

Introduction

For the coming 2020 fall black bear season, we propose mandatory harvest reporting and a pilot program for voluntary hunter tooth submission. This pilot project will help us evaluate the efficacy of a mandatory statewide tooth submission protocol for collecting black bear age data. This information will help us evaluate the potential sample size we would receive with voluntary submission and hunters' ability to successfully extract a tooth that is viable for aging. Requiring hunters to submit a premolar would reduce our workload, yet provide us with valuable age data for managing bear populations. Currently, these data are critical for the reconstruction component of the integrated population model.

The following states require hunters to submit a premolar from all harvested black bears: Arkansas, Maine, Minnesota, Vermont, Virginia, West Virginia, and Wisconsin. Massachusetts, North Carolina, New York, and South Carolina have a voluntary tooth submission program; however, North Carolina is moving towards mandatory tooth submission in 2021. These states provide instructions on how to extract and submit the tooth for aging, and most of these departments provide the age data online via hunter accessible portals.

Specific State Requirements for Mandatory Tooth Submission

Arkansas: Successful hunters must collect and submit a premolar to fulfill the check requirement for a bear. Upon checking the bear, a shipping package is mailed to the hunter. The premolar must be submitted within 7 days after the hunter receives the premolar package from AGFC. By January the following year, hunters will be sent a notification if they have not yet submitted a premolar from the harvested bear. Citations of approximately \$250 are issued to hunters who fail to submit a tooth. Typically, they only issue up to 5 citations a year.

Maine: Successful hunters and bear trappers are required to submit a tooth when it is registered. Information on how to submit a tooth is available at hunter check stations and online. The information and tooth is then handed over to the store clerk or agent at the check station, who then mails it to the department. The Department provides an annual tooth age report on their website the following year where hunters can look up the age of the bear they harvested.

Minnesota: Successful bear hunters must submit a tooth sample to the DNR after they register the harvested bear. The DNR provides tooth envelopes that have printed instructions on how to submit the tooth for aging. Postage-paid envelopes for mailing the bear teeth to DNR are provided at bear registration stations. Each person who kills a bear is responsible for mailing the envelope to the DNR. All individuals who submit a tooth sample, prior to November 1, will be sent information on the age of their bear and a bear cooperation patch. If hunters are unable to obtain a bear tooth envelope from a bear registration station, they are instructed to follow these instructions: Clean the tooth thoroughly and place in a zip-lock bag, wrap tooth in tissue paper or aluminum foil. Mail in a padded envelope with all relevant information (include a copy of your bear registration info) to DNR Wildlife Research.

Vermont: Hunters are required by law to collect a pre-molar tooth from each harvested bear within 30 days of harvesting a bear. A successful hunter must, within 48 hours, report the taking and exhibit the carcass to the nearest game warden, official Fish & Wildlife Department Reporting Station, or to a person designated by the commissioner to receive the reports. A person who takes a bear shall collect a

premolar tooth from the bear and submit it to a game warden, official Fish & Wildlife Department Reporting Station, or to a person designated by the commissioner to receive it.

Virginia: Hunters in Virginia are required by law to submit premolar teeth from any bear they harvest. If the hunter checks his/her bear at a check station, the attendant will extract a premolar tooth and submit it with your check card. If the hunter checks his/her bear by phone, internet, or mobile app, they are required to remove and submit the teeth.

West Virginia: A person who kills a bear shall submit a first premolar tooth to the Division of Natural Resources by January 31 of the year following the kill. The tooth should be secured to a card along with a label with the name and address of the hunter, date of kill, weapon used, whether dogs were used to kill the bear, county of kill and the game tag number, and either mailed or delivered to a DNR District Office or the DNR Elkins Operation Center.

Wisconsin: Each successful hunter is required to extract two upper premolar teeth and submit them to the DNR. Hunters are notified of their bear's age by mail.

Specific State Requirements for Voluntary Tooth Submission

North Carolina: North Carolina has operated a Bear Cooperator Program to collect biological information on black bears since 1976. Part of this program includes voluntary hunter tooth submission. All bear hunters receive tooth envelopes printed with a datasheet. In addition, roving wildlife staff assist in tooth collection in the field when they make hunter contacts. Participants in the program receive a complimentary baseball hat and the age data of their harvested bear. They are planning to go to mandatory mail-in tooth submission in Fall 2021.

South Carolina: South Carolina has a voluntary tooth submission program, in which teeth are pulled by SCDNR staff or by the hunter. If SCDNR staff are not available to check the bear, they ask hunters to submit a tooth. After the hunter reports a bear harvest, SCDNR will either contact the hunter to examine the bear or will ask the hunter to use the tooth collection packet. Many taxidermists will submit the tooth samples for the hunter.

Massachusetts: Upon killing a bear, hunters must immediately fill out and attach to the carcass the "harvest tag" found on the bear permit. Hunters must report their bear either online or at a check station within 48 hours of harvest. If reporting online, a confirmation number will be issued and must be written on the harvest tag, if reporting at a check station a metal seal will be attached to the carcass. Either the seal or the harvest tag must be attached to the bear until it is processed. The hunter can then choose to voluntarily extract a premolar and put it in a small envelope or bag and mark it with their name, mailing address, customer ID number, and confirmation number (or seal number) of their harvested bear. They must then enclose everything in a mailing envelope and send it to MassWildlife. MassWildlife provides written instructions on how to extract a premolar on their website, as well as a link to a video showing hunters how to extract a tooth. Results from aging are mailed to individual hunters the following summer.

New York: Hunters who harvest bears in New York are asked to submit a premolar tooth or part of the lower jaw of the bear for DEC to determine the bear's age and to record the dressed weight of the bear. A collection packet including instructions and a postage-paid return envelope is mailed to each hunter that reports taking a bear. There are many cooperating taxidermists in New York that can extract the

requested premolar teeth, weigh bears, and submit the data to DEC on the hunter’s behalf. All successful hunters are still required to report their bear harvest online, via the mobile app, or via the automated phone system.

Program Success

I reached out to the biologists in charge of bear management in each of the above listed states. I spoke with or corresponded via email to all but four of these states (Minnesota, Virginia, West Virginia, and South Carolina) concerning their bear tooth submission programs. Overall, mandatory hunter tooth submission programs were highly successful; whereas, voluntary hunter submission was less successful and not that useful in reconstruction (Table 1). The one exception was New York, where the biologist felt a 50-60% voluntary submission rate was adequate for population reconstruction. This was not the feeling of the biostatisticians and biologists from the other states.

State	Tooth Submission	Year	# Bears Harvested	# Teeth Submitted	% Submitted	% Bears Aged	
Arkansas	Mandatory	2017-2020	~ 400/ yr		90%	90%	
Maine	Mandatory	2017	2897	2502	86%	84%	
		2018			90%	89%	
		2019			90%	89%	
Vermont	Mandatory	2014	4526	4271	94%	94%	
Wisconsin	Mandatory	2015	4198	3493	83%	83%	
		2016	4682	3955	84%	84%	
		2017	4157	3539	85%	85%	
		2018	3716	3034	82%	82%	
Massachusetts	Voluntary	2014	240			29%	
		2015	236			28%	
		2016	283			16%	
		2017	270			19%	
		2018	204			16%	
North Carolina	Voluntary	2014			62%		
		2015			50%		
		2016			52%		
		2017			52%		
		2018			45%		
New York	Voluntary	2015	1,715	908	53%		
		2016	1,539	871	57%		
		+	2017	1,420	880	62%	
		2018	1,295	722	56%		
		2019	1,505	855	57%		

Based on the data I collected, states that require hunters to submit bear teeth obtain age data for 86 ± 0.04 % of the bears harvested annually; whereas states with voluntary tooth submission programs only aged 44 ± 0.14 % of harvested bears. Several of the states began with a voluntary tooth submission program, but then transitioned to mandatory. Arkansas actively enforces the tooth regulation, and backs the regulation by citing individuals who fail to submit a tooth. As a result, Arkansas has a high rate of tooth return.

Voluntary hunter tooth submission is less successful than mandatory submission in obtaining enough age data for modeling efforts. Most states, except New York, do not feel that voluntary submissions result in enough data to adequately manage black bear populations and harvest. For example, prior to 2013, Massachusetts required mandatory inspection of harvested black bears, at which time a tooth was extracted. In 2013, they went to an online registration of black bears harvested and voluntary tooth submission. The number of teeth received annually since then has decreased dramatically, and they do not currently receive enough teeth to do any type of population reconstruction modeling with their data. The program essentially is just a service to hunters to provide them with age data on their bears, and serves no scientific purpose due to the lack of information obtained. North Carolina has experienced a similar trend, and are therefore planning to transition to mandatory tooth submission in 2021.

Instructional Videos

https://www.google.com/search?q=how+to+remove+a+bear+tooth&rlz=1C1GCEA_enUS873US875&oq=how+to+remove+a+bear+tooth&aqs=chrome..69i57j0l7.7845j0j7&sourceid=chrome&ie=UTF-8#kpvalbx=_fRXqXu28MOe90PEPgvGI-Ak26

<https://www.youtube.com/watch?v=0n3i91OAXGc>

<https://www.youtube.com/watch?v=qpQ829ICpAw>