

Appendix C

Threat & Action Definitions

Vermont's Wildlife Action Plan 2015

Threat Categories for Wildlife Action Plan Revision 1

Conservation Actions for Wildlife Action Plan Revision 6

Threat Categories for Wildlife Action Plan Revision

Element number three of the eight congressionally required elements of a Wildlife Action Plan requires that states: describe the problems that may adversely affect Species of Greatest Conservation Need or their habitats and priority research and survey efforts needed to identify factors which may assist in restoration and improved conservation of these species and habitats. Problem and threats are defined as follows:

Problem: Something that is a concern and could cause a negative impact at the species, population, habitat and/or landscape levels (e.g., habitat conversion, pollution, illegal pet trade). A problem can also be the lack of information or a data gap vital to the successful management of a species.

Threat (direct): Processes or human activities “that have caused, are causing, or may cause the destruction, degradation, and/or impairment of biodiversity targets” (adapted from Salafsky et al. 2008).

Threat (indirect): The factors contributing to or enabling direct threats. Typically there is a chain of contributing factors behind any given direct threat. Synonyms include contributing factors, underlying factors, drivers, and root causes (adapted from Salafsky et al. 2008).

For the purposes of this report, problem and threat are used in a similar or related manner. For each Species of Greatest Conservation Need in the Action Plan we identified priority problems. Priority research needed to evaluate other potential problems was also identified. They are detailed in SGCN conservation summaries (Appendix A) and in habitat/ community summaries (Appendix B).

Each of the threats and problems identified in the Action Plan was assigned to one of 24 categories roughly grouped into habitat-related factors and non-habitat-related factors. These categories make it possible to search our database for similar factors impacting other species. It also makes it easier to roll-up for broad scale conservation planning. The categories were cross-walked (Appendix C) with those developed by the International Union for Conservation of Nature and Natural Resources (IUCN) (Salafsky et al. 2008) to aid in the regional roll-up of Action Plan data as recommended by the Diversity Technical Committee of the Northeast Association of Fish & Wildlife Agencies (Crisfield 2013).

The categories are not mutually exclusive and threats can often logically be placed into more than one category depending on the particular stress it causes for a species or habitat. For example, a road can fragment the habitat of grassland nesting birds, cars traveling the road can injure or kill amphibians that were crossing the road to mate in an adjacent pool, and salt spread on the road to prevent icing can wash into a stream impacting its population of Brook Trout. In this example the threats stemming from the road would be recorded in the "Habitat Fragmentation," "Impacts of Roads & Transportation Systems," and "Pollution" categories.

Threats are often species and/or habitat specific. What may negatively impact one species may benefit another. For example, if a cold water stream with a healthy Brook Trout population was dammed it might no longer support Brook Trout. That impact to the dam would be described as the "conversion of habitat" category. However, the reservoir created by the dam might make it more suitable for a warm water fish species.

Clearly life is too complex to be placed into any one box. Therefore it is important to read the full description of a factor affecting a species or habitat in the appropriate species or habitat summary. Table C.1 lists the threat categories used in this Wildlife Action Plan.

Table C.1 Threat Categories for Wildlife Action Plan Revision

#	Threat/ Problem	Description	IUCN Category
Habitat-Related Categories			
A	Climate Change	Long-term changes linked to global warming and other climate issues that can lead to major changes in habitat availability (e.g., high elevation habitats), vegetative composition and location (e.g., the movement up in elevation or north in latitude, invasion by exotic pests) as well as climate variability (e.g., change in snow depth, rainfall and/or natural disturbances).	11. Climate Change and Severe Weather
B	Habitat Alteration/ Degradation	A lessening of the quality of a habitat by human action stopping short of complete conversion (e.g., the reduction of mast production from a forest stand, the riprapping a streambank, and significant land use changes adjacent to a habitat such as replacing a forest stands on the edge of a wetland with a housing development. In the last case, the development would be a conversion of the forest stand and, if not designed properly, could also degrade the wetland). Habitat Conversion, Habitat Fragmentation, Hydrologic Alteration, Sedimentation, Pollution and Inadequate Distribution Of Successional Stages are closely related categories.	1, 7.3. Residential and Commercial Development; Other Ecosystem Modifications
C	Habitat Conversion	The complete transformation or loss of a habitat by human action (e.g., filling a wetland to create a grassy field, converting a forest into a parking lot, or damming a stream to create a reservoir). Habitat Alteration/Degradation, Habitat Fragmentation, Hydrologic Alteration, and Inadequate Distribution of Successional Stages are closely related categories.	1. Residential and Commercial Development
D	Habitat Fragmentation	The breaking up of habitats into smaller, non-contiguous patches as a result of habitat conversion (e.g., housing, commercial development, roads, utility lines). Fragmentation can: 1) render important habitats inaccessible (such as isolating a den site from a feeding site), 2) breakdown of the metapopulation structure of a species (for example grassland butterflies, spotted salamander, and tiger beetles); and, 3) degrade remaining habitat patches through edge effects that favor edge-tolerant species such as raccoons and crows, as well as invasive exotic species that can out-compete native and rare species. The result of habitat fragmentation is often increased predation, increased mortality, reduced mobility and changes in habitat micro-climates. Habitat Alteration/Degradation, Hydrologic Alteration and The Impacts off Roads and Trails are closely related categories.	1. Residential and Commercial Development
E	Hydrologic Alteration	Changes in the flow, periodicity or quality of a surface or subsurface water system (examples include a dam on a river preventing historic fluctuations in water level and mining activities causing a perennial seep to run dry). Dams can also increase water temperature. If warm water was identified as a problem then that problem would be placed in the pollution category. Hydrologic Alteration is a subset of Habitat Alteration but is a significant enough problem to warrant a separate category.	7.2 Dams and Water Management/Use

#	Threat/ Problem	Description	IUCN Category
F	Impacts of Roads & Transportation Systems	Transportation corridors that bring people, disturbance, and exotics to a habitat or directly impact a Species of Greatest Conservation Need (e.g., road kill, bird species whose mating calls are drowned out by the noise of road traffic, a road corridor that speeds the spread of an exotic invasive species. Habitat Fragmentation, habitat Alteration/Degradation and Impact of Roads are closely related categories. <i>In 2005 this category included trail impacts. For 2015 trail impact should be categories in Incompatible Recreation.</i>	4.
G	Impacts of Energy Infrastructure & Development	Threats from exploring for, developing, producing and distributing energy resources. Hydrofracturing and other natural gas extraction and distribution processes. Removal and distribution of minerals and rocks, limited to energy production. Generating and distributing power from the wind. Generating and distributing power from the sun.	
H	Inadequate Disturbance Regime	A disturbance regime is re-occurring process that disrupts a habitat, ecosystem, populations, and/or substrate causing significant change to a system (Picket and White). Many species have adapted to these disturbances and depend upon them to maintain habitats (e.g., the loss of beaver created wetlands, and a dam preventing the yearly flooding of floodplain forests that brings nutrients to the site and creates opening for early successional vegetation).	7.1. Fire and Fire Suppression (Other disturbance types need representation)
I	Inadequate Distribution of Successional Stages	The lack of either late, mid or early successional habitat in appropriate size and/or juxtaposition (examples include ruffed grouse and woodcock which prefers early successional forest stands, American marten which prefers late-successional stands and lynx which depends on a mix of stages).	7.3 Other Ecosystem Modifications
I	Invasion by Exotic Species	The introduction and spread of nuisance exotic and native species (plants and animals). These species may lead to the elimination of populations, threats to long-term stability or extirpation by out-competing a native species, displacing its food source or altering a key process or function of a habitat. Note that this category includes both exotic species and invasive native species such as cowbirds and sea lamprey. Exotic disease and parasites are addressed separately in the disease category.	8.1. Invasive Non-native/Alien Species/Diseases
J	Parcelization	Separating a large parcel into multiple smaller parcels. Parcelization is a significant driver of habitat fragmentation (and is often driven itself by tax policy). Parcelization can make it difficult to deliver management programs or present access issues which could impede actions benefiting SGCN even when fragmentation is not a problem (e.g., when a single 800-acre parcel is broken into many smaller lots some of the new landowners may choose to post their land while others may close logging roads).	1. Residential and Commercial Development

#	Threat/ Problem	Description	IUCN Category
K	Sedimentation	Excessive inputs (in frequency and/or abundance) of solid material (inorganic or organic solid fragments) that are carried and deposited by wind, water, or ice to a water body. These materials have a negative impact on Species of Greatest Conservation Need through their physical presence (example: soils washing into a stream from a construction site and smothering fish eggs and other aquatic species that live in the spaces between rocks and gravel in a streambed). Sedimentation was broken out from the habitat alteration/degradation category because of its significant impact on aquatic species. Note: a problem that exerted a negative chemical impact on wildlife (e.g., road salt), would be listed in the Pollution category.	9.3.2. Ag/Forestry Soil Erosion and Sedimentation (Other sedimentation sources need representation)
Non-Habitat-Related Threat Categories			
L	Competition	Where two or more species compete for the same limited resource (e.g., space, food) decreased survival, growth rate and/or reproduction of competing individuals is possible (e.g., fisher, bobcat and coyote have overlapping habitat needs and prey preference).	8.2. Problematic Native Species
M	Disease	Any disease causing agent such as, fungi, bacteria and viruses (e.g., rabies, West Nile disease, whirling disease, chronic wasting disease, hemlock wooly adelgid, and sudden oak death). Diseases are often transmitted by parasites, a related problem.	8.1, 8.2, 8.3, 8.4-6. Invasive and Other Problematic Species, Genes and Diseases
N	Genetics	A reduction of survival or fecundity of a species due to inbreeding depression (the mating of close relatives) usually due to small and isolated populations, and outbreeding depression (the mating of different locally adapted populations). Examples include lake sturgeon and timber rattlesnake for whom inbreeding depression and genetic drift may be distinct possibilities due to small and isolated populations. Outbreeding depression can be a problem for native baitfish whose locally adapted genes may be swamped out by the accidental release of relatives taken from other waters in the state or elsewhere.	<i>Research needed</i>
O	Harvest or Collection	Legal or illegal taking of biological resources (e.g., hunting, trapping, collecting, fishing) for commercial, recreation, subsistence, research, or management purposes (e.g., the accidental taking of spruce grouse or American marten by a hunter or trapper, illegal collection of wood turtles for sale in the pet trade, and the harvesting of eels).	5.1, 5.2, 5.4. Hunting and Collecting Terrestrial Animals. Gathering Terrestrial Plants
P	Incompatible Recreation	Recreational activities (outside of established transport corridors) that directly impact SGCN or their habitats (e.g., include: poorly planned ORV or hiking trails that cause wildlife to abandon a den site, bird watchers getting too close to nesting loons causing loons to abandon their nest, and off-road vehicles operated outside of approved areas can run through vernal pools degrading the pool and crushing spawning amphibians and their eggs) Because of the scale of impact, the construction of a golf course or ski area would be listed in Habitat Conversion or Habitat Alteration categories respectively. Incompatible Recreation is also closely related to Impacts of Roads & Trails.	6.1. Recreational Activities
Q	Loss of Food Base or Prey Base	The disappearance of a food source important to a species' survival (e.g., lynx which feeds primarily on snowshoe hare and the whippoorwill whose primary diet of	<i>Research needed</i>

#	Threat/ Problem	Description	IUCN Category
		flying insects has been decreased).	
R	Loss of Relationship with Other Species	A species whose existence depends upon another for a process, function or product (examples include the larvae of many mussel species will attach to fish and depend on these fish for dispersal). Many insects, including butterflies and moths, have specific relationships with host plants that serve as its sole food. In some cases the host plant also conveys a chemical protection to the insect.) This category differs from the Loss of Prey Base category in that there are no alternatives (e.g., lynx and whippoorwill can take other prey, monarch butterflies won't persist without milkweed to feed on and to provide chemical protection from predators).	<i>Research needed</i>
S	Parasitism	A relationship between two species in which one benefits (the parasite) and the other (the host) is harmed, (Smith 1980) although not directly killed (e.g., ticks, sea lamprey parasitizing lake whitefish and lake trout). Parasites may transmit diseases to the host therefore disease is a closely related problem. Examples include ticks transmitting Lyme disease and mosquitoes transmitting West Nile virus.	<i>Research needed</i>
T	Pollution	Introduction of exotic materials (other than sediments) from point and non-point sources. Includes chemicals and toxins in the air, land, and water; excess nutrients from farm and municipal sewage plants; garbage and other solid waste; radioactive materials; road salt; excessive noise and infrasound noise; excessive heat; and light pollution that disturbs animals and disrupts migration patterns. Note: Sediments were broken out from this category because of its significant impact on some water bodies. Greenhouse gasses such as carbon dioxide and methane would be covered in the Climate Change category.	9. Pollution
U	Predation or Herbivory	Species or habitats negatively impacted by wildlife species that eat them (e.g., raccoons and skunks that eat wood turtle and spiny softshell turtle eggs and moose over-browsing vegetation and preventing the regeneration of a forest stand. This category differs from Competition in that competition is two or more species vying for the same specific resource, whereas predation is one species eating another.	<i>Research needed</i>
V	Reproductive Traits	Species whose specific reproductive strategies make it vulnerable, such as species producing very few offspring because they take a long time to reach sexual maturity and/or take a long time between reproductive events (e.g., lake sturgeon and wood turtle).	<i>Research needed</i>
W	Trampling & Direct Impacts	Non-recreational, and sometimes inadvertent, negative impacts to a species (examples include the crushing of wildlife by agricultural equipment operating in a farm field, vehicles operating off-road, the killing of rattlesnakes or bats out of antipathy for the species, increased nest abandonment by brown thrashers due to the proximity of people). Impacts to a habitat would be assigned to the Habitat Degradation/Alteration and perhaps Habitat Conversion. Incompatible Recreation and Impacts of Roads & Trails are closely related categories	5.1.3, 5.2.3, 5.4.3. Persecution/Control

Conservation Actions for Wildlife Action Plan Revision

Element number four of the eight congressionally required elements of a Wildlife Action Plan requires that states describe “conservation actions proposed to conserve the identified species and habitats and priorities for implementing such actions.”

We identified actions to address the threats and problems impacting each of Species of Greatest Conservation Need (SGCN) and their habitats. Selected actions are based on the best science available today as well as a strategic assessment of needs and priorities of all wildlife species. In the coming years, as monitoring data on SGCN and conservation actions becomes available, as priorities change, or new threats or opportunities arise, actions may need to be revisited. Not every action in this report will be eligible for State Wildlife Grant funding. Furthermore, it may not be suitable, or feasible, for the Vermont Fish & Wildlife Department to implement some of the actions in this report, however, some conservation partners may find them fitting and practical.

Actions are described in short narratives in each SGCN conservation summary (Appendix A) and in each habitat, community and landscape summary (Appendix B). Actions are intentionally broad, directional, and nonspecific so as not to constrain our selection of procedures for implementing them. For example, an action such as “provide technical assistance to landowners to maintain or improve riparian habitat for Species of Greatest Conservation Need” allows for different approaches to providing that assistance and leaves the door open to a variety of providers to implement. Where action implementation is to be funded by the State Wildlife Grant program the approach should be consistent with the Department’s mission and strategic plan, and precise procedures will be detailed in operational plans once the Action Plan is finalized.

Vermont’s Action Plan was designed for the state, not just the Fish & Wildlife Department. While the VFWD may be responsible for implementing many of the actions in this report, it could be conservation partners that are the more logical and appropriate leaders for others, due to their skills and expertise, staffing, history, location, available resources and constituencies.

Each of the actions identified in this report were assigned to one of 27 categories in six major classes. The categories were developed by the Conservation Measures Partnership (Salafsky 2005) as a means of standardizing terminology (not practices) among conservation practitioners worldwide. Many states have used these same categories to organize the strategies and actions in their Action Plan. They have also been incorporated into Wildlife TRACS (Tracking and Reporting Actions for the Conservation of Species) the US Fish & Wildlife Services’ system for tracking and reporting conservation activities. States, including Vermont, will use TRACS for all work funded through the USFWS once it is fully operational.

The action categories are used solely for the purpose of organizing and grouping strategies developed by Action Plan teams and committees. It was not our goal to create strategies for every category. A few categories were not applicable to the species or habitats in Vermont whereas others were deemed not as effective. Table C.2 lists the action categories used in this Wildlife Action Plan.

Table C.2 Conservation Actions for Wildlife Action Plan Revision

#	Strategy Type	Description
1	Land/Water Protection	
1.1	Creating Publicly-Owned Protected Areas	Setting up or expanding public parks, forests and other protected areas where wildlife conservation is a primary management objective (e.g., wildlife management areas, state forests, municipal lands)
1.2	Creating Privately-Owned Protected Areas	Setting up or expanding private reserves and other protected areas where wildlife conservation is a primary management objective (e.g., private lands managed by non-profit conservation or hunting groups)
1.3	Easements	Setting up protection of some specific aspect of a resource on public or private lands (e.g., development rights, wild & scenic river designation)
2	Land/Water/Species Management	
2.1	Protected Area Management	Generally managing protected areas where wildlife conservation is a primary management objective (e.g., site design, training park staff, managing water levels).
2.2	Compatible Resource Use	Promoting use of resource lands (where wildlife management is not a primary objective) to be compatible with conservation (e.g., promoting sustainable logging, grazing, fishing, hunting, trapping, farming, aquaculture, energy development, transportation infrastructure).
2.3	Invasive Species Control & Prevention	Dealing with invasive and/or alien plants, animals, and pathogens (e.g., developing boat wash stations, pulling noxious weeds from a habitat).
2.4	Habitat Restoration	Enhancing degraded or restoring missing habitats (e.g., clayplain forest restoration and riparian tree plantings). If a strategy specifically targets one or two species we consider it a species restoration strategy. If it specifically targets three or more species we consider it a habitat restoration strategy.
2.5	Natural Processes Restoration	Enhancing or restoring natural ecosystem functions (e.g., prescribed burns, dam removal and restoration of historic flow regimes, fish ladders).
2.6	Species Restoration	Enhancing or restoring specific plant and animal populations (e.g., translocating spruce grouse from Canada to Vermont, and erecting artificial nesting boxes/platforms for bluebirds and osprey.) If a strategy specifically targets one or two species we consider it a species restoration strategy. If it specifically targets three or more species we consider it a habitat restoration strategy.
2.7	Ex-Situ Conservation	Protecting wildlife out of its native habitats (e.g., captive breeding of bald eagles and creating regional refugia for New England cottontail rabbit).
3	Law & Policy	
3.1	Legislation	Making, changing, influencing, or providing input into formal legislation at all levels: international, national, state/provincial, local (e.g., lobbying to make the SWG program permanent, addressing greenhouse gas emissions).
3.2	Policy & Regulations	Making, changing, influencing, or providing input into policies and regulations affecting the implementation of laws at all levels: international, national, state/provincial, local (e.g., providing data to policy makers, development of wildlife harvest regulations).
3.3	Planning & Zoning	Developing, changing, influencing, or providing input into plans governing natural resource use and allocation (e.g., municipal zoning, public or private management plans for ecoregions, sites, habitats, or species, commenting on zoning plans, developing a town ordinance).

#	Strategy Type	Description
3.4	Standards	Setting, changing, influencing, or providing input into voluntary standards that govern practices (e.g., best management practices for forestry, habitat guidelines for state lands).
3.5	Compliance & Enforcement	Monitoring and enforcing compliance with laws, policies & regulations, plans, and standards (e.g., water quality standard monitoring, enforcement of ATV regulations).
4	Research, Education & Awareness	
4.1	Research	Conducting and disseminating research to improve knowledge about conservation issues (e.g., conducting inventories for SGCN, developing habitat maps, demonstration projects for sustainable forestry)
4.2	Technical Assistance, Training, Workshops	Enhancing knowledge, skills and information exchange for practitioners, landowners, stakeholders, and other relevant individuals in structured settings outside of degree programs (e.g., providing technical assistance to landowners, monitoring workshops, conferences, learning networks)
4.3	Lifelong Learning	Enhancing knowledge and skills of practitioners, stakeholders, and other relevant individuals through non-structured means (e.g., writing a how-to manual for landowners or towns and communities, stakeholder education on proper ORV use)
4.4	Awareness Raising, Communications	Raising conservation awareness and providing information through various media (e.g., websites, newsletters, presentations)
5	Economic & Other Incentives	
5.1	Linked Enterprises	Developing enterprises that directly depend on natural resources as a means of influencing behaviors, attitudes, and beliefs (e.g., ecotourism, sustainable forest product harvesting, fishing, hunting and trapping).
5.2	Substitution	Promoting products and services that substitute for environmentally damaging ones (e.g., floodplain restoration in place of dams and bank reinforcement, promoting recycling/use of recycled materials)
5.3	Financial Incentives & Market Forces	Using market mechanisms to influence behaviors, attitudes, and beliefs (e.g., forestry certification, positive incentives, negative incentives, forest banking, valuation of ecosystem services such as flood control)
5.4	Conservation Payments	Using direct or indirect payments to influence or reinforce behaviors, attitudes, and beliefs (e.g., landowner payment programs).
5.5	Non-Monetary Values	Using non-market forces to change behaviors, attitudes, and beliefs (e.g., landowner/land manager recognition awards).
6	Capacity Building	
6.1	Institutional Development	Creating or providing non-financial support, capacity building for non-profits, government agencies, and for-profits (e.g., creating new local land trusts)
6.2	Alliance Development	Forming and facilitating partnerships, alliances, and networks of organizations (e.g., Action Plan Conservation Partners, Vermont Monitoring Cooperative, Vermont Sportsmen's Federation).
6.3	Conservation Finance	Raising and providing funds for conservation work (e.g., State Wildlife Grants small grants program, private foundations, debt-for-nature swaps).