Current Beaver Management Upper Black River Council



Watershed Reference Maps





UBRC History

The Upper Black River has long been considered one of Michigan's finest brook trout fisheries; Ernest Hemingway fished (and wrote about) the Upper Black. The Upper Black River system is situated in Cheboygan, Montmorency, Otsego and Presque Isle counties upstream of Black Lake and is the only river in Michigan's lower peninsula exclusively managed for brook trout.

The Upper Black River Council (UBRC) was established in 1993, forming a unique partnership of local, state and national governmental entities, non-profit conservation and sportsmen's organizations, private landowners and interested citizens dedicated to the restoration and preservation of the Upper Black River watershed as a highly prized, multiple use natural resource. Over the years, the UBRC's partnership with the Michigan Department of Natural Resources (MDNR) Fisheries Division has confirmed through study data that growth rates of brook trout in the Black River system are among the highest found in any study area in Michigan.

The Partners

UBRC Project Partners **Black River Ranch** Canada Creek Ranch Challenge Chapter, Trout Unlimited Cheboygan Conservation District Headwaters Chapter, Trout Unlimited HeadWaters Land Conservancy **Huron Pines** Alpena/Montmorency Conservation District Montmorency County Road Commission **Otsego County Road Commission** Michigan Department of Natural Resources Michigan Trout Unlimited Michigan Fly Fishing Club Montmorency County Conservation Club NEMCOG - Northeast Michigan Council of Governments **Pigeon River Country Association** Presque Isle Conservation District Sturgeon for Tomorrow – Black Lake Chapter Tip of the Mitt Watershed Council US Department of Agriculture - Natural Resource Conservation Service US Fish and Wildlife Service Multiple Foundations







In-Stream Habitat Improvement Work







Upper Black River - Rattlesnake Creek Area at Former Railroad Grade



2005-2022

Beaver Structure Inventory – Fall 2024 Upper Main Branch Black River







Photos of Waypoint Areas 1 & 2







Photos of Waypoint Areas 3 - 5







Photos of Waypoint Areas 9 & 10







Waypoint Areas 14-17

Our "Perfect Storm"

- Decreased interest and numbers of recreational trappers
- Lower Fur Prices during the 1800's beaver pelts typically sold for \$2. After adjusting for inflation, their current price should be nearly \$100 as compared to their current market price of \$20 to \$25, which is up from \$10-\$12.
- Higher fuel prices which impact trapper activity
- Increased stream use by recreational paddlers Beaver dam "notching" and partial removal releasing accumulated silt which is toxic to the fishery.

Michigan Department of Natural Resources POLICY AND PROCEDURE

39.21-20 – Management of Adverse Beaver Impacts on Trout Populations (Revised: 04/17/2024)

Administering Division: Wildlife Division (WLD) Procedure:

• Evaluation of permit applications for the removal of beaver and beaver dams to mitigate impacts to trout habitat.

Note: Each Division should seek to have statewide consistency in how this policy is applied. To help facilitate this, an additional reviewer from each Division is recommended whenever possible. Permit applications must be issued or denied within 30 days of receipt of completed permit application.

Who: Does What: DNR Divisions

1. Application for permit received. Forwards application to relevant WLD-Area Wildlife Biologist or LED-Conservation Officer:

a. If permit application is for private land, forwards application to relevant LED-Conservation Officer.

2024 DNR Beaver Management Policy Content

Continue to Step 2.

39.21-20 – Management of Adverse Beaver Impacts on Trout Populations

b. If permit application is for public land, forwards application to relevant WLD-Area Wildlife Biologist. Go to Step 3.

LED-Conservation Officer

Application for permit on private land received. Sends permit application to relevant WLD-Area Wildlife Biologist Go to Step
 WLD-Area Wildlife Biologist

3. Application for permit on public land received. Sends copy of permit application to relevant FD-Fisheries Management Biologist.

WLD-Area Wildlife Biologist and FD-Fisheries Management Biologist

4. Reviews permit application to determine if beaver activities are notably impacting the existence of a localized federally listed threatened or endangered species?

a. Yes – STOP. Consultation with the United States Fish and Wildlife Service (USFWS) is required. Follow USFWS guidance on whether or not to deny the permit application. Continue to Step 5 if USFWS guidance allows.

i. NOTE: The timeframe to issue or deny a permit application within 30 days of receipt does not apply to this situation.
 b. No – Continue to Step 5.

5. Reviews permit application to determine if beaver activities are notably impacting the existence of a localized state listed threatened or endangered species?

a. Yes – STOP. Consultation with the relevant WLD or FD biologists that cover threatened and endangered species is required. Follow their guidance on whether or not to deny the permit application. Continue To Step 6 if Division guidance allows.

i. NOTE: The timeframe to issue or deny a permit application within 30 days of receipt does not apply to this situation.
 b. No – Continue to Step 6.

6. Continues with reviewing the permit application using the Decision Tree for Reviewing Permit Applications.7. Following use of Decision Tree for Reviewing Permit Applications, attempts to come to agreement on whether or not a

permit will be issued. If agreement is reached, go to Step 8. If agreement is not reached, decision authority moves to next set of direct supervisors until agreement is reached. If agreement is not reached, continue to a.

a. WLD-Field Operations Manager and FD-Unit Manager. If agreement is reached, go to Step 8. If agreement is not reached, continue to b.

2024 DNR Beaver Management Policy Content (continued):

39.21-20 – Management of Adverse Beaver Impacts on Trout Populations

Who:Does What:

b. WLD-Regional Supervisor and FD-Basin Coordinator. If agreement is reached, go to Step 8. If agreement is not reached, continue to c.

c. WLD-Chief/Assistant Chief and FD-Chief/Assistant Chief. Agreement must be reached. Go to Step 8. WLD-Area Wildlife Biologist

8. Issues or denies the permit within 30 days from receipt of completed permit application. Go to Step 9.

a. Issuance: Follow IC9133-1 Instructions for Damage and Nuisance Animal Control Permits. Specify that the permit is being issued to mitigate impacts to trout habitat on public OR private land under "Type and Extent of Damage or Safety Issue."

b. Denial: Follow policy 39.21-04 License Application Denial.

WLD-Area Wildlife Biologist

9. Sends copy of issued permit or denied application and permit denial letter to WLD-Permit Specialist. Go to Step 10.

WLD-Permit Specialist

10. Records and files issued permit or denied application and permit denial letter according to applicable retention schedule.

WLD-Area Wildlife Biologist

a. If permit was approved, go to Step 11.

b. If application was denied, Procedure is complete.

11. Ensures permittee provides final and/or quarterly reports after removal activities are conducted and provides a copy to WLD-Permit Specialist. Go to Step 12.

WLD-Permit Specialist

12. Records and files issued permit reports according to applicable retention schedule. Procedure is complete.

Decision Tree for Reviewing Permit Applications

Decision tree to be used after Step 6 of the Procedure, when WLD-Area Biologist and FD-Fisheries Management Biologist review permit application. Continue with Step 7 of Procedure after working through decision tree. Decision Tree:

- 1. Is the stream classified as a designated trout stream?
- a. Yes Question 2
- b. No Deny Permit
- 2. Are trout present in the stream?
- a. Yes Question 3
- b. No Question 8
- 39.21-20 Management of Adverse Beaver Impacts on Trout Populations
- 3. Is the stream classified as a stream or small river (Figure 1, Zorn et al. 2018)?
- a. Yes Question 4
- b. No Deny Permit
- 4. What is the water temperature classification of the stream (Figure 1, Zorn et al. 2018)?
- a. Cold Question 7
- b. Cold Transitional Question 5
- c. Warm Transitional Question 5
- d. Warm Deny Permit

Decision Tree for Reviewing Permit Applications (continued):

9. By arriving at Question 9, there is sufficient justification to issue the requested permit. However, it is also important to evaluate potential site-specific conditions such as those listed below, as well as others that may not be listed.

- Wildlife Species of Greatest Conservation Need
- Featured Wildlife Species
- Timing of trout migration and spawning
- Impacts to consumptive and non-consumptive stakeholders
- Sociopolitical interest or value
- Impacts of dam removal to infrastructure
- History of nuisance beaver permitting along stream system
- Viability of alternative management actions
- Timing relative to open beaver trapping season
- Cultural perspectives
- Impacts of recent land use changes in the stream system
- Considerations of the land-managing Division

After evaluating site-specific conditions, are there conditions that outweigh the justification assessed by the decision tree to issue the requested permit?

- a. Yes Deny Permit
- b. No Issue Permit

Decision Tree for Reviewing Permit Applications (continued):

5. Are beaver activities increasing water temperature of the stream system above 70oF (e.g., Figure 2, Zorn et al. 2011)?

- a. Yes Question 9
- b. No Question 6
- 6. Are water temperature impacts of beaver ponds notably prohibiting trout management goals from being accomplished (e.g., Figure 2, Zorn et al. 2011)?
- a. Yes Question 9
- b. No Question 7
- 7. Are sedimentation impacts due to beaver activities notably prohibiting trout management goals from being accomplished?
- a. Yes Question 9
- b. No Question 8
- 8. Are targeted trout management goals in place within the stream system (ex. Research areas, streams used for research, grayling reintroduction) that are negatively impacted by beaver activity?
- a. Yes Question 9
- b. No Deny Permit

Summary Recommendations:

- When the policy review is conducted, please reconsider the use of a single statewide beaver management policy, especially as it relates to cold-water fisheries.
- Consider the use of watershed-based permits and management strategies
- Consider the separation of beaver dam removal from the nuisance beaver permit process

Even the current policy makes exceptions for *"public road authorities, county drain commissions or drainage*" boards, and railroad authorities removing beaver, beaver dams, or other beaver caused obstructions which directly threatened public roads, public drains or railroad tracks year-round within the designated right of ways for those public roads, public drains, or railroad tracks. These entities are considered a damage and nuisance animal control permittee for the purpose of controlling beavers and a permit is not required [Wildlife Conservation Order 5.56].

"This policy also does not apply to private landowners taking beaver without a written permit if their activities result in flooding or culvert blockages that cause damage as defined as physical harm to forest products, roads, dams, buildings, orchards, apiaries, livestock, and horticultural or agricultural crops. These landowners are considered a permittee and a written permit is not required [Wildlife Conservation Order 5.56]."

DNR Policy 39.21-20 (rev. 4/17/2024)

Comments on the New DNR Policy on Management of Adverse Beaver Impacts on Trout Populations

Michigan Natural Resources Commission – 11/7/24



Michigan Department of Natural Resources POLICY AND PROCEDURE

39.21-20 – Management of Adverse Beaver Impacts on Trout Populations (Revised: 04/17/2024)

Supersedes: 39.21-20 – Beaver Management (Issued: 07/11/2005)

Issue/Purpose:

This policy guides the evaluation of Damage and Nuisance Animal Control Permit applications for the removal of beavers and beaver dams to mitigate adverse impacts to trout populations and habitat.

Dr. Bryan Burroughs Executive Director Michigan Trout Unlimited



Status Quo

- Beaver management relatively PASSIVE management, beaver conflicts dealt with relatively REACTIVELY.
- If impacts to trout are identified, some Fish Div. staff work with external entities towards addressing them, costs shouldered by external entities (paying trappers, removal of dams, associated stream restoration measures).
- Efforts at impact management are a drop in bucket relative to the prevalence of beaver and beaver dams on MI's ~30,000 miles of coldwater streams.
- Recreational trapping is down, beaver are abundant, thermal stressors on coldwater fish are up.
- Many examples of partnership in addressing nuisance beaver instances going well. But, the new policy introduces systematic problem opportunities.

Our Concerns

- Lack of Input Opportunity
- Equity/Parity
- Context / Justification for Regulation
- Impacts to Temperature & Decision Tree
- Subjective policy elements
- Primacy of thermal intolerant, more threatened species



Input - Participation

- Michigan Constitution Article 4 Sec. 52, & MEPA, establish obligations to prevent impairment of natural resources.
- This new policy limits or conditions our ability to address impairment to coldwater fisheries
- This policy is equivalent to promulgation of rules
- This policy revision process was designed to exclude opportunity for those affected by it to have input into it (DNR internal staff only no "regulated community" perspective)
- The policy mentions a 1 year review, and specifically mentions seeking input from staff during it, but continued to exclude input from external affected parties.

The Department will solicit staff input on key aspects of this policy after one year of implementation to evaluate process functionality and adherence. The policy will then be reviewed at least every five years per Department Policy 01.00.01 Department Policies and Procedures or as needed by the Department's Executive Division.

• Natural resources management requires partnerships; this process did not reflect a recognition of that.

Parity - Equity

- Private Property Owners
 - No permit required (property damage at stake)
- Road, Drain & Railroad Entities
 - No permit required (infrastructure at stake)

• <u>Presence = presumption of risk of impairment</u>

Nuisance Wildlife Regulations Wildlife Conservation Order Amendment No. 6 of 2023 Page 5 April 17, 2023

damage by lawful hunting or trapping methods. Since then, the Department has seen an increase in nuisance and damage complaints by beaver, cottontail rabbit, fox squirrel, gray squirrel, muskrat, opossum, red squirrel, and weasel. The proposed changes will provide property owners with another tool to help remove nuisance wildlife causing property damage.

Biological

The Department does not expect a significant increase in harvest of these species; therefore, no biological impact is expected.

Social

The Department receives numerous requests throughout the year from property owners to obtain a nuisance animal control permit to take beaver, cottontail rabbit, fox squirrel, gray squirrel, muskrat, opossum, red squirrel, and weasel that are causing damage. This delays nuisance control efforts and creates an administrative burden for both property owners and Department staff. Applying the same regulations across species that cause the most damage to private property will also increase consistency.

These recommendations help the Department consistently respond to human-wildlife conflicts across the state while improving the permitting process by reducing barriers for property owners resolving nuisance wildlife issues.

Economic

Allowing the take of these species if doing damage or physically present where they could imminently cause damage to an individual's property will reduce the amount of damages to private property and alleviate some of the cost and administrative burden associated with wild animals causing damage.

PUBLIC INTEREST

Beavers, rabbits, squirrels added to Michigan nuisance kill list

Updated: May. 16, 2023, 10:28 a.m. | Published: May. 15, 2023, 6:05 a.m.

Under the Wildlife Conservation Order amendment No. 6 of 2023, beavers, muskrats, cottontail rabbits, fox squirrels, gray squirrels, red squirrels, ground squirrels, opossums and weasels can now be killed, or "taken," by landowners without obtaining a DNR nuisance control permit.

Those animals join woodchucks, skunks, raccoons and coyotes which are already on the lethal control list.

New order language states that property owners can kill a nuisance animal if its causing damage or is "physically present where it could imminently cause damage."

The definition of property damage is "physical harm to forest products; roads; dams; buildings; orchards; apiaries; livestock; and horticultural or agricultural crops."

Parity - Equity

- Trout Conservation Yes permit, new decision tree, data collection can be required (natural resource impairment at stake)
- Trout streams are separated from that policy, and where coldwater fish, public trust natural resources are at risk different regulatory burdens, and standards of proof are required.
- Same beavers, same issues and risks, different interest put at risk. This is nonjustified inequal treatment (discrimination) by these internal regulation policies.
- Should the DNR value natural resource impairment concerns at least equally to public and private infrastructure and property concerns? Should a conservation partner be subjected to greater administrative burden?

Department staff shall follow the procedures outlined in this policy when evaluating Damage and Nuisance Animal Control Permit applications for the removal of beaver and beaver dams for the purpose of mitigating impacts to trout populations. *For the purposes of this policy, trout refers to all native and desired salmonids in Michigan: brook trout, brown trout, rainbow trout (steelhead), coho salmon, chinook salmon, and Arctic grayling.* This policy does not apply to applications for the removal of beaver and beaver dams for purposes other than mitigating impacts to trout populations.

Beaver Status Context Missing

- The policy presented no basis of justification for the increased scrutiny over nuisance beaver trout stream conflicts.
- No abundance & distribution of beaver • data or historic trends provided in new policy.
- DNR relies on harvest data to infer • abundance; it has many limitations and is not a direct estimate of abundance.



–o–Trappers

100.000 90,000

80,000

4,000

3,500

3,000

Figure 8. Estimated number of trappers, trapping effort (days), and number of beaver captured in Michigan, 1998-2018. Vertical bars represent the 95% confidence interval. The 2006-2018 estimates were not directly comparable to estimates from previous years because the 2006-2018 estimates only represent the participation, effort, and harvest of trappers that obtained an otter harvest tag. Also beginning in 2004, trappers taking beaver as part of a nuisance control business were asked to exclude nuisance animals from their reported harvest on annual harvest surveys.

Beaver Status Context Missing

- DNR passively managing beavers without direct information on their abundance & distribution, yet increasing their scrutiny when conflicts arise due to their abundance.
- Wildlife Division seeking increase in beaver abundance, expansion into more trout streams, while relying on coarse & anecdotal information on beaver abundance?



MICHIGAN DEPARTMENT OF NATURAL RESOURCES – <u>www.michigan.gov</u> Wildlife Division

Featured Species Habitat Management Guidance for Beaver

Latin Name: Castor canadensis

Scope: Statewide

Priority Landscapes – the landscape, setting, or cover-type where we should focus management within the areas above: Forested riparian zones where alder, aspen, birch, maple or willow are already present and/or can be encouraged. Public forests offer the best opportunity to minimize beaver-human conflicts. Management to promote beavers should focus on but not be limited to warm water systems.

Population Goal - the goal for the species, its habitat, or a stakeholder's actions: Maintain or increase beaver numbers in the northern two thirds of the state.

Evaluation Method - the monitoring method to measure progress towards the goal above:

Beaver population trends are monitored through annual trapper harvest surveys. The number of beavers harvested and trapper effort are used as an index of beaver numbers. While harvest surveys give a coarse measure of regional or statewide numbers, anecdotal information such as numbers of complaints or observations of beaver activity may be used to assess local beaver conditions. Regions should compare population assessments against local goals and adjust planned beaver habitat management as needed during compartment reviews.

Thermal Impacts

• Trout are thermally intolerant, are restricted in habitat requirements, abundance and sustainability of them are tied to water temperature, and they are increasingly at-risk.



Thermal Impacts

- Decision Tree in new policy for considering thermal impacts to nuisance beavers
 - 4. What is the water temperature classification of the stream (Figure 1, Zorn et al. 2018)?
 - a. Cold Question 7
 - b. Cold Transitional Question 5
 - c. Warm Transitional Question 5
 - d. Warm Deny Permit
 - Are beaver activities increasing water temperature of the stream system above 70°F (e.g., Figure 2, Zorn et al. 2011)?
 - a. Yes Question 9
 - b. No Question 6
 - Are water temperature impacts of beaver ponds notably prohibiting trout management goals from being accomplished (e.g., Figure 2, Zorn et al. 2011)?
 - a. Yes Question 9
 - b. No Question 7

Thermal Impacts – policy decision tree



Subjectivity

- Policy sought to establish a primary decision tree for permit review, yet significant subjectivity still permeates it.
- Treats fisheries concerns as set defined standards (data needed), but treated all wildlife related concerns subjectively (no data needed), and placed all burden of proof upon the fisheries considerations.

Decision Tree for Reviewing Permit Applications

Decision tree to be used after Step 6 of the Procedure, when WLD-Area Biologist and FD-Fisheries Management Biologist review permit application. Continue with Step 7 of Procedure after working through decision tree.

Decision Tree:

- 1. Is the stream classified as a designated trout stream?
 - a. Yes Question 2
 - b. No Deny Permit
- 2. Are trout present in the stream?
 - a. Yes Question 3
 - b. No Question 8
- 3. Is the stream classified as a stream or small river (Figure 1, Zorn et al. 2018)?
 - a. Yes Question 4
 - b. No Deny Permit
- 4. What is the water temperature classification of the stream (Figure 1, Zorn et al. 2018)?
 - a. Cold Question 7
 - b. Cold Transitional Question 5
 - c. Warm Transitional Question 5
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- 5. Are beaver activities increasing water temperature of the stream system above 70°F (e.g., Figure 2, Zorn et al. 2011)?
 - a. Yes Question 9
 - b. No Question 6
- 6. Are water temperature impacts of beaver ponds notably prohibiting trout management goals from being accomplished (e.g., Figure 2, Zorn et al. 2011)?
 - a. Yes Question 9
 - b. No Question 7
- 7. Are sedimentation impacts due to beaver activities notably prohibiting trout management goals from being accomplished?
 - a. Yes Question 9
 - b. No Question 8
- 8. Are targeted trout management goals in place within the stream system (ex. Research areas, streams used for research, grayling reintroduction) that are negatively impacted by beaver activity?
 - a. Yes Question 9
 - b. No Deny Permit

Subjectivity

- Extensive wildlife considerations were all vaguely tacked onto the end of the decision criteria, in non-defined manner for decision making relevancy.
 - 9. By arriving at Question 9, there is sufficient justification to issue the requested permit. However, it is also important to evaluate potential site-specific conditions such as those listed below, as well as others that may not be listed.
 - Wildlife Species of Greatest Conservation Need
 - Featured Wildlife Species
 - Timing of trout migration and spawning
 - Impacts to consumptive and non-consumptive stakeholders
 - Sociopolitical interest or value
 - Impacts of dam removal to infrastructure
 - History of nuisance beaver permitting along stream system
 - Viability of alternative management actions
 - Timing relative to open beaver trapping season
 - Cultural perspectives
 - Impacts of recent land use changes in the stream system
 - Considerations of the land-managing Division

After evaluating site-specific conditions, are there conditions that outweigh the justification assessed by the decision tree to issue the requested permit? a. Yes – Deny Permit

- b. No Issue Permit
- This results in a regulated party not being able to understand the decision-making process they will be bound to. Regulatory uncertainty and inability to evaluate the permit decision result. Blanket subjectivity following the decision tree.

Primacy when Conflict

- Beaver are a generalist species, who have the added ability to re-engineer or manipulate their habitats to suit them. Their current abundance and sustainability is not in question.
- Coldwater fish are "thermal obligates", with a narrow range of habitat suitability. Concerns over the future sustainability of these species is well documented, and has been discussed by fish division numerous times in past presentations.



Primacy when Conflict

- The primacy of infrastructure or property over beaver presence has been adopted in DNR policy (WCO Amendment 6 of 2023).
- This policy revision removed coldwater natural resources recognized primacy of nuisance beaver in these circumstances, despite the narrower distribution, and more imperiled status. This primacy due to rarity/abundance has been around in Michigan since at least 1935, and existed previously in policy.
- Trout are not universally more important than beaver. But in areas of beaver-trout conflict, the trout are species in greater conservation jeopardy. The policy should accept and re-adopt that primacy in areas of conflict.

MDNR (Michigan Department of Natural Resources). 2005. Beaver management. MDNR, Policies and Procedures 39.21-20, Lansing. North American Journal of Fisherics Management 38:1203–1225, 2018 @ 2018 American Fisherics Society ISSN: 0275-947 print / 1548-8675 online DOI: 10.1002/nafm.10223

FEATURED PAPER

A Review of Beaver–Salmonid Relationships and History of Management Actions in the Western Great Lakes (USA) Region

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Current Beaver Management on Salmonid Streams

In 2001, the state of Michigan established its current beaver adaptive management program based on two primary principles: (1) beavers, salmonids, and their habitats are managed for human needs and wants; and (2) the lesscommon natural resource (i.e., coldwater streams) must be protected while still providing opportunities for beavers to exist (MDNR 2005). High-quality salmonid streams were identified by state fisheries divisions and were approved by designated ecoregion teams. Local managers are responsible for responding to complaints and determining nuisance beaver presence on salmonid streams. The management plan also states that a zone of intact vegetation is required around the streams in order to protect water quality, and this zone is managed by local forestry divisions to discourage beaver use. Nuisance control is carried out by a combination of MDNR Wildlife, Law Enforcement, Forest Management, and Parks and Recreation Management personnel, depending on the region and type of land (public or private) on which the nuisance beavers are located.

Bottom Line

- We expect to continue working with partners and DNR Fish Div. towards selective, priority nuisance beaver issues, for fisheries conservation.
- Fundamentally, this unique policy shouldn't exist separate from universal nuisance beaver impact policies & procedures. Poses inequal treatment of people for same issue.
- New policy is significantly problematic, so sooner or later, it will result in problems; or it could be fixed proactively.

Ecological Context and Trout/Beaver Interactions on the Au Sable River

Dr. Mark Luttenton R.B. Annis Water Resources Institute Grand Valley State University

Pre-colonial Conditions vs. Post-colonial Conditions

Pre-colonial Conditions

- Forests were intact
- Several large predators
 - Wolves
 - Cougars

Pre-colonial Conditions

- Forests were intact
- What was the role of forests?
 - A food source

- Mature pine and hardwoods vs softwood
- Food likely not as abundant

Pre-colonial Conditions

- Several large predators
 - Wolves
 - Cougars

- What was the role of large predators?
- Wolf Study conducted in Voyageurs National Park
- During summer, beaver is approx. 25% of wolf diet

Ecological Context Post-colonial Conditions

- Forests in various stages of regrowth
- Large predators are gone
 - Wolves
 - Cougars

Post-colonial Conditions

- Forests in various stages of regrowth more food?
- Large predators are gone
 - Wolves
 - Cougars
 - Beaver population control
 - Trapping
 - Dependent on price

Post-colonial Conditions

- Beaver remain, but current ecosystem conditions do not resemble historic conditions
- Should management of a system be predicated on perception of historic conditions when those conditions no longer exist?

Map

REMINGTON WAY

2:44

Dam at Isenhauer Rd.

Check Dam below Isenhauer Rd.

Likely "fish #26" redd below Check Dam Isenhauer Rd.

North Branch Au Sable at Sheep Ranch

- Fish #8 was tagged below
 Twin Bridge
- Moved through Twin Bridge multiple times
- Beaver dam constructed
 during Oct
- Oct 18 fish was in normal spot
- Oct 24 fish has moved

North Branch Au Sable at Sheep Ranch

General Conclusions for Au Sable

- Ecosystem has changed
- Ecosystem management should not be based on historic perceptions
- East Branch -
 - Fish previously moved from hatchery past I-75
 - Beaver dam appears to limit upstream movement
 - Potential spawning area lost
- North Branch -
 - Dam constructed very quickly!
 - Fish vacated home site
 - Potential spawning area lost

Broader Conclusions Based on Meta Analysis Ecke et al. (2017)

- Using a large dataset comparing upstream to downstream, the authors found:
- Temperature was cooler upstream
- Negatively affected flow velocity
- DO concentrations were higher upstream
- Trout abundance was higher downstream
- Total suspended solids were higher downstream
- Methane concentrations were higher in ponds
- Hg was higher in water and biota downstream and in ponds

Broader Conclusions Based on Voyageurs National Park and Historical Records

- Ecosystem has changed change in food available
- Natural predators are gone no natural population controls

