

Stocked vs. Wild Fisheries

Jay Wesley

Michigan Department of Natural Resources

Fisheries Division



Why do we stock fish?

- Restoration of fish populations
- Provide diverse sportfishing opportunities
- Improving ecosystem balance





Where do we stock fish?

- ▶ Streams with adequate temperature and cover
 - ▶ Reproduction limited/non-existent
- ▶ Lakes
 - ▶ 2 story-trout
 - ▶ Prey control
 - ▶ Diverse fisheries and restoration





What species do we stock?

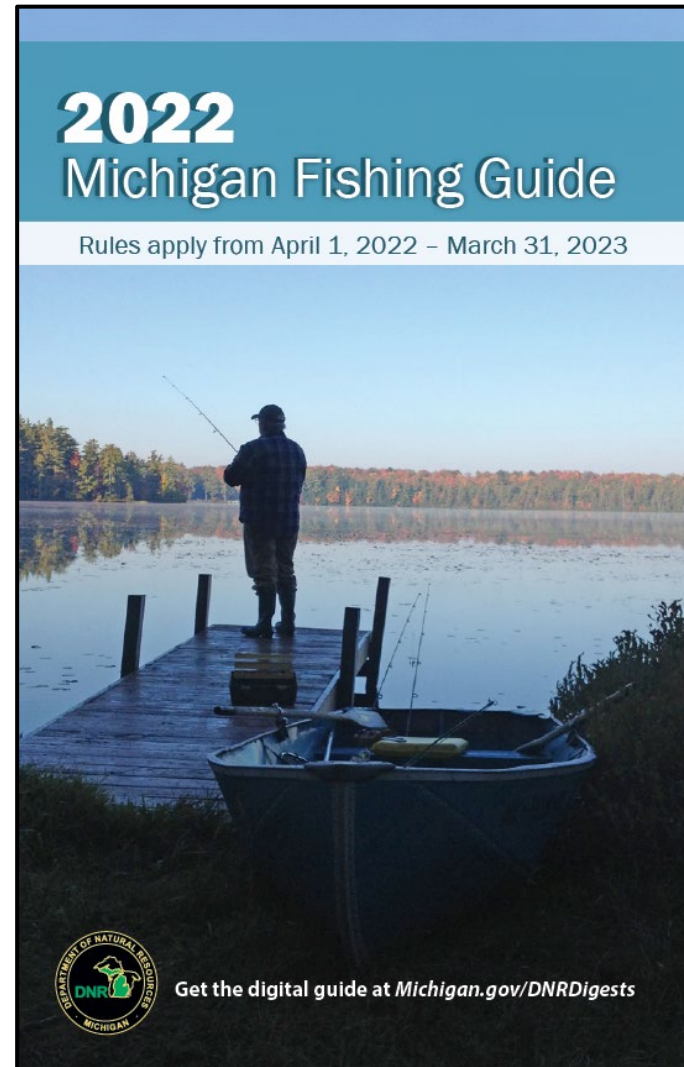
- ▶ Chinook, Coho, Atlantic Salmon
- ▶ Brook, Brown, Rainbow, Lake Trout
- ▶ Splake, Cisco
- ▶ Walleye, Musky, Sturgeon





Fishery Management Considerations

- ▶ Availability
- ▶ Stocking densities
- ▶ Costs
- ▶ Regulations





How many waterbodies are stocked annually?

- ▶ Lakes: 3.8%
- ▶ Streams: 2.7%
- ▶ Fish Production accounts for 1/3rd of our annual budget
- ▶ Success is uncertain, multiple risks include:
 - ▶ Infrastructure failure
 - ▶ Pathogen control
 - ▶ Weather and predators
 - ▶ Water quality
 - ▶ Available food resources





2022 rearing costs per fish for select species

Species	Cost
Brown trout yearling	\$1.34
Brook trout yearling	\$4.83
Rainbow trout yearling	\$1.75
Coho yearling	\$0.78
Chinook spring fingerling	\$0.43
Musky fall fingerling	\$9.17
Walleye fall fingerling	\$4.74
Walleye spring fingerling	\$0.07



Viability of stocking

- ▶ Yes and No!
- ▶ High profile fisheries with high use and benefits
- ▶ Small lakes and streams
 - ▶ Drive anglers to these waters
 - ▶ Trout Trails
 - ▶ Popular news articles
 - ▶ Social media



Stocking isn't always necessary!

- ▶ Most waterbodies support natural populations
- ▶ Vast majority of Michigan species don't require stocking
- ▶ Natural reproduction is substantial
- ▶ Warm water species fare better than cold water species



Trout facts

- ▶ Streams produce much more than hatcheries
- ▶ 17,000+ miles of trout streams produce:
 - ▶ 15 million brook and brown trout
 - ▶ 5.5 million age 1
 - ▶ 4+ times hatchery production





More trout and salmon facts

► Our 6 hatcheries produce:

- All stocking activities need evaluations
- 10-year or less evaluation cycle preferred

Species	Amount
Brook trout	70,000
Brown trout	1.1 Million
Chinook	1.4 Million
Coho	1.8 Million
Steelhead	1.2 Million





Performance of hatchery trout

- ▶ Multiple studies show that hatchery trout grow and survive less than wild trout
- ▶ Wild strains (Sturgeon River and Gilchrist) survive better than domesticated strains
- ▶ Favorable characteristics of wild strains tend to diminish over time in the hatchery
- ▶ Managers must scrutinize which waters to stock



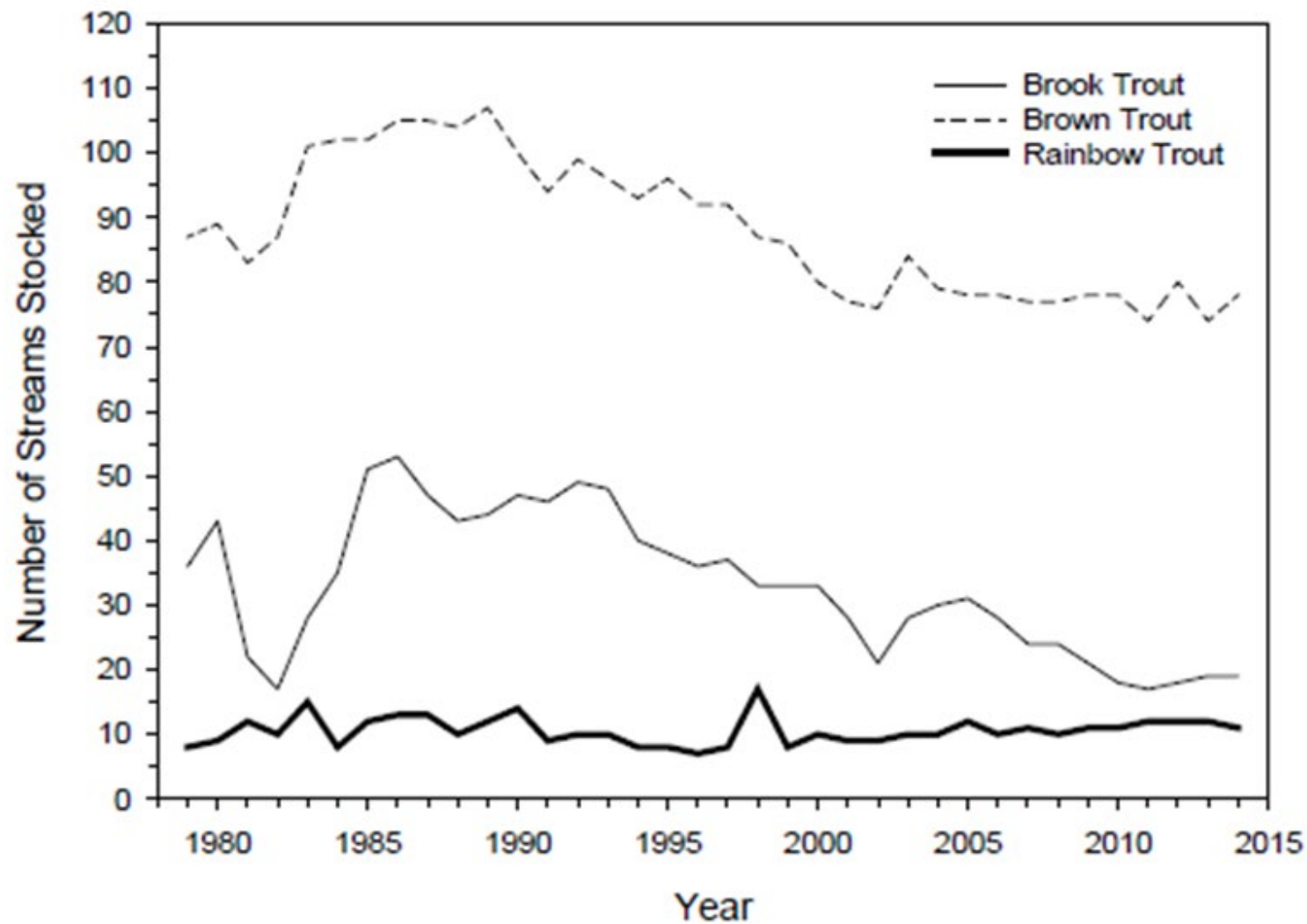
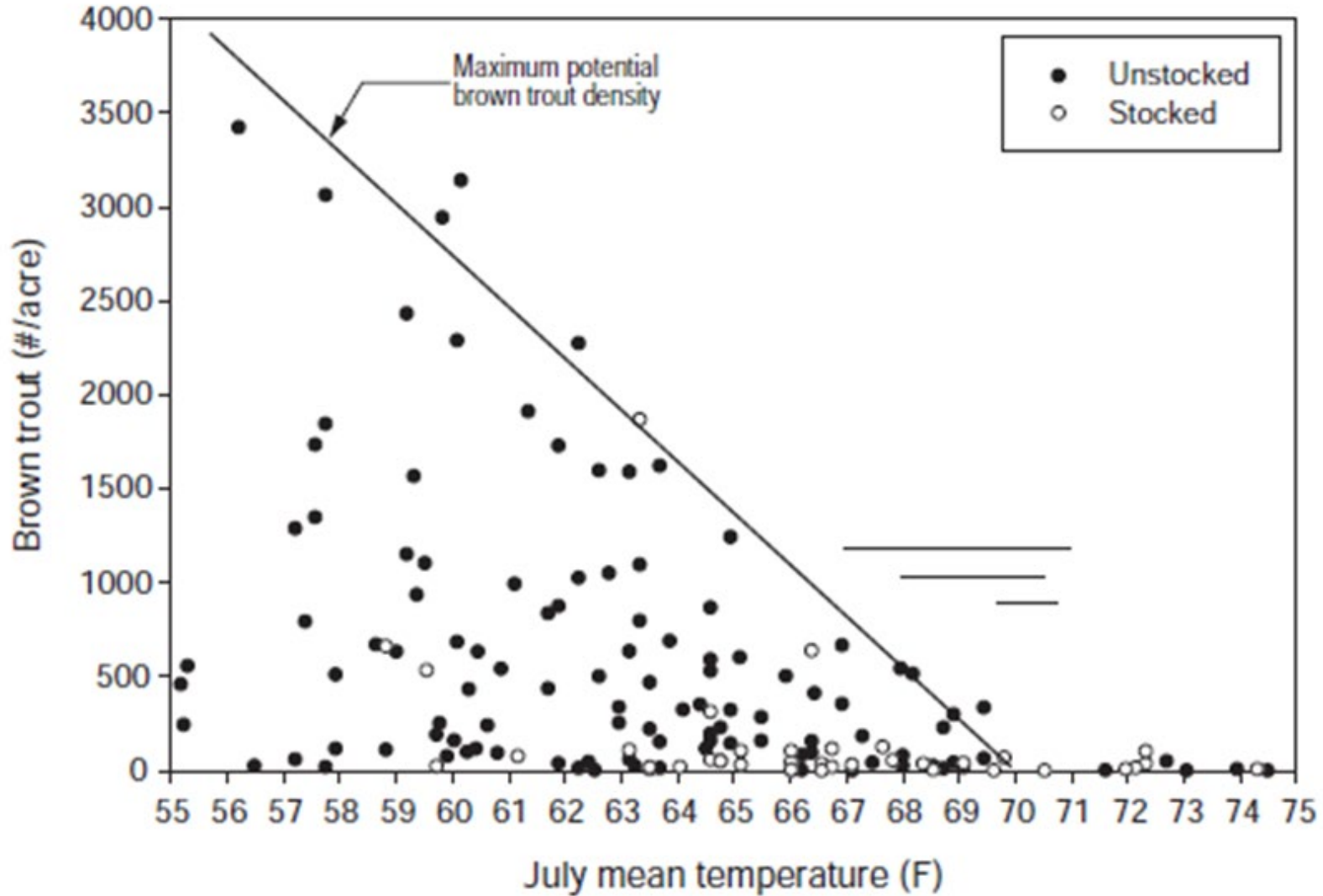


Figure 19.—Numbers of streams stocked with Brook, Brown, and Rainbow trouts for inland fisheries management purposes during 1979–2014. Data from MDNR Fisheries Division’s, Fish Stocking Information System.





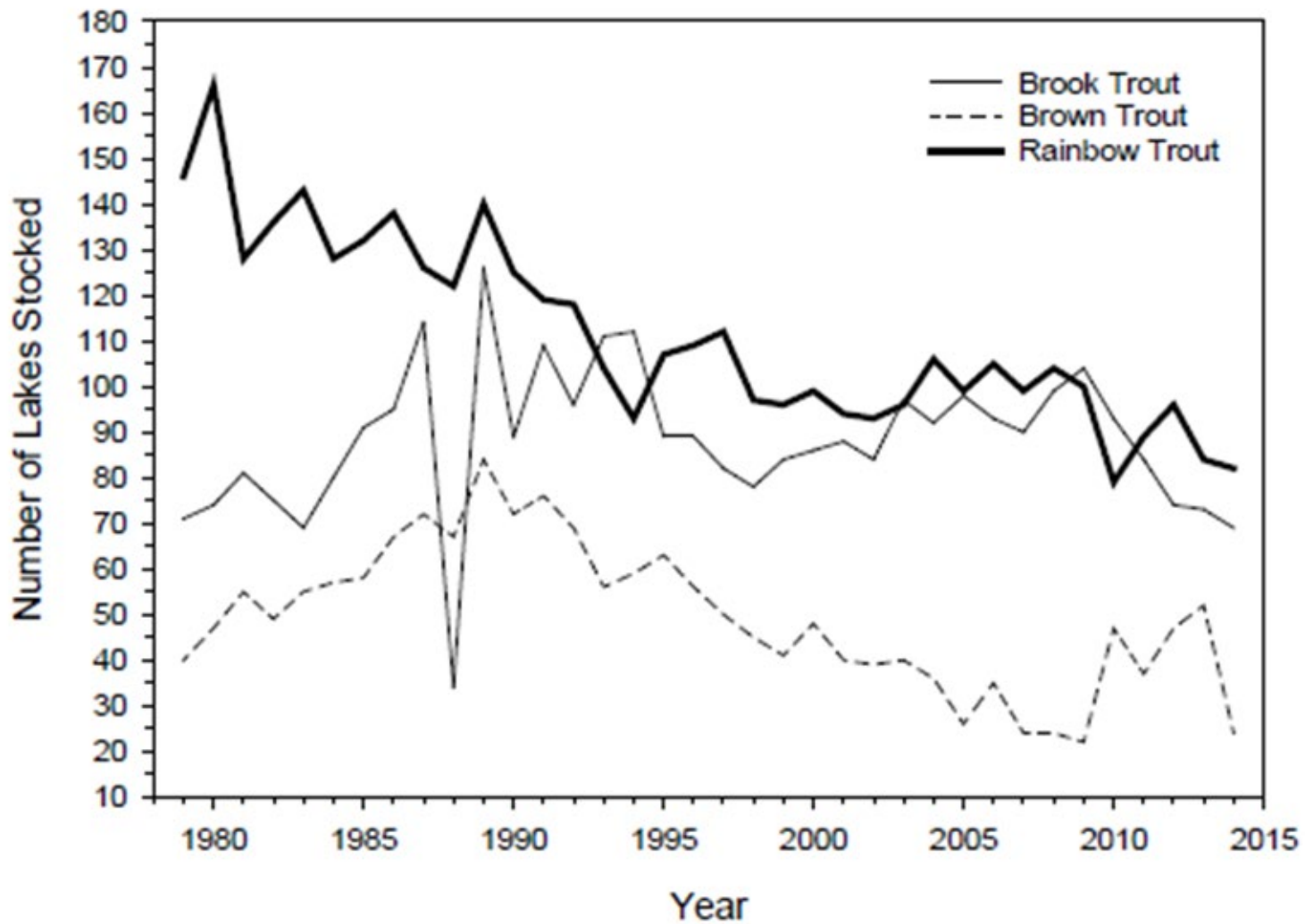


Figure 20.—Numbers of inland lakes stocked with Brook, Brown, and Rainbow trouts during 1979–2014. Data from MDNR Fisheries Division’s, Fish Stocking Information System.



Fisheries Division prefers wild fisheries

- ▶ Lower costs
- ▶ Less risk
 - ▶ Balance
 - ▶ Disease
 - ▶ Genetics
 - ▶ Adaptability
- ▶ Wild fish know their local environments





Anglers prefer wild fisheries

- ▶ Angler survey 2014: wild rated higher than stocked
- ▶ Higher perceived value than stocked fisheries
 - ▶ Wild fisheries heighten public interest
 - ▶ Wild fisheries promote stewardship



Take home messages

- ▶ Hatcheries allow managers to achieve management objectives
- ▶ Stocked fisheries are expensive to maintain
- ▶ Stocked and wild fisheries are expensive to evaluate
- ▶ Wild fisheries typically require less attention
- ▶ Manage to capacity of the system is paramount





Stocked and naturalized Steelhead in Lake Michigan

September 8, 2022

NRC Meeting

Lansing

Jory Jonas- Research Biologist, Fisheries Division



Rationale for stocking:



Benefits

- 1) Create fishing opportunities
- 2) Reestablish declining or extirpated populations

Costs

- 1) Financial cost to rear and transport fish
- 2) Potential genetic concerns
- 3) Ecological concerns
 - Competition (for food and spawning habitat)



Rationale for naturalized fish:

Benefits

- 1) Natural selection and local adaptations.
- 2) Better acclimated to environment (lower predation losses, better at feeding)
- 3) No cost to produce

Costs

- 1) All rivers aren't suitable for reproduction
- 2) More variability





History of steelhead in the Great Lakes (Part 1)

- ▶ Steelhead are not native to the Great Lakes.
- ▶ 1st introduced in 1876

146 years in Great Lakes



1 million years for speciation to occur

- ▶ Even subspecies designation requires time and reproductive isolation.
- ▶ Rapid evolution in Great Lakes as steelhead adapted to fresh water.

Willoughby, J.R., Harder, A.M., Tennessen, J.A., Scribner, K.T., Christie, M.R., 2018. Rapid genetic adaptation to a novel environment despite a genome-wide reduction in genetic diversity. *Mol. Ecol.* 2018, 1-11.





History of steelhead in the Great Lakes (Part 2)

- ▶ Little Manistee River likely one of the first colonized by introduced trout
- ▶ Multiple hatchery strains with evolved tendencies to enter rivers at different times of the year have been stocked to extend the duration of once seasonal fisheries.

Summer steelhead

- Four strains (Rogue, Skamania, Siletz, and Umpqua)

Winter steelhead (varying spawn times)

- Michigan, Little Manistee River (McCloud River, CA)
- Chambers Creek, Washington
- Ganaraska, Ontario
- Kamloops, British Columbia



Genetic stock considerations:

- ▶ Genetic differences highest between hatchery strains in Lake Michigan steelhead (Bartron et al.).
- ▶ Changes in hatchery management practices increased relative contributions of hatchery steelhead to naturalized populations.
- ▶ Hatchery fish are contributing genetically even to non-stocked systems:
 - Increased numbers of genes in spawning adults from populations can be attributed to genes specific to recently introduced hatchery strains.
 - Higher than expected straying rates
 - The % of hatchery fish returning to the four rivers with naturalized populations ranged from 13% to 31% of total spawning runs.

Bartron, M.L., Scribner, K.T., 2004. Temporal comparisons of genetic diversity in Lake Michigan steelhead, *Oncorhynchus mykiss*, populations: effects of hatchery supplementation. *Environ. Biol. Fishes* 69, 395-407.

Bartron, M.L., Swank, D.R., Rutherford, E.S., Scribner, K.T., 2004. Methodological bias in estimates of strain composition and straying of hatchery-produced steelhead in Lake Michigan tributaries. *North Am. J. Fish. Manag.* 24, 1288-1299.

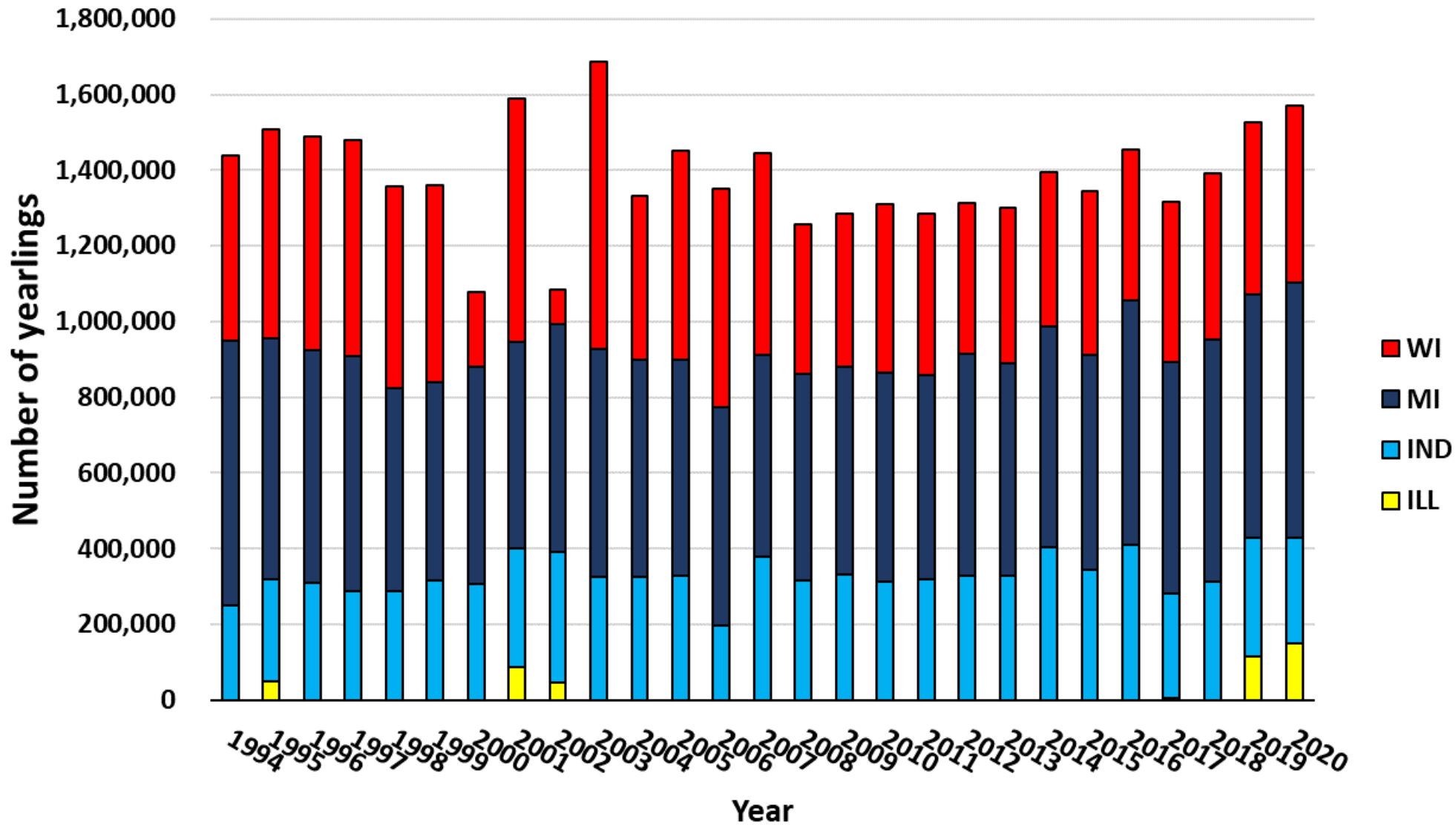


Other considerations:

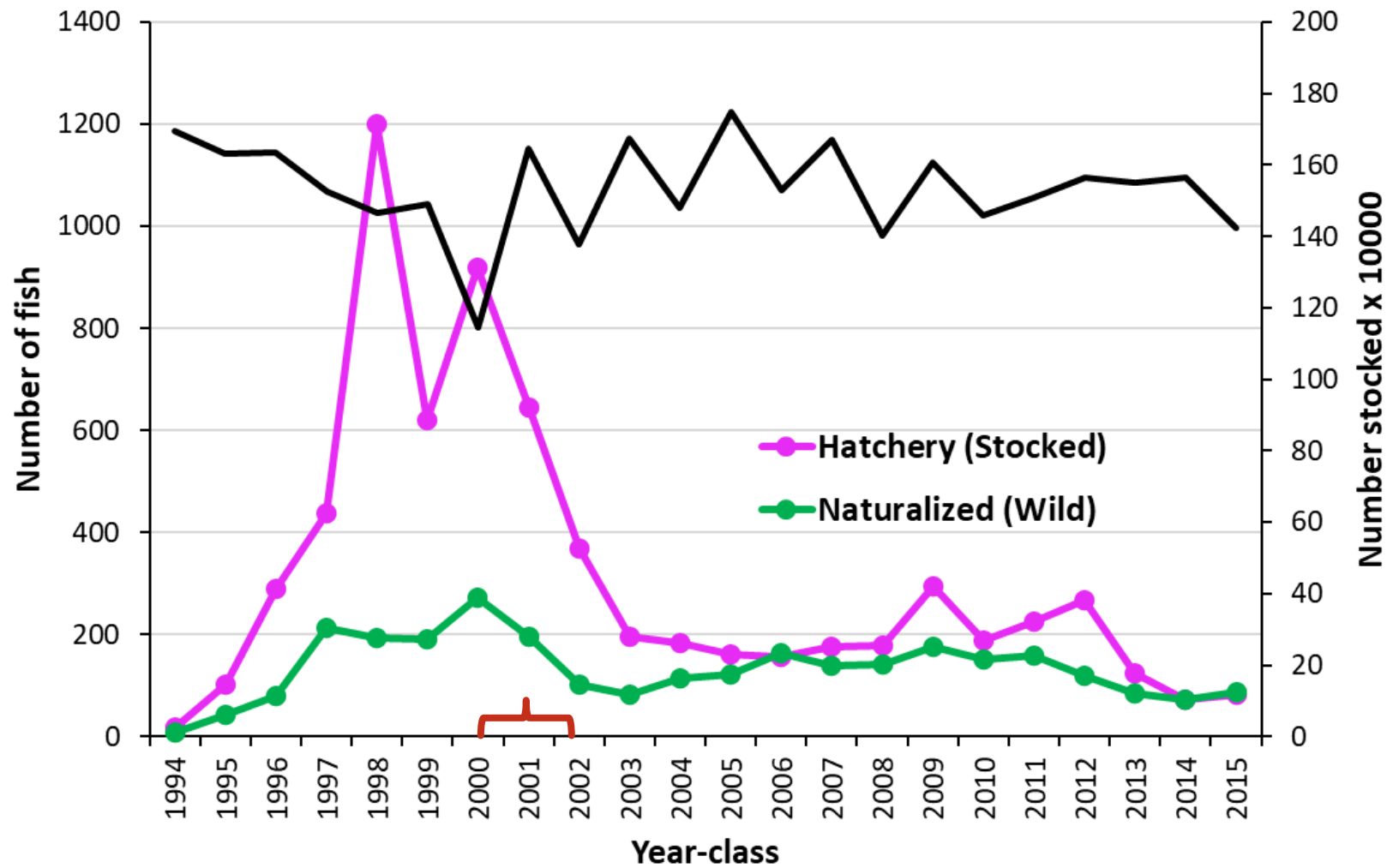
- ▶ Hatchery fish lower survival vs. naturalized fish
- ▶ Hatchery fish can be less effective spawners (lower fitness)
 - Fitness = “ability to contribute to future generations”
- ▶ Hatchery fish and alter adaptations due to natural selection (outbreeding depression)



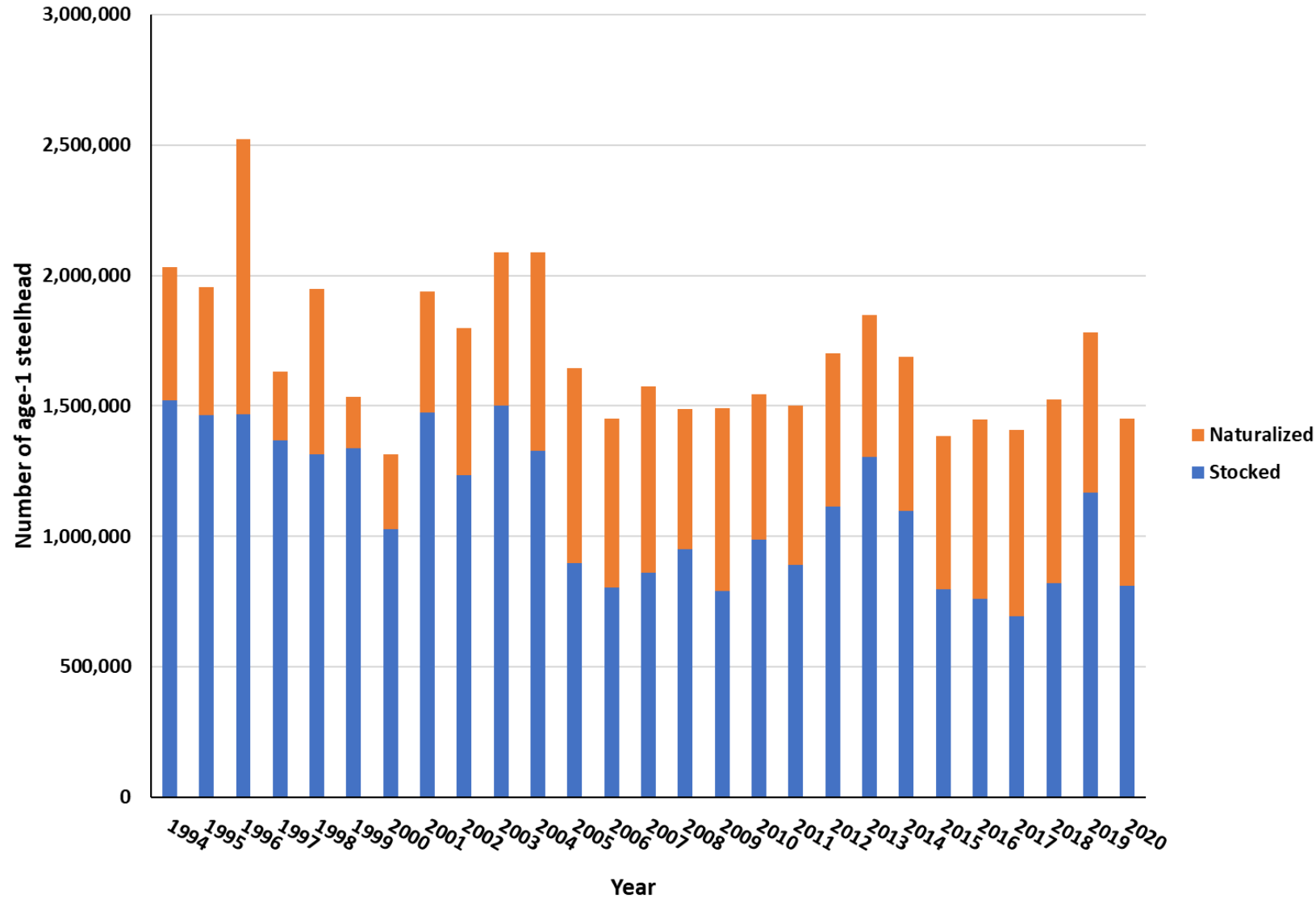
Current stocking practices for steelhead



Decreased survival of stocked steelhead

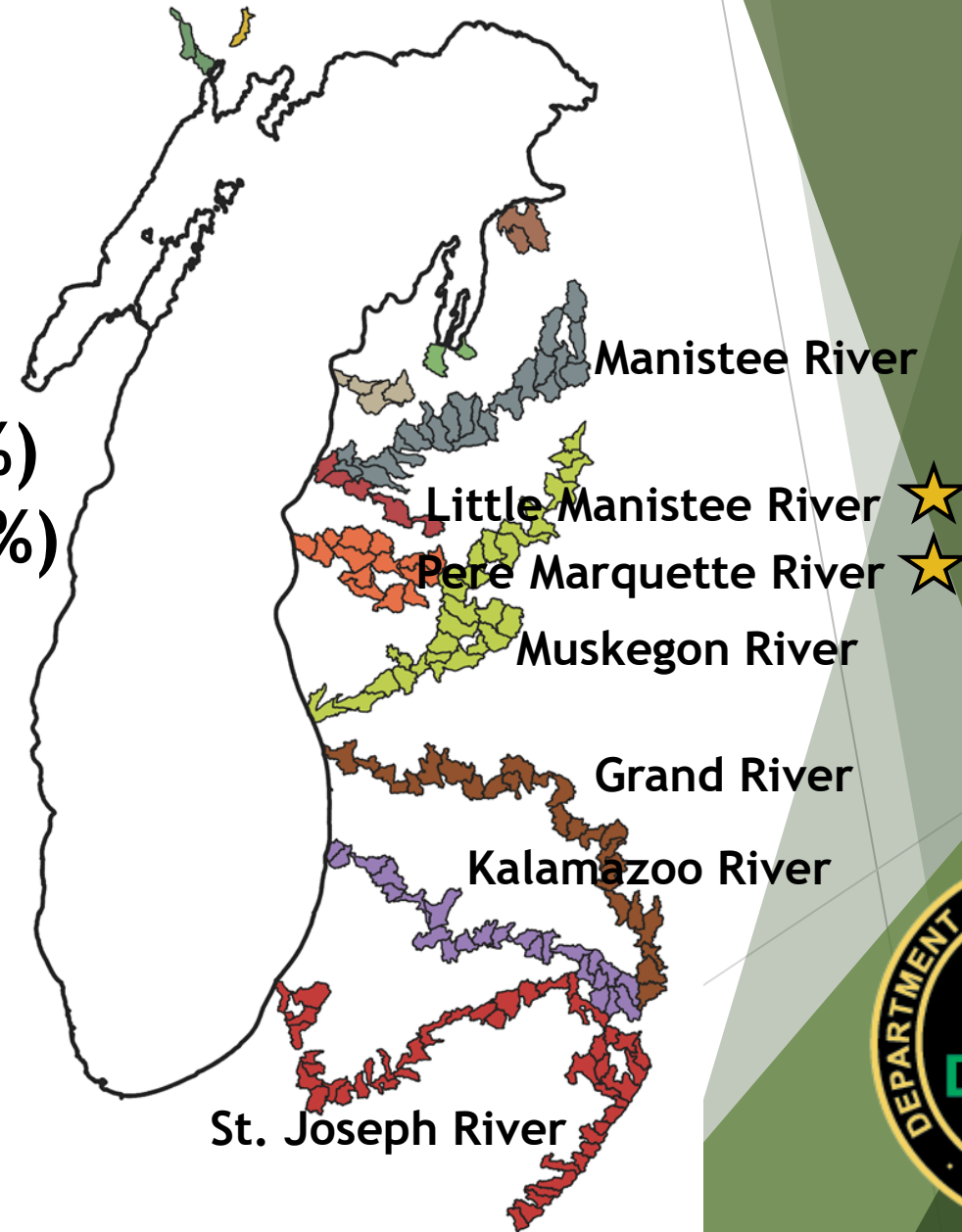


Proportion of stocked vs naturalized fish



Sources of Wild Steelhead Caught in Lake Michigan

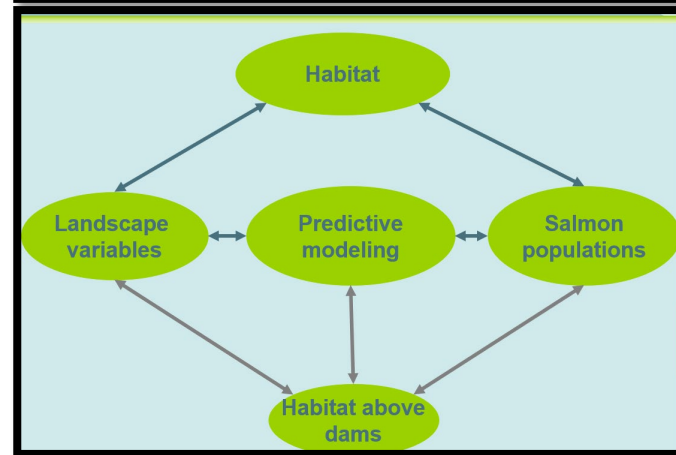
80% {
Little Manistee River (25%)
Pere Marquette River (18%)
Kalamazoo River (17%)
Muskegon River (11%)
St. Joseph River (9%)





Ongoing and Future research:

- ▶ Mortality sources for young stocked and wild steelhead.
- ▶ Recruitment bottlenecks. (predation on young steelhead)
- ▶ Evaluation of time spent in river prior to smolting





New study: Movement patterns and survival of out-migrating steelhead smolts in tributaries to Lake Michigan

Hypothesis 1: Stocked young steelhead will out-migrate earlier and during a shorter-time span than naturalized fish.

Hypothesis 2: Naturalized steelhead are less likely to be consumed by predators than stocked fish.

Hypothesis 3: The numbers of predators influence predation rates on young steelhead.



Preliminary investigation complete:

- ▶ Test survival of young steelhead after:
 - Surgeries
 - Tag insertion
 - Holding for 2 months

- ▶ Zero mortalities!!





Proposed project timeline:

Year	2023			2024		2025		2026	
Season	Winter	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Purchase/maintain tags and receivers	█								
North-Jordan River: Marking and monitoring*		█		█		█			
Mid-Manistee River: Marking and monitoring								█	
South-St. Joseph River: Marking and monitoring				█	█	█	█		
Hire graduate student-technician									█
Data summary-reports, manuscript writing			█	█	█	█	█	█	█

* 1st year is less expensive location only tag on Jordan River



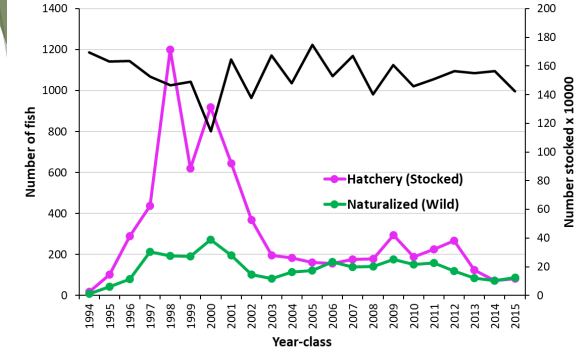


New finding, Smolt residency time for naturalized steelhead in streams is changing

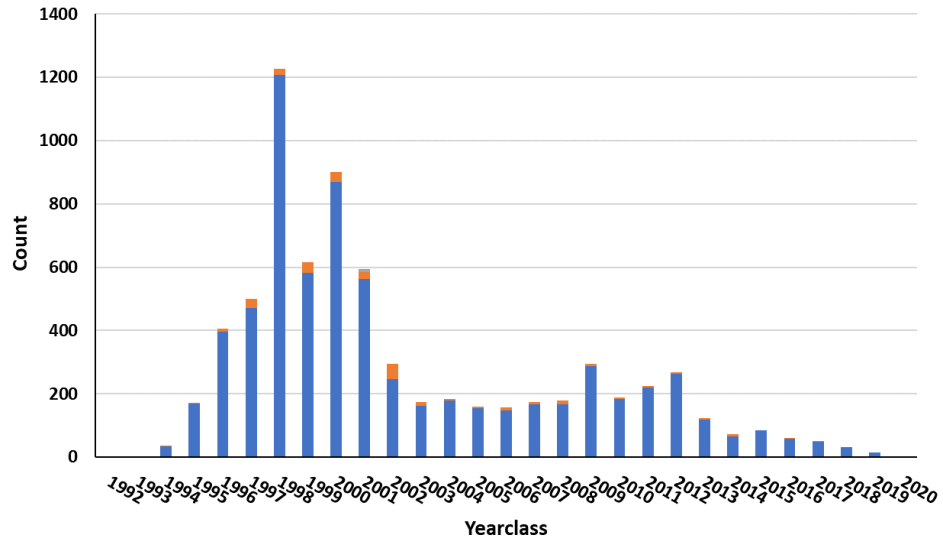


Stocked vs naturalized fish:

Recreational fishery

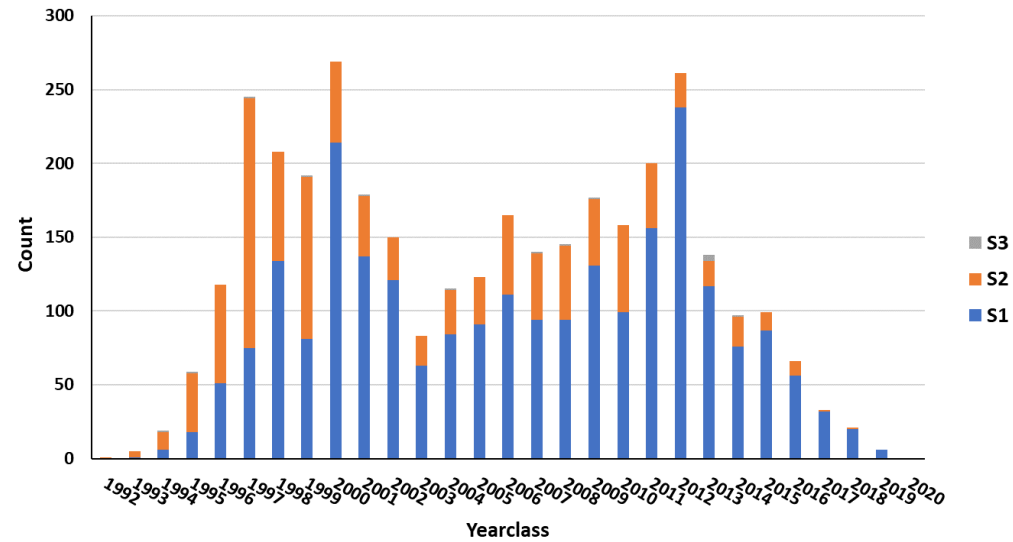


Hatchery



Average 96% S1

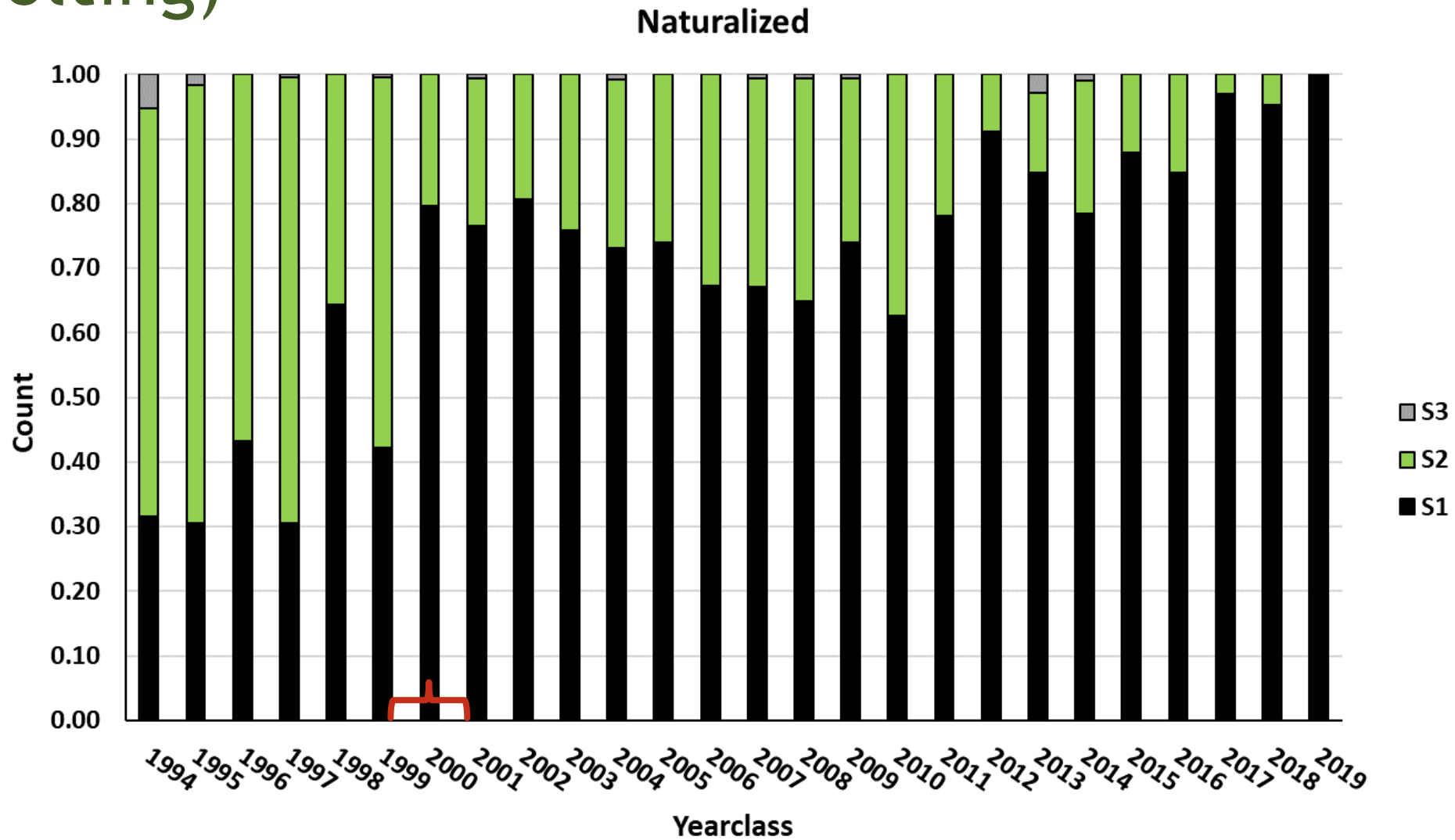
Naturalized



Average 71% S1



Recreational fishery age at out-migration (smolting)



Average 40%

Average 80%





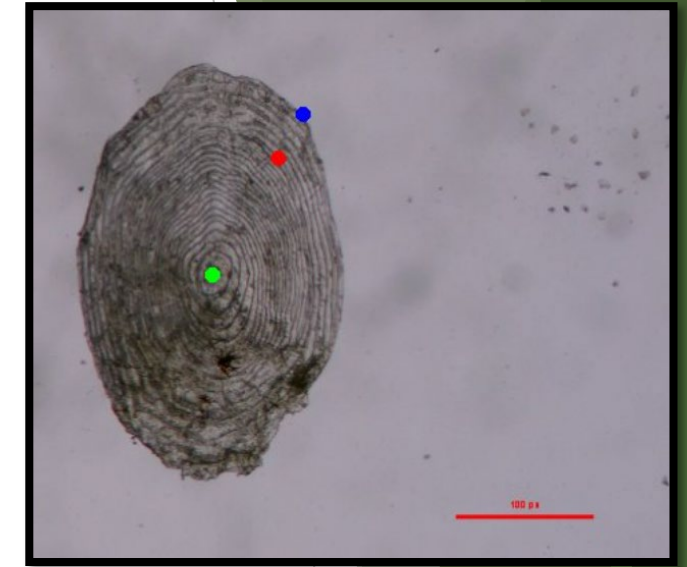
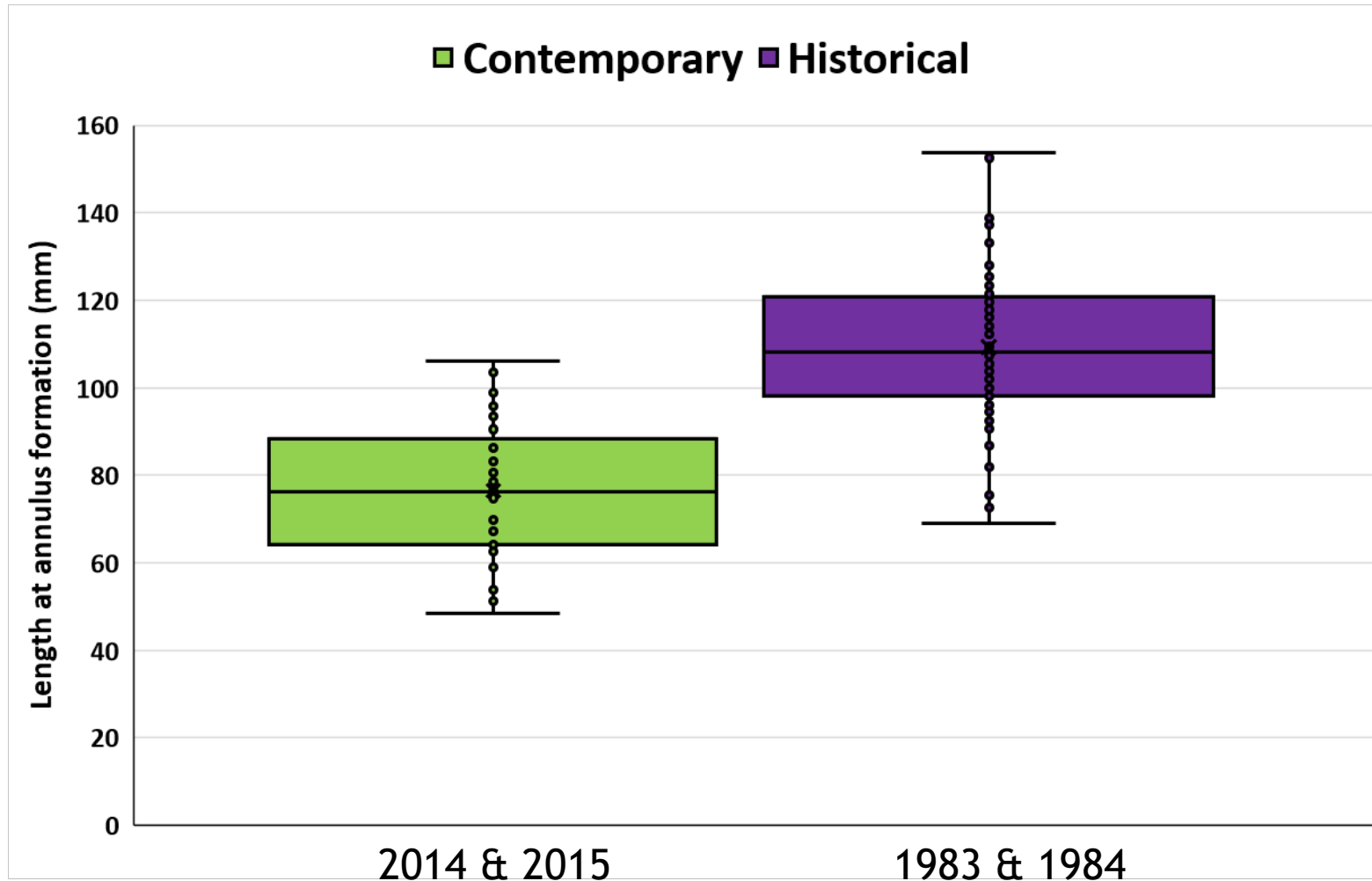
Given what you now know, what are your expectations for growth of young steelhead?

Pre-2020 vs post-2020





Summary from Little Manistee River Age-1 steelhead



Next steps: Similar analysis on adults from open lake fishery.



Thank you

Questions?



OVERVIEW OF CURRENT METHOD OF TAKE TRENDS

PRESENTED BY:
F/LT JASON WICKLUND, EMPLOYMENT,
TRAINING, LEGAL & TECHNOLOGY SECTION, LED
&
SARA THOMPSON, SPECIES MANAGEMENT UNIT
SUPERVISOR, WLD

September 2022
Prepared for NRC meeting





SUPPRESSORS

- June 26, 1934 – The U.S. congress passed a law regulating the use of certain firearms under the National Firearms Act (NFA).
- February 11, 2016 – The NRC approved the use of suppressors as a legal hunting method of take.
- Michigan allows for NFA item ownership as long as the items are duly registered in accordance with federal law. They must file an Alcohol, Tobacco and Firearms (ATF) form-4 application (available on the ATF website), which includes:
 1. photograph,
 2. fingerprint cards, and
 3. \$200 transfer tax.



SUPPRESSOR PROS

- In Michigan, you can use your suppressor for target shooting, home defense, hunting, or any other legal use.
- Helps protect against permanent hearing loss.
- May increase shot accuracy by reducing noise and felt recoil.
- Mitigates many of the hindrances associated with introducing newer generations to hunting.
- May lesson disruption of wildlife behavior with the use of suppressors.



SUPPRESSOR CONS

- Suppressor cost: \$350 – \$1,500+
- Tax stamp: \$200, no matter what kind of suppressor you purchase.
- NFA gun trust: FREE – \$500+
- Barrel threading: \$50 – \$100



CARTRIDGES - LIMITED FIREARMS DEER ZONE

- On June 12, 2014 – The NRC authorized a three year review to allow the use of straight-walled cartridges in the southern zone (limited firearm deer zone) for deer hunting. (Due to be rescinded on May 12, 2017)
- On May 11, 2017 – After the conclusion of the review process, the NRC approved the use of straight-walled cartridges permanently.
- Restricted the size of the cartridge to 1.80” (legal use) for the taking of deer.



CARTRIDGES - LIMITED FIREARMS DEER ZONE

FIREARMS CURRENTLY ALLOWED

- A shotgun with a smooth or rifled barrel and may be of any gauge.
- A .35 caliber or larger rifle loaded with straight-walled cartridges.
- A .35 caliber or larger air rifle or pistol.
- A muzzle-loading rifle or black-powdered rifle.
- A .35 caliber or larger pistol capable of holding no more than nine shells at one time in the barrel and magazine combined and loaded with straight-walled cartridges.



CARTRIDGE PROS

- Longer barrel rifle with straight-walled cartridges increases accuracy as compared to short-barreled firearms.
- Using rifles with straight-walled cartridges ensures that the firearm is sized appropriately to fit the physical abilities of participants in the Mentored Youth Hunting Program.
- Youth or small-statured hunters may prefer to use lighter rifles with less recoil than a shotgun.
- Paving the way for rifles such as the .45/70, 450 Bushmaster, and 350 Legend.



CARTRIDGE CONS

- Increased hunters on public lands.
- Densely populated areas of hunters may increase the number of hunting incidents.
- May increase the potential of hunting incidents due to increased range of projectiles.





TECHNOLOGY ADVANCES

- Some technologies available today have drastically impacted the way people hunt. In some cases, they also challenge the concept of fair chase.
- Over the last 30 years, probably no other piece of technology has changed the way we hunt deer, elk and bear in Michigan more than trail cameras.

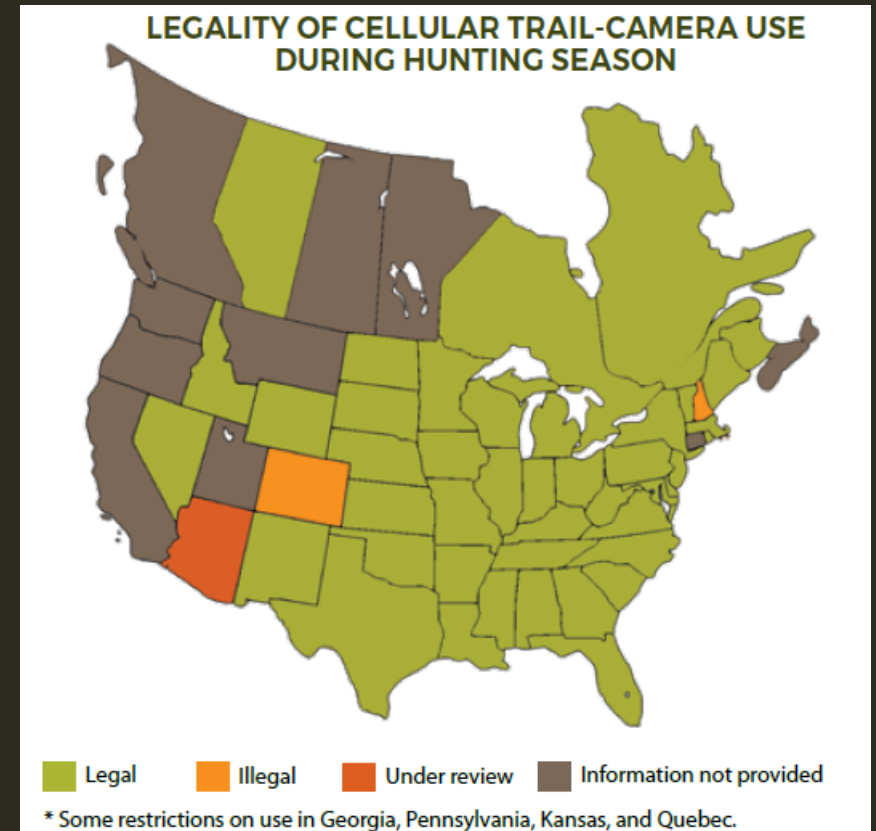
STATE POLICIES AND REGULATIONS

- Currently, Nevada and Arizona are the only states that have a full ban on the use of any trail cameras for hunting purposes.
- Montana, Utah, Kansas, New Hampshire, and Alaska have partial bans, prohibiting the use of cellular cameras during the hunting season.



CELLULAR TRAIL CAMERAS

- Hunters can purchase cameras that instantly send pictures to them in the form of a text or e-mail (**cellular trail cameras**).
- There is some public thought that cellular cameras have the potential to give the hunter an improper or unfair advantage **under certain conditions.**



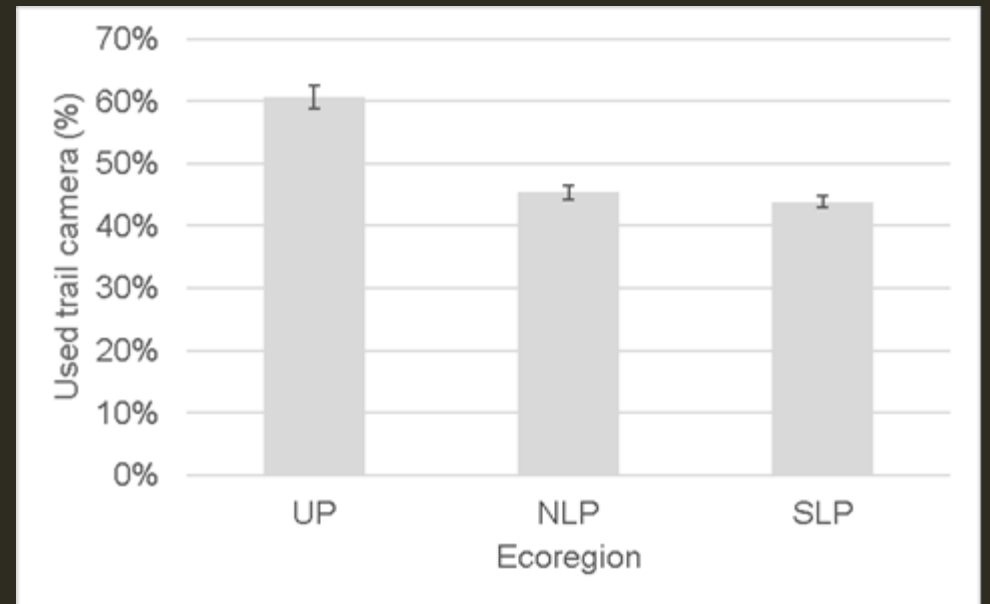
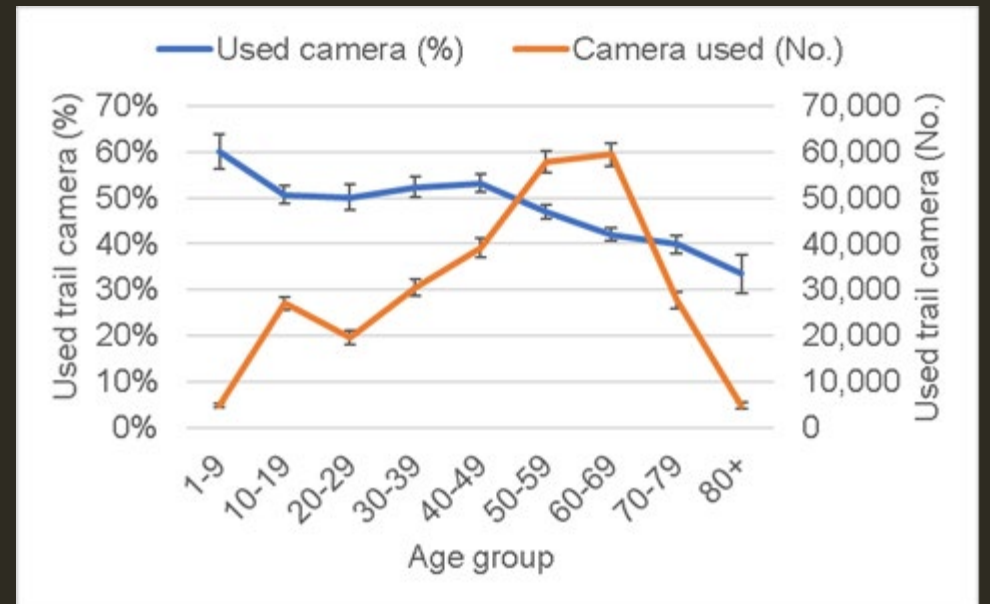


DNR VIEWPOINT

- There are multiple techniques used for hunting that might be considered fair by one hunter and unfair from another.
- The larger, more important questions:
 1. Is the technique negatively impacting the resource?
 2. Is the technique negatively limiting opportunities for others to participate or be successful?
- If the answer is **yes** to either one of those questions, then the technique should be evaluated.

TRAIL CAMERA USE

- In 2020, about **81% of bear** hunters and **47% of deer** hunters in Michigan used a trail camera.
- Among deer hunters, trail camera use is highest for the youngest hunters (**potential recruitment tool**).
- Deer hunters in the Upper Peninsula are more likely to use trail cameras than hunters in the Lower Peninsula.



DEER HUNTING SUCCESS MONITORING

- During 2018-2020, deer hunter success was **7-10 percentage points higher** for hunters that used a trail camera for all seasons combined.
- Success specifically not linked to trail camera use.

Year	Season	Camera	No camera	Difference
2018	All seasons	53.4%	43.9%	10%
2019	All seasons	53.7%	46.2%	7%
2020	All seasons	55.9%	47.3%	9%
2018	Archery	34.0%	30.0%	4%
2019	Archery	35.2%	31.4%	4%
2020	Archery	37.7%	32.3%	5%



BEAR HUNTING SUCCESS MONITORING

- During 2016-2020, bear hunters using cameras **generally** were more successful and more likely to take older bears than hunters that did not use a camera.
 - There is no evidence that this was related directly to trail camera use.
 - Small sample size of data
 - No statistically significant difference in success rate.



DNR VIEWPOINT ON CAMERA USE

Quotes by Chad Stewart – Deer and elk program specialist:

“I think for most (deer) hunters, trail cameras provide (the) enjoyment of seeing animals that are in nature, when they are not”.

“Because the cameras operate 24/7, it often provides a glimpse of animals they wouldn’t otherwise see while hunting. They can also help individuals survey their individual deer herd to help inform their local management decisions.”

“There is no guarantee that putting a trail camera up will lead to a successful harvest.”



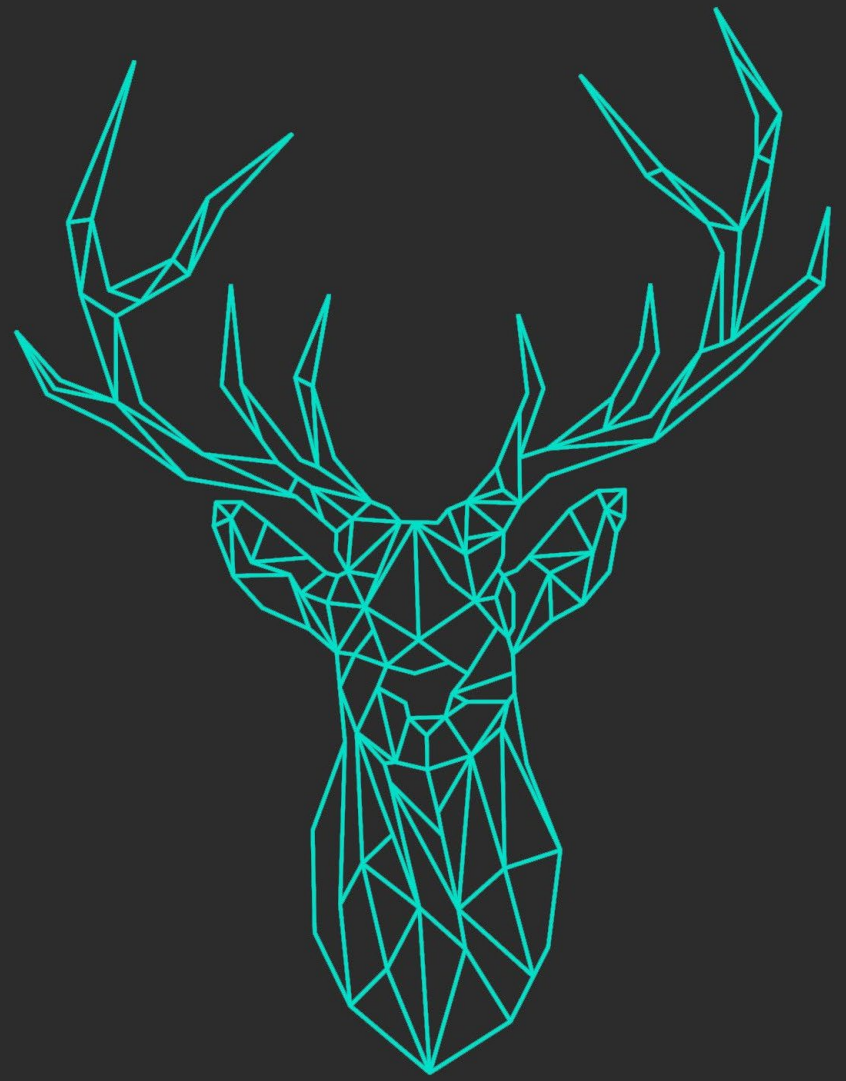
CONCLUSIONS FOR MICHIGAN:

There is no evidence that the use of trail cameras is negatively impacting the resource.

There is no evidence that the use of trail cameras is negatively limiting opportunities for others to participate or be successful.



QUESTIONS ?



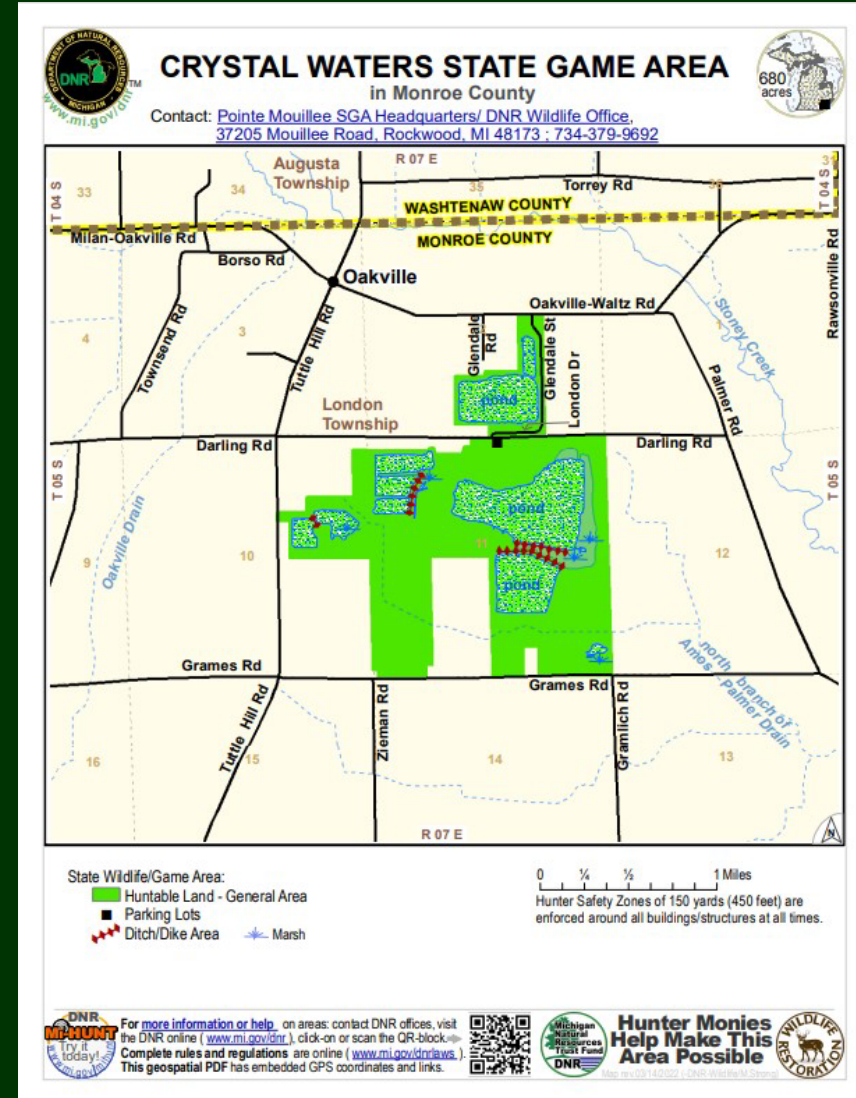
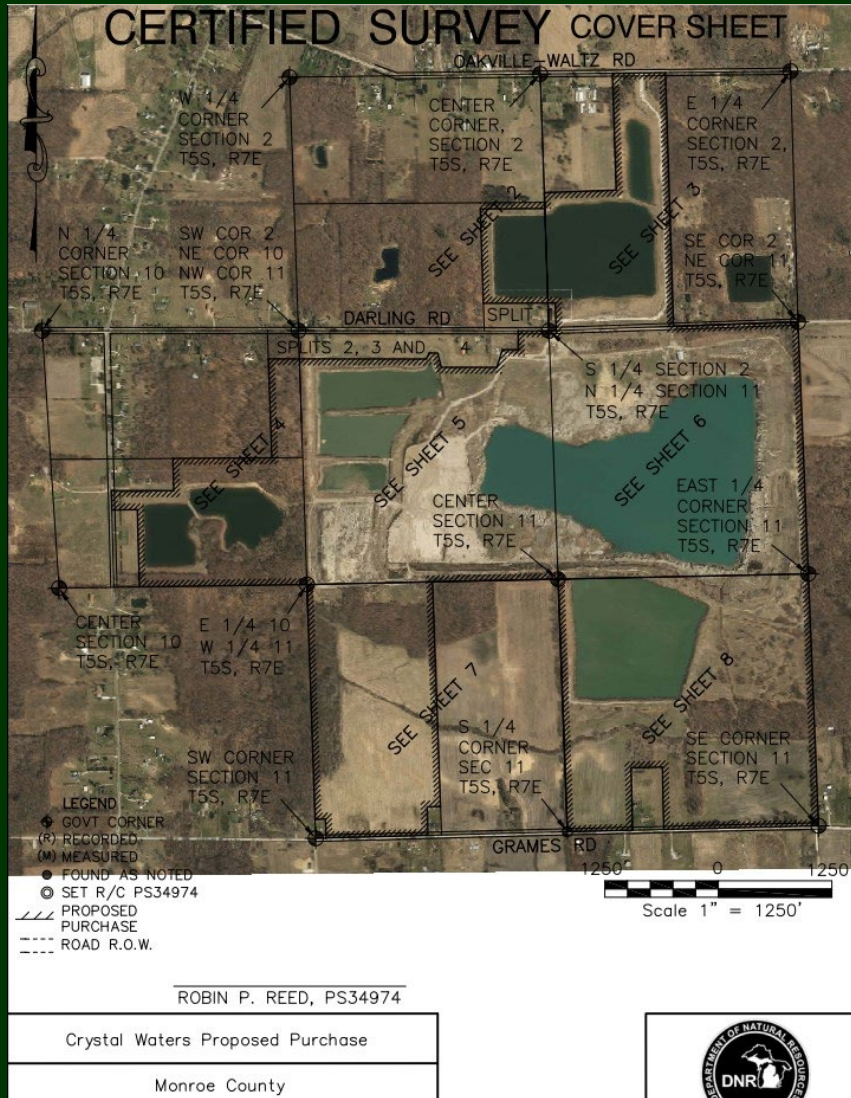
Crystal Waters State Game Area Designation and Rules

Land Use Order of the Director Amendment No. 6 of 2022

Zach Cooley
Wildlife Biologist Southeast Region
Wildlife Division



Crystal Waters State Game Area - Maps



Crystal Waters State Game Area – Land Transaction

- 680-acre parcel in Monroe County
- \$3.675 million land transaction provided by:
 - Michigan Natural Resources Trust Fund
 - Michigan United Conservation Clubs
- Provides public access to high quality outdoor recreation
 - 7 inland water bodies
 - 6 miles of hiking trails



Crystal Waters State Game Area – Engagement Process

- Local government process with the London Township Board
 - Reviewed and considered requests from township
 - Worked with LED and WLD staff to review township requests
 - Developed rules



Crystal Waters State Game Area – Proposed Rules

- A person shall not do any of the following:
 - Enter, use, or occupy the area between the hours of 11:00pm and 4:00am unless otherwise permitted by posted notice
 - Signage “Game Area Closed 11pm-4am”
 - Build or use any ground fire of any kind
 - Signage “No Fires”
 - Target, skeet, or trap shoot
 - Signage “No Target Shooting”



Crystal Waters State Game Area – Proposed Rules

- A person shall not do any of the following:
 - Launch a watercraft with a motor, except those using electric motors
 - Signage “No Fuel Powered Motors”
 - Camp
 - Signage “No Camping”



Crystal Waters State Game Area – Proposed Rules

- Most of the rules are consistent with those at the Pointe Mouillee State Game Area also in Monroe County
- Worked with and supported by the local government body and Department staff



Thank You



**Parks and Recreation
Division
Land Use Order of the
Director**



LUOD No. 7 of 2022

Background

- Silver Lake State Park's ORV riding area is offered within approximately 450 acres from April 1st – October 31st annually.
- During the off-season, the Parks and Recreation Division (PRD) has been permitting equestrian riding events (since 2019) and fat tire biking events (since 2020).
- PRD would like to establish seasons for these recreational activities in the ORV area of the park during a time when it has been historically closed for the season to ORV users.
- Two operational issues, use of color flashing lights on vehicles and rental vehicle use, are also being addressed in this proposed LUOD.



Questions

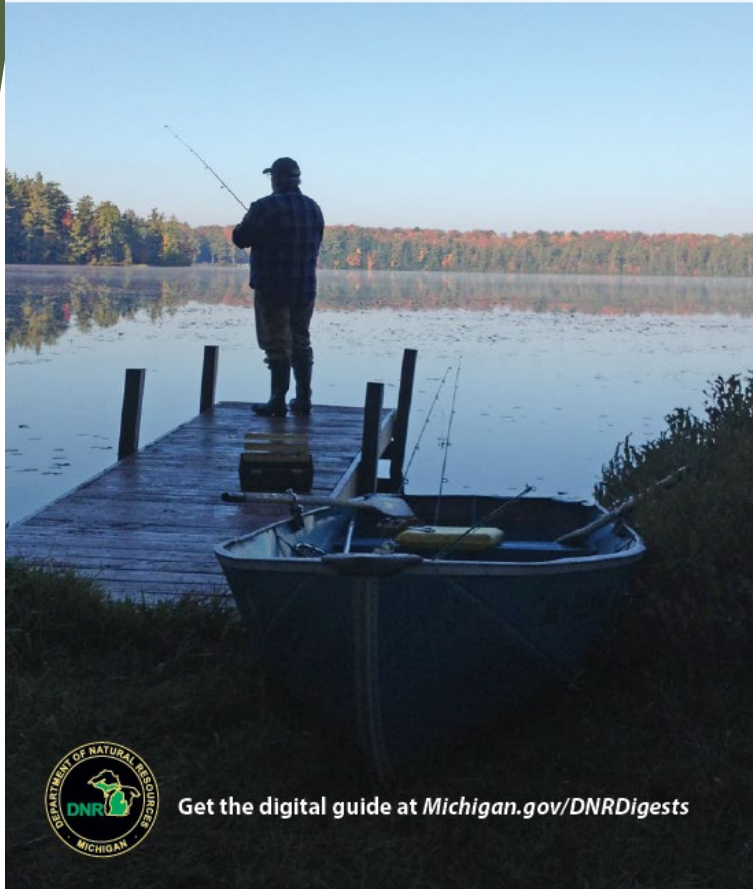
Thank you!



2022

Michigan Fishing Guide

Rules apply from April 1, 2022 – March 31, 2023



Get the digital guide at Michigan.gov/DNRDigests

Recommendations for Fisheries Orders

Fisheries Division

Seth Herbst, Ph.D.

Aquatic Species and Regulatory Affairs Unit Manager

Sept. 8, 2022

Fisheries Orders

for information

- FO-200: Statewide Trout, Salmon, Whitefish and Lake Herring Regulations
- FO-210: Designated Trout Streams
- FO-254: Inland Lakes - Trout and Salmon Regulations



Fisheries Order 200.23

For Information

Huron River (Oakland County)

- Add clarity to upstream boundary for anglers targeting the adult-broodstock trout that are stocked in this area

Recommendation:

- Modify the upstream boundary under the Gear Restricted Streams section “from the sign below Moss Lake Outlet” to “from 50 yards below Proud Lake Dam (T2N, R8E, S18) to 100 yards below Wixom Road (T2N, R7E, S13)”



Fisheries Order 200.23

For Information

North Branch Cedar River (Gladwin County)

- Increase angler opportunities for cold- and warmwater fish species

Recommendation:

- Modify from Type 1 to Type 4 regulations near the tri-city area (Bay City, Midland, and Saginaw)
 - Will allow fishing all year for all fish species
 - Increased min. size limit for Brown Trout from 8 to 10-inches



Fisheries Order 200.23

For Information

Unnamed tributary on North Bank of Coldwater River (Barry County)

- Manage and regulate fishery according to habitat characteristics
 - Stream lacks the thermal habitat to support coldwater fish species
 - Also recommending removal of designated classification within FO-210
 - Conservation officers indicate no anglers targeting trout

Recommendation:

- Remove Type 2 regulations
 - Will allow for fishing all year for all species



Fisheries Order 200.23

For Information

- Address enforcement concerns related to the current definition of artificial flies and allow for use of additional styles of artificial flies

Recommendation: Modify the definition to read as follows,

- “Known as wet and dry flies, streamers or nymphs, is defined as a single pointed hook, or no more than two single pointed hooks connected in-line (the second hook commonly known as a stinger hook), crafted with natural, artificial and/or synthetic materials attached to the hook. An artificial fly may not include a spinner, spoon, scoop, lip or any other fishing lure or bait attached. Material of any type cannot be attached above the eye of the hook, except that the fly or leader may be weighted, but no weight shall be attached to the terminal tackle in a manner that allows the weight to be suspended from or below the hook. Single pointed hooks are restricted to measuring $\frac{1}{2}$ inch or less from point to shank.”



Fisheries Order 210.23

For Information

- Adjust stream designations to be consistent with thermal habitats and fish community characteristics

Recommendations:

- Remove the trout stream designation from the following waters,
 - Unnamed tributary on north bank of the Coldwater River (Barry County)
 - Thermal habitat not suitable for trout survival
 - Cedar Creek (Barry County)
 - 2021 survey collected no Brown Trout
 - Thermal habitat not suitable for trout survival
 - Pigeon Creek (Ottawa County)
 - 2021 survey collected no Brown Trout
 - Thermal habitat not suitable for trout survival



Fisheries Order 210.23

For Information

East Branch Au Gres River (Iosco County)

- Address a clerical naming error

Recommendation:

- Modify “Quiley Creek” to “Guiley Creek,”



Fisheries Order 254.23

For Information

Big Trout Lake (Marquette County)

- Management goal is to provide a fishery consisting of cold- and warmwater species.
 - Trout species have been stocked since 1937
 - Brown Trout stocking was discontinued in 2014 to shift stocking to fall fingerling Steelhead.
 - Surveys concluded that steelhead stocking was unsuccessful, but indicated Brown Trout persisted
 - Steelhead stocking was discontinued, and anglers expressed interest to reinitiate Brown Trout stocking



Illustration provided by Joseph R. Tomelleri ©

Recommendation:

- Add Type E regulations to protect stocked Brown Trout
 - 15-inch minimum size limit
 - Allows anglers to fish all year



Fisheries Order 254.23

For Information

Redboat Lake (Gogebic County)

- Expand harvest opportunities for trout in a lake with an increasing relative abundance of warmwater fish species
 - 2017 and 2021 surveys indicated increased relative abundance of warmwater species
 - 2021 survey - majority of Brook Trout were under 15” min. size limit

Recommendation:

- Change Type D to C regulations, which will result in the following,
 - Reduced minimum size limit from the 15 to 8 inches for trout,
 - Increased daily possession limit from 1 to 5 with only three 15” or greater,
 - Expand the fishing season to all year, and
 - Allow the use of all bait types



Fisheries Order 254.23

For Information

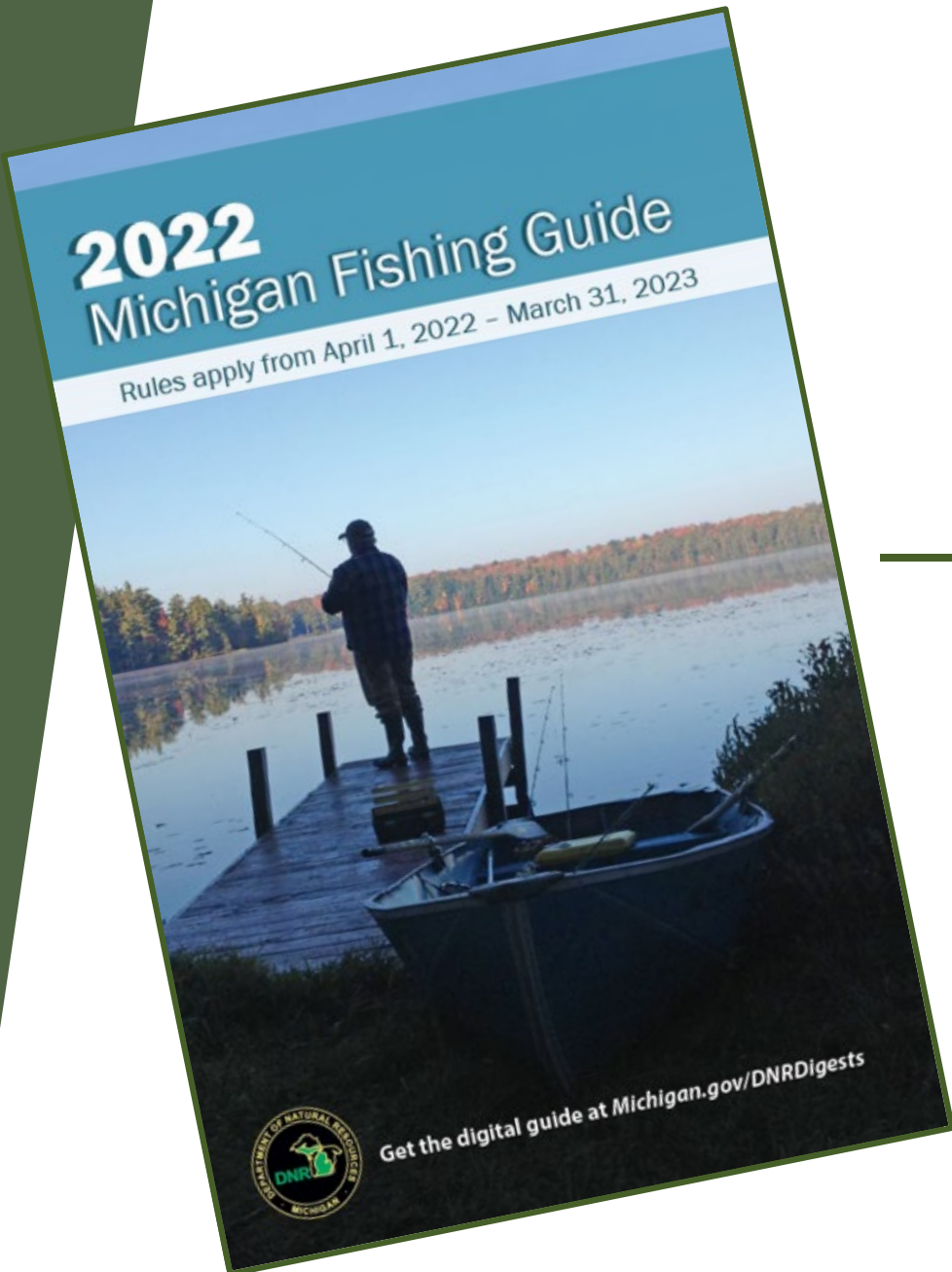
Grand Sable Lake (Alger County)

- Management goal has shifted from coldwater to warmwater fishery
 - Prior to 2005, Lake Trout were stocked (not a naturally occurring species)
 - In 2005, the National Park Service requested that the state move towards management of native species within park boundaries
 - Lake trout stocking was cancelled, and Type E fishing regulations were enacted to sustain fishery for previously stocked Lake Trout

Recommendation:

- Remove Type E fishing regulations and no longer regulate as a trout lake
 - Results in an 8-inch minimum size limit for trout, and
 - Possession season that is open all year





Thank You!

Questions?

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