

A photograph of a deer with large antlers standing in a snowy field. The deer is the central focus, looking directly at the camera. The background is a soft-focus, snowy landscape with bare trees and bushes. The overall tone is light and wintry.

Deer Season: Ballistics to *borrelia*

Adam C. Hunt, DO MHS FACEP

October 27th, 2023

Disclosures

- I am a deer hunter
- I am likely to tell stories
- No financial disclosures



Today's Roadmap

- Economic Impact
- Calendar
- Licensure and logistics
- Deer Herd Dynamics
- Trauma
- Toxicology
- Infectious Disease



State/Local Revenue



- 2019 Economic Impact Study from Michigan United Conservation Clubs
 - 700,000 hunters → \$8.9 Billion
 - 1.1 million anglers → \$2.3 Billion
 - 171,000 jobs annually (19.61 jobs per \$1 Million spent)
 - \$62 Million from licenses (\$40M from hunting)
 - State revenue from these licenses has to go to conservation or wildlife management
 - Michigan Tech study shows a 21% drop in numbers of hunters from 1998 to 2017 (785,000 → 621,000)



Calendar

Deer seasons	Bag limit	Area	Season dates (dates listed may be hunted)	Notes
Deer - Liberty Hunt	1 per kill tag	See pages 37 and 43	Sept. 9-10	See "Youth hunting" (page 37) and "Hunters with disabilities" (page 43)
Deer - early antlerless firearm	1 per kill tag	See page 52 for open DMUs	Sept. 16-17	Open on private lands only
Deer - Independence Hunt	1 per hunter	See page 44	Oct. 19-22	See "Hunters with disabilities" (page 44)
Deer - archery	1 per kill tag	Statewide	Oct. 1 - Nov. 14 and Dec. 1 - Jan. 1	See "Lower Peninsula" (pages 53-55), and "Upper Peninsula" (pages 58-59), for antler point restriction regulations. For counties with an extended archery season, see page 53.
Deer - regular firearm	1 per kill tag	Statewide	Nov. 15-30	See "Lower Peninsula" (pages 53-55), and "Upper Peninsula" (pages 58-59), for antler point restriction regulations
Deer - muzzleloader	1 per kill tag	Statewide	Dec. 1-10	See "Lower Peninsula" (pages 53-55), and "Upper Peninsula" (pages 58-59), for antler point restriction regulations
Deer - late antlerless firearm	1 per kill tag	See page 52 for open DMUs	Dec. 11 - Jan. 1	Open on private lands only

Licensure

License types

License by age	Age: Up to 9	Junior ¹ age: 10-16	Resident age: 17-64	Nonresident ² age: 17+	Resident senior age: 65+
DNR Sportcard	\$1	\$1	\$1	\$1	\$1
Mentored youth license	\$7.50	NA	NA	NA	NA
Base license ⁺³ (valid as small game license; see page 66). Valid through March 31, 2024.	NA	\$6	\$11	\$151	\$5
Pheasant hunting license ⁴	NA	NA	\$25	\$25	\$25
Small game 3-day nonresident license	NA	NA	NA	\$50	NA
Small game 7-day nonresident license	NA	NA	NA	\$80	NA
Hunt/fish combo license ⁺ (includes: base license, deer combo and all-species fish license)	NA	NA	\$76	\$266	\$43
Deer license (one kill tag)	NA	\$20	\$20	\$20	\$8
Deer combo license (two kill tags)	NA	\$40	\$40	\$190	\$28
Universal antlerless deer license ^{**}	\$20	\$20	\$20	\$20	\$20

<https://www.michigan.gov/dnr/gohunting>

Purchasing a license

You must have one of the following forms of identification:

- Valid Michigan driver's license or valid nonresident driver's license.
- State of Michigan ID card (issued by the Secretary of State).
- DNR Sportcard (issued through license agents, at [Michigan.gov/DNRLicenses](https://www.michigan.gov/DNRLicenses) or on the DNR Hunt Fish app). If the information on your DNR Sportcard from a previous year is still accurate, you should continue to use it.

Hunters must possess qualifying credentials and/or identification that may be required for certain license purchases. When hunting or trapping, you must carry your license and present it upon demand of a Michigan conservation officer, a tribal conservation officer or any law enforcement officer.

Where can I purchase Michigan hunting licenses?

You can purchase Michigan hunting and fishing licenses online at [Michigan.gov/DNRLicenses](https://www.michigan.gov/DNRLicenses), through the Michigan DNR Hunt Fish app or in person at any agent that sells Michigan licenses. A list of license agents is available at [Michigan.gov/DNRLicenseAgents](https://www.michigan.gov/DNRLicenseAgents). The Michigan DNR Hunt Fish app is available for download on the Google Play Store or the Apple App Store.

Do I need a base license?

Yes. All hunters are required to have a base license before purchasing other licenses. (A base license is not required to purchase a fishing license or limited-license hunt applications. A base license is not required to buy a nonresident small game three-day or seven-day license.)

What is the base license?

The base license provides funding for habitat and conservation work on both public and private land and supports the work of conservation officers and field staff to ensure safe, legal hunting practices are followed. The base license is valid for hunting small game. Additional licenses are required to hunt other species. Hunters are always encouraged to carry their base license when hunting.





What is a kill tag?

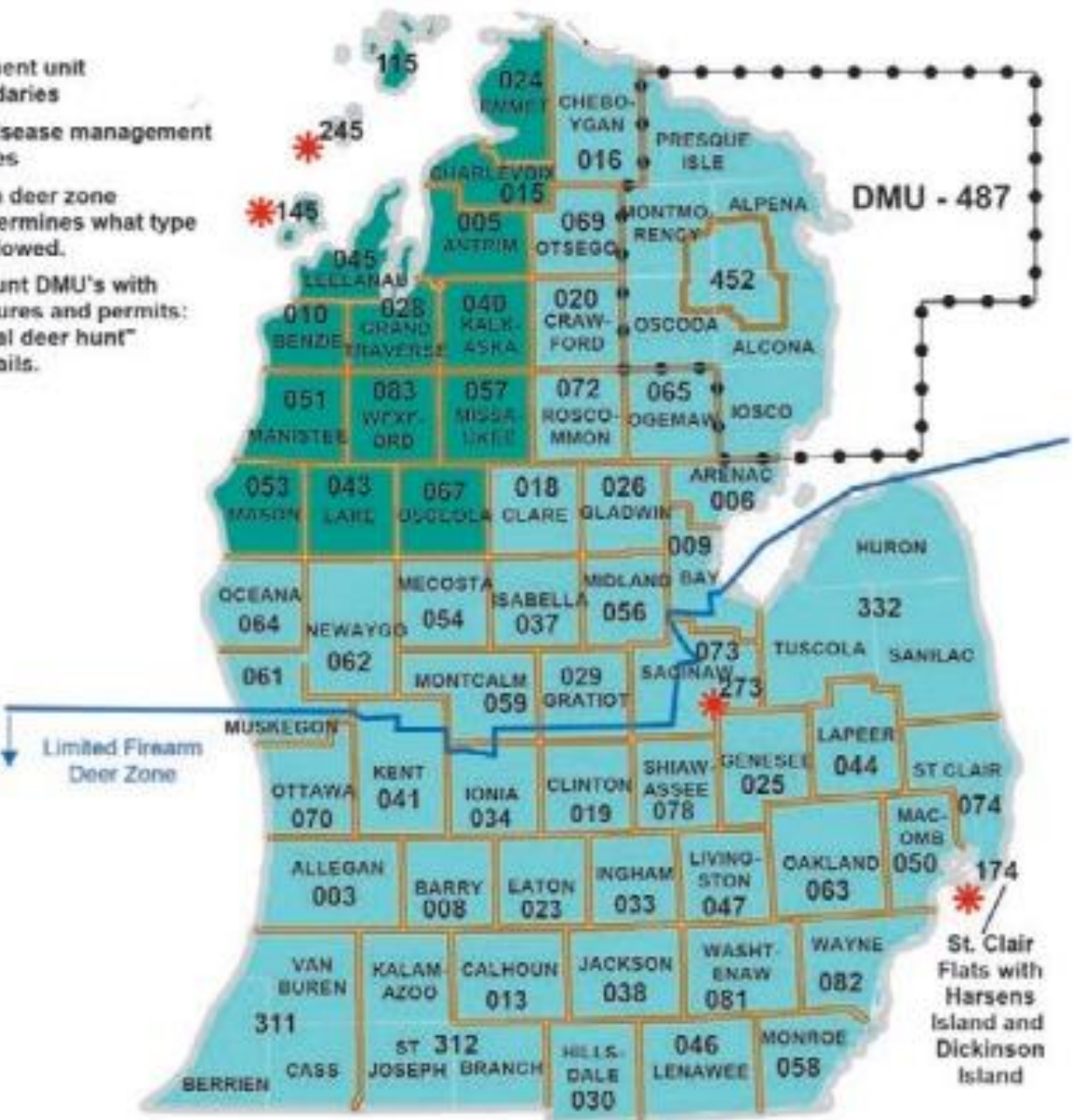
Kill tags are licenses that are affixed to the following harvested animals: deer, turkey, bear, otter, fisher, marten and bobcat. You cannot harvest these animals without the physical kill tag in your possession. Information on the harvest must be recorded on kill tag as indicated on tag, like date of harvest, sex of animal, antler points, etc. See page 32 for more information on tagging.





































Do I need to take hunter safety?

Yes. All hunters born on or after Jan. 1, 1960, must present their hunter safety certificate or previous hunting license (other than an apprentice license) to purchase their licenses.

License

-  Deer management unit (DMU) boundaries
-  Multi-county disease management DMU boundaries
-  Limited firearm deer zone boundary - determines what type of firearm is allowed.
-  Special deer hunt DMU's with unique procedures and permits: see the "Special deer hunt" section for details.



		Seasons		
		Archery	Firearm	Muzzleloader
Deer license		 or 	 or 	 or 
Deer combo license	Regular tag	 or 	 or 	 or 
	Restricted tag	 or 	 or 	 or 
Deer license		 or 	 or 	 or 
Deer combo license	Regular tag	 or 	 or 	 or 
	Restricted tag	 or 	 or 	 or 

Successful hunt

- What now?
- Field dress your deer
- Report your harvest
- DNR Check station
 - Sampling/State Lab
- Butchering

How do I report my harvest?

Report through eLicense

Visit Michigan.gov/DNRHarvestReport on a computer or mobile device to go directly to the reporting page. Enter your kill tag license number and date of birth to begin the report.

If you don't have your hunting license/kill tag number, you can [log in to eLicense](#) (using your driver's license and birthdate, or user ID and password) then click on the Harvest Report tab to see the tags available to report. If you don't already have an account, you will have the chance to create one to enter your report.

Report using the new Michigan DNR Hunt Fish App

The Michigan DNR Hunt Fish app is available in the app stores:

Scan Here To Download the App

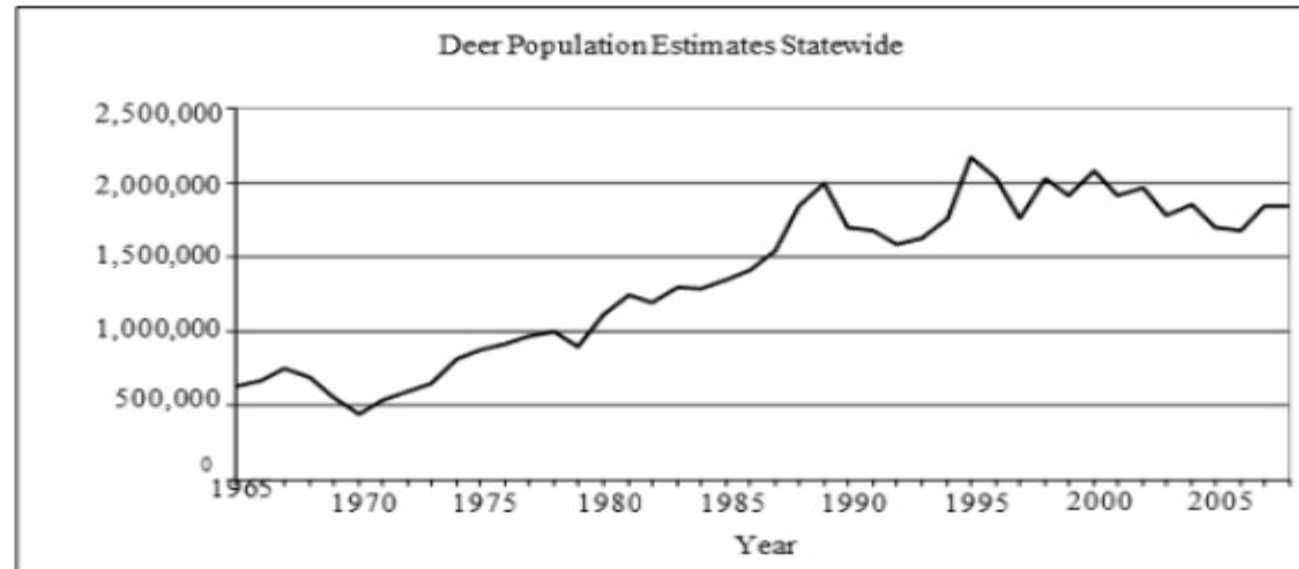


Once the app is downloaded, and you've signed in or created an account, you can enter the harvest report information.

Once your harvest report is completed, you will be given a confirmation number and the option to receive a copy by email.

Deer herd dynamics

- There is an estimated 2 million deer in Michigan
 - This population is up approx. 300,000 from a decade ago
- In 2022, there was a reported harvest of 339,000
 - This was down 14% from the previous year
- Resources are spread across greater numbers as the deer population rises
 - Hunting season harvests
 - Natural predators
 - Vehicles
 - Harsh winter
 - 5-50% winter die off



Population Impact

- As the number of deer rises...
 - Agricultural Impact
 - Deer crop damage permits
 - Your garden
 - Deer car accidents rise
 - Disease spreads (TB or CWD)
 - Overall deer health declines
 - Weight
 - Offspring
 - Winter die off



Your Garden



- Anti-Deer plants

- Marigold
- Verbena
- Snapdragons
- Butterfly bushes
- Juniper bushes/Trees
- Russian Sage
- Bee Balm

- Deer Love

- Hostas!!!
- Knockout roses
- Daylilies
- Arborvitae
- Apple/Cherry Trees

Trauma

- Fall out of tree stand
- Car accident
- Attacked
- Shot
 - Ballistics



Trauma

- Fall from a tree stand
 - Most common injury during hunting season
 - 2-3 times more likely to fall out of a tree stand than any other injury
 - Data suggests that 80-90% of hunters hunt from aloft

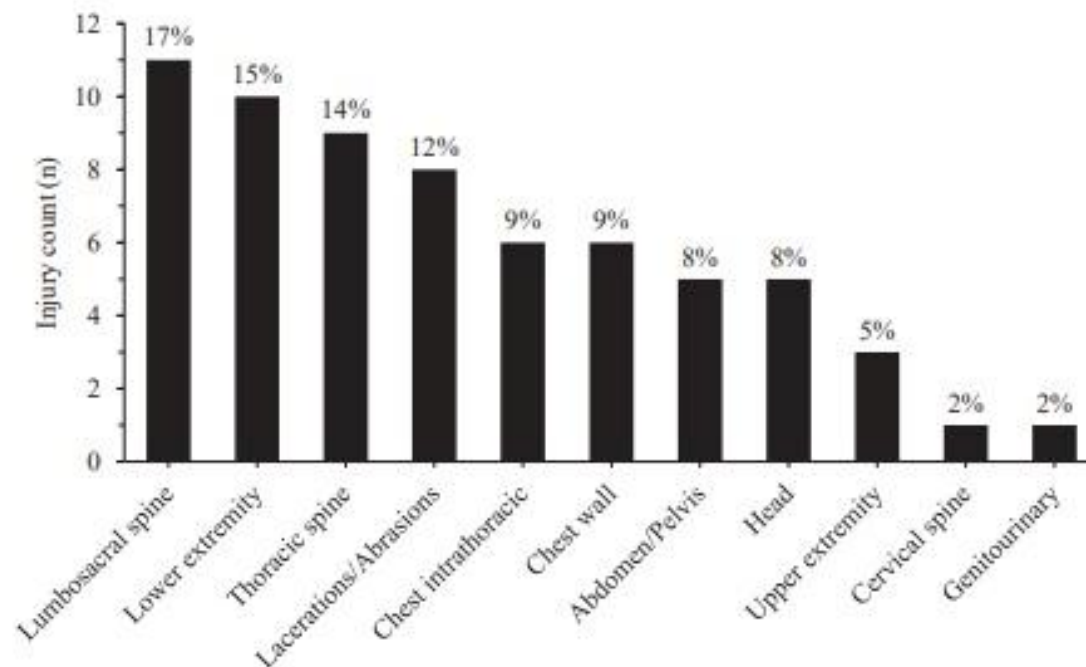
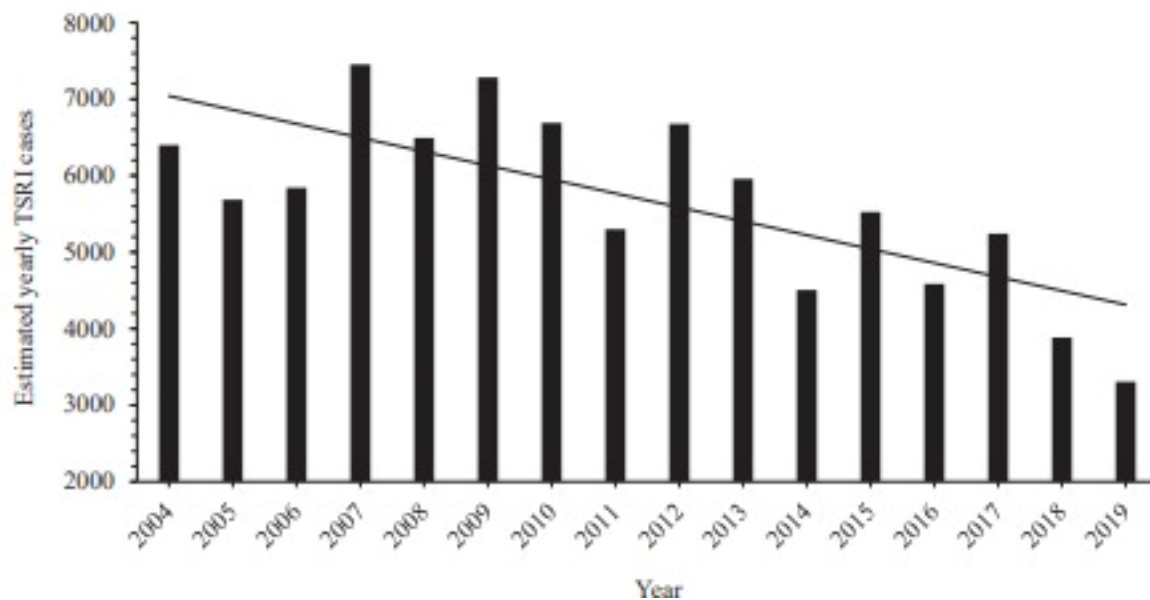


ORIGINAL RESEARCH

Tree Stand–Related Injuries in Nonadmitted and Admitted Patients at a Level 2 Trauma Center in Michigan: 2015–2019

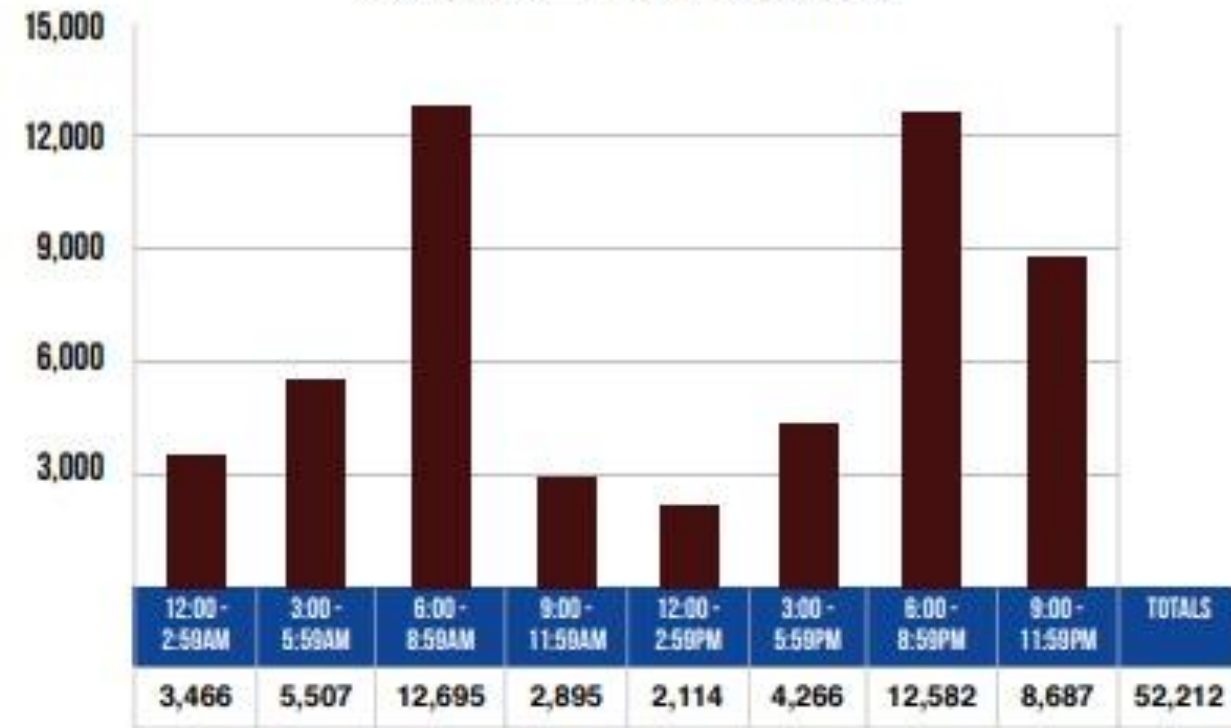
Alan A. Lazzara Jr., MD, FAWM, FACEP; Bailey I. Ditmer, DO; Kyle W. Doughty, DO; Kyle R. Reynolds, DO

Henry Ford Allegiance Health Emergency Department, Jackson, Michigan

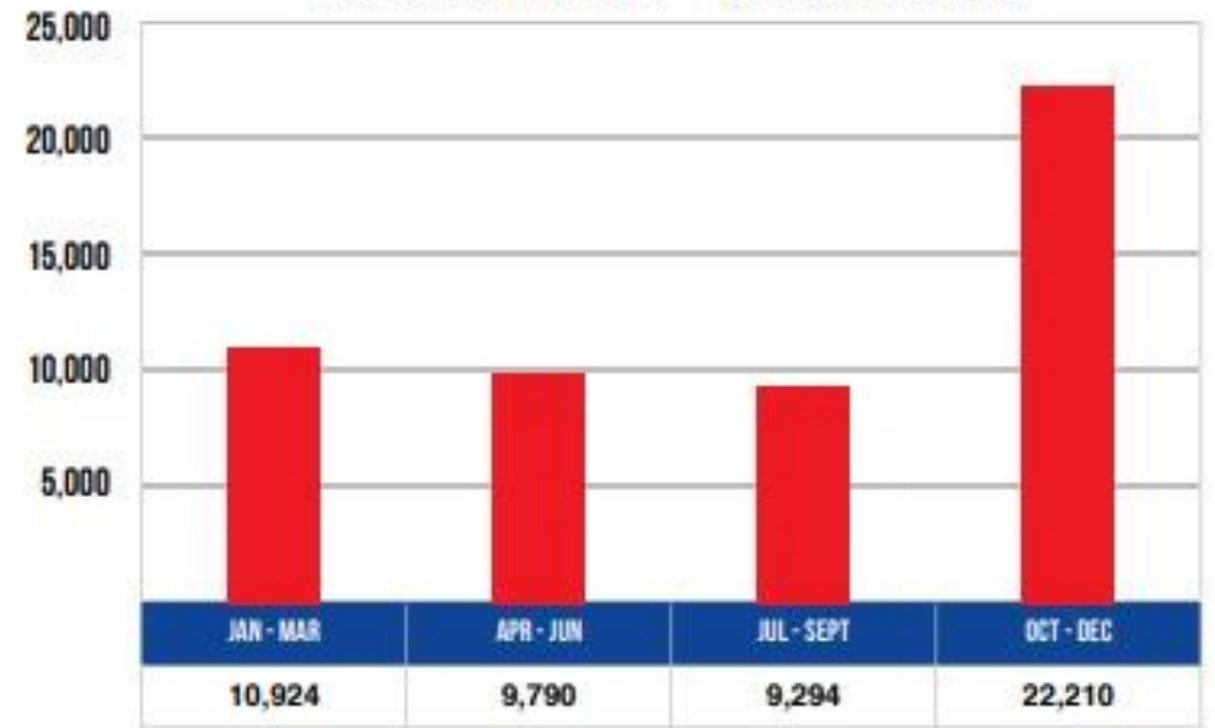


Deer-car accidents

TIME OF DAY — ALL DEER CRASHES



SEASON OF THE YEAR — ALL DEER CRASHES



Trauma

- Majority of drivers/passengers are uninjured
- Motorcycles at higher risk of injury
- Higher rates of injuries if hitting another car or stationary object
- Mostly blunt trauma related injuries



Trauma

- When animals attack
 - Blunt trauma
 - Penetrating trauma
 - Bite
 - Extremity fractures
 - Lacerations/Abrasions



HUNTING WITH THE RIGHT CALIBER

Ballistics

- Most common deer hunting rifles:

- Michigan
 - .30-06
 - .308 Winchester
 - .300 Winchester Magnum
- Nationwide
 - .270 Winchester
 - 7mm Remington Magnum
 - .30-06 Springfield
 - .308 Winchester
 - 6.5 Creedmoor
 - .243 Winchester
 - .30-30 Winchester



Ballistics

- Penetrating injuries
 - These bullets/firearms are designed to kill and cause catastrophic damage



Bullet Point



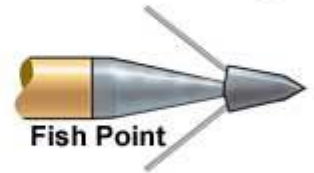
Blunt Point



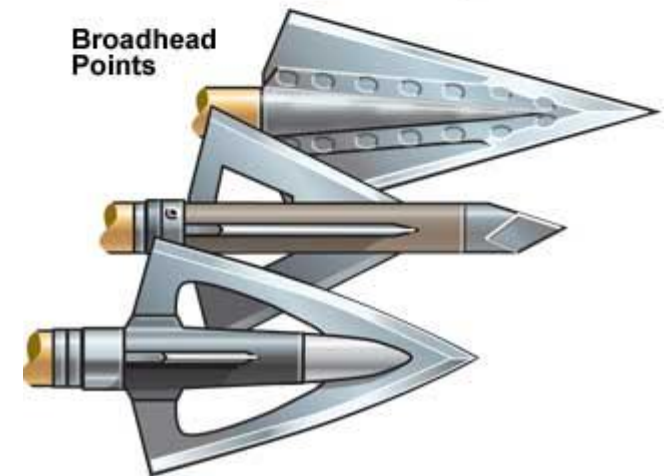
Field Point



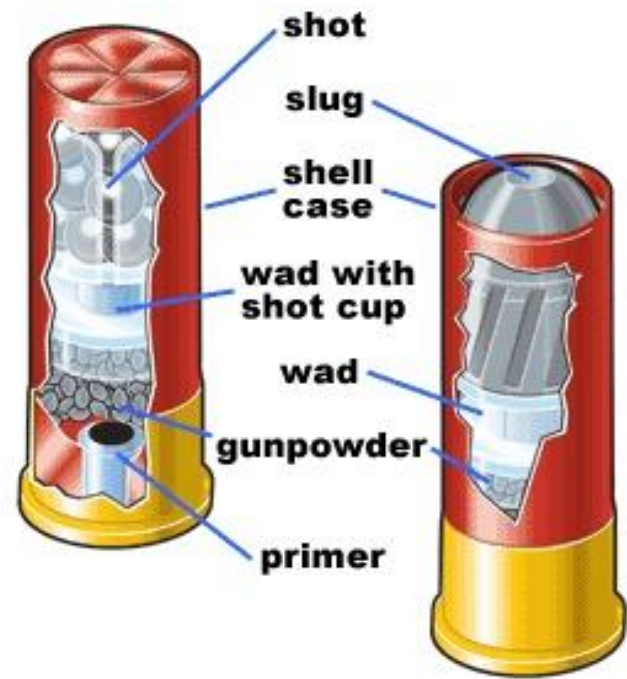
JUDO Point



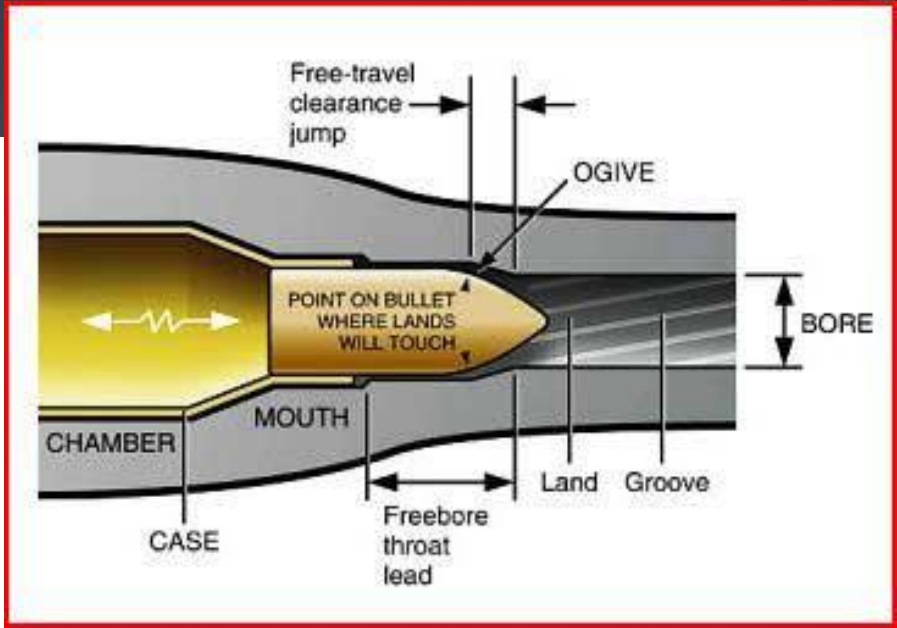
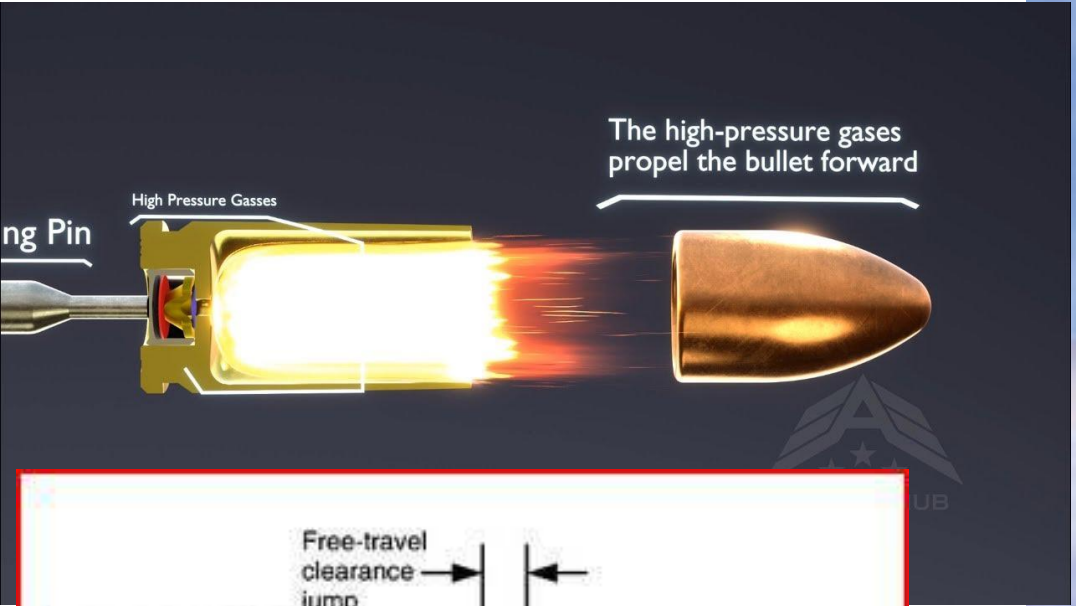
Fish Point



Broadhead Points



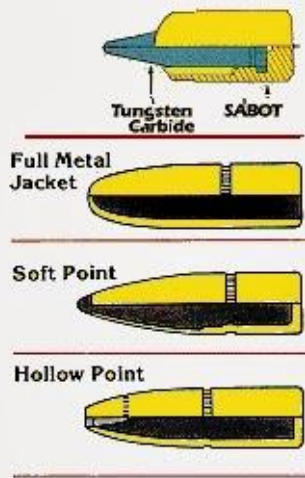
Ballistics



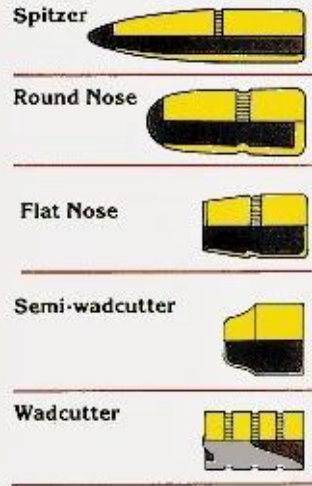
Caliber	Average Velocity (fps)					
	Muzzle	100	200	300	400	500
.223 Win/5.56 NATO	3,209	2,748	2,332	1,953	1,618	1,339
.270 Win	3,005	2,739	2,489	2,253	2,032	1,826
.300 Win Mag	2,980	2,742	2,516	2,302	2,099	1,908
.30-06 Springfield	2,867	2,600	2,350	2,117	1,899	1,700
.308 Win	2,698	2,485	2,261	2,060	1,872	1,698

Ballistics

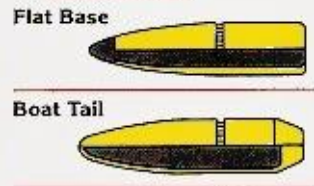
TIP SHAPES



OGIVE SHAPES



HEEL SHAPES

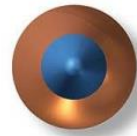


48%



EXTREME POINT™

22%



Classic Plastic Tip design

8%



Traditional Soft Point



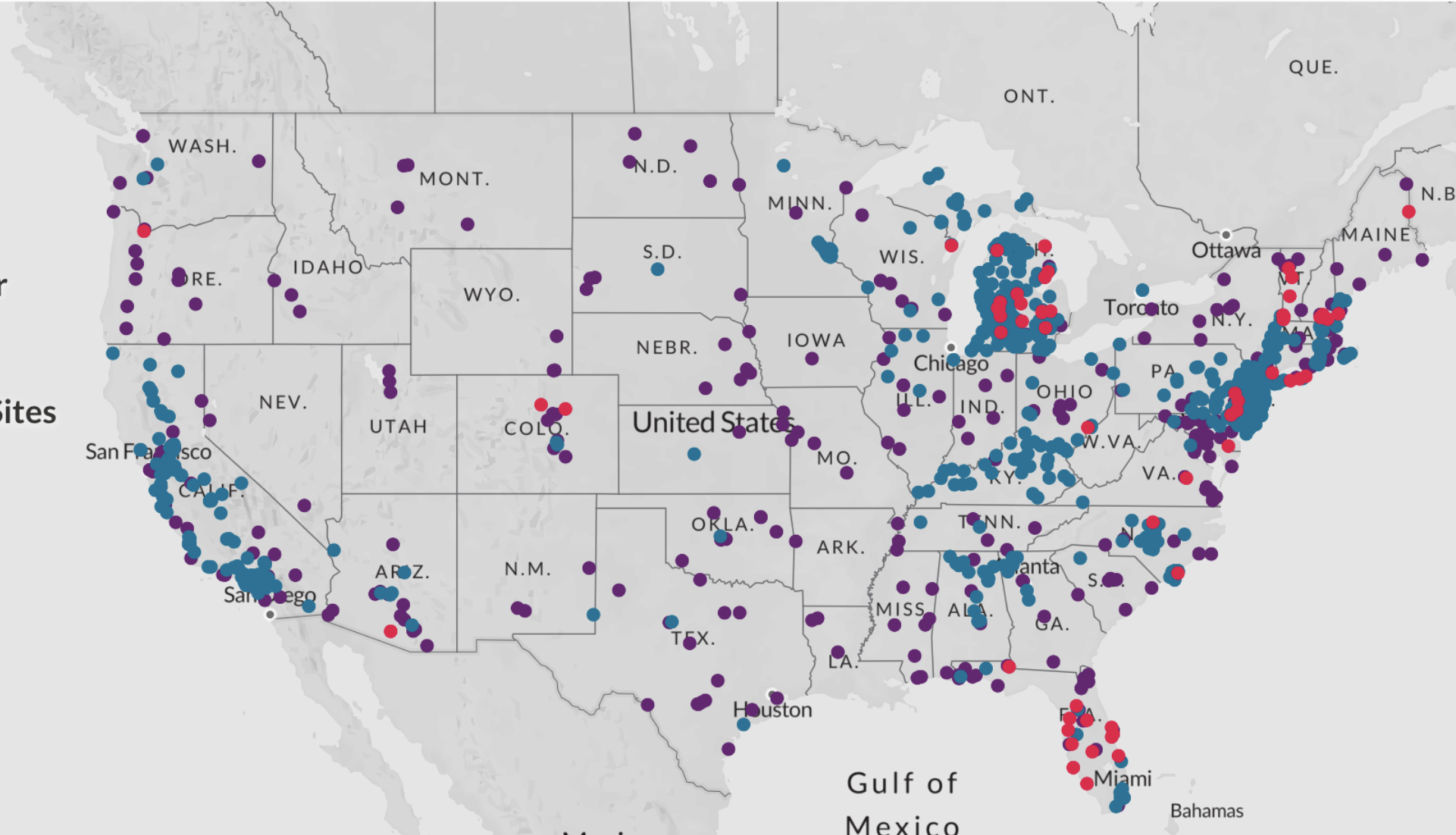
Toxicology

- PFAS?
 - Perfluoroalkyl Substances (Family of many sub compounds)
 - Manmade substances used in carpeting, waterproof clothing, upholstery, food paper wrappings, personal care products, fire-fighting foams, metal plating, non-stick cookware
 - Resistant to heat, water and oil
 - Ingested with water or food
 - Bioaccumulates



PFAS Contamination in the U.S.

- On** Military Sites
- On** Drinking Water
- On** Other Known Sites

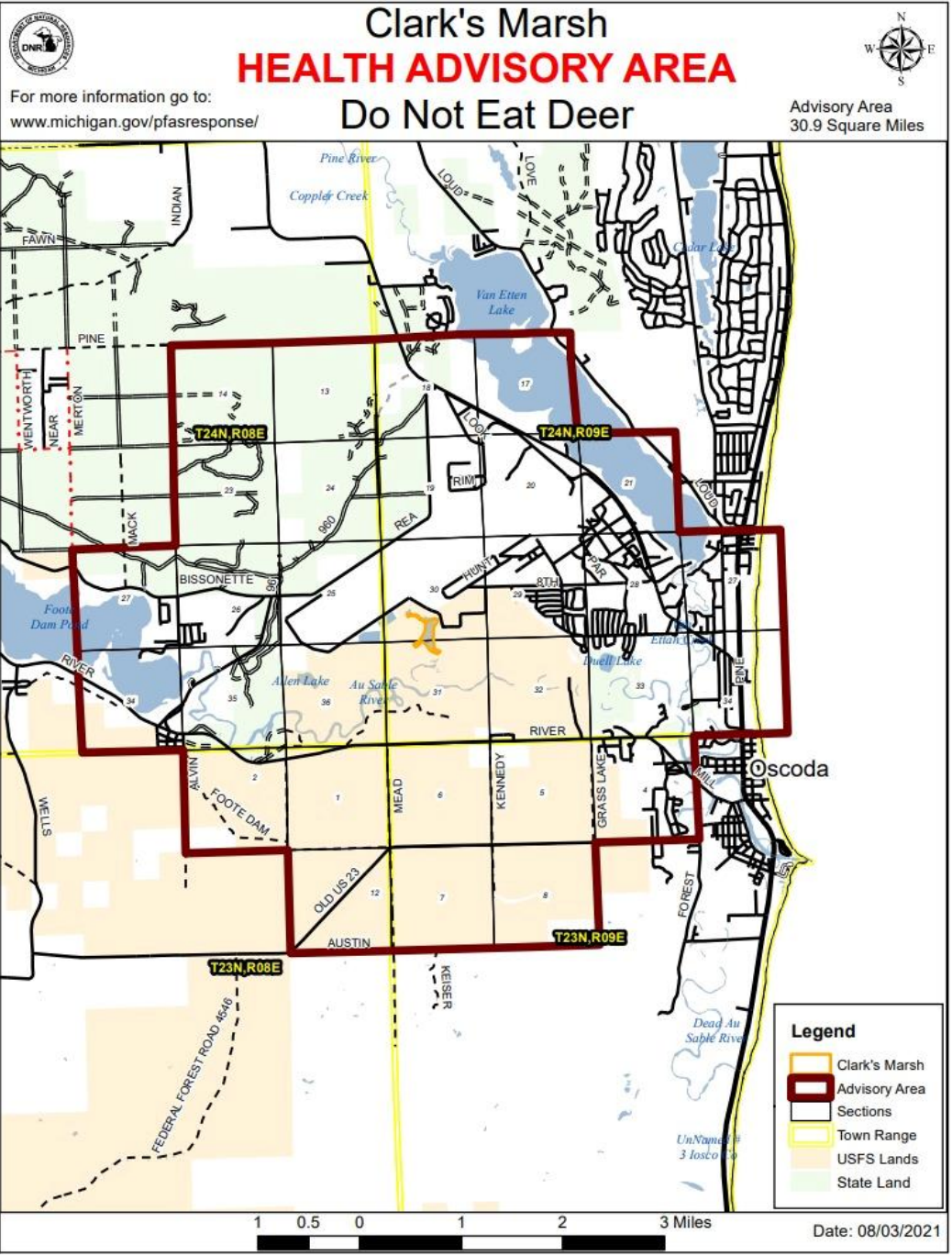


PFAS

- Research is ongoing for long term health effects and how to get rid of this substance from the environment
- Believe there is a link to CKD, testicular CA, kidney CA, liver disease, high cholesterol, blunted growth and development, immune system dysfunction
- OK, why are we talking about this...

PEAS

•



Infectious Diseases

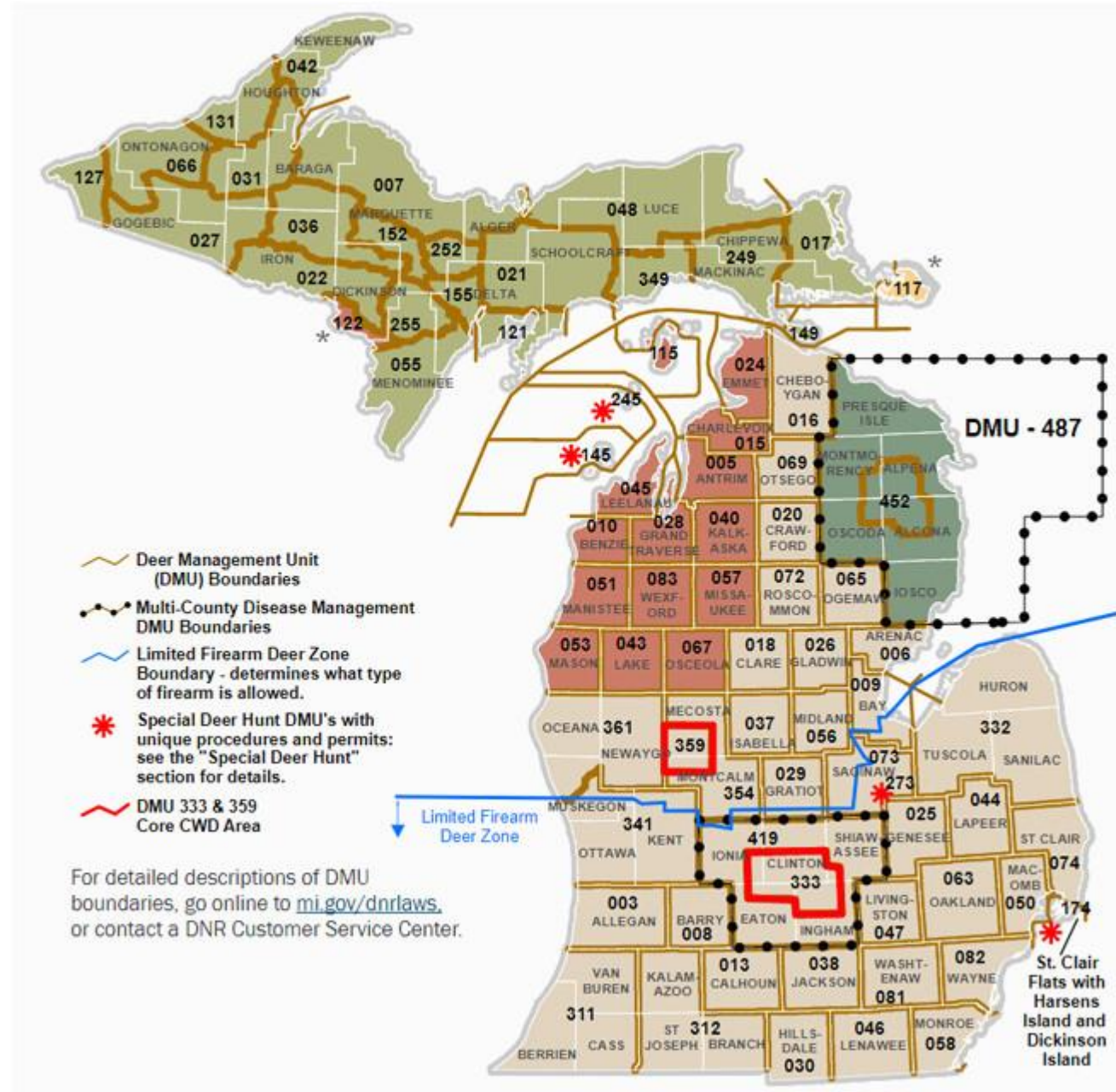
- Bovine Tuberculosis (bTB)
- Chronic Wasting Disease (CWD)
- Epizootic Hemorrhagic Disease (EHD)
- Ticks/Lyme's Disease



Bovine Tuberculosis

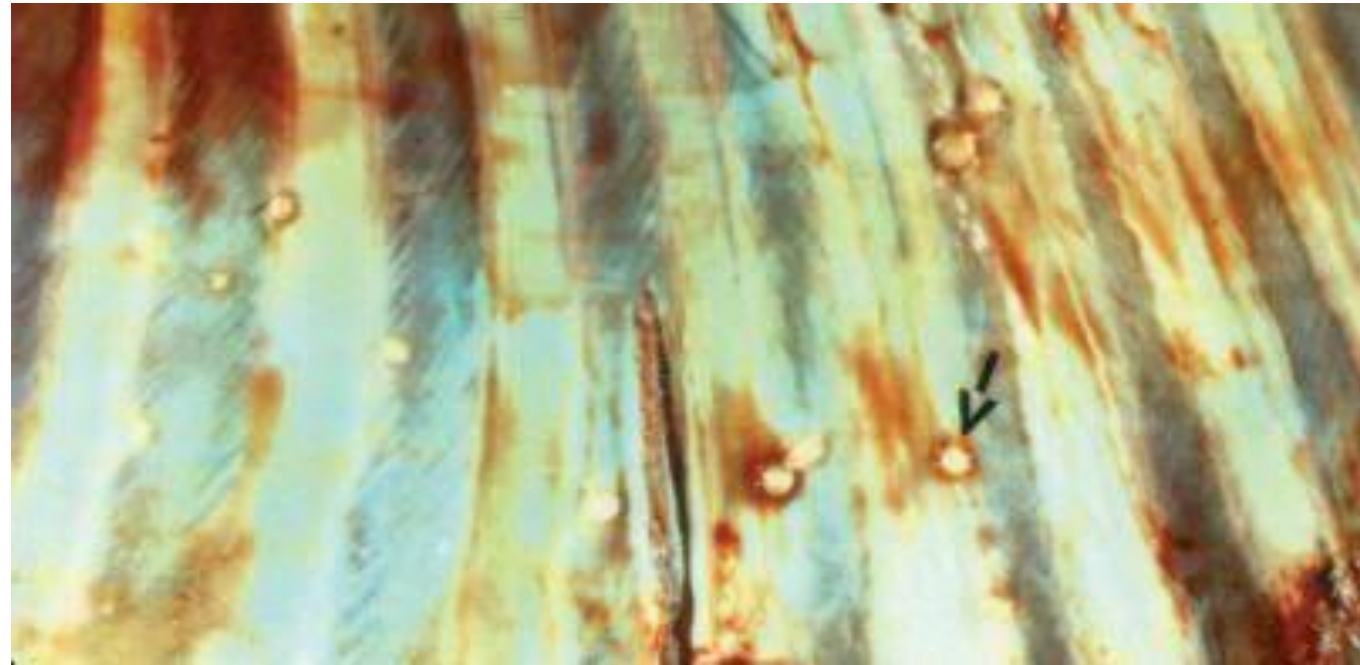
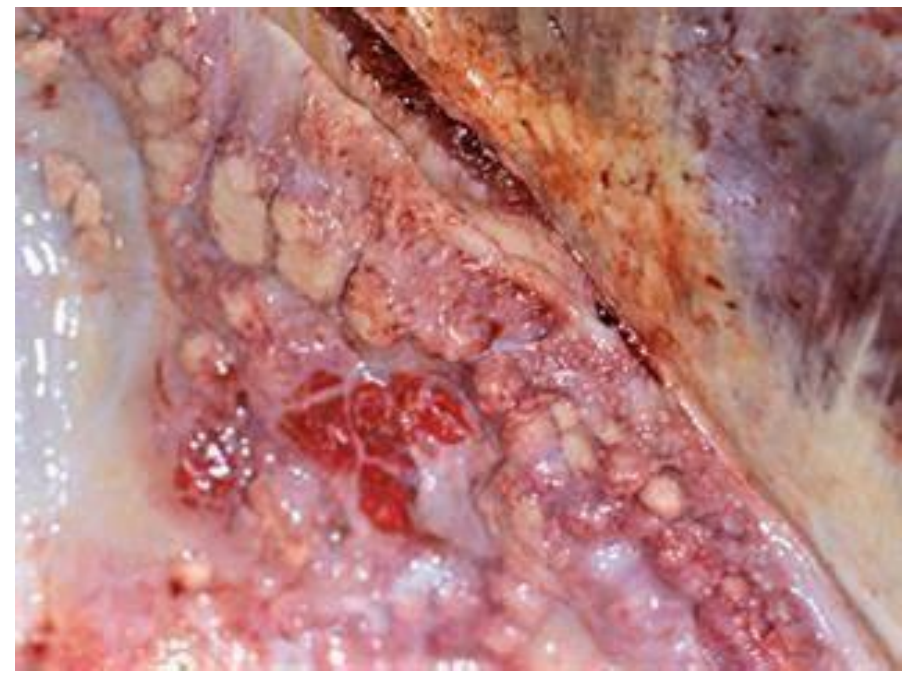
- Bovine TB (bTB)
 - *Mycobacterium bovis*
 - 998 deer have tested positive in this area since 1975

County name	Total tested	Number positive
Alcona	743	9
Alpena	1269	12
Cheboygan	168	0
Crawford	201	2
Iosco	339	1
Montmorency	598	0
Ogemaw	363	1
Oscoda	552	3
Otsego	233	0
Presque Isle	456	0
Roscommon	272	0
Z - Total for 2022	5194	28



[Bovine tuberculosis testing data \(michigan.gov\)](http://michigan.gov)

Bovine Tuberculosis



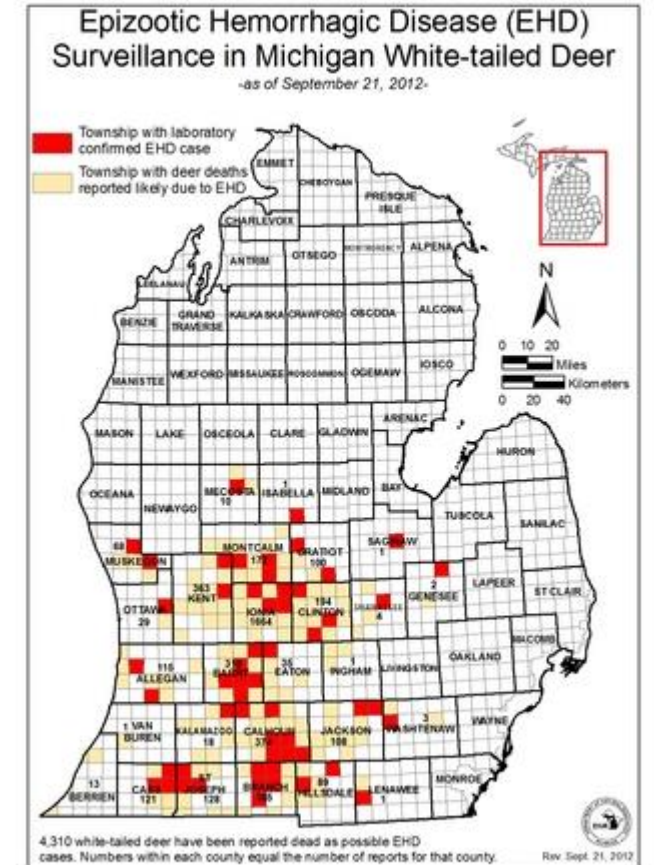
CWD

- CWD is prion disease
- Similar to BSE/Mad Cow or Scrapie
- 2022 Michigan tested 10,200
 - 16 Positive Cases
- Since 2015, 249 cases in MI
- ZERO cases in humans
 - Theoretical threat



Epizootic Hemorrhagic Disease (EHD)

- Caused by a virus, spread by *Culicoides*, a biting fly or midge
- No direct transmission
- Develop symptoms in 7 days from bite
- Responsible for concentrated mass die offs
- Deer lose appetite and fear of humans. Foam at the mouth. High fever, heart rate and respiratory rate. Rapid weight loss. Many times found laying in water or dead in the water to bring temp down



Ticks

1 inch



Actual Size Comparison **MI Tick ID Card**

Blacklegged (Deer) tick

 1 inch

American dog (Wood) tick

 1 inch

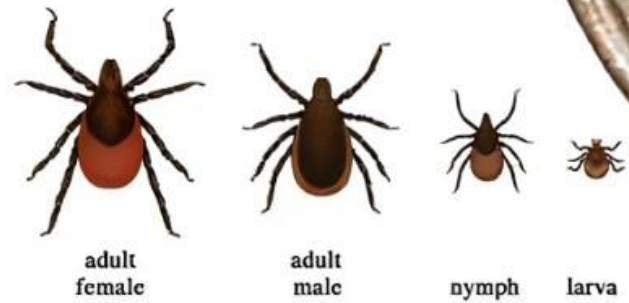
Lone star tick

 2 inch

Female, Male, Nymph, Larva

Common ticks found in Michigan
 From left to right: Blacklegged tick nymph, Blacklegged tick female, Lone star tick female, American Dog tick female

Blacklegged Tick (*Ixodes scapularis*)



Lone Star Tick (*Amblyomma americanum*)



Dog Tick (*Dermacentor variabilis*)



2

Pop quiz



Rocky Mountain Spotted Fever

- *Dermacentor variator*
- *Rickettsia rickettsii*
- Starts with fever
- Rash starts 2-4 days
- Doxycycline 100%

Doxycycline saves lives!

A good reason to smile:

Doxycycline is the **#1 recommended treatment** for suspected rickettsial infections in patients of all ages.

New research shows **NO** evidence of tooth staining when used in short courses.

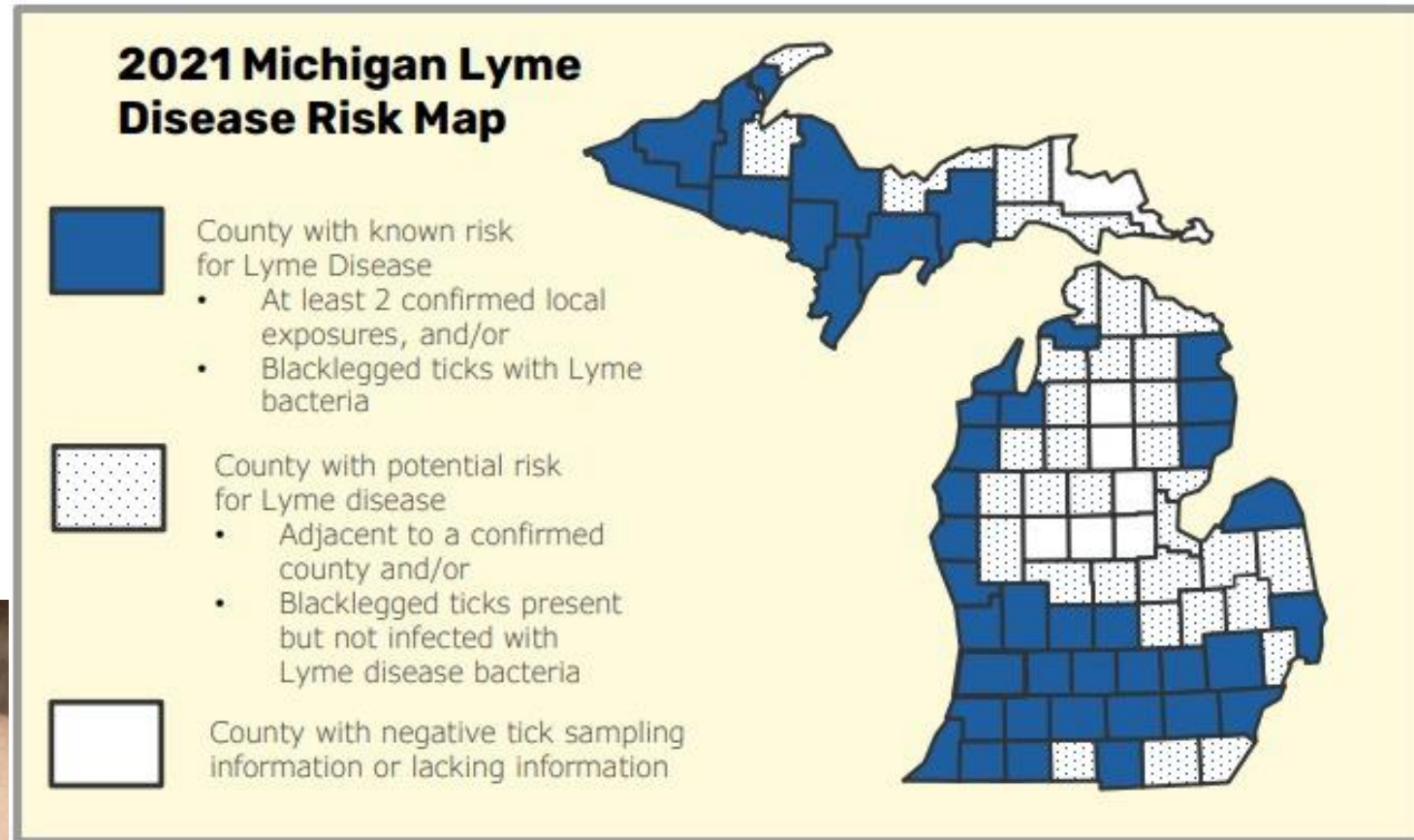


[Click to learn more.](#)



Lyme Disease

- *Borrelia burgdorferi*
- Spread by *Ixodes scapularis*





Questions???