allow for nesting, foraging, breeding, and hibernation, and/or to reduce disturbance. NHDES does not require development setbacks from wetlands, unless designated as a 'prime wetland' by the town. The Comprehensive Shoreland Protection Act (RSA 483-B) regulates tree cutting and development of major rivers and large surface bodies (> 10 ac); however, most of the smaller perennial tributaries receive no upland protection. Town zoning and wetland regulations vary considerably throughout the state.

Development of terrestrial habitats is largely unregulated in New Hampshire. Site-specific permits are required by the NHDES for impacts exceeding 100,000 sq. ft. As part of the 2005 Wildlife Action Plan implementation, wildlife and rare natural community impacts are being included in the review process for alteration of terrain permits.

Tourism & recreation areas

Two major initiatives are underway to boost the North Country economy through recreation. One is Ride the Wilds and the second is a major expansion proposed for the Balsams Ski Area and Resort in Dixville. Ride the Wilds is an initiative to attract ATV riders to Coos County for which the state developed a system of motorized vehicle trails in Jericho Mountain State Park. In addition, 10 towns have opened their roads to ATV use to provide a 1,000 mile network of riding opportunities. As riding pressure increases and new trails are developed, wildlife will experience direct mortality from vehicles and disturbance from noise. Trail development and use will also provide expansion opportunities for invasive species.

Plans are also underway for a major expansion of the Balsams ski area. High elevation spruce- fir forest and associated species such American marten, Bicknell's thrush and three-toed woodpecker will likely be impacted by new and expanded ski trails.

Research Needs

- Determine minimum patch sizes and levels of connectivity required for supporting self-sustaining populations of threatened and endangered wildlife.
- Evaluate new development patterns that emerge with changing human demographics.
- Evaluate ATV impacts to wildlife to develop best management practices.
- Identify habitat types with low levels of existing protection and high levels of development pressure as targets for conservation efforts.

Table 4-14. Habitats and species at highest risk from the effects of commercial and residential development (threats ranked as *Low* not included here). IUCN Level 2 provided if evaluated to that level (if not evaluated to level 2, text reads *not specified*). Some habitats and species were evaluated for multiple specific threats separately and therefore listed multiple times below. See Appendix E for additional information on specific threats and ranking

Habitat	IUCN Level 2	Overall Threat Score
Appalachian Oak Pine Forest	Not Specified	H
Coastal Islands	Not Specified	M
Coldwater rivers and streams	Not Specified	M
Dunes	Housing & urban areas	M
Floodplain Forests	Not Specified	H
Grasslands	Commercial & industrial areas	M
Grasslands	Not Specified	M
Hemlock-Hardwood-Pine Forest	Not Specified	M
High Elevation Spruce-Fir Forest	Not Specified	M
Large warmwater rivers	Not Specified	M
Marsh and Shrub Wetlands	Not Specified	M
Northern Hardwood-Conifer Forest	Not Specified	M
Peatlands	Not Specified	M
Pine Barrens	Not Specified	M
Salt Marsh	Not Specified	H
Shrublands	Not Specified	H
Talus Slopes, Rocky Ridges	Not Specified	M
Temperate Swamp	Not Specified	M
Vernal Pools	Not Specified	H
Warmwater lakes and ponds	Not Specified	M
Warmwater rivers and streams	Not Specified	M

Common Name	IUCN Level 2	Overall Threat Score
American Bumble Bee	Not Specified	M
American Marten	Not Specified	M
American Woodcock	Not Specified	M
Bald Eagle	Not Specified	M
Banded Sunfish	Not Specified	M

Bay-breasted Warbler	Not Specified	M
Bicknell's Thrush	Not Specified	M
Black-billed Cuckoo	Not Specified	H
Blanding’s Turtle	Not Specified	H
Blue-winged Warbler	Not Specified	H
Bobolink	Commercial & industrial areas	M
Bobolink	Not Specified	M
Box Turtle	Not Specified	M
Bridle Shiner	Not Specified	H
Brook Floater	Not Specified	M
Brown Thrasher	Not Specified	H
Canada Warbler	Not Specified	M
Cape May Warbler	Not Specified	M
Cerulean Warbler	Not Specified	M
Common Nighthawk	Not Specified	H
Common Tern	Not Specified	M
Coppery Emerald	Not Specified	M
Dwarf Wedgemussel	Not Specified	M
Eastern Meadowlark	Commercial & industrial areas	M
Eastern Meadowlark	Not Specified	M
Eastern Pearlshell	Not Specified	M
Eastern Pondmussel	Not Specified	M
Eastern Towhee	Not Specified	H
Eastern Whip-poor Will	Not Specified	M
Field Sparrow	Not Specified	H
Fowlers Toad	Not Specified	M
Frosted Elfin	Not Specified	H
Golden-winged Warbler	Not Specified	H
Grasshopper Sparrow	Commercial & industrial areas	H
Grasshopper Sparrow	Not Specified	M
Hessel's Hairstreak	Not Specified	M
Hognose Snake	Not Specified	H
Horned Lark	Commercial & industrial areas	H
Jefferson/Blue-Spotted Salamander Complex	Not Specified	M
Karner Blue Butterfly	Not Specified	H
Kennedy's Emerald	Not Specified	M

Least Terns	Not Specified	M
Lynx	Not Specified	H
Lyre-tipped Spreadwing	Not Specified	M
Marbled Salamander	Not Specified	H
Margined Tiger Beetle	Not Specified	M
Monarch	Not Specified	M
Moose	Not Specified	M
New England Cottontail	Not Specified	H
Northern black racer	Housing & urban areas	M
Northern black racer	Not Specified	H
Northern Goshawk	Not Specified	M
Northern Harrier	Not Specified	M
Northern Leopard Frog	Not Specified	M
Ocellated Emerald	Not Specified	M
Olive-sided Flycatcher	Not Specified	M
Pine Barrens Bluet	Not Specified	M
Pine Barrens Lepidoptera	Not Specified	M
Piping Plover	Not Specified	M
Prairie Warbler	Not Specified	H
Purple Finch	Not Specified	M
Rainbow Smelt (diadromous)	Not Specified	M
Ringed Boghaunter	Not Specified	M
Roseate Tern	Not Specified	M
Ruffed Grouse	Not Specified	M
Rusty Blackbird	Not Specified	H
Rusty-patched Bumble Bee	Not Specified	M
Scarlet Tanager	Not Specified	M
Sleepy duskywing	Not Specified	M
Spotted Turtle	Not Specified	H
Swamp Darter	Not Specified	M
Three-toed Woodpecker	Not Specified	M
Three-toed Woodpecker	Tourism and recreation areas	M
Timber Rattlesnake	Not Specified	H
Veery	Not Specified	M
Vesper Sparrow	Commercial & industrial areas	M
Vesper Sparrow	Not Specified	M

Wood Thrush	Not Specified	M
Wood Turtle	Not Specified	H
Yellow Bumble Bee	Not Specified	M
Yellowbanded Bumble Bee	Not Specified	M

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