Fish and Wildlife Board Meeting Minutes
Wednesday, October 16, 2024

The Vermont Fish and Wildlife Board held an in-person meeting at 5:00 pm on Wednesday, October 16, 2024, at the National Life Dewey Conference Room, 1 National Life Drive, Montpelier, VT 05620. A recording of the meeting is available on the department's YouTube channel.

Agenda

1. Approval of Previous Meeting Minutes (May 15, 2024)
2. Public Comments (Limited to 2-minutes per speaker)
3. Petition Regarding the Impact of Rodenticides on Fishers (10 minutes for petition presentation)
4. Petition on Fall Archery Turkey Season (10 minutes for petition presentation)
5. Discussion on Licensed Leashed Dog Tracking (10 minutes for discussion)
6. Black Bear Presentation
7. Commissioner's Update

Board Members Present: Brian Bailey, Michael Bancroft, Nicholas Burnham, Beth Deimling, Brad Ferland (Chair), Allison Frazier, Neal Hogan, Paul Noel, Robert Patterson, Martin Van Buren

Virtual: David Deen, Linda Hook, Jay Sweeny

Department Staff Present: Commissioner Christopher Herrick, General Counsel Hannah Smith, Wildlife Division Director John Austin, Black Bear Project Leader Jaclyn Comeau, Game Warden Colonel Justin Stedman, Wildlife Management Program Manager David Sausville, Game Warden Major Sean Fowler, Principal Assistant Abigail Connolly

Virtual: Biometrician and Research Manager Katherina Gieder, Furbearer Project Leader Brehan Furfey, Wildlife Technician Mary Beth Adler, Upland Game Bird Biologist Toni Mikula, Wildlife Biologist Chris Bernier

Members of the Public Present: Barbara Felitti, Gaela Chutter-Ames, Chris Bradley, Rod Coronado, Mike Covey, Sarah Gorsline, Brenna Galdenzi, Nancy Fitzpatrick, Jean Semprebon, Marcia Drake, Will Marlier, Bob Galvin

Virtual: Weldon Bosworth, Jack, Jane Fitzwilliam, Lisa Jablow, Matt Anderson, Walter Medwid, Christine Cano, Elinor Osborn, Jeremiah Gracie, Brian

The meeting was called to order at 5:00 pm

Approval of Previous Meeting Minutes

Board Member Patterson moved to approve the May 15, 2024 meeting minutes. Board Member Noel seconded the motion. The Board voted to approve the minutes (13-0).

Public Comment Period

Barbara Felitti, regarding the petition on the impact of rodenticides on fishers
Chris Bradley, Northfield, thanking the Board for their work
Rod Coronado, Orange, regarding black bear sows with cubs
Mike Covey, Williamstown, regarding the petition on the impact of rodenticides on fishers
Sarah Gorsline, Grand Isle, regarding the petition on the impact of rodenticides on fishers
Brenna Galdenzi, regarding the petition on the impact of rodenticides on fishers
Will Marlier, regarding the petition on the impact of rodenticides on fishers
Bob Galvin, Bolton, regarding black bear sows with cubs, wildlife crossings and connectivity, and the commercial fishing petition
Lisa Jablow, regarding the petition on the impact of rodenticides on fishers
Jane Fitzwilliam, regarding the petition on the impact of rodenticides on fishers

The recording of the public comments and the meeting can be viewed here.

Petition Regarding the Impact of Rodenticides on Fishers

Jennifer Lovett and Weldon Bosworth presented the petition. The petition and presentation documents are included below. The Board Members asked the presenters questions about if the they had worked with the Agency of Agriculture, Department of Health, or the Legislature, whether stores like Tractor Supply carry these types of rodenticides, if this issue is affecting other wildlife, how it was determined that it is affecting fisher fertility, and what Catch per Unit Effort (CPUE) means for fisher populations and what the data means. Commissioner Herrick and John Austin said the Department would come back with a recommendation to the Board at the next Board meeting. Board Member Deen asked that the Department of Agriculture be brought into the conversation. The Board Members asked the presenters questions about the data referenced in the petition and what the non-lethal methods suggested are for gathering data.

Petition on Fall Archery Turkey Season

Mark Green presented the petition, which is included below. Commissioner Herrick said that the Department will come back to the Board with a recommendation. Board Member Frazier asked about the timing of the turkey hunting rule.

Discussion on Licensed Leashed Dog Tracking

Board Member Noel reviewed a public comment that was received regarding licensed leashed dog tracking, which is included below. Commissioner Herrick suggested that the Department come back with a recommendation. The Board and the Department discussed that law enforcement agrees it should allow for tracking outside of the season, that a leashed dog tracker has to notify a warden, that leashed dog trackers are volunteers, and the definition of big game in the leashed tracking dog rule.

Black Bear Presentation

John Austin introduced Black Bear Project Leader Jaclyn Comeau. Jaclyn Comeau presented on the black bear population in Vermont and the four components of the black bear program: habitat conservation and management, research projects, population monitoring and management, and human bear conflict work. The presentation is included below. The Board Members asked questions about beach bark disease and studies on tree stands, who is involved in the Deerfield Wind Black Bear Study, population estimates and how they change, the objective range of the population, what foods are available to bears in wetlands, the health of black bears and weights, how often black bears reproduce, if teeth are studied of bears killed outside of the hunting season (being hit by cars, etc.), the distribution of bears in Vermont, whether a longer bear season has been considered, whether management by WMU has been considered, education around birdfeeders, and the effect of ski resorts on black bears.

Commissioner's Update

Commissioner Herrick welcomed the new Board Members Beth Deimling and Linda Hook. Commissioner Herrick reported on the regional landscape conservation conference in Montreal over the summer, the work done with the Agency of Transportation on wildlife passageways, the work of the wardens, and the recent work of the Department.

Motion To Adjourn:

The Board voted to adjourn the meeting at 7:40 pm.

The Impact of Anticoagulant Rodenticides on Fishers (*Pekania pennanti*)

Introduction

Anticoagulant rodenticide (AR) poisoning of non-target wildlife is a significant conservation concern. Studies conducted across the country as well as in Canada have demonstrated that fishers, among other predators, are highly impacted by ARs and that these toxins pose a threat to predator populations (2, 7, 8, 12, 13). As the scale of the environmental consequences of rodenticides becomes more recognized, states are beginning to restrict the use of these toxins to protect wildlife.

The Fisher

The fisher (*Pekania pennanti*) is a carnivorous forest-dwelling mammal native to North America. It is a member of the Mustelid (weasel) family and is closely related to the American marten, an endangered species in Vermont (5). Fishers, themselves, are endangered in parts of the western US. They are protected to varying degrees in Washington, Oregon, and California.

Fishers live in coniferous and mixed hardwood forests. They prefer old-growth boreal forests where downed trees and underbrush provide locations for dens and concentrations of prey. Dense woods with overhead cover protect them in winter from deep snow that hinders their mobility. Fishers are territorial, wary of humans, and generally solitary except during the spring mating season. Although top predators, they are dietary generalists and will eat whatever food is available to them including, small- to medium-sized mammals, birds, fruits, nuts, berries, reptiles, and amphibians. Fishers are one of the few animals that prey on porcupines. Despite their name, they rarely eat fish (5, 15).

Unfortunately, fisher populations appear to be declining in New England and the reasons are likely complex and the result of habitat loss and fragmentation, trapping, and the use of rodenticides. Trapping of fisher can negatively impact both fisher and protected American marten populations because these species overlap in habitat, food sources, and behavior. Because fishers are elusive,

solitary, prefer dense forested habitat, and nest hidden in the cavities of large trees, it is challenging to effectively measure their populations.

Fishers have few predators besides humans who have trapped them for their fur since the 18th century, almost driving them to extinction. They were common in Vermont prior to the middle of the 20th century when numbers sharply declined due to long trapping seasons and loss of habitat from excessive logging and farming (15). The porcupine population flourished in the fisher's absence and, because of its appetite for bark, existing forests and efforts to reforest were threatened. Consequently, trapping season on fishers was closed in 1929, and from 1958 through 1967 fishers were reintroduced into Vermont from Maine. The fisher population gradually recovered with more successful efforts at reforestation and increased habitat. By 1974, reintroduction was considered a success. Historically, fishers have been characterized as vicious and savage predators with no positive attributes other than their prized pelt. Only recently have they garnered the appreciation they deserve as a keystone and indicator species (13). Because fishers, as well as martens, are extremely sensitive to human-caused environmental disturbances, they should be considered indicators of ecosystem function in the forests they inhabit. Therefore, declining populations should be seen as a cause for alarm.

Anticoagulant Rodenticides

Anticoagulant rodenticides (ARs) are commonly used to kill rodents in urban, rural, agricultural, industrial, and suburban locations. These toxins work by preventing blood from clotting and causing fatal internal hemorrhaging.

ARs are classified as either first generation (FGARs) or second generation (SGARs) compounds based on the specific toxins involved (2, 7, 12, 13, 14). FGARs, developed before 1970, are less potent than SGARs and require frequent bait feedings by rodents to build up to the lethal dose. SGARs, introduced in the 1970s to address resistance to FGARs by target animals, possess greater toxicity and a longer half-life. Consequently, the toxins remain in the tissues of affected animals longer. Although a single dose of SGAR will prove fatal, all ARs can take from four to nine days to kill the target animal. During this time the target rodent may continue to ingest poisoned bait and will become increasingly more toxic to any

predator that may consume them. Poisoned rodents tend to act intoxicated as they gradually deteriorate, become lethargic, and spend more time than normal out in the open, exposed to potential predators (2, 12, 13).

SGARs poison wildlife in two ways: 1) primary poisoning when a targeted animal eats the bait and dies several days later, or 2) secondary poisoning when a predator or scavenger eats prey that has eaten poisoned bait. Anticoagulants bioaccumulate, or build up over time, in animals that consume large quantities of rodents that have ingested these poisons. Secondary poisoning has been documented in birds of prey like eagles, hawks, and owls, as well as mammals like foxes, fishers, bobcats, and coyotes (4, 9).

In addition to direct mortality, sublethal exposure to SGARs can be equally devastating to wildlife (3, 4, 8, 13). These lesser exposures result in compromised immune and circulatory systems and abnormal clotting mechanisms. Thus, what might otherwise be a minor wound can result in a fatality in an animal made much more vulnerable to hemorrhaging. Life threatening tick infestations were found to be higher in fishers with sublethal levels of AR toxicity (7). Neonatal transfer of toxins between nursing mothers with sublethal exposures and kits has also been documented, as have miscarriages and still births. This collection of disturbing data serves to emphasize SGARs devastation and their potential to decimate fisher populations.

The Impact of ARs on Fisher populations

The effects of ARs on fishers was first studied in California to document presumed threats to isolated populations. A correlation was found between high amounts of ARs being used, particularly by marijuana farms, and fisher population decline (7, 8). Like most subsequent studies, almost 100% of the fishers tested were exposed to SGAR compounds. The conclusion was that ARs pose a threat to fishers through direct mortality, fitness compromise, and a risk to viable populations.

Research conducted in Alberta, Canada, in 2016 suggested that the impact of SGARs on fisher populations is underestimated and that the incidents of sub-lethal exposures might be greater due to the fisher's aggressive lifestyle (13). Additional research found that the chemical analysis methods used by various

studies were inconsistent and could underestimate the prevalence of SGARs in wildlife (11).

Recently, two ambitious studies, published in 2023 and 2024, focused on the prevalence of AR exposure in fishers in the northeastern United States (2, 12). The research teams included biologists from the Vermont Fish and Wildlife Department. Their results were consistent with those of the earlier California studies and indicated that, "ARs could pose a threat to wild mesocarnivore species in this region." A common method that states Fish & Wildlife Departments use to monitor population trends on certain species is known as "CPUE/Catch Per Unit Effort." According to Vermont Fish & Wildlife's CPUE data in their 2023 furbearer newsletter, the fisher population is in decline.

The Fisher carcasses sampled in this study were obtained from trappers from geographically diverse areas across Vermont (2, 12). Shockingly, 98- 100% of the fishers tested positive for at least one of eleven AR compounds. The results of these studies demonstrate that fishers "are highly exposed to a wide spectrum of ARs across Vermont." The authors stated, "… the near universal exposure of the fishers sampled suggest that AR exposure is widespread and represents and underestimated health risk to wild fishers. (2)"

In 2017, a study of fisher diets showed that, as generalists, fishers consume a variety of species: scavenged deer, rabbits, porcupines, squirrels, other fishers, other predators like raccoon, skunk, and red fox, as well as birds, bats, and reptiles (10). Notably missing from the list of consumed species were those most often targeted by Ars - rats and house mice. This indicates that fishers are exposed to ARs second hand by consuming poisoned non-target animals who may have eaten bait or eaten a poisoned rodent.

Researchers at SUNY Environmental Science and Forestry are currently investigating the relationship between the number of AR compounds found in fisher livers to the decline in local populations (3). Fishers killed by trappers from five northeastern states (PA, NY, VT, NH, and ME) were tested for the presence of AR compounds in their livers. Vermont had the highest incidents of AR exposures with 100% of the fishers testing positive. Preliminary findings indicate that there is a strong correlation between the number of AR compounds found in fishers and the likelihood that local populations have declined. Population estimates back to

1990 were used to calculate catch per unit effort (CPUE) (1). The researchers found that "the higher the exposure level, the greater the probability of a declining catch...It potentially indicates that rodenticide exposure is an important driver of population decline."

AR Regulations

Commercial rodenticide is usually dispensed in ready-to-use or refillable bait stations/containers. The use of ARs is regulated by the Environmental Protection Agency. In 2008, the EPA declared SGARs to be an "unreasonable risk" to children, pets, and wildlife (14). Consumer retailers are prohibited from selling SGARs, meaning most people no longer buy them for use at home. Current use of SGARs is limited to licensed pest controllers, as well as certain agricultural users. Except under regulated conditions, it is illegal for anyone to place any poisons outdoors (including rodenticides). When used outdoors they must be placed within a specific distance of a building/structure.

The regulations associated with ARs are primarily aimed at protecting children and domestic pets from accessing the poisons. But, because they are most often placed outside buildings, they do not protect wildlife from exposure to bait or to poisoned prey. And, despite the EPA regulations, SGARs are still available online to anyone. Unlawful use is a serious problem (2, 9).

In addition to the Federal restrictions, several states have recently enacted legislation to restrict or ban SGARs. California was the first state to restrict the sale and use of SGARS in 2020. Recently, both Massachusetts and Connecticut introduced legislation to ban or restrict SGARs. New Hampshire introduced legislation similar to the California law and Maine is participating in a regional study to evaluate the threats/impact to predators including fishers (9).

Mitigation/Protection Strategies

Due to the reclusive and solitary nature of fishers, it is challenging to accurately assess their population numbers, but fisher population decline is a concern that is shared by most researchers. The data suggest rodenticides may play a large role in this decline. Loss of forested habitat and nesting/denning sites, and trapping, are also major drivers of fisher decline in the northeast (3, 6).

A great deal more research needs to be done to understand the impact of ARs on fisher populations (11). Population size needs to be accurately determined to assess what proportion of a population is being sampled. Exposure paths, the ways that fishers come in contact with ARs, need further study. How are fishers exposed to ARs when their diet does not include the target species or when they are not in proximity to bait stations? What are the effects of sub-lethal exposure on reproduction? All these questions remain unanswered and reinforce the need for more comprehensive population level studies.

Conclusion

Fishers, as well as numerous other predators impacted by ARs, play enormously important roles in Vermont's ecosystems. Considerable evidence has established that they are endangered by SGARs and that this threat is on the population level. According to Audubon Vermont, there are more than 175 rat poison products available on the open market, which do not pose the same level of risk to rodent-predators (9). In addition, many basic non-lethal preventative measures can reduce rodent infestations. Finally, and ironically, healthy populations of raptors and other wildlife will reduce and control levels of problematic rodent populations. As other New England states take steps to restrict and/or ban the use of these poisons, it is important that Vermont joins this effort.

Given the many threats to fisher survival, a moratorium/ban on fisher trapping would add needed protections for this vulnerable species. Impacts from climate change, habitat loss, and AR poisoning are virtually impossible to control. Consequently, it would be prudent to eliminate the one threat to fisher populations that can be controlled, recreational trapping.

Jennifer Lovett, MS
Starksboro, VT

Sources:

1. Allen, M.L., Roberts, N. M., Bauder, J.M. 2020. Relationships of catch-per-unit-effort metrics with abundance vary depending on sampling method and population trajectory. PLOS ONE 15 (5): e0233444. https://doi.org/10.1371/journal.pone.0233444

2. Buckley, J. Y., Cottrell, W., Needle, D., Royar, K., Tate, P., and Whittier, W. (2023). High Prevalence of Anticoagulant Rodenticide Exposure in New England Fishers (*Pekania pennanti*). https://doi.org/10.21203/rs.3.rs-2512469/v.1

3. Eaton, Joe. (2023**)** Eastern Fishers Exposed to ARs. RATS Tales January 2023. https://raptorsarethesolution.org/press/rats-tales-archives/rats-tales-full-articles/eastern-fishers-exposed-to-ars/

4. Eaton, Joe. (2023) New England/Mid-Atlantic Foxes, Fishers, and Otters Exposed to ARs. RATS Tales March 2023. https://raptorsarethesolution.org/press/rats-tales-archives/rats-tales-full-articles/new-england-mid-atlantic-foxes-fishers-and-otters-exposed-to-ars/

5. Elbroch, M., Rinehart, K. 2011. Behavior of North American Mammals. Houghton Mifflin Harcourt, pp. 163-169.

6. Fogarty, R.D., Weir, R.D., Lofroth, E.C., Larsen, K.W. 2022. Trapping mortality accelerates the decline of the fisher, an endangered mesocarnivore, in British Columbia, Canada. Endangered Species Research (49): 1-12 https://doi.org/10.3354/esr01200

7. Gabriel, M.W., Woods, L.W., Poppenga, R., Sweitzer, R. A., Thompson, C., Matthews, S. M., Higley, J. M., Keller, S.M., Purcell, K, Barrett, R.H., Wengart, G. M., Sacks, B.N., Clifford, D., L. 2012. Anticoagulant Rodenticides on our Public and Community Lands: Spatial Distribution of Exposure and Poisoning of a Rare Forest Carnivore. PLOS ONE 7 (7): e40163 https://doi.org/10.1371/journal.pone.0040163

8. Gabriel, M.W., Woods, L.W., Wengert, G.M., Stephenson, N., Higley, J.M., Thompson, C., Matthews, S. M., Sweitzer, R.A., Purcell, K., Barrett, R. H., Keller, S. M., Gaffney, P., Jones, M., Poppenga, R., Foley, J.E., Brown, R. N., Clifford, D. L.,

Sacks, B. N. (2015). Patterns of Natural and Human-caused Mortality Factors of a Rare Forest Carnivore, the Fisher (Pekania pennanti) in California. PLOS ONE 10 (11). DOI: 10.1371/journal.pone.0140640

9. Lee, D. 2023. Are We Burning Down Our House to Kill a Rat? Why the Use of Second-Generation Anti-Coagulant Rodenticides is a Bad Idea for Birds and People. Audubon Vermont. https://vtaudubon.org/news/are-we-burning-down-our-house-kill-rat-why-use-second-generation-anti-coagulant-rodenticides.

10. McNeil, D.J. Jr., Nicks, C., Wester, J. C., Larkin, J. L., Lovallo, M.J., (2017). Diets of Fishers (Pekania pennanti) and Evidence of Intraspecific Consumption Pennsylvania. The American Midland Naturalist 177:200-210

11. Quinn, N. (2019). Assessing individual and population-level effects of anticoagulant rodenticides on wildlife. Human-Wildlife Interactions 13 (2): 200-211.

12. Silveira, G., Frair, J.L., Murphy, L., Ellis, J.C., Needle, D., Cunningham, S.A., Watson, A., Facka, A., Tate, P., Webb, S., Royar, K., Bernier, C., Keller, T., Schuler, K. (2024). Drivers of anticoagulant rodenticide exposure in fishers (*Pekania pennanti*) across the northeastern United States. Frontiers in Ecology and Evolution 12:1304659 doi: 10.3389/fevo.2024.1304659

13. Thomas, P.J., Eccles, K.M., Mundy, L.J. (2017). Spatial Modelling of non-target exposure to anticoagulant rodenticides can inform mitigation options in two boreal predators inhabiting areas with intensive oil and gas development. Biological Conservation 212, 111-119

14. United States Environmental Protection Agency (EPA). 2023. Restrictions on Rodenticide Products (Fact sheet) https://www.epa.gov/rodenticides/restrictions-rodenticide-products

15.Vermont Fish and Wildlife Department. 2009. Fisher. Vermont Wildlife Fact Sheet. https://vtfishandwildlife.com/sites/fishandwildlife/files/documents/Learn%20More/Library/FACTSHEETS/FURBEARER%20AND%20TRAPPING/FURBEARER%20FACTSHEETS/FISHER.pdf

Good evening, Commissioner Herrick and members of the FW Board,

Thank you for letting me present my petition requesting a moratorium on recreational trapping of fishers in Vermont. My name is Jennifer Lovett, I live in Starksboro and am a conservation biologist with a master's degree in environmental science. I became alarmed last year by data in several studies across the country that demonstrated the horrific impact of rodenticides on fisher populations. I sent you each a copy of my paper on this topic, which I really hope you read.

Anticoagulant rodenticides, or ARs, are commonly used to kill rodents in urban, rural, agricultural, industrial, and suburban locations. These toxins work by preventing blood from clotting and causing fatal internal hemorrhaging. ARs poison wildlife in two ways---primary poisoning when a targeted animal eats the bait and dies several days later, or secondary poisoning when a predator or scavenger eats prey that has eaten poisoned bait. Secondary poisoning has been documented in birds of prey as well as mammals like foxes, fishers, bobcats, and coyotes. Multiple studies conducted across this country and in Canada have demonstrated that fishers, among other predators, are highly impacted by ARs and that these toxins pose a considerable threat to predator populations.

This past February, a peer-reviewed study, led by researchers from SUNY Syracuse, and including members of the VT FWD, tested fishers across five northeastern states to evaluate land use patterns driving rodenticide exposures. Vermont had the highest rate of exposure in the northeast with 100 % of animals testing positive for AR compounds. In fact, over 90% of the VT fisher carcasses tested had between 2 and six different compounds detected (see study here).

The authors of another study conducted in 2023, which also included two biologists from the Vermont Fish & Wildlife Department, stated that fishers are "highly exposed to a wide spectrum of ARs across Vermont… the near universal exposure of the fishers sampled suggest that AR exposure is widespread and represents an underestimated health risk to wild fishers…. rodenticide exposure is an important driver of population decline." (See study here).

Fisher populations face major threats from habitat loss, AR poisoning, trapping, and effects of climate change. Because we already know fisher populations are declining in VT, and that 100% of fishers tested this year were positive for ARs, it seems expedient to put a moratorium on recreational trapping of this species. You have the power to remove one of the existential threats to Vermont's fisher populations right now, non-essential trapping.

In the middle of the 20th century, Vermont's fisher numbers declined due to long trapping seasons and loss of habitat from logging and farming. To increase their numbers, a

moratorium was placed on trapping fisher in 1929 and from 1958 through 1967 fishers were reintroduced into VT from Maine to manage porcupine overpopulation. So, there is an existing precedent for a ban on trapping.

Extremely sensitive to human-caused environmental disturbances, fishers are considered a Keystone and indicator species. Thus, a healthy fisher population is the sign of a mature and well-balanced forest ecosystem. A declining fisher population is cause for alarm.

Sublethal exposure to ARs is equally devastating to wildlife resulting in compromised immune and circulatory systems and abnormal clotting mechanisms. A minor wound can result in a fatality in an animal made much more vulnerable to hemorrhaging. Tick infestations become life threatening, nursing mothers transfer lethal toxins to their kits, and there are more miscarriages and stillbirths. Rodenticides clearly have the potential to decimate fisher populations.

Subject to Federal regulations, ARs are most often placed outside buildings in ready-to use or refillable bait containers. But these toxins are ubiquitous and do not protect wildlife from exposure to poisoned prey. In fact, they are still available online to anyone and unlawful use is a serious problem.

In summary, fishers, as well as numerous other native predators impacted by ARs, are critically important to Vermont's ecosystems. Clearly, we cannot afford to lose this important species. Rodenticide usage is widespread and uncontrolled. Habitat loss and fragmentation, as well as climate change are also serious ongoing challenges. The one threat to fisher populations that we can control, and remove, is recreational trapping. I am asking you to implement a moratorium on that dangerous and unnecessary activity now.

I am giving the rest of my allotted time to Dr. Weldon Bosworth, an environmental consultant, who will discuss fisher population decline and CPUE.

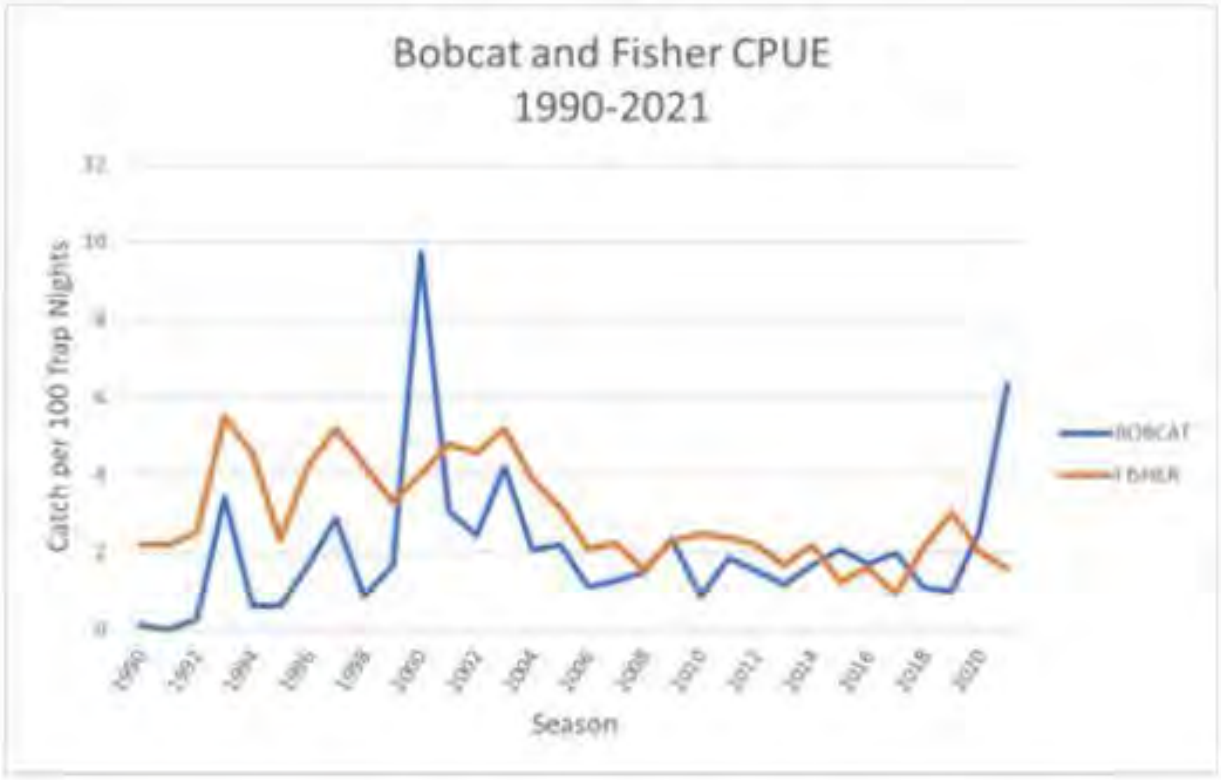
Jennifer Lovett, MS

Starksboro, VT

Weldon Bosworth

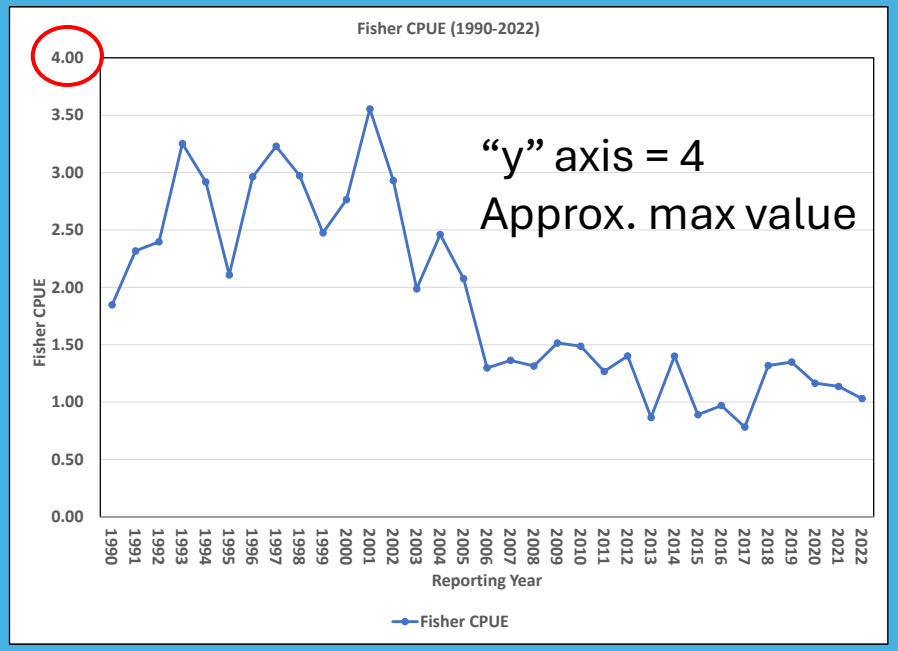
- Ph.D. in Ecological Sciences (Oregon State 1976)
- 45 years as environmental consultant
- CEO of two national environmental consulting firms (>100 employees) and responsible for scientific integrity of reports
- Qualified as expert in several states and British Columbia
- Member and Chair of EPA Scientific Advisory Committee for 10 years (consortium of Rice, LSU and Georgia Tech)
- Veteran - U.S. Army 1964-1968

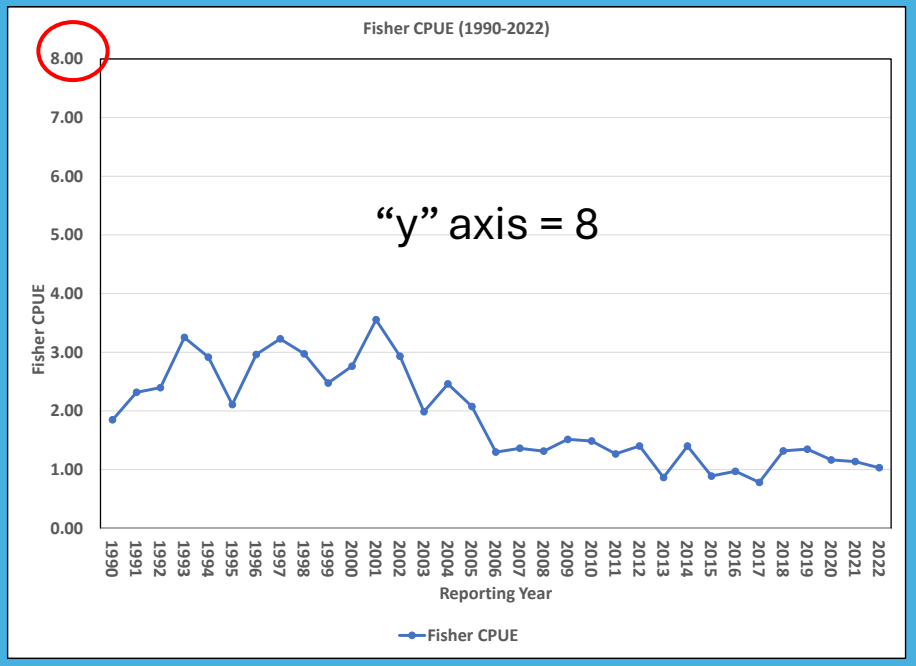
From Furbearer Management Newsletter Autumn 2003



Catch per Unit of Effort 1990 to 2021 of Fisher and Bobcat

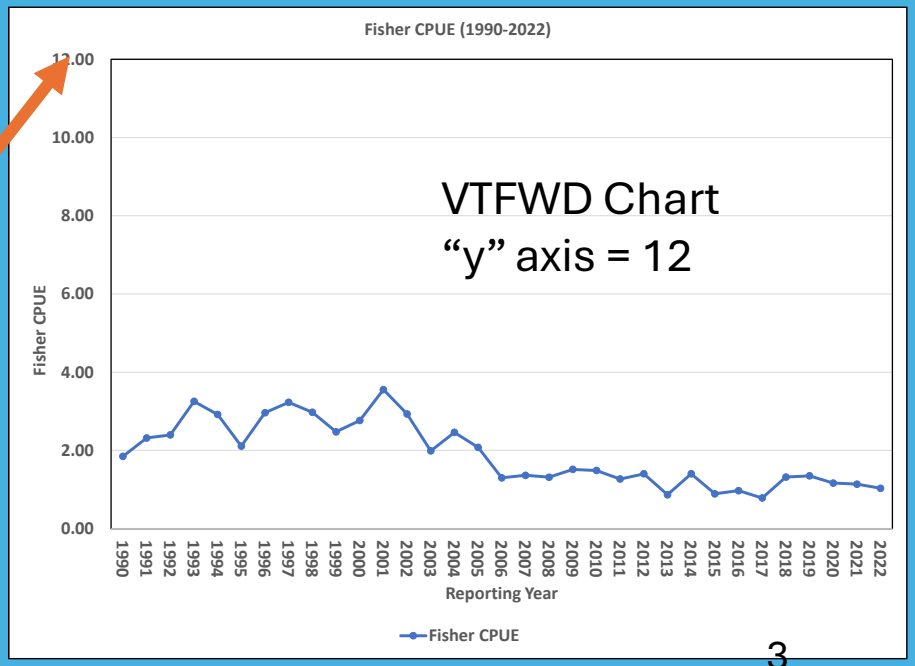
Presentation masks fisher CPUE trend because fisher data are charted on expanded “y” axis to account for Bobcat data

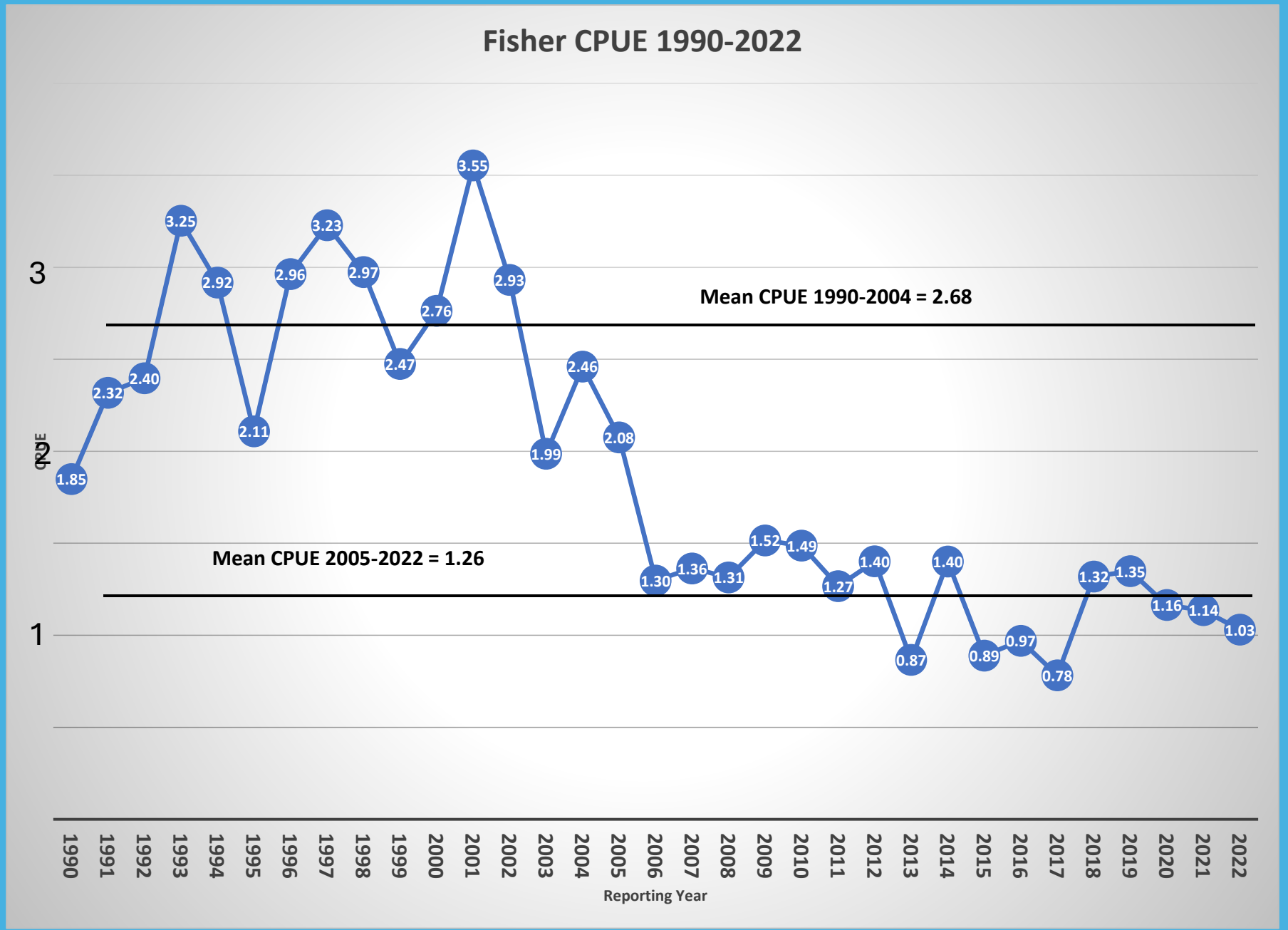




The exact same data has been plotted on each of these charts, only the "y" axis has been changed from a maximum CPUE of 12 as plotted by VTFWD in the Autumn Newsletter and finally to 4.

Using a "y" axis of 12 makes the significant decline in CPUE seem less apparent.




Fisher CPUE 1990-2022
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2
1
CPUE
Mean CPUE 1990-2004 = 2.68
Mean CPUE 2005-2022 = 1.26
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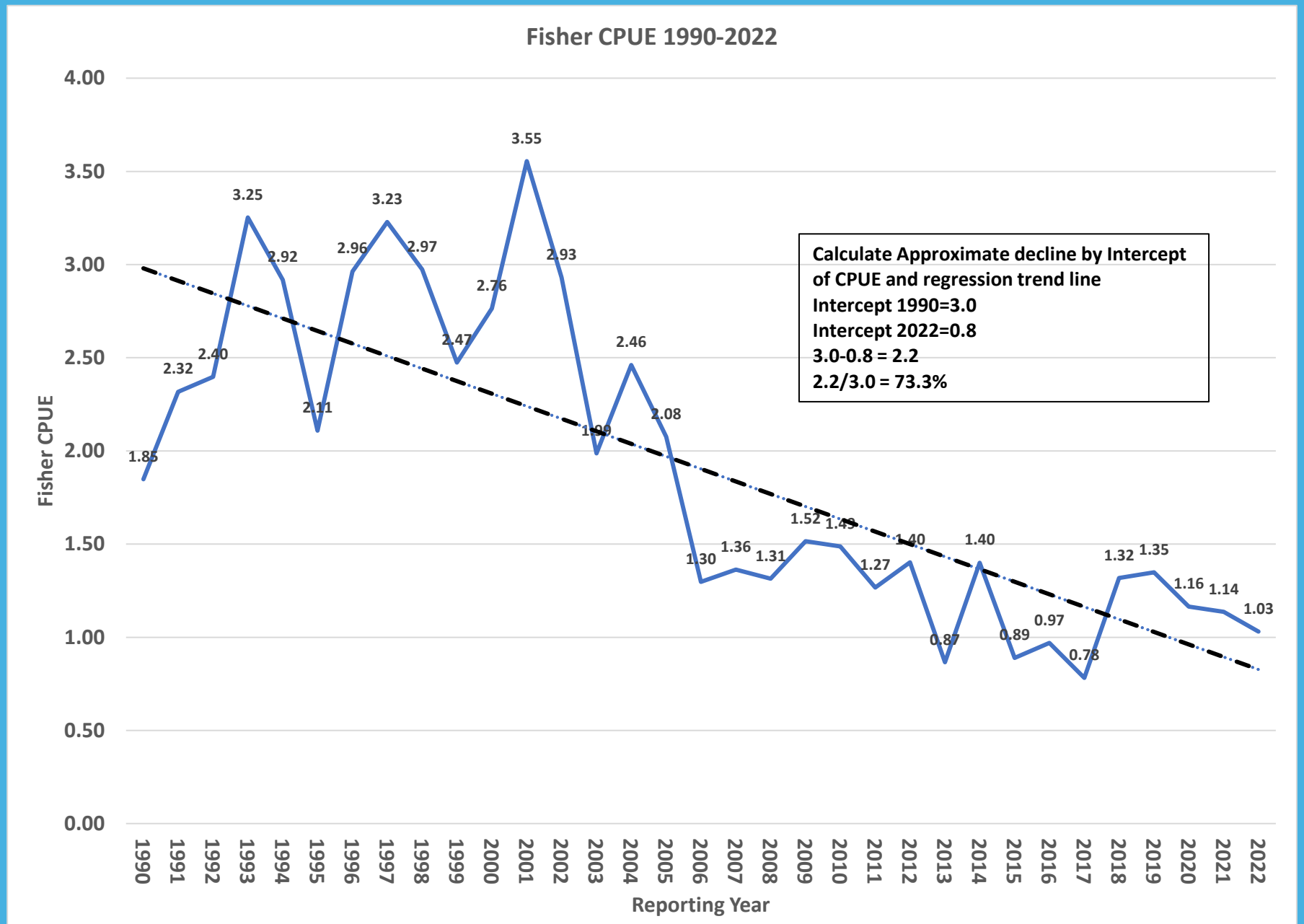
Reporting Year


Fisher CPUE 1990-2022
Fisher CPUE
Reporting Year
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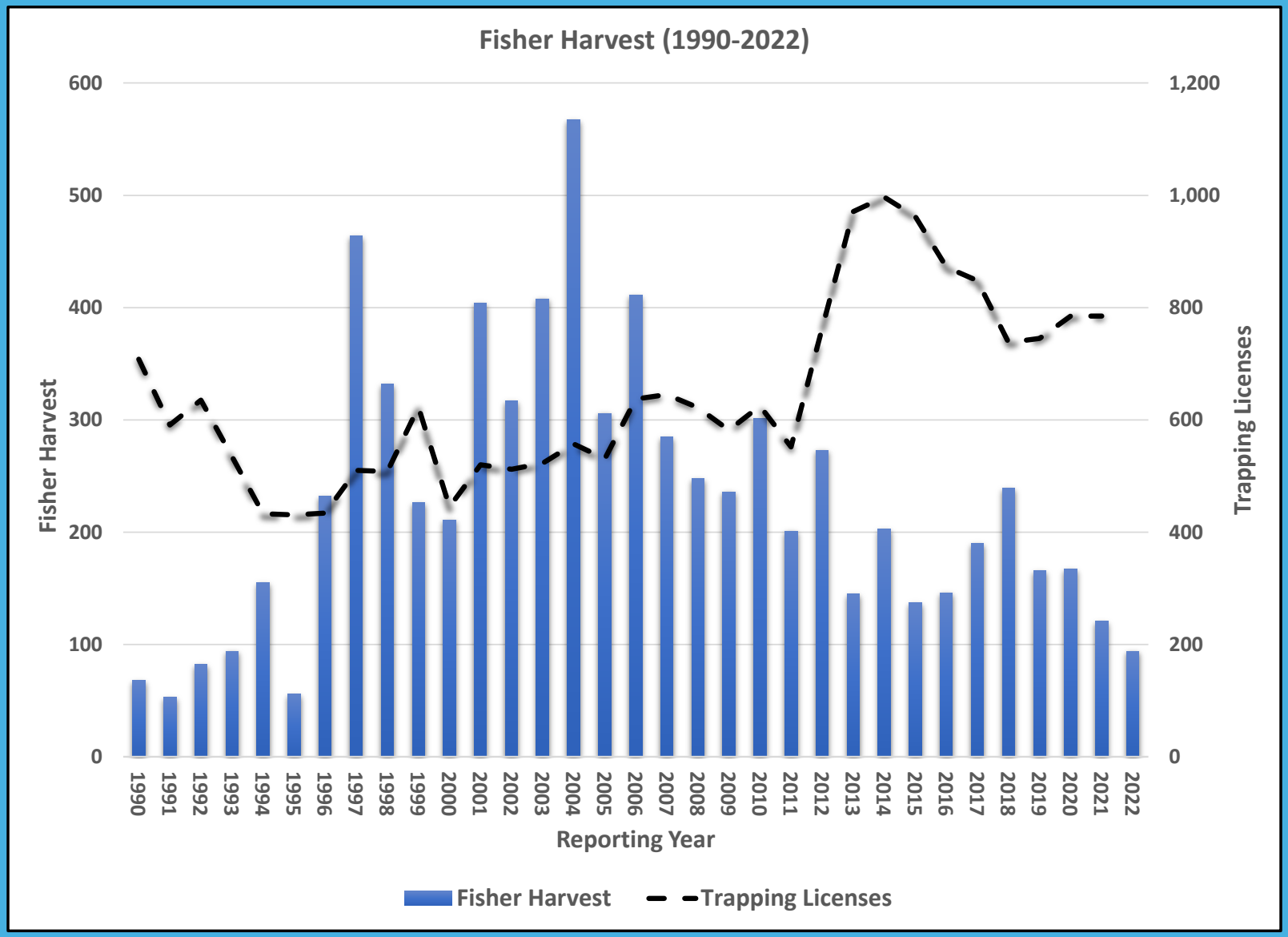
1.85 2.32 2.40 3.25 2.92 2.11 2.96 3.23 2.97 2.47 2.76 3.55 2.93 1.99 2.46 2.08 1.30 1.36 1.31 1.52 1.49 1.27 1.40 0.87 1.40 0.89 0.97 0.78 1.32 1.35 1.16 1.14 1.03
Calculate Approximate decline by Intercept of CPUE and regression trend line
Intercept 1990=3.0
Intercept 2022=0.8
3.0-0.8 = 2.2
2.2/3.0 = 73.3%

Fisher Harvest 1990-2022 and Number of Trapping Licenses (Annual and 5-Year)



Conclusions

- Significant decrease in CPUE and harvest over the last 30+ years
- There are no other objective data that contradict this trend
- Implied changes in population could be related to overharvesting, habitat fragmentation, or disease/other idiosyncratic variables
  - Distemper
  - Effects of AR's

Conclusions

- Only one available management option to address population trend and potential effects of rodenticides = close recreational trapping of fisher
- Decision should be based upon precautionary principal –
- When scientific evidence is incomplete or uncertain, decisions should err on the side of caution and prioritize health of environment

Memorandum

To: Brenna Galdenzi, POW

Date: January 24, 2024

From: Weldon Bosworth, Ph.D,
Mark Mattson, Ph.D

As your request, we have reviewed the data on Vermont's fisher harvest for the years 1990-2022 provided to you by VT DFW. Unfortunately, there were numerous errors in the database which will introduce an unquantified uncertainty in the use of these data to calculate Catch per Unit Effort (CPUE) trends. These errors included[1]:

- The data set has 2967 records, but at least 125 records are clearly incorrect, an obvious error rate of at least 4.2%.
- 34 records have zero traps deployed for zero nights catching zero fisher (are these licenses issued but not trapped, in which case they should be deleted?).
- 87 records have zero traps deployed for zero nights with a catch of fisher at least one or more fisher (reporting error?).
- 4 records have zero traps deployed for more than zero nights, with a catch of 0, 1, 2 or 3 (reporting error?).

We didn't take the time to analyze the number of errors by year, but a disproportionate number of these errors in one year or another would bias any inter-annual trend analysis.

We disagree with Dr, Gieder on her advice for calculating CPUE, i.e. by calculating individual trapper CPUE's and then averaging all of them to get an annual CPUE. Unless the data set has a normal distribution, which has not been demonstrated, this method will lead to inaccurate results. Individual trapper CPUE's are an average of how many fishers were trapped per trap night (or per 100 trap nights) so calculating an annual CPUE for all trappers in the manner she recommends is essentially taking an average of catch per trap night (or 100 trap nights) for each trapper and then averaging over the annual data set is essentially taking an average of averages. Doing so to derive an average for the year, is an example of Simpson's Paradox, which can be summed up as: "an average of averages is not the true average."[2]

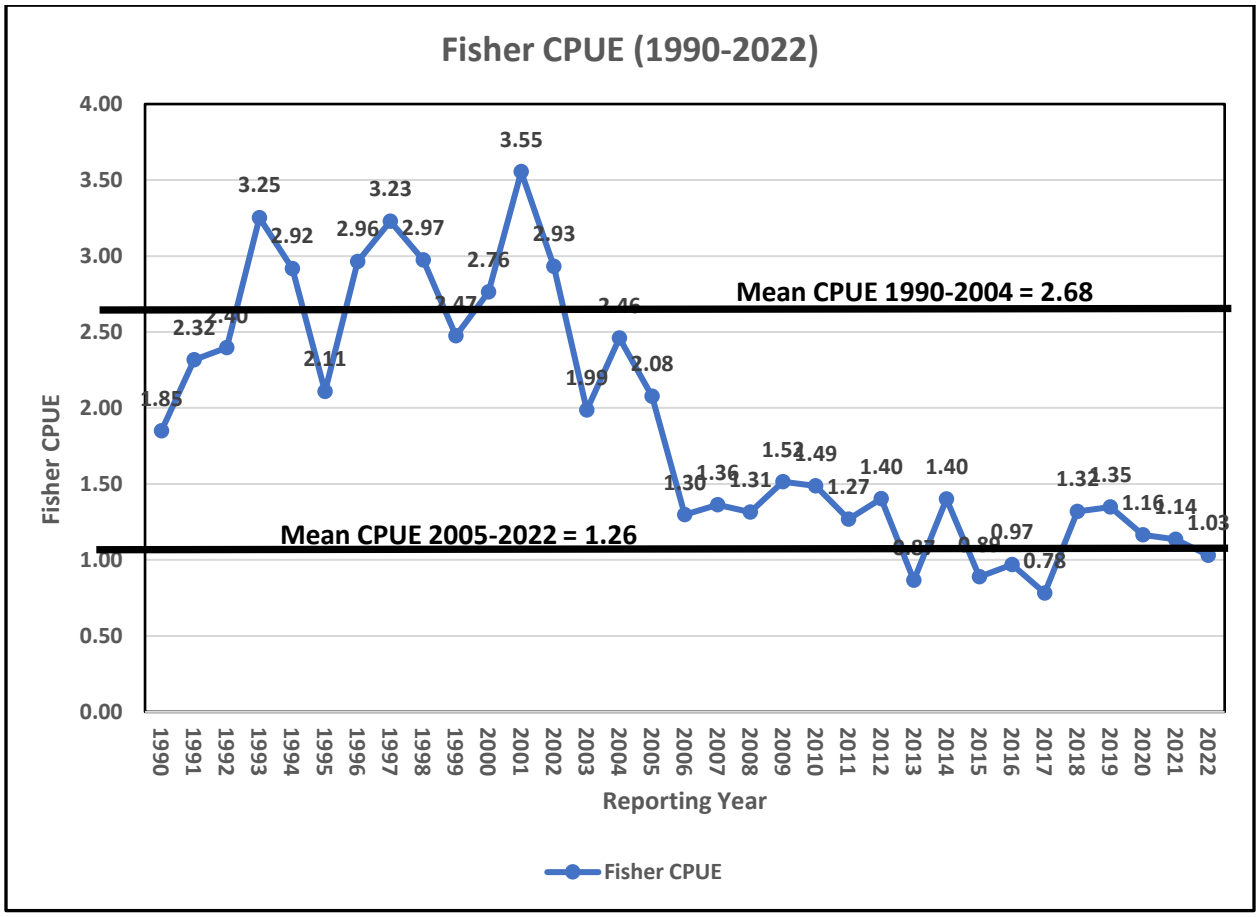
Despite the errors in the data set we went ahead and calculated the annual CPUE using the conventional method, i.e., dividing the sum of the annual harvest by the total trap nights multiplied by 100 to get catch per 100 trap nights, using each year's data assuming that this would provide results somewhat

[1] We did not check to see if any individual valid record showed more fishers caught than the product of traps and trap nights, but this also is a possibility given the number of errors in the database.

[2] Because the cardinality of each trapline is not the same, "averageness" is not distributed equally throughout the data set. In other words, each trapline has a different number of traps; therefore, the denominator in each equation calculating the individual average of the trapline will also be different. Therefore, when calculating the average of averages of each of the individual traplines, the individual averages will be weighted differently in the equation, distorting the true, overall average. From the point of view of statistical accuracy, such variability is not desirable.

similar to what VTFWD presents in their annual report.[3] The result of that analysis is depicted in the following graph. While more elegant statistical analysis could be conducted which would quantify trends, etc., this clearly shows that there has been a significant decline of the CPUE in the last 17 years compared to an assumed 15-year baseline for CPUE between 1990 and 2004. The average CPUE from 1990-2004 was 2.68 while that from 2005-2022 was 1.26, less than half of the earlier period.

We recommend that VTFWD review the database and correct the errors addressed above. Following that further statistical analysis may be worthwhile.'



[3] It is unclear how VTFWD treats all the database errors in their calculation but at this point any estimate of CPUE it publishes based upon this dataset cannot be relied upon.

Hello, My Name is Mark Green and I am a Director with The Vermont Bowhunters Association. We have a petition to present to the Board at the upcoming Board meeting in September. The Purpose of the petition is to see if the board will make adjustments to the start of the fall archery Turkey season to coincide with the start of Fall archery deer season which was changed several years ago by the board to always start on October 1 while fall archery season for turkey season remained the first Saturday in October we would like to see that changed coincide with the start of the Fall Archery Deer Season.We also would like to see the Fall Archery season to extend through till the end of the First Archery deer season which is the day before the Regular deer season. We feel this would have very limited impact on the resource and offer more opportunity for archery hunters as very few turkeys are taken by the means archery equipment.Was just hoping to give you and the board a heads up about this as it has been in the works for a while.I had hoped to send this to the whole board but no longer find a way to do that was hoping you could forward this to other members of the board.

Thank You Very Much!

Vermont Bowhunters Association Director Mark Green

Good afternoon Paul,

My name is Mandi Harbec, I have been a licensed leash dog tracker for 10 years and have some concerns regarding the limitations of our permits. In the past few years with the increase of bears has come an increase of property destruction which results in more nuisance bear tags being issued. I have encountered on more than one occasion where a hunter issued a nuisance tag has shot and wounded the animal and is unable to locate or prove that the animal is still living, in which case the hunter then contacts us hoping we may be able to bring a dog out to help them locate the animal. However the limitations of our permits do not allow us to track any big game animal outside of legal hunting seasons and the 24 hour period immediately following. In these cases we are not able to help locate these animals and many times they may go to waste. We are asking that the fish and game board please consider allowing us to help in these special instances as one of our many goals is to decrease them number of game animals going to waste each year.

My second concern is regarding our inability to charge for our services. Due to hunters not wanting to donate to us we have had to considerably decrease the are in which we will service leaving many hunters with the disadvantage of not being able to get a tracker. We spend a great deal of money out of pocket willingly to provide this service to hunters, however each year we loose time from our full time jobs and money as well as time with our families to help hunters who don't even offer to cover the gas that it cost to get to them. We are asking that the board reconsider the limitations regarding charging for our services to at least allowing us to charge for our gas money so that we are able to continue this amazing service and service a larger area.

I look forward to hearing from you!

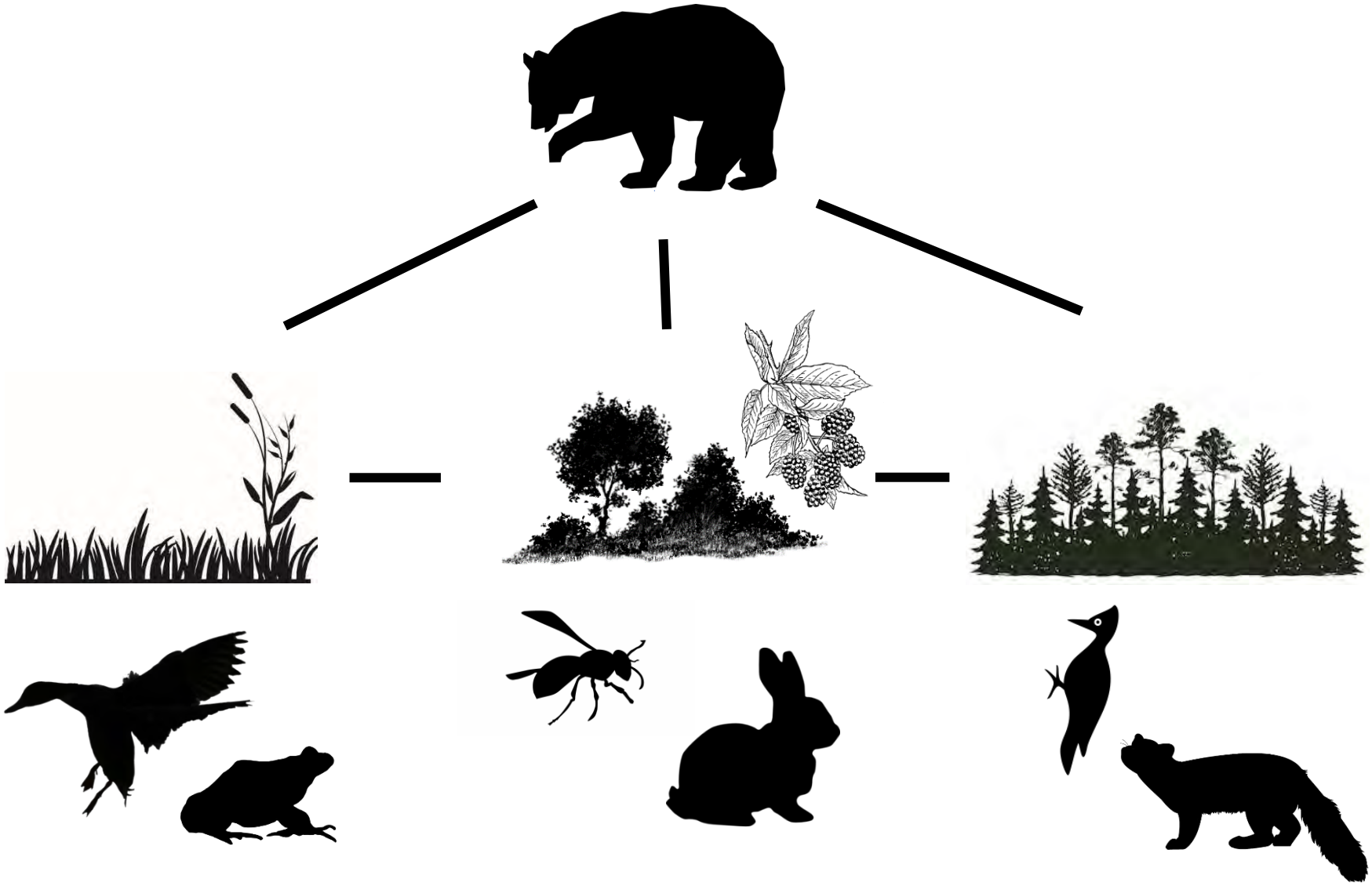
Mandi Harbec

Vermont Fish & Wildlife's Black Bear Program

Vermont Fish & Wildlife Department
Jaclyn Comeau
10/16/24

VERMONT FISH & WILDLIFE

The mission of the Vermont Fish & Wildlife Department is the conservation of our fish, wildlife, plants and their habitats for the people of Vermont



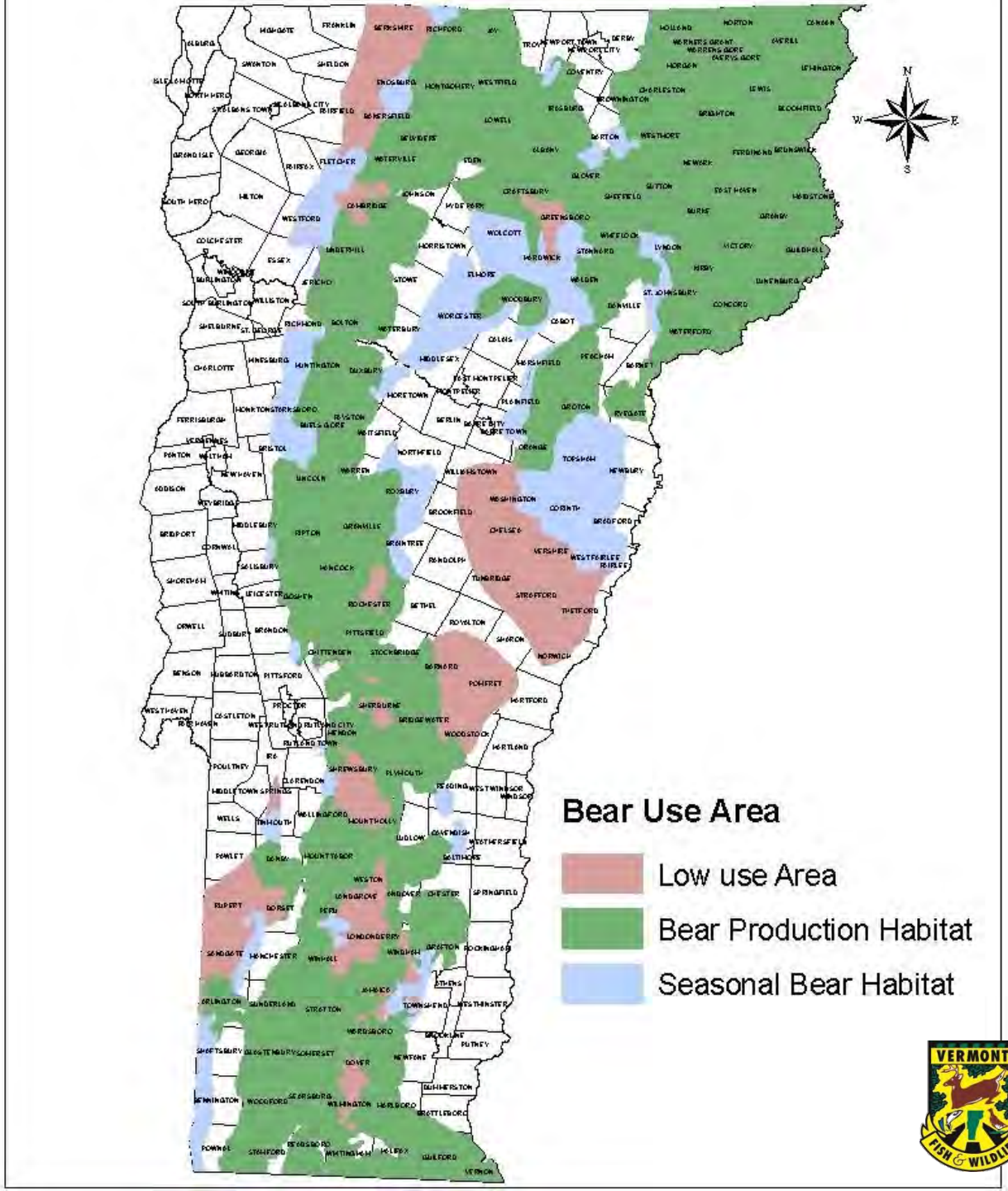
Black Bears are an Umbrella Species

VFWD's Black Bear Project: Habitat Conservation & Management


VERMONT
FISH & WILDLIFE


VERMONT
FISH & WILDLIFE

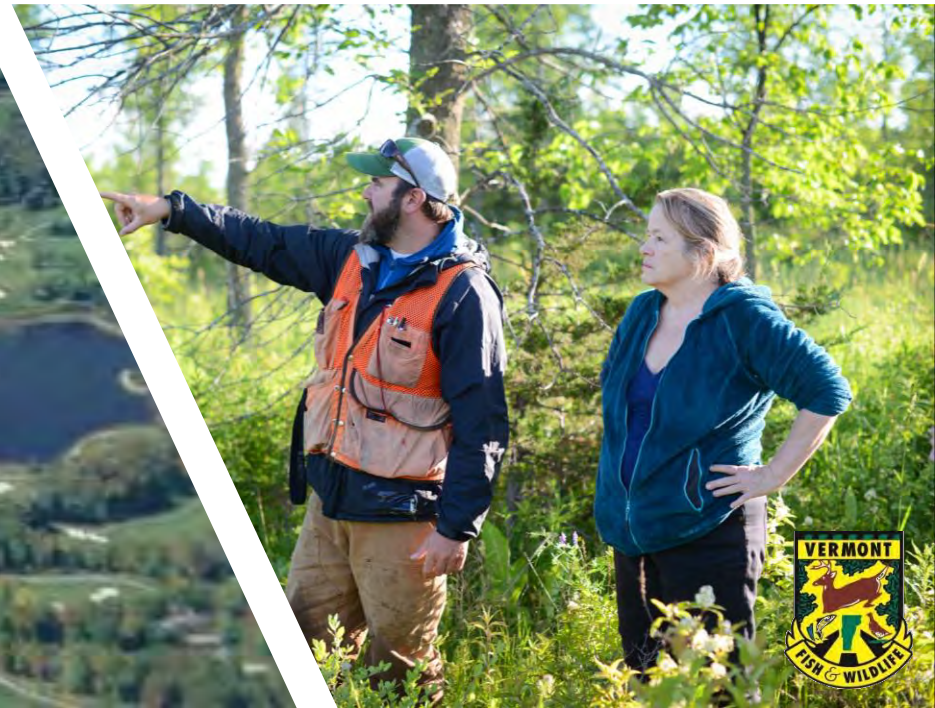
Black Bear Habitat in Vermont as of 1989



Black Bear Habitat Goal: Maintain large concentrations of important foods and landscape connectivity

VFW Habitat Program

- Land conservation
- Habitat management on state lands
- Assistance for private landowners
- Review of development projects (ACT 250)

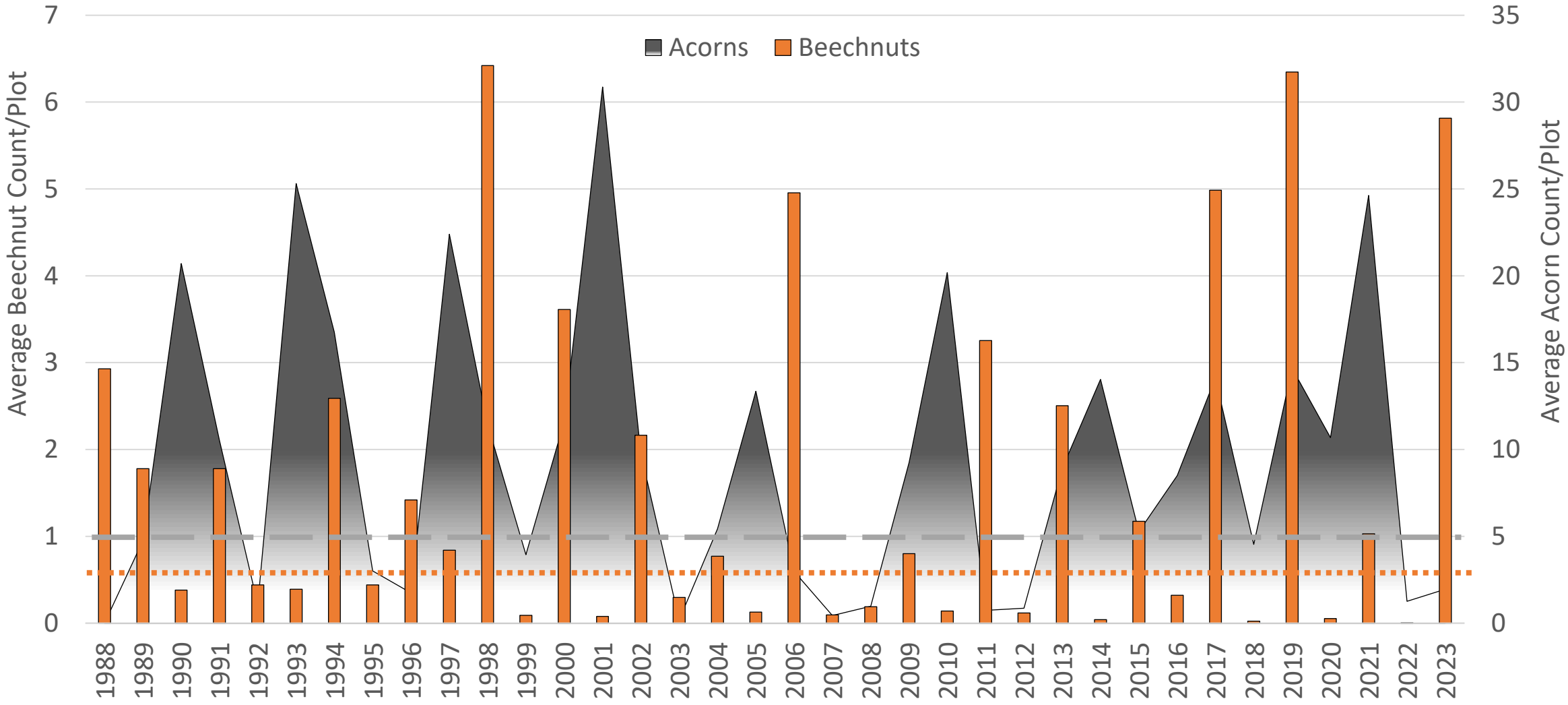


Legal Precedent: Necessary Black Bear Habitat

- Concentrations of hard mast
- Spring bear wetlands


VERMONT
FISH & WILDLIFE

Hard Mast Availability in Vermont, 1988 - 2023



Bear F32
Use of beech habitat
Fall 2015 & Spring 2016

Whitingham

Readsboro

High St

8

9

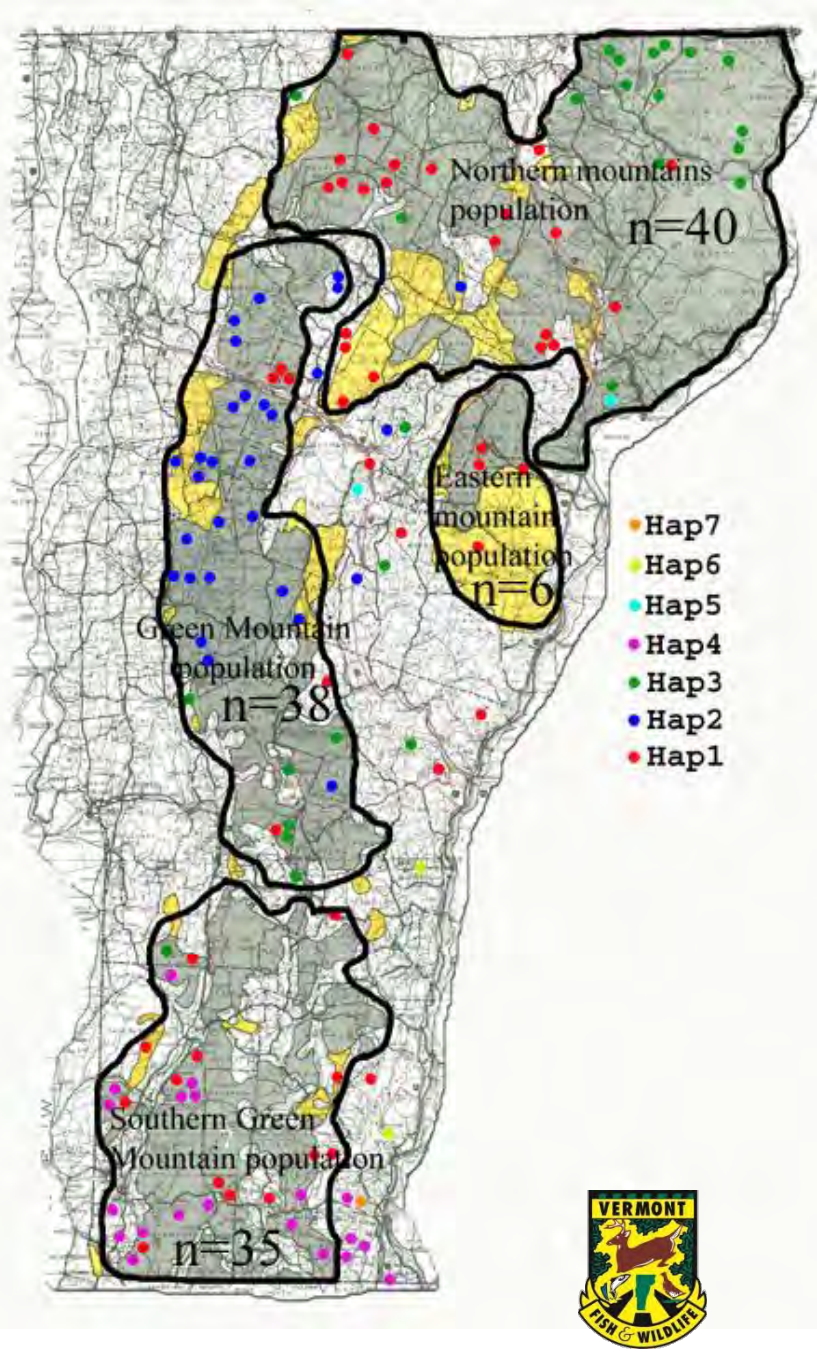
100

Bear F32
Use of oak habitat
Fall 2014

VFWD's Black Bear Project: Research

Black Bear Research in Vermont

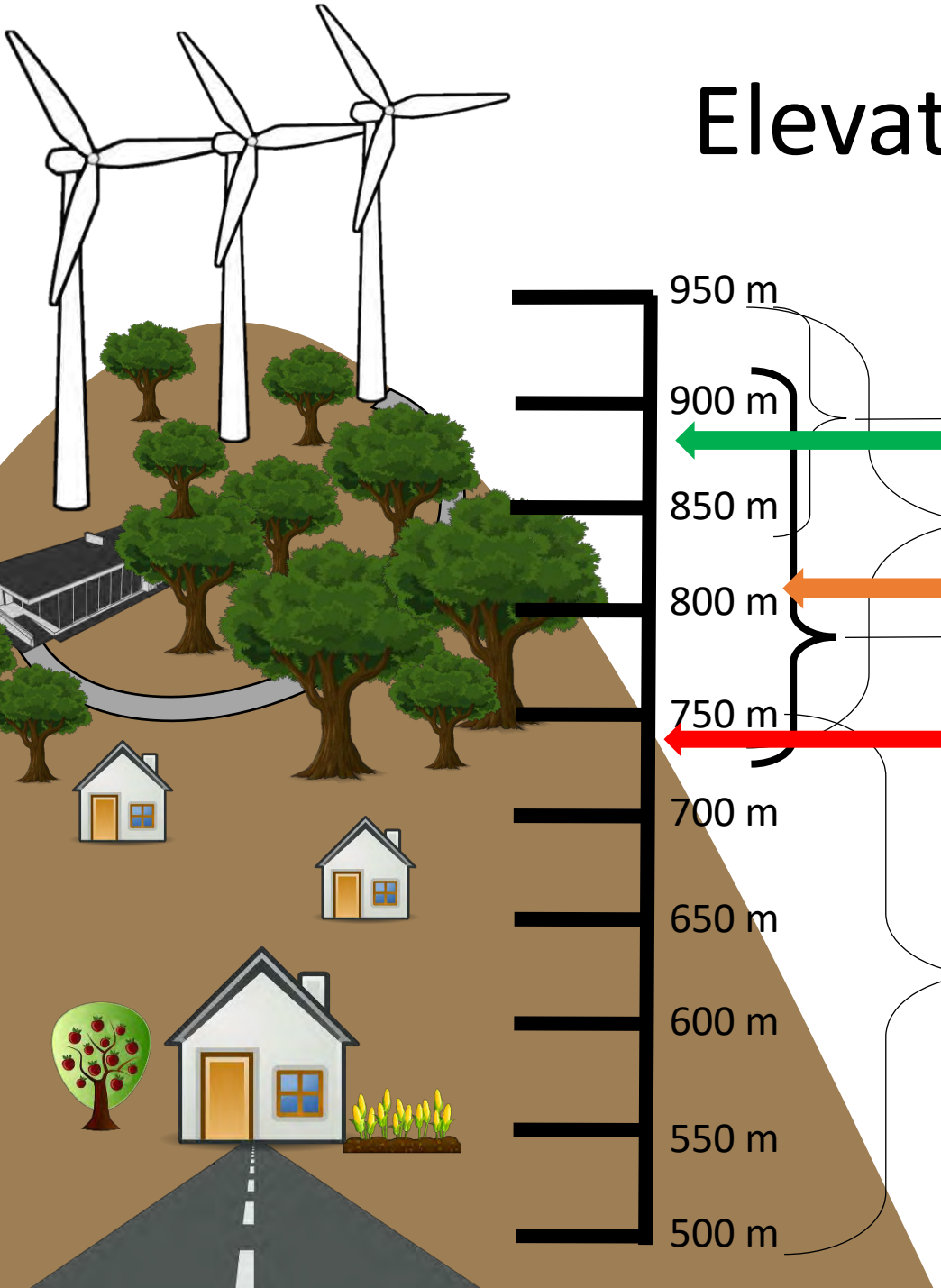
- **1976:** The Vermont Black Bear
- **1992:** Beech Stands as Black Bear Habitat
- **2002:** The Stratton Black Bear Study: effects of ski resort development on black bear ‘necessary’ habitat use
- **2005:** Structure of the VT Black Bear Population Inferred From Mitochondrial DNA Sequences
- **2021:** Improving Roadway Conservation Investments in VT
- **Ongoing:** Using Electrical Circuit Models to Map Wildlife Movement and Guide Transportation Management in VT
- **Ongoing:** The Deerfield Wind Black Bear Study: effects of wind development on black bear ‘necessary’ habitat use
- **Upcoming:** Study to evaluate productivity in Vermont’s black bear population: how does access to different foods effect productivity



Deerfield Wind Black Bear Study

What are the impacts of wind energy on black bear habitat use?

Elevation – shift in habitat selection



950 m
900 m
850 m
800 m
750 m
700 m
650 m
600 m
550 m
500 m

Wind turbines

Wind farm footprint

Top beech values

Top anthropogenic density values

Pre-Construction

Post-Construction

Construction

VFWD's Black Bear Project: Population Monitoring & Management

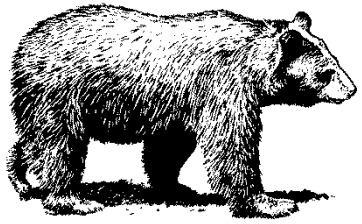
Vermont's Bear Population Model:

Population Reconstruction Model

Dead bears are used as a representative sample to estimate Vermont's bear population

1. Hunting Mortality Data
   - Count and age of females
   - Count and age of males
   - Total count
2. Incidental Mortality Data – more recent
   - Total count

Vermont's Black Bear Population Estimate, 1972-2023



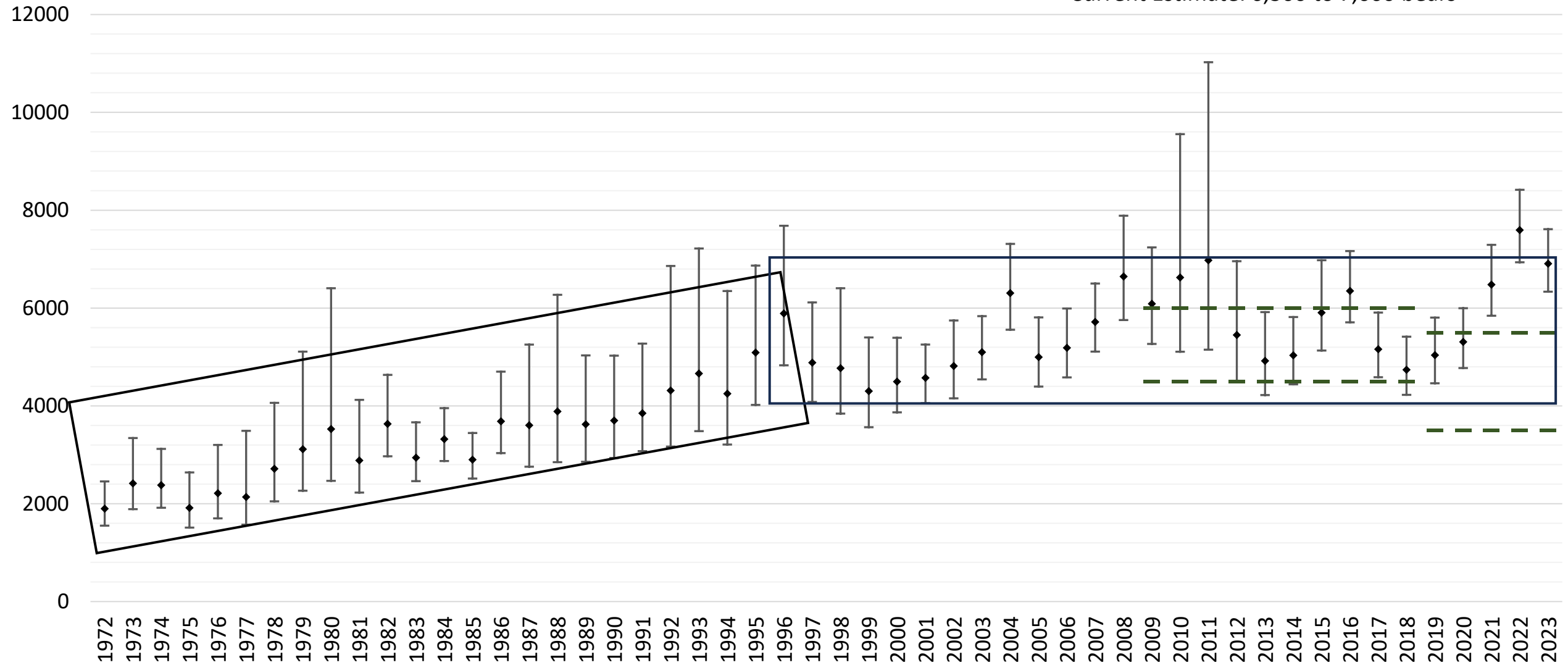
Population estimate (mean±80% confidence intervals) with population range objective in green

Focus is the Population Trend

Recent Typical Range: 4,000 to 7,000 bears

Objective Range: 3,500 to 5,500 bears

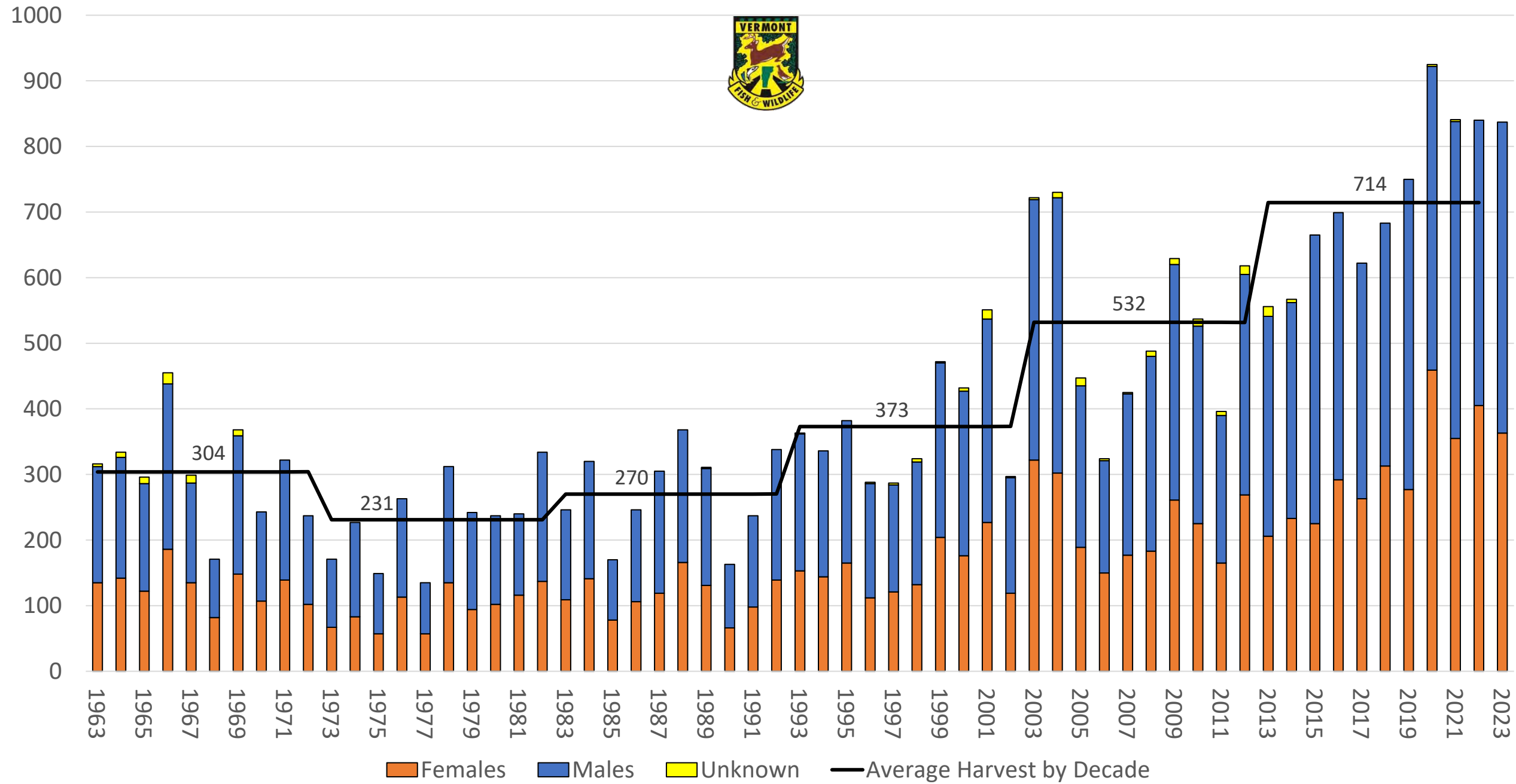
Current Estimate: 6,300 to 7,600 bears

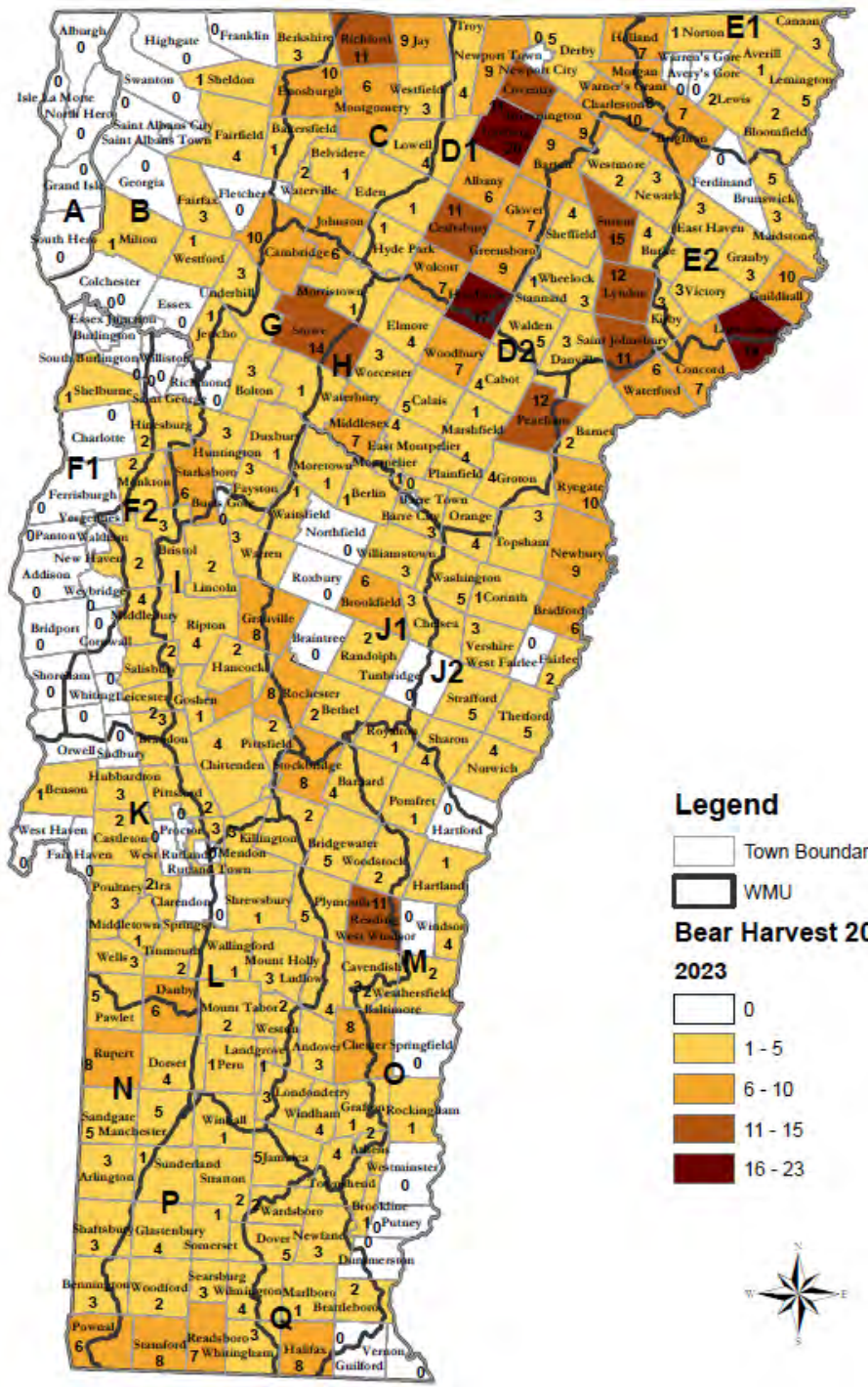


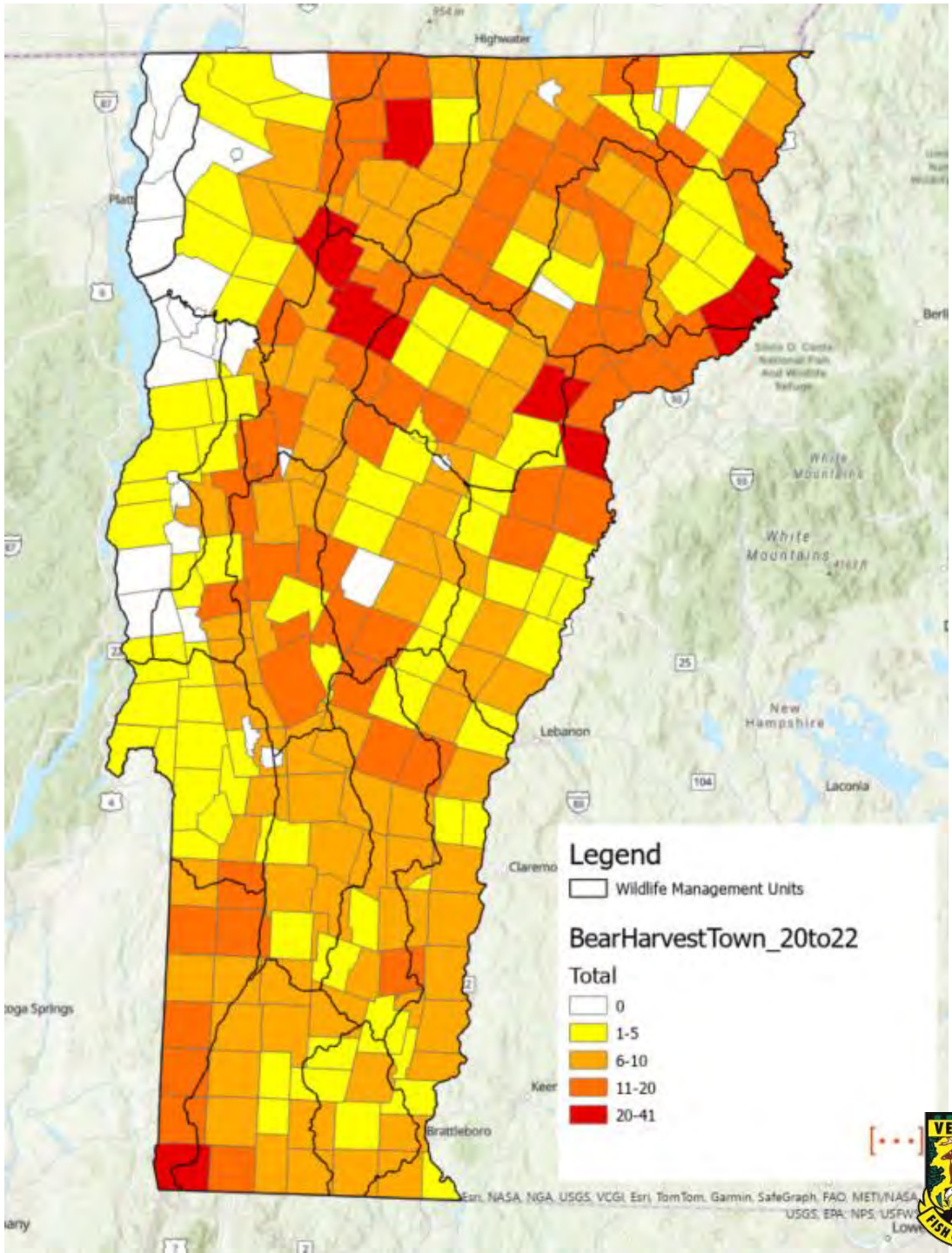
Vermont Bear Hunting Regulations

- **1831 to 1941** – Vermont legislature imposed a bounty on bears
  - 1,295 bounty claims were paid (Willey 1978)
- **1941** – First bear season established, June 1 to Dec. 31
- **1955** – Report harvested bears required
- **1961** – Season reduced to Sept. 1 – Nov. 30
- **1967** – Trapping bears prohibited
- **1968** – Limit of 1 bear per year
- **1972** – Bear dog permit required, and baiting prohibited
- **1974** – Season reduced, Sept. 15 – 9th day of deer season
- **1980** – Season extended, Sept. 1 – 9th day of deer season
- **1982** – Formalized process for setting population goals
- **1990** – Season reduced, Sept. 1 – 5th day of deer season
- **2013** – Early season tag required, & season extended, Sept. 1 – 9th day of deer season
- **2017** – Tooth submission mandatory
- **2018** – Field dressed before reporting required and refined bear dog requirements
- ?

Vermont Bear Harvest, 1963-2023



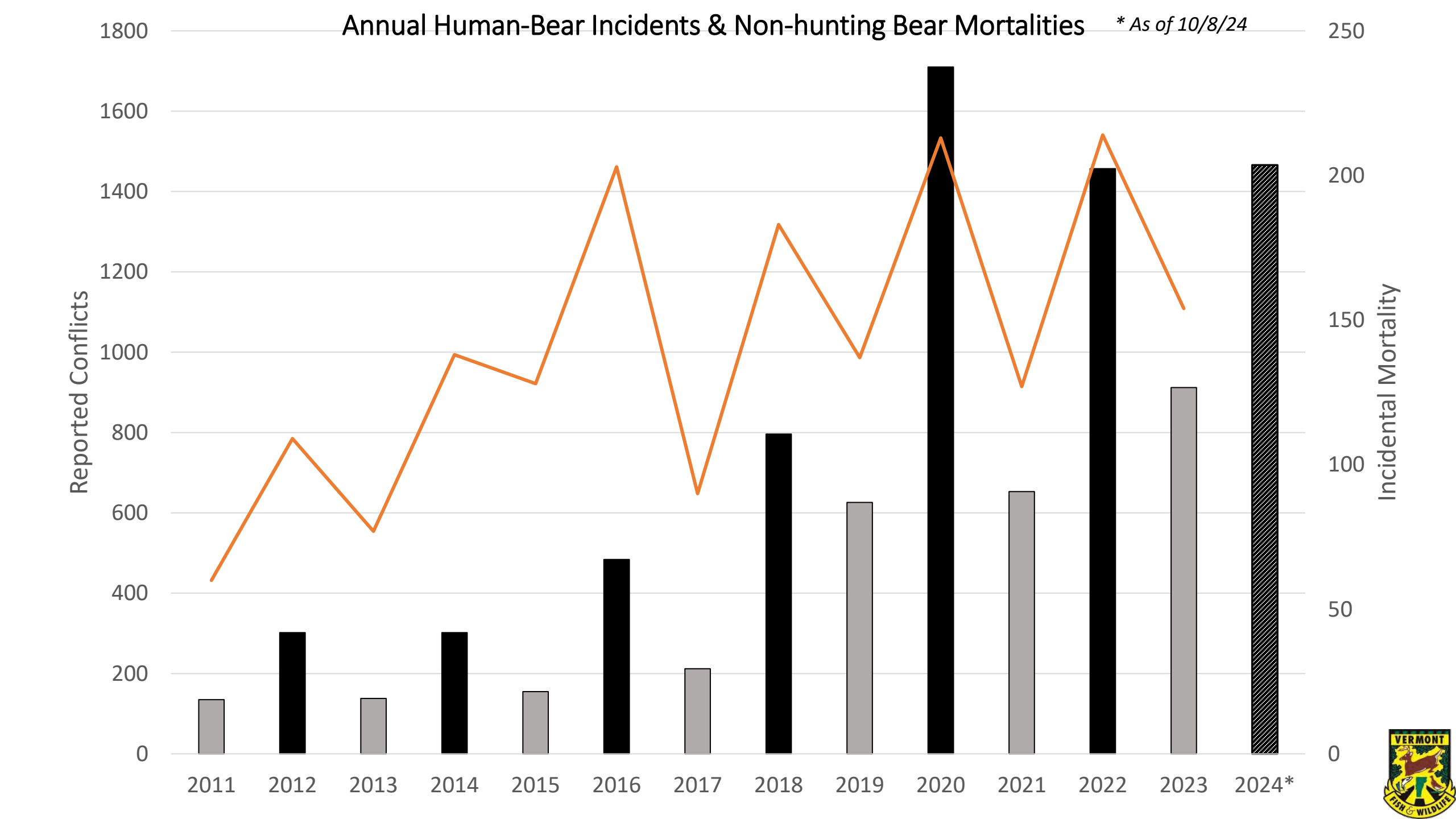

A
B
C
D1
D2
E1
E2
F1
F2
G
H
I
J1
J2
K
L
M
N
O
P
Q
Legend
Town Boundary
WMU
Bear Harvest 2023
2023
0
1 - 5
6 - 10
11 - 15
16 - 23


Legend
Wildlife Management Units
BearHarvestTown_20to22
Total
0
1-5
6-10
11-20
20-41
Lebanon
Laconia
Brattleboro
White Mountains
New Hampshire
Esri, NASA, NGA, USGS, VCGI, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS

Bear Harvest Metrics	Average	Range
% of Mean Population Estimate	9.3%	4% to 17%
% Early Season	72%	52% to 93%
% Males in Harvest	58%	50% to 66%
% with Hounds	15%	6% to 26%

“I shouldn’t, but I’m going to have the garbage.”

VFWD’s Black Bear Project: Human-Bear Interactions

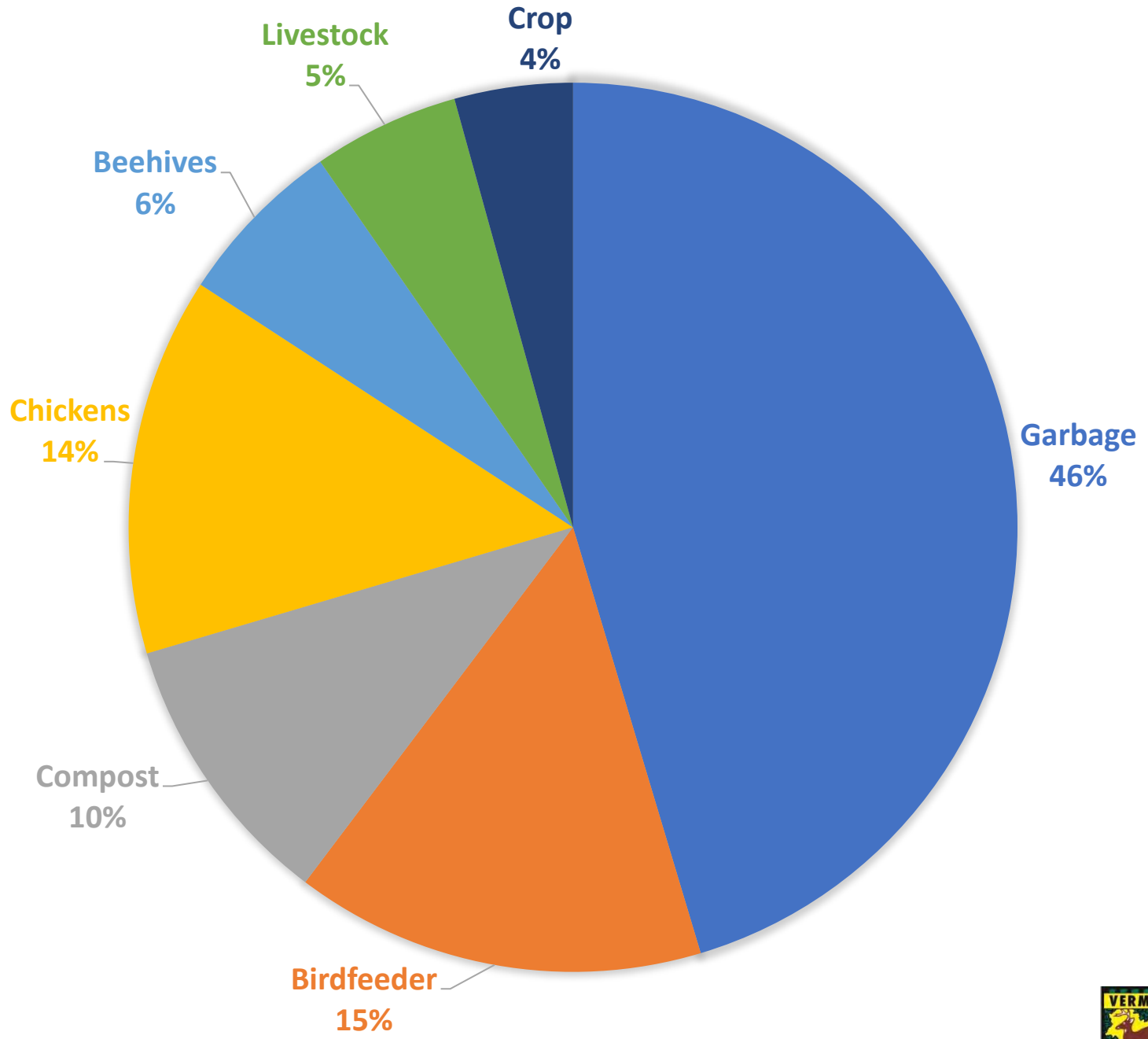

Annual Human-Bear Incidents & Non-hunting Bear Mortalities
* As of 10/8/24
Reported Conflicts
Incidental Mortality
1800
1600
1400
1200
1000
800
600
400
200
0
250
200
150
100
50
0
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024*

What is driving human-bear conflicts?

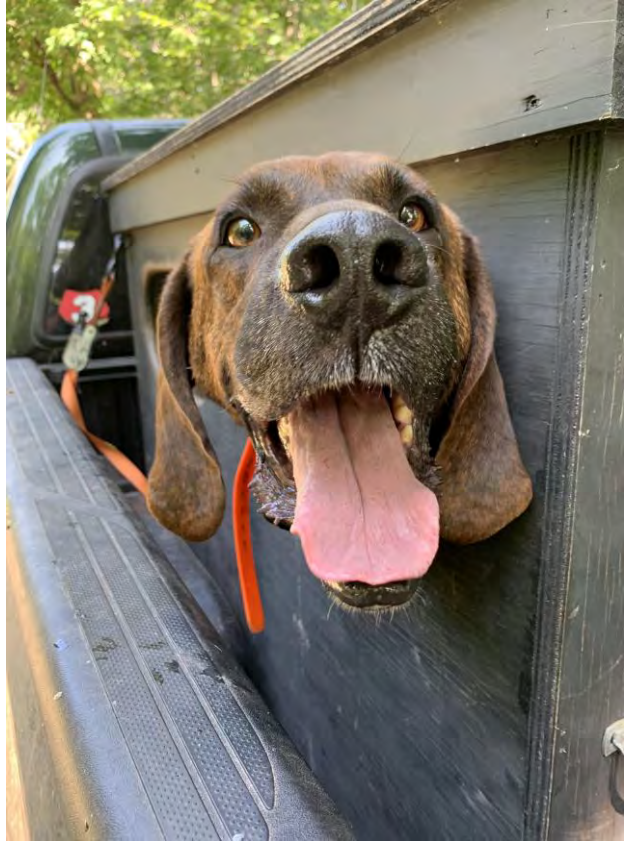
- Bear Population: size & distribution
- Human Population: size & distribution
- Wild Food Availability
- Human Food Availability
- Bear & Human Behavior

Every Meal Is A Learning Experience!

Bears Have Easy Access to Human Foods in Vermont!



Human Foods Involved in Human-Bear Conflicts, 2011-2023

What Can We Do?

- Protect bear habitat
- Manage the number of bears
- Try to manage bear behavior
- Change people behavior

Bears are active in your community. Take action:

HELP KEEP BEARS WILD

NEVER FEED BEARS
it's illegal!

SECURE GARBAGE, COMPOST, & FOODS
behind closed doors or in bear-proof bins

BE LOUD
make bears feel uncomfortable

USE ELECTRIC FENCES
for chickens and other farm animals

TAKE DOWN ALL BIRDFEEDERS

Learn more and report bear encounters:

vtfishandwildlife.com

Composting in Bear Country

Composting well protects animals and people because it reduces the chance that you will accidentally feed an animal.

Take down birdfeeders, except when bears are hibernating. Bird seed draws bears into yards. Plant native flowers and shrubs that attract birds instead.

Compost in a hard, durable bin, ideally with a lid that would be challenging for a bear to open. Cover all food scraps with "browns" (dried yard debris, wood chips, sawdust, or shredded paper); they help contain odor. Frequently mix the pile.

Don't compost meat and bones at home. Bring them to a compost drop-off or put them in the trash.

You have options! You can bring food scraps to transfer stations and other local drop-offs. Consider drop offs in the spring when bears are most active.

Curious Bear? Don't Feed It.

1. **Contact Vermont Fish & Wildlife** for more advice on deterring a bear in your yard **before it becomes a problem.** Fill out this form to get in touch: Anrweb.vt.gov/FWD/FW/WildlifeBearReport.aspx

2. Bring food scraps to a drop-off for a while. **OR** Surround your bin with an electric fence (smear peanut butter on the fence so the bear gets a little zap to the face).

Agency of Natural Resources
Vermont Fish & Wildlife Department

Hunt | Fish | Lands & Habitat | Wildlife | I want to

- Home
- Hunt
- Fish
- Conserve
- Licenses and Lotteries
- Watch Wildlife
- Get Involved
- **Learn More**
  - Conservation Education
  - **Living with Wildlife**
    - **Living with Black Bears**
      - Bear-Resistant Trash Containers
      - Composting in Bear Country
      - If You Encounter A Bear
      - Living with Black Bears FAQs
      - Bear Necessities: Living With Black Bears

Living with Black Bears

Seeing black bears in their natural surroundings is exciting. But when bears venture into human territory, problems can occur and bears

Click Here to Report a Bear Incident

Human-Bear Conflicts: A Fed Bear is a Dead Bear

People often encourage bears to come out of the forest by providing food without realizing it. When bears become used to these food so with humans they become more dependent on human foods and less wary. This is bad news for the bears. This puts bears at increased r killed in defense of property.

The most common sources of food that attract bears are: **pet food, bird feeders, barbecue grills, garbage, household trash container with accessible food and food wastes.**

Purposely feeding a bear is not just bad for the bear, **it's also illegal**.

If you need immediate assistance dealing with an unsafe bear situation, please contact your local game warden.

Have any questions? Please visit our website for more information at VT Fish&Wildlife's Citizen Reporting information page or feel free to contact VFWD Wildlife at jaclyn.comeau@vermont.gov or (802) 461-5620.

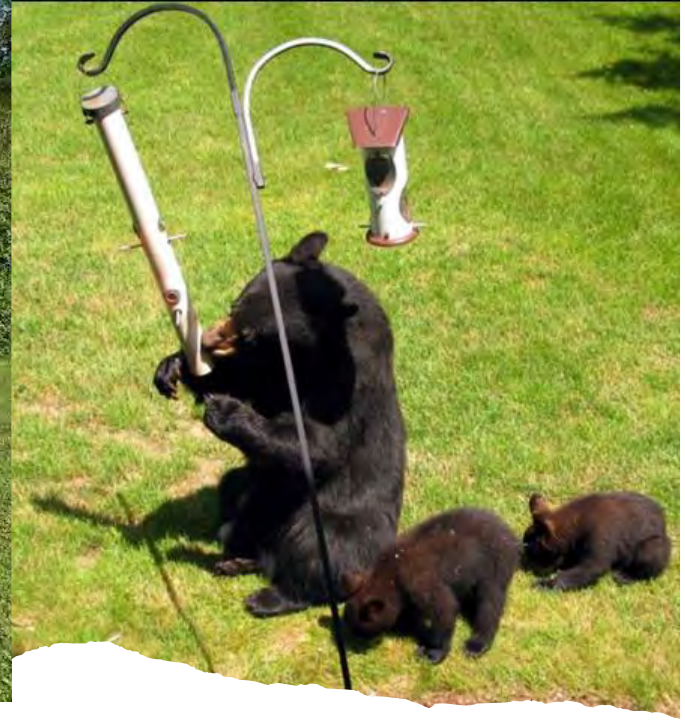
Required fields are marked with *

RESET

ENCOUNTER CONTEXT

In which type of setting did your bear incident occur? *

- Yard / Neighborhood / In Town
- Camping / Campground / Picnic Area
- Recreation Trails

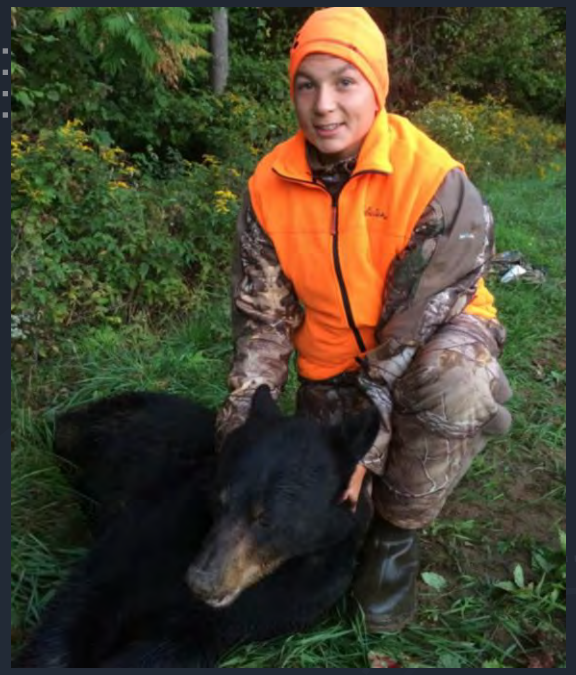


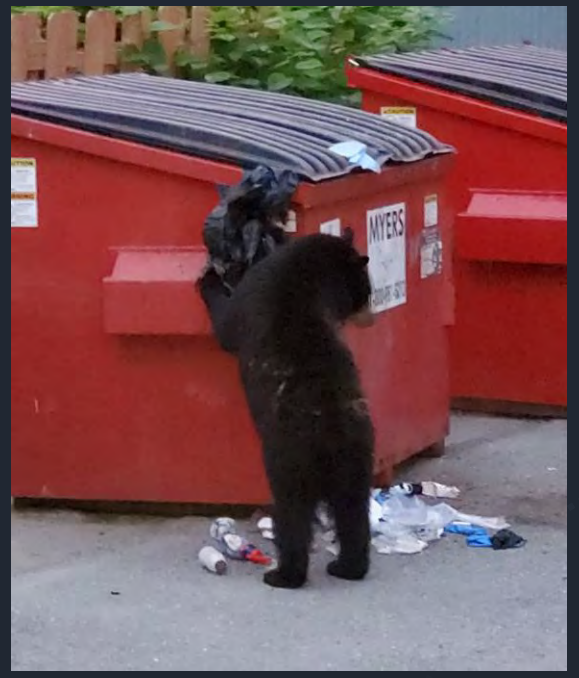
Bear Aware Checklist

- ✓Securely Store Garbage & Control Odors
- ✓Don’t Feed Birds When Bears Are Active
- ✓Follow Composting in Bear Country Guidelines
- ✓Protect Chickens, Bees & Property With A Zap!
- ✓Keep Grill Clean
- ✓Securely Store Animal Feed
- ✓Make Bears Feel Uncomfortable In Human Spaces
- ✓Report Your Bear Incidents To Fish & Wildlife

Securing Garbage is Effective at Reducing Bear Conflicts

When ~60% of a community use Bear Resistant garbage storage conflicts drop significantly





"People … must accept that they are participants in the natural world, not mere observers."

-David Baron, The Beast In The Garden