

FISH & WILDLIFE DEPARTMENT PERFORMANCE-BASED BUDGET 2020 REPORT



From creating an online big game reporting system to moving mandatory hunter education certification online to designing, permitting, and completing \$1.5 million in CARES Act public access projects in a matter of months, the COVID-19 pandemic changed the way the department did business in 2020.

However, our biggest challenge in 2020—managing the surge in outdoor recreation, especially interest in hunting and fishing—was also a welcome affirmation of the department’s mission.

Vermonters cherish wild places and wild creatures. Survey after survey has confirmed this, but research also shows that our ability of to hunt, fish, trap and watch wildlife is severely constrained by our busy lives. For some, this means not participating as much as they want. For others, it prevents them from even trying in the first place. Then came COVID-19 and, as unfortunate as the effects of the pandemic have been, the pause allowed many Vermonters the time they needed to enjoy the outdoors.

Besides time, the opportunity to provide food for the family and the physical, mental and spiritual health benefits of connecting with nature made wildlife-related recreation even more attractive in 2020. While department efforts to make the outdoors more accessible, including enhanced public access and outreach to new audiences, made it easier for people to participate. Also, as a bonus, wildlife-related recreation is inexpensive. The cost of a year-long license is the same as filling up a car, and \$100 can purchase a decent pair of binoculars or a summer’s worth of fishing tackle.

The sum of these factors meant an astounding number of Vermonters took to the woods and waters. By the

end of calendar year, sales of many of the department’s hunting and fishing license types exceeded their five-year averages with some reaching levels not seen in decades.

While harder to measure, more people also birded, paddled, and boated. They added to an observed, dramatic increase in the use of department-owned access areas and Wildlife Management Areas.

Fortunately, social distancing is intrinsic to the outdoors. There wasn’t much need to remind hunters and anglers to keep six feet away from each other. Even in normal years, six feet is usually too close.

Wildlife-based recreation was ideally suited for the moment, and the surge may prove temporary once our other commitments begin to return. On the other hand, this could be the beginning of a long-term, back-to-nature boom that will require the department re-evaluate what we do, how we do it and with whom.

Regardless, 2020 should serve as a reminder to us all about the importance of nature and wildlife recreation. While Vermonters may not be able hunt, fish, trap and go wildlife watching as much as they would like, having access and opportunities to participate in these pursuits still provides incredible value.

The Vermont Fish and Wildlife Department is proud of its integral role in managing these opportunities, particularly after a year when they were needed the most. But our work is not done. Our goal remains making nature and wildlife recreation, and the benefits they confer, available and accessible to current and future generations of Vermonters, no matter who they are or where they live.





DEPARTMENT OVERVIEW

We are biologists, game wardens, educators and support staff.

Our MISSION is conserving fish, wildlife, plants, and their habitats for the people of Vermont.

Administration: Provides policy, legal, personnel, and financial leadership for the department. The division oversees license sales and more than 15 other permits related to resource protection. The division also promulgates rules and regulations via the Commissioner and the Fish & Wildlife Board.

Fisheries: Conserves and manages the state's fish populations and aquatic habitats. This includes: operating five fish hatcheries; maintaining more than 196 fishing access areas; controlling the spread of fish diseases, invasive fish and aquatic nuisance species; restoring populations of fish such as muskie, lake sturgeon and salmon; and protecting aquatic species and critical aquatic habitat through technical assistance of regulatory processes such as Act 250, Section 248, hydroelectric dam relicensing, stream alteration and shore land protection permits, and aquatic organism passage.

Division of Warden Service: Protects Vermont's fish and wildlife from poaching and illegal trade, in addition to ensuring that the state's 160,000 licensed hunters, anglers, and trappers are compliant with rules and regulations. State Game Wardens respond to human-wildlife conflicts, animal damage complaints,

potentially diseased animals and remove dead big game animals from roadsides. They also perform standard law enforcement duties such as search and rescue, assistance to other law enforcement agencies, and boating, snowmobile, and ATV operation enforcement.

Outreach and Education: Provides quality information and education about Vermont's fish and wildlife to ensure greater understanding and safe, responsible enjoyment of these resources. This includes operating the department's two Green Mountain Conservation Camps and offering a variety of public education programs such as mandatory hunter education, Lets Go Fishing and Project WILD.

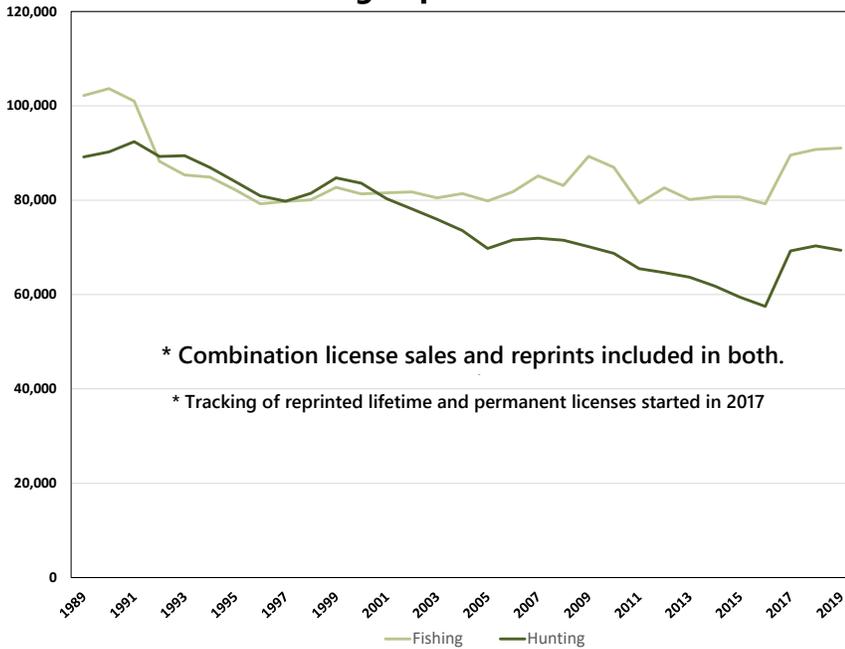
Wildlife: Protects, manages, and restores all wildlife, plants, and their habitats throughout Vermont. Division staff work on three main areas—management and conservation of hunted or trapped species; public and private land and habitat conservation, management, and restoration; and the protection and recovery of rare, threatened, and endangered species. This includes the oversight of 100 Wildlife Management Areas and participating in the protection of necessary wildlife habitat through the Act 250 and Act 248 processes, among others.

THE DECLINE IN LICENSE SALES



Performance measure: Maintain the number of Vermonters participating in hunting, fishing and trapping, as measured by license sales.

Resident Hunting and Fishing License Sales including Reprints of Licenses*



License sales are recorded by calendar year. 2020 licenses sales will be reported in next year's report.

License sales surged during the COVID-19 pandemic. By the end of fiscal year 2020, almost all resident license types were well ahead of year-to-date sales from last year. By the end of calendar year 2020, many types appear to have exceeded five-year averages and resident fishing is now the highest since 1991. It is too early to report on 2020 license sales and the patterns that drove it. Unfortunately, these gains will be likely be temporary.

License sales provide funding to conserve and manage the state's fish and wildlife species.

Yearly license sales are not equivalent to the number of hunters and anglers in the field. Landowners do not need licenses to hunt and fish on their own land if their property is unposted, and youth under age 15 fish for free. More importantly, many resident hunters hold permanent and lifetime licenses.

These license types are not considered sales after the first year of purchase, and the department has only been able to require yearly 'reprints' of these licenses from those planning to use them since 2017. When 2018 and 2019 reprints are added to license sales, the totals show a much smaller decline than sales alone suggested.

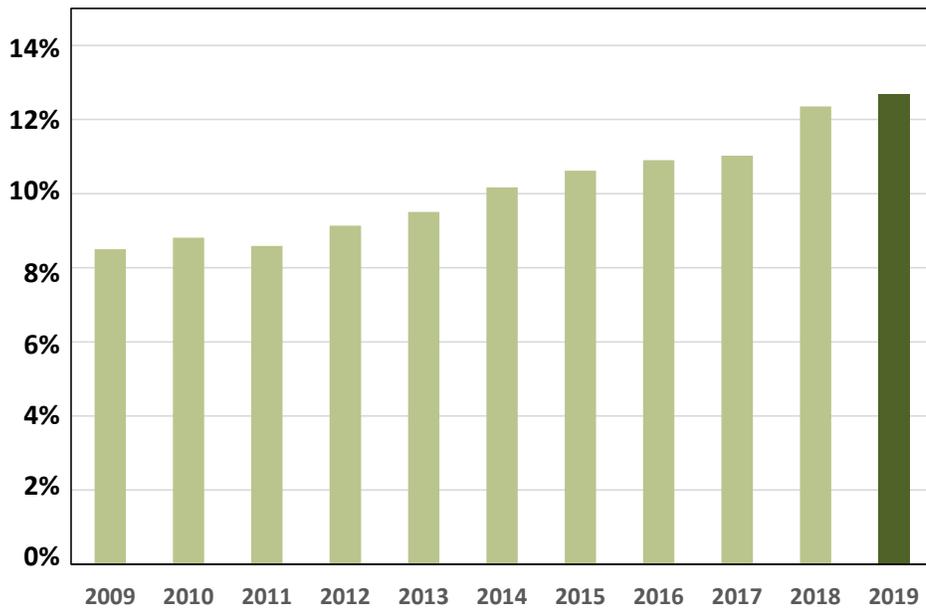
Reprint numbers are directly related to the state's demographics and as Vermonters continue to age, they will likely continue to decrease over time.

WOMEN IN THE OUTDOORS



Performance measure: Increase the number of women participating in hunting, trapping and fishing in Vermont, as measured by license sales.

Percent of Women Hunting and Combination License Holders

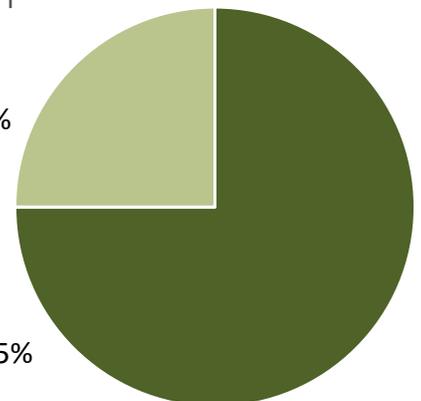


The number of female hunters in Vermont increased in the 2000s and has since leveled out.

The percentage of female hunters in the hunting population has risen as the number of male hunters has declined. In calendar year 2019, 34 percent of all hunter education graduates were female, suggesting further increases may occur. Meanwhile, women make up 1 in 4 anglers, a ratio that has remained stable for decades.



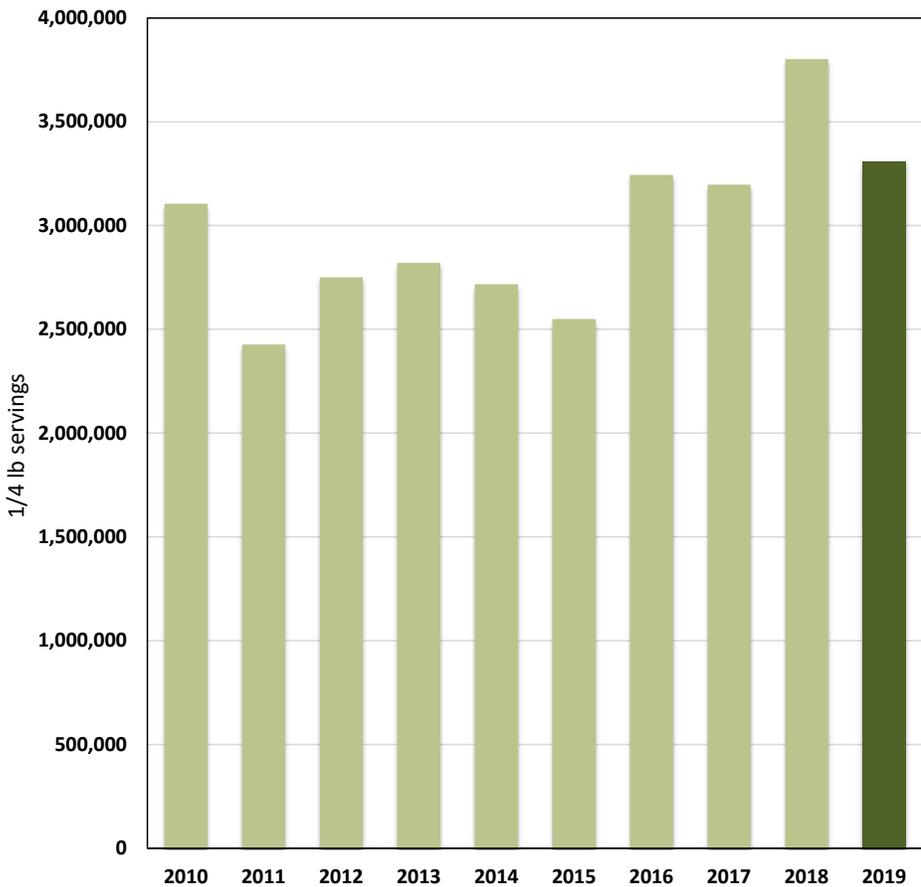
Resident Fishing by Gender





Performance measure: The amount of meat, fish and other resources from fish and wildlife, taken annually, during regulated seasons shall be maintained at sustainable levels.

Meals of Venison Provided Through Regulated Hunting



Hunting and fishing provide Vermonters with free-range, local, sustainable, and affordable food sources.

Vermont is a leader in ‘Farm to Table’ and eating locally is a primary motivation for first-time hunters, especially those who are not from hunting backgrounds. Among experienced hunters, meat ranks among the top reasons to hunt. Anecdotally, the importance of meat increased in 2020 due to food security concerns.

Fishing is mostly associated with relaxation and spending time with friends and family, though the possibility of fresh fish may have played a factor in the surge in fishing license sales in the spring of 2020. Some species like yellow perch, walleye and crappie owe most of their popularity to their taste. Keeping fish is particularly common during the winter when cold temperatures both in and out of the water keeps fillets firm and fresh.

CONSUMER SPENDING AND WILDLIFE-RELATED RECREATION



Performance measure: Maintain consumer spending related to wildlife-recreation.

Long hunting and fishing seasons are a testament to the sustainability of carefully managed fish and game species while the steady, off-season traffic they create provides reliable income to rural general stores, diners and gas stations.

The economic benefits of wildlife extend beyond hunting and fishing. Vermont is home to a number of wildlife-watching hotspots that draw both residents and nonresidents, all of whom must eat, sleep and be outfitted. Dead Creek Wildlife Management Area (WMA), for instance, is known throughout Vermont, even among the most casual observers, for its up-close views of snow geese each fall. In contrast, serious birders from New England and beyond visit Wenlock Wildlife Management Area and the surrounding area for its accessible opportunities for boreal birds, such as black-backed woodpeckers, gray jays and spruce grouse.

As immeasurable as wildlife's cultural importance may be to the state, wildlife-related recreation generates significant economic activity and the sum of this passion quickly adds up and represents a significant contribution to the economy.

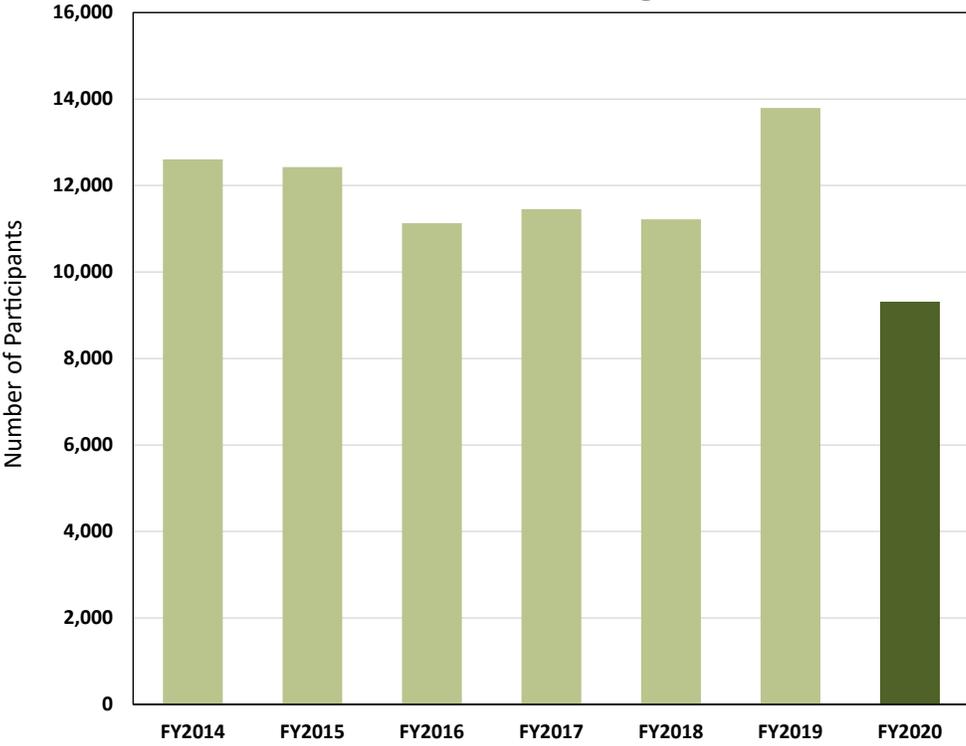
- ➔ A recent US Department of Commerce, Bureau of Economic Analysis found only snow sports topped hunting, shooting and trapping in total, value-added economic impact in Vermont with boating and fishing coming in fourth. The recreational activities examined ran the gamut from the conventional (camping, hiking and climbing) to agritourism, outdoor concerts and even gardening.
- ➔ Wildlife-related spending is particularly important to rural areas and often coincides with the 'off-season' for other tourism.
- ➔ Anglers make a significant contribution to tourism; the bulk of their spending is on food, lodging and related trip expenses.
- ➔ According to survey conducted by UVM's Center for Rural Studies, Lake Champlain generates an average expenditure of \$88 per angler, per day.
- ➔ Vermont draws dedicated wildlife watchers from around the region, not counting casual viewing by residents and tourists.
- ➔ The economic impact of bird feeding in Vermont cannot be overstated. The US Fish and Wildlife Service estimates almost half of Vermont households feed birds.



CONSERVATION EDUCATION AND OUTREACH PROGRAMS

Performance measure: Maintain or increase the public's support for, and knowledge of, fish and wildlife conservation and land stewardship.

Participation in Fish & Wildlife Education and Outreach Programs



The department works to maintain Vermonters' strong connection to the land.

The department's education programs strengthen an understanding of ecology, build support for conservation and teach the outdoor skills needed to responsibly enjoy our woods and waters. In FY2020, COVID-19 struck just before the Let's Go Fishing program's busiest time of year and as hunter education courses were ramping up for the spring turkey season. In response, the department streamed fishing clinics and game cooking seminars online (receiving over 20,000 views) and the basic firearm and bowhunter hunter education courses were adapted to allow for remote certification.

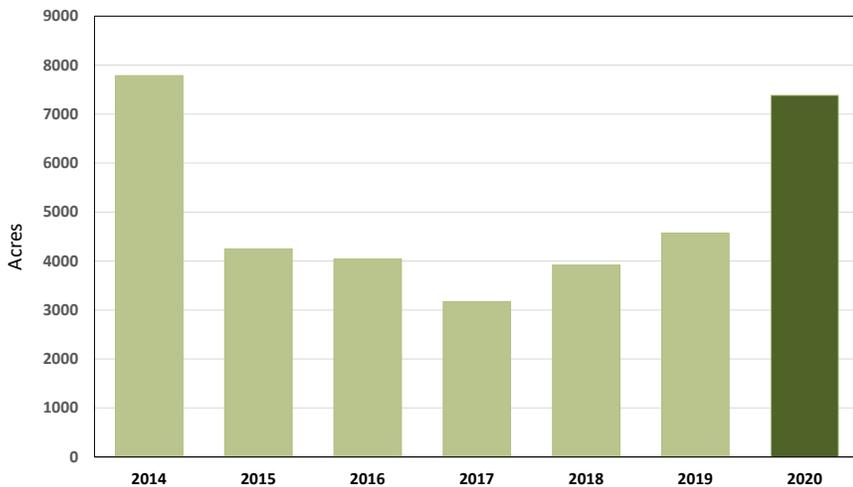
These programs are affordable too. Other than the Green Mountain Conservation Camps and educator's course, all programs are free. Camp tuition is a fraction of the cost of almost any other week-long, residential camp. Plus, there are an ample number of scholarships available for those in need. All applicants that demonstrate need receive financial support.

HABITAT CONSERVATION THROUGH ACT 250



Performance measure: Increase the number of acres of habitat and shoreline protected through the regulatory process.

Habitat Conserved through Act 250 and Section 248



Act 250 works to protect important habitats for fish and wildlife.

The department plays a critical role in the protection of ecologically important fish and wildlife habitats through Act 250 and Section 248. In 2020, this included reviewing 258 projects and protecting 4,837 acres of habitat. In addition, staff also reviewed 6,604 acres of forestland through a review process with the Vermont Public Utility Commission and Burlington Electric Department and Ryegate Associates biomass energy facilities. Habitat is the key to healthy populations of fish and wildlife, and the department’s technical support to these regulatory processes is key to that success.

Only 3 to 5 percent of all development projects in Vermont are regulated by Act 250. As a result, Vermont loses roughly 6,500 acres of undeveloped land every year, an area roughly the size of Montpelier. As part of its strategic plan, the department pursues alternate solutions to minimize habitat loss and fragmentation such as advising town and regional planning commissions and assisting private landowners with conservation practices.



Wildlife Biologist Noel Dodge surveys proposed forest clearing for a large solar facility in Saint Johnsbury. When the permit was issued, it contained conditions to protect a deer wintering area through mitigation and seasonal construction limitations, as well as protection for bat roost trees.

LAND ACQUISITION AND CONSERVATION EASEMENTS



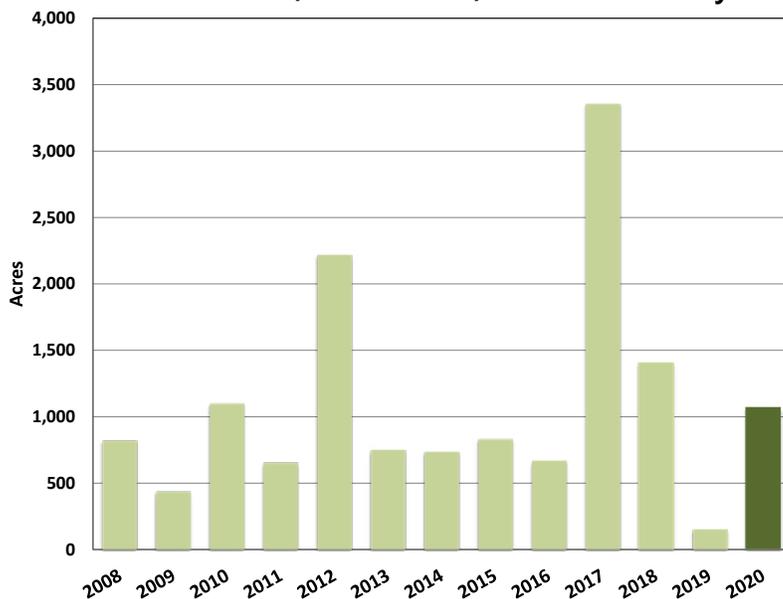
Performance measure: Increase the cumulative number of acres of high-value habitats and natural communities conserved through acquisition or easements.

Strategically targeting critical habitats for conservation.

Working with many partners, the department is safeguarding important fish and wildlife habitat through acquisitions, easements, and management agreements. The department closed on six real estate transactions in the fiscal year totaling 1,068.5 acres.

Projects ranged from a 141.3-acre partnership with ECHO Leahy Center for Lake Champlain at Mallets Creek Wildlife Management Area (WMA) in Colchester to purchasing a 527-acre property in Shrewsbury to create Town Farm WMA, our 100th Wildlife Management Area in 100 years.

Wildlife Habitat Conserved through Acquisitions and Easements
Wetlands, Forest Blocks, Forest Connectivity



The department also secured three acquisitions at critical locations in the Lake Champlain Basin to enhance water quality through wetland restoration and add onto some marquis WMAs such as Dead Creek in Addison County. These three acquisitions total just over 360 acres and include roughly 60 percent restorable acres.

This targeted focus is the result of the new Environmental Protection Agency Wetland Acquisition and Restoration grant that is enabling the department to enhance water quality and wildlife habitat. Roughly twenty projects are in various stages of development, with an emphasis on wetland acquisition and restoration in the Champlain Basin.

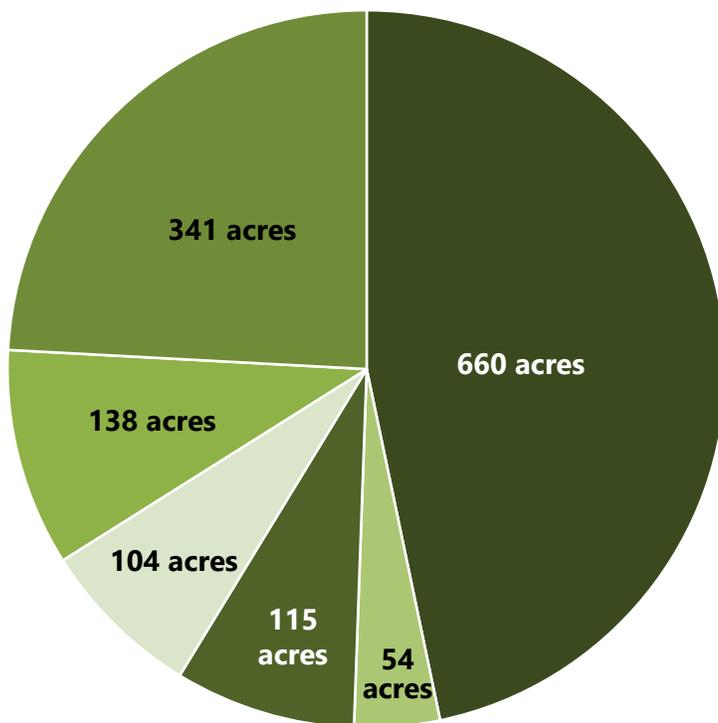
The department's public lands are open to hunting, fishing, trapping, wildlife watching or just connecting with nature.

HABITAT ASSISTANCE FOR PRIVATE LANDOWNERS



Performance measure: Increase the cumulative number of acres of high-value habitats improved through private lands technical assistance.

Wildlife Habitat Improved on Private Lands through Fish & Wildlife Staff Technical Assistance



- Apple and Mast Tree Release - 341 acres
- Invasive Species Control / Herbaceous Weed Control - 660 acres
- Early Successional Habitat - 54 acres
- Delayed Mowing or Brush Hogging - 115 acres
- Young Forest Habitat Created - 104 acres
- Forest Stand Improvement - 138 acres

Approximately 80 percent of Vermont land is privately owned, thus working with landowners is essential to wildlife habitat.

Despite COVID-related restrictions on field work during part of the fiscal year, department staff conducted 577 site visits in a safe manner to provide wildlife habitat technical services to more than 350 Vermont landowners. The primary focus of these visits was to familiarize landowners with potential habitat management activities and funding sources, and, more broadly, to introduce a ‘conservation-based’ way of thinking about the future of their property.

However, these visits also resulted in direct improvement to 1,400 acres of important wildlife habitat through the federal Natural Resources Conservation Service (NRCS) Environmental Quality Incentive Program (EQIP) program. In addition, department staff worked closely with 13 partnering organizations, attending meetings to coordinate landowner habitat technical assistance efforts across the state with other groups. Department biologists also presented over 22 workshops to conservation organizations, natural resource professionals, and students.

WILDLIFE DAMAGE AND CONFLICT

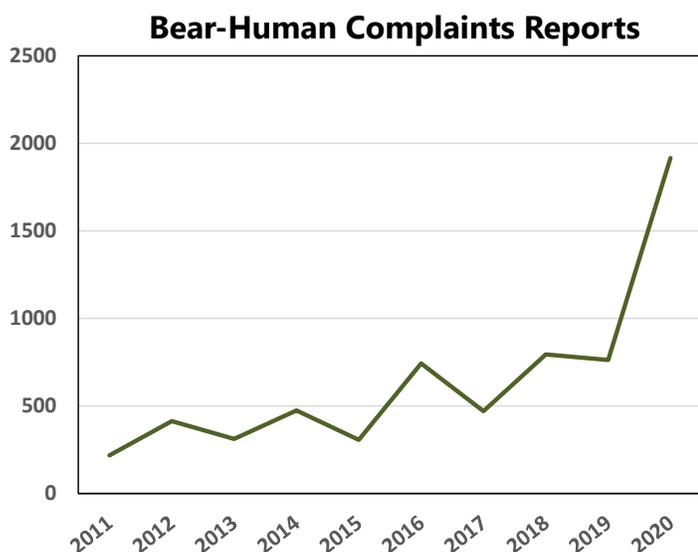


Performance measure: Minimize the total number of negative interactions occurring between wildlife and Vermonters to achieve acceptable levels of human safety and tolerance and to protect critical wildlife habitats.

A record number of bear-human interactions is taxing the department beyond its capacity to provide direct and effective assistance.

Since 1990, the bear population has doubled but reports of bears causing damage or being killed by means other than hunting has increased 20 to 30-fold. From 2019 to 2020 alone, the number of cases doubled, and 2019 was the previous record. Dealing with these complaints falls mainly on the shoulders of game wardens and bear project staff.

Most of the increase in 2020 can be attributed to a lack of natural food, a high number of females with cubs due to the phenomenal food year of 2019, and the first-in-the-nation universal recycling law (Act 148) that has inexperienced Vermonters trying to compost. There was also an uptick in bird feeding and backyard chicken flocks, which also resulted in more reports of bears causing damage.



Pandemic or not, the department believes bear-human conflicts will likely remain high into the foreseeable future as bears continue their range expansion into towns and neighborhoods that, until recently, had little history of living with bears or bear problems.

Changing human behavior is key. The department's expanded outreach and education efforts include presentations on living with bears, online content, social media posts, and television and radio spots. Some of this outreach is statewide, but for the last two years, staff have focused messaging on hotspot communities, such as Stowe and Killington. The department also increased coordination with Department of Environmental Conservation solid waste program, solid waste districts and trash haulers, and USDA (APHIS) Wildlife Services.

Beaver Baffle Program

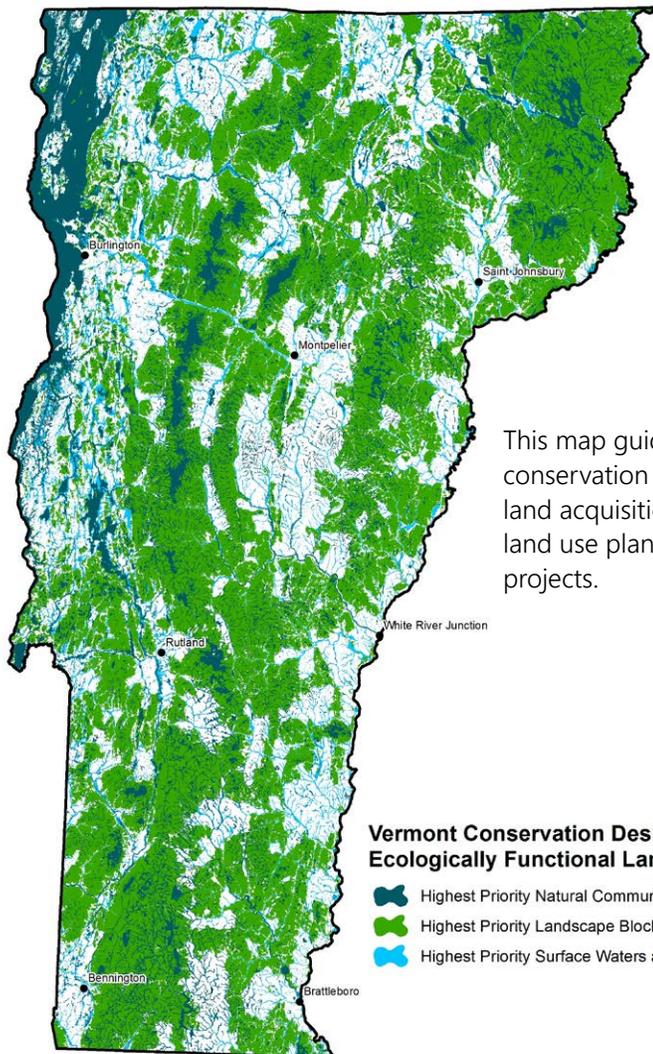
The critical wetland habitats that beaver create are valuable to many species of fish, wildlife, and plants. However, they can also flood roads, yards and septic systems. To help town and state road crews and landowners resolve conflicts while still maintaining the critical wetland habitats that beaver create, the department established the beaver baffle program 20 years ago. These baffles allow some water to pass through the dam without breaching the dam and destroying the wetland.

Since the project's inception in 2000, a total of 306 structures (189 baffles and 117 exclusion fences) have been installed around the state, impacting 3,431 acres of beaver created wetland habitats. In addition, since April 2019, project staff responded to more than 450 emails and 300 phone calls and conducted 93 site evaluations statewide. It is important to note that baffles are not effective for all situations and do not replace the need to manage the beaver population.

MAINTAINING ECOLOGICAL FUNCTION THROUGH VERMONT CONSERVATION DESIGN



Performance measure: Increase the percentage of lands and waters containing the highest priority forest blocks and riparian areas identified in Vermont Conservation Design in some form of protection, conservation, improvement or restoration.



This map guides department conservation programs including land acquisition, land management, land use planning and other projects.

Vermont Conservation Design (VCD) is a science-based vision to sustain our forests, waters, and wildlife for future generations.

VCD identifies the intact, connected, and diverse lands and waters that are highest priority for ecological function. Thoughtful management and conservation of these places helps maintain a healthy environment and all the benefits it provides to fish, wildlife, plants and people.

As a result, VCD informs land acquisition, land management, land use planning and other conservation efforts. In 2020, the department used this design to encourage landowners, towns, and partner organizations to voluntarily focus conservation and stewardship in high priority areas. It was also used to help identify species that need specific conservation attention for biological or social reasons.

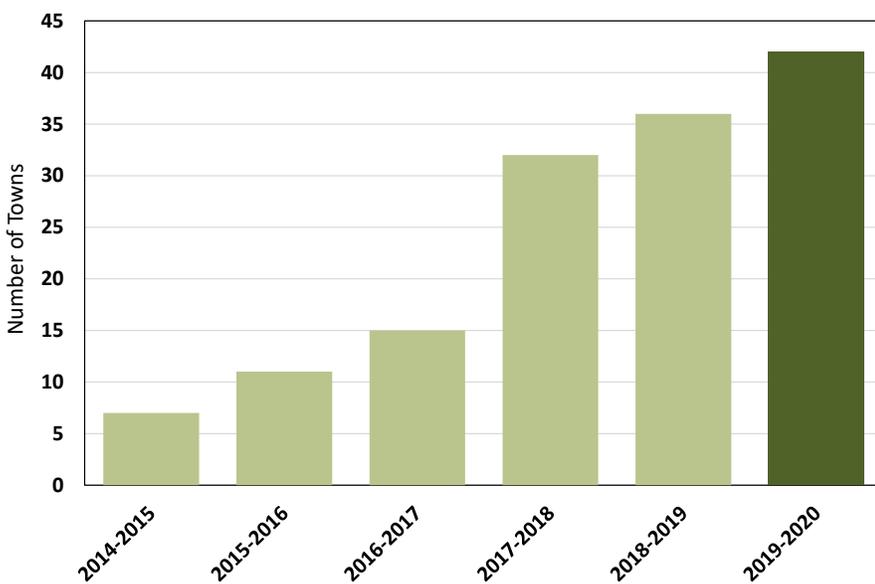
Find VCD at vtfishandwildlife.com/conserve/vermont-conservation-design

COMMUNITY WILDLIFE PROGRAM



Performance measure: Provide technical planning assistance to all Vermont Municipalities

Direct Technical Assistance to Towns by Fiscal Year



In FY2020, the department’s Community Wildlife Program served 124 towns totaling 602 hours of technical assistance. This includes 42 towns that received in-depth assistance, equaling 404 hours of the total hours of assistance.

In addition, the program worked with 10 Regional Planning Commissions, engaged 61 partner organizations, participated in 10 collaborative partnerships, offered 151 technical assistance events (presentations, meetings, trainings, webinars) and reached 1,164 Vermonters.

The Community Wildlife Program serves Vermont municipalities with technical assistance for conservation planning.

The department’s Community Wildlife Program uses Vermont Conservation Design as the scientific basis for land use planning recommendations. Vermont Conservation Design was developed to support stewardship and conservation, particularly land use planning and is available on the Vermont Agency of Natural Resource’s BioFinder website.

The tool identifies features at the



landscape and natural community scales that are necessary for maintaining an ecologically functional landscape—a landscape that conserves current biological diversity and allows species to move and shift in response to land-use patterns and climate change.

BALANCING WILDLIFE WITH RENEWABLE ENERGY

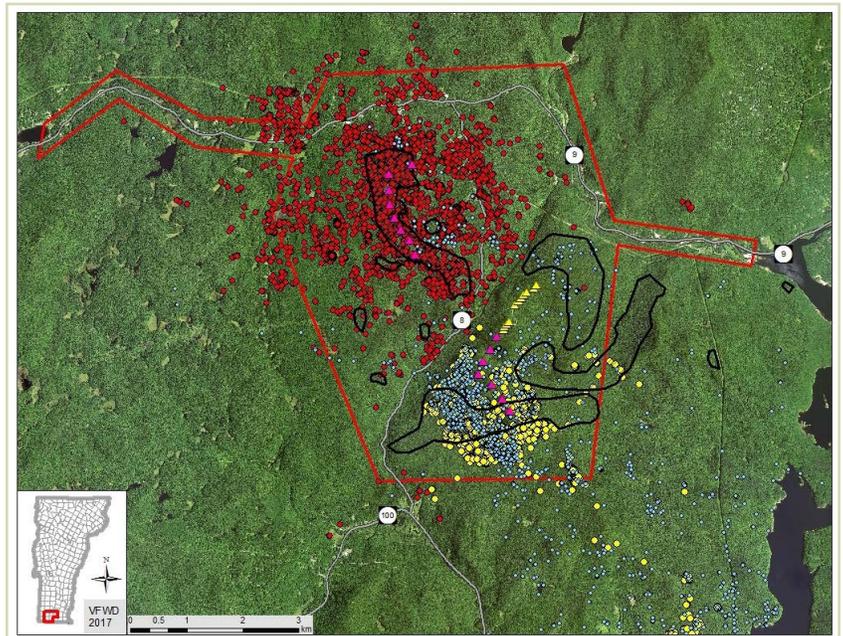


Performance measure: Maintain the functionality of high-value habitat in areas targeted for renewable energy development.

Wind and solar are essential components of Vermont's carbon-free future. However, energy development must be balanced with needs of wildlife, particularly irreplaceable habitat, natural communities and travel corridors.

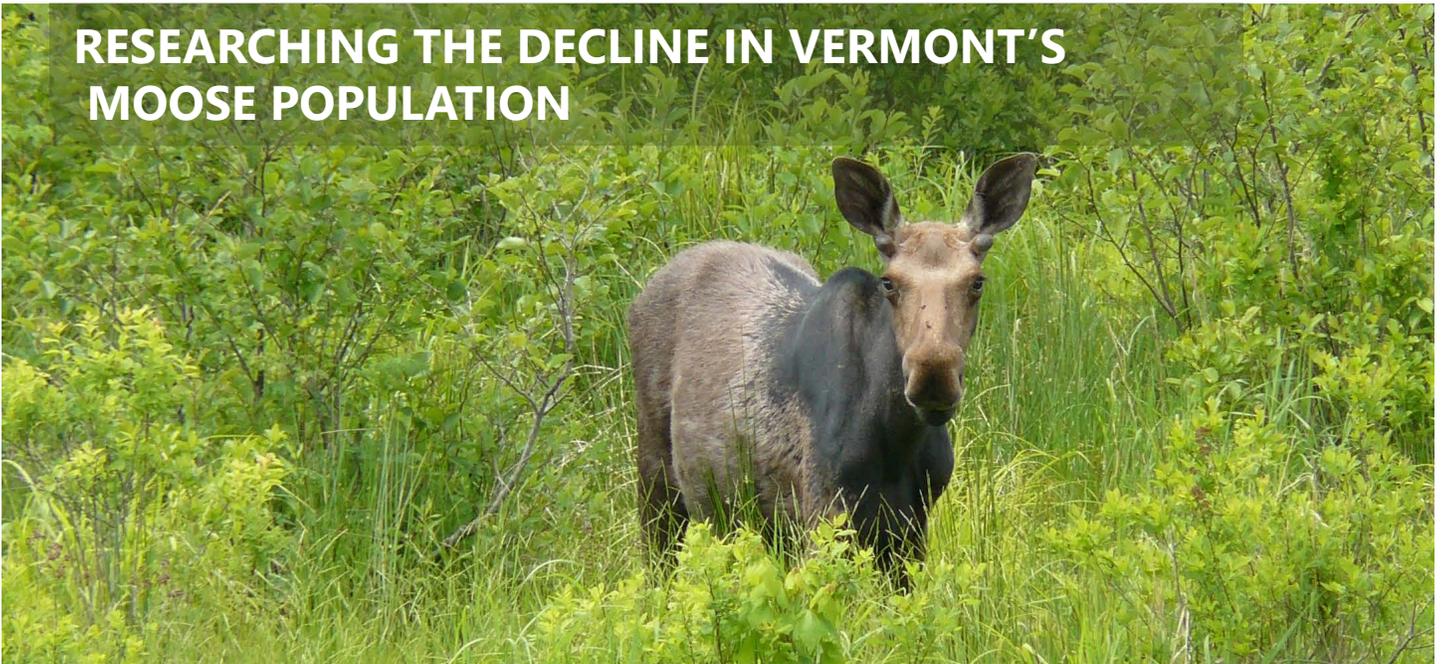
Since 2011, the department has been researching the effects of a large wind energy project on black bears in southern Vermont. This is the first industrial-sized wind project on United States Forest Service (USFS) lands and the only research project investigating the potential effects of wind energy on black bears.

The primary objective is to determine how bears respond to disturbances associated with the construction and operation of the turbines. The research area includes extensive concentrations of American beech trees that are used seasonally by bears as a critical source of high caloric food. To date, 46 bears have been captured and fitted with satellite GPS collars to track their movements and habitat use. Additional data from uncollared bears is being collected with 40 wildlife trail cameras. Field work should be completed in 2021.



Locations of three study bears during 2015 near the future Deerfield Wind Energy Project (pink triangles). The red circles and yellow circles represent the locations of two different female bears and the blue circles are the locations of a male bear. The black polygons are mapped stands of bear scarred beech concentrations. The red polygon is the virtual fence – collars within the fence collect one location every 20 minutes. Construction of the wind facility did not begin until the fall of 2016.

RESEARCHING THE DECLINE IN VERMONT'S MOOSE POPULATION



Performance measure: Monitor and minimize the impact of disease on wildlife populations.

Shorter winters and abundant moose are increasing winter tick densities in the heart of Vermont's moose range.

The department recently completed a three-year study in the Essex County area to understand the impacts of winter ticks on Vermont moose. Beginning in 2017, 60 eight-month-old moose calves and 36 adult cows were captured and outfitted with radio/GPS collars.

Overall, winter ticks killed almost half of all the moose calves. Collared cows fared much better (87% winter survival), but they produced fewer calves than would be expected. This was likely due to poor body condition because of winter tick infestations. Additionally, lungworm, another parasite, was found in 70% of the dead calves. While usually not fatal, lungworms can increase the risk of death from blood loss due to winter ticks.

Results of the study clearly indicated that ticks remain at high enough levels to limit moose population growth. As a result, the department reinstated a limited hunt in 2020 designed to reduce the moose density in Essex County to, in turn, reduce winter tick density and allow moose to persist.

The majority (65%) of Vermonters support a smaller moose population, through hunting, to prevent fewer moose dying from ticks.



Winter tick infestation

THE DEPARTMENT'S APPROACH TO FISH & WILDLIFE DISEASES



Performance measure: Maintain or restore fish and wildlife populations at healthy and sustainable levels.

The department actively works to identify and monitor fish and wildlife diseases to ensure sustainable and diverse wildlife populations in the future.

One of the earliest discoveries about COVID-19 was its ability to be transmitted between humans and wild and domestic animals. In response, department biologists have been working with experts from across the country to assist with the latest research and to determine what measures are needed to safeguard the safety of both humans and native wildlife. Department staff coordinated with the state's sole bat rehabilitator to submit samples to Tufts University for research on SARS-CoV-2 and enacted immediate restrictions on wildlife research and handling protocols.

COVID-19 is just one of a long list of fish and wildlife diseases that staff are currently monitoring. Others include: Chronic Wasting Disease (deer and moose), avian influenza variants (particularly waterfowl), White-Nose Syndrome (bats), Whirling Disease (trout), rabies and canine distemper virus (particularly furbearers), Viral Hemorrhagic Septicemia (all fish species), and the emerging threat of Rabbit Hemorrhagic Disease Virus 2, another new, highly contagious and often fatal virus that is spreading rapidly in multiple species of domestic and wild rabbits and hares in the Western United States.

The department's multi-disciplinary approach to disease includes:

- Two Fish Health Biologists stationed at the Fish Health Lab at the Vermont Agriculture and Environmental Laboratory in Randolph.

- Three wildlife disease response teams (mammals, birds and reptiles and amphibians) operating under the guidance of disease surveillance plans.
- A contract with a wildlife veterinarian to provide technical guidance and hands-on assistance.
- Membership, training and communications with the Northeast Wildlife Disease Cooperative and Northeast Fish Health Committee, as well as state, regional and federal agencies.

Vermont's Fish Health Program

Vermont's Fish Health program helps protect wild fish populations and fish reared at fish culture stations by preventing and managing serious fish diseases. Its fish health laboratory is equipped to diagnose many parasitic, bacterial and viral fish pathogens. The program:

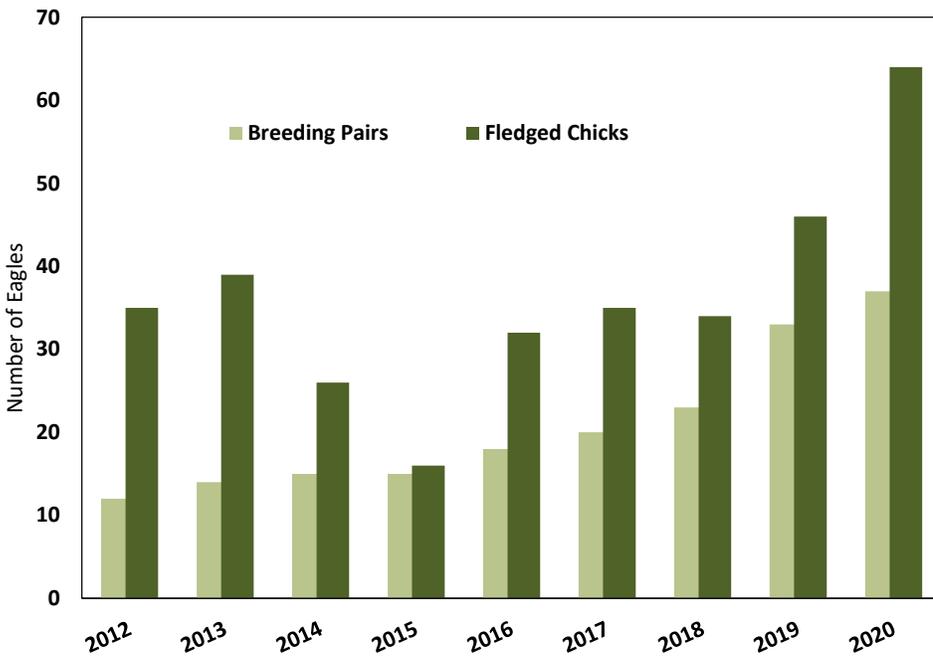
- Conducts annual fish health inspections on all state owned and private fish culture stations and investigates specific diseases when they occur on facilities.
- Develops statutes and regulations designed for preventing and managing serious fish diseases.
- Administers Vermont's fish importation, baitfish dealer and fish propagation permit programs.
- Investigates fish kills and study fish disease agents in the natural environment.
- Provides technical assistance in fish health related matters to fisheries staff and the public.



THREATENED AND ENDANGERED SPECIES

Performance measure: Maintain or restore fish and wildlife populations at healthy and sustainable levels.

Vermont Bald Eagle Recovery Area Monitoring Results for Breeding Pairs and Fledged Eagles



In 2020, 37 nesting pairs of bald eagles successfully fledged 64 chicks. Vermont’s delisting criteria regarding number of nesting pairs (14 pairs over a 5-year average) has been met for the past five consecutive years and the criteria for fledglings (28) has been met since 2019. As a result, the state’s Endangered Species Committee is recommending they be removed from the state’s Threatened and Endangered Species list. This is a remarkable achievement; the first successful nest in more than 60 years occurred in Vermont only twelve years ago in 2008.

Two other once endangered bird species had successful nesting seasons:

- 48 nesting pairs of peregrine falcons fledged 77 chicks
- 96 nesting common loon pairs successfully fledged 75 chicks

The department works strategically to keep common species common and prevent vulnerable species from becoming threatened and endangered.

The Wildlife Action Plan is a 10-year framework designed to assess the health of Vermont’s fish and wildlife species, identify the problems they face, and outline the actions needed for long-term conservation. Some species such as moose, spruce grouse, and marten may be at risk due to climate change. Many species, from the Jefferson salamander to the Northern goshawk, are at-risk due to habitat loss and fragmentation from development.

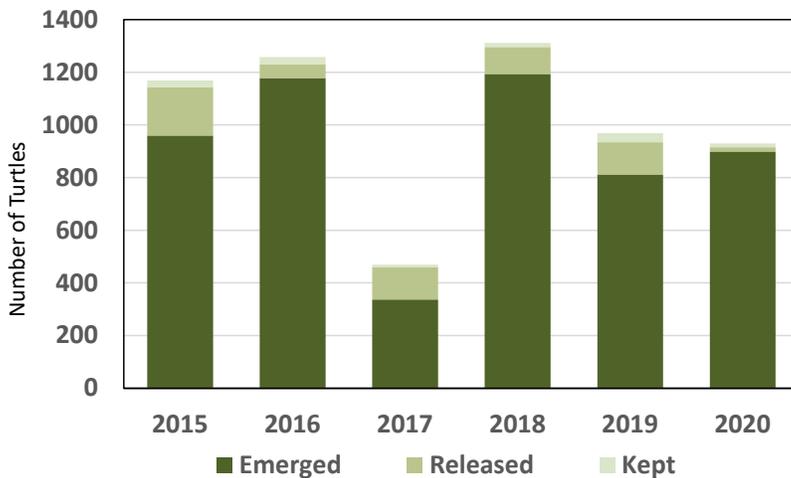


THREATENED AND ENDANGERED SPECIES



Performance measure: Monitor and minimize the impact of disease on wildlife populations.

Spiny Softshell Turtle Nesting Success



Spiny softshell turtles are a state-threatened species. In Vermont, they are only found in Lake Champlain, and nesting-related problems are a primary reason why they are imperiled. Threats to nesting include habitat loss due to development and competing vegetation, depredation by raccoons, foxes, and skunks, and periodic flooding of nesting sites due to high lake levels.

The department is working to minimize these threats by:

- Covering known nesting sites with wire mesh after females have laid their eggs to prevent predation.
- Employing USDA APHIS Wildlife Services to reduce nest predator abundance at the most sensitive nesting beaches.
- Removing any live eggs/young from hatched nests, then incubating them and raising the hatchlings in captivity for release back into Lake Champlain the following spring.
- Increasing public awareness and outreach by partnering with the ECHO Leahy Center for Lake Champlain and conducting annual volunteer turtle beach cleanups.

Conserving Vermont's diversity of species involves protecting important habitats and reducing other threats that impact survival.

The Northeastern bulrush (*Scirpus ancistrochaetus*) was first described in scientific literature in 1962. It was known from only two sites and both were in Vermont. At the time, its habitat was best described as a Connecticut River backwaters and, for several years, this is where the department searched for the federally endangered species.

Then, in 1993, two populations were found in beaver flowages well away from the river. Two more populations were found in 1994. Since then, more focused inventories have found many new populations, mostly in beaver influenced wetlands in Windham County.

Fifty populations have also been found in Pennsylvania, bringing the total known populations to 120, including one recently discovered in Quebec. As a result, the U. S. Fish & Wildlife Service recently proposed removing the Northeast bulrush from the federal endangered species list.

WILDLIFE MANAGEMENT AREAS



The department manages 100 Wildlife Management Areas (WMAs) and many Streambank Management Areas (SMAs) totaling 130,000 acres.

These properties showcase quality habitat management for all wildlife species and ensure public access for hunting, fishing, trapping and wildlife watching. While WMAs and SMAs are open to all, their acquisition and maintenance is primarily funded through sporting license sales and federal funds derived from excise taxes on hunting equipment with additional assistance from Habitat Stamp donations.

Highlights from FY2020 include:

- 2,653 acres of direct habitat management including grassland mowing, controlled burns and invasive plant control.
- 189 acres of timber harvested where young forest habitat was needed.
- 125 trees planted for habitat restoration.
- 536 waterfowl nesting structures and boxes were installed and maintained.
- 22 dams and dikes were maintained to actively manage 800 acres of wetland.
- 12 bridges and culverts were repaired or replaced.
- Infrastructure maintenance, vital for public access, included work on 890 linear feet of fence, 39 miles of roads, 63 kiosks, 8 miles of boundary lines, 36 parking areas (including 5 new parking areas on 2 new WMAs), and 13 gates.

100 WMAs in 100 Years

2020 marked the 100th anniversary of WMA conservation and ownership in Vermont. This milestone was celebrated by hosting a series of winter wildlife walks (prior to COVID), an art contest and features in the department's popular annual calendar. Socially distanced, commemorative ceremonies were also held at Sandbar, Dead Creek and Town Farm WMAs. The latter was certainly the most poignant. In fiscal year 2021, the 526-acre Town Farm property became the department's 100th WMA, the purchase of which involved critical partnerships with the Vermont Land Trust, the town of Shrewsbury and local landowners.



Celebration of Town Farm WMA, the department's 100th WMA.

LAKE CHAMPLAIN WETLAND CONSERVATION AND RESTORATION INITIATIVE



The department has a long, successful history of conserving, managing and restoring wetland habitat.

The department has a long, successful history of conserving, managing, and restoring wetland habitat. Sandbar Wildlife Management Area (WMA), established as a refuge for migratory waterfowl in Milton in 1920, was the first state-owned WMA in the eastern United States. One hundred years later, the department has conserved almost 30,000 acres of essential wetlands and is the largest owner of wetlands in the state.

In keeping with this tradition, a wetland conservation and restoration initiative was created in 2019 to accelerate conservation and restoration in the Lake Champlain drainage basin. This initiative is funded by

the EPA (\$1.75 million for three years) with support from the Department of Environmental Conservation (DEC) and Lake Champlain Basin Program and is focusing on improving water quality and fish and wildlife habitat in Champlain and its tributaries.

In FY2020, the department secured three acquisitions with these funds at critical locations in the Lake Champlain Basin to enhance water quality through wetland restoration and add onto our marquis WMAs, such as Dead Creek WMA in Addison County. These three acquisitions total just over 360 acres and include roughly 60 percent restorable acres. Roughly twenty other projects are in various stages of development.





Performance measure: Maintain or restore fish and wildlife populations at healthy and sustainable levels.

The department works to conserve a diversity of aquatic species.

This includes well known fish like lake trout, salmon, muskie and sturgeon as well as lesser known species such as channel darters and dwarf wedgemussels.

Lake sturgeon populations had declined precipitously in Lake Champlain by the mid-1900s due to dams, pollution and commercial fishing and sea lamprey likely pushed them over the edge.

In 2016, the department released a new lake sturgeon recovery plan and stepped up its efforts to restore this state endangered fish to Lake Champlain and its tributaries. The plan was initiated with the knowledge that full recovery could take generations since it takes 25 years for the ancient, long-lived fish to even mature.

In 2020, department biologists monitored the movements of 19 tagged fish in the Winooski River during the spawning season using hydroacoustic receivers. In the next few years, this work will be expanded to the Missisquoi River and Otter Creek to help better understand the population. Biologists also continued public outreach efforts to inform anglers that sturgeon cannot be legally targeted by anglers and to report any incidental catch. Two were reported in 2020 although there were informal reports of a few others.

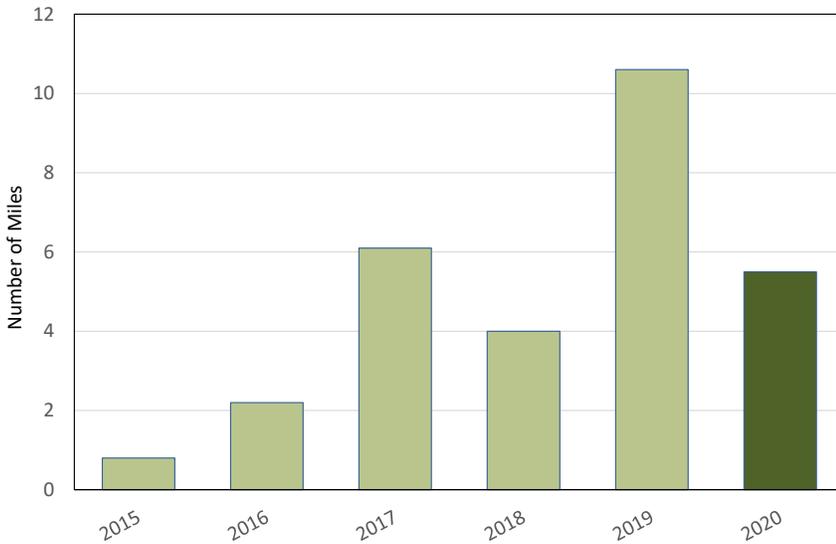


TROUT HABITAT MANAGEMENT



Performance measure: The number of stream-miles restored.

Miles of Wild Trout Stream Restored in the Northeast Kingdom



Fisheries biologists work with Trout Unlimited and other partners to improve trout habitat on the East Branch Nulhegan River.

Fisheries biologists, in cooperation with Trout Unlimited, have been strategically adding woody material to streams in the Northeast Kingdom. Brook trout population monitoring reveals that brook trout abundance has more than doubled in treated areas. In FY2020, COVID-related field work restrictions impacted planned treatments.

Department biologists recently completed a decade-long survey of wild brook trout and found that present day populations are comparable to those from more than 50 years ago.

This is a remarkable conclusion for Vermont’s favorite fish given that populations of wild brook trout have declined significantly across much of the species’ historic range in the eastern United States.

While most measures were similar, significantly higher densities of young brook trout were found. This may reflect the improved environmental protections put in place since the 1950s, particularly legislation and programs focusing on water quality and aquatic habitat protection.

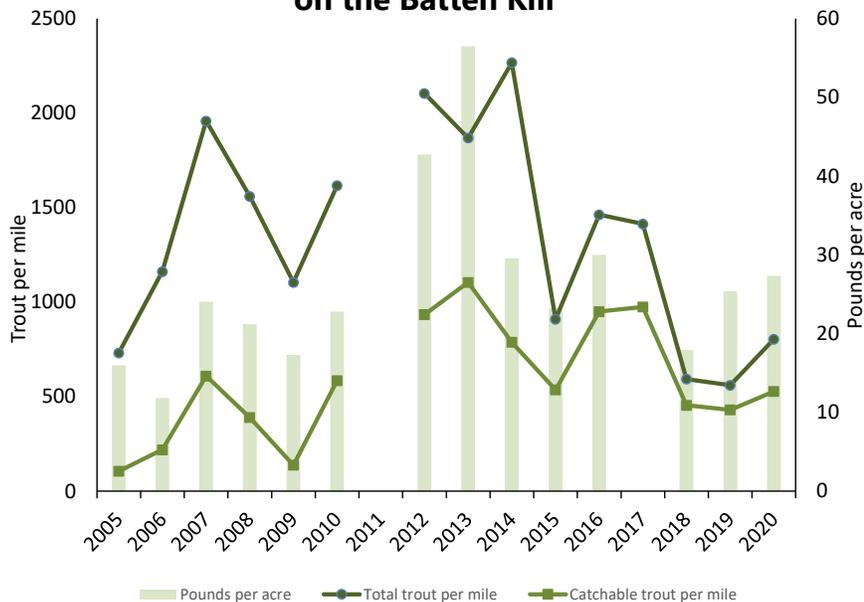
The survey included sampling of 138 streams within 17 watersheds between 2005 and 2016, each of which were originally sampled between 1952 and 1960 by former biologist James MacMartin.

WILD TROUT FISHERIES RESTORATION



Performance measure: The number of catchable trout per mile.

Trout Numbers at the Twin Rivers Project Site on the Batten Kill



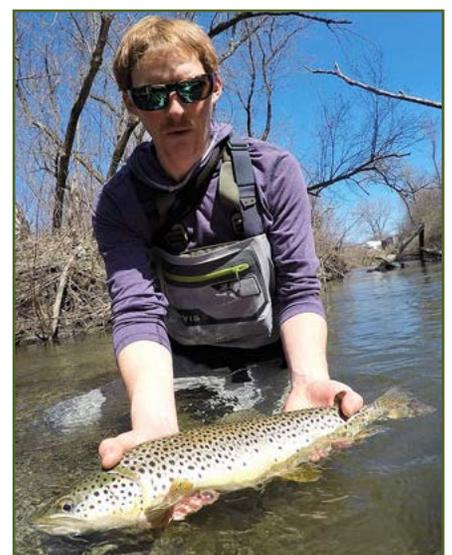
The department is working to provide quality trout fishing opportunities by restoring and maintaining self-sustaining wild trout fisheries.

Vermont’s finest wild trout rivers include the Batten Kill and the Dog River, and the department is working to improve a number of other streams too, including in the Northeast Kingdom.

The “Twin Rivers” project site on the Batten Kill in Arlington was the location of the river’s first instream habitat restoration project in 2006. Trout populations substantially increased in the years following the work but may be locally declining as these structures deteriorate over time.

Trout numbers in the famed Batten Kill declined sharply in the 1990s due to a lack of instream habitat and cover. Projects designed to restore this habitat have shown trout populations respond positively when habitat becomes available, improving angler satisfaction as a result.

Biologists are now working with landowners to restore and protect native vegetation along riverbanks. These trees and shrubs will help keep the water cool, stabilize riverbanks, improve water quality, and provide the next round of necessary instream habitat for trout as they naturally age and fall into the river.



PROTECTING AND RESTORING STREAMBANK HABITAT



Performance measure: The number of miles and acres of streambank habitat enhanced or restored.

The department works with state and federal agencies and non-profits to protect and restore habitat for fish and other aquatic creatures.

Trout depend on cold, clean, complex and connected rivers and streams with unconstrained flow. These conditions occur naturally when: trees grow along the banks are left after they fall in; stream channels are given room to meander and flood their banks; bridges and culverts are appropriately sized; and dams are removed. To put it another way, it is cheaper and more effective to protect and restore habitat than it is to create it. Healthy aquatic habitat is also essential to water quality and flood resilience. In FY2020, among many accomplishments, staff:

- Monitored improvements in aquatic organism passage by assessing 234 bridges and culverts that have been repaired or replaced since 2011.
- Worked with 11 aquatic connectivity working groups that removed 3 dams in 2020 and are working on designs for 7 more dams and 12 culverts.
- Reduced invasive knotweed on agency lands along the Little and White Rivers.
- Compiled and analyzed stream temperature data. Unfortunately, in 2019, the most recent year for which data are available, stream temperatures continued to increase in July, August and September.

- Coordinated the department's emergency drought monitoring to better understand the extent and impacts of the 2020 drought.
- Co-taught Rivers and Roads trainings with DEC. These courses provide technical assistance to state and municipal staff and consultants who design and maintain road infrastructure. Unfortunately, spring trainings were canceled due to COVID.
- Restored 35 acres of floodplain and wetland habitat along the White River in Bethel.
- Worked with partners to conduct the experimental restoration of forested riparian areas in fields dominated by invasive reed canary grass on the Missisquoi National Wildlife Refuge, Hinesburg Town Forest and department lands.
- Provided \$62,061 in funding and more than 100 hours of non-regulatory technical assistance towards the removal of 3 deadbeat dams and designs for the removal of 6 more.
- Provided \$40,231 in funding and more than 100 hours of non-regulatory technical assistance towards upgrading 5 stream crossing structures, restoring access to over 12.5 miles of stream for brook trout and other aquatic species.
- Provided \$77,905 in Watershed Grants to 17 watershed organizations, conservation districts and regional planning commissions.



TROUT PRODUCTION SHORTFALLS FOLLOWING HURRICANE IRENE

BEFORE IRENE

AFTER IRENE

Performance measure: Meet the management request for cultured fish (+/- 10%) to support recreation and restoration goals.



ROXBURY FCS FOLLOWING TROPICAL STORM IRENE

Roxbury Fish Culture Station completion returns to pre-Irene production capacity.

The department's oldest hatchery is also its newest. The recent completion of the Roxbury Fish Culture Station reconstruction will provide welcome relief to the department's other facilities, such as Bennington Fish Culture Station, that have been working beyond capacity to meet statewide fishing stocking goals since Tropical Storm Irene.



ROXBURY FCS REBUILT AND OPERATIONAL

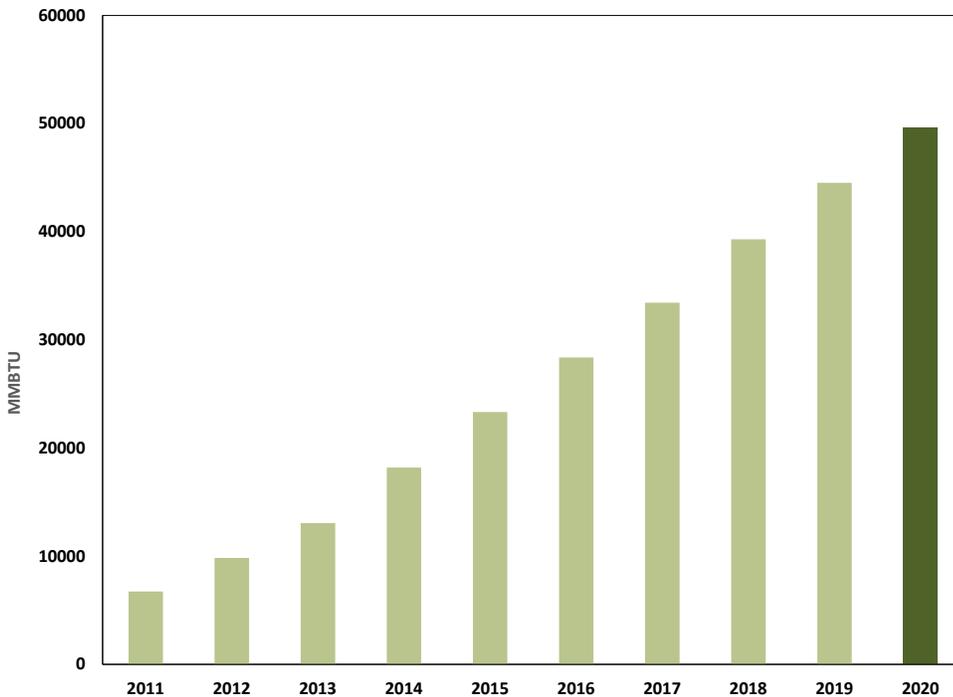
The rebuilt facility will produce roughly 60,000 brook and rainbow trout, and Roxbury's first yearling stocking will occur in spring of 2022. The outside grounds are open to the public for visitation.

ENERGY EFFICIENCY UPDATES AT FISH HATCHERIES



Performance measure: Increase management effectiveness and efficiency.

**Cumulative Energy Savings (MMBTU) Over Time
Vermont Fish Hatchery Energy Efficiency Projects**



The department is a conscientious steward of energy resources and constantly works to increase its efficiency and reduce costs.

Switching fish hatchery energy use to solar power saves enough energy every year to power the entire town of Grand Isle for a year. This not only saves money, but also reduces our carbon footprint. In 2020, it is projected to save the department \$120,000.

PUBLIC ACCESS FOR BOATING AND SHORE FISHING



The department's access area program provides the state's 28,000 registered motorboat owners and 120,000 licensed anglers with safe and reliable access to 130 unique bodies of water at 196 locations.

All access areas are free and include:

- 143 with concrete or gravel boat ramps
- 41 sites with at least one courtesy dock
- 30 with non-motorized boat access
- 23 with accessible shore fishing platforms

Access Areas are funded through state and federal sources. Fishing license revenues and motorboat registration fees are used to leverage federal derived from excise taxes on fishing tackle and the federal marine fuel tax. Despite not paying into the system, non-motorized watercraft and non-anglers are welcome to use the sites, provided they follow access area rules.

Over the past decade, the department has completed 152 infrastructure improvement projects, including 5 ramp upgrades and 40 dock upgrades replacements. These improvements were made possible by combination of capital appropriations, state motorboat registration fees and Federal Aid in Sport Fish Restoration.

Fishing access areas were vital recreation outlets in 2020 and likely never used more. General maintenance of the sites is usually conducted by Department of Corrections work crews. COVID-19 restrictions, however, prevented their use. In response, department staff from across the state adopted their local access areas, ensuring the sites remained clean, safe and welcoming to users all season long.

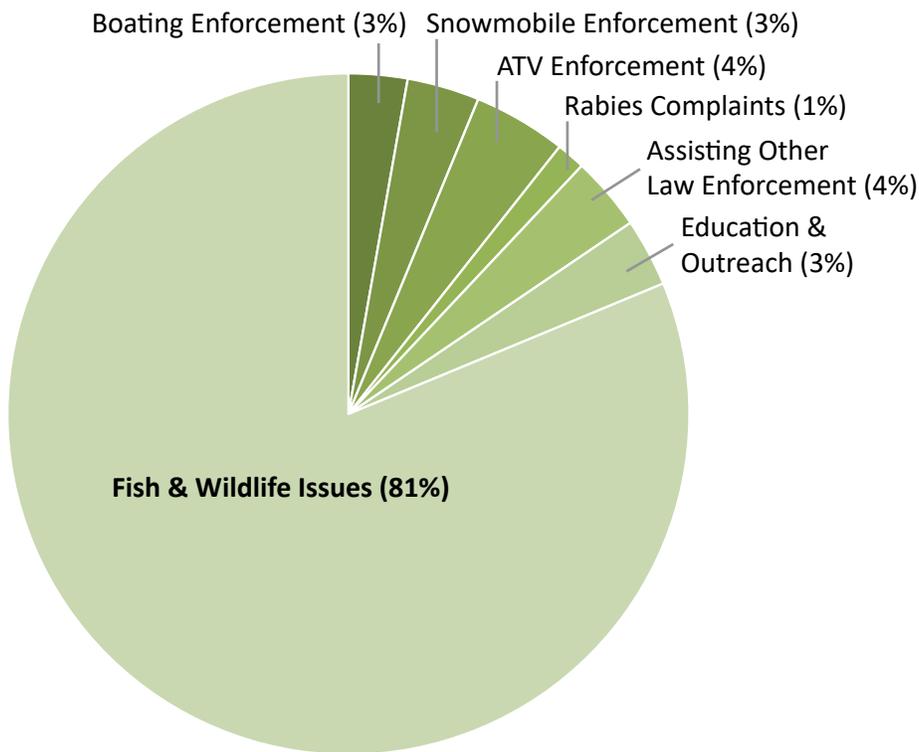


WARDENS SERVE THE PUBLIC



Performance measure: Decrease human-wildlife conflicts while increasing safety for outdoor recreationists.

Warden Activities Benefiting the Public



COVID-19-related patrols accounted for a significant percentage of warden time in the latter half of the FY2020. With the extraordinarily high numbers of people fishing, hunting, boating or just spending time outside, and many other agencies occupied with direct response to the crisis, wardens spent the majority of their time in the field serving the public. Wardens also conducted major search and rescue operations and state park patrols, assisted with general law enforcement, and provided social distancing reminders where large groups of people gathered.

Wardens apply their broad range of skills and expertise to provide a wide variety of services that Vermonters increasingly rely on.

In 2020, the Law Enforcement Division changed its name to the Division of Warden Service to better reflect its broad mission. Conservation law enforcement is, and will remain, the service's highest priority. However, it's not their only mandate. Wardens also respond to rabid animal calls and human-wildlife conflicts, enforce boating, ATV and snowmobiling laws, participate in outreach and education programs, conduct search and rescue operations, and offer mutual assistance to other agencies. Mutual assistance calls have almost doubled in the last decade due to strained law enforcement budgets around the state.

COMMUNITY-BASED LAW ENFORCEMENT



Performance measure: Increase positive interactions with the public to improve law enforcement capabilities.

Effective law enforcement is the result of building trust and credibility within the community through positive interactions and strong individual relationships.

Wardens are the original community police, each with a home office and publicly listed phone.

Ensuring Game Meat is Not Wasted

Wardens have lists of people in their districts who are in need of deer, bear and moose meat. And while wardens regularly obtain road-killed game, only a handful of the people who want the meat can actually accept a carcass. They don't have the time or place to process the animal, the carcass is recovered too late at night or the weather is too hot to prevent the meat from spoiling.

To address these challenges, wardens work with local butchers who donate their time and wrapping materials to ensure these animals are not wasted. The wardens drop the carcasses off at the processors, deliver the meat to a local food shelf and then dispose of the left-over carcasses. In districts where processing is unavailable, some wardens are even processing the meat themselves. In 2020, 3,500 pounds of meat were distributed. This is equivalent to 14,000 individual meals.

Lending a Hand With Make-A-Wish

The Division of Warden Service delivered a very special surprise to a teenager who thought he was just going to the Apple Island marina to see a friend's bass boat. Instead, two wardens, with sirens blaring, led a convoy of bass boats to the dock he was standing

on and delivered a bass boat that was donated by the Make-A-Wish Vermont program. Of course, no fishing boat is complete without fishing equipment and, once outfitted, the wardens escorted him out on his maiden voyage.

Fish With a Warden

Outreach and education are mission central to the warden service, but COVID prevented participation in standard venues like hunter education courses and Let's Go Fishing events. In response, the "Fish with a Warden" series was developed to safely connect anglers with wardens at popular shore fishing sites across the state. Registration was limited and participants were required to bring their own equipment, wear a mask and practice social distancing. The sessions included an overview of the lake's ecology and fishing regulations, fishing tips and techniques and, of course, fishing. In 2020, 287 participants attended 17 events.



CORONAVIRUS AID, RELIEF AND ECONOMIC SECURITY (CARES)



In a nod to the importance of outdoor recreation to both health and the economy, the \$2 trillion Coronavirus Aid, Relief, and Economic Security (CARES) Act included funding to improve public access to the outdoors. Congress passed the bill in March and all funds had to be spent by the end of the year. This was a stretch for state contracting procedures, but staff rallied to ensure the department didn't lose out on this historic opportunity.

The \$1.6 million in projects included:

- Fishing Access Area enhancements and repairs, included expanding parking lots, addressing needed dock improvements at popular sites and repairing existing infrastructure such as roads and dredging of boat ramps. Most notable: the repair of the road on the Allen Point Access Area in South Hero. This site doubles as the recreational trail that connects to the Colchester Causeway to the islands, and even in a non-pandemic year, sees thousands of users each year.
- Twelve canoe/cartop access points were added or enhanced on the Barton, Black, Clyde, Lamoille, Willoughby Rivers and on Lake Memphremagog.
- Wildlife Management Area enhancements and repairs including road and trail maintenance, new parking areas and gate installations and improved signage and kiosks. Projects were conducted statewide, but the largest were concentrated on some of the most popular WMAs such as Dead Creek, Otter Creek, Bill Sladyk and West Mountain.
- Interpretation services to create multiple language signage at department access sites and facilities, particularly in the Chittenden County area.
- A mobile app to assist the public with finding opportunities for socially distanced outdoor recreation. The app provides public health notifications, maps of department owned lands and access areas, and the ability to purchase a hunting, fishing, or trapping license among other things.

