USDA
United States Department of Agriculture

Animal and Plant
Health Inspection
Service

Wisconsin Wildlife
Services State Office

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January 20, 2026

Kate Angel, Program Manager
Wisconsin Coastal Management Program
Division of Intergovernmental Relations

Dear Ms. Angel,

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) has prepared an Environmental Assessment (EA) on alternatives for WS involvement in beaver damage management in the state. The Wisconsin Department of Natural Resources (WDNR) and The United States Department of Agriculture, Forest Service, were cooperating agencies in the preparation of the analysis along with the Great Lakes Indian Fish and Wildlife Commission, Bad River Band of Lake Superior Chippewa Indians, and the Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin as participating entities. A copy of the EA has been enclosed for your use. The EA will also be available for public comment and review from January 23rd to February 23rd, 2026.

Beaver damage management activities in Wisconsin may be conducted within the state coastal zone which includes the 15 counties which are adjacent to Lake Superior and Lake Michigan, as well as watersheds that drain into the Great Lakes. The proposed action also includes WS continuing its partnership with the WDNR conducting beaver management for the restoration of select coldwater streams in Wisconsin. The Wisconsin Inland Trout Management Plan (2020-2029) guidelines for management of inland fisheries of coldwater habitat stated that beaver dams are a major source of damage to trout streams. Evaluations by the WDNR have concluded that beaver dam removal is a successful and cost-effective tool for trout habitat improvement.

WS does not have independent authority for wildlife management. All WS wildlife management actions are conducted in accordance with applicable state, federal, and local regulations including Cooperative Service Agreements between WS and the WDNR, the WDNR Beaver Management Plan (in preplanning stages for 2026-2036), and other authorizations granted by the WDNR for work done for federal agencies, and county, municipal, and private land managers. As noted above, the WDNR is a cooperating agency in the preparation of the EA. As part of the EA process, WS consulted with the WDNR Bureau of National Heritage Conservation to ensure the proposed action would not adversely impact state-listed threatened or endangered species populations. WS is also a member of the WDNR Beaver Management Plan committee working on the revised state beaver management plan.

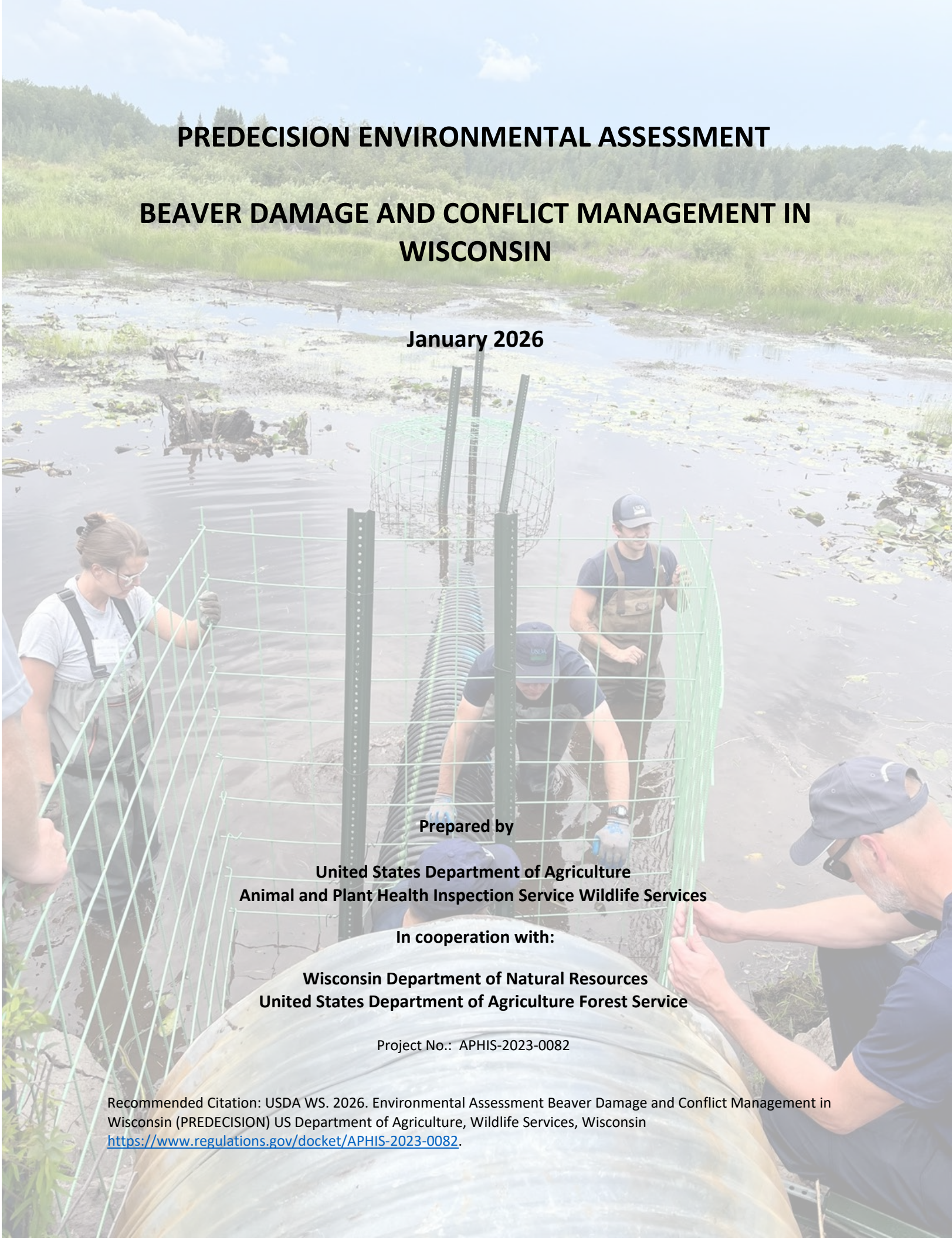
Given that all WS beaver damage management activities would be conducted in coordination with and under the authorization of the WDNR, and that some of the proposed Beaver damage management projects are conducted at the request of the WDNR specifically for the benefit of coastal resources, WS has concluded that the proposed beaver damage management program is consistent to the maximum extent practicable with the Wisconsin Coastal Management Plan enforceable policies. We are requesting your concurrence with this determination.

Thank you for your consideration of this matter. If you have any additional questions, please feel free to contact me at the number below or at shelagh.t.deliberto@usda.gov.

Sincerely,

Shelagh T. Deliberto

Wildlife Biologist
Wildlife Services (WS)
Operational Support Staff
(970) 266-6007



PREDECISION ENVIRONMENTAL ASSESSMENT

BEAVER DAMAGE AND CONFLICT MANAGEMENT IN WISCONSIN

January 2026

Prepared by

United States Department of Agriculture
Animal and Plant Health Inspection Service Wildlife Services

In cooperation with:

Wisconsin Department of Natural Resources
United States Department of Agriculture Forest Service

Project No.: APHIS-2023-0082

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AFWA	The Association of Fish and Wildlife Agencies
APHIS	Animal and Plant Health Inspection Service
APHIS-WS	National Wildlife Services Program
AVMA	American Veterinary Medical Association
BDM	Beaver Damage Management
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNF	Chequamegon National Forest
CNNF	Chequamegon-Nicolet National Forest
CSA	Cooperative Service Agreement
CWA	Clean Water Act
CY	Calendar Year
DATCP	Wisconsin Department of Agriculture, Trade and Consumer Protection
DO	Dissolved Oxygen

EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
HSM	Habitat Suitability Model
IWDM	Integrated Wildlife Damage Management
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NHC	Wisconsin Department of Natural Resources Bureau of Natural Heritage Conservation
NNF	Nicolet National Forest
NOA	Notices of Availability
NRB	Natural Resource Board
NWP	Nationwide Permit
SDA	Special Designated Area
SOP	Standard Operating Procedure
TA	Technical Assistance
T&E	Threatened and Endangered
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Services
WA	Wilderness Area
WAC	Wildlife Acceptance Capacity
WCO	Wildlife Control Operator
WDM	Wildlife Damage Management
WDNR	Wisconsin Department of Natural Resources
WID	Work Initiation Document
WS	USDA APHIS Wildlife Services
WS-Wisconsin	USDA APHIS Wildlife Services personnel in Wisconsin

1 NEED FOR ACTION AND SCOPE OF ANALYSIS

1.1 INTRODUCTION

Wildlife Services (WS), an agency within the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), provides federal leadership and expertise to resolve wildlife conflicts (Appendix A). Agencies, tribes, and private entities experiencing damage or threats of damage associated with wildlife can request assistance from APHIS-WS. This Environmental Assessment (EA) documents the analysis of the potential environmental effects of alternatives for Wildlife Services in Wisconsin (WS-Wisconsin) involvement in beaver (*Castor canadensis*) damage and conflict management in Wisconsin, hereafter referred to as beaver damage management (BDM).

Beavers are commonly considered "ecosystem engineers" and "keystone species" because of the impacts their foraging and dam building have on a wide range of ecosystem services for people and wildlife (Baker and Hill 2003, D. Muller-Schwarze 2011, Johnson-Bice et al. 2018, Fairfax and Whittle 2020, Jordan and Fairfax 2022, Rosell and Campbell-Palmer 2022). Beavers also provide economic, recreational, cultural, and esthetic benefits (Baker and Hill 2003, letter from J. Schlender, GLIFWC, to WS-Wisconsin, January 12, 2024). However, beaver activity including their foraging and dam and den construction can result in damage to agricultural and natural resources, property, infrastructure, and threaten human health and safety. Wildlife damage management is the alleviation of damage or other problems caused by or related to the behavior of wildlife and is an integral component of wildlife management (Berryman 1991, The Wildlife Society 2015)

APHIS-WS is only authorized to assist with wildlife damage management upon request (Appendix A, Sections 1.2 and 1.4). APHIS-WS does not manage lands or have the authority to establish regulations and cannot dictate wildlife management policy or regulations by other federal, state, or tribal entities (Appendix A). Accordingly, the scope of this EA is limited to WS-Wisconsin response to requests for assistance with BDM. This EA is not a comprehensive beaver management plan, and it does not set Wisconsin Department of Natural Resources (WDNR) or tribal wildlife management objectives, regulations, and policy for beaver in Wisconsin (See Section 1.2).

1.2 WHAT IS WILDLIFE DAMAGE AND WHEN DO PEOPLE REQUEST HELP WITH MANAGING WILDLIFE DAMAGE?

Wild animals do not intend to do harm or cause health or safety concerns for humans. They are simply using and adapting to available habitats to meet their own needs for food, water, and shelter. These behaviors are a natural part of healthy ecosystems. However, in some situations, wildlife habitat and resource uses conflict with human resource uses and management objectives, or they are associated with health and safety concerns. Wildlife damage can be broadly defined as any conflict that occurs or may occur between wildlife and human interests. These interests may include property, natural resources, agricultural resources, infrastructure, or human health and safety (The Wildlife Society 2015). The term "damage" in the case of wildlife damage management may also be defined as a loss in

aesthetic, cultural or recreational resources. A need for action may exist if financial or physical damage *has* occurred, or individuals, agencies and tribes may take action to *prevent* damage from occurring as allowed by law.

People request assistance with wildlife damage management when they have determined that the losses or risk of losses caused by wildlife exceed their threshold for requesting assistance (i.e., damage threshold) or when attempts to take care of the problem themselves have had unsatisfactory results. The threshold triggering a request for assistance is often unique to the individual person, entity, or agency requesting assistance (Enck et al. 1993, Jonker et al. 2006, 2009, Siemer et al. 2013). What constitutes intolerable damage to one person or entity may not even be considered a problem by another individual or entity. For example, the threshold for determining there is a need for action and the preferred solutions for conflicts for tribes that emphasize the autonomy of beaver as thinking and reasoning beings, with whom they have a strong cultural relationship, can be very different from that of county forestry or transportation departments. Tolerance of wildlife conflicts can change over time with shifting public values and understanding of the role of wildlife in ecosystems, but even then, there may be limits to tolerance. For example, agencies and the public have become increasingly aware of the beneficial impacts of beaver and beaver ponds (D. Muller-Schwarze 2011, Rosell and Campbell-Palmer 2022). Addressing wildlife damage requires consideration of both the resource owners' and society's levels of tolerance, agency and tribal management objectives, and the long-term and short-term impacts on wildlife populations and ecosystems.

1.3 WHAT FACTORS IMPACT PERCEPTIONS OF DAMAGE AND THE NEED FOR DAMAGE MANAGEMENT?

Biological carrying capacity refers to the maximum number of animals the ecosystem/habitat can sustain over time. Wildlife acceptance capacity (WAC) refers to the wildlife population in an area that is acceptable to people. Depending on the wildlife species, individuals and communities involved, WAC may be lower than the biological carrying capacity. WAC is influenced by human perceptions, attitudes, and emotions regarding wildlife which differ among individuals and communities depending on factors including, but not limited to, cultural and personal traditions and values, past and day-to-day experiences with wildlife, income, education, and the degree of dependence on land and natural resources (Lute and Attari 2016, Manfredo et al. 2018, Reidinger 2022). Individual perceptions of wildlife are also highly dependent upon context. For example, watching beavers and other wildlife at a beaver pond on public land may be exciting, but a beaver dam that results in flooding on private property may be a problem (Jonker et al. 2009, Siemer et al. 2013).

The public generally has positive attitudes towards beaver, and an increasing number of individuals appreciate the ecological services beavers provide. However, even when people have positive underlying values about beaver, those values can be overridden by negative attitudes associated with beaver conflicts (Enck et al. 1993). Studies of attitudes towards beaver and beaver conflict management techniques indicate that experience with beaver damage, and the nature or severity of the conflict can have a strong impact on attitudes

towards and tolerance of beaver (Enck et al. 1993, Jonker et al. 2006, 2009, Siemer et al. 2013, Morzillo and Needham 2015). People who have prior experience with beaver damage tend to have a lower acceptance capacity for beaver and are more accepting of strategies such as beaver dam removal or lethal removal of beaver. Negative attitudes towards beaver and the acceptability of lethal methods generally increase as the severity of negative impacts increases (Wittmann et al. 1998, Jonker et al. 2006, 2009, Siemer et al. 2013). However, there can be regional differences in opinions. For example, in the western United States, acceptance of more invasive damage and conflict management strategies such as capture and relocation of beaver or beaver dam and lodge removal increased as the magnitude of beaver impacts increased, but some strategies such as scaring beaver or lethal removal remained generally unacceptable regardless of damage intensity (Morzillo and Needham 2015). Positive encounters with beaver (consumptive and nonconsumptive), exposure to benefits of beaver, and readily available support when conflicts occur can increase tolerance of beaver (Enck et al. 1988, 1993, Morzillo and Needham 2015, Charnley et al. 2020). Taking into account the potential regional and temporal variation in public attitudes towards beaver, the WDNR is completing a survey of attitudes of Wisconsin residents toward beaver to help inform development of a new beaver management plan (Wisconsin Department of Natural Resources 2025*a*).

1.4 WHAT IS THE DIFFERENCE BETWEEN WILDLIFE MANAGEMENT AND WILDLIFE DAMAGE MANAGEMENT?

Wildlife management is the art and science of managing wildlife populations and their habitats to achieve specific objectives. These objectives generally involve sustaining healthy, wildlife populations and the ecosystems upon which they depend. Objectives may also include factors such as preservation and fostering of ecosystem services provided by wildlife, protection of threatened and endangered (T&E) species, enhancing wildlife viewing opportunities, and management of populations of game species to sustain desired levels of harvest. At times, these objectives may involve decreasing local populations of one species for the benefit of other species and ecosystems. In Wisconsin, beaver management objectives and policy are established in state (Wis. Admin. Code. § DNR 10 and 12) and tribal regulations, the WDNR beaver management plan (Wisconsin Department of Natural Resources 2015).

Wildlife management objectives are established by entities with legal authority for natural resources management (e.g., legislatures, state agencies, tribes) through laws, regulations, policies, management plans and cultural traditions, and associated community involvement. Wildlife and land management agencies are responsible for formulating and implementing management actions necessary to achieve the wildlife management objectives. In Wisconsin, wildlife management agencies include WDNR, the Wisconsin Department of Agriculture Trade and Consumer Protection (DATCP), the U.S. Fish and Wildlife Service (USFWS) and Native American tribes. Land management agencies like the U.S. Forest Service (USFS) and National Park Service work in cooperation with wildlife management agencies to achieve their wildlife management objectives.

Unlike wildlife management, wildlife damage management (WDM) is limited to the resolution of wildlife damage and is conducted within the constraints of overall wildlife management objectives, policies and regulations. WDM addresses localized instances of damage, damage threats, or risks to health and safety and is not a comprehensive strategy to manage native wildlife populations. The Wildlife Society, a non-profit scientific and educational organization that represents wildlife professionals, recognizes WDM as a specialized field within the wildlife profession and that WDM is an important part of modern wildlife management (Berryman 1991, The Wildlife Society 2015) and the North American Model of Wildlife Conservation (Organ et al. 2010, 2012). WDM may be conducted by federal, state, and tribal wildlife and land management agencies, or these entities may authorize others including APHIS-WS, private citizens, private companies, non-government organizations, and local agencies to conduct WDM.

APHIS-WS is the federal agency authorized by Congress to help protect American resources from damage associated with wildlife (Appendix A). As a service agency, APHIS-WS provides WDM assistance only at the request of land and resource managers in accordance with applicable federal, state, and local agency and tribal laws and regulations (Appendix B), policies, management plans and memoranda of understanding (USDA Forest Service 2023). In contrast to wildlife and land management agencies and tribes, APHIS-WS does not have the authority to independently manage natural resources in Wisconsin or establish laws, regulations or species management plans, or direct wildlife management. Therefore, as a non-regulatory agency, APHIS-WS is not responsible for "wildlife management" but does provide "wildlife damage management" assistance.

In addressing conflicts between wildlife and people, consideration must be given to the needs of those directly affected by wildlife damage and to a range of environmental, sociocultural, and other relevant factors. Access to professional assistance with WDM is essential to ensure any WDM strategy considers the applicable science, the use of nonlethal and lethal methods, and measures necessary to minimize adverse impacts. Entities involved in WDM, including those working for APHIS-WS, should be experienced in evaluating the circumstances at each site, identifying the wildlife species involved, and expertly implementing or recommending effective strategies using methods that balance those considerations. Assistance can include information, training, help accessing tools and materials, and/or implementation of methods. WDM may be conducted by agencies, tribes, universities, non-government organizations, and private individuals and businesses. In the absence of professional assistance, there is an increased risk that WDM may result in preventable adverse environmental effects or increased risks to public safety.

1.5 NEED FOR ACTION

The need for action is to respond to requests for assistance in reducing damage and threats to human health and safety caused by beaver in Wisconsin. WS-Wisconsin may receive requests for assistance from agencies, tribes, and public and private entities to reduce beaver damage to agricultural and natural resources, property, infrastructure, and risks to human health and

safety. Most beaver conflicts in Wisconsin involve the flooding associated with beaver dams, the impact of beaver dams on water management structures (e.g., beaver blocking water level control devices), or the impact of beaver dams on existing water quality and conditions. Other conflicts may be associated with beaver excavation of bank dens and tree cutting. In rare circumstances, BDM may be requested to test for diseases transmissible to humans (e.g., tularemia, rabies) or to address safety threats from sick or aggressive beaver. Most requests for BDM assistance in Wisconsin come from agencies (WDNR, State, County and Municipal Transportation Departments, County Forestry Departments, and USFS) and railroads with a limited number of requests coming from other private entities or tribes. In some cases, WS-Wisconsin may receive requests to assist with BDM because of the impact of a beaver dam and pond on adjacent property. Wisconsin law states, "A person who owns, leases or occupies property on which a beaver or a beaver structure is causing damage and who fails or refuses to give consent to the department to remove the beaver, or the structure is liable for any damage caused by the beaver or the structure to public property or the property of others." (Wisconsin Statute 29.885(6)).

The nature of requests for BDM assistance received by WS-Wisconsin has not shifted substantially since the completion of the 2013 EA on BDM in Wisconsin (USDA Wildlife Services et al. 2013). However, there has been an increase in the overall number of requests for assistance received, as well as an increase in the level of damage management assistance requested by some cooperators (e.g., the number of miles of coldwater streams managed for free-flowing conditions for the WDNR) (Table 1-1). WS-Wisconsin has provided operational BDM assistance (hands on use of BDM methods) in response to requests in 51 of 72 counties in the state (71%) since 2013. This includes 27 counties where BDM had not been conducted by WS-Wisconsin when the 2013 EA was completed (USDA Wildlife Services et al. 2013). The total number of counties where BDM occurred each year is listed in Table 1-1. Table 1-1 reports the number of counties where operational (hands on) assistance with problems caused by beaver or beaver dams was provided but does not encompass all areas where nonlethal activities such as stream surveys or technical assistance only were conducted.

The increase in requests for WS-Wisconsin assistance may be related to factors including overall decreases in the number of private contractors and volunteers willing to conduct beaver removal, a generally decreasing trend in harvest during the licensed furbearer trapping season and increasing numbers of people moving into rural areas. A review of Wisconsin beaver harvest data starting in the early 1990s indicates high beaver harvest in the early 2000s when an estimated average of 66,000+ beaver were harvested each year (2000-01 season to the 2005-06 season) and a decreasing trend to an average of approximately 22,000 beavers harvested per year from the 2012-13 through 2022-23 seasons (excluding the 2020-21 and 2021-22 seasons as outliers) (Kitchell 2020). Beaver harvest rose sharply during the winters of 2020-21 during the COVID pandemic when there was a spike in all outdoor activities and persisted through the following year (Dhuey and Rossler 2020*a*, 2021*a*). Recent increases in beaver fur prices due to a rise in popularity of beaver felt hats in the 2022-23 and 2023-24 seasons also resulted in a sharp increase in beaver harvest (Rees Lohr and Rossler 2023, S. Rossler et al. 2024*a*). The increase in pelt prices and harvest is not expected to persist; in part

because the total number of licensed trappers continued to decline despite higher fur values and harvest rates (Dhuey and Rossler 2020*a*, 2021*a*, 2022*a*, Rees Lohr and Rossler 2023, S. Rossler et al. 2024*a*).

Table 1-1. Trends in requests for WS-Wisconsin operational assistance with beaver damage management.

Calendar Year (CY)	Total Counties Worked[1]	% Increase in Counties Since 2013	Miles of Coldwater Streams Where BDM was Requested[2]	Beaver Take by WS-Wisconsin[3]	Beaver Dams Removed by WS-Wisconsin
2013	24	N/A	1,536	1,264	1,091
2014	29	+21%	1,425	1,455	1,351
2015	26	+8%	1,631	1,457	1,467
2016	28	+17%	1,752	1,935	1,593
2017	40	+67%	1,809	2,691	1,979
2018	37	+54%	1,809	2,854	1,683
2019	39	+63%	1,892	3,452	2,020
2020	40	+67%	1,839	3,289	1,812
2021	39	+63%	1,851	3,055	1,764
2022	43	+79%	1,840	3,543	1,722
2023	42	+75%	1,888	3,132	1,543
2024	42	+75%	1,858	2,635	1,397
2025	Data unavailable		1,535	Data unavailable	

[1] The total counties where BDM occurred, including all counties where operational BDM has been conducted for the protection of coldwater fisheries and other natural resources, roads and infrastructure, human health and safety, and property. Additional counties may have received technical assistance (e.g., site visits, advice, training).
[2] The number of miles of trout streams where BDM is requested has been rounded to the nearest whole number. This number fluctuates annually based on funding availability and the determination of a need for BDM by fisheries biologists.
[3] Beaver take includes all wildlife damage management activities conducted by WS-Wisconsin, including beavers taken incidentally during non-BDM projects. Incidental take of beaver by WS-Wisconsin is historically low with only two nontarget beaver killed over the period of 2013-2024.

Decreases in the number of licensed trappers (S. Rossler et al. 2024*a*, Rossler et al. 2025*a*) are likely to impact the number of private contractors and volunteers willing or able to conduct beaver removal for damage management (e.g., the WDNR Nuisance Wild Animal Removal Registry). Based on WS-Wisconsin conversations with cooperators the decrease in private hunters and trappers has likely contributed to requests for WS-Wisconsin assistance from state, local, federal, and tribal partners (Table 1-1). Given this information, at least some of the increase in WS-Wisconsin's involvement in BDM likely reflects a shift in the entity providing assistance. In general, increases in WS-Wisconsin take of beaver have not been of sufficient magnitude to cause overall increases in the total known number of beavers removed (Figure 1-1).

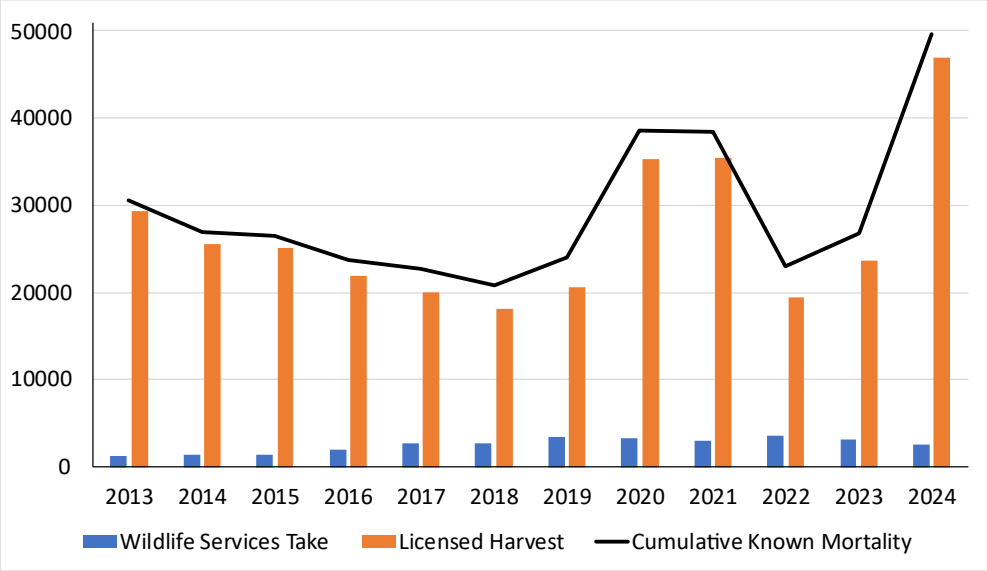


Figure 1-1. Relationship between total known beaver take, licensed harvest (by fur season Nov.-April) and beaver take by WS-Wisconsin for damage management during CY 2013-2024.

1.5.1 What is the Need to Protect Infrastructure and Human Health and Safety?

Beaver dams can threaten human safety by causing roads, railroads, and/or residential areas to flood (D'Eon et al. 1995). Beaver dams built in or around culverts cause flooding that may block roads/railways, undermine roads, railroad beds, or trestles or saturate and weaken the substrate under roads/railways. This may render the roads/railways impassable or result in temporary closures to prevent further damage to the road/railway (Jensen et al. 2001). High water levels in developed areas can lead to unsanitary conditions and potential health problems by flooding septic systems and sewage treatment facilities (De Almeida 1987, Loeb Jr. 1994). Beaver dams and/or associated flooding can damage or obstruct access to public utilities such as electrical power poles or substations or water management devices (e.g., stormwater or wastewater inlets/outlets).

The increase in counties requesting WS-Wisconsin's BDM assistance (Table 1-1) is largely attributable to requests for assistance with the protection of roadways from flooding and washouts. BDM for the protection of recreational areas, such as all-terrain vehicle trails, campgrounds, and parks are also included in this need for action. BDM in these instances protects the public and the timber industry by preserving access to roads and recreational use areas which otherwise would become unsafe or impassable.

Beaver burrows in embankments can weaken dikes, impoundments, or levees that protect residential and municipal areas (Miller 1983, Woodward 1983, Federal Emergency Management Agency 2005). They can also weaken elevated railways and roadbeds.

Beaver ponds created on and adjacent to airports increase the hazard of bird strikes because the open water attracts waterfowl which pose a substantial strike risk to aircraft (Cleary and Dolbeer 2005, Dolbeer et al. 2023). Beaver presence in airfield environments is generally

incompatible with aviation safety standards. Standard airport safety practices usually involve draining water features on airports or making them inaccessible or unattractive to wildlife that pose a high-risk to aircraft (Federal Aviation Administration 2020).

Zoonotic diseases (i.e., wildlife diseases transmissible to humans) may be of concern to some cooperators requesting assistance, even though disease transmission from beaver to humans is rare. WS-Wisconsin's primary involvement in the management of zoonotic diseases would be to support agencies, tribes, and research entities in monitoring for the presence or absence of diseases in wildlife and to educate the public about the risks of disease transmission from wildlife to people. Monitoring data can be used to predict potential risks to human health and safety, and aid agencies in directing management efforts. Most disease sampling by WS-Wisconsin will occur ancillary to other wildlife damage management activities (i.e., disease sampling occurs opportunistically after beavers are captured or lethally taken for other purposes). However, WS-Wisconsin may conduct BDM activities solely to remove individual beaver showing aggression to humans and/or pets, clinical signs of zoonotic diseases, or for disease surveillance.

Beaver sometimes carry intestinal parasites such as *Giardia lamblia* that can contaminate water supplies and cause outbreaks of Giardiasis, however other wildlife species, livestock and humans can also carry and transmit Giardia in their waste (Erlandsen et al. 1990, Alberta Environment and Protected Areas 2014, Girling et al. 2019, Centers for Disease Control 2024*a*). In people symptoms of giardiasis may include diarrhea, cramps, and nausea (Centers for Disease Control 2024*a*).

Beaver can also be carriers of tularemia, a bacterial disease primarily transmittable to people through bites by insect or animal vectors, by handling animals that are infected, inhaling bacteria from contaminated soils when they are disrupted, or ingestion by eating contaminated meat or through contaminated pond water or soil (Wade and Ramsey 1986, D. Muller-Schwarze 2011, Girling et al. 2019). Wearing clothing that minimizes skin exposed to tick and fly bites, gloves while working around beaver or their structures, not drinking or swimming in untreated pond water, and washing hands before eating, drinking, or touching your face can reduce the chances of contracting tularemia. Instances of tularemia associated with beaver as cause for management action are very rare. However, in the spring and early summer of 1981 and 1982, levels of beaver mortality due to tularemia at the Necedah National Wildlife Refuge and adjacent state wilderness areas was sufficiently high that the areas were closed to the public (D. Muller-Schwarze 2011).

While beaver attacks on people or pets are rare, they can occur if a beaver feels threatened or is infected with rabies (Caudell 2012, CBS 2023, Keer 2025). Twenty-one beavers tested positive for rabies in the United States from 2011-2020 (Hareza et al. 2023).

Beaver damming can create conditions favorable to mosquitoes and can hinder mosquito control efforts (Wade and Ramsey 1986). While the presence of these insects is largely just an annoyance and most mosquito species do not carry diseases of concern to humans, some

beaver impoundments may support mosquito species that can transmit diseases, such as Eastern Equine encephalitis and West Nile Virus (Rey et al. 2012, Centers for Disease Control 2024*b*).

1.5.2 What is the Need to Protect Property?

Beavers may cause damage to a variety of property types, most often through flood damage to structures. Beaver may also cut valuable trees and woody vegetation for use in dam and lodge construction, and food caches. The loss of woody vegetation and landscaping can be aesthetically displeasing to property owners, and trees damaged by beaver may also damage property. Beaver burrowing may undermine lawns and walkways and burrows in levees can damage pond and reservoir dams. Beaver may also gnaw on boat houses and docks, and cause other damage to private and public property (Wade and Ramsey 1986).

1.5.3 What is the Need to Protect Agricultural Resources?

Beaver damage to agriculture primarily occurs when beaver ponds inundate crops, pastures, or timber resources. Beaver dams can impair the operation of drainage systems and irrigation ditches. Flooding can also prevent access to crops or timber resources, and block livestock access to pastures. Beaver have also been known to feed on crops when planted near aquatic habitats (Roberts and Arner 1984). During stomach content analyses of beaver, Roberts and Arner (1984) found that the stomachs of 83% of the beaver sampled in the summer near soybean fields contained only soybeans.

Beaver may also have positive impacts on agriculture. Beaver impoundments can elevate local water tables, and provide a more reliable year-round source of water which, in turn, can improve grazing in the areas adjacent to the ponds (Charnley et al. 2020). This can be especially beneficial for producers in areas prone to extended dry periods.

1.5.4 What is the Need to Protect Natural Resources?

Beavers substantially alter habitats and plant and animal distribution, primarily through dam building and tree cutting. These impacts are a normal part of healthy ecosystems and provide numerous ecological and social benefits (Rosell et al. 2005*a*, Muller-Schwarze 2011, Nummi et al. 2011, Wisconsin Department of Natural Resources 2015, Johnson-Bice et al. 2018, Fairfax and Whittle 2020, Rosell and Campbell-Palmer 2022)(Sections 3.3 and 3.5). However, in limited circumstances, beaver dams and associated impoundments can conflict with natural resource management objectives. In Wisconsin, conflicts involving beaver impacts on natural resources have involved coldwater ecosystems, wild rice areas, and rare plants and plant communities.

The need for BDM to protect natural resources is determined by the WDNR, USFS, and tribes who have technical expertise and management authority for the wildlife, fish, plants, and lands under their jurisdiction. Natural resource management conflicts are most likely when the species to be protected may already be challenged by factors such as habitat loss/degradation, increasing average temperatures and frequency of extreme weather events, introduced

species, or historic over-harvest. They may also occur in situations where habitat changes (e.g., intensive logging and slash burning) create environmental conditions that favor one species over another and potentially disrupt the balance among species (Wisconsin Department of Natural Resources 2015, 2019). In general, BDM assistance from WS-Wisconsin is only a portion of the overall strategies employed by the agencies and tribes to enhance and protect vulnerable resources.

1.5.4.1 Enhancement of Coldwater Fisheries for Trout

WS-Wisconsin's BDM for the protection of coldwater fisheries involves the prevention or reduction of negative beaver impacts on Class 1, 2, and 3 trout streams at the request of the WDNR or USFS. Historically, beaver dams have been considered to have negative impacts on coldwater fisheries in the low gradient trout streams of the western Great Lakes region, (Wisconsin Department of Natural Resources 1990, 2015, 2019, Avery 2002, 2004). Concerns regarding beaver impacts on trout habitat in Wisconsin include water temperature, dissolved oxygen levels, availability of spawning sites and impacts on fish movements. The Wisconsin Inland Trout Management Plan lists beaver management as a core strategy for maintaining some coldwater streams in the region and, in some locations, the primary means of maintaining trout fisheries (Wisconsin Department of Natural Resources 2019). However, some determinations regarding potential adverse impacts of beaver on trout rely heavily on older research and a series of case studies that may not reflect modern research standards or changes in environmental conditions including increasing temperatures and frequency of weather extremes (Johnson-Bice et al. 2018, WICCI 2025*a*, *b*).

More recent research on fish and beaver relationships from across the country indicates that beaver can benefit trout and adverse impacts of beaver impoundments to fishery resources are highly dependent upon site-specific circumstances (McRae and Edwards 1994, Niles et al. 2013, Wisconsin Department of Natural Resources 2015, 2019, Johnson-Bice et al. 2018, Renik and Hafs 2020). However, much of the recent research is from regions with fish species, habitats, hydrology and terrestrial ecosystems very different from those in Wisconsin (e.g., persistent arid conditions and high gradient streams (See Appendix C). Given the site-specific nature of beaver impacts, the data and experience of local managers play an important role in coldwater fisheries management. The WDNR is conducting ongoing research to help inform future management decisions (Lundberg and Mitro 2022, Mitro 2022). Appendix C contains a discussion of the potential positive and negative impacts of beaver on trout with emphasis on Wisconsin and/or Great Lakes specific examples when available.

WS-Wisconsin only conducts beaver and beaver dam removal for fishery resources on trout streams identified by the WDNR or USFS. Fisheries biologists determine where BDM is necessary based on site-specific information and ongoing research (e.g., (Lundberg and Mitro 2022, Mitro 2022). The exact streams and stream segments vary on a yearly basis due to funding constraints, staffing, and the ecological need for action as determined by the resource manager, but some places have been part of long-term BDM for coldwater fisheries (e.g., Ribic et al. 2017). Tribal perspectives are included in meetings of the beaver working group, and

tribal representation on the committees developing the state beaver and inland fisheries management plans and USFS resource management plans.

Of the roughly 84,000 miles of perennial rivers and streams in Wisconsin, 13,740 are designated as either Class 1, 2, or 3 trout streams (WDNR personal comm. 2025). Class 1 streams (6,018 miles, 44% of trout streams) are high quality trout waters with sufficient natural reproduction to sustain populations of wild trout, at or near carrying capacity. Class 2 streams (6,072 miles, 44% of trout streams) have some natural trout reproduction, supplemented with stocking. Class 3 streams (1,650 miles, 12% of trout streams) are marginal trout habitat with no natural reproduction occurring. WS-Wisconsin's BDM assistance is primarily requested in Class 1 and 2 streams where clear, free-flowing conditions are desired for salmonid reproduction and where dams may be a barrier to fish movement. The annual average of approximately 1,743 miles of trout stream where WS-Wisconsin worked during 2013-2025 was less than 2.1% of the perennial rivers and streams in the state (range 1.7-2.3%) and approximately 12.7% of the designated Class 1, 2 or 3 trout streams (range 10.4-13.8%). This low percentage of rivers and streams where BDM is requested is indicative of the targeted approach used by WDNR and USFS fisheries biologists when requesting BDM assistance for coldwater fisheries.

Table 1-2. Total miles of coldwater streams where cooperators have requested assistance with beaver and beaver dam removal by WS-Wisconsin to maintain free-flowing water conditions for coldwater fisheries CY 2013 - 2025.

CY	Total Stream Miles Treated	% Change in Stream Miles Treated from 2013	Beaver Take for Fisheries	Beaver Dams Removed for Fisheries
2013	1,536	N/A	730	686
2014	1,425	- 7.2%	774	812
2015	1,631	+ 6.2%	656	774
2016	1,752	+ 14.1%	864	875
2017	1,809	+ 17.8%	1,329	1,114
2018	1,809	+ 17.8%	1,209	674
2019	1,892	+ 23.2%	1,347	832
2020	1,839	+ 19.7%	1,240	653
2021	1,851	+ 20.5%	1,279	677
2022	1,840	+ 19.8%	1,524	771
2023	1,888	+ 22.9%	1,474	783
2024	1,858	+ 21.0%	1,089	517
2025	1,535	- 0.1%	Data not available.	

The number of streams and the number of miles of coldwater streams where the cooperators request BDM from WS-Wisconsin generally increased since completion of the 2013 EA (Tables 1-1 and 1-2). This increase is due, in part, to a reduction in WDNR staff conducting their own BDM for trout stream protection, the identification of new areas for BDM assistance identified by the WDNR and USFS, and these agencies' preference to use WS-Wisconsin for BDM projects over private trappers. This preference is due to the efficiency of utilizing WS-Wisconsin due to

our professional expertise in resolving beaver conflicts, organizational structure, and geographic distribution of staff allowing one point of contact to manage statewide conflicts. In some instances, WDNR and USFS may contract private trappers for individual BDM projects, however, this is relatively uncommon. Due to ongoing evaluation of the need for beaver management for trout stream enhancement, as well as funding constraints, there is annual variation in the number of stream miles where WS-Wisconsin conducts BDM (Table 1-2). For example, in 2025, most BDM for trout streams in the Driftless Area was cancelled due to WDNR funding constraints. BDM services were only requested at individual conflict sites, where immediate need was identified by WDNR to restore free-flowing conditions. The need for action for BDM for the protection of coldwater resources is anticipated to be similar to or below the range presented in Table 1-2 as new research enables more targeted BDM and a balance between the desire to address instances of adverse impacts on trout and the benefits of beaver colony complexes.

1.5.4.2 Protection of Wild Rice and Rare Plants and Plant Communities

WS-Wisconsin receives requests for assistance when beaver or beaver dams affect water level management for specific plant and wildlife species (e.g., wild rice, waterfowl habitat on refuges, old growth timber). Wild rice, or manoomin in Ojibwemowin (*Zizania palustris* and *Zizania aquatica*) is an important part of the diet, culture, and economy of many Native American tribes in Wisconsin and the Great Lakes Region (David et al. 2019, Hosterman et al. 2023). It is also of dietary and economic importance to other individuals in the state. Water level management is an important part of wild rice management and restoration (David et al. 2019, McGilp et al. 2023). Beaver and wild rice have coexisted for centuries, however, changes in habitat caused by human activity (e.g., timber harvest and development) have favored beaver while also decreasing the abundance of wild rice. Wild rice communities depend on relatively stable water levels and changes to water depth during the critical early growing period can have adverse effects. In some cases, the elevated water levels associated with beaver dams blocking the outlets of rice lakes can adversely affect wild rice beds (David et al. 2019). However, Consequently, the need for beaver and beaver dam removal for wild rice management is assessed on a case-by-case basis (David et al. 2019, Hosterman et al. 2023). When adverse impacts are identified the WDNR, tribes, and tribal organizations may request assistance from WS-Wisconsin.

Requests for WS-Wisconsin assistance with management of beaver dams to support wild rice management have increased. During the period analyzed in the 2013 EA, WS-Wisconsin conducted BDM for wild rice lakes at 17 sites and removed an average of 37 beaver and 33 dams each year. Over the last five years, CY 2020 – 2024, WS-Wisconsin conducted operational BDM for the protection and enhancement of wild rice at an average of 27 sites per year, removing an average of 152 beaver and 30 dams per year (Table 1-3).

According to the Strategic Analysis of Wild Rice Management in Wisconsin, the WDNR monitors and actively manages approximately 50 rice waterbodies (the number varies yearly) and prioritizes beaver management as needed when funding permits (Wisconsin Department of

Natural Resources 2021). Efforts within the Ceded Territory are largely coordinated with the GLIFWC, which has also contributed funding for BDM on off-reservation wild rice waters. Information on water bodies where BDM has been requested for manoomin is presented at the annual joint State (WDNR)/Tribal Wild Rice Management Committee meetings which include state, tribal, and federal representation. Due to the limited number of sites with wild rice and funding considerations, WS-Wisconsin does not anticipate future increases in BDM for wild rice management. Pending the decision based on this EA, WS-Wisconsin may assist with tests of flow devices instead of dam removal as a strategy for addressing beaver impacts to wild rice lakes. If these nonlethal devices meet wild rice management objectives, a reduction in the number of beaver and beaver dams removed for this type of work is expected.

Table 1-3. WS-Wisconsin operational beaver damage management assistance for the protection and enhancement of wild rice lakes for 2020-2024.

CY	Wild Rice Sites	Beaver Take	Dams Removed
2020	27	142	34
2021	24	119	30
2022	27	182	23
2023	30	151	27
2024	29	168	35
Five-Year Average	27	152	30

In rare instances, the WDNR or USFS have requested WS-Wisconsin assistance when beaver impoundments jeopardize rare species and plant communities such as state or federally endangered, threatened, or special concern species (e.g., plants, mussels). In scoping comments, the WDNR Division of Forestry noted that, while the benefits of beaver to wetland communities are commonly noted, not all wetland cover types benefit equally from beaver presence. Wisconsin's wooded wetlands are very sensitive to water table fluctuations and sometimes a single season of abnormally high water can convert a wooded wetland into another wetland cover type such as open water or emergent vegetation. WS-Wisconsin has not received requests for this type of assistance in recent years, but we are including this type of activity to enable prompt response if assistance is requested.

The WDNR may adjust water levels seasonally in some refuges to maximize production of forage for migrating waterfowl (e.g., (Nelms 2007). The variations in water levels may be contrary to the needs of beaver and beaver may build dams to block water management devices. Ringelman (1990) recommended managing for beaver and beaver ponds but noted that beaver management including periodic drawdowns may be needed over time to maximize productivity for waterfowl and minimize conflicts. The WDNR may request WS-Wisconsin assistance with these situations.

1.6 NATIONAL ENVIRONMENTAL POLICY ACT AND APHIS-WS' DECISION-MAKING

This project was initiated under the 1978 Council on Environmental Quality (CEQ) national NEPA implementing regulations (50 CFR Parts 1500-1508), USDA NEPA Implementing Regulations (7 CFR 1b) and APHIS NEPA Implementing Procedures (7 CFR 372). During the EA's

development there have been changes to the NEPA and to the CEQ NEPA Implementing Regulations culminating in the February 20, 2025 repeal of the CEQ NEPA Implementing Regulations and July 3, 2025 USDA Interim Final Rule modifying the USDA NEPA Implementing Regulations and repealing the APHIS NEPA Implementing Procedures (90 FR 29632). We are using the option from the 2025 USDA Interim Rule to complete the EA under the NEPA as amended by the Fiscal Responsibility Act (Public Law 118-S), preexisting USDA NEPA Implementing Regulations and APHIS NEPA Implementing Procedures and provisions of the CEQ 2020 NEPA Implementing Regulations.

The purpose of the EA is to describe the environmental impacts of alternatives to meet the need for action and analyze whether they will result in significant impacts on the human environment. WS-Wisconsin will use the analyses in this EA, including input from consulting and cooperating agencies, and the public comment periods to help inform its decisions regarding if and how WS-Wisconsin should conduct BDM activities and whether to prepare an EIS or a Finding of No Significant Impact.

1.7 SCOPE OF THE EA

The geographic scope of this EA is statewide. WS-Wisconsin has decided that one EA analyzing potential operational impacts for the entire State provides a more comprehensive and less redundant analysis than multiple EAs covering smaller regions. This approach also provides greater consistency when using data and reports from state and federal wildlife management agencies, which are typically collected and reported on a statewide basis.

The mission of WS-Wisconsin is to provide federal leadership with managing damage and threats of damage associated with wildlife (WS Directive 1.201). WS-Wisconsin could receive a request for assistance from a property owner or manager to conduct activities on property which could include federal, state, tribal, municipal, and private land within Wisconsin. WS-Wisconsin would only assist when the appropriate property manager, property owner, or tribal authority requests assistance and when authorized by a Work Initiation Document (WID).

1.8 LAND DESIGNATIONS AND OWNERSHIP INCLUDED IN THIS EA

Areas where WS-Wisconsin may be asked to provide BDM assistance include rural and urban areas including residential and commercial development, pastures, farms, agricultural croplands, timber and forested areas, recreation areas and trails, airports, State Natural Areas, and other places where beaver activity may conflict with humans. Specific land classes where WS-Wisconsin may work include:

- **Federal Property**

  In Wisconsin, the USFS is the primary federal land management agency that requests BDM assistance. WS-Wisconsin occasionally receives requests for assistance from USFWS. WS-Wisconsin BDM is coordinated with the federal land management agencies prior to conducting BDM activities on land under their jurisdiction to ensure projects are conducted in a manner consistent with applicable agency goals, laws, regulations, resource management plans, and MOUs (e.g., USDA Forest Service 2023). Most projects on federal

lands are conducted for the protection of infrastructure/human health and safety and, in the case of the USFS, for coldwater fisheries.

- **Private Property**

Private property includes lands in private ownership in urban, suburban, and rural areas, including agricultural lands, railroads and trestles, timberlands, pastures, residential complexes, subdivisions, and businesses.

- **State and Municipal Property**

WS-Wisconsin's BDM activities on state and municipal properties are typically conducted for the protection of coldwater ecosystems, roads and bridges, irrigation dikes or impoundments, water treatment or confluences structures, parks and trails, natural areas, scenic areas, conservations areas, and campgrounds.

- **Tribal Property**

Tribal governments and members can request assistance from WS-Wisconsin for BDM on lands under their authority or ownership. WS-Wisconsin has primarily conducted BDM activities at the behest of tribes for the protection of wild rice waters. WS-Wisconsin obtains permission from tribal leadership or their designated agents before conducting any BDM activities on tribal lands to ensure that activities are conducted in a manner consistent with applicable regulations, values, and traditions.

- **Ceded Territories**

In off-reservation areas included in treaties between the federal government and Ojibwe tribes, GLIFWC assists member Ojibwe bands in implementation of treaty seasons and in the protection of treaty rights and natural resources. GLIFWC and/or individual member tribes can request BDM assistance from WS-Wisconsin. GLIFWC also helps to ensure member tribes rights and perspectives are included in agency decision making, through participation in state and federal committees and working groups, such as the Beaver Management Plan Committee, the Furbearer Advisory Committee, joint State/Tribal Wild Rice Management Committee, etc.

1.9 SITE SPECIFICITY

As mentioned previously, WS-Wisconsin would only conduct BDM activities when requested by the appropriate resource owner or manager. This EA analyzes the potential impacts of managing damage caused by beaver based on previous activities conducted on private, public, and tribal lands by WS-Wisconsin. The EA also addresses the potential impacts of managing beaver damage in areas where WS-Wisconsin and a cooperating entity could sign additional agreements in the future. As the need for action would be to reduce damage and provide services whenever requested (within the constraints of available funding and workforce), it is conceivable that additional BDM efforts could occur. Thus, this EA anticipates those additional efforts and analyzes their potential impacts.

Beaver can be found statewide in Wisconsin, within suitable habitat, although there is regional variation in habitat availability, habitat quality, beaver presence, and likelihood of conflicts between humans and beaver (Section 3.2.5). Requests for BDM assistance can occur wherever beaver occur and overlap with human presence or activities. In general, requests for WS-

Wisconsin BDM assistance, as indicated by beaver take for damage management, are most common in WDNR Beaver Management Zones (BMZs) A and B in northern Wisconsin (Figure 1-2). Wildlife damage management falls within the category of actions in which the exact timing or location of individual requests for assistance can be difficult to predict. Using historical data, WS-Wisconsin can predict some of the locations or types of situations and sites where beaver-related damage could occur, and the general areas where BDM may be requested for coldwater fisheries are generally known. However, the program cannot predict each specific location or time when resource owners would determine that damage has become intolerable to the point that they request assistance from WS-Wisconsin. Therefore, WS-Wisconsin must be ready to provide BDM assistance on short notice, anywhere in Wisconsin to protect infrastructure, human/pet health and safety, property, or any other resource upon request.

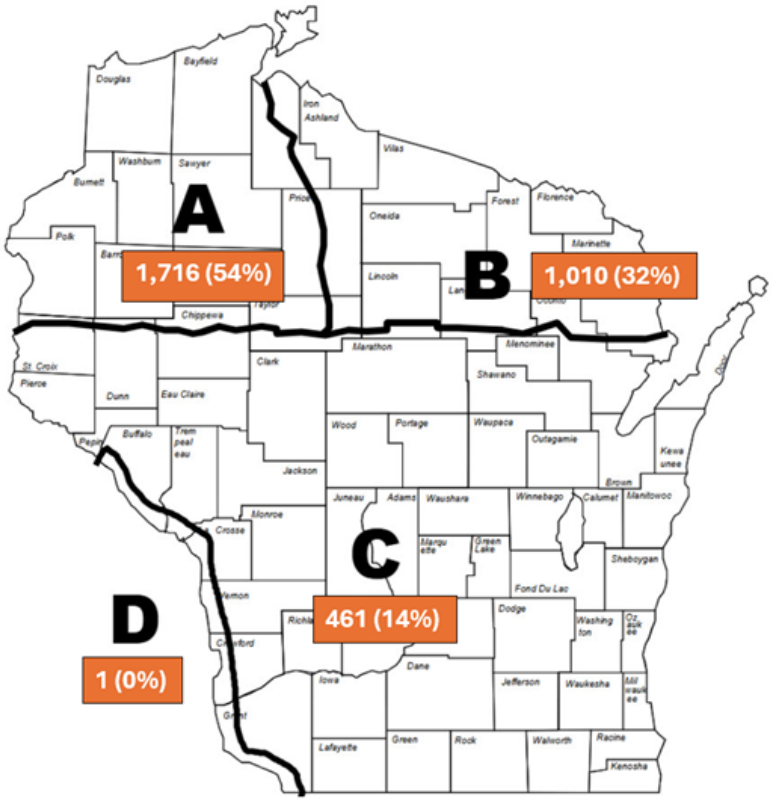


Figure 1-2. WS-Wisconsin average beaver take for BDM (number taken, % of take) per WDNR Beaver Management Zone, FY 2020-2024.

The WS Decision Model (Section 2.6.2) is the site-specific procedure for individual actions conducted by APHIS-WS personnel in the field when they respond to requests for assistance. Site-specific decisions made using the model are in accordance with provisions of NEPA analyses, applicable WS Directives[1], relevant laws and regulations, interagency agreements and memoranda of understanding, and cooperating agency policy and procedures. As part of the WS Decision Model, WS-Wisconsin considers state and federally listed endangered species and

[1] APHIS-WS Directives may be found at https://www.aphis.usda.gov/wildlife-services/directives

conservation measures which have been identified for those species. Although WS-Wisconsin cannot always predict where requests for services will occur, we have conservation measures established for areas where T&E species are or may occur that are formulated into the decision process of where, when, and how we will provide BDM services.

The analysis in this EA is intended to apply to any action that may occur in any locale, and at any time within Wisconsin for which WS-Wisconsin may be requested for assistance. Using the Decision Model (Section 2.6.2) for field operations, this EA meets the intent of NEPA regarding site-specific analysis, informed decision-making, and providing the necessary timely assistance to agencies and cooperators, consistent with WS-Wisconsin objectives.

1.10 ENTITIES INVOLVED IN THIS EA AND THEIR ROLES AND AUTHORITIES

WS-Wisconsin is the lead agency for this analysis. The USFS and WDNR are Cooperating Agencies. The Great Lakes Indian Fish and Wildlife Commission, Bad River Band of Lake Superior Chippewa, and the Red Cliff Band of Lake Superior Chippewa participated in the preparation of the EA. A description of authorities of each agency and tribe may be found in Appendix A. Cooperating and participating agencies and tribes provided input on the proposed action during a project initiation meeting discussing potential alternatives and issues to be addressed and available data and during review of an agency draft of the EA. In addition to reviewing EA content, these entities provided input to ensure the proposed actions comply with all applicable federal, state, and tribal regulations, policies, resource management plans, MOUs and cooperative agreements.

WS-Wisconsin consulted with the USFWS and WDNR NHC on procedures needed to protect state and federally listed T&E species (Section 3.4). WS-Wisconsin also worked with the U.S. Army Corps of Engineers to identify circumstances when notifications or permits would be required for BDM activities (Appendix D).

2 ISSUES AND ALTERNATIVES

2.1 INTRODUCTION

Chapter 2 lists the goals, objectives and issues that were considered when developing management alternatives for detailed consideration in Chapter 3 (Environmental Effects). These issues were also used to develop protective measures (Section 2.7). This chapter describes BDM actions which may be conducted by WS-Wisconsin under each of the alternatives identified for detailed analysis.

2.2 ISSUES USED TO DEVELOP ALTERNATIVES

Environmental issues include resources that may be affected by the proposal, including risks to humans. The issues in this section were identified based on APHIS-WS experience, agency and tribal outreach, and/or public comments provided during scoping. The following issues are analyzed in detail:

- Effects on Target Species Populations

- Effects on Nontarget Species
- Effects on T&E Species and Critical Habitat
- Effects on Water and Wetlands
- Effects on Human and Pet Health and Safety
- Humaneness Considerations
- Cultural and Recreation Impacts, and Tribal Concerns

2.3 ISSUES NOT CONSIDERED FOR COMPARATIVE ANALYSIS

Several issues raised by the public during scoping for this EA or similar APHIS-WS NEPA reviews were considered but not advanced for comparative analysis. Each issue and the reason for not advancing it for comparative analysis are presented in Appendix E.

2.4 GOALS AND OBJECTIVES

Based on conversations among WS-Wisconsin, agency and tribal partners, and the need for action outlined in Section 1.5, the following goal and objectives were established for WS-Wisconsin BDM activities.

Goal: Provide prompt, professional response to all requests for assistance in reducing conflicts with beaver in a manner that balances the need to effectively resolve conflicts with the need to minimize risks of adverse impacts on the human environment.

Objectives:

1) Professionally and proficiently respond to all requests for assistance using an integrated and adaptive approach and the APHIS-WS Decision Model.
2) Assistance must be consistent with all applicable federal, state, and local laws, APHIS-WS policies and directives, cooperative agreements, MOUs, and other requirements as provided in any decision resulting from this EA.
3) Implement and coordinate BDM to ensure effects do not negatively affect the viability of the beaver population in Wisconsin.
4) Ensure WS-Wisconsin actions are compatible with the goals and objectives of applicable management plans established by state, tribal, and federal wildlife management agencies.
5) Minimize impacts to nontarget species by selecting the most effective, target-specific methods and techniques available, given legal, environmental, feasibility and other constraints; and
6) Evaluate and incorporate the use of effective new and existing nonlethal and lethal technologies, where appropriate, into technical and direct assistance strategies.

2.5 ALTERNATIVES CONSIDERED IN DETAIL

Each alternative is briefly described here, with additional details about WS-Wisconsin decision-making, methods, and Protective Measures discussed in subsequent sections and

Appendix F. Appendix E includes a discussion of additional alternatives considered but not advanced for detailed analysis.

2.5.1 Alternative 1 – Integrated Beaver Damage Management (Proposed Action)

This Alternative allows WS-Wisconsin to implement an adaptive integrated approach using nonlethal and lethal methods for BDM (Section 2.6.4, Appendix F). Site-specific strategies would be identified using the APHIS-WS Decision Model (Section 2.6.2). WS-Wisconsin would encourage the use of nonlethal methods where their use is practical and effective and when resources are available. WS-Wisconsin would only conduct BDM when requested by the landowner/manager and only after a WID or other agreement is signed. Most operational BDM activities conducted by WS-Wisconsin are for agencies and tribes. WS-Wisconsin primarily provides technical assistance (advice, educational materials) in response to residential conflicts with beaver, and may refer such requests to WDNR's Beaver Control Guidelines and/or the Wisconsin Trapper Association Nuisance Wild Animal Removal List for operational assistance (e.g., (Wisconsin Department of Natural Resources 2020)[2]. Information on the number of beavers taken, relocated, dispersed, and freed by WS-Wisconsin is available annually to the public in Program Data Reports. WS-Wisconsin also provides summaries of BDM activities to cooperators and the WDNR. As a member of the Wisconsin Beaver Task Force, WS-Wisconsin provides an annual summary of agency BDM activities during meetings and at the WDNR Furbearer Advisory Committee meetings.

The methods that could be used or recommended by WS-Wisconsin include a range of nonlethal and lethal methods as well as education and research (Section 2.6.1, 2.6.4, Appendix F). We have updated the list of applicable methods in the 2013 EA to include recent improvements in the design of flow devices, exclusion systems, increased use of UAS, and participation in beaver relocation projects. WS-Wisconsin BDM operations would be conducted in a manner consistent with the following:

- Applicable federal and state laws and regulations including the Clean Water Act (CWA) and provisions established in state and federal consultations for the protection of T&E species (e.g., Section 3.4, Appendix B.1, B.9, and B.12; Appendix D)
- APHIS-WS policies and directives
- Methodologies described in this EA (e.g., Section 2.7)
- Applicable federal, state, and tribal land and resource management plans
- Memorandum of Understanding between WS-Wisconsin and other agencies (USDA Forest Service 2023)

Under Alternative 1, WS-Wisconsin could conduct BDM activities within federally managed lands which may include Special Designation Areas managed for the protection or

[2] Referral to the Wisconsin Trapper Association Nuisance Wild Animal Removal Referral List is directed by the WDNR and does not constitute recommendation or endorsement by APHIS-WS. Mention of service providers or commercial products in this report does not imply endorsement by USDA over others not mentioned. USDA neither guarantees nor warrants the standard of any product or service provider mentioned.

preservation of environmental or cultural resources. All activities on public lands would be coordinated with the land management agency to ensure consistency with policies and procedures for the protection of the site. WS-Wisconsin does not anticipate requests for BDM in Wilderness Areas.

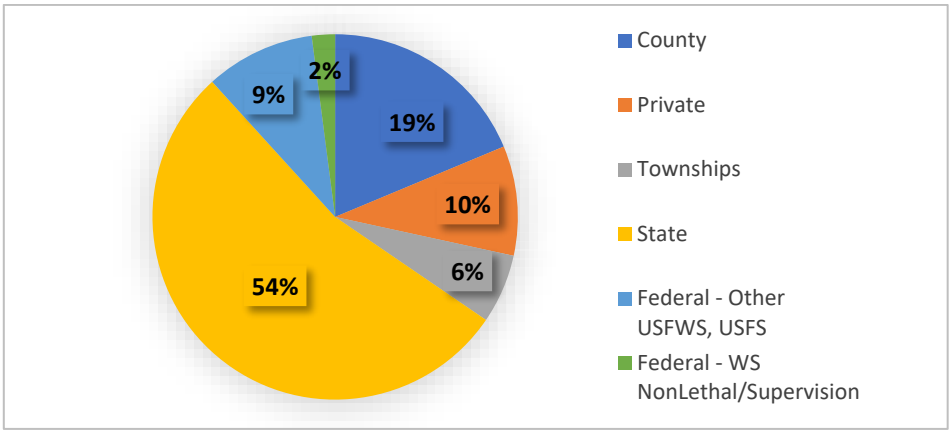


Figure 2-1. Sources of average annual beaver damage management funding for WS-Wisconsin, CYs 2022-2024.

Average annual funding for WS-Wisconsin BDM Activities for 2022-2024 was $1,030,064. Approximately 98% of funding was from cooperators with the remainder from WS-Wisconsin federal allocation (Figure 2-1). The limited WS-Wisconsin federal funding for BDM in Wisconsin is used for supervision, and for the APHIS-WS Nonlethal Initiative (United States Department of Agriculture 2024). WS-Wisconsin allotment from the Nonlethal Initiative is divided between beaver damage management and gray wolf damage management.

In accordance with applicable state and tribal regulations (Appendix B), BDM may be conducted by entities other than WS-Wisconsin. For example, county highway and forestry departments also implement a range of nonlethal methods to prevent damage addressed above and in Appendix F. All methods proposed for use by WS-Wisconsin are also available to agencies, tribes, and private entities. However, as is the case for WS-Wisconsin, special training and authorizations may be needed to use methods such as explosives or animal handling. State law does not require permits or reporting of beaver or beaver dams taken for damage management. See Also Section 3.1.

2.5.2 Alternative 2 – Only Nonlethal Beaver Damage Management Except for Projects for Coldwater Fisheries

Under this alternative, WS-Wisconsin would implement an adaptive integrated approach as described under Alternative 1, however, WS-Wisconsin would only consider nonlethal methods when formulating approaches to resolve damage associated with beaver in all situations except those involving protection of coldwater fisheries. This alternative addresses concerns regarding the extent of WS-Wisconsin use of lethal WDM methods. This alternative does not limit BDM for natural resources protection to nonlethal methods because nonlethal methods are generally impractical or unsuitable for many resources

projects, particularly those to protect coldwater fisheries. Actions to protect coldwater fisheries usually involve beaver removal from lengthy sections of stream, not discrete sites (e.g., a specific culvert), and often involve remote areas. Exclusion methods are best suited to discrete sites, are logistically impractical for remote areas and may have substantial adverse impacts on movements and habitat use by other species if applied to large areas. Water control devices are also intended for application to discrete sites and would be impractical to implement in remote locations. Additionally, water control devices allow for beaver relocation upstream or downstream of the protected location which is contrary to the WDNR goal to remove beaver dams from specific stream segments. Relocation may be possible under limited circumstances but would not be suitable as a replacement for all lethal removal because of logistical considerations (e.g., safe and cost-effective beaver transport from remote locations and the number of beavers to be removed).

As with Alternative 1, WS-Wisconsin would only conduct BDM when requested by the landowner/manager and only after a WID or other agreement is signed. WS could provide technical assistance and/or direct operational assistance like Alternative 1 within the constraints of methods allowed under this alternative. The way WS-Wisconsin conducts activities would be the same as for Alternative 1, in terms of compliance with applicable laws, regulations, policies and directives, coordination with land management agencies, use of protective measures and consistency with applicable land and resource management plans.

Entities other than WS-Wisconsin could conduct BDM as noted for Alternative 1 (Section 3.1.1). WS-Wisconsin staff would refer requests for information regarding lethal methods to the WDNR and to the Wisconsin Trappers Association Nuisance Wild Animal Removal Referral List or recommend the use of private contractors. Several cooperators expressed a need to retain access to lethal BDM methods during scoping for this EA[3]. WS-Wisconsin anticipates that many cooperators will switch to conducting lethal BDM on their own or using alternative sources of assistance who are able to use lethal BDM methods. Overall requests for WS-Wisconsin BDM assistance are expected to decrease substantially under this alternative. Funding for WS-Wisconsin BDM activities is likely to decrease as cooperators reallocate funds to their own personnel or other entities that can use lethal BDM methods. This alternative is likely to result in a reduction in the information available on BDM activities because entities other than WS-Wisconsin are not required to report beaver take to the WDNR. The WDNR also currently does not keep any centralized records of its BDM activities. See Also Section 3.1

[3] For example, comments from the WDNR Division of Forestry, Langlade County Forestry, Parks and Recreation Department, Washburn County Highway Department, and Wisconsin County Forests Association. Public comments are available in regulations.gov docket APHIS-2023-0082 (https://www.regulations.gov/docket/APHIS-2023-0082/document).

2.5.3 Alternative 3 – Integrated Beaver Damage Management Except No Beaver Damage Management for Coldwater Fisheries

Under this Alternative WS-Wisconsin would implement an adaptive integrated approach using nonlethal and lethal BDM methods in the same manner as for Alternative 1 except that WS-Wisconsin would not assist the WDNR with BDM for the protection of coldwater fisheries. This alternative addresses concerns that BDM for the protection of coldwater fisheries is not warranted or that the potential benefits do not justify the ecological impacts. WS-Wisconsin would only provide BDM assistance for the protection of infrastructure and human health and safety, property, agriculture, wild rice, and other natural resources except coldwater fisheries (Section 1.5.4.2). Methods and procedures for addressing these conflicts would be as presented in Alternative 1. Depending on WDNR policies for recording and reporting information on its beaver damage management activities for coldwater fisheries, this alternative could result in similar levels of information on impacts to beaver as Alternative 1.

The WDNR can conduct BDM for the protection of natural resources on its own in the absence of assistance from WS-Wisconsin using the same methods available to WS-Wisconsin. It would likely take time for the WDNR to acquire the staff and resources needed to implement projects for the protection of coldwater fisheries. There may also be a slight reduction in resources available to conduct BDM for the protection of coldwater fisheries because the WDNR would have to assume costs for administering the project.

2.5.4 Alternative 4 – No Involvement in Beaver Damage Management

Under this alternative, WS-Wisconsin would not provide any assistance with BDM. As noted in Alternative 1, agencies, tribes, private individuals, and companies could still conduct BDM in accordance with applicable state laws and regulations. All the BDM methods used by WS-Wisconsin would be available to private entities. As with Alternative 2, slightly less funding may be available for some BDM because cooperating agencies would have to assume additional costs to administer a program, and there may be a temporary reduction in BDM activities until alternative sources for BDM assistance are identified, trained as needed, and provisioned. Agencies conducting BDM may be able to hire employees and arrange to acquire equipment from WS-Wisconsin that will no longer be involved in BDM. Unless the WDNR changes reporting requirements for all entities, this alternative would result in the greatest reduction in information on impacts to the beaver population from damage management activities because WS-Wisconsin would not be involved in reporting take or providing nonlethal assistance. See also Section 3.1.

2.6 ACTIVITIES INCLUDED IN ALL WS-WISCONSIN ACTION ALTERANTIVES

This section discusses actions and strategies that WS-Wisconsin would use under any of the alternatives that involve assistance from WS-Wisconsin (i.e., action alternatives, Alternatives 1-3).

2.6.1 Wildlife Damage Management Strategies

Prior to providing any wildlife damage management assistance, APHIS-WS obtains necessary general authorizations for the category of assistance to be provided (e.g., beaver damage management) from the applicable state, federal, tribal and local agencies. These authorizations may be in the form of Memoranda of Understanding (MOU), Cooperative Service Agreements (CSAs), Work Initiation Document (WID), and/or permits. CSAs also address the protocols for recovering some or all the costs of the proposed actions. All APHIS-WS actions must comply with applicable federal, state, tribal, and local laws and regulations (APHIS-WS Directive 2.201, Appendix B). All actions must also be consistent with memoranda of understanding and other agreements with federal and state agencies, such as the WDNR, USFWS, USFS, or U. S. Army Corps of Engineers (USACE), if the actions involve those agencies.

Once the general authorizations for the wildlife damage management activities are obtained, trained and experienced APHIS-WS field specialists work directly with cooperators to address specific conflicts with wildlife. Strategies and methods used by APHIS-WS are not based on punishing offending animals but are intended to reduce animal damage to resources and are used as part of the WS Decision Model (Slate et al. 1992)(Section 2.6.2). APHIS-WS uses an integrated wildlife damage management (IWDM) approach to reduce or prevent wildlife damage (WS Directive 2.105). IWDM may incorporate cultural practices (e.g., animal husbandry, human behavior changes), habitat modification (e.g., exclusion), animal behavior modification (e.g., scaring), removal of individual offending animals, local population reduction, and educational programs that can promote increased tolerance for wildlife or any combination of these. The following general strategies are or may be employed by WS-Wisconsin for BDM.

2.6.1.1 Education and Outreach/Technical Assistance

WS-Wisconsin provides training to agencies, organizations, the public, property owners and managers, and cooperators upon request on wildlife management and biology, wildlife damage management, and nonlethal and lethal techniques for managing the risk of damage and encourage co-existence. Many APHIS-WS personnel, including scientists at the National Wildlife Research Center (NWRC) publish professional papers and speak at conferences and meetings to further the science and application of wildlife damage management. WS-Wisconsin offers instruction and education through one-on-one in person or over the phone discussions, in-person localized group gatherings, tradeshows or association meetings, distributing technical / self-help outreach materials, and participation in other outreach events. WS-Wisconsin also works with the WDNR and NWRC to produce and distribute educational materials. For example, in 2024, WS-Wisconsin provided 77 technical assistance (TA) responses to reduce conflicts and damage caused by beaver in Wisconsin.

Implementation of TA recommendations provided by WS-Wisconsin is the responsibility of the requester, though a person or entity which receives TA may request WS-Wisconsin operational BDM assistance to implement recommendations (see 2.6.1.2 below). In some cases, WS-Wisconsin may provide/loan supplies or materials. WS-Wisconsin tries to provide as many feasible management strategies as possible to the requester based on their goals and

application of the WS-Decision model thought process. The information APHIS-WS provides may lead to no action being taken by the requester or it may lead to management action. Individuals are not required to implement the recommendations from WS-Wisconsin and can choose to implement strategies the agency has not recommended. Under USDA and APHIS NEPA implementing regulations, APHIS-WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of WS-Wisconsin's integrated WDM approach.

2.6.1.2 Operational Damage Management

Operational damage management occurs when the problem cannot be resolved through TA alone, efforts from the resource owner are insufficient or unavailable, and when applicable agreements and authorizations are in place including a WID. WIDs give the field specialist access to the cooperator's property, specify the wildlife species and damage to be addressed, and list the methods to be used by WS-Wisconsin. The initial investigation defines the nature of the problem, extent of damage, and the species responsible for the damage. WS-Wisconsin considers the biology and behavior of the damaging species and other factors using the APHIS-WS Decision Model (Slate et al. 1992). Recommended damage management methods may be considered preventive or corrective and could be implemented by the requester, WS-Wisconsin, or other appropriate entity.

> **Preventive damage management** is applying management strategies before damage occurs. This is largely based on the historical context of prior damage conflicts but may be implemented as a general protective measure. For example, in areas with recurring beaver flooding, WS-Wisconsin might provide information or assistance with exclusion and/or water flow devices, and other nonlethal techniques. Resource owners may be advised to install barriers on trees as a preventative measure to avoid tree loss or damage. WS-Wisconsin or road maintenance crews will periodically clear debris building up at culverts or around exclusion systems to prevent damage situations. Monitoring helps to address threats prior to them causing significant amounts of damage.
>
> **Corrective damage management** is applying management strategies to stop or reduce current losses. Corrective damage management is the most common BDM strategy. People typically do not request assistance with beaver until damage has occurred.

2.6.1.3 Research and Development

APHIS-WS' National Wildlife Research Center (NWRC) is internationally recognized as a leader in wildlife damage management science. NWRC applies scientific expertise to the development of practical methods to resolve conflicts with wildlife and to maintain the quality of the environments shared with wildlife. NWRC designs studies to ensure that the methods developed to alleviate animal damage are biologically sound, effective, safe, economical, and acceptable to the public. Through the publication of results in peer-reviewed scientific literature and the exchange of technical information by other means, the NWRC provides

reliable information to the public and the scientific community, as well as to APHIS-WS' operations. WS-Wisconsin works closely with NWRC to evaluate WDM methods and incorporate emerging technologies and information into WS-Wisconsin's operations.

2.6.2 Wildlife Services Decision Making

For all alternatives in which WS-Wisconsin provides services (action alternatives), WS-Wisconsin uses the APHIS-WS Decision Model (Figure 2-2) to identify options to minimize the risk of further damage that are discussed with the cooperator (WS Directive 2.201)(Slate et al. 1992). The Decision Model is not a written documented process for each incident, but rather a mental problem-solving process. This process is like adaptive management strategies used by all wildlife management professionals when addressing a wildlife damage problem. To use an analogy, it is also like the assessment processes used by fire departments when they arrive on a scene and determine the most effective and safe strategy for resolving the situation.

Under the APHIS-WS Decision Model, trained and experienced WS-Wisconsin field personnel assess the problem and evaluate the appropriateness of available damage management strategies. Development of site-specific strategies includes consideration of short-term and long-term effectiveness, regulatory constraints, management objectives for the site, environmental conditions, and cooperator ability to implement methods including maintaining devices and paying for materials. APHIS-WS encourages the use of nonlethal methods when practical and effective. After the selected strategy has been implemented, the landowner/manager monitors and evaluates the results, sometimes with WS-Wisconsin assistance. If needed, management strategies are then adjusted, modified, or discontinued, depending on the evaluation.

The thought process and procedures of the APHIS-WS Decision Model include the following steps:

Receive a Request for Assistance: WS-Wisconsin only provides assistance after receiving a request and determining that the request is within the authority of WS-Wisconsin. WS-Wisconsin personnel can respond by providing technical assistance, recommendations, and advice through on-site, verbal, or written communication. If the requester needs further assistance onsite with direct operational assistance, WS-Wisconsin personnel and the requester decide the level of service required and enter into a work agreement or WS-Wisconsin refers the requestor to another entity.

Assess Problem: More information is gathered to verify the type and magnitude of damage, as well as the species responsible. Other factors considered include the amount or threat of economic loss, threats to human health and safety, local history of damage, environmental considerations, use of the affected property and surrounding areas, and what damage management methods, if any, were used to reduce past damage and the results of those actions.

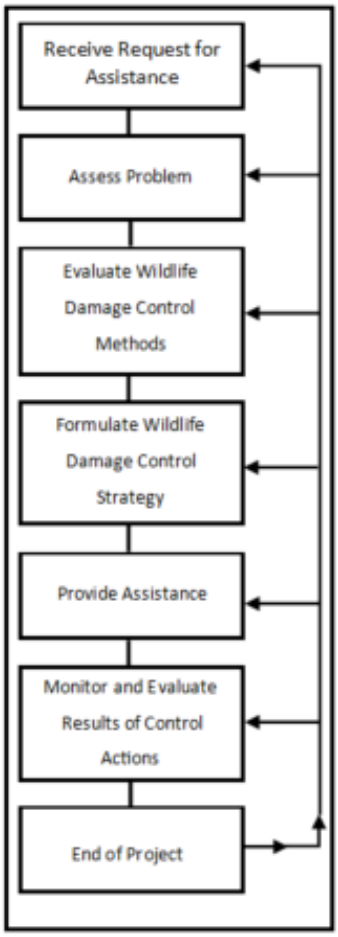


Figure 2-2. The Wildlife Service Decision Model as represented in a flow chart.

Evaluate Management Methods: WS-Wisconsin personnel recommend available methods in the context of their legal and administrative availability, feasibility, compatibility with existing land uses and use of adjacent properties, information on method efficacy in similar situations, and their acceptability based on biological, environmental, social, and cultural factors. WS-Wisconsin encourages the use of nonlethal methods where practical and effective.

Formulate Management Strategy: The field employee formulates a management strategy using those methods that the employee determines to be practical and effective for use, considering additional factors essential to formulating each management strategy, such as expertise, availability, and capacity of the property owner to participate, legal constraints on available methods, resource availability, and other logistical considerations (e.g., protective measures in Section 2.7).

Provide Assistance: After formulating a management strategy and obtaining any applicable site-specific agency or tribal authorizations, technical assistance and/or direct operational assistance is provided as appropriate (see WS Directive 2.101).

Monitor and Evaluate Results of Management Actions: When providing direct operational assistance, effectiveness of the management strategy is monitored primarily by the cooperator although WS-Wisconsin personnel assist with monitoring when appropriate. Monitoring is important for determining if further assistance is required.

End of Project: When providing technical assistance, a project normally ends after WS-Wisconsin personnel provide recommendations. Direct operational assistance ends when WS-Wisconsin personnel are able to stop or reduce damage to acceptable levels. Some situations require continuing or intermittent assistance from WS-Wisconsin. These projects have no well-defined termination point, as work must be repeated periodically to maintain acceptable damage levels.

2.6.3 APHIS-WS Co-Managerial Approach to Decision Making

The person and/or entity experiencing damage or threats of damage determines the appropriate involvement of other people and/or entities in the decision-making process regarding activities that may occur on their property. WS-Wisconsin follows the "co-managerial approach" to solve wildlife conflicts as described by Decker and Chase (1997). Within this management model, WS-Wisconsin would provide technical assistance regarding the biology and ecology of target species and its role in ecosystems, information to help understand the likelihood and scope of potential damage (or lack thereof), and effective, practical management options available to reduce damage or threats as identified through use of the WS Decision Model. Strategies may include nonlethal and lethal methods depending on the alternative selected in the Decision for this EA.

Generally, a decision-maker seeking assistance would be part of a community, municipality, business, governmental agency, and/or a private property owner. The decision-maker for the local community would be elected officials or representatives of the community. Elected officials or representatives are popularly elected residents or appointees who oversee the interests and business of the local community. This person or people would represent the local community's interest and make decisions for the local community or bring information back to a higher authority or the community for discussion and decision-making depending on the public involvement processes of the applicable agency/organization. When decision-making involves a local community, WS-Wisconsin and other state, tribal, and federal wildlife management agencies may facilitate discussions at local community meetings when resources are available. Requests for assistance often originate from the decision-maker(s) based on community feedback or from concerns about damage or threats to human safety. As representatives of the community, the decisionmaker(s) can provide information to local interests through technical assistance or demonstrations and presentations by WS-Wisconsin. This process allows decisions on wildlife damage management to be based on local input. The entity requesting assistance may implement recommendations on their own, request assistance from WS-Wisconsin or choose to implement some other strategy without WS-Wisconsin involvement.

In the case of private property, the decision-maker is the individual who owns or manages the property. Private property owners must make determinations regarding third-party involvement in decision-making processes regarding their property. Private property owners have the discretion to implement WS-Wisconsin recommendations on their own, request WS-Wisconsin or another entity's assistance in implementing WS-Wisconsin recommendations or choose to implement some other strategy without WS-Wisconsin involvement.

The decision-maker for local, state, or federal property would be the official responsible for or authorized to manage the public land to meet interests, goals, and legal mandates for the property. Public involvement in decision making is conducted in accordance with agency procedures and is the responsibility of the agency. For some agencies, participating In the NEPA process for this EA can meet their needs for public involvement in planning.

The decision-makers for tribal property and ceded territories would be the officials responsible for or authorized to manage the tribal lands and the lands and/or resources identified under treaty rights, to meet interests, goals, and legal mandates for the areas. Involvement of tribal members or members of the surrounding community would be conducted in accordance with the established regulations and procedures for the affected tribe(s). As with other entities, land management agencies and tribes may choose to implement WS-Wisconsin recommendations on their own, request WS-Wisconsin or another entity's assistance in implementing WS-Wisconsin recommendations or choose to implement some other strategy without WS-Wisconsin involvement.

2.6.4 Methods Available for Beaver Damage Management

The proposed adaptive WDM approach integrates and applies effective, legal, and practical methods of preventing and reducing damage while minimizing harmful effects on the human environment. An adaptive approach includes modification of strategy based on the site-specific factors and ongoing monitoring of implemented management strategies, as described in the discussion of the Decision Model (Section 2.6.2). Appendix F provides a detailed description of all methods proposed for use or recommendation by WS-Wisconsin under this analysis, but a summary is included in this section.

2.6.4.1 Nonlethal Methods

Nonlethal methods can be used to prevent anticipated damage (e.g. cultural practices), allow for coexistence (e.g., relocation, flow control devices) disperse/disturb wildlife (e.g., frightening devices), restrict access (e.g., barriers), or otherwise make an area unattractive to beaver. WS-Wisconsin encourages the use of practical and effective nonlethal methods when responding to requests for assistance with wildlife damage management. Nonlethal methods used or recommended by WS-Wisconsin for BDM are used or recommended consistent with laws, rules, management goals, agency policies and ESA requirements outlined in WS-Wisconsin's consultations with the WDNR NHC and the USFWS.

WS-Wisconsin may assist with the implementation of nonlethal methods, such as construction of a fence, barrier, or flow device, but most often nonlethal methods are implemented by the land or resource owner. WS-Wisconsin collaborates with landowners to maximize service delivery by encouraging and assisting them to implement as many of the methods as they can, while leaving the more technical and aspects of WDM to trained and qualified WS-Wisconsin personnel. Many nonlethal methods require persistence and/or regular maintenance to be effective, making the landowner the most appropriate entity to implement and monitor the methods. Nonlethal methods that may be used or recommended by WS-Wisconsin include site modifications (e.g., habitat management, culvert design), exclusion, water control devices, and live capture and relocation using foothold traps and cage traps (Appendix F). Depending on the method used, beaver activity may relocate upstream or downstream of the original damage site, which may result in a new conflict depending on site conditions and cooperator objectives. WS-Wisconsin works to anticipate these types of conflicts when conducting the initial site assessment and formulating management strategies.

2.6.4.2 Lethal methods

After receiving a request for assistance and conducting a field review using the APHIS-WS Decision Model, WS-Wisconsin personnel may recommend lethal methods to address the damage. Lethal methods may be used to remove animals that have been identified as causing damage or posing a threat to human safety, and/or to reduce the risk of damage recurring. Management actions would be directed toward the individual animal or group of animals causing damage. Damage at the site may recur eventually or occur nearby. When suitable habitat is available, new beaver are likely to move into the area. Lethal methods used by WS-Wisconsin employees include ground shooting, cable devices, body-gripping traps, cage traps, and foothold traps (Appendix F). Some live capture devices (i.e., cable devices and foothold traps) can be modified to become lethal capture devices when there is water of sufficient depth to permit the dispatch of the target animal. Unless live capture is desired, all cable devices and foothold traps set for beaver by WS-Wisconsin will be equipped with a one-way slide to facilitate the submersion and dispatch of the target animal. Other live capture devices including cage and suitcase style traps may also be used as lethal methods where capture is followed by euthanasia via shooting.

2.7 PROTECTIVE MEASURES

WS-Wisconsin would include protective measures to reduce or prevent adverse environmental impacts and risks to human safety in all action alternatives. These measures are included in APHIS WS Directives[4], consultations and permits issued by agencies including the USFWS and WDNR, provisions established in this EA and associated Decision and through site-specific consultations with landowners/managers when developing BDM strategies. A summary of key provisions is provided below.

[4] WS directives are located at https://www.aphis.usda.gov/wildlife-services/directives

Animal Welfare and Humaneness of Methods Used by APHIS-WS

- Research on selectivity and humaneness of management practices would be monitored and adopted as appropriate.
- The Decision Model (Slate et al. 1992) would be used to identify effective biological and ecologically sound BDM strategies and their impacts.
- Nontarget animals captured alive during BDM would be released unless it is determined by WS-Wisconsin personnel that the animal would not survive.
- Use of traps and cable devices would conform to current laws and regulations administered by WDNR and WS-Wisconsin policy, except if exempted by WDNR.
- Where practical, euthanasia procedures approved by the AVMA that cause minimal pain would be used.
- Use of newly developed, proven, nonlethal methods would be encouraged when appropriate.

Safety of People and Pets

- The Decision Model (Slate et al. 1992) would be used to identify practical and effective beaver damage management strategies that minimize risks to human and pet safety.
- BDM conducted on public lands would be coordinated with the management agency.
- Live traps would be placed so that captured animals would not be readily visible from any road or public area.
- Warning signs are placed at major access points to areas where body grip traps, foothold traps, and cable devices are used.
- APHIS-WS employees who, as a condition of employment, are required to utilize firearms are required to certify that they meet the criteria as stated in the Lautenberg Amendment and must immediately notify their supervisor if they can no longer comply. This amendment prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.
- To ensure safe use and proficiency, APHIS-WS employees who use firearms in their official capacity are required to attend an agency-approved firearms safety course prior to firearms use on the job and attend refreshed training as required (WS Directive 2.615).

Impacts on Target and Nontarget Species

- WS-Wisconsin would report all beaver and nontarget take during BDM activities to the WDNR to facilitate monitoring of impacts on the populations. All WS-Wisconsin BDM activities are conducted in accordance with authorization from the WDNR and tribes, as appropriate, which are responsible for maintaining native wildlife populations on lands under their jurisdiction.
- The WDNR would monitor beaver population and harvest trends.
- Management actions would be directed toward localized populations or groups and/or individual offending animals, dependent on the magnitude of the problem.

- Trained personnel from WS-Wisconsin would use the APHIS-WS Decision Model and information from consultations with the WDNR NHC and USFWS to minimize risks to nontarget species.
- WS-Wisconsin personnel would comply with all measures established for the protection of state and federally listed T&E species in consultation with the USFWS and WDNR. Consultations would be updated as needed if BDM activities change, new species are listed, or if a triggering event (as established in consultations) was reached.
- New proven strategies identified to reduce risks to nontarget species from BDM methods would be incorporated as they become available.

3 ENVIRONMENTAL EFFECTS

Chapter 3 provides information needed to guide selection of an alternative to meet the need for action and determine if the alternative will have a significant impact on the quality of the human environment. The environmental consequences of the four alternatives are discussed below in context of the issues presented in Section 2.1, with analysis of the direct and reasonably foreseeable effects, as applicable. In accordance with CEQ guidance for ongoing activities (Council on Environmental Quality 1981), the environmental consequences of each alternative are compared with the current level of activity to determine if the real or potential impacts would be greater, lesser, or the same. Therefore, the current level of activity alternative (no action alternative) serves as the baseline for the analysis and the comparison of expected impacts among the alternatives. Alternatives are also considered in context of the likely consequences if WS-Wisconsin is not involved in BDM.

NEPA describes the elements that determine if an impact is "significant." Significance is dependent upon context and intensity of the impact. The following factors were considered in evaluating the significance of impacts on the human and natural environment relating to context and intensity:

- magnitude of the impact (size, number, or relative amount of impact) (intensity);
- duration and frequency of the impact (temporary, seasonal impact, year-round or ongoing) (intensity);
- likelihood of the impact (intensity);
- geographic extent: how widespread the program impact might be (intensity); and
- status of the resources that may be affected by the action (context)

APHIS-WS uses a variety of methods to help resolve conflicts between humans and wildlife and to conduct associated activities such as wildlife surveys and disease monitoring. APHIS-WS prepared risk assessments on the methods it uses. The risk assessments analyze the impacts of WDM methods on people and the environment. To ensure the scientific rigor of the risk assessments, non-federal professionals, with knowledge of the methods and risks associated with their use, have conducted peer reviews of the assessments. Peer reviewers were selected by the Association of Fish and Wildlife Agencies, the organization of state, provincial and territorial fish, and wildlife agencies in North America, entrusted with primary stewardship over

vital wildlife resources. Risk assessments created for APHIS-WS methods included in this EA are summarized in Appendix F and incorporated by reference into this EA[5].

Throughout Chapter 3, data on WS-Wisconsin activities are reported for the federal fiscal year (FY) instead of calendar year because the date range (October 1-September 30) best aligns with WDNR licensed harvest seasons that extend through the end of the calendar year including the beaver fur harvest season. To address nomenclature difference between the federal fiscal year and state harvest season (WDNR harvest season 2023 refers to the 2023-24 season but the term for the federal fiscal year that corresponds to roughly the same interval is FY 2024), we have elected to the actual time period (i.e., 2023-24).

3.1 ASSESSMENT OF IMPACTS WHEN WS-WISCONSN ACTIVITIES ARE MODIFIED OR ABSENT

When comparing the environmental impacts of the alternatives, it is important to understand how conflicts between beavers and humans are likely to be addressed when assistance from WS-Wisconsin is limited or absent (42 U.S.C. 4321 §102(C)(iii)). Threats to human safety and damage to resources such as agriculture, infrastructure, property, and natural resources are unlikely to be tolerated or allowed to continue just because WS-Wisconsin is not available to assist. This is especially the case for beaver damage management in Wisconsin where all the tools available to WS-Wisconsin are available to non-federal entities and where approximately 98% of the funding for beaver damage management is provided by cooperators.

People and agencies experiencing damage or threats associated with wildlife are unlikely to engage with entities they doubt can promptly resolve their conflict. For most WS cooperators, there is a strongly held belief that access to at least some use of lethal methods is necessary for effective BDM (Callahan et al. 2019 and Section 2.5.2). Depending upon the perspective and values of the individual and agencies involved, alternatives that restrict WS-Wisconsin access to the full set of legal and effective BDM tools may be seen as an impediment to WS-Wisconsin's ability to effectively resolve conflicts and/or an inappropriate restriction on the cooperator's access to legally available BDM methods. In either case, cooperators who are dissatisfied with the options available from WS-Wisconsin are expected to do the work on their own or seek alternative sources of BDM assistance. Operational damage management may be necessary to resolve the immediate damage situation, but education and site-specific technical assistance are also provided by WS-Wisconsin to minimize future damage or increase tolerance.

Within the constraints of applicable tribal and agency regulations and policy, it is the prerogative of the individual tribe, agency, or landowner to determine when a conflict exists. When an entity with technical expertise provides BDM assistance (e.g., WS-Wisconsin, WDNR, NGO), that entity can provide information to help the landowner/manager understand available options and the consequences of beaver and beaver dam removal (e.g., loss of

[5] WS Method Risk Assessments are located at https://www.aphis.usda.gov/wildlife-services/publications/nepa/methods-risk-assessments.

benefits associated with beaver dams). This type of assistance may not be as readily available or frequently used if WS-Wisconsin is not involved. Tribal perspectives are included in decision making via tribal and GLIFWC involvement in WDNR rulemaking and management plans and working groups, and through consultation policies of the agencies managing public lands where treaty rights are exercised (i.e., USFS). Individual management decisions conducted in accordance with these rules and plans are not subject to case-by-case review with the tribes or GLIFWC unless there is a specific arrangement between the tribe and the agency or private entity.

3.1.1 Entities Who Can Respond to Requests for BDM Assistance

Agencies, tribes, private organizations and companies, and individuals can conduct BDM activities in Wisconsin. These entities include:

- Under Alternatives 1-3, WS-Wisconsin may provide BDM services when requested on any land class (federal (USFWS, USFS), state, county and local public lands, tribal lands, or private lands), either directly for the landowner or as an agent of WDNR with landowner permission, including technical and operational assistance. Most WS-Wisconsin operational BDM activities are conducted for agencies, with approximately 88% of WS-Wisconsin BDM funding during the period of CY 2022-2024 provided by agencies other than WS-Wisconsin and 10% of funding from private entities (e.g., railways) (Figure 2-1). WS-Wisconsin maintains detailed records of intentional and unintentional take and methods used. This information is publicly available in Program Data Reports[6] and shared with WDNR. Information on activities conducted under the APHIS-WS Nonlethal Initiative is provided in an annual report (e.g., USDA Wildlife Services 2022). None of the BDM methods proposed for use in this EA are restricted to WS-Wisconsin, although some methods may require training and licensing or certification (e.g., explosives, immobilization drugs).
- The WDNR is responsible for investigating complaints and can remove or authorize removal of nuisance and damage causing wildlife (Wis. Stat. 29.885). The WDNR may conduct BDM activities to meet their own needs (e.g., protection of natural resources and infrastructure). At present, WDNR assistance to the public is limited to providing technical assistance including clarification of applicable laws, and referral to WS-Wisconsin or experienced trappers or private wildlife control companies (Wisconsin Department of Natural Resources 2020). The WDNR generally does not have the resources for site visits. The WDNR does not keep centralized records on the removal of beaver or beaver dams by WDNR personnel.
- Other agencies (e.g., county highway departments) may conduct BDM activities on their own, but their actions are limited to land under the agency's jurisdiction unless they get permission from the landowner/manager. Agencies are not required to report take of unprotected wild animals, beaver removals for BDM or the removal of beaver dams to the WDNR.

[6] APHIS-WS Program Data Reports are available at https://www.aphis.usda.gov/wildlife-services/publications/pdr

- Tribal members and tribal agencies may conduct BDM activities on tribal lands in accordance with policies and procedures established by the individual tribes. They may also conduct BDM activities outside of tribal lands in accordance with tribal treaty rights and applicable state and federal regulations pertaining to BDM. Reporting on the take of beaver and beaver dams on tribal lands will depend on the requirements of the tribe.
- Any person, business, or entity offering beaver removals for damage management as a service involving lethal control and/or trapping must possess a Wisconsin trapping license, which requires completion of the Wisconsin trapper's education course (or previous completion of an equivalent course in another state accepted by WDNR). The trapper's education requirement is waived for people who possessed a trapping license on or prior to May 12, 1992.
- Wildlife Control Operators (WCOs) can provide commercial services to anyone, as requested. In many states, the title WCO is obtained after passing a state licensing exam, however, this is not a requirement in Wisconsin. An optional "certification" is available after taking a test by, and paying a fee to, the Wisconsin Wildlife Control Operators Association LLC. The Wisconsin Trapper's Association provides a list of persons willing to conduct wild animal removal activities for damage and conflict management (https://wistrap.org/nuisance-animal-removal). WCOs are not required to report take of beaver, to the WDNR or report removal of beaver dams. Service areas of the companies may be limited to regions, so some areas may have limited access to WCOs with the capacity to provide BDM assistance. See also Section E.2.9.
- Private landowners or authorized agents may take beaver and remove beaver dams on their private property without any permit or other authorization from WDNR and are not required to report take of beaver and dams to the WDNR under NR12.10(1) (b)(3). Additionally, people experiencing damage from flooding associated with a beaver dam may access neighboring private property and remove that dam without any sort of permit or authorization under State statutes s. 88.90(3). This does not constitute a trespass.
- Non-government organizations other than the Wisconsin Trappers Association noted above may also provide BDM assistance. These organizations may emphasize coexistence with beaver and the use of nonlethal methods. Assistance may be limited to advice and instructional materials but may also include operational assistance if resources are available.
- The WS-Wisconsin workforce may be reduced under Alternatives (2-4) that decrease or eliminate BDM activities by WS-Wisconsin. Based on past APHIS-WS experiences, at least some of these employees would be hired by WDNR or other WS-Wisconsin cooperators or establish/work for private businesses that provide services similar to their current work with WS-Wisconsin.

3.1.2 How BDM Activities Conducted by all Entities, Including WS-Wisconsin, Complement and Compare

Proficiency and experience of the person using lethal and nonlethal wildlife damage management methods are critical for ensuring effectiveness, selectivity, and humaneness. WS-

Wisconsin employees are highly trained professionals that adhere to all the Protective Measures outlined in Section 2.7 which are designed to minimize adverse effects on the environment and reduce risks to people. WS-Wisconsin's use of the APHIS-WS Decision Model (Section 2.6.2) helps to ensure that BDM is performed according to all applicable federal, state, and local laws and agency policies in the most effective, selective, and humane way possible.

The WDNR does not have a certification process for commercial entities (WCOs) that conduct BDM, however, all trappers (recreational and those providing wildlife damage management assistance), must meet WDNR requirements for trapper education and age as noted in Section 3.1.1. Individual landowners may also hire or request other individuals who are not WCOs to address the damage problem or address the problems themselves. Individual landowners (who are not otherwise licensed trappers) are not required to obtain a trapping license or education course under Wis. Stat. 29.337 and are less likely to have the proficiency, experience, or skill for using traps, cable devices, or firearms for lethal take of beaver. Landowners and their agents may use traps, cable devices, and firearms in a manner inconsistent with best practice standards for humaneness, safety, and effectiveness.

The Furbearer Conservation Technical Working Group of the Association of Fish and Wildlife Agencies (AFWA) developed Best Management Practices (BMPs) for beaver (White et al. 2021). The BMPs are based on the most extensive study of animal traps ever conducted in the U.S., and scientific research and professional experience regarding currently available traps and trapping technologies. The review emphasized state-licensed methods and did not formally include indigenous trapping practices. Trapping BMPs identify both techniques and trap types that address the welfare of trapped animals and allow for the efficient, selective, safe, and practical capture of furbearers. The WDNR's Beaver Control Guidelines and Beaver Management Plan encourage the use of BMPs, but landowners and their agents are only required to follow the state's trapping laws and regulations, as written. The Responsive Management National Office (2015) surveyed trappers and found that only 42% of trappers had heard of BMPs and of those, only 66% used/planned to use them. They would also not be required to use the same decision process that WS-Wisconsin uses (Section 2.6.2). In contrast, WS-Wisconsin follows BMPs for trapping activities and conservation measures identified during consultations with the WDNR NHC and the USFWS to reduce the risks to state and federally listed T&E species from BDM activities. WS-Wisconsin staff have also been instrumental in the development and advancement of BMPs for managing human-beaver conflicts (Sundelius et al. 2026) and understanding strategies to reduce nontarget river otter take (Sundelius et al. 2021)

There may be limited access to commercial BDM assistance in some areas. As of December 2025, there were approximately 124 individuals listed on the Wisconsin Trappers' Association Nuisance Wild Animal Removal Referral list[7]. Members of this list reportedly "can provide assistance in exclusion, habitat modification as a deterrent, population reduction and

[7] The Wisconsin Trapper's Association Nuisance Wild Animal Referral list is available at: https://wistrap.org/nuisance-animal-removal

maintenance, or zero tolerance management". The list does not specify species of expertise, therefore, the number of trappers listed offering assistance resolving human-beaver conflicts is likely less than the total number of individuals on the list. Trappers are listed by the counties where they are willing to work, and some geographic areas may have greater accessibility to assistance. No trappers were listed for three counties. Depending on the time of year (due to beaver pelt value), trappers may be more or less willing to assist the public and may assess a higher or lower fee to provide service. There are also numerous WCOs in the state that can be hired to provide WDM assistance, several of whom specifically mention providing assistance with beaver damage management.

As noted in Section 3.1.1, there is no WDNR mandatory reporting requirement for the take of beaver and beaver dams to resolve human-beaver conflicts, and the only known/reported take of beaver and beaver dams for BDM provided to WDNR is from WS-Wisconsin. There is also no requirement to report impacts on nontarget species other than known impacts on species protected under state and federal endangered species laws. Therefore, if WS-Wisconsin is not involved in BDM or the use of lethal BDM methods, there would be a substantial reduction in information on beaver damage management activities in the state available to the WDNR, tribes, and the public, unless WDNR changes its reporting requirements.

Federal agencies have a responsibility to federally recognized tribes which other entities do not, including the maintenance of a government-to-government relationship that allows tribes to participate in federal decision-making processes if they are directly impacted by the outcome. Sections A.6 and B.7 explain APHIS-WS's compliance with the Executive Order and procedures for coordinating and consulting with tribal governments. Non-federal entities do not have the same obligations to consult with tribal entities as federal agencies, and alternatives that decrease WS-Wisconsin involvement in BDM may also decrease opportunities for tribes to address issues of concern related to BDM.

3.2 IMPACTS ON THE WISCONSIN BEAVER POPULATION

3.2.1 Considerations and Strategies Relevant to Evaluating Impacts on the Beaver Population

State wildlife agencies have limited resources for wildlife management, and it is not possible to intensively monitor the population size and harvest of all wildlife species under their jurisdiction. Estimating wildlife population sizes over large areas can be extremely difficult, labor intensive, and expensive. Agencies may invest resources on species of management concern such as T&E species, or big game species (e.g., deer, bear). However, few states conduct surveys of beaver populations (e.g., Kenyon et al. 2024, Wozinacka n.d.) because despite being at lower densities than may have occurred pre-settlement, the species is sufficiently abundant that it is of relatively low management concern. Alternatively, wildlife management agencies may monitor data that reflect changes in the population over time (population indices). Population indices including data on catch-per-unit effort (CPUE) from hunter/trapper surveys, standardized surveys of a subset of the population (e.g., (Pennsylvania Game Commission 2023), and data on the age and sex of animals harvested are examples of

techniques that can be used to monitor trends in population size and health. Some states like California may collect information on beaver distribution (CDFW 2025). These population indices are generally a less expensive way to monitor the status of wildlife populations and are likely to be repeated more frequently so they can facilitate adaptive management to address changing conditions. While there are limitations to what can be inferred from indices, population indices, like population estimates, have the advantage of reflecting the combined impact of all factors such as harvest, habitat change, disease, and predation on a wildlife population.

Analysis of harvest data is one of the most cost-effective methods to advance ecological knowledge and monitor population trends for game and furbearing species and is often a key component of the assessment of wildlife population health by state agencies. Harvest monitoring, usually via review of CPUE or long-term trends in total known mortality, is the standard used by most wildlife agencies across the country to monitor and guide management of beaver populations.

This EA uses existing data and resources provided by the WDNR, USFS, APHIS-WS data, and peer-reviewed literature to evaluate potential impacts on the state beaver population. While no one method is ideal, the combination of methods provides insight into past and current impacts on the beaver population and allows for projection of future impacts. These analyses emphasize review of impacts in BMZs A and B, as these are the zones where the majority of WS-Wisconsin take occurs and where the most data is available. Except where longer time-series are used to provide context and trend information, we have selected the period of 2019-20 to 2023-24 for emphasis in this analysis as it best represents current and anticipated future requests for WS-Wisconsin BDM assistance. This interval includes three years when social factors resulted in harvest outside the norm and may represent a high estimate of future harvest and known WDM take (Figure 3-1).

There are two long-term data sets on the Wisconsin beaver population. The first is statewide information on CPUE calculated using responses to the WDNR trapper surveys. The second is a standardized aerial survey of streams in the Chequamegon Nicolet National Forest. Data from aerial surveys conducted in BMZs A and B from 1992 – 2014 by the WDNR and a new, more detailed statewide assessment of CPUE calculated using data from trapper diaries were also considered. These datasets are discussed in detail in Section 3.2.5.1.1.

For purposes of this analysis a significant impact on the beaver population is defined as: take by WS-Wisconsin that would result in declines in the state beaver population contrary to state management objectives, or tribal management objectives on reservation lands. This definition of significance recognizes the state and tribe's right to establish management objectives for beaver and authority to set requirements for and limits on beaver harvest and take for damage management. This is especially important because most beaver take is from licensed harvest (Figure 1-1). State and tribal beaver management objectives constitute the environmental baseline as these decisions are made independent of the NEPA process and will persist with or without WS-Wisconsin involvement in BDM. WS-Wisconsin has no authority to dictate state or

tribal beaver management policy. Consequently, even if total impacts cause the population to decrease, it would not be considered significant if the decrease is consistent with WDNR or tribal objectives because the state and tribes would work to achieve their objectives with or without WS-Wisconsin involvement.

3.2.2 Beaver Management, Past and Present Practices

Prior to European settlement, North American beavers were distributed throughout most of the continent with the exceptions of the arctic tundra in Canada and north slopes of Alaska, portions of the desert southwest in southern California and Nevada and most of the Florida Peninsula (Baker and Hill 2003). While population estimates that meet modern standards are not available, the population has been estimated at 60-400 million. Beaver pelts were highly valued by settlers, in large part because of their use in felt hats. The subsequent overharvest and changes in habitat associated with European settlement led to a crash in beaver populations with beaver extirpated from most portions of the Eastern U.S. before 1900. By the early 1900s public concern regarding the reductions in populations of many native wildlife species, including beaver, led to the establishment of state regulations that controlled or prohibited take. The increased protections, augmented by live capture and reintroduction in some places, led to the restoration of beaver populations in much of their former range, although the population is below prior levels of abundance. The North American beaver is currently listed by the International Union for Conservation of Nature as a species of least concern, with a stable population trend (Cassola 2016). Habitat changes (e.g., wetland loss) resulting from agriculture and development and even the long-term absence of beaver will likely preclude beaver from reaching pre-settlement population size (Rosell and Campbell-Palmer 2022, Scamardo et al. 2022).

Currently, only Wisconsin (Wisconsin Department of Natural Resources 2015), Utah (Utah Division of Natural Resources 2017) and Pennsylvania (Hardisky 2011) have beaver management plans. Montana (Montana Beaver Working Group 2023) and Oregon have Beaver Action Plans (ODFW 2023). California is expected to develop a plan as part of its new Beaver Restoration Program[8] and Colorado is also expected to develop a beaver management plan (Fallon 2024). The WDNR has initiated the process of preparing a new state beaver management plan (Wisconsin Department of Natural Resources 2025*a*). WS-Wisconsin is represented on the Beaver Management Plan Committee along with a diverse array of stakeholders.

3.2.3 Beaver Management in Wisconsin

The pattern for the beaver population in Wisconsin follows the national trend. Pre-settlement, Native Americans likely increased the availability of preferred early succession stage plant communities for beaver in Wisconsin through their use of fire (Gartner 1997). With the decline

[8] Information on California's beaver restoration program is available at: https://wildlife.ca.gov/Conservation/Mammals/Beaver

in Native American populations following European colonization, riparian forest matured and habitat suitability for beaver declined (Wisconsin Department of Natural Resources 2015). Beavers were widespread but may have occurred at relatively lower densities in Wisconsin because the ecosystem was dominated by mature coniferous forest which provided less of the early successional plant species like aspen and poplar preferred by beaver. By the early 1900s, overharvest and habitat factors had reduced the statewide population to less than 500 animals (Wisconsin Department of Natural Resources 1990). However, an abundance of early successional stage plant species that developed in the wake of intensive logging, and tight restrictions on take reduced pressure on the beaver population and promoted population recovery (Knudsen 1963, Wisconsin Department of Natural Resources 1990, Rosell and Campbell-Palmer 2022). With protective management and ample favorable habitat (pioneering aspen forests) caused by regeneration following intensive logging and fires, the beaver population increased steadily from the 1930s through the 1950s, where Knudsen (1963) found beaver to be present in ~85% of Wisconsin counties. By the 1980s the beaver population in northern Wisconsin had increased to the point where complaints about beaver were common and there were increasing complaints about beaver in agricultural areas of southern Wisconsin (Wisconsin Department of Natural Resources 1990).

In 1990 the state completed a beaver management plan that emphasized strategies for reducing conflicts with beaver (Wisconsin Department of Natural Resources 1990). The 1990 beaver plan provisions for reducing conflicts with beaver included 1) decreased restrictions on the take of beaver via trapping, 2) increased use of contracts and permits to trap and shoot beaver from high quality trout streams including working with WS-Wisconsin; 3) authorization of beaver dam removal for damage management without a permit, 4) the use of subsidies to pay for beaver removal in select beaver damage control areas in northern Wisconsin; and 5) authorizing landowners to remove beaver from their property without a license. The plan also called for monitoring the beaver population through trapper and fur buyer surveys, and fall aerial surveys conducted every three years to monitor the beaver population. The plan also encouraged managing to promote more mature forests to help reduce beaver densities.

The plan also updated the state Beaver Management Zones (BMZs) (Figure 1-2). Use of management zones facilitates the development of management strategies and regulations best suited to the needs of specific portions of the state. Zone A had the highest concentration of trappers. Emphasis in Zone A was placed on managing the harvest season to maximize pelt quality and site-specific damage management actions with population reductions intended. Zone B had the highest beaver densities and the most conflicts with beaver. Population reduction to reduce conflicts was identified as a priority in this zone with extended harvest seasons. Zone B includes the majority of streams where beaver removals were proposed for trout stream enhancement. Zone C had more localized conflicts with beaver and management in this zone reflected a greater tolerance for beaver and desire to maximize the benefits of beaver wetlands for waterfowl. As with Zone A, the harvest season was set to maximize pelt quality but was shorter than in Zone A. Changes in landowner/manager access to BDM methods were likely to address conflicts in this area. Zone D had the lowest beaver population and the least conflicts with beaver. Zone D is also a high-quality duck production area. To

reduce potential conflicts between waterfowl hunters and beaver trappers, this area had a shorter trapping season starting after the conclusion of the waterfowl hunting season.

Management objectives for the zones are reviewed and revised by the Wisconsin Beaver Task Force and during preparation of the state beaver management plans. The 2015 beaver management plan called for maintaining the beaver population in BMZs A and B or allowing for a slight increase, maintaining the beaver population in BMZ C at current levels and maintaining the beaver population in Zone D at current levels or allowing for a slight decrease (Wisconsin Department of Natural Resources 2015). The December 16th, 2022, Beaver Task Force Meeting revised these objectives to maintain the current level for beaver populations in all BMZs or to allow a slight decrease in BMZ D (Wisconsin Department of Natural Resources 2022).

3.2.4 General Biology

Beaver are the largest rodent in North America with weights of adults ranging from 35-69 lbs. (Baker and Hill 2003). Beavers usually live in family groups called colonies comprised of an adult breeding pair, young of the year and young from the previous year. Dispersing individuals exist as floaters in the population until they find a mate or construct a dam or lodge which may help attract a mate (Baker and Hill 2003). Older offspring may remain with the colony, especially if the surrounding area is at or near carrying capacity. Instances of more than one reproductive pair in a colony are rare. Beaver colonies maintain territories with approximately 0.6 miles between colonies in an unexploited beaver population in Alaska (Boyce 1981). Territory size and distance between territories varies depending on a range of factors including but not limited to landform, habitat quality, population density and age of the colony (Baker and Hill 2003, Rosell and Campbell-Palmer 2022).

Beavers reach reproductive maturity at approximately 1.8 to 3 yrs of age. Habitat quality, harvest and colony density can impact the age of first reproduction in beaver (Baker and Hill 2003). Beavers are monogamous but will form bonds with a new mate if the current mate dies or is replaced in a territorial dispute (Rosell and Campbell-Palmer 2022). Breeding occurs in winter with young born in late spring. Only one litter is produced per year. Average litter size ranges from 1-9 young. In Wisconsin, during 1990-1993, pregnant females averaged 4.2 fetuses per year (Kohn and Ashbrenner 1994). In 1976-1977 when harvest rates of beaver were still relatively low, average litter size of 3.4 beaver was documented in Forest and Oneida Counties. Habitat quality and weight of the adult female impact litter size. Beaver harvest also appears to impact littler size, likely due to increased availability of food in areas with reduced populations.

In most areas, human-caused mortality (fur harvest, removals for damage management) is the primary source of mortality in beaver (Baker and Hill 2003, Wisconsin Department of Natural Resources 2015). Natural sources of mortality include severe winter weather, under ice starvation, malnutrition, flooding, falling trees, and predation. In Wisconsin, wolves and coyotes are the primary predators on beaver, although beaver may also be taken by black bear, red fox, mink and river otter (Novak 1987, Baker and Hill 2003, Wisconsin Department

of Natural Resources 2015). Mortality rates in beaver can also be impacted by beaver population density. High beaver density can lead to beaver dispersal to less suitable habitat and increased natural mortality from starvation or exposure over the winter (Payne 1989).

Habitat

Beavers require sufficient water for safety and access to vegetation and adequate vegetation for food and construction of dams or lodges (if needed) but will use a wide range of sites within those general conditions (Rosell and Campbell-Palmer 2022). Beavers are ecosystem engineers that alter habitats to suit their needs by building dams to retain water. The resulting ponds provide habitat for the beaver and also for a wide range of other species of insects, plants, and other wildlife (Brazier et al. 2021). Beaver may use artificial water sources including retaining ponds and drainage ditches (Wisconsin Department of Natural Resources 2015). In Wisconsin, beavers may colonize areas with intermittent streams, particularly during years of high rainfall. Beavers may also occur in larger rivers and lakes where they use bank dens and lodges built as extensions of bank dens but do not construct dams. Beaver prefer low gradient streams ~1% (range 0-6%) but have been found in streams with gradients up to 15% in areas with high population densities or in mountainous areas (Novak 1987, Rosell and Campbell-Palmer 2022).

The vegetation adjacent to the waterway is a critical determinant of beaver distribution and density. The diet of beavers varies considerably by region and season; however, they are generalist herbivores consuming a mix of herbaceous and woody plants (Muller-Schwarze 2011, Rosell and Campbell-Palmer 2022). In Wisconsin common woody plants consumed by beaver include alder, aspen, cottonwood, maple, birch, ash, oak, willow and dogwood supplemented with herbaceous plants such as water grasses, fleshy roots, and water lilies (Wisconsin Department of Natural Resources 2015). In rare instances, they may even eat row crops.

Heat, Drought, and Extreme Weather Events

Wisconsin temperature and rainfall forecasts indicate an ongoing rise in average annual temperatures statewide, decreasing summer precipitation in the northern portion of the state and stable or increasing rainfall for the central and southern portions of the state (WICCI 2025*b*). Overall increasing temperatures have been associated with increasing frequency of severe weather events including flooding. Increasing temperatures can lead to longer growing seasons and less time with ice cover which can potentially be beneficial for beaver in that it increases food availability and decreases the need to create food caches and associated exposure to predation. Beaver ponds retain water and can provide a more stable source of water for beaver and wildlife during periods of low rainfall. Beaver ponds can also help to retain water during flooding events and decrease the impacts of high water on downstream ecosystems and communities. Because of their adaptability and the wide range of weather conditions where beaver can occur, beaver are more likely to be resistant to the impacts of higher average temperatures, drought, and heavy precipitation.

Role of Beaver in Ecosystems

The variety of species within a system and the ability of ecosystems to withstand environmental extremes including drought and wildfire are important components of ecosystem health (Gunderson 2000). In ecosystems with a wide range of species, there is a degree of redundancy in the role species play within the different ecological levels (e.g., apex predators, mesopredators, herbivores, plants, decomposers). In general, ecosystems that are less complex in terms of species variety and trophic levels, are more susceptible to adverse impacts and stressors such as high heat, drought, wildfire, disease outbreaks, introduction of invasive species, etc.(Crooks and Soule 1999, Rosell et al. 2005*a*, Estes et al. 2011, D. Muller-Schwarze 2011, Fairfax and Whittle 2020, Rosell and Campbell-Palmer 2022). However, the number of species and variety of taxonomic groups is not the sole indicator of ecosystem health. Different ecosystems may inherently support more or less species than others. For instance, (Cooke and Zack 2008) found that increased beaver dam density correlated to increases in total species richness and abundance, however, this study was on warmwater ecosystems. In Wisconsin, high quality coldwater streams have fewer fish species than warmwater systems and lack some of the taxonomic groups that may be supported by warmwater systems (Lyons et al. 1996). Opposite of the norm for warmwater ecosystems, environmental degradation in coldwater systems may incidentally be associated with an increase in species richness.

Beaver are known as a "keystone species" for their construction of dams which alters hydrology and creates valued wetlands. The building and rebuilding of beaver dams over seasons and years creates a mosaic of different-aged ponds in a watershed (Pollock et al. 2023). Beaver pond wetlands provide habitat for many species of animals and plants (Baker and Hill 2003, D. Muller-Schwarze 2011, White et al. 2015, Rosell and Campbell-Palmer 2022). Beaver activity benefits other species by increasing edge habitat, improving water quality, and connecting floodplains with side channels (Pollock et al. 2007, 2018, Bouwes et al. 2016, Weber et al. 2017, Wathen et al. 2019). The range of species that may benefit from beaver-generated wetland habitat includes insects and other invertebrates, fish, reptiles, amphibians, waterfowl, shorebirds, and furbearers such as muskrats, river otter, and mink (Naiman et al. 1988, Muller-Schwarze 2011, Rosell and Campbell-Palmer 2022). The USFWS estimates that up to 43% of T&E species rely directly or indirectly on wetlands for their survival (U.S. Environmental Protection Agency 1995). When the ponds mature and are eventually abandoned, they progress through successional stages which improve feeding conditions for other plant and animal species (Naiman et al. 1988, Rosell and Campbell-Palmer 2022, See also Appendix C). Aquatic and early successional plants may become established in the newly deposited sediment allowing conditions to become favorable for the stabilization of a flood plain by more permanent woody vegetation (Pollock et al. 2007, 2018). (See also Section 3.5)

3.2.5 Comparative Impacts of Alternatives on the Wisconsin Beaver Population

3.2.5.1 Alternative 1 – Integrated Beaver Damage Management (Proposed Action)

WS-Wisconsin would continue to use nonlethal and lethal methods to address conflicts with beaver. As noted in Section 3.1 and 2.5.1, other entities would continue to conduct BDM activities in accordance with applicable state and tribal regulations. There is yearly variation in

requests for WS-Wisconsin BDM assistance (Table 1-1). Based on WS-Wisconsin experience, rain and snowfall levels appear to be primary factors determining variation in requests for BDM assistance. Increases in beaver movements and colonization of new sites may ultimately be associated with increased requests for BDM assistance. Most requests for WS-Wisconsin BDM assistance involve recently constructed dams associated with newly colonized sites rather than expansions of existing colonies or older ponds with established wetland plant and animal communities. Increased water levels in years with heavy rainfall may facilitate dispersal of beaver by providing improved cover from predation. Conversely, there may be reductions in beaver colony density in years with drought and years following severe winters (Ribic et al. 2017) which will likely cause an associated reduction in requests for BDM assistance.

Future requests for WS-Wisconsin BDM assistance and any associated beaver take can be difficult to predict based on variations on biological factors discussed above, funding and other social factors. For example, reductions in WDNR funding resulted in the cancellation of BDM for coldwater fisheries in the Driftless Region in 2025. Cooperator willingness to incorporate more nonlethal measures could reduce beaver taken by WS-Wisconsin. Conversely, additional counties, townships, or municipalities could request WS-Wisconsin assistance with BDM for the protection of roadways or county forest areas, which could increase take. In this latter instance, at least some increase in take by WS-Wisconsin would be in lieu of unreported BDM take by other entities for the same cooperators. For purposes of this analysis, we are considering a scenario of maximum annual WS-Wisconsin take of 4,000 beaver per year.

3.2.5.1.1 Licensed Harvest and Take for Damage Management

Information on estimated WS-Wisconsin take of beaver and WDNR estimates of beaver harvest by BMZ during 2019-20 – 2023-24 is provided in Tables 3-1 and 3-2. WS-Wisconsin's current system for recording operational data can provide data at the county level. To estimate WS-Wisconsin beaver take by BMZs, we used the proportion of the county included in each BMZ (data provided by WDNR) and assigned beaver take to BMZs in the county proportionally assuming uniform distribution of beaver take within each county.

Trappers are not required to report beaver harvest. The WDNR estimates statewide beaver harvest using data from an annual beaver trapping questionnaire (Table 3-2). Trapper harvest is calculated by taking the average harvest level per trapper reported on beaver trapping questionnaires and multiplying it by the number of active trappers (estimated by those who indicated that they actively trapped throughout the year on beaver trapper questionnaires). The formula is sensitive to individual trappers who report especially high harvest (outliers), and which can result in an overestimate of harvest. To estimate licensed harvest by BMZ for this EA, the WDNR multiplied the statewide mean reported beaver harvest per trapper by the proportional effort that beaver trappers reported, allocating to each zone and multiplying that number by the number of active beaver trappers (WDNR unpublished data). Due to differences in the formulas and sensitivity of the calculations to differences such as those attributable to rounding, the totals from the BMZ estimates do not match the statewide total calculated using the WDNR's usual system (Table 3-2). In the discussion for this section, reference to statewide

licensed harvest will refer to the WDNR calculations for statewide harvest and not the sum of the zone estimates.

WS-Wisconsin statewide average annual take of beaver for damage management during the period of 2019-20 to 2023-24 was 3,188 beaver per year (Table 3-1). Most beaver were taken using body gripping traps (74.8%) followed by foothold traps (24.8%), cable devices (0.3%), shooting (0.09%), and cage traps (<0.01%). Estimated average annual statewide licensed beaver harvest for the same period was 32,166 beavers using the method described above (WDNR unpublished data; Table 3-2), with WS-Wisconsin take an average of 9.9% of statewide licensed harvest and 9% of total estimated anthropogenic beaver mortality (WS-Wisconsin take and licensed harvest combined). There is no data on take for damage management by entities other than WS-Wisconsin, although such take is known to occur (Section 3.1). When removing beaver for damage management, WS-Wisconsin attempts to remove all beaver at the conflict site. In contrast, trappers engaged in avocational harvest typically move on from an area as the effort to capture beaver increases (i.e., their catch-per-unit effort decreases). This key difference between avocational and wildlife damage management trapping is one reason that increased licensed harvest does not necessarily correlate in a reduction in beaver damage complaints or conflicts (Tables 3-1 and 3-2).

Table 3-1. Estimated WS-Wisconsin take of beaver for damage management during 2019-20 through 2023-24 (Federal Fiscal Year – October 1 to Sept. 30).

Beaver Management Zone[1]	2019-20	2020-21	2021-22	2022-23	2023-24	Average
A	1,912.2	1,606.8	1,875.8	1,640.1	1,544.6	1,715.9
B	1,059.4	911	1,137.4	1,031.5	910.9	1,010
C	496.3	464	478.1	536.7	332.1	461.5
D	1.1	0.2	0.7	1.7	0.4	0.8
Statewide	3,469.0	2,982.0	3,492.0	3,210.0	2,788.0	3,188.2

[1] WS-Wisconsin records information on a county basis. In counties that had area in more than one BMZ, we estimated WS-Wisconsin beaver take per BMZs by dividing take based on the proportion of county area in each BMZ.

Table 3-2. WDNR beaver harvest estimates for 2019-20 through 2023-24 licensed harvest seasons (Beaver trapping season November 1 – April 30 with shorter seasons in some BMZs).

Beaver Management Zone[1]	2019-20	2020-21	2021-22	2022-23	2023-24	Average
A	8,691	13,229	3,880	4,909	13,257	8,793.2
B	14,299	7,105	6,410	5,760	11,310	8,976.8
C and D	12,765	15,870	8,548	12,746	22,952	14,576.2
Total Population from Zone Estimates[1]	35,755	36,204	18,838	23,415	47,519	32,346
Statewide	35,250	35,441	19,456	23,724	46,961	32,166.4

[1] WDNR does not require reporting of beaver harvest. Take is estimated using answers to a beaver trapper questionnaire (statewide estimate). To facilitate analysis for this EA, they developed a formula and calculations to estimate take by BMZ. Due to differences in the calculations, the sum of the BMZ estimates is not identical to the usual statewide harvest estimate that is used by the WDNR.

The level of licensed beaver harvest varies year-to-year and is influenced by the market value for beaver fur, number of fur takers targeting beavers, environmental conditions, and volume of damage complaints (Figure 3-1). During the period of 2005-2022, there appears to be a general decreasing trend in total known beaver take in Wisconsin. This trend is consistent with other data indicating that younger generations are less interested in trapping. In Wisconsin, 45% of trappers are age 55 or older but only 18% of trappers were age 35 or younger (Association of Fish and Wildlife Agencies and Responsive Management 2024). Spikes in harvest in 2011 and 2023 were related to high pelt prices and high levels of harvest in 2019 and 2020 that coincide with an overall increase in all forms of outdoor recreation, including hunting and trapping, during the Covid-19 pandemic.

Most known beaver take in Wisconsin (average 91% of known annual mortality 2019-20 to 2023-24) is attributable to licensed harvest, and harvest is the primary driver of variability in known beaver mortality. However, the extent to which BDM take by WS-Wisconsin contributes to total take varies among BMZs. The proportion of total known take attributable to WS-Wisconsin during 2019-20 to 2023-24 averaged 16.3% of annual known take in BMZ A, 10.1% of annual known take in BMZ B and 3.1% of annual known take in BMZs C and D.

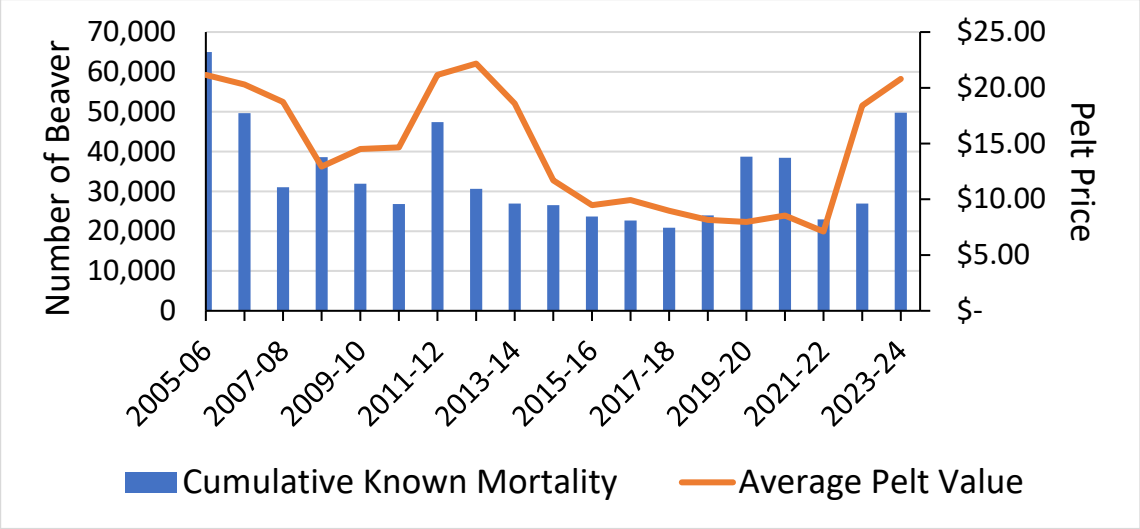


Figure 3-1. Total known beaver take (WDNR harvest data and APHIS-WS data) and beaver pelt price. The database used by WS-Wisconsin only provides data from 2005 to present. See Section 3.2.1 for details on how WS-Wisconsin and WDNR data are combined for the analysis.

3.2.5.1.2 Harvest Monitoring

Catch Per Unit Effort – WDNR Trapper Surveys: The WDNR uses an annual beaver trapper survey to estimate beaver harvest trends, the number of active beaver trappers, and beaver trapping effort. Catch-per-unit-effort, or CPUE uses a measure of the time investment per animal captured as an indicator of species abundance over time. This index intends to reflect the impact of all factors on the beaver population including unreported take for BDM. In

general, an increase in CPUE is indicative of an increase in the species population and *vice versa*. CPUE results can be confounded by factors such as changes in the skill level of trappers (less experienced trappers may require more time to capture animals), changes in market prices for pelts (increased effort to obtain more animals may lead to decreased catch per unit effort despite stable pre-harvest population), and environmental conditions during the trapping season (e.g., heavy snowfall impacting trapping effort). The WDNR takes these factors into consideration when reviewing year-to-year variation in harvest and CPUE.

We estimated statewide CPUE for Wisconsin for the 1990-91 to 2023-24 seasons using data obtained from WDNR's annual beaver trapping questionnaires. We calculated CPUE using the average number of beavers trapped, the average number of traps set per day, and the average number of days trapped per trapper from the surveys to estimate CPUE by dividing the average # beaver caught/(average number of days trapped x average number of traps set per day) (Figure 3-2). This information does not show the magnitude of decline in CPUE in the early 1990s that might be expected given declines in the beaver population in BMZs A and B indicated in the CNNF and WDNR aerial surveys discussed below (Ribic et al. 2017, S. Rossler et al. 2024*a*). However, the CPUE estimates are calculated at the statewide level and given the low proportion of beaver habitat impacted by BDM for coldwater streams (See discussion of CNNF Chequamegon NF data and Habitat Suitability Impacts Sections 3.2.5.1.3 and 3.2.5.1.5), and the dispersed nature of WS-Wisconsin other beaver removals, impacts are likely to be localized. Reductions in CPUE in portions of BMZs A and B may not have been of sufficient scope or magnitude to strongly influence statewide CPUE or decreases in one portion of the state could have been offset by increases in other portions of the state. Beaver trapper questionnaires are provided at the end of the harvest season and errors in estimating effort may also impact the accuracy of the results (See Catch-Per-Unit-Effort – Beaver Diary Survey below).

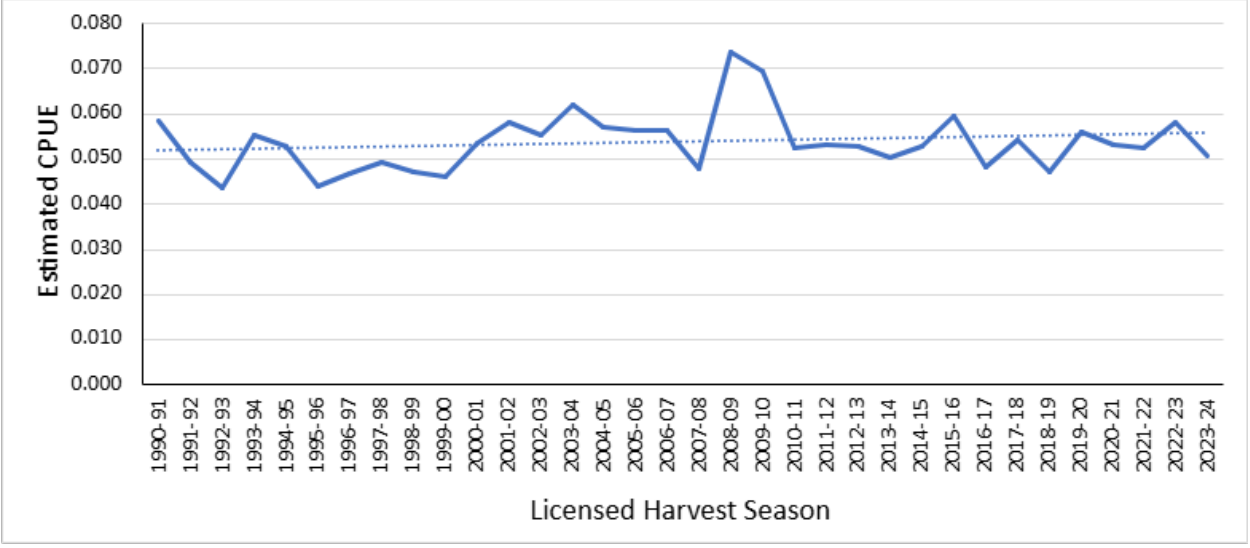


Figure 3-2. Estimated CPUE for licensed harvest during the trapping season in Wisconsin.

Catch-Per-Unit-Effort - Beaver Diary Survey: A WDNR pilot study from 2018 demonstrated that responses from prospective beaver trappers through a Beaver Trapper Diary could provide improved CPUE metrics to help assess beaver population trends and meet beaver management needs.

In October 2021, 2022, and 2023, the WDNR sent Beaver Trapper Diaries to prospective trappers who said they were active beaver trappers in the past two years and randomly selected trappers from trapper license sales data. The Beaver Trapper Diaries provided trappers with the opportunity to collect accurate daily information on effort and their associated trapping success for the month of November. Data from the diaries were used to calculate CPUE for the state in BMZs A, B, and C (Figure 3-3). Use of the trapper diaries is in early stages, and to avoid survey fatigue, the dairy was not sent out in October 2024. As such, it does not provide sufficient data to determine long-term trends. However, based on the three years of data available the highest average CPUE estimate and variability in average CPUE was in BMZ A, followed by BMZ B, and then BMZ C. The CPUE estimates indicate an increasing trend statewide in BMZ A, while holding relatively stable in BMZs B and C (Wisconsin Department of Natural Resources 2025*b*). Based on this information, the Wisconsin beaver population was able to withstand impacts on the population including known (WS-Wisconsin and estimated harvest) and unknown (unreported take for damage management) sources of human-caused mortality during this period. Similarly, there is no evidence of a decreasing population trend in the CNNF surveys over the period of approximately 2013 to present. Harvest data from 2024-25 season was lower than previous years (estimated 21,623 beaver harvested). Decreased harvest was largely attributed to variable weather conditions creating both good and poor conditions for beaver trapping during the 2024-2025 season (Rossler et al. 2025*a*).

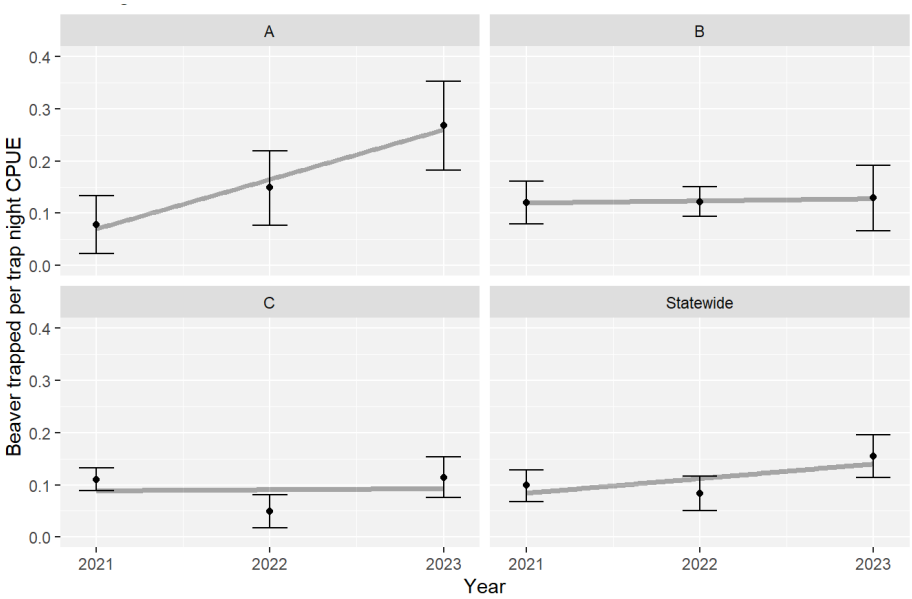


Figure 3-3. Beaver trapped per trap night Catch-per-Unit-Effort calculation for state and BMZ, November 2021-2023. Figure adapted from data presented at the WDNR May 2025 Furbearer Advisory Committee.

Comparison of Potential Harvest to Past Harvest and Population Trends: This system compares maximum anticipated take levels to historic take levels associated with a relatively stable population based on population trend indices. Beaver take fall within the range of values known to have been sustained in the past. Beaver take levels outside the range of levels that have been sustained in the past may have a greater likelihood of resulting in a decline in the beaver population. To project consequences of a worst-case scenario of statewide WS-Wisconsin take of beaver of 4,000 beaver per year on specific BMZs, we allocated the take of 4,000 beaver to BMZs based on the proportion of annual average WS-Wisconsin take in each zone from Table 3-1 (BMZ A – 54% Beaver, BMZ B – 32%, BMZ C&D – 14% (Table 3-3). We used harvest data from the 2019-20 – 2023-24 licensed harvest seasons to represent the range of potential take by licensed trappers (Table 3-3). This interval includes years with peaks in licensed harvest associated with high outdoor recreation during the Covid pandemic (2019-20 and 2020-21 seasons) and high market prices during the 2023-24 season. Average harvest for this interval may be high relative to the long-term trend and provides for a more conservative estimate of impacts on the beaver population (i.e., high take estimate). We added the estimate of WS-Wisconsin anticipated maximum take to the average harvest estimate to obtain an estimate of maximum projected beaver mortality (Table 3-3). We compared these estimates to the range of known mortality during the period of 2019-20 to 2022-23 when the CNNF, statewide CPUE and beaver diary data indicate the beaver population was relatively stable. For BMZs A and B, we compared take to take that occurred during the 2019-20 through 2023-24 seasons.

Table 3-3. Projection of total known beaver take with worst-case WS-Wisconsin annual beaver take during 2019-20 through 2023-24.

Area	Range Cumulative Take 2019-20 -2023-24	WS Maximum Potential Take[1]	Max Potential Take by WS, Plus Average Harvest
BMZ A	5,824 - 14,870	2,160	10,953
BMZ B	6,787 - 15,342	1,280	10,297
BMZs C & D	8,990 - 16,270	560	15,097
Statewide	23,002 - 38,539	4,000	36,166

[1] Maximum WS-Wisconsin potential take for each BMZ anticipated by applying the proportion of WS take for each BMZ during 2019-20 – 2023-24 (Table 3-1) to the maximum anticipated statewide take.

Only under the scenario with maximum licensed harvest and maximum take by WS-Wisconsin (projected maximum known mortality) did the projected known mortality exceed the range observed during 2020-2023 when the beaver diary and CNNF data indicate the population was relatively stable. It is unlikely that a spike in recreational harvest would coincide with the worst-case maximum take by WS-Wisconsin. Based on trends in beaver harvest over the last 20 years, even if the worst-case scenario of projected cumulative take were to occur, it is unlikely to be sustained over time (e.g., Figure 3-1). The beaver pelt prices that drove the 2023-24 spike in harvest have decreased with both fewer pelts sold and lower quality beaver pelts commanding reduced prices in the 2024-25 season (Fur Harvesters Auction Inc. 2025). Data on beaver population trends from the CNNF (Figure 3-4) indicate that years with spikes in beaver

harvest, as noted in Figure 3-6, do not appear to result in sustained declines in beaver colony density. Furthermore, even with maximum beaver take by WS-Wisconsin, take by WS-Wisconsin would only be a fraction of average licensed harvest for 2020-2024 (12% Statewide, 25% BMZ A, 15% BMZ B, 4% BMZ C&D by WS-Wisconsin). The WDNR monitors licensed harvest and take by WS-Wisconsin and is expected to adjust licensed harvest through reductions in the length of the harvest season or other strategies (e.g., establishment of bag limits, zone closures) to foster population increases if needed. Consequently, there is no indication from this information that WS-Wisconsin's current or future involvement in beaver damage management will result in sustained or large-scale decreases in the state's beaver population, outside the reductions in coldwater streams specifically requested by the WDNR. While other short-term decreases could occur statewide or in specific BMZs, available data indicate the decreases would not be sustained over time and that there are sufficient monitoring and management strategies in place for the WDNR to maintain the beaver population at desired levels.

3.2.5.1.3 Chequamegon-Nicolet National Forest (CNNF) Beaver Survey Data

The USFS conducts aerial surveys to monitor the beaver population in the Nicolet and Chequamegon portions of the CNNF Forest (NNF and CNF respectively) in randomly selected streams with and without beaver removal for trout stream enhancement (Figure 3-4). Data collection started in the NNF portions on the CNNF in 1987 and in the CNF portions of the CNNF (BMZ A) in 1997 (Figure 3-4). These surveys are the longest continuous beaver population monitoring in the state and reflect the impact of all factors in the survey area on the beaver population. Surveys are conducted in fall to capture beaver preparation of food caches and lodges for winter. Surveys are conducted after the conclusion of BDM activities for the year and reflect areas with and without beaver removals for coldwater fisheries management. Phenological changes in when beaver build these constructions may need to be tracked and incorporated in the future. For example, during the 2023 surveys, WS-Wisconsin observers noted that the late onset of cool fall conditions may have reduced the number of beaver colonies detected (WS-Wisconsin unpublished data). The drop in colonies counted on the CNF in 2023 was unlikely to be attributable to high beaver harvest in 2023-24 season because the survey was completed too early in the harvest season (Figure 3-4). It also seems unlikely that the decline is attributable to BDM because a similar decline did not occur on the NNF where a greater proportion of survey streams have beaver removals to protect coldwater fisheries.

Data for the NNF during 1987-2013 and the CNF during 1997-2013 were evaluated by Ribic et al. (2017). Unlike Figure 3-4 that combines data for all survey streams, the authors categorized streams into three categories, targeted trout streams, non-targeted trout streams and non-trout streams. On the CNF, beaver colony density did not change over time in non-targeted trout streams or non-trout streams, but colony density on targeted trout streams declined and then stabilized by approximately 2003 (Figure 3-5). On the NNF beaver colony density declined on non-targeted and targeted streams (Figure 3-5). Although density declined, untreated streams in the NNF remained at a higher density than treated streams. The rate of population

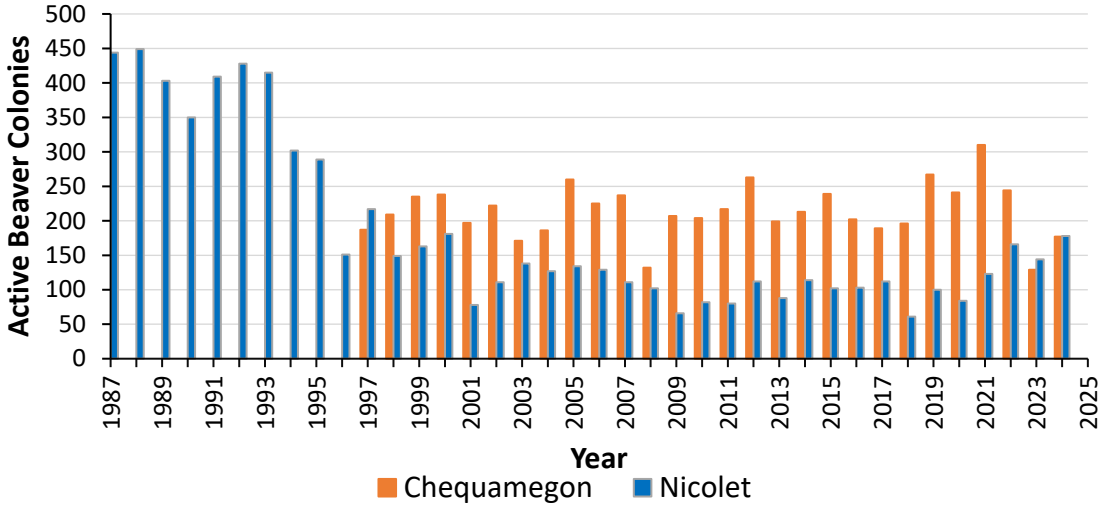


Figure 3-4. The number of active beaver colonies detected on the Chequamegon-Nicolet National Forest Fall survey flights, 1987-2024 (USFS unpublished data). Chequamegon NF survey area is in BMZ A, Nicolet NF survey area is in BMZ B. Data includes areas with and without BDM for coldwater streams.

decrease in the NNF declined substantially in 1996 for untreated streams and in 1999 for treated streams (Ribic et al. 2017)(Figure 3-5). Although the population on the NNF declined through the study period, subsequent monitoring indicates the overall population on the NNF was relatively stable or has increased slightly after that point (Fig. 3-4). The impact of beaver removal for trout streams resulted in an approximately 60% reduction in colony density on treated streams in the NNF and CNF areas (Ribic et al. 2017). Population reductions in the NNF that occurred in the 1990s and the reduction in beaver density in select trout streams were consistent with WDNR management objectives (Wisconsin Department of Natural Resources 1990).

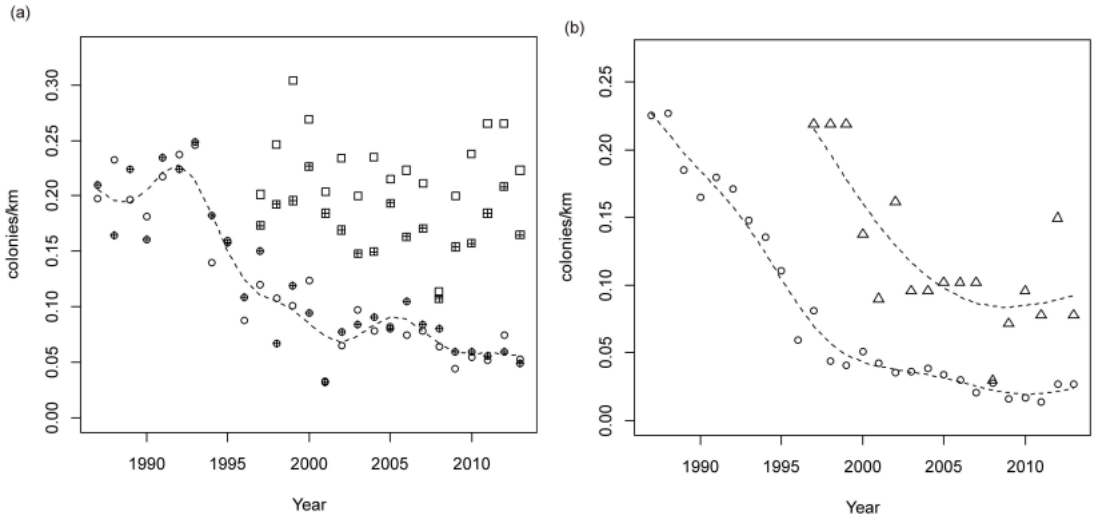


Figure 3-5. Figures from Ribic et al. (2017) review of beaver colony numbers/km by year in areas with and without targeted beaver removal for coldwater streams in Nicolet (BMZ B) and

Chequamegon (BMZ A) portions of the Chequamegon-Nicolet National Forest. In panel (a) open circle = Nicolet trout streams, filled circle = Nicolet non-trout streams, open square = Chequamegon trout streams, filled square = Chequamegon non-trout streams. In panel (b), open circle = Nicolet side, triangle = Chequamegon side. Dotted lines are the predicted trends from generalized additive models (significant trends only).

Data from the CNF indicated that it took approximately seven years of intensive effort in treated streams before the population stabilized at a reduced level (Ribic et al. 2017). Treated areas are recolonized but ongoing BDM efforts keep population density below pre-treatment levels. The relatively stable population on the untreated portions of the CNF was as expected if licensed harvest and other impacts were within sustainable thresholds. Reasons for the decline in untreated streams of the beaver population on the NNF were unclear but may have been related to the higher intensity of BDM for trout stream removal in the overall NNF area (Ribic et al. 2017). If beaver from the treated areas had been a source population for the surrounding area, reductions for trout stream management could have impacted the beaver available to disperse to the surrounding areas. Alternatively, the decline may have been related to local factors including licensed harvest or local habitat changes (e.g., transitions to older growth forests (Ribic et al. 2017). Immigration appears to be a key factor in maintaining baseline beaver populations in treated streams as the majority of individuals removed are yearlings (13-24 months old) and subadults (25-36 month old), which corresponds to the age demographic most likely to disperse (Payne 1989, McNew and Woolf 2005, Rosell and Campbell-Palmer 2022).

3.2.5.1.4 WDNR Helicopter Surveys

Like almost all states in the U.S., there are no recent estimates of the Wisconsin beaver population (See Section 3.2 above). The WDNR used helicopter surveys in northern Wisconsin to monitor population abundance from 1990-2014 (Figure 3-6). Survey data reflect the impact of all factors on the beaver population in the survey area. Data from the surveys were extrapolated to provide population estimates for BMZs A and B and for the state. We are only considering population estimates from BMZs A and B because no surveys were conducted in Zones C and D. The helicopter surveys were discontinued after 2014 due to cost. Research Objective 6.1 in the 2015-2025 Beaver Management Plan calls for development of alternative, more cost-effective survey methods (Wisconsin Department of Natural Resources 2015)(See "Catch-Per-Unit-Effort - Beaver Diary Survey" above).

Based on helicopter survey data, the beaver population in the northern third of the state decreased between 1995-2008. Data from the last two surveys indicated that the population had stabilized and the estimated number of colonies in the northern third of the state was virtually unchanged between 2011 and 2014 (Rolley et al. 2015). The initial decline in the beaver population followed by stabilization at a lower density level was consistent with WDNR management objectives for BMZs A and B.

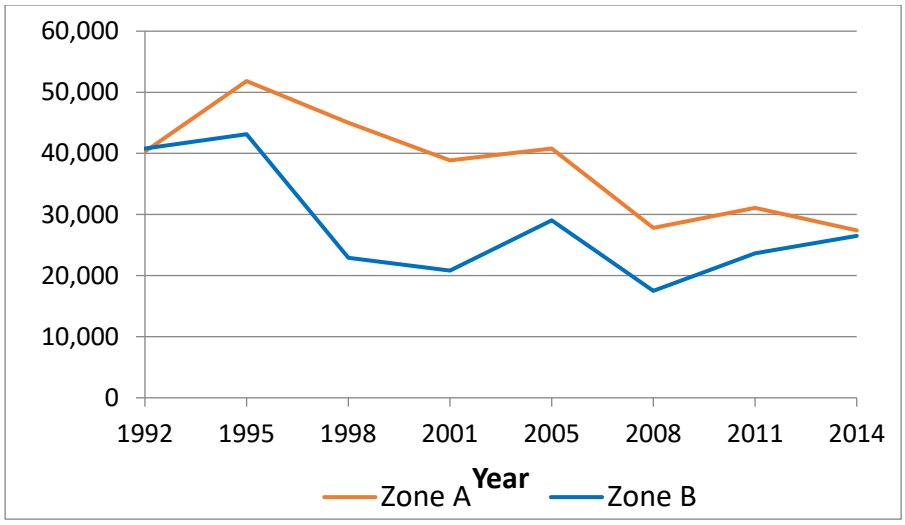


Figure 3-6. Wisconsin estimated beaver population for BMZs A and B. Survey protocols were still in development in 1992 and may have yielded higher population estimates than protocols used from 1995-2014 (Rolley et al. 2015).

3.2.5.1.5 Habitat Suitability Model

Habitat suitability models (HSMs) facilitate understanding the suitability of an area for a given species/species group and can be used to estimate the relative impact of management actions in context of the habitat available to a species. The NEPA does not require agencies to undertake new scientific or technical research unless the new scientific or technical research is essential to a reasoned choice among alternatives and the overall costs and time frame for obtaining it are not unreasonable (42 U.S.C 4321 §106(b)(3)(B)). Nonetheless, WS-Wisconsin worked with the NWRC to develop a HSM that projects the potential beaver colony density in Wisconsin. While many beaver dam capacity and habitat suitability models exist, consideration of local context (geography, vegetation, etc.) improves the model's resolution, especially if the HSM was developed for a different ecoregion (Moravek et al. 2025). Hence, a HSM was developed to help evaluate the impacts of BDM on the Wisconsin beaver population (Robinson et al. 2025).

The Robinson et al. (2025) model ranked the quality of beaver habitat based on a combination of geomorphological and habitat characteristics. Beaver in Wisconsin are known to occupy shorelines of lakes and ponds, so the model uses 'waterway km' it its calculations, which includes the length of riverine channels and the perimeter of lacustrine waterbodies. Unnatural waterways including ditches, wastewater ponds, fish hatcheries, and cranberry bogs were excluded because they cannot support beaver populations, either because of habitat quality or because of conflict with human land uses. Waterways were scored based on their suitability using factors including water source duration, gradient, stream order, channel width, and riparian vegetation. A Best Estimate model was developed using data from studies that showed a clear and quantifiable relationship between the variable and beaver density, particularly studies from Wisconsin and similar areas. Uncertainty in the model was addressed by calculating upper and lower bounds for each variable. Upper and lower bounds were identified based on the more extreme values from the range of published studies. Model output was

checked against data from CNNF and WDNR aerial surveys in BMZs A and B, and data from the statewide Snapshot Wisconsin project (Cove et al. 2021). Use of these datasets allowed for consideration of the model at the local (CNNF), regional (BMZs A and B) and statewide (Snapshot Wisconsin) scales.

Riparian cover values were the primary drivers of model scores. While scores varied for the upper, lower and best model scenarios, the general pattern of habitat distribution remained consistent for the state (Figure 3-7). The Best Estimate model was the best fit for data from the CNNF survey and the WDNR helicopter survey data (BMZs A and B). The CNNF survey area and BMZs A and B ranked as high-quality habitat with mean beaver density estimates of 0.194 and 0.136 colonies per waterway km respectively. The lower bound model was the best fit for the Snapshot Wisconsin data. Consistent with the data from the other two surveys, data from Snapshot Wisconsin showed BMZs A and B as having the highest quality beaver habitat and BMZ C having the lowest habitat scores and the greatest variability in habitat scores. Results for BMZ C were as expected given the range of habitat types and anthropogenic impacts on land use in BMZ C. There was insufficient information from Snapshot Wisconsin to estimate beaver density in BMZs C and D. However, even within low-scoring portions of the state, some streams and lakes were scored as acceptable to excellent quality for beaver. Flooded backwater portions of BMZ D scored highly.

Once satisfied by model performance, Robinson et al. (2025) assessed the impact of WS-Wisconsin BDM trout stream protection activities. The number of miles of designated trout streams treated by WS-Wisconsin at the request of the USFS and WDNR varied yearly but constituted less than 2.5% of the 84,000 miles of rivers and streams in the state, and approximately 15% of the designated Class 1, 2, or 3 trout streams. Trout streams where BDM was conducted for the WDNR had higher habitat quality scores than the BMZ or statewide averages, which was expected given that beaver and trout have co-evolved and thrive in similar environments (Robinson et al. 2025). Beaver removals in these high-quality habitat areas likely have greater impact than removals in lower quality habitat types, as may occur for other types of BDM. When impact scores were weighted to take into consideration habitat quality, beaver removal for trout streams impacted only 2.4% of beaver habitat statewide and only 7.3% of beaver habitat in BMZ B where most WS-Wisconsin BDM for trout streams is conducted. It is important to note that beaver are not eradicated from these areas, nor is BDM for coldwater fisheries a beaver elimination program, it occurs on a small subset of streams identified by natural resource experts as requiring assistance maintaining free-flowing conditions to enhance and protect fisheries resources. While beaver populations are reduced in the trout stream management areas, data from Ribic et al (2017) indicate that rapid recolonization of beaver in untreated subsections of streams generally designated for BDM for coldwater fisheries result in colony densities approximately 40% of colony densities in untreated streams.

Location data sufficient for the Robinson et al. (2025) model are not available for the areas where WS-Wisconsin conducts BDM for the protection of human health and safety, property, and resources other than coldwater streams. Take for BDM issues other than coldwater streams constitute approximately 58% of all WS-Wisconsin beaver take for damage

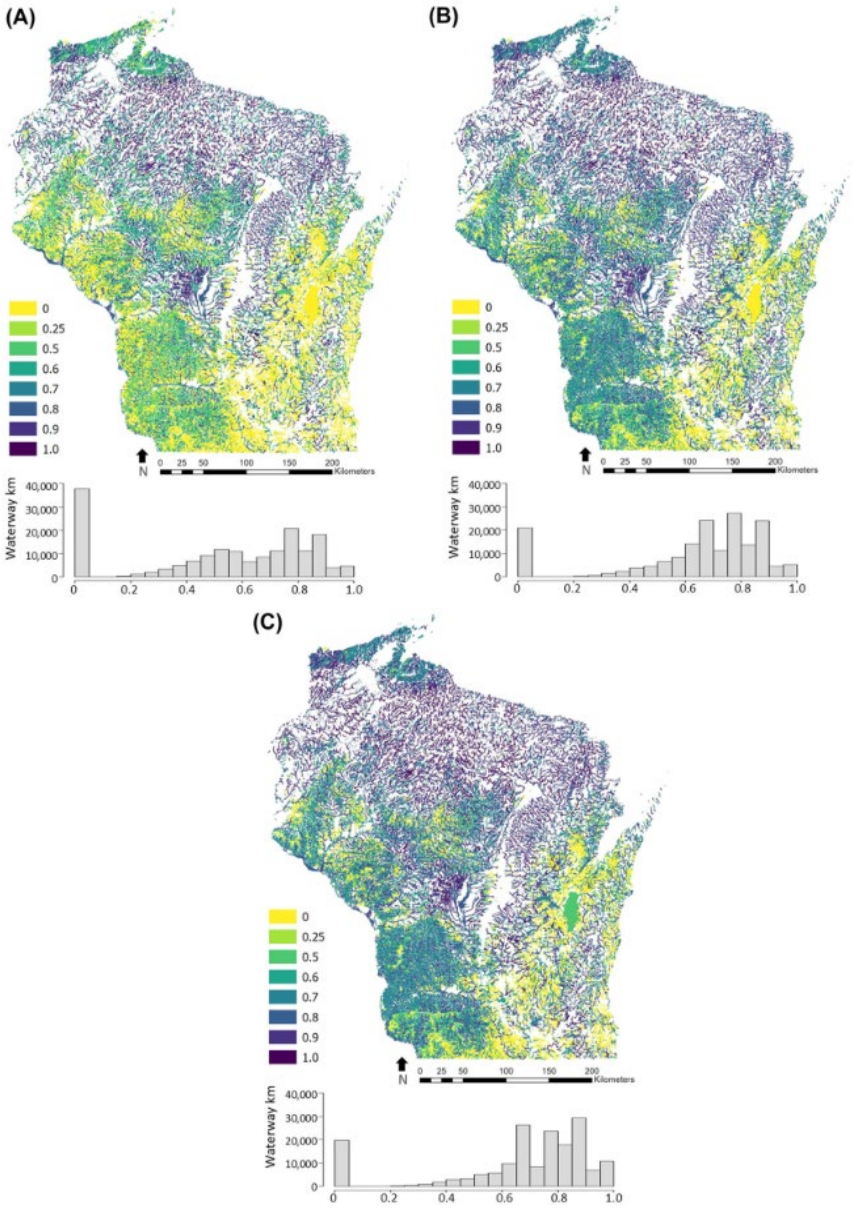


Figure 3-7. Geographic distribution of habitat quality for North American beaver in Wisconsin as estimated by a habitat suitability model (Robinson et al. 2025). Habitat suitability was calculated according to a Best Estimate model (B) as well as Lower (A) and Upper Bounds (C). Histograms below each map summarize the distribution of waterway lengths across the range of habitat suitability scores. (Robinson et al. 2025).

management. The take involves individual beaver or colonies distributed across the landscape and is not concentrated in specific stream segments as is the case for BDM for coldwater fisheries. If the proportion of beaver habitat impacted by BDM for coldwater fisheries is extrapolated to all beaver removals, approximately 5.9% of state beaver habitat would be impacted by WS-Wisconsin BDM activities. This may be a slight over-estimate because the estimate of the proportion of beaver habitat impacted by BDM for coldwater fisheries is

weighted to address the higher-than-average proportion of high-quality habitat in the coldwater streams. In contrast, activities for other types of BDM are more likely to be distributed proportionately to availability.

There are some limits to HSMs including that the value of habitat types may be strongly influenced by region and habitat availability. For example, in BMZ C, where overall habitat quality was lower, the habitat type at the top of the range in BMZ C was only midlevel or non-selected habitat in BMZs A and B (Robinson et al. 2025). Due to limitations in data available, it is impossible for the model to fully reflect the impact of human tolerance/intolerance and harvest on the beaver population, although the model incorporates some impacts through relative scoring of human-modified habitat types (e.g., agricultural lands) as an indicator of anthropogenic impact. Additionally, each of the data sets available to Robinson et al. (2025) to develop the model has limitations. The CNNF survey is limited to a relatively small area and the WDNR aerial survey data only covered the northern third of the state and the survey was discontinued in 2014. The Snapshot Wisconsin data are available statewide but does not include systematic coverage of beaver habitat. Furthermore, information on colony density from Ribic et al. (2017) and the CNNF surveys count construction by beaver and may be an underestimate of beaver density depending upon the extent to which beaver use bank dens without lodges or dams.

Conclusions

Based on the information above, WS-Wisconsin activities are a relatively small part of the overall known impacts on the state beaver population (8.9% of total known mortality statewide) although impacts are higher in areas where WS-Wisconsin conducts BDM for trout streams at the request of the WDNR (19% BMZ A, 11% BMZ B). Beaver harvest managed by the WDNR is the primary factor impacting the state beaver population and, with the exception of select coldwater trout streams, is the primary mechanism used by the WDNR to achieve beaver population management objectives.

WS-Wisconsin projects for trout streams are likely to have the greatest local impact on the beaver population but are not permanently eliminating beaver from treated areas (Ribic et al. 2017). Beaver populations in BMZs A and B are sufficiently resilient that a combination of immigration and beaver from subsections of designated treatment streams that do not receive BDM in a given year are sufficient to sustain approximately 40% of the pre-treatment population density by the fall, after WS-Wisconsin BDM beaver and dam removals. Given this level of resilience, beaver populations in the area retain the capacity to readily rebound if removals for BDM are discontinued, even in areas where WS-Wisconsin work is concentrated (e.g., trout streams in BMZ B). Impacts of BDM activities for coldwater fisheries are limited in scope and only affect 2.4% of beaver habitat statewide and 7.3% of beaver habitat within BMZ B where most BDM for trout streams occurs.

BDM for other types of damage management is more dispersed and generally involves management of a single colony to address site-specific conflicts (e.g., blocked culverts or flooded roads and railways) and is less likely to have a sustained impact on local beaver

populations. If we extrapolate the proportion of statewide beaver habitat impacted by coldwater fisheries BDM to WS-Wisconsin statewide BDM activities, WS-Wisconsin activities impact less than 6% of beaver habitat statewide.

Based on the information above, WS-Wisconsin is having a locally moderate but overall low level of individual and cumulative impact on the beaver population. Cumulative impacts on the Wisconsin beaver population, particularly in BMZs A and B are consistent with WDNR management objectives as established in state management plans and associated public and legislative involvement processes. Although specific details on harvest and take for BDM by entities other than WS-Wisconsin are not available, population indices used by the WDNR and CNNF reflect the cumulative impacts of all factors and are sufficient for the WDNR to detect changes in population trends. The WDNR uses an adaptive management strategy to adjust harvest and take for BDM to sustain the Wisconsin beaver population in accordance with state objectives. These practices are consistent with practices used by wildlife agencies across the country to manage beaver populations. Therefore, while periodic spikes in beaver take and natural events may occur that can cause reductions in the beaver population, the WDNR is able to detect these events and adjust accordingly (e.g., reducing the length of the harvest season). Based on the information above, and because WS-Wisconsin BDM activities are conducted under authorization from the state, this alternative is not expected to result in impacts on the state beaver population contrary to state management objectives or contribute to cumulative impacts contrary to the WDNR management objectives.

3.2.5.2 Alternative 2 – Only Nonlethal Beaver Damage Management Except for Projects for Coldwater Fisheries

This alternative would reduce the use of lethal methods by WS-Wisconsin. Approximately 58% of all WS-Wisconsin take of beaver for BDM is for the management of conflicts other than those involving coldwater streams. Eliminating WS-Wisconsin use of lethal methods in these areas would reduce the 2020-2024 average annual beaver take by WS-Wisconsin by slightly over 1,800 beaver per year. WS-Wisconsin beaver take as a proportion of all *known* statewide mortality would decrease from 9% to 4%. WS-Wisconsin impacts on the beaver population would primarily be concentrated in BMZs A and B, although the WDNR could request some beaver removals for trout streams in the Driftless Area in the future. WS-Wisconsin would continue to promote the use of nonlethal methods to resolve conflicts with beaver and, if available, use funds from the APHIS-WS Nonlethal Initiative to assist cooperators with implementing nonlethal methods.

WS-Wisconsin is not the only entity which can use lethal BDM methods (Sections 2.5.2 and 3.1.1). Based on comments provided during public scoping for this EA and WS-Wisconsin's years of working with cooperators, we anticipate that most WS-Wisconsin cooperators will seek assistance with beaver removal from other entities or hire their own staff to do the work themselves. These entities are highly unlikely to allow conflicts to persist. There is likely to be an initial increase in individuals who do not have the same qualifications as WS-Wisconsin personnel conducting BDM, until such time as sources of trained service providers/employees

can be identified. Less skilled individuals may take fewer beaver than WS-Wisconsin or they may take longer to remove the same number of beavers as WS-Wisconsin. We anticipate any decline in lethal beaver take associated with less skilled individuals conducting BDM to decline in a few years. Ultimately beaver removals for damage management would return to levels at or somewhat below levels in Alternative 1, depending on the cost of beaver removals (assumes cooperator funding for BDM says the same). At a minimum, cooperators would have to assume the cost of program administration that was paid for by WS-Wisconsin under Alternative 1 (<2% of expenditures). Given the low level of WS-Wisconsin financial contribution to current BDM activities and that take by WS-Wisconsin for beaver damage management constitutes a low proportion of all known take, we expect the long-term differences in cumulative beaver take to be minimal.

Under current WDNR regulations, this alternative would result in a substantial reduction in the information available to agencies, tribes and the public regarding beaver removals for damage management. None of the entities that could conduct beaver removals for damage management in lieu of WS-Wisconsin are required to report take to the WDNR. The WDNR is expected to continue to use population indices such as harvest monitoring and CPUE to monitor the state beaver population. These indices reflect all impacts on the beaver population, and we do not expect significant impairment in WDNR's ability to manage for a sustainable beaver population, consistent with state management objectives, despite the reduction in information on BDM.

3.2.5.3 Alternative 3 – Integrated Beaver Damage Management Except No Beaver Damage Management for Coldwater Fisheries

Under this alternative, WS-Wisconsin would continue to use an integrated approach to address all types of conflicts with beaver except WS-Wisconsin would not assist the WDNR with BDM for trout streams. WS-Wisconsin would continue to use allocations from the APHIS-WS Nonlethal Initiative to promote nonlethal BDM methods. During FY 2020-2024, WS-Wisconsin annual beaver take for trout streams averaged 1,330 beaver or approximately 42% of all WS-Wisconsin annual beaver take. Implementing this alternative would reduce WS-Wisconsin take as a proportion of total known mortality from 9% to 5% of total known take.

The WDNR is expected to find alternative sources for beaver removal for trout streams consistent with the provisions of the state beaver and trout management plans (Wisconsin Department of Natural Resources 2015, 2019). Based on past experience (Ribic et al. 2017), the WDNR will not be able to achieve their management objectives through the use of licensed trappers and will need to either conduct the work themselves or hire private contractors to achieve similar levels of beaver removal for trout streams. The WDNR would have to cover project administration costs that are currently paid by WS-Wisconsin, and, if they choose to do the work themselves, the costs to acquire equipment instead of just replacing equipment which is the case for ongoing WS-Wisconsin activities. There may also be increased contracting and administration costs if the WDNR needs multiple private contractors to do the work previously coordinated with one WS-Wisconsin state office. The WDNR could develop a hybrid system

that focuses trapper effort on target areas and then use contractors or their own staff to complete work needed to achieve management objectives. The hybrid approach might reduce employee costs to conduct BDM but may increase administration costs. There is likely to be a decline in beaver take for coldwater stream protection, particularly in the first few years after selection of this alternative while the WDNR works to implement an alternative BDM system. The WDNR is expected to use individuals with skill sets similar to WS-Wisconsin, so problems with inexperienced individuals attempting beaver removals would be lower than Alternative 2.

With time, a WDNR BDM project for trout streams is expected to result in levels of take somewhat lower than Alternative 1 because of the additional costs the WDNR would have to use for project administration. This could result in increased prioritization of BDM sites with fewer sites worked, or a system that would treat the same number of streams but increase the interval between treatments (e.g., from every year to every other year). WS-Wisconsin only contributed approximately 2% of the costs of BDM during 2022-2024 (including funds from the APHIS-WS Nonlethal Initiative). If WS-Wisconsin contributions for supervision are spent on par with cooperator funding for BDM then 42% of WS-Wisconsin's average statewide funds for BDM, or approximately $26,700 would not be available for beaver damage management in trout streams. This is less than 2% of the total state spending on BDM during 2022-2024. Given the relatively low level of financial contribution by WS-Wisconsin, it is entirely possible that the state could have beaver take levels similar to Alterative 1 over the long term.

If the WDNR conducts the BDM work themselves or arranges for contractors to do the work, they are expected to have records of beaver take for trout streams and the information available on BDM would be similar to Alternative 1. There would only be a reduction in information available if the WDNR worked with licensed trappers to help with population reduction, at which point, take for BDM at trout streams would be included in overall estimates of licensed harvest. The reduction in information available to agencies, tribes and the public would not be as great as for Alternative 2.

3.2.5.4 Alternative 4 – No Involvement in Beaver Damage Management

Under this alternative, WS-Wisconsin would have no impact on the state beaver population. The WDNR is expected to arrange for BDM for trout streams and for its other infrastructure (e.g., roads and trails on state lands and water control systems at refuges) and natural resources projects (e.g., wild rice) as discussed for Alternative 3. For reasons discussed in Alternative 3, overall impacts on beaver from WDNR actions may be somewhat lower than for Alternative 1. WS-Wisconsin cooperators are likely to conduct BDM activities for all other conflicts on their own or with assistance from private entities with impacts similar to or slightly greater than Alternative 1 and 2 because WS-Wisconsin would not promote use of nonlethal methods. As noted above, we anticipate an initial reduction in take for BDM, particularly for WDNR projects until alternative entities are identified and have the proficiency and resources currently available to WS-Wisconsin. The extent to which the decreases in beaver take for the WDNR and increases in other types of BDM because no WS-Wisconsin promotion of nonlethal methods would offset one another are unclear. Unless there are changes in WDNR policy and

regulations, there will be less information available to the WDNR, tribes and the public on the consequences of BDM activities.

As with all other alternatives, private entities can promote use of nonlethal methods and provide assistance if they have the available resources. Overall success of these endeavors will depend on the resources these entities can provide to incentivize use of nonlethal methods. However, there is no information indicating whether these efforts or available resources would change from current levels under this alternative.

3.3 IMPACTS ON NONTARGET SPECIES

There is a risk that WS-Wisconsin BDM activities may result in the unintentional capture, injury and mortality of nontarget animals. BDM activities can also impact the habitat used by nontarget species. WS-Wisconsin reduces the risk of unintentional capture, injury or mortality through practices including adherence to APHIS-WS Directives created to improve the safety and selectivity of wildlife damage management actions, use of trapping Best Management Practices (BMPs)(Association of Fish and Wildlife Agencies 2014, White et al. 2021), ongoing training of personnel involved in BDM, consultation with the WDNR and USFWS regarding measures needed to reduce potential risks to state and federally listed T&E species, and participating in research evaluating measures to improve the efficacy and selectivity of traps (e.g., Sundelius et al. 2021). The protective measures used by WS-Wisconsin exceed measures required of licensed trappers. WS-Wisconsin field personnel are experienced in selecting BDM methods that are as-selective as possible for the target species and apply methods in ways to reduce the likelihood of capturing or otherwise adversely impacting nontarget species. For example, WS-Wisconsin selects trap sites that are used routinely by beaver and where nontarget animals are unlikely to occur and uses methods in ways to reduce risks of nontarget animals being captured (e.g., setting equipment in water to reduce risks to many terrestrial species).

Depending on the species captured, the capture device and manner of its use, some nontarget animals captured during BDM can be freed. There may be a risk of post-release mortality, depending on the method and other factors including the initial health of the animal (Table 3-4). To address this issue, the analysis below considers total number of animals captured as if they were all killed as a worst-case scenario for fate of animals taken by WS-Wisconsin. Risks to domestic dogs are addressed in Section 3.6 and risks to T&E species (e.g., wolves) are addressed in Section 3.4.

3.3.1 Alternative 1 – Integrated Beaver Damage Management (Proposed Action)

3.3.1.1 Direct Impacts on Nontarget Species

During FY 2020-2024, while 15,941 beaver were captured, 2,277 nontarget animals (approximately 12% of all animals captured during WS-Wisconsin BDM activities) were unintentionally captured. Due to the lethal specificity of most BDM capture methods, only 22% of all nontarget animals that were captured were able to be released (493 nontarget animals freed compared to 1,784 killed) (Table 3-4). This ratio reflects the challenges of working in

beaver impoundments that are used by a wide range of species, some of which use the same travel routes as beaver (e.g., otters, muskrats, turtles, and raccoons). For these species, similarities in size, behavior and/or habitat selection and use may reduce the utility of protective measures which reduce risks to other nontarget animals (e.g., device placement in water, pan tension systems). There are no requirements in Wisconsin for landowners or their agents to report nontarget take of any species other than river otter or T&E species, so there are no comparative data available on the impact of beaver removals for BDM by entities other than WS-Wisconsin. Wisconsin beaver trapper surveys only ask about unintentional take of otters which is likely underreported because unintentional take of otters may be used to fill otter tags held by the trapper and therefore considered intentional take (See River otters below). Even if reporting was required, licensed trappers would not necessarily consider taking of other furbearers (muskrat, raccoon) in a beaver set to be unintentional take as these pelts also have value to the trapper.

Assuming the training and extra protective measures used by WS-Wisconsin are effective at reducing nontarget take, public trappers could have higher risk of nontarget take than WS-Wisconsin. However, risks to nontarget species are also related to the intensity of trapping effort. Trappers typically try to be as efficient as possible, catching some beaver quickly, then moving on to another site whereas, to resolve beaver damage conflicts, WS-Wisconsin typically attempts to remove all beavers from the conflict site. Trappers can also elect to move to a different beaver colony if there is evidence of nontarget species activity, but WS-Wisconsin must work in the colony where the conflict occurs. Consequently, WS-Wisconsin may use more capture devices and leave them set for a longer duration than a recreational trapper, resulting in higher risk of nontarget take.

The average number of animals WS-Wisconsin unintentionally captured (nonlethal and lethal) during BDM activities from FY 2020 – 2024 is listed in Table 3-4. Capture methods are summarized in Table 3-5.

Table 3-4. Nontarget take of wildlife during WS-Wisconsin BDM activities, FY 2020 – 2024. Take is reported as number of animals killed vs freed (e.g., 1 / 3 means one animal was killed, three were caught and freed, for a total of four nontarget captures of that species during the period).

Nontarget Species Captured during BDM Activities	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Average
Bass, Largemouth	-	0 / 1	0 / 2	0 / 3	0 / 1	1.4
Coots, American	0	-	-	0 / 1	-	0.2
Cormorants, Double-crested	-	-	-	0 / 2	0 / 1	0.6
Deer, White-tailed	0 / 3	0 / 1	-	1 / 0	-	1
Dogs, Feral, Free-Ranging	-	-	1 / 0	-	-	0.2
Ducks, Mallard	0 / 11	0 / 6	0 / 5	0 / 12	0 / 8	8.4
Ducks, Merganser, Common	0 / 1	0 / 1	0 / 1	-	0 / 1	0.8
Ducks, Merganser, Hooded	0 / 1	-	0 / 2	-	0 / 2	1
Ducks, Teal, Blue-winged	-	0 / 1	-	-	-	0.2

Nontarget Species Captured during BDM Activities	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Average
Ducks, Wood	0 / 4	0 / 2	0 / 1	0 / 2	0 / 1	2
Fish (Other/Unidentified)	-	0 / 3	-	-	-	0.6
Fishers	-	-	0 / 1	0 / 2	-	0.6
Geese, Canada	0 / 1	1 / 20	0 / 6	1 / 14	0 / 6	9.8
Grebes, Pied-billed	-	0 / 1	-	-	-	0.2
Herons, Great Blue	0 / 2	-	-	0 / 1	0 / 1	0.8
Minks	0 / 5	1 / 3	0 / 2	0 / 1	0 / 5	3.4
Muskrats	0 / 94	1 / 87	2 / 104	1 / 93	1 / 118	100.2
Otters, River	1 / 139	5 / 156	2 / 142	1 / 152	4 / 112	142.8
Pike, Northern	-	-	-	-	0 / 2	0.4
Raccoons	0 / 61	1 / 38	2 / 50	1 / 49	2 / 47	50.2
Suckers, Common White	-	-	-	-	0 / 2	0.4
Swans, Trumpeter	-	2 / 0	2 / 0	-	1 / 1	1.2
Turtles, Blanding's	1 / 0	3 / 2	1 / 1	3 / 0	1 / 0	2.4
Turtles, Common Snapping	101 / 52	105 / 41	86 / 43	75 / 23	73 / 19	123.6
Turtles, Painted	-	1 / 0	1 / 0	1 / 0	4 / 0	1.4
Turtles, Spiny Softshell	0 / 1	-	0 / 2	-	-	0.6
Wolves, Gray/Timber[1]	-	-	2 / 0	-	1 / 0	0.6
Total - Freed / Killed	103 / 375	120 / 363	99 / 364	84 / 355	87 / 327	455.4

[1] Gray wolf take by WS-Wisconsin is addressed in Section 3.4.

Table 3-5. Methods involved in nontarget take during WS-Wisconsin BDM activities FY 2020 – 2024.

Species	Nontarget Captures % Body-Grip Trap	Nontarget Captures % Cable Device	Nontarget Captures % Foothold Trap	Average Number of Animals Captured per Year
Bass, Largemouth	100%	0%	0%	1
Coots, American	100%	0%	0%	< 1
Cormorant, Double-crested	100%	0%	0%	< 1
Deer, White-tailed	0%	0%	100%	1
Dog, Feral, Free-ranging	100%	0%	0%	< 1
Ducks, Mallard	93%	0%	7%	8
Ducks, Merganser, Common	100%	0%	0%	< 1
Ducks, Merganser, Hooded	100%	0%	0%	1
Ducks, Teal, Blue-winged	100%	0%	0%	< 1
Ducks, Wood	100%	0%	0%	2
Fish, (Other/Unidentified)	100%	0%	0%	< 1
Fishers	67%	0%	33%	< 1
Geese, Canada	25%	0%	75%	10
Grebes, Pied-billed	100%	0%	0%	< 1
Heron, Great Blue	0%	0%	100%	< 1
Minks	88%	0%	12%	3

Species	Nontarget Captures % Body-Grip Trap	Nontarget Captures % Cable Device	Nontarget Captures % Foothold Trap	Average Number of Animals Captured per Year
Muskrats	86%	0%	14%	100
Otters, River	91%	8%	< 1%	143
Pike, Northern	100%	0%	0%	< 1
Raccoons	21%	< 1%	78%	50
Suckers, Common White	100%	0%	0%	< 1
Swans, Trumpeter	33%	0%	67%	1
Turtles, Blanding's	100%	0%	0%	2
Turtles, Common Snapping	97%	< 1%	3%	124
Turtles, Painted	86%	0%	14%	1
Turtles, Spiny Softshell	100%	0%	0%	< 1
Wolf, Gray	0%	0%	100%	< 1

Risks to wolves are addressed in Section 3.4 and risks to dogs are addressed in Section 3.6. For all species except deer, raccoons, great blue herons, geese and swans, the majority of animals captured were caught in body-grip traps which is consistent with the overall use of body-grip traps to remove beaver (approximately 75% of beaver captured) and the size and life history of animals captured (e.g., fish and turtles are more likely to pass through a submerged body grip trap and unlikely to contact or have the size to trigger a foothold trap). Swans and geese are less likely to try and enter or pass through a body grip trap because of their size and are more likely to trigger the pan tension device on a foothold trap. However, when using beaver runs where body-grip traps are set, swans and geese are at risk of capture by this method if they are swimming "low and fast", with their heads down near the water. This behavior often occurs when these birds feel threatened or are defending their territory. Similarly, deer are unlikely to put a foot through the vertically oriented body grip traps but do have the weight to trigger a foothold trap.

Table 3-6. Estimated licensed harvest of mammal species in Wisconsin that have also been taken unintentionally during WS-Wisconsin BDM activities.

Species	2019-20	2020-21	2021-22	2022-23	2023-24	Average Estimated Harvest
Deer, White-tailed	339,901	309,392	340,282	300,651	327,950	323,635
Fishers	555	745	641	594	724	651
Minks	4,634	3,875	4,230	4,174	3,903	4,163
Muskrats	169,280	152,107	135,215	83,378	79,045	123,805
Otters, River	1,663	2,168	1,784	1,986	2,887	2,098
Raccoons	70,497	56,455	41,029	45,794	48,903	52,536

Harvest data are from WDNR Fur Trapper and Otter Harvest Surveys and the WDNR deer harvest trends report (Dhuey and Rossler 2020*b*, *c*, 2021*b*, *c*, 2022*b*, 2023*a*, *b*, Shawn Rossler et al. 2024, S. Rossler et al. 2024*b*). Deer harvest data, contrary to furbearer data, are reported by calendar year so the date range shown for deer harvest is CY 2020 – 2024.

Mammals

- **Mink, Muskrat, Raccoons, and Deer** – WS-Wisconsin annual average nontarget take of mink, muskrat, raccoons, and white-tailed deer was less than 0.1% of statewide estimated harvest (Table 3-6) and is not of sufficient scope or magnitude to substantially contribute to existing impacts on mink, muskrat, raccoon, or white-tailed deer populations. WS-Wisconsin nontarget take of these species is not anticipated to increase substantially over time. However, even if the WS-Wisconsin BDM take of nontargets were to increase to twice the current levels, it would still be less than 0.2% of licensed harvest and not contribute substantively to existing impacts on mink, muskrat, raccoon, or white-tailed deer populations.

- **Fisher** – WS-Wisconsin unintentional take of fisher during BDM activities is rare (only five instances during the period of 2005-2024; 80% (3) by foothold trap and 20% (2) by body-grip trap) and is not expected to change substantially over time. Licensed harvest of fisher is allowed in Wisconsin, but trappers must have a tag to capture fisher and report all take (intentional and unintentional). Requests for tags generally exceed the harvest allocation (Rossler et al. 2025*b*). A threshold agreement was developed for tribal harvest of 15% of the non-native harvest for each respective zone in the ceded territory. When tribal harvest exceeds the 15% threshold for a specific zone, a declaration is required in that zone for the following harvest season. Harvest quotas are adjusted annually based on population and harvest data and data on other known sources of take such as incidental take by WS-Wisconsin.

  State population monitoring indicates a declining or stable population for the Northern Fisher Management Zone and an expanding and increasing population in the Southern Zone despite higher take occurring in the Southern Fisher Management Zone (Rossler et al. 2025*b*). The 2025 WDNR Furbearer Advisory Committee recommended a statewide harvest quota of 800 fisher (200 Northern Zone and 600 Southern Zone) for 2025-26 (Wisconsin Department of Natural Resources 2025*b*). WS-Wisconsin maximum annual unintentional take of fisher (2) would be 0.25% of the recommended quota and is not of sufficient magnitude or scope to contribute substantively to existing trends in the fisher population or fisher harvest opportunities.

- **River otter** – WS-Wisconsin unintentionally captured an average of 143 river otters annually. WS average annual otter capture was 6.8% of the average licensed harvest and 5.7% of the current state harvest quota of 2,500 river otters in the most recent seasons (S. Rossler et al. 2024*b*) WDNR is aware of WS-Wisconsin's average nontarget otter take and incorporates the take of otters trapped incidentally during agency authorized beaver removal operations into account when establishing the annual harvest quota.

  Trappers must have a tag to harvest river otters and incidental take of river otters must be reported to the WDNR. Prior to 2020, there were concerns the number of incidental

otters killed was being underreported. For example, if we apply WS-Wisconsin's beaver-to-otter ratio of 22:1 to the licensed trapper beaver harvest estimate for the 2019-20 season, substantially more than the 102 incidental captures reported to WDNR by entities other than WS-Wisconsin could have occurred (Dhuey and Rossler 2020*c*). To provide additional trapping opportunities and improve reporting of incidental otter take, the WDNR transitioned to authorization of the harvest of two river otters per trapping license beginning in the 2020-21 season. This allows trappers to report and legally retain two river otters during the season, whether intentionally targeted or incidentally captured. The following trapping season saw a >30% increase in river otter harvest and an 84% increase in reported incidental captures (Dhuey and Rossler 2021*c*). Otter harvest is monitored throughout the season to assure that the total harvest quota is not exceeded. For example, during the 2023-24 season the WDNR closed the season early when projections indicated harvest could exceed the quota.

There are factors which preclude extrapolating WS-Wisconsin's 22:1 ratio of beaver taken to otter to other entities. As noted above, there are numerous strategies employed by WS-Wisconsin to reduce risks of nontarget take including several that are not required of other entities. Conversely, some recommended strategies for reducing risks to otters such as avoiding colonies with otter sign may be harder to implement because BDM activities are directed to the specific colony/site where the conflict occurs. Licensed trappers usually have greater flexibility in which colonies they target. Moving the placement of the trap trigger which has been recommended by AFWA to reduce risks to otters has proven ineffective in a Wisconsin study (Sundelius et al. 2021). If there is extensive sign of otter activity and site conditions allow, WS-Wisconsin may switch to foothold traps because they pose less risks to otters, at a capture rate of approximately 64 beaver per otter instead of 18:1 beaver per otter for body-gripping traps. Although foothold traps may pose less risk to otters, they may pose greater risks to terrestrial species that use the shorelines of beaver ponds and involve immersion sets (Section 3.7) and are not a preferred solution for most situations. Ultimately the decision to use a specific BDM method is made by the WS-Wisconsin employee based on site-specific circumstances and use of the APHIS-WS decision model.

Considering other known levels of mortality, WS-Wisconsin incidental take of river otter is expected to have a moderate impact on the statewide otter population, but cumulative known take remains within constraints of WDNR's allowed take. Take by WS-Wisconsin could impact the public harvest quota, if WDNR were to identify trends that indicate take may be exceeding established quotas and need to close the season early. As nontarget captures during BDM are difficult to regulate, WDNR would most likely reduce the seasonal river otter harvest quota to accommodate the cumulative known mortality from licensed trappers and WS-Wisconsin BDM activities. Considering that WS-Wisconsin average nontarget take of otter was less than 6.8% of the WDNR harvest quota of 2,500 otters, and annual take was 8.5% or less of licensed harvest from 2020-2024, licensed harvest has a far greater impact on the state river otter population than WS-Wisconsin. Given WDNR intensive monitoring of the otter population and

otter harvest and ability to adjust harvest to sustain management objectives, WS-Wisconsin unintentional take of otter would have a moderate but not significant impact on the state otter population and otter harvest opportunities.

Birds

- **Trumpeter Swans**
  There is no public harvest season for trumpeter swans in Wisconsin, though a tribal swan hunting season allowing harvest of native and nonnative swans (i.e., trumpeter, tundra, and mute) is open from 1 September to 31 December, or until 50 trumpeter swans are harvested[9] . Trumpeter swans commonly nest near or within beaver impoundments and may be observed loafing on beaver dams. Trumpeter swans were removed from the Wisconsin state endangered species list in 2009. WDNR survey data indicate an increasing trend for the state's breeding trumpeter swan population for the period of 2005-2024, with a modeled population estimate of 14,781 birds in 2024, despite incidental take by WS-Wisconsin and other cumulative impacts on the population (Murphy et al. 2024). While undesirable, the incidental lethal capture of two or three trumpeter swans per year has been of insignificant magnitude and scope to cause a decline in the state trumpeter swan population. Trumpeter swans usually have preferred loafing spots, which are very evident (due to swan presence, flattened vegetation, scat deposition etc.). When these locations are detected by WS-Wisconsin staff implementing BDM, staff avoid placing traps in the general area. This may result in WS-Wisconsin staff setting more body-grip traps at sites with trumpeter swan presence because swans often loaf directly on and adjacent to beaver dams, where foothold trapping is otherwise an effective BDM method.

Table 3-7. Waterfowl harvest data for species that have been taken incidentally during WS-Wisconsin BDM activities (Raftovich et al (2021, 2022, 2023, 2024)**.**

Species	2019-20	2020-21	2021-22	2022-23	2023-24	Average Estimated Harvest
Coots, American	7,200	8,000	2,000	8,000	4,000	5,800
Duck, Mallard	99,458	137,041	80,278	93,544	91,653	100,395
Ducks, Merganser, Hooded	4,022	5,099	2,962	2,373	4,352	3,762
Ducks, Merganser, Other	1,097	3,665	1,481	989	3,328	2,274
Ducks, Teal, Blue-winged	33,640	62,625	24,587	37,774	23,041	36,333
Duck, Wood	79,712	105,649	86,499	67,241	89,605	85,741
Goose, Canada	130,156	164,412	134,268	101,946	157,204	137,597

[9] Additional information on tribal migratory bird hunting seasons and regulations may be found at https://glifwc.org/exercising-treaty-rights/seasonal-harvest-regulations/migratory-bird-regs.

- **All Other Birds.**
  Mallards, wood ducks, hooded mergansers and Canada geese were the waterfowl species most commonly taken incidentally during WS-Wisconsin BDM activities. Take of all four species was less than 0.01% of average licensed harvest during 2020-2024 (Table 3-7). WS-Wisconsin average annual nontarget take of coots, grebes, and all other ducks was one or less per year and less than 0.05% of licensed harvest. WS-Wisconsin nontarget take of harvested waterfowl was negligible relative to licensed harvest and is not of sufficient magnitude or scope to substantively impact waterfowl populations.

  WS Wisconsin take of all other bird species averaged less than one bird per year of pied-billed grebes, double crested cormorants, and great blue herons (Table 3-4). None of these species are state or federally listed as threatened or endangered and the annual take of one or two birds in a given year with less than 5 taken over a five-year period is not of sufficient magnitude to impact species population trends. According to the North American Breeding Bird Survey, population trends for the period 1966-2022 for double-crested cormorants, great blue herons, and pied-billed grebes are generally increasing across the U.S. (Hostetler et al. 2023).

Fish

WS-Wisconsin annual take of bass and pike was at or below the standard bag limit for a single license (WDNR Bureau of Fisheries Management 2025). White suckers are common and widespread in the state and there is no prohibition on take of this species. Incidental take of fish is not of sufficient magnitude to substantively impact any sport fish population. Fish captured in traps may be eaten by other species and not identifiable at the time the trap is checked. There were three such instances during the period of 2020-2024. For reasons noted in Section 3.4, it is highly unlikely the fish were a state or federally listed T&E species. All other state fish populations would not be adversely impacted by this low level of take.

Turtles

- **Blanding's turtle** – on average, two Blanding's turtles were unintentionally captured annually. WS-Wisconsin was able to release nine of the 12 Blanding's turtles captured during 2020-2024. Blanding's turtles are currently a species of Special Concern in Wisconsin, having been delisted from Threatened status in 2014. The Wisconsin Natural Heritage Inventory database has records of Blanding's turtles in all but eight counties of the state. Although there is no statewide population estimate available for the species, the unintentional take of two Blanding's turtles per year by WS-Wisconsin is not of sufficient scope or magnitude to be a significant driver of population decline nor of sufficient magnitude to substantively contribute to existing impacts on the species' population. The biggest perceived threat to the species is wetland habitat loss (Hay and Foster 2022).

- **Snapping turtle** – on average, 123 common snapping turtles were unintentionally captured per year. WS-Wisconsin has been able to release an annual average of 72% of

all snapping turtles incidentally captured. Snapping turtles are common and may be found in all Wisconsin counties. WDNR does not produce a population estimate for snapping turtles, however, snapping turtles are considered sufficiently abundant that turtles with a carapace of 12 inches to 16 inches in length may be legally harvested with no reporting requirements. Due to the dimensions of body-grip traps used by WS-Wisconsin, the carapace of snapping turtles caught incidentally during BDM would typically fall within the legal harvest size dimensions. Given the species abundance and distribution, and the relatively small portion of beaver habitat, which is also likely to be snapping turtle habitat impacted by BDM activities (Section3.2.5.1), WS-Wisconsin take of snapping turtles would have a low impact on the state snapping turtle population.

WS-Wisconsin would review state population monitoring data, harvest data, harvest regulations, and other applicable regulations (e.g., state list of T&E species) for changes that could indicate cumulative impacts including BDM activities, may be adversely impacting nontarget species in a manner not already considered in this EA. When negative impacts are observed, WS-Wisconsin will consult with the WDNR and review impacts as needed in accordance with the NEPA and USDA NEPA regulations.

3.3.1.2 Impacts on Nontarget Species from Beaver Dam Removal

WS-Wisconsin primarily responds to request for assistance where dams have recently been constructed. Due to the nature of the damage which does or could occur from the beaver dams and associated flooding, landowners/land managers typically seek a remedy for the damage quickly upon onset. These impoundments have not had the time for wetland plant and animal communities to become fully established and removal of the dam restores the status quo for the site. Similarly, most sites where the WDNR asks WS-Wisconsin to conduct BDM to maintain free-flowing conditions for coldwater fisheries are monitored and dams removed annually. In this case, the decision to favor one habitat type (i.e., free flowing streams and associated habitat) over beaver pond complexes has been made by the WDNR in accordance with objectives set in the state beaver and inland trout management plans that were developed in accordance with the state public involvement processes (Wisconsin Department of Natural Resources 2015, 2019). Beaver dam removal and the exclusion of beaver from sites precludes the development and ecological maturation process of beaver pond wetlands, but treated areas retain ecological utility for a wide range of species, particularly species that need free-flowing water conditions and species that may be adversely impacted by silt that accumulates upstream of dams.

Overall, WS-Wisconsin impacts from beaver dam removal are limited in scope and would likely have a low to moderate impact on nontarget species. Actions for the protection of coldwater fisheries are estimated to impact approximately 2% of the beaver habitat in Wisconsin and only 7.3% of beaver habitat in BMZ B where most WS-Wisconsin BDM for trout streams is conducted. During CY 2020 – 2024, approximately 41% of all beaver dams removed by WS-Wisconsin occurred during BDM for coldwater fisheries projects. Although WS-Wisconsin removes a greater number of dams each year for other types of damage management, the area

impacted is dispersed among single colonies at individual sites and not miles of streams, as is the case for the work for coldwater fisheries.

Most species that could be impacted by the shift from newly constructed ponds to free-flowing stream are relatively common and abundant. While localized impacts on species abundance and distribution are possible, as noted above the magnitude of the impacts are localized and limited in scope. WS-Wisconsin has completed consultation with the USFWS and WDNR to ensure there are no significant effects to any federally listed species, critical habitat or state listed species. WS-Wisconsin implements conservation measures and follows the Terms and Conditions prescribed by USFWS in the 2022 informal consult and 2026 supplement and the 2024 biological opinion. Therefore, there is unlikely to be a significant effect on listed species from WS-Wisconsin activities under this Alternative.

3.3.2 Alternative 2 – Only Nonlethal Beaver Damage Management Statewide Except for Projects for Coldwater Fisheries

WS-Wisconsin impacts of BDM for coldwater fisheries and associated impacts on nontarget species would be identical to Alternative 1. There would be a substantial reduction in WS-Wisconsin use of methods likely to result in the unintentional capture, injury or death of nontarget species for other types of BDM under this alternative because of restrictions on methods that can be used by WS-Wisconsin and because the majority of WS-Wisconsin current cooperators are likely to seek alternative sources of BDM assistance (Section 2.5.2 and 3.1). Landowners/managers who are unsatisfied with the services available from WS-Wisconsin may seek lethal control solutions from private trappers or other entities or attempt lethal control measures on their own. These entities may not have the same skills or utilize the Protective Measures, techniques, or BMPs followed by WS-Wisconsin which may result in greater cumulative direct impacts on nontarget species than for Alternative 1.

Under Alternative 1, WS-Wisconsin already promotes use of nonlethal methods and provides resources to implement nonlethal methods within the constraints of the APHIS-WS Nonlethal Initiative. WS-Wisconsin federal funding available for nonlethal methods would not differ from Alternative 1 and non-WS entities are expected to engage in similar levels of dam removal for damage management as WS-Wisconsin for the same types of projects. Cumulative levels of beaver dam removal and impacts on nontarget species from beaver dam removal are likely to be similar to Alternative 1.

3.3.3 Alternative 3 – Integrated Beaver Damage Management Statewide Except No Beaver Damage Management for Coldwater Fisheries

Under Alternative 3, WS-Wisconsin would use the same tools and methods as Alternative 1, however, WS-Wisconsin would not conduct BDM for the protection or enhancement of coldwater fisheries. By excluding coldwater fisheries' beaver conflicts, WS-Wisconsin could expect to remove approximately 42% less beavers and 41% fewer beaver dams per year, which would reduce direct impacts from beaver removal and impacts on nontarget species habitat from beaver dam removal.

Under this Alternative, WDNR is expected to conduct BDM activities for coldwater fisheries on their own or hire other entities to conduct this work. The overall level of BDM for coldwater fisheries would likely be somewhat lower than for Alternative 1 for logistical reasons (Section 2.5.3). The WDNR is expected to require their personnel and contractors to implement protective measures similar to those implemented by WS-Wisconsin. There may be some short-term increases in direct risks to nontarget species if the individuals conducting the BDM need time to achieve the same skill and experience levels as WS-Wisconsin personnel. Over the long term, direct impacts would be slightly less than WS-Wisconsin because of the reduced level of BDM work for coldwater fisheries.

Cumulative direct impacts on nontarget species and impacts on nontarget species habitat are likely to be slightly lower for this alternative because of the anticipated reduction in BDM for coldwater fisheries.

3.3.4 Alternative 4 – No WS-Wisconsin BDM Assistance

Under this Alternative, WS-Wisconsin would have no effect on nontarget species or nontarget species habitats. As with Alternative 2, entities other than WS-Wisconsin are expected to continue to use lethal BDM methods with may lead to an increase in direct risks to nontarget species. Risks from this type of action may be slightly higher than under Alternative 2 because WS-Wisconsin would not promote use of nonlethal methods. BDM by WDNR for coldwater fisheries would have fewer direct impacts on nontarget species because of the reduction in the amount of BDM conducted as per Alternative 3. The extent to which these factors would offset one another is unclear but could vary depending upon the resources available to the WDNR.

3.4 IMPACTS ON THREATENED AND ENDANGERED (T&E) SPECIES AND CRITICAL HABITAT

3.4.1 Potential Impacts on T&E Species

In accordance with the federal ESA [Sec. 7(a)(1)], WS-Wisconsin conducted Section 7 consultation with the USFWS to ensure compliance with the ESA and to ensure that the proposed management actions are not likely to jeopardize the continued existence or recovery of any T&E species. The federal list of T&E species is provided in Table 3-8 below. Informal consultation with USFWS completed on February 3, 2022, for all species that may be affected, except gray wolf. Formal consultation regarding potential impacts to gray wolves from all WS-Wisconsin activities, including BDM, was completed on May 13, 2024. An additional letter updating the informal consultation for consistency with the state consultation described below was sent to USFWS in November 2025 with a letter of concurrence in January 2026.

Wisconsin has its own state endangered species laws (Appendix B). The state T&E species list is included as Appendix H. WS-Wisconsin has consulted with WDNR NHC on BDM activities in this EA to minimize impacts to state listed T&E species on all lands in Wisconsin. The proposed authorization for incidental take of state-listed species is being made available for public review

at the same time as the comment period for this EA[10]. WS-Wisconsin conducts all BDM activities in accordance with the provisions of these consultations.

State and federal consultations are incorporated by reference. WS-Wisconsin monitors the state and federal lists of T&E species and would reinitiate consultation as needed under Alternatives 1-3.

Table 3-8. Species listed under the Federal Endangered Species Act in Wisconsin and WS-Wisconsin's effects determination of impacts to these species from BDM activities. Determinations are NE = No Effect, NLTAA = Not Likely to Adversely Affect, and MALAA = May Affect, Likely to Adversely Affect.

Class	Species	Scientific Name	Federal Status	Effects Determination	Critical Habitat
Mammal	Canada Lynx	*Lynx canadensis*	Threatened	NLTAA	
Mammal	Gray Wolf	*Canis lupus*	Endangered	MALAA	
Mammal	Northern Long-eared Bat	*Myotis septentrionalis*	Threatened	NE	
Mammal	Tricolored Bat	*Perimyotis sublavus*	Proposed Endangered	NE	
Bird	Piping Plover	*Charadrius melodus*	Endangered	NE	Yes
Bird	Rufa Red Knot	*Calidris canutus rufa*	Threatened	NE	
Bird	Whooping Crane	*Grus americana*	Experimental Population, Non-Essential	NLTAA	
Reptile	Eastern Massasauga	*Sistrurus catenatus*	Threatened	NLTAA	
Clam	Higgins Eye (Pearly Mussel)	*Lampsilis higginsii*	Endangered	NE	
Clam	Salamander Mussel	*Simpsonaias ambigua*	Proposed Endangered	NE	Proposed
Clam	Sheepnose Mussel	*Plethobasus cyphyus*	Endangered	NE	Proposed
Clam	Snuffbox Mussel	*Epioblasma triquetra*	Endangered	NLTAA	Proposed
Clam	Spectaclecase Mussel	*Cumberlandia monodonta*	Endangered	NE	Proposed
Clam	Winged Mapleleaf	*Quadrula fragosa*	Endangered	NE	
Snail	Iowa Pleistocene Snail	*Discus macclintocki*	Endangered	NE	
Insect	Hine's Emerald Dragonfly	*Somatochlora hineana*	Endangered	NLTAA	Yes

[10] The proposed authorization for incidental take of state-listed species is available at https://dnr.wisconsin.gov/topic/erreview/itnotices for public review.

Class	Species	Scientific Name	Federal Status	Effects Determination	Critical Habitat
Insect	Karner Blue Butterfly	*Lycaeides melissa samuelis*	Endangered	NE	
Insect	Monarch Butterfly	*Danaus plexippus*	Proposed Threatened	NE	
Insect	Poweshiek Skipperling	*Oarisma poweshiek*	Endangered	NE	Yes
Insect	Rusty Patched Bumble Bee	*Bombus affinis*	Endangered	NE	Proposed
Insect	Suckley's Cuckoo Bumble Bee	*Bombus suckleyi*	Proposed Endangered	NE	
Insect	Western Regal Fritillary	*Argynnis idalia occidentalis*	Proposed Threatened	NE	
Plant	Dwarf Lake Iris	*Iris lacustris*	Threatened	NE	
Plant	Eastern Prairie Fringed Orchid	*Platanthera leucophaea*	Threatened	NE	
Plant	Fassett's Locoweed	*Oxytropis campestris var. chartacea*	Threatened	NLTAA	
Plant	Mead's Milkweed	*Asclepias meadii*	Threatened	NE	
Plant	Northern Wild Monkshood	*Aconitum noveboracense*	Threatened	NE	
Plant	Pitcher's Thistle	*Cirsium pitcheri*	Threatened	NE	
Plant	Prairie Bush-clover	*Lespedeza leptostachya*	Threatened	NE	

WS-Wisconsin determinations regarding impacts on federally listed species are in Table 3-8. Only one species, the gray wolf, was identified as likely to be adversely affected by the proposed action even with the implementation of protective measures. During the period of 2020-2024, WS-Wisconsin incidentally captured and released three gray wolves. These captures were in foothold traps set at beaver dams. Trapping on and against beaver dams is a legal trap set that licensed trappers, landowners and their designated agents may use for fur harvest or damage management. The USFWS determined the proposed action including potential incidental take, may affect but not result in jeopardy to the gray wolves' population. Wherever possible, WS-Wisconsin will avoid setting foothold, body-gripping, and cable device traps for beaver where there is evidence of current use by wolves. In some cases, this may not be possible and if lethal beaver capture methods must be set where wolves are likely to be present, adherence to the trap placement provisions and prompt trap checking will minimize risks to wolves. WS-Wisconsin will ensure that all cable devices and body-gripping traps set for beaver are set in water (a minimum of 50% of the trap device must be submerged at the time of placement). All foothold traps set for beaver will be set in water with at least six inches of water over top at placement and foothold traps will not be set in a way that a nontarget animal investigating a previously captured animal or the carcass of a previously captured animal results in capture. All trapping devices will be sufficiently anchored to prevent an unintentionally

captured wolf from leaving the site. Live trapping of beaver using suitcase traps (or any other live capture devices), requires a daily trap check. Suitcase traps set for beaver will have the access point placed in water, facing away from land and the back of the trap must be accessible for wolves to investigate lures (if used) without entering the trap.

Tricolored bats, salamander mussels, monarch butterfly, Suckley's cuckoo bumble bee, Western regal fritillary were proposed for listing as threatened or endangered after the initial consultation was completed. WS-Wisconsin beaver damage management activities are not expected to result in the direct take of these species or alteration of terrestrial habitats used by tricolored bats, salamander mussels, monarch butterflies or Suckley's cuckoo bumble bees. Beaver wetland ecosystems support extensive insect communities and concerns were expressed during scoping that removal of beaver impoundments would adversely affect listed bats. Consultation with USFWS indicated that white nose syndrome was the primary issue impacting listed bats in our area and that availability of water bodies for drinking and invertebrate prey base was not a limiting factor (Jill Utrup, USFWS pers. comm. 1/28/2025). Therefore, we have determined that the proposed action will have no effect on the tricolored bat, monarch butterfly, Western regal fritillary or Suckley's cuckoo bumblebee.

Salamander mussels require clear, flowing water and high dissolved oxygen concentrations. Water flow and temperatures conducive to salamander mussels are critical to delivering oxygen and nutrients, facilitating larval movement and host encounters, and removing silt and fine sediment from rock shelters to prevent mussel suffocation and degradation of host (mudpuppy) habitat (U.S. Fish and Wildlife Service 2023). As siltation, low dissolved oxygen, and increased temperatures are all threats to freshwater mussels, WS-Wisconsin BDM may affect but is not likely to adversely affect salamander mussels. BDM may provide a slight benefit to salamander mussels similar to those for coldwater fisheries, but potential beneficial impacts are likely to be very limited and not likely to contribute substantively towards population recovery. WS-Wisconsin will initiate consultation with the USFWS as needed when final decisions regarding these species are made.

The USFWS concurred that with the proposed protective measures, WS-Wisconsin BDM activities were not likely to adversely affect critical habitat for Piping Plover, Poweshiek skipperling, or Hine's emerald dragonflies. We have determined that the proposed action would not result in loss or substantive alteration of terrestrial habitat used by rusty patched bumble bees. Sheepnose mussels and spectaclecase mussels occur in relatively large rivers where beaver would not build dams and WS-Wisconsin would not conduct BDM activities that could impact mussel habitat. The proposed snuffbox and salamander mussel critical habitat in Wisconsin is in relatively large rivers where WS-Wisconsin also would not conduct BDM activities that could impact mussel habitat. WS-Wisconsin will initiate consultation with USFWS as needed when final decisions regarding proposed critical habitat are made.

Risks of unintentional capture, injury or death of an animal in devices used for BDM are low. The only state-listed species with a record of unintentional take by WS-Wisconsin was wood turtles. Two wood turtles were killed in body grip traps during the period of January 2013

through June 2025. The primary concern regarding impacts to state listed species were related to indirect impacts on T&E species associated with beaver dam removals including changes in water levels when reptiles are in brumation (a form of hibernation) or when amphibians have laid eggs, and the potential for silt disturbance and elevated water flows resulting from beaver dam notching to adversely impact downstream plants and animals. To minimize risks to state listed species, WS-Wisconsin must check the WDNR Natural Heritage Inventory database for the presence of T&E species prior to removing beaver dams. When certain T&E species are present within the work area, consultation with WDNR NHC established conservation measures to reduce impact to these species. Conditions of the WDNR NHC incidental take permit would prohibit the removal of beaver dams and the installation of exclusion and water flow devices that may impact water levels during seasons when species are vulnerable. The permit also calls for prohibitions on the use of explosives for beaver dam removal in some situations and removal of dams in steps that will reduce the amount of water released at one time and minimize potential disturbance of sediments upstream of the dam. In some cases, particularly if the action involves an older, established dam, site-specific consultation with NHC is required prior to breaching the dam for any purpose. Based on these measures, the WDNR NHC has determined that the proposed action would not have a significant adverse effect on state listed T&E species and the proposed authorization for incidental take of state-listed species is being made available for public review at the same time as the comment period for this EA (see footnote 10).

3.4.2 Comparative Impacts of the Alternatives on T&E Species

State and federal endangered species laws prohibit the take of T&E species. Non-WS entities may not have full awareness of state and federally protected species, the ESA, nor requirements therein to consult or report take of T&E species. Consequently, there may be greater risks to T&E species from BDM conducted by entities other than WS-Wisconsin, agencies and tribes.

Table 3-9. Comparison of impacts of the alternatives on Threatened & Endangered Species. Items that are constant across all alternatives:

- WS-Wisconsin staff conducting BDM are trained professionals, who use the APHIS-WS Decision Model to help minimize risks of adverse consequences from the use of BDM methods.
- WS-Wisconsin implements protective measures identified in ESA consultations with the USFWS and WDNR NHC.
- Take of species protected under state and federal ESAs is prohibited. However, non-WS entities are not bound by the same requirements to proactively work with the USFWS and WDNR-NHC as WS-Wisconsin. Comparisons in this section are based on increasing variability in method implementation, with decreasing WS-Wisconsin availability to provide operational BDM or technical assistance.

Alternative 1 – Integrated BDM (Proposed Action)	Alternative 2 –Only nonlethal BDM Except for Coldwater Fisheries	Alternative 3 – Integrated BDM Except No BDM for Coldwater Fisheries	Alternative 4 – No Involvement in BDM
Alternative allows for the greatest availability of professional BDM assistance to all requestors by WS-Wisconsin. Non-WS entities still conduct BDM but there would likely be less risk of adverse effects on T&E species because there is less need to seek out alternative service providers than the other alternatives.	Reduced risks from WS-Wisconsin because of reduced use of lethal methods. Risks associated with changing water levels with nonlethal methods remain. Increased risks to T&E species are likely given variability in proficiency in BDM and compliance requirements for non-WS entities (i.e., advance consultation).	Reduced risks from WS-Wisconsin. Overall risks similar to or lower than WS-Wisconsin because the WDNR is expected to require their employees or contractors who conduct BDM for coldwater fisheries to implement protective measures similar to those of WS-Wisconsin and because there would likely be less BDM for coldwater fisheries.	No impact from WS-Wisconsin. All BDM would be conducted by non-WS entities who may not have the same level of proficiency, training, or accountability (e.g., advance consultation). Overall impacts similar to or slightly greater than Alternative 2 because no WS-Wisconsin involvement in promoting nonlethal. Some reduction in risks because less BDM for coldwater fisheries

3.5 IMPACTS ON WATER AND WETLANDS

Beaver dams and impoundments provide a wide range of benefits for aquatic systems, water quality and ecosystem health in Wisconsin. The ecological impacts of beaver vary greatly based on the type of habitat they occupy and the behavior of the individual beaver or colony. Not all beaver build dams, and not all dams provide the same ecological functions. Impacts of individual beaver pond complexes are highly dependent upon soil conditions and the geology of the site (D. Muller-Schwarze 2011, Johnson-Bice et al. 2018, Rosell and Campbell-Palmer 2022). Beaver dams vary in size (height and length), materials, level of beaver activity, and water source. Alterations of these variables combined with varied landscape settings alter the effect of the dam on local hydrology and geomorphology (Ronnquist and Westbrook 2021).

Beaver and beaver dam presence is receiving increasing attention as a mechanism for restoration of riparian ecosystems and a way to buffer adverse effects of severe weather events (e.g., drought and heavy rainfall events) and wildfire (Grudzinski et al. 2022, Jordan and Fairfax 2022, Pollock et al. 2023). Research, primarily from the Western United States shows that the presence of dam-building beaver increases the complexity and water holding capacity of riparian ecosystems which improves resiliency to floods, drought, and other events such as wildfire in certain regions and landscape settings (Fairfax and Whittle 2020, Jordan and Fairfax 2022, Fairfax et al. 2024; See also Appendix C). Beaver dams can alter hydrology, slow water flow (attenuation), and improve water quality. Simultaneously, beaver activities can contribute to erosion, sedimentation, and structural degradation. The benefits and costs associated with beaver dams largely depend on the location of the dam. Concerns have also been expressed

that the promotion of beaver as a relatively simple strategy for environmental restoration without considering the long-term role of beaver in ecosystems as a whole (positive and negative) and long-term relationships among beaver, people and ecosystems may serve as a distraction from the more complex fundamental environmental and sociological issues that they seek to alleviate and may not have the desired effects (Gottschalk Druschke et al. 2024).

Alteration of Hydrology: Beaver may construct and maintain a system of dams to create a body of slow-moving water to support their biological needs. Beavers also excavate canals which increase soil moisture and water available to plants in the area surrounding the ponds. Beaver dams in confined riverine systems result in downstream disconnection or a ponding situation, whereas beaver dams in unconstrained riverine systems may result in lateral flooding or expansion of a single riverine system into a multi-channel system (Westbrook et al. 2013, Brazier et al. 2021). Lateral movement of water can increase connectivity, distribute nutrients, and recharge groundwater (hyporheic flow) (Wegener et al. 2017, Brazier et al. 2021).

The retention of water in beaver pond complexes expands the region beneath and alongside the bed of a stream where stream water and groundwater mix (i.e., the hyporheic zone), recharges groundwater, and serves as a reservoir of water that can help preserve water flow during droughts. Expansion of the hyporheic zone increases the area where plants have access to water during periods of low rainfall. Research from the western United States suggests these zones of fresh vegetation are more resistant to wildfire, including extreme wildfire events (Fairfax and Whittle 2020, Fairfax et al. 2024). As such, they can provide refugia for plants and animals and facilitate post fire recovery of adjacent areas. However, in a study by Fairfax and Whittle (2020), vegetation greenness rebounded in areas with and without beaver in the year after the fire. The potential benefits and buffering effects of beaver pond complexes to reduce wildfire impacts as shown in studies conducted in the arid western U.S. would likely be less pronounced in areas like northern Wisconsin. Statewide, the Wisconsin landscape is naturally composed of significant wetlands, waterbodies, and waterways, and severe, stand-replacing wildfires are unusually rare and severe wind disturbance is more prevalent (Schulte and Mladenoff 2005). Beaver altering stream hydrology would not significantly reduce the fire impact to the mesic forests of northern Wisconsin (USFS personal communication). This is especially true in the northern Wisconsin areas where WS-Wisconsin may be conducting BDM for coldwater resources and infrastructure projects.

Flow Attenuation: Flow attenuation is the slowing of water flow across the landscape. Multiple studies demonstrate that beaver dams and dam series can attenuate flow, reducing the peak flow of water after storm events (Nyssen et al. 2011, Puttock et al. 2017, 2021). Beaver dams can slow water flow, holding the water and its nutrients in any given area of the landscape for a longer period before they are lost downstream. The slowing of water can also increase the filtration of water through soils and improve water quality by removing contaminants. The retention of water can reduce risks of flooding in downstream communities, though the extent to which beaver dams can mitigate risk from large flooding events depends on many factors, including pond fullness prior to the storm event, and may be site or region specific (Neumayer et al. 2020, Westbrook et al. 2020, Larsen et al. 2021). Liao et al. (2020) estimated the carrying

capacity of beaver colonies that could occur in the Milwaukee River watershed to determine the potential benefits. According to their model, if the maximum estimated number of beaver dams were present, it could potentially provide over three million dollars in ecosystem services including reduced flooding damage for downstream communities.

Beaver dams are not permanent structures and can be washed out over time or fail during high water flooding events (Butler and Malanson 2005, Westbrook et al. 2020). Dam failure releases water and sediment and can result in the failure of subsequent dams in a system. The sudden release of water can be catastrophic for downstream ecosystems and structures. There are 13 human deaths associated with beaver dam failures between 1984- 2005, with noted risk to transportation corridors such as railways from such events (Butler and Malanson 2005). Wetlands that develop in older beaver dams can dampen the effects of an upstream beaver dam failure (Hillman 1998). In a case study involving a 2013 rainstorm that was the largest recorded flood in the Canadian Rocky Mountains west of Calgary, Alberta, 68% of the beaver dam complexes were intact or partially intact after the event (Westbrook et al. 2020). Pond fullness and the magnitude of the water-sediment surge were key factors in determining the fate of the dam complexes. Water storage offered by beaver dams, even if dams eventually failed, still slowed downstream flow of water.

Water Quality: Beaver ponds can function as sinks and help to filter nutrients and reduce sedimentation downstream. This can aid in maintaining the quality of nearby water systems (D. Muller-Schwarze 2011, Rosell and Campbell-Palmer 2022, Ledford et al. 2023). Water flow attenuation caused by beaver dams results in the deposition of nutrients in an ecosystem and an increase in nutrient cycling due to increased moisture (Brazier et al. 2021). The slowing of these nutrients across the landscape allows for more of them to be absorbed by plants and invertebrates. Anaerobic conditions in beaver impoundments may result in the accumulation of ammonium and nearly tripled amounts of inorganic nitrogen in soils over a 50-year period (Johnson 1994). Increased anerobic activity was also reported in Brazier et al. (2021). Arner et al. (1964) found that bottom soils of beaver ponds in Mississippi were generally higher in phosphate, potash, and organic matter than bottom soils of feeder streams. Along with increasing nutrients available for plants and animals across the landscape, beaver impoundments can immobilize pollution. Wetlands created by beaver dams absorb nitrogen runoff and, even when dams are removed, nitrogen levels downstream are reduced (Lazar et al. 2015, Puttock et al. 2017, Ledford et al. 2023). Shepherd and Nairn (2022) demonstrated that even when the dam was removed, the existing wetlands retained most of the metal precipitates from an upstream mine drainage.

Beaver feeding activity in stream systems increases the presence of large woody debris, which is important in maintaining stream health in forested systems (Wohl 2019, Wohl et al. 2019). Large woody debris, defined as downed, dead wood pieces greater than or equal to 10 cm in diameter and 1 m in length (Wohl et al. 2010) may be mobile pieces or clump into logjams. Like beaver dams, large wood provides both benefits to stream health (increased stream complexity, reduced peak flow, sediment deposition and storage) and risks (e.g., local erosion

and deposition, channel avulsion, blockage of diversion intakes or culverts, flooding) (Dumke et al. 2010, Wohl et al. 2019).

The potential for beaver dams to elevate stream temperature is one of the primary concerns regarding beaver impacts on coldwater fisheries in the Great Lakes Region. However beaver impacts on temperature are variable and highly dependent upon site specific variables (McRae and Edwards 1994, Collen and Gibson 2001, Avery 2002, Dumke et al. 2010, Johnson-Bice et al. 2018, Renik and Hafs 2020). Variation in the impact of beaver dams on downstream temperatures is likely influenced by many factors including geomorphic characteristics, base flow, channel complexity, and thermal regime. For more information on beaver impacts to stream temperature see Appendix C.

3.5.1 Alternative 1 – Integrated Beaver Damage Management (Proposed Action)

All WS-Wisconsin beaver dam removal activities are conducted in accordance with applicable state and federal regulations including the Clean Water Act (Appendix B.9 and Appendix D). Table 3-10 and Figure 3-8 provide information on beaver dams removed by WS-Wisconsin for BDM. Overall trends in beaver dams removed are relatively stable to decreasing over the last five years. The actual number of beaver impoundments that are drained by WS-Wisconsin is lower than the number of dams removed because it is not uncommon for submerged dams to be discovered when breaching the primary dam.

WS-Wisconsin beaver dam removal would result in the loss of most of the hydrologic benefits in the immediate area of the beaver colony in terms of flow attenuation and water and sediment retention. However, it should be noted that prevention of reductions in water flow rates is the specific intent of many BDM actions. WS-Wisconsin beaver dam removal generally only involves removal of material from the approximate center of the dam to restore free-flowing conditions, particularly when hand tools are used to remove dams (see Appendix F). This often leaves the side portions of dams intact, preserving some of the initial sediment retention capacity of the site. Reducing dam height in increments slows the flow of water out of the dam, reduces the scouring effect of high water flow, and reduces the risk of sediments and any associated contaminants (e.g., nitrogen and phosphorus from fertilizer) being washed downstream. Concerns regarding sediment discharge are also relatively low because almost all beaver dams removed by WS-Wisconsin are recently constructed and have not been in place long enough for substantial amounts of sediment to accumulate behind the dam.

WS-Wisconsin removal of beaver dams from areas not previously considered wetlands (e.g., roadside culverts) when dams are relatively new prevents the development of these sites into beaver pond wetlands (See Appendix D for definition of ‘wetland’). In most other situations, the areas flooded by new beaver dams were wetland before placement of the dam and will remain wetland after dam removal. In Wisconsin, the primary drivers for wetland loss are agriculture and development. As such, wetland loss has been greatest in the southern half of the state (i.e., BMZ C) where WS-Wisconsin does not conduct as much beaver and beaver dam removal. Despite decades of BDM, losses of wetlands have been lowest in the northern third of

the state where WS-Wisconsin has been conducting the majority of its BDM activities (Clean Lakes Alliance 2019).

Nonlethal methods such as exclusion and water flow devices can allow for the retention of the hydrological benefits of beaver and beaver ponds, in some circumstances, depending upon the extent to which the level of impounded water needs to be reduced or unobstructed flow maintained. Depending on the site, it may be possible for beaver to continue to build dams upstream or downstream of the protected area without conflict. However, in other areas, the nature of the conflict or landowner site uses may preclude the retention of beaver colonies on the property.

Impacts of WS-Wisconsin BDM activities vary depending upon the nature of the activity. Most BDM actions involve single beaver colonies at isolated sites (e.g., culverts). Because of their dispersed nature, these types of dam removals are unlikely to have a significant impact on a regional or watershed scale. BDM for coldwater ecosystems is more likely to result in a loss of potential hydrological benefits because entire sections of streams are maintained in free-flowing conditions. However, these areas have been selected for BDM by the WDNR because the otherwise beneficial impacts of beaver impoundments are outweighed by negative impacts on coldwater fisheries in specific portions of the state (Wisconsin Department of Natural Resources 2015, 2019). The WDNR routinely reevaluates the need for BDM for specific sites considering site conditions and available research and adjusts requests for WS-Wisconsin assistance accordingly using an adaptive management approach.

While we acknowledge that beaver dam removal will result in the loss of benefits from beaver impoundments, for the purpose of the NEPA, it is important to note that the issue is not simply a matter of WS-Wisconsin impact, but the extent to which WS-Wisconsin actions impact baseline conditions. As noted in Sections 2.5 and 3.1, beaver and beaver dam removal can and are expected to be conducted by agencies, tribes, and private entities in the absence of assistance from WS-Wisconsin using the same methods available to WS-Wisconsin. Accordingly, the primary consequences of WS-Wisconsin's involvement in this alternative are the promotion of the use of nonlethal methods, including using resources from the WS Nonlethal Initiative to pay for nonlethal BDM activities, and a small increase in the amount of BDM conducted annually due to WS-Wisconsin contributions to administration costs and efficiencies for the WDNR associated with working with WS-Wisconsin.

Table 3-10. The number of beaver dams removed by WS-Wisconsin while responding to beaver conflicts per fiscal year, proportionally, by WDNR Beaver Management Zone (rounded to nearest whole number).

Beaver Management Zone[1]	2020	2021	2022	2023	2024	Average
A	1060	980	912	761	802	903
B	594	519	537	485	528	533
C & D	312	292	246	266	208	265

Beaver Management Zone[1]	2020	2021	2022	2023	2024	Average
Statewide[2]	1,966	1,791	1,695	1,512	1,539	1,701

[1] WS-Wisconsin records information on a county basis. We extrapolated WS-Wisconsin beaver take by county to BMZs by assigning take by county to BMZ based on the proportion of the county in each BMZ. The proportional take of beaver dams in BMZ D was < 1.0 in each year and was incorporated into BMZ C for analysis.

[2] Rounding of individual BMZ totals can cause the Statewide total to differ from the individual BMZ zone sum.

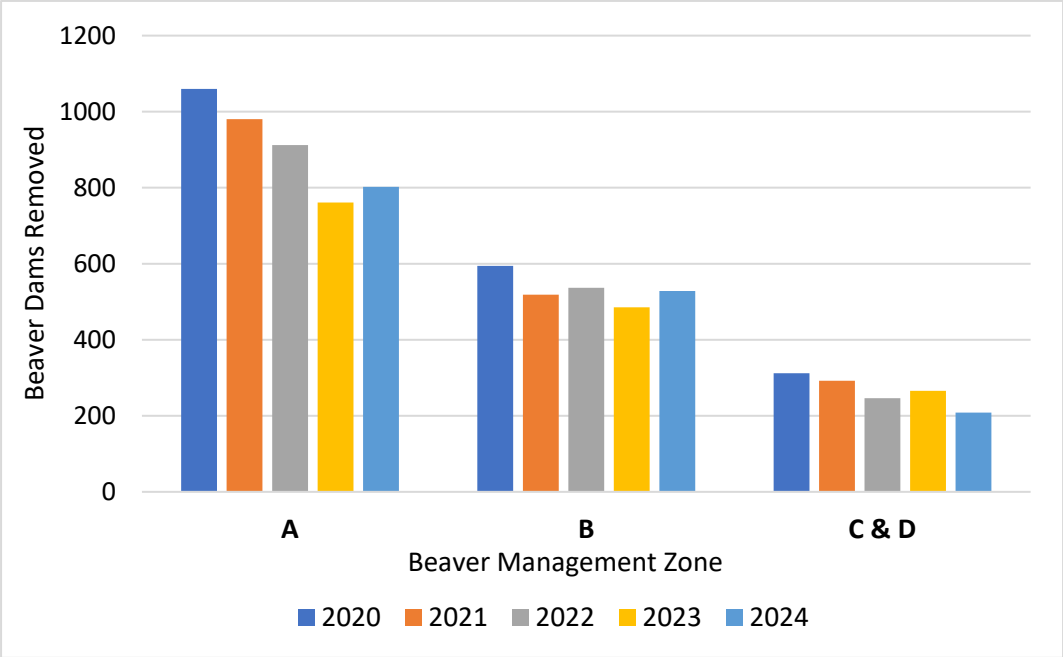


Figure 3-8. The number of beaver dams removed by WS-Wisconsin when responding to requests for BDM assistance, separated by WDNR BMZ.

3.5.2 Alternative 2 – Only Nonlethal Beaver Damage Management Statewide Except for Projects for Coldwater Fisheries

WS-Wisconsin removal of beaver dams and associated adverse local hydrological impacts would primarily be limited to removals associated with projects for coldwater streams (approximately 41% of beaver dam removal under Alternative 1), abandoned dams and dam complexes, and removals associated with installation of exclusion and water control systems. While there is the potential for an increase in cooperator use of nonlethal methods, we anticipate that most cooperators will switch to alternative sources of BDM assistance if WS-Wisconsin assistance is limited to nonlethal methods. Removals associated with the installation of nonlethal methods are not expected to increase substantially above levels described for Alternative 1. Cumulative hydrological impacts of this alternative are expected to be similar to Alternative 1.

3.5.3 Alternative 3 – Integrated Beaver Damage Management Statewide Except No Beaver Damage Management for Coldwater Fisheries

WS-Wisconsin would not remove beaver or beaver dams to maintain free-flowing conditions for coldwater streams which would substantially reduce WS-Wisconsin's impacts on the hydrological benefits of beaver dams. The WDNR is expected to conduct similar actions on their own and with the assistance of contractors in the absence of assistance from WS-Wisconsin. However, due to loss of administrative funds from WS-Wisconsin and a potential decline in efficiency discussed in Section 2.5.3, the annual level of beaver dam removals for coldwater fisheries would likely be somewhat lower than for Alternative 1. Cumulative hydrological impacts of this alternative would be slightly less than Alternative 1

3.5.4 Alternative 4 – No WS-Wisconsin BDM Assistance

Under this alternative WS-Wisconsin would have no adverse impact on the hydrological benefits of beaver and beaver dams. As with Alternative 3, overall beaver dam removals for coldwater fisheries would be somewhat lower than Alternative 1. Beaver dam removals by entities other than WS-Wisconsin for all other types of BDM would be similar to or slightly greater than Alternative 1 because there may be an increase in use of lethal methods associated with the loss of nonlethal methods promotion by WS-Wisconsin. Impacts of this Alternative on the hydrological benefits of beaver and beaver impoundments would be less than Alternative 1 but slightly greater than Alternative 3.

3.6 IMPACTS ON HUMAN AND PET HEALTH AND SAFETY

This section evaluates the potential risks of BDM methods used by WS-Wisconsin to human and pet health and safety. People that may encounter BDM methods include recreationists, hunters, trappers, tribal members, general members of the public, and WS-Wisconsin employees. During FY 2020-2024, approximately 32% of the person-day site visits for operational BDM by WS-Wisconsin occurred on private lands at the authorization of the private landowner(s), 33% occurred on state land, 23% on county or city owned lands, and 10% on federally owned land. The remaining roughly 2% of WS-Wisconsin's operational BDM person-day site visits occurred to resolve beaver-human conflicts on military owned or tribal land.

APHIS has prepared risk assessments evaluating the methods APHIS-WS uses. To ensure the scientific rigor of the risk assessments, non-federal professionals, with knowledge of the methods and risks associated with their use have conducted peer reviews of the assessments. The peer reviewers were selected by AFWA. AFWA is an organization of state, provincial and territorial fish and wildlife agencies in North America, entrusted with primary stewardship over wildlife resources. We are incorporating the risk assessments by reference and summaries of the conclusions in the risk assessment are provided in Section F.6.

The risk assessments concluded that the use of cable devices (USDA Wildlife Services 2019*a*), cage traps (USDA Wildlife Services 2019*b*), foothold traps (USDA Wildlife Services 2019*c*), firearms (USDA Wildlife Services 2019*d*), lead (USDA Wildlife Services 2022*b*), quick-kill traps

(USDA Wildlife Services 2022*c*), explosives (USDA Wildlife Services 2023*a*), carcass disposal (USDA Wildlife Services 2022*d*), and exclusion (USDA Wildlife Services 2023*b*) by trained personnel in accordance with appliable laws regulations, and agency policies poses minimal risks to people and pets.

BDM methods are only used after careful consideration of the safety of the people employing methods and for people and pets that may encounter the methods. WS-Wisconsin coordinates BDM activities with the landowner/manager to minimize risks to workers, the public, and pets. All methods must be agreed upon by the requesting entities, who are made aware of the safety issues of the methods when entering into a MOU, WID, or other comparable document with WS-Wisconsin. WS-Wisconsin works with landowners to identify any need for communication with neighbors that may access the site.

Where possible, WS-Wisconsin recommends landowners/managers limit or restrict access to locations where WS-Wisconsin is working. Capture methods require direct contact to trigger the device and, when left undisturbed, would have no effect on human safety. On public lands, warning signs are posted at entry points or near the area where BDM capture methods are deployed to inform individuals entering the property of management activities. When possible, capture methods would be used where human activity is minimal to minimize risks to the public. If there is a risk of people being present, then, whenever possible, activities are conducted during periods when human activity is low, such as at night or early morning. This protective measure is not feasible for capturing devices, which once set, are functional until triggered or unset. Capture devices would be used within a limited period, would not be residual, and generally do not possess properties capable of incurring cumulative effects on human health and safety. Risks for adverse environmental impacts and risks to human and wildlife health and safety and environmental contamination from the use of lead ammunition by WS-Wisconsin is minimal and discussed in detail in Appendix E, Section E.1.4.

Nationally, APHIS-WS has on rare occasion unintentionally captured or killed pets that were off leash or got away from their owner and were captured in devices set for BDM. During the period of FY 2000-2024. WS-Wisconsin has not killed any pets and has only captured and released one off-leash domestic dog during BDM activities (Tables 3-4 and 3-5).

Shooting is only applied in situations where it can be used safely and where permitted. The risk of a stray bullet inadvertently striking nontarget wildlife, an individual, or pet is virtually eliminated by WS' precautionary measures such as positively identifying target animals before shooting, ensuring a safe backstop should the bullet miss or passthrough the target, using rifles that fire single projectiles per shot and using only specially trained personnel. APHIS-WS field employees are required to take extensive and repeated training and receive certification for use and proper storage of firearms and firearm-like devices (WS Directive 2.615), including the proper use of personal protection equipment (PPE) such as ear protectors and glasses.

Nationwide, APHIS-WS employees have had 67 accidents (incidents involving injury or damage) with uses of all firearms between 2010 to present (July 2025), average of approximately 5 per

year, typically by firearm and ammunition malfunctions. No accidents but four incidents were recorded by WS-Wisconsin involving firearms between FY 2011 and July 2025, all of which involved firearm or ammunition malfunctions without injury to people, wildlife, or damage to property.

WS-Wisconsin use of I&E drugs during BDM is expected to be a rare occurrence to facilitate safe release of nontarget species or for beaver research or relocation efforts. Only small amounts of I&E drugs would be used by WS-Wisconsin in a year, and only highly trained field employees are authorized to use I&E drugs. Additionally, WS-Wisconsin does not immobilize harvestable species within 30 days of the legal hunting/harvest season, except in emergency scenarios, which provides adequate time for all immobilization drugs to be out of the animal's system and tissues. All drugged animals are either marked (e.g., ear tagged) or disposed of in compliance with law and APHIS-WS policy. The use of ear tags in beaver has been shown to be an effective marking system (Windels 2014). These measures minimize any potential risk to the public. Therefore, the risk of adverse impacts from I&E drugs on human and pet safety is negligible.

3.6.1 Comparative Impact of Alternatives on Human and Pet Health and Safety

Where WS-Wisconsin's involvement in BDM is limited or absent, BDM by non-WS entities is expected to increase and may result in less experienced people implementing damage management methods, which could increase risks to human and pet health and safety. Private trappers are not required to post signage warning the public about the presence of traps which could lead to increased risk of people and pets being injured or pets killed by capture devices. Some lethal and nonlethal capture methods can cause injuries to people who try to use them without proper training (e.g., body-gripping and suitcase-style traps). Failure to adequately address conflicts (e.g., flooded property or structure), could result in a continued or escalated threat to public safety due to flooding, damage to structural integrity of infrastructure, or other created hazards. Frustration caused by the inability to reduce losses in the absence of professional assistance from WS-Wisconsin could lead to less selective or illegal application of methods which could also lead to increased risks to humans and pets when compared to Alternative 1. Overall risks to human and pet safety would be greater under Alternatives 2 and 4. Table 3-11 summarizes the impact of each Alternative on human and pet health safety.

Table 3-11. Comparison of the impact of the alternatives on human and pet health and safety. Items that are constant across all alternatives:

- All WS-Wisconsin actions would be in compliance with WS Directives, applicable laws and Protective Measures.
- All necessary MOUs or WIDs obtained by WS-Wisconsin prior to conducting any operational assistance.
- Non-WS entities are not required to comply with all the Protective Measures established by/for WS-Wisconsin.

Alternative 1 – Integrated BDM Statewide	Alternative 2 – Only Nonlethal BDM Statewide Except for Projects for Coldwater Fisheries	Alternative 3 – Integrated BDM Statewide Except No BDM for Coldwater Fisheries	Alternative 4 – No Involvement in BDM
Greatest exposure of WS-Wisconsin employees and the public to WS-Wisconsin implemented BDM methods. Baseline (status quo) level of BDM by non-WS entities. Risks to human and pet safety are very low.	Less exposure of humans and pets to WS-Wisconsin BDM methods than Alternative 1 due to restrictions on methods. Increased exposure to BDM methods used by non-WS entities. These entities are not required to implement the same Protective Measures as WS-Wisconsin for ensuring public and pet safety (e.g., warning signage). Greater impact on human and pet safety than Alternative 1 because more BDM implemented by non-WS entities.	Less exposure of humans and pets to WS-Wisconsin BDM methods than Alternative 1. Increased exposure to BDM methods used by non-WS entities. WDNR is expected to require similar protective measures as WS-Wisconsin. Similar or slightly less impact on human and pet safety as Alternatives 1 due to WDNR oversight of BDM activities and potential reductions in BDM for coldwater fisheries by WDNR.	No adverse impacts from WS-Wisconsin. Increased human and pet exposure to BDM methods used by non-WS entities. These entities are not required to use the same Protective Measures for ensuring public and pet safety as WS-Wisconsin. Some increase in use of lethal methods is possible because of loss of APHIS-WS Nonlethal Initiative. Risks from work for coldwater fisheries as described for Alternative 3. Overall risks are similar to or slightly greater than Alternative 2 due to potential for increase in use of lethal methods

3.7 HUMANENESS CONSIDERATIONS

Humaneness is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action or method differently (Appendix G). Classification of a given method as humane or inhumane may vary by circumstances and species (Brook et al. 2015, Peterson et al. 2020). This section focuses on the impact of BDM methods on the physiological condition of target and nontarget animals. There are concerns that some of the methods proposed for use such as foothold traps and cable devices may cause stress, distress, unintentional injury, and death in target and nontarget animals including pets.

The science of wildlife biology and management, including wildlife damage management and wildlife research, often involves directly capturing, handling, physically marking, taking samples from, and, at times, lethally removing free-ranging animals. These actions can cause stress, pain, and sometimes inadvertent injury to or death of individual animals (e.g., (Kreeger et al. 1990, White et al. 1991, Powell and Proulx 2003, Sneddon et al. 2014). APHIS-WS Directive 2.450 establishes guidelines for APHIS-WS personnel using certain types of capture devices, and

promotes training of its employees to improve efficiency, effectiveness, and humaneness. Additionally, all WS-Wisconsin activities comply with applicable federal, state, and local laws and regulations. WS-Wisconsin field personnel strive to undertake activities as humanely as possible under field conditions and implement BMPs prescribed by AFWA.

The Furbearer Conservation Technical Working Group of the AFWA has developed BMPs for beaver (Association of Fish and Wildlife Agencies 2014, 2021, White et al. 2021). The BMPs are based on the most extensive study of animal traps ever conducted in the U.S., and scientific research and professional experience regarding currently available traps and trapping technologies. Trapping BMPs identify both techniques and trap types that address the welfare of trapped animals and allow for the efficient, selective, safe, and practical capture of furbearers. Detailed information on the impacts of individual methods and APHIS-WS's approach to humanness is provided in Appendix G.

3.7.1 Comparative Impacts of the Alternatives on Humaneness

Concern for the humaneness of traps and lethal methods would likely be similar across the alternatives because the methods proposed for use by WS-Wisconsin could be employed by non-WS entities when WS-Wisconsin is unavailable to provide assistance or restricted to the use of nonlethal methods (Section 3.1). WS-Wisconsin's limited federal allocation for BDM (approximately 2% of current program expenses) is currently allocated to supervision and implementation of the WS nonlethal initiative. Selection of alternatives that restrict WS-Wisconsin to using nonlethal methods would not increase WS-Wisconsin federal allocation available to implement nonlethal methods.

Table 3-12. Comparison of the humaneness of methods used for each alternative considered in detail. Items that are constant across all alternatives:

- WS-Wisconsin staff conducting BDM are trained professionals, who use the APHIS-WS Decision Model to help minimize risks of adverse consequences from the use of BDM methods.
- WS-Wisconsin follows AFWA BMPs, implements the protective measures established in this EA and in APHIS-WS Directives, and implements protective measures identified in ESA consultations with the USFWS and WDNR NHC.
- Non-WS entities are not bound by the same conditions, so the comparison of humaneness is assessed based on increasing variability in method implementation, with decreasing WS-Wisconsin availability to provide operational BDM or technical assistance.

Alternative 1 – Integrated BDM (Proposed Action)	Alternative 2 –Only nonlethal BDM Except for Coldwater Fisheries	Alternative 3 – Integrated BDM Except No BDM for Coldwater Fisheries	Alternative 4 – No Involvement in BDM
Alternative allows for the greatest availability of professional BDM assistance to all requestors by WS-Wisconsin. Non-WS entities still conduct BDM. However, there would be less need to seek them out, so there would likely be less risk of adverse effects than the other alternatives. Likely the most humane alternative because of WS-Wisconsin's professional involvement.	WS-Wisconsin's use of traps and other lethal methods would be limited to protection of natural resources. Non-WS entities may use the same methods as WS-Wisconsin under Alternative 1. These entities may not have the same level of proficiency, training, or accountability (e.g., NEPA, state and federal ESA, and protective measures). Increased perceived humaneness due to limitations on WS-Wisconsin's activities compared to Alternative 1, but likely overall greater adverse impact to humaneness due to increased BDM activity by non-WS entities.	Increased perceived humaneness due to limitations on WS-Wisconsin's activities WDNR likely to require training and protective measures similar to WS-Wisconsin for coldwater fisheries projects by non-WS entities. Overall impacts similar to or slightly less impact than Alternative 1 due to increased BDM activity by non-WS entities for coldwater fisheries, but a slight reduction in annual BDM for coldwater fisheries.	No impact from WS-Wisconsin. Loss of WS-Wisconsin promotion of nonlethal methods through TA and nonlethal initiative may slow adoption of nonlethal methods. All BDM conducted by non-WS entities who may not have the same level of proficiency, training, or accountability (e.g., NEPA, state and federal ESA, and protective measures). This alternative is expected to have the greatest involvement of non-WS entities conducting BDM, and some reduction in promotion of nonlethal methods which could result in the greatest risk of adverse impact on humaneness.

The ability of non-WS entities to conduct BDM as proficiently, selectively, and humanely as WS-Wisconsin is variable. All the methods proposed for use in this EA (Appendix F) are available for use by non-WS entities, however these entities cannot universally offer all the professional resources that APHIS-WS offers (e.g., NWRC Research, ESA compliance). This section considers the effects on humaneness of WS-Wisconsin's proposed activities as well as the potential effects of non-WS entities conducting BDM where WS-Wisconsin is limited. However, people who view a particular method as humane or inhumane are likely to view those methods as humane or inhumane under any of the alternatives, regardless of what entity applies them, even though variations in the skills, training and tools available to the applicator can result in variations in selectivity and humaneness. Table 3-12 summarizes the anticipated perception and comparative level of humaneness for each Alternative.

3.8 CULTURAL AND RECREATION IMPACTS, AND TRIBAL CONCERNS

3.8.1 Impact on Recreation

Outdoor recreation is an important part of life in Wisconsin for residents and visitors. Based on a 2022 survey of hunting, fishing and wildlife-associated recreation, an estimated 148.3 million Americans participated in wildlife watching, 39.9 million fished and 14.4 million hunted (U.S. Department of the Interior 2023). Individuals could report participating in more than one type of wildlife related recreation. There was an estimated $394.8 billion in expenditures for wildlife-recreation (hunting, fishing, wildlife viewing) in 2022, with $91 billion trip related, $179 billion for equipment and $124.9 billion for items such as licenses, land leasing, and ownership. Some individuals have expressed concern that the proposed action may adversely impact opportunities to view or harvest beavers and that dam removals may adversely impact opportunities to interact with (view or harvest) other wildlife species that use beaver ponds.

The primary impact of WS-Wisconsin BDM activities on beaver and beaver related recreation is from beaver and beaver dam removal and impacts on recreation are directly tied to the impacts addressed in Sections 3.2, 3.3, 3.4 and 3.5. The use of nonlethal methods can disperse wildlife (e.g., temporary dispersal, habitat changes associated with installation of water flow and exclusion devices). Dispersal is likely to be temporary, and some beaver may return or remain in the area after the installation of flow and exclusion devices depending on site characteristics and the level of water that is allowed to remain.

BDM activities for the protection of resources other than coldwater fisheries are less likely to adversely impact recreational opportunities on private lands because the landowner is the primary recreational user and all WS-Wisconsin activities are coordinated with the landowner/manager. These projects are often conducted to address impoundments immediately adjacent to roadways and other developments which may make the sites unsuitable for activities such as waterfowl hunting. Projects for the protection of coldwater fisheries require permission from the landowner/manager where the equipment will be used, but the nature of the work (beaver removal and removal of dams) is set by the WDNR for the enhancement of a different recreational resource (coldwater fisheries) in accordance with state beaver and inland fisheries management plans (Wisconsin Department of Natural Resources 1990, 2019). The plans' decisions to prioritize coldwater fisheries in limited areas over beaver and beaver impoundment related recreational opportunities were made after extensive state plan development processes, including public involvement.

Substantially more beavers and other furbearers are taken by licensed trappers than by WS-Wisconsin (Figure 1-1). The impact of licensed trapping on opportunities to view beaver and other wildlife is dependent upon intensity of effort in individual colonies, beaver response to removals of some colony members, and wildlife response to trapping activity. Fur trappers are less likely to remove all beaver from an area and cannot remove beaver dams except when also trapping for damage management which may be less likely to impact recreation associated with beaver impoundments. Untended beaver dams are likely to eventually fail. Nonetheless, the

scale of beaver trapping is such that it is the primary driver of beaver abundance in some portions of the state which will also impact viewing opportunities.

To the extent practicable, when BDM is needed near public use areas, WS-Wisconsin strives to schedule activities at times and in seasons when recreational activity is likely to be low. Other strategies used by WS-Wisconsin to reduce the risk that BDM activities would have an adverse impact on an individual's recreational experience include setting capture devices well away from high use areas and conspicuously posting warning signage. In many instances, conflicts with the public are further reduced (but cannot be entirely avoided on public lands) because BDM often occurs at remote field sites or locations with minimal recreational use (e.g., railroads, remote coldwater stream sites, or at water-control structures). WS-Wisconsin BDM for infrastructure, property, and human health and safety often occurs adjacent to highways, roads, rights-of-way, or more urbanized areas that may be used extensively by the public. Placement of warning signage in addition to legal trap placement of body-gripping traps and cable devices for beaver at least half-submerged and the WS-Wisconsin enhanced protective measure of setting foothold traps at least six-inches submerged further reduce the risk of adverse public and pet experiences due to BDM activities.

Most WS-Wisconsin BDM activities are conducted outside of the state's fur trapping season, but WS-Wisconsin activities and private trapper activities may overlap in the spring and fall. WS-Wisconsin conducts nearly all BDM activities from the end of March or early April (variation depends upon weather and other factors) through the end of October. A low level of BDM may extend into November, and in rare instances, BDM may occur to resolve an infrastructure or human health and safety concern over the winter months (December – February). WS-Wisconsin makes every effort to avoid conflict with avocational trappers while conducting BDM. WS-Wisconsin staff avoid intentionally setting traps near where private trappers are working and remove all government traps and equipment (including warning signage) if a private trapper decides to set their own traps nearby. WS-Wisconsin staff will return to the site to determine whether BDM is still required to resolve the conflict or whether the private trapper has removed the problem beaver(s) and/or beaver dams. An exception to this may occur if there is an immediate need to breach or remove a beaver dam to reduce risks to human health and safety from flooding of roads, railways, or other infrastructure but these instances are extremely rare. Follow up visits to the site by WS-Wisconsin may be necessary for dam removal because current Wisconsin Trapping Regulations and Beaver Control Guidelines do not permit the damage or removal of beaver dams, except by landowners, lessees and their agents for damage management (Wisconsin Department of Natural Resources 2020). WS-Wisconsin staff will not knowingly breach or remove beaver dams while private trappers are actively trapping a site, except for emergency safety scenarios.

3.8.2 Tribal Concerns Regarding Beaver

Natural ecosystems including beaver are an important part of Native American culture. WS-Wisconsin extended invitations to all federally recognized tribes in Wisconsin to participate in

the preparation of this EA but only three Ojibwe tribes and GLIFWC responded to the invitation. Consequently, information in this section is strongly influenced by Ojibwe culture.

Among the Ojibwe, amik (beaver) is considered a highly sacred being with human-like behaviors who is very wise and taught the Ojibwe how to build wigwams. Amik helps to care for the water and create homes and habitat for other beings. Special care is taken when tribal members harvest beavers. The pelts are highly valued for use in traditional artwork and dress, and the meat is used in traditional recipes (GLIFWC Climate Change Team 2023). Tribal members may trap beaver both on-reservation and off-reservation on public lands and on privately owned land with permission of the landowner, in accordance with treaty trapping rights in the Ceded Territories. The Native American Tribes and GLIFWC are deeply concerned about beaver populations (Section 3.2), overall ecosystem health including the ecological services provided by beaver (Sections 3.3 and 3.5) and potential risks to nontarget species from BDM methods (Section 3.3).

The GLIFWC annually contracts with WS-Wisconsin to remove beaver and beaver dams from waterbodies where their presence may adversely affect manoomin (wild rice). Traditional knowledge notes that amik and manoomin have shared the landscape for centuries and the impact of amikwag to manoomin can be negative or positive, and impacts are localized and unique (David et al. 2019). WS-Wisconsin participates in the Wisconsin Wild Rice Committee meetings which provide an opportunity for tribal, state, federal, and academic partners to collaborate on wild rice conservation and enhancement. The number of wild rice waterbodies does not fluctuate substantively year-by-year, but site-specific beaver conflicts do. As such, a list of wild rice lakes where BDM may be needed is provided to WS-Wisconsin annually. Those waterbodies are monitored and beaver damage conflicts addressed, as they occur. Tribes can request coordination with WS-Wisconsin regarding opportunities for tribal members to harvest beaver in situations where beaver removal is warranted for specific wild rice lakes at the Wisconsin Wild Rice Advisory Committee meetings and through direct communication with WS-Wisconsin.

As noted in Section 3.1, GLIFWC and individual Native American tribes can and have conducted BDM activities on their own and form partnerships with agencies and organizations other than WS-Wisconsin to promote beaver management priorities.

GLIFWC and the tribes have expressed an interest in reducing the lethal take of beaver through increased adoption of nonlethal methods, including the potential use of nonlethal methods to facilitate wild rice protection. Under Alternatives 1, 2, and 3, WS-Wisconsin would be available to utilize nonlethal methods such as flow devices (Appendix F), in locations where they would be appropriate, including for wild rice protection. WS-Wisconsin would continue to use resources from the APHIS-WS nonlethal initiative to promote use of nonlethal methods and would be open to developing partnerships with tribes and other entities to promote the use of nonlethal methods within the constraints of available funding and regulatory requirements. Identifying where nonlethal methods such as flow devices might successfully mitigate beaver conflicts for wild rice is best accomplished on a case-by-case basis and could be discussed in

detail during Wild Rice Advisory Committee meetings or when a specific need for BDM is identified during the season.

3.8.3 Comparative Impacts of the Alternatives on Cultural Issues Including Consumptive and Nonconsumptive Values of Beaver and Tribal Concerns

Impacts of WS-Wisconsin BDM activities on consumptive and nonconsumptive recreation and cultural practices are directly related to the impact of WS-Wisconsin activities on the beaver population as described in Section 3.2. WS-Wisconsin BDM activities have the potential to cause localized reductions in beaver harvest and viewing opportunities through lethal removal of beaver and beaver dams. These activities also have the potential to impact recreational opportunities involving impoundments which are related to the impacts of the proposed action on nontarget species including threatened and endangered species, waters and wetlands addressed in Sections 3.3, 3.4 and 3.5.

Although adverse impacts on recreation can and do occur, they are limited in scope. WS-Wisconsin BDM activities to maintain free flowing conditions in trout streams are the most likely to have an impact on beaver-related recreational opportunities but have constituted less than 2.5% of the 84,000 miles of rivers and streams in the state, and only approximately 15% of the designated Class 1, 2, or 3 trout streams. Based on the model by Robinson et al. (2025) beaver removal for trout streams impacted only 2.4% of beaver habitat statewide and only 7.3% of beaver habitat in BMZ B where most WS-Wisconsin BDM for trout streams is conducted. Although localized impacts will occur, abundant opportunities to enjoy viewing beaver, beaver impoundments and associated wildlife and wetland ecosystems remain in the state. WS-Wisconsin's other types of BDM activities are dispersed across the state and most commonly occur along highways, roads, and railways where public recreation opportunities may be limited. Most WS-Wisconsin BDM projects involve recently constructed dams (e.g., dams less than a year old). While these new impoundments provide some of the recreational opportunities associated with beaver dams, they generally have not had enough time to develop the vegetation and animal communities typical of an established beaver pond wetland.

While the removal of beaver ponds in localized areas may be needed to protect trout populations, in the first few years after pond construction, beaver impoundments may also provide some of the best opportunities for trout fishing. As noted above, the streams maintained in free-flowing conditions are being managed for different ecological and recreational goals per state management objectives and are not devoid of recreational, aesthetic and existence value.

WS-Wisconsin's annual take of beaver averaged less than 9% of the known statewide beaver take. WS-Wisconsin impacts on beaver population and associated harvest opportunities are localized and WS-Wisconsin involvement in BDM did not preclude increases in beaver harvest that occurred when the Covid pandemic and market factors increased interest in beaver harvest (Section 3.2.5). Impacts are most likely to occur in areas where the WDNR asks WS-Wisconsin to maintain free-flowing conditions for coldwater fisheries. However, the USFS

makes winter aerial beaver surveys of target coldwater streams available to facilitate removal by licensed trappers (https://www.fs.usda.gov/r09/chequamegon-nicolet/publications/beaver-colony-maps). WS-Wisconsin unintentional take of all other harvested species was less than 1% licensed harvest for all species except river otters and was not of sufficient magnitude to substantively impact harvest opportunities. For river otters, WS-Wisconsin average annual otter capture was 6.8% of the average licensed harvest and 5.7% of the current state harvest quota of 2,500 river otters in the most recent seasons and analysis in Section 3.3.1 indicates, WS-Wisconsin BDM activities could have a moderate impact on otter harvest opportunities.

Table 3-13. Comparison of the impacts on recreation and tribal concerns for each alternative considered in detail. Items that are constant across all alternatives:

- WS-Wisconsin staff conducting BDM are trained professionals, who use the APHIS-WS Decision Model to help minimize risks of adverse consequences from the use of BDM methods.
- BDM activities are coordinated with the landowner/manager to minimize risk of adverse impacts on other site uses including recreation.
- Impacts on consumptive and nonconsumptive opportunities to enjoy beaver, beaver impoundments and associated resources directly parallel impacts on these resources and are discussed above in Sections 3.2 through 3.5.

Alternative 1 – Integrated BDM (Proposed Action)	**Alternative 2 –Only nonlethal BDM Except for Coldwater Fisheries**	**Alternative 3 – Integrated BDM Except No BDM for Coldwater Fisheries**	**Alternative 4 – No Involvement in BDM**
Impacts on beaver trapping and viewing low for most types of damage management because of the dispersed nature of work and low proportion of the population impacted by WS-Wisconsin. Impacts moderate for areas where BDM is conducted for coldwater fisheries.	Less impact by WS-Wisconsin for most types of BDM but overall impacts are similar because of anticipated lethal BDM by other entities. Impacts of BDM for coldwater fisheries are the same as for Alternative 1.	No WS-Wisconsin involvement in BDM for coldwater fisheries which are most likely to impact recreational opportunities involving beaver. Similar or somewhat lower levels of impacts from actions taken by WDNR for coldwater fisheries. WS-Wisconsin impacts for all other BDM the same as for Alternative 1	No impacts by WS-Wisconsin. Actions for coldwater fisheries by WDNR are likely to have similar or somewhat lower impacts than Alternative 1.
WS-Wisconsin able to collaborate with tribes on BDM initiatives (e.g., promotion of nonlethal methods). WS best able to consult with tribes and exchange information	WS-Wisconsin able to collaborate with tribes on BDM initiatives. May be more consistent with goal to promote nonlethal methods than Alternative 1 because	WS-Wisconsin able to collaborate with tribes on BDM initiatives within constraints of methods allowed. May be less consistent with goals to promote nonlethal methods	No WS-Wisconsin collaboration on BDM initiatives. WS-Wisconsin is unable to exchange information on BDM activities in Wisconsin. Information on BDM for conflicts

Alternative 1 – Integrated BDM (Proposed Action)	Alternative 2 –Only nonlethal BDM Except for Coldwater Fisheries	Alternative 3 – Integrated BDM Except No BDM for Coldwater Fisheries	Alternative 4 – No Involvement in BDM
on BDM activities because greatest WS-Wisconsin involvement in BDM. The use of an integrated BDM strategy allows for greatest efficacy in addressing adverse impacts of beaver on wild rice.	WS-Wisconsin required to use nonlethal methods to address property damage and human safety issues. WS-Wisconsin ability to consult and exchange information on BDM activities in Wisconsin limited because of reduced WS-Wisconsin involvement in BDM. Reduced information on beaver impacts available to tribes because there is no reporting requirement for non-WS entities. WS-Wisconsin is unable to use lethal methods for protection of wild rice, but work could be conducted by others including tribes.	than Alternative 2 because no change in WS-Wisconsin methods use but better than Alternative 1 because potential for less lethal BDM. WS-Wisconsin would not have information on or be able to consult with tribes regarding BDM for coldwater fisheries. WDNR expected to provide information on BDM conducted for coldwater fisheries. Process for addressing impacts to wild rice identical to Alternative 1	other than those conducted by WDNR or agency contractors limited. No BDM for wild rice by WS-Wisconsin but work could be conducted by others including tribes.

Tribal ability to collaborate with other agencies, tribes and private entities on beaver damage management is not impacted by any of the alternatives. Tribes may also form partnerships with WS-Wisconsin under all alternatives except Alternative 4, but tribes may be less willing to do so under alternatives with higher levels of WS-Wisconsin lethal beaver take.

Federal agencies have unique responsibilities to consult with tribes and include tribes in decision making. WS-Wisconsin is also available to exchange information with tribes and other partners regarding BDM activities that would not necessarily be available if other entities conducted BDM. Alternatives that limit WS-Wisconsin involvement in BDM and increase BDM by other entities limit consultation opportunities for tribes and the data on BDM available to agencies, the public and the tribes.

3.9 ABILITY OF ALTERNATIVES TO MEET OBJECTIVES

Section 2.4 discusses the goal and objectives of WS-Wisconsin BDM activities. Table 3-14 below summarizes the ability of each Alternative to meet those objectives.

Table 3-14. Comparison of Alternatives in meeting the objectives outlines in Section 2.4 to support the APHIS-WS mission of providing professional wildlife damage management to the public.

Objective	Alternative 1: Full, Integrated BDM Program	Alternative 2: Limited Methods for BDM, Nonlethal Methods Only Except for Coldwater Fisheries Projects	Alternative 3: Limited Integrated BDM, WS-Wisconsin Would Not Conduct BDM for Coldwater Fisheries Protection	Alternative 4: No WS-Wisconsin BDM Assistance Available
1: Professionally and proficiently respond to all requests for assistance using an integrated and adaptive approach and the APHIS-WS Decision Model.	Meets all components of objective.	Partially due to excluded methods.	Does not meet objective because it does not allow for responding to conflicts involving natural resources.	Does not meet objective.
2: Assistance must be consistent with all applicable federal, state, and local laws, APHIS-WS policies and Directives, cooperative agreements, MOUs, and other requirements as provided in any decision resulting from this EA.	Meets all components of objective.	Meets all components.	Meets objectives partially but prohibits WS-Wisconsin response to some needs for action.	Does not meet objective.
3: Implement and coordinate BDM to ensure effects do not negatively affect the viability of the beaver population in Wisconsin.	Meets objective because WS-Wisconsin coordinates with management agencies.	Meets objective because WS-Wisconsin would coordinate actions, even when activities are limited.	Meets objective because WS-Wisconsin would coordinate actions, even when activities are limited.	Does not meet objective.
4: Ensure WS-Wisconsin actions are compatible	Meets objective because WS-Wisconsin works with	Meets objective because WS-Wisconsin would	Does not meet objective due to prohibition on	Does not meet objective.

Objective	Alternative 1: Full, Integrated BDM Program	Alternative 2: Limited Methods for BDM, Nonlethal Methods Only Except for Coldwater Fisheries Projects	Alternative 3: Limited Integrated BDM, WS-Wisconsin Would Not Conduct BDM for Coldwater Fisheries Protection	Alternative 4: No WS-Wisconsin BDM Assistance Available
with the goals and objectives of applicable management plans established by state, tribal, and federal wildlife management agencies.	land managers' plans and goals.	work within land managers' plans and goals, even with limited method availability.	assisting state with actions called for in state beaver and inland trout management plans.	
5: Minimize impacts to nontarget species by selecting the most effective, target-specific methods and techniques available given legal, environmental, feasibility, and other constraints.	Meets objective.	Does not meet objective due to restrictions on the methods available.	Meets the objective because while BDM would not be conducted for coldwater fisheries, it could be conducted in an integrated manner for all other projects.	Does not meet objective.
6: Evaluate and incorporate the use of effective new and existing nonlethal and lethal technologies, where appropriate, into technical and direct assistance strategies.	Meets objective.	Does not meet the objective because this Alternative does not allow for the use of new lethal methods/tools for any projects other than coldwater fisheries.	Does not mee the objective because WS-Wisconsin could not provide any technical or operational assistance, including nonlethal methods for coldwater fisheries.	Does not meet objective.

APPENDIX A: AGENCIES AND TRIBES INVOLVED IN THIS EA

To facilitate planning, efficiently use agency expertise, and promote interagency coordination, WS-Wisconsin partnered with the WDNR and USFS during the preparation of this EA. Cooperating agencies were asked to review the draft and provide input to ensure all actions comply with applicable federal, state, and tribal regulations, policies, land management plans, MOUs, and cooperative agreements. WS-Wisconsin consulted with the USFWS and the Wisconsin Natural Heritage Program regarding compliance with state and federal Endangered Species Acts. WS-Wisconsin also worked with the U.S. Army Corps of Engineers to identify actions necessary for compliance with Section 404 of the Clean Water Act.

WS-Wisconsin recognizes the sovereign rights of Native American tribes to manage wildlife on their lands and the rights of tribes in ceded territories as established in Treaties between the tribes and the government of the United States. WS-Wisconsin invited all federally recognized tribes in Wisconsin to participate in the development of this EA. The GLIFWC, Red Cliff Band of Lake Superior Chippewa, and the Bad River Band of Lake Superior Chippewa agreed to participate in the preparation of this EA.

The following is a brief discussion of the authorities that APHIS-WS and the entities that WS-Wisconsin cooperates with or consults with when conducting BDM activities in Wisconsin.

USDA APHIS WILDLIFE SERVICES

APHIS-WS is the federal agency authorized by Congress to protect American resources from damage associated with wildlife. The Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 8351-352) states:

> *The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program….*

The Act was amended in 1987 (Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 8353) to further provide:

> *On or after December 22, 1987, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with State, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammal and bird species that are reservoirs for zoonotic diseases, and to deposit any money collected under such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities.*

For more details on the various federal laws and Executive Orders regarding wildlife management and protection see Appendix B.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

The WDNR, under the direction of the Governor appointed Natural Resources Board (NRB), is specifically charged by the state legislature with the management of Wisconsin's wildlife resources. Although many legal mandates of the NRB and the Department are expressed throughout the Administrative Code of Wisconsin, the primary statutory authorities include establishment of a system to protect, develop and use the forest, fish and game, lakes, streams, plant life, flowers, and other outdoor resources of the State (s.23.09 Wis. Stats.) and law enforcement authorities (s.29.001 and s.29.921 Wis. Stats). The NRB adopted mission statements to help clarify and interpret the role of WDNR in managing natural resources in Wisconsin. WDNR's mission statement is "To protect and enhance our natural resources: our air, land and water; our wildlife, fish and forests and the ecosystems that sustain all life. To provide a healthy sustainable environment and a full range of outdoor opportunities. To ensure the right of all people to use and enjoy these resources in their work and leisure. To work with people to understand each other's views and carry out the public will. And in this partnership consider the future and generations to follow."

U.S. FOREST SERVICE

The U.S. Forest Service (USFS), an agency within the U.S. Department of Agriculture, manages lands for multiple uses, including wildlife habitat, protection of T&E species, livestock grazing, timber, wilderness, cultural resources, and recreation. The USFS is a cooperating agency on this EA in accordance with the national MOU between the two agencies (USDA Forest Service 2023). The national MOU between APHIS-WS and the USFS recognizes the USFS land management responsibilities for wildlife, habitat, and resources and WS role in managing wildlife damage. The MOU provides guidance on coordinating and conducting WDM activities on USFS managed lands. WS-Wisconsin consults with the USFS prior to conducting BDM activities on USFS lands and all activities are conducted in accordance with applicable laws, APHIS-WS Directives, MOUs, regulations, USFS management plans, and policies and Work Initiation Documents.

Special designated areas (SDA) are federal lands that have unique cultural, scenic, educational, scientific, geological, or ecological values and are specially designated, to be managed to preserve their characteristics. They are established by the USFS for a specific purpose (e.g., habitat management for a T&E species) or to preserve the characteristics of a site until a formal management decision regarding the site's future management can be made. These areas may have special restrictions on the types of activities which may be conducted in the area. Any work that relates to SDAs, e.g., Wilderness Areas (WA) or Wilderness Study Areas (WSA), are subject to further analysis by the land management agencies. The USFWS and WS-Wisconsin do not anticipate conducting BDM activities in Wilderness Areas. However, based on consultation with the USFS, no work in WAs or WSAs is anticipated at this time.

U.S. FISH AND WILDLIFE SERVICE

The USFWS mission is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. Responsibilities are shared with other federal, state, tribal, and local entities. However, the USFWS has specific responsibilities for the protection of T&E species under the ESA, migratory birds, inter-jurisdictional fish, and certain marine mammals, as well as, for lands and waters that the USFWS administers for the management and protection of those resources, such as the National Wildlife Refuge System. The USFWS occasionally requests WS-Wisconsin assistance with BDM on refuge lands in Wisconsin. In recent years, WS-Wisconsin BDM assistance has been requested annually at two USFWS refuges.

Under Section 7 of the ESA, federal agencies must consult with USFWS when any action the agency carries out, funds, or authorizes may affect a listed endangered or threatened species or designated critical habitat. Effects of WS-Wisconsin's activities on federally listed species in Wisconsin were evaluated in an informal consultation with USFWS completed on February 3, 2022, for all species except gray wolves. A formal consultation regarding impacts of WS-Wisconsin wildlife damage management activities was May 13, 2024. WS-Wisconsin closely follows operational measures outlined in its ESA consultations to minimize the risks to listed species. Minimization measures included in the consultation documents, and analyses of potential impacts of WS-Wisconsin activities on T&E species are discussed in Chapter 3.

GREAT LAKES INDIAN FISH AND WILDLIFE COMMISSION (GLIFWC)

The Great Lakes Indian Fish and Wildlife Commission is an agency of eleven Ojibwe nations in Minnesota, Wisconsin, and Michigan, with off-reservation treaty rights to hunt, fish and gather in treaty-ceded lands. It exercises powers delegated by its member tribes. GLIFWC assists its member bands in the implementation of off-reservation treaty seasons and in the protection of treaty rights and natural resources. GLIFWC provides natural resource management expertise, conservation enforcement, legal and policy analysis, and public information services. GLIFWC's member tribes include: the Bay Mills Indian Community, Keweenaw Bay Indian Community, and the Lac Vieux Desert Band in Michigan; the Bad River, Red Cliff, Lac du Flambeau, Lac Courte Oreilles, Sokaogon, and St. Croix Bands in Wisconsin; the Fond du Lac and Mille Lacs tribes in Minnesota. All member tribes retained hunting, fishing, and gathering rights in treaties with the U.S. government, including the 1836, 1837, 1842, and 1854 Treaties.

GLIFWC's Board of Commissioners, comprised of a representative from each member tribe, provides the direction and policy for the organization. Recommendations are made to the Board of Commissioners from several standing committees, including the Voigt Intertribal Task Force. The Voigt Intertribal Task Force was formed following the 1983 Voigt decision and makes recommendations regarding the management of the fishery in inland lakes and wild game and wild plants in treaty-ceded lands of Wisconsin.

FEDERALLY RECOGNIZED NATIVE AMERICAN TRIBES IN WISCONSIN

WS-Wisconsin recognizes the rights of sovereign tribal nations, the unique legal relationship between each Tribe and the federal government, and the importance of strong partnerships with Native American communities. Tribes have management authority for natural resources on reservation lands. Some tribes have rights to hunt, fish and gather, graze livestock, and exercise other traditional uses and practices on unoccupied federal lands within ceded territories defined in treaties. The United States and its agencies owe a trust duty to Native American tribes which includes involving tribes in planning processes for projects with the potential to substantively impact tribal interests. WS-Wisconsin is committed to working with tribes respecting tribal heritage and cultural values when planning and initiating wildlife damage management activities. WS-Wisconsin invited all federally recognized tribes in Wisconsin to participate in preparing this EA. The Bad River Band of Lake Superior Chippewa Indians and the Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin participated in the preparation of this EA.

The other federally recognized Native American tribes in Wisconsin at the time this EA was completed include the Forest County Potawatomi Community, Ho-Chunk Nation of Wisconsin, Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin, Lac du Flambeau Band of Lake Superior Chippewa Indians of the Lac du Flambeau Reservation of Wisconsin, Oneida Tribe of Indians in Wisconsin, Sokaogon Chippewa Community, St. Croix Chippewa Indians of Wisconsin, Stockbridge Munsee Community, and the Menominee Indian Tribe of Wisconsin.

UNITED STATES ARMY CORPS OF ENGINEERS

The United States Army Corps of Engineers is responsible for permitting activities related to water quality under Section 401 and the discharge of dredged or fill material under Section 404 of the Clean Water Act. WS-Wisconsin worked with the Army Corps of Engineers to identify protocols for compliance with Section 404 of the Clean Water Act (Appendix E)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

The United States Environmental Protection Agency (EPA) is responsible for implementing and enforcing the Federal Insecticide, Fungicide, and Rodenticide Act, which regulates the registration and use of pesticides. The EPA is also responsible for administering and enforcing the Section 404 program of the Clean Water Act with the United States Army Corps of Engineers that established a permit program for the review and approval of water quality standards that directly affect wetlands.

APPENDIX B: FEDERAL, TRIBAL, AND STATE REGULATIONS THAT COULD APPLY TO WS-WISCONSIN'S BDM ACTIVITIES

In addition to the NEPA, several other federals laws, regulations, and executive orders would be relevant to activities that WS-Wisconsin could conduct when providing assistance. This section discusses regulations and executive orders that would be highly relevant to WS' activities when providing assistance. All management actions conducted and/or recommended by WS would comply with appropriate federal, tribal, state, and local laws in accordance with WS Directive 2.210.

B.1 ENDANGERED SPECIES ACT

Under the ESA, all federal agencies shall seek to conserve T&E species and utilize their authorities in furtherance of the purposes of the ESA (Section 2(c)). Evaluation of the alternatives in regard to the ESA will occur in Section 3.4.2 of this EA.

B.2 NATIONAL HISTORIC PRESERVATION ACT

The National Historic Preservation Act and its implementing regulations (see 36 CFR 800) require federal agencies to initiate the Section 106 process if an agency determines that its actions are undertakings as defined in Section 800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects on historic properties. If the undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties were present, the agency official has no further obligations under Section 106. WS-Wisconsin has determined that the proposed action will not cause effects on historic properties as defined under the Act and that consultation under the NHPA is not warranted. The proposed action will not result in a change in landownership and will not result in dredging or similar activities with the potential to disturb buried resources. Beaver dams and associated ponds are dynamic entities that are established, expand and contract over time in accordance with natural processes (Appendix C) even in the absence of BDM. It is possible that BDM could be requested to prevent a historic site from being inundated, in which case, WS-Wisconsin would initiate applicable NHPA consultation.

B.3 FEDERAL FOOD, DRUG, AND COSMETIC ACT (21 USC 360)

This law places administration of pharmaceutical drugs, including those immobilizing drugs used for wildlife capture and handling, under the Food and Drug Administration.

B.4 CONTROLLED SUBSTANCES ACT OF 1970 (21 USC 821 ET SEQ.)

This law requires an individual or agency to have a special registration number from the United States Drug Enforcement Administration to possess controlled substances, including controlled substances used for wildlife capture and handling.

B.5 ANIMAL MEDICINAL DRUG USE CLARIFICATION ACT OF 1994

The Animal Medicinal Drug Use Clarification Act and its implementing regulations (21 CFR 530) establish several requirements for the use of animal drugs, including those animal drugs used to capture and handle wildlife. Those requirements are: (1) a valid "*veterinarian-client-patient*" relationship, (2) well defined record keeping, (3) a withdrawal period for animals that have been administered drugs, and (4) identification of animals.

B.6 THE NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT OF 1990

The Native American Graves Protection and Repatriation Act require federal agencies to notify the Secretary of the Department that manages the federal lands upon the discovery of Native American cultural items on federal or tribal lands. Federal projects are to discontinue work until they have made a reasonable effort to protect the items and have notified the proper authority.

B.7 CONSULTATION AND COORDINATION WITH INDIAN TRIBAL GOVERNMENTS – EXECUTIVE ORDER 13175

Executive Order 13175 directs federal agencies to provide federally recognized tribes the opportunity for government-to-government consultation and coordination in policy development and program activities that may have direct and substantial effects on their tribe. Its purpose is to ensure that tribal perspectives on the social, cultural, economic, and ecological aspects of agriculture, as well as tribal food and natural resource priorities and goals, are heard and fully considered in the decision-making processes of all parts of the federal government. WS-Wisconsin invited all federally recognized tribes in Wisconsin to participate in the preparation of this EA (Appendix A)

B.8 COASTAL ZONE MANAGEMENT ACT OF 1972, AS AMENDED (16 USC 1451-1464, CHAPTER 33; PL 92-583, OCTOBER 27, 1972; 86 STAT. 1280)

This law established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans. Funds were authorized for cost-sharing grants to states to develop their programs. After federal approval of their plans, grants would be awarded for implementation purposes. To be eligible for federal approval, each state's plan was required to define boundaries of the coastal zone, identify uses of the area to be regulated by the state, determine the mechanism (criteria, standards or regulations) for controlling such uses, and develop broad guidelines for priorities of uses within the coastal zone. This law requires that federal actions be conducted in the established coastal zone consistent with the applicable Coastal Zone Management Plans. WS-Wisconsin is conducting the State Coastal Zone Review concurrent with the publication of this EA.

B.9 CLEAN WATER ACT

As required by Section 401 of the Clean Water Act (see 33 U.S.C. 1341), an applicant for a permit issued pursuant to Section 404 of the Clean Water Act must also possess a permit from the state in which the discharge originates or will originate, when applicable. The Clean

Water Act prohibits the discharge of dredged or fill material into waters of the United States without a permit from the USCAE unless the specific activity is exempted in 33 CFR 323 or covered by a nationwide permit by 33 CFR 330. Breaching of most beaver dams is covered by these regulations (33 CRG 323 and 330). WS-Wisconsin has consulted with the USACE on activities discussed in this EA and will continue to discuss with them, as needed, to remain compliant with Sections 401 and 404. WS-Wisconsin protocols for CWA Section 404 compliance are detailed in Appendix E.

B.10 FOOD SECURITY ACT

The Wetland Conservation provision (Swampbuster) of 1985 (16 USC 3801-3862), 1990 (as amended by Public Law 101-624), and 1996 (as amended by Public Law 104-127) farm bills require all agricultural producers to protect wetlands on the farms they own. Wetlands converted to farmland prior to December 23, 1985, are not subject to wetland compliance provisions even if wetland conditions return because of lack of maintenance or management. If prior converted cropland is not planted to an agricultural commodity (crops, native and improved pastures, rangeland, tree farms, and livestock production) for more than five consecutive years and wetland characteristics return, the cropland is considered abandoned and then becomes a wetland subject to regulations under Swampbuster and Section 404 of the Clean Water Act.

B.11 TRIBAL REGULATIONS

As discussed in Section 1.10, the federally recognized tribes in Wisconsin have the authority to manage wildlife on their tribal lands. WS-Wisconsin would not conduct BDM activities on tribal lands unless the applicable tribe signs a work initiation document or a similar written document allowing WS-Wisconsin to conduct activities on their tribal lands. If a tribe requests WS' assistance, WS would work with tribal authorities to obtain the necessary permits or authorizations to conduct activities and WS would adhere to the regulations of the tribe in accordance with WS Directive 2.210. GLIFWC provides natural resource management expertise, conservation enforcement, legal and policy analysis, and public information services in support of the exercise of treaty rights during well-regulated, off-reservation seasons throughout the treaty-ceded territories (https://GLIFWC.org).

B.12 STATE REGULATIONS

Removal of Wild Animals and Authorization to Remove Wild Animals Causing Damage or Nuisance

Wisconsin regulations (Wis. Stat. 29.885) grants WDNR the authority to authorize the removal of wild animals causing damage or a nuisance. WDNR Code (WAC, Natural Resources (NR) 12.10) is established to administer Wisconsin regulations relating to the removal of wild animals causing damage or nuisance. This administrative rule defines criteria whereby landowners, lessees, or occupants may remove from lands under their control wild animals constituting a nuisance. WS-Wisconsin assistance to those requesting assistance in reducing beaver damage, which could involve the removal of beaver, would be conducted under authority granted to WS, or landowners, lessees, or occupants, by the WDNR.

This statute also stipulates that a person who owns, leases, or occupies property on which a beaver or a beaver structure is causing damage and who fails or refuses to give consent to the department to remove the beaver or the structure is liable for any damage caused by the beaver or the structure to public property or the property of others.

Wisconsin Administrative Code NR 1.16 (4) (b) (not a statute but a rule), specifically authorizes beaver control activities to protect trout habitat on all Class I and select Class II or III trout streams and productive lowland coniferous stands.

Installation of beaver control procedures

The installation of beaver control procedures on culverts in Wisconsin that meet the conditions under NR 320.06(1)(c)(8) are exempt from permitting requirements. This administrative code authorizes the replacement of culverts that do not exceed 24-inches in diameter and are greater than three years in age (i.e., not new construction), however, it provides that culvert inlets may be modified for the exclusion of beaver, so long as the modification does not prevent the movement of fish, wildlife, or collect debris. Exempted modifications are generally constrained to the physical culvert (e.g., barring, cones) and do not extend into the waterway (i.e., installation of trapezoidal fencing in front of the culvert inlet would not be exempted from permitting requirements). The modified culvert inlet must be inspected at least annually for debris and any obstructions removed. Following this administrative code and the associated conditions, the construction of various exclusion designs or installation of a typical water flow device on *an existing culvert less than 24 inches in diameter* by WS-Wisconsin or the entity with management authority over the culvert would be exempt from state permitting requirements.

The installation of beaver control structures on culverts greater than 24 inches in diameter or in conjunction with a water control structure (as defined in Appendix D) or beaver dam is not exempt from state permitting under NR 320.06(1)(c)(8). Prior to installation of beaver control structures on culverts, water control structures (as defined in Appendix D), or beaver dams on navigable waterways in the state, WS-Wisconsin will consult with WDNR or other appropriate state department and obtain the necessary permit, as required[11]. If there is any question whether a state permit or USACE permit under Section 404 of the CWA is required, WS-Wisconsin will consult with the appropriate regulating agency (See Also Appendix D).

Wisconsin state statute section 87.30 requires communities to adopt floodplain ordinances which may apply to beaver control procedures. WS-Wisconsin will consult with the local zoning administrator, planning and zoning staff, or similar persons prior to installation of devices.

[11] For information regarding the WDNR Waterways Permitting Process and exempted activities, see https://dnr.wisconsin.gov/topic/Waterways/Permits/PermitProcess.html and https://docs.legis.wisconsin.gov/statutes/statutes/30.

APPENDIX C: REVIEW OF INFORMATION REGARDING BEAVER IMPACTS ON COLDWATER FISHERIES

There are numerous coldwater dependent salmonid species in Wisconsin including brook, brown, lake, and rainbow (including steelhead) trout, as well as chinook and coho salmon. The discussion within this EA and appendix primarily pertains to the impacts of beaver and beaver dams on coldwater fisheries focusing on impacts on brook and brown trout populations, though beaver damage and requests for assistance could occur for any coldwater species. Due to overlapping habitat requirements, and in many places, range, BDM to protect or enhance habitat for one coldwater dependent species (e.g., brook trout) can also benefit other coldwater species (e.g., brown trout). Research on Wisconsin and/or Great Lakes Region-specific beaver impacts on coldwater fisheries is limited (Mitro 2022). Every attempt has been made to include Wisconsin and/or Great Lakes Region-specific literature when appropriate. Studies of beaver impacts from other regions of the U.S. have been included where needed to illustrate potential impacts.

Impacts on Trout Habitat

Streams of the Western Great Lakes are commonly sourced by precipitation and groundwater inputs (Johnson-Bice et al. 2018) and distribution and abundance of salmonids in the Great Lakes region is influenced, in part, by geologic factors that impact groundwater flow patterns and the associated hydrologic and thermal characteristics of watersheds and streams (Johnson-Bice et al. 2018). Glaciers and erosion have resulted in a high diversity of geologic conditions in Wisconsin and associated beaver trout relationships. Vegetation surrounding the stream also influences beaver presence and the potential impacts of beaver on trout. Accordingly, the relationship between beaver dams and trout varies based on site specific conditions.

Most parts of northern Wisconsin where beaver and trout interactions are a concern are relatively flat (i.e., low gradient). Many trout streams in the area are warm enough that they are at the border of what can be tolerated by coldwater dependent species. This concern is exacerbated by increasing average temperatures and decreasing summer precipitation in the northern portions of the state (WICCI 2025*a*). Beaver dams tend to flood large areas, with ponds extending well outside the stream channels. Water flow rates are relatively low even under high flow events and beaver dams are more likely to persist over time. Beaver dams can create deep pools that may support the growth of larger trout, improved fishing and cool water refugia, particularly over the first 2-4 years after construction (Collen and Gibson 2001, Niles et al. 2013, Johnson-Bice et al. 2018). Vegetation flooded by the new pond fertilizes the water as it decays and insect eggs may be deposited in the pond, both of which increase food availability, leading to larger trout in the impoundment.

With time, emergent vegetation provides new habitat and forage for wildlife and invertebrates. Depending on the characteristics of the site, air temperature, and sun exposure, exacerbated by loss of cover due to beaver feeding activity and flooding may cause the pond to become warmer which supports higher productivity of invertebrates and their

food, and associated species including fish that feed on the invertebrates (Naiman et al. 1988, Rosell et al. 2005*b*). Other studies have also documented the change in fish and macroinvertebrate communities below beaver dams (Lessard and Haynes 2003). Eventually, sediment accumulates behind the dams resulting in shallow, sediment-lined ponds that cover potential spawning areas and some of the initial thermal benefits from cool water at the base of deep ponds are lost. In the long term and over a larger scale than the individual pond, beaver colony complexes develop to include a mix of abandoned areas with shallow water or with newly incised streams as abandoned ponds fail , smaller new impoundments and interconnecting stream segments (Naiman et al. 1988). Habitat needs for trout at various live stages are described by Dieterman and Mitro (2019) which may be provided as described by Naiman et al. (1988), although the total availability of specific habitat types such as stream segments with substrates suitable for spawning may be less abundant (Johnson-Bice et al. 2018, Mitro 2022, 2023). Streams in areas subject to repeated beaver colonization have been documented to grow wider and shallower over time (Salyer 1935) which may lead to more rapid warming, particularly if beaver activity reduces streamside vegetation that can provide shade.

There are some relatively higher gradient streams in northern-Wisconsin and the Driftless Area. Beaver dams may be more likely to wash out in these higher gradient streams and less likely to reach later stages where adverse impacts on trout may occur (Johnson-Bice et al. 2018). A review of studies evaluating the impact of beaver in high-gradient systems reported beaver ponds are more likely to have beneficial impacts on trout likely because trout take advantage of the pools and increased habitat heterogeneity in the first 2-4 years after dam construction. Although there may be select circumstances where beaver dams may still be a concern for coldwater fish species (Johnson-Bice et al. 2018). Also, over time, the accumulation of sediment and alterations to water quality characteristics have a negative effect on local trout populations (Johnson-Bice et al. 2018).

Beaver and beaver dam removals result in deeper and narrower channels, increased stream velocity and increases in coarse substrates and riffle habitat which may be beneficial to trout depending on the stream characteristics and the relative need for certain habitat types (e.g., pools, riffles and runs (Dumke et al. 2010). Dumke et al. (2010) documented decreases in the sand bed and an increase in available coarse substrate in a segment of the Little Sioux River in Wisconsin after removal of beaver dams, small woody debris, and unstable large woody debris that had been impeding fine sediment transport. However, they also documented increases in sand and sediment downstream that increased stream width and filled pools. Impacts diminished over time and the downstream sites had returned to pre-removal conditions after 12 months. No data was available on the length of time dams and other materials had been present at the site. Downstream impacts may be lower in areas where removals are routinely conducted, and sediment and fine sand do not have extended periods of time to accumulate. The narrowing of stream width and increased flow velocity that results from dam removal may be beneficial in that it exposes coarse substrates, but it also may facilitate the acceleration of human-caused degradation such as channel incision and bank erosion which can adversely affect aquatic ecosystems. Beaver reintroductions are used

in some parts of the country, particularly the western United States, to reduce stream incision and erosion (Johnson-Bice et al. 2018, Charnley et al. 2020). Causes of stream incision and erosion in Wisconsin may be attributed to changes in agricultural land management practices (Fitzpatrick 2001, Juckem et al. 2008).

Beaver dam construction can help increase the water holding capacity of a system, recharge aquifers, increase water table levels, and help support sustainable water flows through periods of seasonal low rainfall or drought (Johnson-Bice et al. 2018, 2022, Renik and Hafs 2020, Myers 2022*a*; Section 3.5). Beaver impoundments may provide refuge for fish during periods of drought, high temperatures and severe cold (freezing water) if the dam does not result in conditions that cannot be tolerated by the fish (e.g., warm temperature, low dissolved oxygen) (Johnson-Bice et al. 2018, Renik and Hafs 2020). Over time, beaver impoundments may become a detriment to fish as sediment accumulates, and dams prevent movement along the stream channel (Mitro 2025). Wetlands and ponds associated with beaver dams can retain and slow the flow of water during high rainfall events.

The slowing of waterflow, retention of sediment and uptake of nutrients by wetland plants due to beaver impoundments can improve water quality (Carter 1996). Sediments mobilized upstream are deposited in beaver ponds which may have beneficial or negative impacts depending on the species of concern (Bledzki et al. 2011, Lokteff et al. 2013, Niles et al. 2013, Bylak et al. 2014, Giriat et al. 2016). Beaver may contribute to the sediment in ponds when they excavate burrows instream banks (Meentemeyer et al. 1998). The associated bankside weakness may lead to localized erosion and, in some instances, the collapse of embankments (Harvey et al. 2019).

Brook and brown trout typically spawn over loose well sorted gravel 0.2 – 2 inches in diameter; Brook trout can also use areas with sandy bottoms if there is upwelling water (Dieterman and Mitro 2019, Mitro 2023). Sediment accumulation in beaver ponds may have adverse impacts when it covers spawning sites, but the retention of sediment may have beneficial impacts downstream of the dam depending on the density of dams and availability of spawning habitat between beaver ponds.

The potential for beaver dams to elevate stream temperature is one of the primary concerns regarding beaver impacts on coldwater fisheries in the Great Lakes Region. However, as with other factors discussed in this section, beaver impacts are variable and highly dependent upon site specific variables (McRae and Edwards 1994, Collen and Gibson 2001, Avery 2002, Dumke et al. 2010, Johnson-Bice et al. 2018, Renik and Hafs 2020). Variation in the impact of beaver dams on downstream temperatures is likely influenced by many factors including geomorphic characteristics, base flow, channel complexity, and thermal regime. Spring-fed streams may be more resilient to warming associated with solar radiation and reduced water flow in beaver ponds. At least some discrepancy in study results may also relate to where water temperatures were measured (e.g., surface water, pond bottoms, and different distances downstream of the dam). After a review of available data for the Great Lakes Region, Johnson-Bice et al. (2018) concluded that there was evidence that beaver dam

presence increased water temperature, but the impact on cold water species depended on how close water temperature was to upper tolerance levels for the fish and the availability of cold water refugia.

Pond size, canopy cover and groundwater inputs can buffer warming impacts of beaver impoundments in Wisconsin (McRae and Edwards 1994). Although, McRae and Edwards (1994) found no consistent relationship between the size or number of beaver dams and their effect on downstream water temperatures. In the Western U.S. reduced flow, increase in air to water ratios, and reduction in canopy cover due to beaver foraging can lead to warming, particularly in surface water (Majerova et al. 2015, Clark 2020). Stream temperatures may remain elevated near breached dams due to channel alteration from increased sediment deposition (Levine and Meyer 2014, Clark 2020). Warming has been recorded within the dam complex and downstream of the dam, although downstream warming may decrease relatively quickly with distance from the dam (Stevenson et al. 2022). In Oregon, downstream warming was best predicted by temperatures at the pond bottom (Stevenson et al. 2022).

Beaver dams can also help stabilize and reduce water temperatures (McRae and Edwards 1994, Johnson-Bice et al. 2018). Due to the volume and depth of water retained, temperature may be stratified within beaver impoundments with cool water and relatively stable temperatures in the deep portions of ponds. These areas can provide refugia from daily and seasonal temperature extremes including high heat and freezing temperatures. These refugia may be temporary as accumulated sediment results in reduced pond depth over time. Weber et al. (2017) found the volume of water in beaver ponds and pond complexes buffers daily temperature fluctuations. However, the water in beaver dams puts pressure on the hyporheic zone which, in turn, leads to upwelling of cooler water downstream of the dam. In some situations, beaver ponds can maintain downstream water temperatures independent of ambient air temperature due to impoundments forcing water through the hyporheic zone, cooling the water as it seeps through the ground and back into the stream, leading to cooler water downstream of beaver dams.

Beaver dams and impoundments can decrease dissolved oxygen (DO) levels by increasing water temperatures and decreasing flow rates (e.g., stream aeration). In older ponds, dissolved oxygen levels may also be reduced by microbial activity in flooded soils and organic matter in pond sediments (Johnson-Bice et al. 2018). Reductions in DO can reach levels unsuitable for fish (Salyer 1935, Avery 2002, Renik and Hafs 2020, Stevenson et al. 2022). However, the impact of beaver dams on dissolved oxygen is most significant within impoundments as reoxygenation generally occurs rapidly downstream of the dam though dissolved oxygen concentrations below the impoundments may be still lower than in the streams above the impoundments (Smith et al. 1991, Bledzki et al. 2011, Wąs et al. 2025). In North Shore Lake Superior streams, Renik and Hafs (2020) identified DO as the threshold for determining whether or not a beaver pond provided suitable habitat for trout and recommended considering dissolved oxygen >4.2mg/L in beaver ponds as an indicator of which ponds are providing high quality brook trout habitat and which ones may be of

management concern. Klein and Newman (1992) documented that removing beaver dams on streams in Minnesota improved DO levels to the point that was suitable for trout. However, Avery (1992) measured DO levels in impounded areas of Wisconsin streams and found DO levels were suppressed, though they were not sufficiently low enough to preclude trout viability. As with other factors, DO is impacted by site specific environmental variables which, in turn likely impacts the efficacy of dam removal and a beaver habitat enhancement method (Johnson-Bice et al. 2018, Renik and Hafs 2020).

Impacts on Fish Movement and population density

Connectivity among spawning, nursery and adult habitat is important for trout and there can also be substantial seasonal movements between habitats as water temperatures change during the year (Lundberg and Mitro 2022, Mitro 2022, 2023). There are concerns that beaver dams may be an obstacle to trout movements (Niles et al. 2013, Renik and Hafs 2020, Johnson-Bice et al. 2022, Myers 2022*b*). As dams become infiltrated with silt and detritus, fish passage may be increasingly difficult for trout (Mitro 2022). Case studies from Wisconsin have documented improvements to trout distribution upon removal of beaver dams. Avery (1992) found wild brook trout populations in smaller, higher gradient tributaries in the North Branch of the Pemebonwon River (Pemonee River) in northeastern Wisconsin improved significantly following the removal of beaver dams, although declines in brook trout were detected on the larger, lower gradient main river. Species abundance, species distribution, and total biomass of non-salmonids also increased in lower order streams following the removal of beaver dams (Avery 1992). Avery (1992) hypothesized that it would take longer than the four years studied for the trout fishery on the larger river to recover, post-beaver dam removal, which led to the eventual two-year follow up study documented by Avery (2002) after maintaining free-flowing conditions on the study area for 18 years. At the conclusion of the follow up study, within both the tributaries and the main channel, wild brook trout and other cold water species' populations had increased, and summer water temperatures were cooler.

Avery's data and findings from both studies on beaver dam removal effects on trout streams (Avery 1992, 2002) were included in a WDNR Research Report which evaluated nine different habitat development techniques applied to 58 Wisconsin trout streams from 1985-2000 (Avery 2004). It found brook trout populations in all seven tributaries evaluated were significantly higher than in 1982 (before the beaver dams were removed), as were populations in the Pemonee River, although there was substantial seasonal variation in the population increase. Abundance of harvestable brook trout, angler harvest and average size of trout in creel surveys also exceeded 1982 levels (Avery 2004). Abundance of mottled sculpin (*Cottus bairdii*), another coldwater species also increased. While Avery (2004) identified beaver dam removal as the most cost-effective and successful technique to increase trout populations in northern Wisconsin, the study acknowledged a weak experimental design with findings weighed heavily upon case studies. Recent evaluation of the effects of stream-specific beaver management by WDNR with assistance from WS-Wisconsin shows trout recruitment and abundance of adult trout per mile were higher on managed streams compared to beaver-impacted streams (Willging 2017).

Studies outside of Wisconsin: A case study from West Virginia (Niles et al. 2013) observed a similar pattern of increase in upstream brook trout numbers after beaver dam removal. However, they also observed declines in brook trout abundance and weight which the authors hypothesized may have been attributable to changes in prey availability associated with the loss of the pond and density-dependent factors including interspecific competition and fish moving several hundred meters upstream to find acceptable habitat and food resources. The authors advised that while there was evidence of beaver dams being an obstacle to fish movement, dam removals should be considered on a case-by-case basis to address concurrent potential for negative impacts. Lokteff et al. (2013) determined that beaver dams were not substantial movement barriers to introduced brook trout in Utah. The best model predicting brook trout passage of beaver dams indicated passage by brook trout decreased as dam height increased. The presence of side channels resulted in more brook trout dam passage, and brook trout were more likely to pass dams higher in the stream system. Brook trout were most likely to pass dams in June when stream flows were high, with movement facilitated by side channels and high-water levels passing over and through dams (of the two streams evaluated, 11% of dams on one stream and 25% of dams on the other did not have side channels). Similarly, preliminary data from a study in headwater tributaries on the Knife River in Minnesota indicated that the number of fish passing beaver dams was correlated to the amount of time water flowed over the tops of the dams (Myers 2022*b*, *a*).

Although there is some positive information regarding the ability of brook trout to pass beaver dams, questions remain regarding the impacts of dams on trout movements. Of particular concern is the consequences of prolonged periods without rainfall sufficient to overtop dams, impacts of larger dams downstream of the areas studied in Minnesota and impacts on upstream movements of trout (Lokteff et al. 2013, Bylak et al. 2014, Johnson-Bice et al. 2022, Lundberg and Mitro 2022, Myers 2022*b*). Ultimately, site-specific management decisions may need to balance the potential hydrological benefits of beaver ponds during periods of low flow and the potential negative impacts on fish passage.

APPENDIX D: APPLICATION OF SECTION 404 0F THE CLEAN WATER ACT TO BEAVER DAMAGE MANAGEMENT ACTIVITIES

The removal of beaver dams from waters of the U.S. has the potential to release debris and sediment, which warrants evaluation under Section 404 of the Clean Water Act (CWA). This appendix explains WS-Wisconsin's proposed activities, the regulatory framework for evaluating them, and the anticipated authorizations necessary under the circumstances described below.

USDA APHIS WS-WISCONSIN DEFINITIONS

Beaver dams are generally made from natural debris such as logs, sticks, rocks, and mud. Man-made materials may be incorporated into beaver dams opportunistically, such as tires, plastic pipe, or other sturdy materials. Dams are constructed of sufficient width and height to reduce water flow and impound water. The width and height of a beaver dam will vary depending upon the environmental conditions of the site (e.g., stream width and velocity, topography). Over the years, continuously maintained beaver dams typically become thicker and longer or taller depending on site characteristics as new materials are deposited, and leaks repaired.

- ***Recently constructed beaver dams*** have not been in place long enough for wetland conditions to develop in association with the beaver impoundment, unless the preexisting site condition before dam construction was wetland. These dams are typically less than three years old and are lacking in at least one of the three characteristics of a wetland: vegetation, soil, or hydrology (See note below regarding U.S. Army Corps of Engineers definition of wetland characteristics). In most cases, the landowner or land manager will have information on when the dam is constructed, or, in the case of trout stream management, stream surveys will indicate dam age. When the age of a dam is unknown, physical characteristics may be used to identify recently constructed dams. Some physical characteristics which may be visibly present at new, or recently constructed dams and used to distinguish them from older dams include fresh or "green" sticks packed on the downstream side of the dam, a lack of herbaceous vegetation growing within the dam or woody vegetation growing on top of or from the downstream side of the dam which is greater than three years old (annual growth rings may be counted to estimate the age of woody vegetation). Recently constructed beaver dams are the most frequently encountered type of dam by WS-Wisconsin. Almost all dams removed from trout streams where WS-Wisconsin provides ongoing beaver and beaver dam removal for the enhancement of trout populations are recently constructed. Similarly, almost all requests for assistance with property/infrastructure damage and risks to human health and safety caused by beaver impoundments involve recently constructed dams. In these cases, dam removal generally occurs within days to a year of dam construction, and removal restores initial site conditions.

- For sites with preexisting wetland conditions, removal of a recently constructed beaver dam involves the de minimis movement of dam materials (e.g., sticks, mud) within the local environment without the use of heavy machinery, dredging, or deposition of introduced materials into the system. The intent of breaching/removal of beaver dams from wetland sites is to lower the hyporheic zone to pre-beaver dam levels to reduce surface level flooding and other flood related damages (e.g., loss of access, road, or railway bed erosion). Under this scenario, there is zero net loss of wetlands.

- ***Long-standing beaver dams*** in rare instances, WS-Wisconsin may receive a request to remove a beaver dam from an area where wetland plant and animal communities have become established in the impoundment or where a beaver dam is otherwise known to have been in place for more than three years. This is most likely to occur when WS-Wisconsin receives a request from the WDNR to help with trout stream enhancement in a new area. In rare circumstances, WS-Wisconsin may be requested to remove an older dam for the protection of property/infrastructure or human health and safety (e.g., situations where there are safety concerns about a long-standing dam with a large impoundment failing). While wetland conditions may take more than three years to establish and be difficult to identify under field conditions, long-standing or "old" beaver dams in Wisconsin typically exhibit visual characteristics experienced wildlife specialists/biologists may use to distinguish them from recently established dams. Long-standing dams tend to be broader than newly built dams, as width is increased over time, through ongoing beaver activity. Fresh wood is typically absent on the downstream side of older dams as, absent a breach, once a dam is fully constructed, fresh mud and sticks are usually only added to the upstream side of the dam. These dams often contain significant herbaceous vegetation growing within them and may have woody vegetation growing on top or downstream face of the dam which would not be present in recently constructed dams. However, woody vegetation reaching three years of age (estimated by counting annual growth rings) is unlikely to be present anywhere on dams accessible to beaver unless beavers are absent from the area due to abandonment, harvest, or other reasons.

Beaver dam notching/removal is commonly used to resolve damage conflicts associated with beaver (e.g., to restore free-flowing conditions and drainage patterns, and/or to reduce flood waters). A section from the approximate center of the dam or area closest to the existing channel is removed using hand tools (e.g., shovels, rakes, portable winches), while the outside remnants of the dam (often referred to as "wings") are left in place. These dam remnants provide habitat for aquatic species, create flow refugia, and retain sediment. Dams obstructing the flow of water through structures such as culverts or dams across narrow streams may be removed entirely. A detailed description is provided in the Description of Action below.

Drawdowns (i.e., multi-stage dam notching/removal) are a commonly used practice where there is concern about the amount of water or sediment that may be mobilized by a sudden

beaver dam removal. Multi-stage notching/removal staggers the removal of sediment over time to reduce the amount of water that is released at once. Lowering the water level in steps minimizes the disturbance of sediment accumulated upstream of the beaver dam and prevents potential damage below the dam from the sudden release of a large amount of water and sediment (i.e., flooding, bank erosion, channel incision). It may also be used to minimize disturbance to state or federally listed T&E species.

Water control devices are fixed installations designed to regulate water levels in impoundments that can be used, in some situations, to address concerns about high water levels resulting from beaver dams. There are many versions of these devices (e.g. the three-log drain, the T-culvert guard, wire mesh culvert, the Clemson beaver pond leveler). The most common device likely to be used by WS-Wisconsin is a fence and pipe system (see Description of Action below) which allow beaver and their dams and impounded water to remain in place while also making it possible for managers to control water levels.

Wetlands are defined in 33 CFR 328.3 as "*those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas*".

REGULATORY CONTEXT

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. In most cases, Section 404 is administered by the U.S. Army Corps of Engineers (USACE). Authorization is required for most activities that results in more than *de minimis* discharge of dredged or fill material into waters of the United States. Certain discharges, such as those associated with normal farming, silvicultural, and ranching practices do not require Section 404 authorization (33 CFR 323.4(1)(i)). "Maintenance" does not require a discharge permit and includes emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, etc., so long as maintenance does not include any modification that changes the character, scope, or size of the original fill design (33 CFR 323.4(2)). Other activities that do not require a discharge permit include maintenance of drainage ditches, construction and maintenance of irrigation ditches, construction and maintenance of farm and forest roads in accordance with best management practices, and maintenance of structures such as dams, dikes, and levees (33 CFR 323.4(3)). However, if the otherwise exempt activities represent a new use of the water or the activity would result in a reduction in reach or impairment of flow or circulation of regulated waters, including wetland, the activity is not exempt.

Some excerpts from 32 CFR 323 are included below for reference:

1. **Dredged Material** is defined in 33 CFR 323.2 as "*material that is excavated or dredged from waters of the United States".*

2. **Discharge of Dredged Material** is defined in 33 CFR 323.2 as *"any addition of dredged material into, including redeposit of dredged material other than incidental fallback within, the waters of the United States. The term includes but is not limited to the following:*
   (i) The addition of dredged material to a specified discharge site located in waters of the United States.
   (ii) The runoff or overflow from a contained land or water disposal area, and
   (iii) Any addition, including redeposit other than incidental fallback, of dredged material including excavated material, into waters of the United States which is incidental to any activity, including mechanized land clearing, ditching, channelization, or other similar activities that redeposit excavated soil material."

   The term ***discharge of dredged material*** does not include the following:
   (i) Discharges of pollutants into waters of the United States resulting from onshore subsequent processing of dredged material that is excavated for any commercial use (other than fill). These discharges are subject to Section 02 of the Clean Water Act even though the extraction and deposit of such material may require a permit from the Corps or applicable State section 404 program.
   (ii) Activities that involve only the cutting or removing of vegetation above the ground (e.g., mowing, rotary cutting, and chain sawing) where the activity neither substantially disturbs the root system nor involves mechanized pushing, dragging, or other similar activities that redeposit excavated soil material.
   (iii) Incidental fallback.

   The following actions do not require Section 404 authorizations (33 CFR 323.2(d)(3)):
   *(i) Any incidental addition, including redeposit, of dredged material associated with any activity that does not have or would not have the effect of **destroying or degrading** an area of waters of the United States as defined in paragraphs (d)(4) and (d)(5) of this section; however, this exception does not apply to any person preparing to undertake mechanized land clearing, ditching, channelization and other excavation activity in a water of the United States…"*
   (ii) "*Incidental movement of dredged material occurring during normal dredging operations, defined as dredging for navigation in navigable waters of the United States…"*
   (iii) "*Certain discharges, such as those associated with normal farming, silviculture, and ranching activities, are not prohibited by or otherwise subject to regulation under section 404. See 33 CFR 323.4 for discharges that do not require permits.*"

   Section 404 also defines what ***destroys*** and/or ***degrades*** waters of the U.S. Destruction is discharge that "*alters the area in such a way that it would no longer be a water of the United States.*" Degrades is defines as any discharge of fill that "*has more than a de minimis (i.e., inconsequential) effect on the area by causing an identifiable individual or cumulative adverse effect on any aquatic function.*"

3. **Fill material** is defined in 33 CFR 323.2 as "*material placed in waters of the United States where the material has the effect of:*
    (i) Replacing any portion of a water of the United States with dry land; or
    (ii) *Changing the bottom elevation of any portion of water of the United States.*"

    Examples of fill material include but are not limited to rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mining or other excavation activities, and materials used to create any structure or infrastructure in waters of the United States. It does not include trash or garbage.

4. **Discharge of fill material "***means the addition of fill material into waters of the United States. The term generally includes, without limitation, the following activities: Placement of fill that is necessary for the construction of any structure or infrastructure in a water of the United States; the building of any structure, infrastructure, or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, or other uses; causeways or road fills; dams and dikes; artificial islands; property protection and/or reclamation devices such as riprap, groins, seawalls, breakwaters, and revetments; beach nourishment; levees; fill for structures such as sewage treatment facilities, intake and outfall pipes associated with power plants and subaqueous utility lines; placement of fill material for construction or maintenance of any liner, berm, or other infrastructure associated with solid waste landfills; placement of overburden, slurry, or tailings or similar mining-related materials; and artificial reefs. The term does not include plowing, cultivating, seeding and harvesting for the production of food, fiber, and forest products…*" (33 CFR 323.2)

5. **Nationwide General Permits (NWP)** The 59 NWPs were reviewed and reissued by USACE in 2021[12]. Three of those NWPs are relevant to WS-Wisconsin's actions and are summarized below. All NWPs are subject to 32 General Conditions[13], which are reviewed for each application of an NWP by WS-Wisconsin.

    A. **National 404 Permit 3 – Maintenance**[14] allows for the *"repair, rehabilitation or replacement of any previously authorized, currently serviceable structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3…Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation or replacement of the structure or fill; such modifications,*

[12] USACE 2022 Statement on NWP Reissuance - https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/19764
[13] Index of 2021 NWPs and General Conditions - https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/20099
[14] Decision Record for the Reissuance of Permit 3 - https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/19768

including the removal of material from the stream channel must be immediately adjacent to the project…This NWP also authorizes the removal of accumulated sediments and debris outside the immediate vicinity of existing structures (e.g., bridges, culverts, road crossings, water intake structures, etc.…)". However, removal of accumulated sediments and debris outside the immediate vicinity of existing structures requires a pre-construction notification to the district engineer prior to commencing the activity

B. **Nationwide 404 Permit 18 – Minor Discharges** allows for minor discharges of dredged or fill material into all waters of the United States provided that 1) the quantity of discharged material and the volume of area excavated do not exceed 25 cubic yards below the plane of the ordinary high water mark, 2) the discharge will not cause the loss of more than 1/10 acre of waters of the United States, and 3) the discharge is not placed for stream diversion. If discharge of dredged or fill material or the volume of area excavated exceeds 10 cubic yards below the plane of the ordinary high-water mark or the high tide line, or the discharge of dredged or fill material is in a special aquatic site, including wetlands, a pre-construction notification must be submitted to the district engineer.

C. **Nationwide 404 Permit 27 – Aquatic Habitat Restoration, Enhancement and Established Activities** allows for activities in waters of the United States associated with the restoration, enhancement and establishment of tidal and non-tidal wetlands and riparian areas, riparian areas, the restoration and enhancement of non-tidal streams and other non-tidal open waters,…provided those activities result in net increases in aquatic resource functions and services…To be authorized by this NWP, the aquatic habitat, restoration, enhancement , or establishment activity must be planned, designed, and implemented so that it results in aquatic habitat that resembles an ecological reference. Binding stream enhancement or restoration agreements may be needed for some projects. Except for the relocation of non-tidal waters on the project site, this NWP does not authorize the conversion of a stream or natural wetlands to another aquatic habitat type (e.g., the conversion of a stream to wetland or vice versa) or uplands. Changes in wetland plant communities that occur when wetland hydrology is more fully restored during wetland rehabilitation activities are not considered a conversion to another aquatic habitat type. There are pre-construction notifications for some projects and there are reporting requirements for projects that do not require pre-project notification.

6. Regional General Permits (RGP)

A. **Minor Discharges RGP** - Regulated activities associated with minor permanent and temporary discharges of dredged or fill material in waters of the US for a

single and complete non-linear project. The regulated discharge may not exceed 400 square feet of waters of the US. Additional exclusions apply.

B. **Transportation RGP – Category 1: Minor Maintenance** removal of accumulated sediment and debris within the vicinity of bridges and culverted crossings, including temporary discharges necessary to conduct those activities. Removal of accumulated sediment and debris is limited to the minimum necessary to reestablish the approximate dimensions of a waterway in the vicinity of a structure to what existed when the structure was built and does not extend farther than 200 feet in any direction from the structure. All dredged or excavated material must be deposited and retained in an area that is not a water of the US.

DESCRIPTION OF ACTION

During calendar years, 2020-2024, WS-Wisconsin removed an annual average of 1,648 beaver dams per year for beaver damage management. Roughly 41% of these beaver dams were removed at the request of the WDNR & USFS for the preservation and enhancement of coldwater fisheries, consistent with the provisions of the Wisconsin beaver and inland trout management plans (Wisconsin Department of Natural Resources 2015, 2019). The majority of the remaining beaver dams were removed to protect infrastructure (roads, trails, bridges, railways, water management devices) and human health and safety. A small number of beaver damage management projects are typically conducted each year at the request of the WDNR or tribes for the enhancement of wild rice lakes, or in response to requests to reduce damage to property and agricultural resources.

Hand tools: The notching/removal of beaver dams is usually done by hand or using hand tools (e.g., rakes, shovels, portable winches). Dams are typically notched from the approximate center to allow a gradual drawdown (see below) leaving dam remnants on either side of the notch, small dams may be completely removed. The materials removed from the dam are deposited on the shore adjacent to the dam, above the waterline. Incidental to dam removal activities, a small amount of mud, sticks, or other debris may fall back into the waterway. Debris and dam materials removed from the waterway are distributed in a way that does not result in a discharge of fill material or create a significant footprint.

Drawdowns (i.e., multi-stage dam removal): To reduce the mobilization of sediment into streams and the risk of damage associated with the rapid release of water, and to prevent changes to streambed elevation downstream of beaver dams, WS-Wisconsin removes large or long-standing dams in at least two stages. First, a notch is taken from the center of the dam to allow 30–50% of the water held behind the dam to enter the fluvial system before the next stage, physical removal activities (hand pulling, blasting) occur to restore free-flowing conditions. Multiple site visits may occur, as needed, to increase the width and depth of the notch before free-flowing conditions are restored. This multi-stage approach may occur over consecutive days; however, the second stage of dam removal often occurs several days after the first step to allow for an adequate level of water to drawdown. In addition to allowing

time for sediment to settle, a multi-stage approach to long-standing dam removal helps to protect the stream channel from incision by the increased flow and pressure of water which would otherwise be released, while protecting property and infrastructure downstream from flooding (Butler and Malanson 2005). Remnants of beaver dams which remain after breaching, often referred to as the wings of a dam, typically remain in a stream for many years, providing residual ecological benefits by trapping sediment and disrupting stream flow, creating slow water refuges behind the remnants (Levine and Meyer 2014).

***Explosives*:** are defined as any chemical mixture or device which serves as a blasting agent or detonator. Binary explosives are individually non-explosive and not classified as explosives until mixed together. Once mixed, binary explosives are considered high explosives and subject to all applicable federal regulations. WS personnel transport and store the explosive components unmixed. The use of binary explosives to remove beaver dams by WS-Wisconsin is conducted by two person teams including a WS Explosives Specialist-In-Charge, who must be a licensed Class 1 Blaster per Wis. Admin. Code § SPS 305.20. Prior to combining the binary explosive components, the team inspects the dam for the best location to restore drainage to the original channel and to ensure that breaching the dam does not result in a significant release of material downstream or a change in downstream streambed elevation. Multicomponent explosives are mixed at the site and placed within the beaver dam to create a vortex of energy to cause the dam material to go up and out (the path of least resistance). When the charges detonate, the energy associated with the explosion is directed away from the water to maximize the impact. The intent of breaching/removal with explosives is to loosen the dam material at the center portion of the dam (typically a 4- to 5-foot-wide section) and allow the force of impounded water to wash away the remaining debris closest to the stream banks. In wider stream channels, the dam remnants will persist. The smallest amount of explosives necessary to accomplish this goal are used. Teams may remove brush, large logs, and rocks from the dam prior to blasting for safety and to improve the efficacy of the blast. Blasting holes are pushed into the dam with a stick for charge placement. Charges are placed to remove dam material and intended to not impact the stream bed. An air horn warning is used prior to blasting and an "All clear!" is voiced after blasting. The explosive blast may cause a small amount of material (which was already present in the system) to fall back into the waterway. The licensed Class 1 Blaster inspects the site after the charge has detonated. Generally, activities are concentrated in a 150 square-foot area, and it takes about 20 minutes from arrival to the removal of a dam with explosives. Following blasting, WS-Wisconsin staff inspect the dam site to ensure the blockage has been sufficiently cleared to allow for free-flowing conditions.

Light-load explosive charges: prior to utilizing multicomponent explosives to remove a beaver dam, the licensed Class 1 Blaster inspects site conditions. In situations where less explosive charge is required to safely remove the desired segment of the beaver dam, the blaster will reduce the amount of components in the charges. Situations where this method may be used include shallow stream beds, near infrastructure, or for other site-specific safety or environmental protective concerns. Federal consultations for the protection of T&E species or state incidental take permits may also call for the use of light-load explosive

charges.

Water control devices are fixed installations designed to regulate water levels in impoundments that can be used, in some situations, to maintain water flow through the dam and to address concerns about high water levels resulting from beaver dams. The devices may be used in situations where the presence of a beaver impoundment is desired, but it is necessary to manage the level of water in the impoundment. They may also be used in areas where beaver damming is highly likely and frequent maintenance or clearing debris is challenging, costly, and/or not desired such as a road culvert or other types of water control structures. Water flow after the installation is maintained despite the beavers' efforts to block the water movement at the dam. For example, a water control device could enable a manager to reduce water level to the point where it no longer covers or threatens roads and trails while still retaining the benefits of a smaller beaver impoundment.

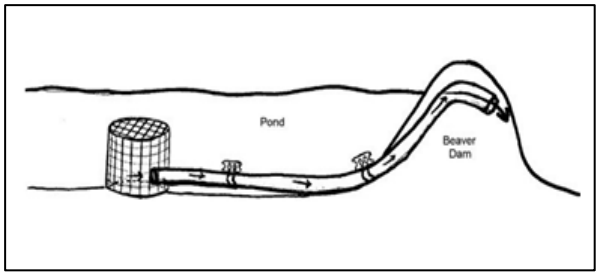


Figure D-1 An example of a flexible pipe with a round fence used to control the water level at a beaver dam.

In general, these devices use a combination of a fence and pipe which allow beaver and their dams and pools to remain in place while also making it possible for managers to control water levels. One example of a common fence and pipe system is shown above. In this example, a flexible pipe is anchored at the deepest point of the impoundment. This end is the intake and is permeable or has holes drilled into it. The intake end is enclosed in fencing to prevent beaver from plugging the openings while the opposite end of the pipe is installed through or over the beaver dam. This end is the outlet. This system allows water to flow through the intake and out the pipe, by passing the beaver dam. These systems rely upon exclusion and deception to create water flow where beavers are unable to identify or block the flow. Other versions of the device include the three-log drain, the T-culvert guard, wire mesh culvert, and the Clemson beaver pond leveler, as well as other customized versions to address site-specific concerns (e.g., movement of sensitive species).

The installation of a typical water control device is conducted by WS-Wisconsin personnel using hand tools within the stream. WS-Wisconsin staff create a notch in the existing beaver dam, as described above, to install the drainage pipe through the dam. If the beaver dam is holding a significant amount of water or sediment behind it, the width and depth of the notch may be increased in multiple steps over a period of hours/days (as a drawdown, see ***Drawdown***, above) before installing the pipe, to avoid a substantive discharge of dredged or fill material. Once installed, some dam material is usually replaced on top of the drainage

pipe to incorporate it into the beaver dam. Materials removed during the notching process are reincorporated into the dam above the pipe. Water control devices are anchored into the substrate with t-posts or similar posts, or in other versions the pipe may be weighed down with attached cinderblocks.

Beaver dam notching/removal may be conducted in either recently constructed or long-standing beaver dams, described in detail below:

Recently constructed beaver dams have not been in place long enough for wetland conditions to develop in association with the beaver impoundment, these dams are typically less than 3 years old and do not meet the definition of a wetland noted above. In general, recently constructed beaver dams have not been in place long enough for substantial amounts of sediment to accumulate. This is the most common type of beaver dam encountered during beaver damage management. Recently constructed beaver dams may be breached/removed all at once or through a drawdown (see two-stage dam removal). The determination of which process to employ depends upon the individual site characteristics and amount of water and sediment behind the dam. Federal and state consultations for the protection of T&E species or state incidental take permits may also call for the use of drawdowns instead of removing the dam in one stage. Dam remnants, where present, help to retain sediments. Dam drawdowns, when used, also help to minimize the transport of sediment during the release of water from the dams. Collectively, the notching/removal of recently constructed beaver dams typically results in the mobilization of a *de minimis* level of sediment in the stream which is not of sufficient magnitude to change the bottom elevation of the downstream streambed and is, therefore, not a regulated activity under Section 404 of the CWA.

EXCEPTIONS: In rare circumstances, typically influenced by site characteristics, unusually high amounts of sediment may accumulate behind recently constructed beaver dams. In these situations, the notching/removal of beaver dams would be conducted in accordance with applicable authorizations under Section 404 of the CWA. In most cases, the beaver dam notching/removal activities conducted by WS-Wisconsin would qualify for one of the Nationwide Permits noted above. Use of Nationwide Permits must comply with all USACE national and St. Paul District restrictions and reporting requirements. Consultation with USACE would be conducted as applicable and required.

Long-standing beaver dams: In rare instances, WS-Wisconsin may receive a request to remove a beaver dam from an area where wetland plant and animal communities have become established in the impoundment and/or where a beaver dam has been actively maintained for 3 or more years. This is most likely to occur when WS-Wisconsin receives a request from the WDNR to help with trout stream enhancement in a new area. Other circumstances where WS-Wisconsin may be requested to remove older dams are for the protection of property/infrastructure or human health

and safety (e.g., situations where there are safety concerns about an old dam with a large impoundment failing or infrequently accessed timber harvest roads). Wetland conditions may take more than 3 years to establish and be difficult to identify under field conditions, however, long-standing or "old" beaver dams in Wisconsin typically exhibit visual characteristics experienced wildlife specialists/biologists may use to distinguish them from recently established dams. Some notable characteristics of long-standing dams include the following:

- Long-standing dams tend to be broader than newly built dams as width increases over time through ongoing beaver activity.
- Fresh wood is typically absent on the downstream side of long-standing dams as, absent a breach, once a dam is fully constructed, fresh mud and sticks are usually only added to the upstream side of the dam.
- Long-standing dams often contain significant herbaceous vegetation growing within them and may have woody vegetation growing on top of the dam which would not be present in recently constructed dams. However, woody vegetation reaching 3 years of age (estimated by counting annual growth rings) is unlikely to be present on dams unless beavers are absent from the area due to abandonment, harvest, or other reasons.

The notching/removal of long-standing beaver dams that have accumulated significant impounded water and trapped sediment will be conducted by drawdown through at least two-stages (see Drawdowns above). Explosives may be used as the second or later stage of a drawdown. In most cases when a gradual drawdown is used, a *de minimis* level of sediment will be mobilized in the stream that is not of sufficient magnitude to change the bottom elevation of the downstream streambed. When this is the case, the action will not change the bottom elevation of any portion of water of the United States and, as such, is not a regulated activity under Section 404 of the CWA.

EXCEPTIONS: In some situations, depending on site characteristics, the use of a gradual drawdown may not be sufficient to adequately protect the downstream streambed sediment deposition following the notching/removal of a long-standing beaver dam. This may occur with notching/removal using hand tools or when explosives are needed to remove large heavily packed, or inaccessible dams that cannot be removed with hand tools. In these cases, WS-Wisconsin would consult with USACE, and the notching/removal of beaver dams would be conducted in accordance with resulting permits and requirements established by the USACE. In almost all cases, WS-Wisconsin activities would qualify for one of the Nationwide Permits noted above. Use of Nationwide Permits must comply with all USACE national and St. Paul District restrictions and reporting requirements. Consultation with and notification of the USACE would be conducted as required.

CONCLUSIONS

For purposes of the CWA, the material (sticks, mud, debris) WS-Wisconsin physically removes from above the ordinary high-water mark does not constitute dredged material. Discharged

dredged material is any addition of dredged material into, including redeposit of dredged material other than incidental fallback within, the waters of the United States. USDA has reviewed typical construction practices associated with dam removal and found that typically, the only result from WS-Wisconsin's actions, as described above, is incidental fallback. Incidental fallback is not regulated under the USACE under Section 404 of the CWA, and no Section 404 permits are required. If there are questions on whether any actions would result in the discharge of dredged fill material, the USACE would be contacted to ensure compliance with the CWA. WS-Wisconsin would also contact the USACE in instances when the dam is surrounded by wetlands, and it is not possible to deposit beaver dam materials above the ordinary high-water mark.

The release of sediment behind a beaver dam and incidental discharge of dam components downstream while notching/removing a beaver dam may be conservatively considered "*fill material*", even though the materials already occur within the waterway due to natural processes and are not placed in waters of the United States by WS-Wisconsin. As noted above for recently constructed beaver dams, in almost all circumstances, given the limited amount of sediment behind the dams and the protective measures implemented by WS-Wisconsin, the fill material (e.g., sediments) mobilized by notching/removal would not be sufficient to replace any portion of a water of the United States with dry land or substantively change the bottom elevation of any portion of water of the United States. Similarly, for older beaver dams the use of drawdowns reduces the disturbance and mobilization of accumulated sediments behind the dam. The retention of dam remnants, where site conditions permit, also aids in retention of sediments. Given these provisions, in many instances, notching/removal of long-standing beaver dams will not result in the mobilization of sediments sufficient to replace any portion of a water of the United States with dry land or substantively change the bottom elevation of any portion of water of the United States.

Under certain circumstances as described above, notching/removal of a beaver dam might result in significant sediment movement and changes to the bottom elevation of the streambed, downstream of the dam. WS-Wisconsin evaluates the site-specific characteristics of each project area prior to making a management determination as to whether authorization under Section 404 of the CWA is warranted. In almost all cases, WS-Wisconsin activities would qualify for one of the General Permits noted above. Use of General Permits must comply with all USACE national and St. Paul District restrictions and reporting requirements. Consultation with USACE would be conducted as applicable and required. If it is determined that a beaver dam cannot be notched/removed under the authorization provided by a General Permit, the landowner or cooperator would be responsible for obtaining a Section 404 permit before the dam could be notched/removed by WS-Wisconsin.

APPENDIX E: ISSUES AND ALTERNATIVES NOT CONSIDERED FOR COMPARATIVE ANALYSIS

E.1. ISSUES NOT ADVANCED FOR COMPARATIVE ANALYSIS

The following issues were raised by the public during scoping for this EA or similar APHIS-WS NEPA reviews. Although these issues were considered in the development of this EA, they were not advanced for comparative analysis. Each issue and the reason for not advancing it for comparative analysis are presented below.

E.1.1. Does the EA need to determine the maximum number of beavers that could be supported in Wisconsin if all sources of removal are discontinued to adequately understand the environmental baseline?

No, in accordance with CEQ guidance, agencies do not need to consider hypothetical conditions without existing human impacts unless that is the situation at the time of the project proposal. NEPA analyses must consider the impacts of major federal actions on the quality of the human environment (42 U.S.C. 4321). Human environment, as used in the NEPA, refers to the natural and physical environment and the relationship of present and future generations with that environment. As it related to this EA, human environment includes ongoing impacts such as licensed harvest and other beaver removals. The NEPA requires consideration of a "no action" alternative which serves as the environmental baseline against which new alternatives are compared. CEQ guidance provides the following information regarding the "no action" alternative:

> "*There are two distinct interpretations of "no action" that must be considered, depending on the nature of the proposal being evaluated. The first situation might involve an action such as updating a land management plan where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases, "no action" is "no change" from current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed. Consequently, projected impacts of alternative management schemes would be compared in the EIS to those impacts projected for the existing plan. In this case, alternatives would include management plans of both greater and lesser intensity, especially greater and lesser levels of resource development.*
>
> *The second interpretation of "no action" is illustrated in instances involving federal decisions on proposals for projects. "No action" in such cases would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the*

effects of permitting the proposed activity or an alternative activity to go forward.

Where a choice of "no action" by the agency would result in predictable actions by others, this consequence of the "no action" alternative should be included in the analysis. For example, if denial of permission to build a railroad to a facility would lead to construction of a road and increased truck traffic, the EIS should analyze this consequence of the "no action" alternative.

In light of the above, it is difficult to think of a situation where it would not be appropriate to address a "no action" alternative…. This analysis provides a benchmark, enabling decisionmakers to compare the magnitude of environmental effects of the action alternatives. (Council on Environmental Quality 1981)

WS-Wisconsin has been providing BDM assistance in the state for decades (e.g., USDA 2013). As documented in Section 3.1, and in the descriptions of the alternatives in Section 2.5, other entities can and are likely to conduct the same or similar activities in the absence of BDM assistance from WS-Wisconsin in most circumstances. As such, we are using the first CEQ definition of "no action" alternative, namely continuing with the present course of action.

E.1.2. Is WS-Wisconsin required to prepare a cost-benefit analysis?

No. The statute of 1931 authorizing the APHIS-WS program, as amended, does not incorporate consideration of economic valuations and cost-effectiveness for the IWDM program as part of decision-making (Section 2.6.2).

Section 102 (B) of the NEPA ensures that federal agencies appropriately integrate values and effects that are difficult and sometimes impossible to quantify from an effects or cost-effectiveness standpoint into decision-making. For example, the intrinsic value of wildlife, biodiversity and to some extent human health and safety, are more difficult to quantify.

WS-Wisconsin has determined there are important qualitative values that are relevant to its decision-making that are considered in this EA, but those considerations will not be monetized. Estimates of non-monetary cost and benefit values for public projects that are not priced in private markets can be difficult to obtain, and methodologies can only produce implied monetary values that are subjective and require value judgments. Selecting an appropriate discount rate to measure the present monetary value of costs and benefits that will occur in the future is also difficult and subjective, with the level of the discount rate creating dramatically different project benefits. Issues pertaining to cost effectiveness of specific methods are included with descriptions of the methods in Appendix F.

E.1.3. How does the WDNR process for updating the state beaver management plan impact this EA?

We are aware that the WDNR is in the early stages of preparing a new beaver management plan. APHIS-WS does not have the authority to dictate wildlife management policies to the states or USFWS. Consequently, while the WDNR, as a cooperating agency on this EA, may consider information in the EA, the EA cannot dictate WDNR policy or practice. Instead, in accordance with APHIS-WS Directives and policy, WS-Wisconsin adjusts its activities for compliance with applicable state laws, regulations and management plans (WS Directive 2.210). Consequently, we will review this EA once the new state beaver management plan is completed to determine if revision or replacement of the EA is warranted.

E.1.4. Effects on Soil, Visual, and Air Quality

The implementation of those alternative approaches discussed in Section 2.4.1 by WS would meet the requirements of applicable federal laws and regulations for the protection of the environment including the Clean Air Act. Actions described in Section 2.4.1 do not involve major ground disturbance or construction. The use and storage of tools and materials by WS-Wisconsin personnel would also follow APHIS-WS Directives, including WS Directive 2.210, WS Directive 2.430, WS Directive 2.435, WS Directive 2.465, WS Directive 2.605, WS Directive 2.615, WS Directive 2.625, and WS Directive 2.630.

Almost all methods available for use to manage damage caused by beaver are mechanical. With the exception of ammunition, mechanical methods would not cause contaminants to enter water bodies or result in bioaccumulation. Nontoxic (lead-free) ammunition is used by WS-Wisconsin, if available. Due to availability, WS-Wisconsin personnel could use lead ammunition in rifles, handguns, air rifles, and shotguns. The impact of this is expected to be very low, in part because firearms are rarely used by WS-Wisconsin as a tool to remove beaver independent of trapping. Body-gripping traps are the primary method used by WS-Wisconsin to capture beaver (approximately 74.6% of beaver taken during CY 2020 – 2024) and, with rare exception, beavers are killed by the devices and secondary euthanasia via shooting is not needed. Foothold traps are used to remove approximately 24.9% of beaver and are set as submersion sets, which kill the captured animal. Shooting (without use of a capture device) is used for only 0.1% of all beaver taken. Most firearm use to remove beaver involve beaver which are live captured by other methods and subsequently euthanized by shooting. This secondary shooting often occurs on land, away from bodies of water and is not likely to exceed 1% of beaver removed per year by WS-Wisconsin.

There are concerns about the deposition of lead into the environment from ammunition used in firearms. However, based on review of impacts associated with situations involving high levels of lead deposition in the environment, risks of substantive environmental impacts from WS-Wisconsin BDM are extremely low. Firearm use by WS-Wisconsin for BDM is minimal and predominantly opportunistic, with only 16 beavers removed by this method from CY 2020 – 2024. As noted above, additional beavers were live-captured using other methods and subsequently euthanized by shooting, however, this number is still a very small fraction of the cumulative beaver taken by WS-Wisconsin.

In an ecological risk assessment on lead shot exposure in non-waterfowl birds, ingestion of lead shot was identified as the concern rather than just contact with lead shot or lead leaching from shot in the environment (Kendall et al. 1996). Deposition of lead into soil could occur if during the use of a firearm the projectile passed through the target animal, misses occurred, or if the carcass is not retrieved. Laidlaw et al. (2005) reported that because of the low mobility of lead in soil, all the lead that accumulates on the surface layer of the soil generally stays within the top 20 cm (about 8 inches). Stansley et al. (1992) studied lead levels in water subject to high concentrations of lead shot accumulation because of intensive target shooting at several shooting ranges. Lead did not appear to "transport" readily in surface water when soils were neutral or slightly alkaline in pH (i.e., not acidic), but lead did transport more readily under slightly acidic conditions. Although the study detected elevated lead levels in water in a stream and a marsh that were in the shot "fall zones" at a shooting range, the study did not find higher lead levels in a lake into which the stream drained, except for one sample collected near a parking lot. Stansley et al. (1992) believed the lead contamination near the parking lot was due to runoff from the lot and not from the shooting range areas. The study also indicated that even when there was high lead shot accumulation in areas with permanent water bodies present, the lead did not necessarily cause elevated lead levels in water further downstream. Muscle samples from two species of fish collected in water bodies with high lead shot accumulations had lead levels that were below the current threshold standard of safety for children of 2.2 µg per day (Stansley et al. 1992, Flannery and Middleton 2022).

Craig et al. (1999) reported that lead levels in water draining away from a shooting range with high accumulations of lead bullets in the soil around the impact areas were far below the "action level" of 15 parts per billion as defined by the EPA (i.e., requiring action to treat the water to remove lead). The study found that the dissolution (i.e., capability of dissolving in water) of lead declines when lead oxides form on the surface areas of the spent bullets and fragments. Therefore, the lead oxide deposits that form on the surface of bullets and shot serves to reduce the potential for ground or surface water contamination (Craig et al. 1999). Those studies suggest that, given the very low amount of lead that WS could deposit and the concentrations that would occur from WS' activities to reduce beaver damage using firearms, as well as most other forms of dry land small game hunting in general, lead contamination of water from such sources would be minimal to nonexistent.

Beaver removed by WS-Wisconsin using firearms could be lethally removed by the entities experiencing damage using the same method, therefore, impacts of lead use by WS-Wisconsin beaver removal would not be additive to the environmental status quo. The proficiency training received by WS-Wisconsin employees in firearm use and accuracy would increase the likelihood that beavers are lethally removed humanely and that misses occur infrequently. Accuracy and selecting the most appropriate ammunition for the project further reduces the potential for lead deposition in the soil from misses or from projectiles passing through carcasses. Based on current information, the risks associated with lead projectiles that WS could contribute to the environment due to misses, the

projectile passing through the carcass, or from beaver carcasses would be below any level that would pose a risk from exposure or significant contamination.

Consequently, WS does not expect that implementing any of the alternative approaches discussed in Section 2.5 would significantly change the environmental status quo with respect to soils, geology, minerals, air quality, prime and unique farmlands, timber, and range. WS has received no reports or documented any effects associated with soil and air quality from previous activities associated with managing damage caused by beaver. Therefore, the EA will not analyze those elements further.

E.1.5. WS' Actions and Irreversible and Irretrievable Commitments of Resources

Other than relatively minor uses of fuels for vehicles, electricity for office operations, immobilization chemicals, components associated with multi-component explosives, and some components associated with ammunition, no irreversible or irretrievable commitments of resources result from WS' activities.

E.1.6. Impacts on Cultural, Archaeological, Historic, and Unique Characteristics of Geographic Areas

A number of different types of federal and state lands occur within the analysis area, such as national wildlife refuges, national forests, and wildlife management areas. WS-Wisconsin recognizes that people interested in those areas may feel that any activities that could occur in those areas would adversely affect the esthetic value and natural qualities of the area. Similarly, WS-Wisconsin's activities could occur in areas with cultural, archaeological, and/or historic resources if the appropriate owner, manager, or tribal authority requests WS-Wisconsin's assistance.

During development of the EA, WS-Wisconsin made a Consistency Determination pursuant to Section 307(c)(1) of the Coastal Zone Management Act (16 USC 1456) and 15 CFR Part 930, sub-part C for WS-Wisconsin's BDM activities. WS concluded the proposed activities to manage beaver damage using an integrated methods approach in accordance with applicable state regulations is consistent to the maximum extent practicable with the enforceable policies of the Wisconsin Coastal Zone Management Program. WS-Wisconsin has submitted a request for concurrence to the Wisconsin Department of Administration Coastal Management Program. and they are making the EA and associated determination of consistency available for public review concurrent with the public comment period for this EA.

If WS-Wisconsin implements Alternatives 1-3, the methods that WS could employ are not expected to cause major ground disturbance. WS could use multicomponent explosives and hand removal to breach or remove beaver dams. Those methods would only involve portions of the beaver dam with the intent of restoring the recent flow of water in the existing water channel. The methods available would not cause any major alterations of property, and would not involve the sale, lease, or transfer of ownership of any property.

In general, implementation of Alternatives 1-3 would not have the potential to introduce visual, atmospheric, or audible elements to areas that could result in effects on the character or use of properties. Therefore, if WS-Wisconsin implemented Alternatives 1-3, the methods would not have the potential to affect the unique characteristics of geographic areas or any cultural, archeological, or historic resources. If WS-Wisconsin implements Alternatives 1-3 and plans an individual activity with the potential to affect historic resources, WS-Wisconsin and/or the entity requesting assistance would conduct the site-specific consultation, as required by Section 106 of the National Historic Preservation Act, as necessary.

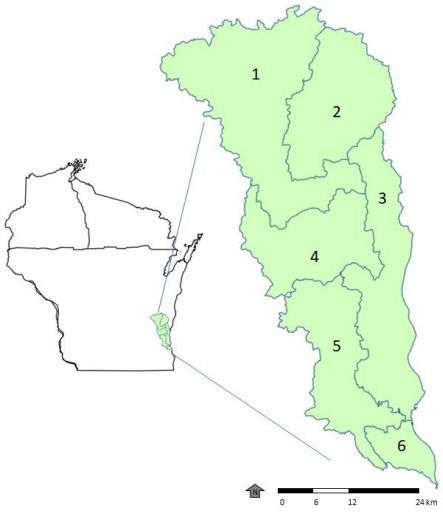
Conducting activities at or near historic or cultural sites for the purpose of alleviating damage caused by beaver may have the potential for audible effects on the use and enjoyment of the historic property. For example, WS could use firearms to remove beaver or multi-component explosives to remove a beaver dam. However, WS would only use such methods at a historic site after the property owner or manager signed a WID allowing WS to conduct activities on their property. A built-in minimization factor for this issue is that nearly all the methods involved would only have very brief effects on the audible nature of a site and could be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects.

WS would abide by federal and state laws, regulations, work plans, Memorandums of Understanding, and policies to minimize any effects and would abide by any restrictions imposed by the land management agency on activities conducted by WS-Wisconsin. The implementation of alternative approaches discussed in Section 2.5 by WS would meet the requirements of applicable federal laws, regulations, and Executive Orders for the protection of the unique characteristics of geographic areas or any cultural, archeological, and historic resources.

E.1.7. How do the findings of Liao et al. 2022 relate to the habitat suitability model by Robinson et al. (2025)?

Liao et al. (2020) estimated the carrying capacity of beaver colonies that could occur in the Milwaukee River Watershed by multiplying the number of river miles (corrected to subtract stream miles classified as impaired by the WDNR) in each of five subwatersheds by estimates of beaver colony density per mile and beaver per colony from the literature. A sixth subwatershed, the Kinnickinnic subwatershed was deemed too impaired to sustain a beaver population. Liao et al. (2020) used a density multiplier of (0.66 colonies/stream km) based on values reported by several other studies in different regions considered to be similar to Wisconsin from Muller-Schwarze (2011). Their model indicated that the Milwaukee River Watershed had the capacity to support approximately 4,563 beavers, in 840 colonies. This estimate is substantially higher than the colony estimate obtained when the model by Robinson et al. (2025) is applied to the same area (Figure E-1).

Some of the difference between the two models relates to the objectives of the model wherein Liao et al. (2020) sought to estimate maximum carrying capacity while Robinson et al. (2025) used estimates of colony density from studies in Wisconsin (e.g., Ribic et al. 2017) that reflected impacts of current management and harvest practices. Additionally, the Robinson et al. (2025) model assigned density estimates to stream segments based habitat conditions, unlike Liao et al. (2020) that assigned one density estimate to all stream miles. This factor would have resulted in lower carrying capacity estimates if applied to the Liao et al. (2020) calculations. Robinson et al. (2025) included lakes and ponds in their habitat calculations which contributed to larger estimates of habitat km for each subwatershed, but the lower maximum colony density and adjustments for habitat quality still resulted in lower estimates of beaver colony density despite the additional stream km of habitat. Liao et al. (2020) modeled locations where beaver dams may occur based on site characteristics but failed to take beaver biology and territoriality into consideration. Much of the difference between the results of the Liao et al. (2020) and Robinson et al. (2025) models is the results of differences in the calculations, and the difference should not be interpreted as quantifying the consequence of beaver management and habitat alterations. We used the model by Robinson et al. (2025) in the impact analysis for this EA because it best reflects current conditions.



Watershed	Liao et al. Estimates	Habitat Index Estimates
1) Milwaukee River East-West Branch	499 km 322 Colonies	653 km 136 Colonies
2) Milwaukee River North Branch	232 km 154 Colonies	321 km 67 Colonies
3) Milwaukee River South Branch	237 km 105 Colonies	379 km 72 Colonies
4) Cedar Creek	246 km 158 Colonies	377 km 76 Colonies
5) Menomonee River	264 km 101 Colonies	328 km 64 Colonies
6) Kinnickinnic River	39 km Beaver unlikely	42 km 8 Colonies
Total	1,517 km **840 Colonies**	2,100 km **423 Colonies**

Figure E-1. Waterway lengths and beaver colony estimates projected by the Robinson et al. (2025) habitat suitability-model compared to projected colonies from Liao et al. (2020) model.

E.1.8. How does beaver and beaver dam removal relate to tribal access to treaty resources and The Public Trust Doctrine?

This issue pertains to Wisconsin's Public Trust Doctrine, which applies to all navigable waters. Among other things, The Public Trust Doctrine protects the rights of the public to transportation, navigation, and recreational activities (e.g., boating, fishing, hunting, swimming) on waterways. This allows access through private lands using navigable waters for recreational purposes, without permission of the riparian (landowner), and does not constitute a trespass. However, Section 1255j of 2001 Wisconsin Act 16 amended Chapter

30.134 of the Wisconsin Statutes to restrict this authorization. Under the present statute, the public may not enter "the exposed shore area" except from within the navigable water, a point of public access, or with landowner permission. Beaver dam removal could have an impact on the presence and the amount of year-round water at a site and tribal members' ability to access treaty resources on public lands.

Removal of beaver dams from private lands is only permitted within the parameters defined in WDNR regulations which are not impacted by WS or subject to the provisions of this EA. None of the alternatives can alter private access to beaver or beaver dam removal for damage management. WDNR rulemaking and the application of The Public Trust Doctrine to WDNR actions is outside the scope of this analysis.

As noted in the EA, we anticipate that private landowners who perceive the need for beaver and beaver dam removal and who are legally allowed to do so, will conduct beaver and beaver dam removal with or without assistance from WS-Wisconsin. Insofar as dam removal on private lands relates to site access, almost all areas where BDM is conducted on private lands involve recently constructed dams. As such, dam removal restores the site to its environmental status quo including historic site access and the ordinary high-water mark of the waterway. Private landowners are under no obligation to maintain or create increased or altered site conditions for tribal or public site access. Given that WS-Wisconsin lacks the ability to substantively address this issue under any possible alternative, we have not advanced this issue for detailed analysis.

E.2. ALTERNATIVES NOT CONSIDERED FOR COMPARATIVE ANALYSIS

E.2.1. Use Only Technical Assistance

Under this alternative, WS-Wisconsin would only respond to requests for assistance by providing recommendations and educational materials involving lethal and/or nonlethal methods. WS-Wisconsin would not conduct any operational assistance. Any operational BDM would be conducted or arranged by the landowner/manager. As WS-Wisconsin would not conduct any operational BDM, impacts of WS-Wisconsin's actions would be similar to Alternative 4. In theory, the technical assistance provided by WS-Wisconsin could reduce the environmental risks associated with improper use of methods, however, technical assistance is already readily provided by agencies and non-governmental organizations[15] (e.g., WDNR, The Beaver Institute, University of Wisconsin Extension). Adding WS-Wisconsin to the list of sources for this information is unlikely to substantially change the impacts of this alternative.

E.2.2. Only Use Nonlethal Methods

[15] Examples of alternative information sources include the WDNR https://widnr.widen.net/content/m10ch9z9t4/pdf/beaverdamage.pdf and The Beaver Institute https://www.beaverinstitute.org/, and the Internet Center for Wildlife Damage Management https://icwdm.org/species/rodents/beavers/damage-prevention-and-control-methods/.

Under this scenario, WS-Wisconsin would provide only nonlethal technical and operational assistance and would not implement or advise others on the use of lethal methods. As noted in Section 2.5.2, only utilizing nonlethal is likely impractical and ineffective for all projects, and for the protection of coldwater fisheries. While there are examples of municipalities that have been able to cost-effectively address all or most beaver damage conflicts with nonlethal processes alone, to sometimes great effect (Hood et al. 2018, Brick and Woodruff 2019, Callahan et al. 2019), As Callahan (2019) noted, approximately 25% of their beaver conflict sites could not be managed with nonlethal methods alone. WS-Wisconsin does not have the authority to require entities seeking BDM assistance to use nonlethal methods. As noted in Section 2.5, in all Alternatives where WS-Wisconsin provides BDM assistance, the use of nonlethal methods is permitted and will be offered and, with cooperator approval, may be utilized where practical and effective. Additionally, implementation of this alternative would have impacts intermediate to Alternatives 2 and 3, with the impacts of WDNR actions for the protection of coldwater fisheries identical to Alternative 3 and the impacts of WS-Wisconsin's actions as described for Alternative 2. Analyzing this alternative in detail would not provide substantive new information. For the reasons above, this alternative will not be addressed in detail.

E.2.3. Relocation Instead of Lethal Removal

This alternative would relocate all beavers that would otherwise be lethally removed. Relocation of beaver has been proposed as a mechanism to increase the benefits of beaver in areas with lower beaver densities (e.g., Liao et al. 2020, Pollock et al. 2023). Some individuals also considered it a more humane alternative to lethal removal. This alternative was not considered in detail primarily because it is not feasible for WS-Wisconsin to implement capture and relocation as an alternative to all lethal removals. Capture and relocation is included among the nonlethal methods that can be used as part of an integrated BDM strategy under Alternatives 1-3. Such action would primarily be conducted in collaboration with agencies, tribes, and municipal governments and that seek to relocate beaver to properties under their jurisdiction and private entities that could collaborate with landowners/managers, including agencies and tribes.

On average, over the period of CY 2020 – 2024, WS-Wisconsin lethally removed an annual average of 3,131 beaver per year. Many of the areas where WS-Wisconsin works, especially the areas where BDM is conducted for coldwater fisheries, are remote. Relocating live-captured beaver out of these areas via canoe or ATV, even if only to get them to a transfer point where a partner agency, tribe or private organization would pick them up would likely take considerably more time and resources than the current program. This would result in a decrease in the number of sites where WS-Wisconsin could conduct BDM or an increase in cooperator costs to provide current levels of assistance. Implementation of this alternative would also require extensive investment in cage and/or suitcase style traps by WS-Wisconsin (see below for discussion of beaver holding facilities). Federal funds only account for approximately 2% of all funds used by WS-Wisconsin for BDM. Unless cooperators agree to have a portion of their current funds allocated for capture and relocation or agree to the additional costs associated with capture and relocation, WS-Wisconsin would be unable to

implement this method. Cooperators who choose not to support capture and relocation would still be able to conduct BDM activities on their own as discussed in Sections 2.5.2 and 2.5.3.

WS-Wisconsin does not own or manage lands and does not have the facilities to temporarily hold beaver while efforts are made to capture the entire colony as suggested in current best practices for beaver relocation (Pollock et al. 2023). WS-Wisconsin also does not have a veterinarian on staff to conduct health screenings of captured beaver to ensure they are healthy and disease free prior to release, which is advisable, and has been done with beavers captured for translocation in Utah (Roug et al. 2022). Quarantine and health screenings prior to the release of wild-captured or captive-reared wildlife, even for those being transported short distances across the landscape, is a worthy precaution to protect the health of the released animals and indigenous wildlife at the release site and can help prevent transporting zoonotic diseases and internal parasites across the landscape (Woodford 2000). While the WDNR does not require a permit to capture and relocate beaver, consent of the landowner/manager of the site where relocation is to occur is required. Release of beaver on state owned land is not permitted without the express permission of the WDNR. Finding sufficient locations to place the beavers that could be involved in this alternative would likely be challenging. Beavers do not always remain in the release area, and a successful relocation program may require collaboration from multiple landowners/managers in a region. Even in high quality habitat without competing beaver presence, Dittbrenner et al. (2022) found that multiple colony releases, over several years, were often necessary before a site was permanently colonized. Without these collaborations and public acceptance of introducing beaver to an area they were absent, there is a risk that relocated beaver could be removed by a different entity for damage management (Holmes et al. 2024).

Relocation is not without risk to the animals. General determinations regarding the need to increase the beaver population and associated beaver impoundments and wetlands in all or a particular portion of the state are the prerogative of the WDNR, Tribes and land management agencies that have responsibility for the management of beaver and lands under their jurisdiction. Petro et al. (2015) evaluated mortality related to beaver relocations in Oregon. Relocated beaver in the study had a 47% survival rate, similar to the 49% survival rate documented for the first six months of a study in Wyoming and 43% after a year (McKinstry and Anderson 2002). Predation was the leading cause of mortality in both studies. Petro et al. (2015) also documented several deaths due to illness that was possibly exacerbated by stress related to the relocation. Current best practices may reduce, but not eliminate, mortality associated with relocation (Pollock et al. 2023).

Relocation is included among the methods that may be used by WS-Wisconsin under Alternatives 1-3, and because relocation alone is not a feasible solution to all conflicts, this alternative does not meet the purpose and need.

E.2.4. No Use of Lethal Methods in the Milwaukee River Watershed

This alternative was proposed by members of the public as a strategy to increase beaver numbers in the Milwaukee River Watershed and potentially decrease problems with downstream flooding (Liao et al. 2020). WS-Wisconsin has had negligible impacts on the beaver population in the Milwaukee River Watershed, having removed zero beaver and only four beaver dams from this watershed over the most recent five years, CY 2020 - 2024. Over the same span, WS-Wisconsin has only lethally removed 11 beaver and seven dams (average of approximately two beaver and slightly more than one dam per year) from the six counties (Dodge, Fond du Lac, Milwaukee, Ozaukee, Sheboygan, and Washington) included entirely, or partially, in the Milwaukee River Watershed. The work was conducted at two project sites (one airport for human health and safety and one site to resolve property damage). One site was within the watershed and only involved beaver dam removal. The second site was not within the watershed and involved dam and beaver removal. This level of beaver removal is not of sufficient scope or magnitude to substantively impact the beaver population in an area of this size (i.e., the six counties that include some of the watershed). We expect requests for WS-Wisconsin BDM assistance in this area to increase slightly over the next 5-10 years, as beaver populations continue to expand and increase in the area. WS-Wisconsin would encourage use of practical and effective nonlethal methods in this area under Alternatives 1-3 and would be able to make resources from the WS Nonlethal Initiative available to cooperators in this area in Alternatives 1-3).

As noted in Figure 1-1 and Section 3.2, most human-caused beaver mortality in Wisconsin is attributable to licensed harvest and there is unreported take for damage management. The WDNR is responsible for determining beaver management policy and objectives for this region and has not concurred with proposals to establish special management procedures or regulations to enhance the beaver population in the Milwaukee River Watershed.

E.2.5. Use Regulated Hunting and/or Trapping to Reduce Beaver Damage

The WDNR can and has used regulated sport hunting and trapping by private individuals as an effective population management tool for beaver (Wisconsin Department of Natural Resources 2015). State-sponsored sport hunting and trapping programs can be one of the most efficient and least expensive techniques for managing populations over broad areas. However, this alternative is not necessarily effective for addressing localized damages and threats at the time the problem is occurring because avocational trappers may not always be available or interested in trapping at the time the damage is occurring. Avocational trapping for native species is typically limited to winter months while pelts have commercial value, but damage occurs year-round. Additionally, effective damage management may require dam removal and/or installation of water control or exclusion devices. Hunters and trappers may not be willing to engage in all activities needed to effectively resolve conflicts with beaver. Ultimately, this alternative is not within the authority of WS-Wisconsin to implement. This alternative was not considered in detail because the WDNR, not WS-Wisconsin, is responsible for setting harvest levels for individual species.

E.2.6. Only Subsidize Nonlethal Methods Implemented by Resource Owners

This alternative would prevent WS-Wisconsin from participating in any operational activities. WS-Wisconsin would only provide technical assistance and supplies to resources owners for use in implementing nonlethal methods such as wire fencing and screens, or the fencing, pipe and stakes, etc. needed for exclusion and water control devices. It was proposed as a mechanism to promote public use of nonlethal methods. WS-Wisconsin lacks the funding to implement this alternative for anything other than a very small number of projects. The federal funding in the WS-Wisconsin budget for BDM, including funding from the Nonlethal Initiative (United States Department of Agriculture 2024) only covers approximately 2% of the costs (annual average of approximately $63,500 per year for 2022-2024) of WS-Wisconsin BDM activities. Resources from the Nonlethal Initiative are already being used to install exclusion and water control devices and as demonstration projects for cooperators, with the remaining funds used for supervision and administration. Selection of this alternative is unlikely to substantively change the number of flow devices constructed with funds from WS-Wisconsin. Most cooperators pay for operational assistance from WS-Wisconsin because they cannot or choose not to conduct these activities on their own. In the absence of operational assistance from WS-Wisconsin, producers are expected to seek alternative sources of operational BDM support or conduct the work on their own. This alternative was not selected for detailed analysis because it would not substantially impact the extent to which WS-Wisconsin assists cooperators with nonlethal methods and would provide no operational assistance to most individuals requesting WS-Wisconsin assistance. See also Section E.2.1

E.2.7. Consider More Alternatives that Vary Amount of Lethal BDM WS Provides

The NEPA only requires agencies to consider a reasonable range of alternatives, not every possible combination along a continuum 42 U.S.C. 4321 §102(C)(iii). The alternatives considered in detail already span a range of options for WS-Wisconsin use of nonlethal methods and D.2.2, discusses limiting WS-Wisconsin to exclusive use of nonlethal methods. Furthermore, APHIS-WS does not have the authority to dictate wildlife management policy or practices or set regulatory requirements (Appendix A). Instead, APHIS-WS only provides assistance upon request in accordance with applicable federal, state, tribal and local agency regulations and policies, MOUs and other agreements. As noted in Section 2.6, responsiveness to landowner/manager needs, existing site uses and the ability of the landowner/manager to implement methods are among the many factors considered when developing site-specific damage management plans. This is especially true in Wisconsin where only approximately 2% of the cost of WS-Wisconsin BDM activities are paid for with WS-Wisconsin funds and where entities other than WS-Wisconsin can obtain authorization to use the same BDM methods as WS-Wisconsin. Consequently, WS-Wisconsin successful implementation of alternatives that restrict access to otherwise legally available BDM methods requires the cooperation of the entities that request and fund WS-Wisconsin assistance. Entities that choose not to abide by WS-Wisconsin restrictions can switch to other service providers or conduct the work on their own (Section 2.5.2). As noted above, except for limited circumstances, nonlethal methods are unsuitable for projects to protect coldwater

fisheries. Impacts of alternatives that place variable requirements on the amount of lethal BDM assistance provided by WS-Wisconsin to address other conflicts are likely to have impacts similar to those analyzed in Alternative 2. See also D.2.2.

E.2.8. Require Cooperators to Completely Fund Activities or Require Cooperators to Fund All Use of Lethal Methods

WS-Wisconsin service recipients already pay for almost all operational costs with only a limited amount of WS-Wisconsin's federal appropriations allocated to administration and limited help with implementing nonlethal methods under the WS Nonlethal Initiative, approximately 2% of WS-Wisconsin average annual expenditures for BDM (United States Department of Agriculture 2024). Consequently, the impacts of this alternative would not differ substantially from Alternative 1. In cases where WS-Wisconsin receives federal, state or local government funding to conduct activities, federal, state, and/or local officials have made the decision to provide funding for damage management activities and have allocated funds for such activities in accordance with their applicable authorities. Given that this alternative would not substantially change current funding sources or environmental impacts addressed under Alternative 1, we have elected to not address this alternative in detail.

E.2.9. Refer Requests for Assistance to Private Wildlife Control Agents

In accordance with state law, people experiencing damage or threats of damage associated with beaver could contact private wildlife control agents and/or other private entities to reduce damage when they deem it appropriate. Under Alternatives 1-3, WS could refer requests for assistance to the Wisconsin Trappers Association Nuisance Wild Animal Removal Referral List or recommend the use of private contractors. Under Alternatives 1-3, WS-Wisconsin would comply with the provisions of APHIS-WS Directive 3.101 which provides guidance on establishing cooperative projects and interfacing with private businesses. WS only responds after receiving a request for assistance. When responding to requests for assistance under Alternatives 1-3, WS-Wisconsin informs requesters that other service providers, including private entities, might be available to provide assistance. If all requests for assistance are referred to private entities, environmental impacts would be similar to Alternative 4 in which WS-Wisconsin provides no assistance with BDM. This alternative was not considered in detail because of its similarity to Alternative 4 and because working with private entities is already an option for cooperators under Alternatives 1-4.

E.2.10. WS should consider an alternative that increases collaboration with Tribes and NGOs on the use of nonlethal methods.

Under Alternatives 1-3, WS-Wisconsin would be able to form partnerships with tribes and NGOs on projects to promote the use of nonlethal methods within the constraints of available funding. None of these alternatives place restrictions on WS-Wisconsin ability to form these partnerships although the exact nature of the collaboration would be constrained by WS lethal authority (or lack thereof) and other legal restrictions (e.g., privacy act). These partnerships are consistent with the tenets of the APHIS-WS nonlethal initiative (Young et al. 2019, USDA Wildlife Services 2022*a*). The fact that WS-Wisconsin can use lethal methods

under some circumstances in Alternatives 1-3 does not obligate any entity to use lethal methods. As noted in Section 2.6, APHIS-WS decision-making includes the perspectives and requirements of regulatory agencies and the needs and values of the individual cooperator in the decision-making process. As the EA already has three alternatives that allow for collaboration with agencies, tribes and NGOs on implementation of nonlethal methods to the maximum extent practicable, no additional alternative to address collaboration is needed.

E.2.11. Create a flow chart to direct BDM actions like the one used by the city of Portland

As noted in the EA, WS-Wisconsin addresses a wide range of BDM conflicts throughout the state in a range of land classes with varying landowner management objectives. While creation of a flow chart may work for a relatively narrow set of circumstances and land ownership such as those addressed by the City of Portland, the range of plans that would be needed for WS-Wisconsin activities would be impractical. We believe the situation is better served by using the WS Decision Model process. Any flow chart system that would direct the actions of individual landowners/managers or restrict their access to specific methods would have to be developed by the entity with regulatory authority for the species and area (e.g., a specific municipality or WDNR) and is outside the scope of this EA.

E.2.12. If lethal removal is warranted, discontinue use of devices that slowly drown beavers in favor of nonlethal methods and quick-kill traps.

Body griping traps are already the preferred method for beaver removal by WS-Wisconsin. Approximately 75% of beaver taken by WS-Wisconsin are taken using body-gripping traps. Selection of the device for beaver removal depends on a range of factors including water depth, site characteristics and site use and other environmental conditions. A range of capture devices may be used at a site to increase the likelihood of prompt beaver removal in the event that beaver may avoid a particular type of device or device location. Consequently, complete conversion to use of body gripping traps would not be a practical or effective option at this time.

APPENDIX F: DESCRIPTION OF METHODS AND STRATEGIES FOR BEAVER DAMAGE MANAGEMENT

A variety of methods and techniques are available for resource owners and their agents and government agencies to address conflicts with beaver.[16] Based on conflict site characteristics, resource owner tolerance to damage, costs to implement, effectiveness, and other factors, lethal and nonlethal methods may have limitations. There is no single solution to beaver damage capable of resolving all conflicts and often a mix of methods and strategies is appropriate.

What follows below is a brief description of beaver damage methods and/or strategies currently available for use or recommendation by WS-Wisconsin. Unless otherwise specified, all methods and/or strategies discussed are available to all entities in Wisconsin, not exclusively to WS-Wisconsin. Should additional data or new products, tools, or methods become available in the future, WS-Wisconsin could consider these for use and will conduct any additional NEPA analysis deemed necessary prior to incorporating into the BDM program.

F.1 NONLETHAL METHODS AND STRATEGIES

Exclusion involves the use of physical barriers to prevent animals from gaining access to protected resources (e.g., Figure F-1). Protecting ornamental, landscape, or fruit trees or other plants from beaver damage can sometimes be accomplished by using hardware cloth, similar screening, chicken wire, chain link fencing (or other materials) or grit paint. The installation process and materials used influence the effectiveness of tree guard protection from beaver damage (Westbrook and England 2022). These methods are used most frequently by property and homeowners. They are rarely, if ever, used to prevent large-scale timber or forest damage due to the high labor and material cost required to wrap hundreds or thousands of trees in a managed forest. However, exclusion can be cost-effective when used on a smaller scale (e.g., a city park) and a preferred method where beaver presence is desirable and/or lethal methods are inappropriate.

A variety of designs and materials have been used to exclude beaver from road culverts. Exclusion is accomplished by affixing wire mesh or metal screens, grates, cones, or other fencing systems to one or both sides of a culvert (Figure F-1). Culvert exclusion devices may extend past the entrance of the culvert to reduce debris and beaver damming activity from causing blockages. Culvert exclusion devices alone may not always resolve a beaver damage conflict as regular maintenance may still be required to remove beaver dam materials from

[16] Mention of companies or commercial products in this report does not imply recommendation or endorsement by USDA over others not mentioned. USDA neither guarantees nor warrants the standard of any product mentioned. Product names are mentioned to report factually on available data and to provide specific information.

the screen or fence itself. WS-Wisconsin may assist with the installation of exclusion devices alone, or in combination with water flow devices, as discussed below.

Figure F-1. Examples of beaver exclusion systems

Water flow devices are fixed installations designed to regulate water levels in ponds that can be used, in some situations, to address concerns about high water levels resulting from beaver dams. The devices may be used in situations where the presence of a beaver pond is desired, but it is necessary to manage the level of water in the pond. They may also be used in areas witch chronic beaver damming issues and frequent maintenance or clearing debris is challenging, costly, and/or not desired at location such as a road culvert or other types of water control structures. At chronically flooded sites, the use of flow devices may provide a cost-effective alternative to regularly implementing lethal methods and dam removal/breaching (Boyles and Savitzky 2008, Hood et al. 2018, Brick and Woodruff 2019, Callahan et al. 2019). They are typically installed in areas where there is continual or regular natural water flow like a stream, river, or combined with infrastructure designed to permit the flow of water (e.g., culverts, water control structures). Installation would not impede the water flow but rather preclude beaver from stopping the flow. Water flow after the installation is maintained despite the beavers' efforts to block the water flow at the surface.

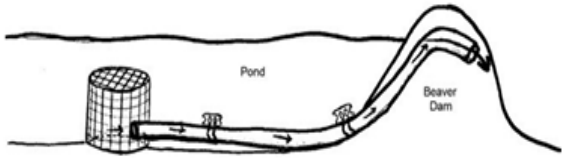


Figure F-2. An example of a flexible pipe with a round fence used to control the water level at a beaver dam.

Water-level control devices are most likely to be installed by WS-Wisconsin on waterways in locations where beaver damming activities block a culvert, impact another type of water conveyance structure, where the water level threatens infrastructure (i.e., roads, buildings, etc.), or to manage water levels on wild rice lakes. They may also be installed in areas to prevent flooding of property, pastures, or to maintain existing ponds at an acceptable water level.

Beaver conflicts with culverts, roads, bridges, irrigation, and other water conveyance structures generally need action within a short period of time. Some conflicts result in damage that is significant enough and are noticed almost immediately, where other damages may accumulate over time. Due to the public safety and infrastructure threats associated with beaver damming activity along roadways, land or resource owners are likely to begin

with removing the debris very quickly after onset or discovery, and they will routinely remove the debris until the impounded water ceases to present a hazard. The installation of a flow-device can help to return the water level to preexisting conditions or to maintain a desired water level, without needing the high frequency of maintenance that can disrupt aquatic environments.

Installing flow-devices can take considerable time to plan, approve, and implement. WS-Wisconsin most commonly recommends and installs these devices in areas that have been identified as chronic conflict areas. Generally, a permit is not required by WDNR to construct a flow-device on an existing culvert so long as installation does not modify the stream bed or channel. Additional permitting and consultation with WDNR and USACE may be required to install a flow device at culverts or in other locations if the device will present a barrier to fish or wildlife movement, involve an alteration of the streambed elevation, or if dredging or a discharge were to occur during installation.

Some sites may have held water for longer periods of time but have only recently increased in size to increase the risk to an unacceptable level. Following protective measures established with WDNR NHC, WS-Wisconsin may remove portions of dams to install flow control devices to minimize impacts to sensitive species or habitats and to alter the water level incrementally. This multi-stage installation helps prevent flushing large amounts of sediments downstream.

Flow-devices installed by WS-Wisconsin generally use a combination of exclusion and a pipe which allow beaver and their dams and pools to remain in place while also making it possible for managers to control water levels. This type of flow device uses a flexible pipe anchored at the deepest point of the pond. This end (the intake) is permeable. The intake is enclosed in fencing to prevent beaver from plugging the openings while the opposite end of the pipe is installed through or over the beaver dam (Figure F-2). This end is the outlet. The system allows water to flow through the intake and out the pipe, bypassing the beaver dam. WS-Wisconsin typically uses a 15-inch-wide pipe combined with six-inch-by-six-inch epoxy-coated fencing. The length of the pipe will vary depending on site specific conditions. No heavy equipment will be used to install water flow devices. All work will be conducted by hand and will include, raking material from a small section of dam to insert the pipe (or removing the entire dam if the flow device is installed in a culvert), affixing blocks or fence posts to anchor the pipe at the desired depth, and installing fence posts with a manual post driver. Flow devices rely upon exclusion and deception to create water flow where beavers are unable to determine the source or block the flow. Flow devices require regular maintenance to avoid clogging and degradation and may be expensive. Additionally, some designs may be a barrier to fish passage. Flow devices may be best suited to situations such as road culverts with ephemeral streams. WS-Wisconsin may provide technical assistance with or install and maintain water flow devices.

Relocation involves the safe and humane capture of live beaver, preferably an entire family unit, and then moving the animals from the capture site to a predetermined location for

release. Beaver may be live captured using any humane live capture device (cable devices, cage traps, foothold traps, and suitcase traps) as described in this Appendix.

The public often perceive relocation as more humane than lethal methods (Massei et al. 2010, Needham and Morzillo 2011). However, relocation of animals can cause stress and increase mortality in many species, can spread diseases and pathogens, and the relocated animal may cause the same problems at its new location (Massei et al. 2010). Relocated beavers are likely to disperse from the release site, occasionally long distances, and may experience high mortality or predation (McKinstry and Anderson 2002, Petro et al. 2015). Petro et al. (2015) documented several deaths due to illness that was possibly exacerbated by stress related to the relocation. Beavers released to unfamiliar new sites without established ponds and dens for escape are vulnerable to predation (McKinstry and Anderson 2002, Petro et al. 2015). Releasing beaver into watersheds with established beaver populations may create competition (Sun et al. 2000).

Based on review of these factors, Morzillo and Needham (2015) determined that replacing lethal control measures by relocating beaver is not always an effective solution. Each site where relocation is considered as a tool should be evaluated carefully to assess the risk of repeated beaver conflicts and the release site conditions and time of year should be considered to evaluate risk of mortality to the relocated beaver, risk of beaver damage/conflict within the local environment, and likelihood of released beaver dispersing. Use of beaver habitat suitability models may help with identification of appropriate relocation sites and may help reduce mortality rates associated with beaver relocation (Pollock et al. 2023). Although beaver relocation is permitted in Wisconsin on privately owned land, without a state-issued permit, with only the landowner's permission at the release site, it would in many cases be logistically impractical and biologically unwise in many or most situations as a tool for beaver-human conflict resolution.

The changes in ecosystems associated with beaver dam construction and beaver feeding habits have the potential for adverse effects on state listed species. To ensure that beaver are not relocated to areas where state listed species may be adversely affected, WS-Wisconsin will consult with the WDNR's Endangered Resources Review Program to identify suitable relocation sites and obtain approval, prior to live capturing beaver for relocation.

Beaver dam notching/removal involves the removal of debris deposited by beaver that impedes the flow of water. Removal of all or a portion of the beaver dam (i.e., notching) may occur depending on the site-specific characteristics and conservation measures identified during the statewide consultation between WS-Wisconsin and WDNR NHC to maintain existing stream channels and drainage patterns and reduce flood waters causing damage to property or resources. Beaver dams are usually removed by hand and using hand tools (e.g., shovels, rakes, portable winches). Explosives may be used instead of hand tools and may be preferred to remove dams constructed with heavy clay, root-bound dams, wide older dams, large dams, and dams at the entrance to culverts where subsequent flooding has covered the dam and culvert entrance. Explosives may also be used in areas where staff have many dams

to remove because removal via explosives is generally more efficient than removal by hand. When removing large dams, staff may use hand tools to remove a portion of the dam by hand first to reduce the amount of water that may be released at once, minimize disturbance of sediment accumulated upstream of the dam, and prevent damage (i.e., flooding, bank erosion, channel incision) below the dam from the sudden release of a large amount of water and sediment.

Beaver dam notching/removal generally falls into 1 of 2 categories:

> ***Recently Constructed Beaver Dams*** which have not been in place long enough for wetland conditions to develop in association with the beaver pond. These dams are typically less than three years old and are lacking in at least one of the three characteristics of a wetland, vegetation, soil, or hydrology (See U.S. Army Corps of Engineers definition of wetland characteristics). In most cases, the landowner or land manager will have information on when the dam is constructed, or, in the case of trout stream management, stream surveys will indicate dam age. When the exact age of a dam is unknown, physical characteristics may be used to identify recently constructed dams. Some physical characteristics which may be visibly present at new, or recently constructed dams and used to distinguish them from older dams include fresh or "green" sticks packed on the downstream side of the dam, a lack of herbaceous vegetation growing within the dam or woody vegetation growing on top of the dam which is greater than three years old (annual growth rings may be counted to estimate the age of woody vegetation). Recently constructed beaver dams are the most frequently encountered type of dam by WS-Wisconsin. Almost all dams removed from trout streams where WS-Wisconsin provides ongoing beaver and beaver dam removal for the enhancement of trout populations are recently constructed. Similarly, almost all requests for assistance with property/infrastructure damage and risks to human health and safety caused by beaver ponds involve recently constructed dams. In these cases, dam removal generally occurs within days to a year of dam construction, and removal restores initial site conditions.
>
> ***Long-standing Beaver Dams:*** In rare instances, WS-Wisconsin may receive a request to remove a beaver dam from an area where wetland plants and animal communities have become established in the pond or where a beaver dam has been actively maintained for more than three years. This is most likely to occur when WS-Wisconsin receives a request from the WDNR to help with trout stream enhancement in a new area. In rare circumstances, WS-Wisconsin may be requested to remove an older dam for the protection of property/infrastructure or human health and safety (e.g., situations where there are safety concerns about a long-standing dam with a large pond failing). While wetland conditions may take more than three years to establish and be difficult to identify under field conditions, long-standing or "old" beaver dams in Wisconsin typically exhibit visual characteristics experienced wildlife biologists may use to distinguish them from recently established dams. Long-standing dams tend to be broader than newly built dams, as width is increased over time, through ongoing

beaver activity. Fresh wood is typically absent on the downstream side of older dams as, absent a breach, once a dam is fully constructed, fresh mud and sticks are usually only added to the upstream side of the dam. These dams often contain significant herbaceous vegetation growing within them and may have woody vegetation growing on top of the dam which would not be present in recently constructed dams. However, woody vegetation reaching three years of age (estimated by counting annual growth rings) is unlikely to be present on dams unless beavers are absent from the area due to abandonment, harvest, or other reasons.

Explosives are defined as any chemical mixture or device which serves as a blasting agent or detonator. Binary explosives are individually non-explosive and not classified as explosives until mixed together. Once mixed, binary explosives are considered high explosives and subject to all applicable federal regulations. WS personnel transport and store the explosive components unmixed. The use of binary explosives to remove beaver dams by WS-Wisconsin is conducted by two person teams including a WS Explosives Specialist-In-Charge, who must be a licensed Class 1 Blaster per Wis. Admin. Code § SPS 305.20. Prior to combining the binary explosive components, the team inspects the dam for the best location to restore drainage to the original channel. The goal is to remove a relatively small section of dam and not the entire dam. In a typical situation, an approximately four-to-five-foot section of dam is removed. Teams may remove large logs, brush, and rocks from the dam prior to blasting. WS personnel mix the components of explosives at the dam site and then attach a detonating cord lead-line to the plastic container containing the mixed components. When placing explosives inside a beaver dam, a pole made of wood or other non-sparking material is used to create a channel to insert the container containing the mixed components. Explosives are placed within the dam, not below it. The blast is intended to remove dam material and to not impact the stream bed. An air horn warning is used prior to detonating the charge(s) and an "All clear!" is voiced after blasting. The licensed Class 1 Blaster inspects the site after the charge has detonated. Generally, blasting activities are concentrated in a 150 square-foot area, and it takes about 20 minutes from arrival to the removal of a dam with explosives. Following the blast, WS staff inspect the dam site to ensure the blockage has been cleared to the channel to allow for free-flowing conditions. Hand tools may be used to supplementally clear debris. During the post-blasting inspection, if any nontarget mortalities were observed, they would be documented.

Unmanned Aerial Systems (UAS) also known as drones are increasingly being used in the field of wildlife management as an economical and efficient tool to survey for wildlife presence, abundance, and density, to locate and estimate wildlife damage, and for harassment/dispersal of wildlife. UAS have been used to monitor abundance, location, movement, and habitat quality for a diverse array of taxa including mammals, birds, and reptiles in both aquatic and terrestrial systems (Scholten et al. 2019, Fiori et al. 2020). Use of UAS has been shown to count wildlife more accurately than human observers and may provide a safer, more cost-effective alternative to fixed-wing aircraft surveys (Christie et al. 2016, Hodgson et al. 2018). Use of UAS can also reduce wildlife disturbance and vegetation impacts associated with conducting surveillance on foot (Borrelle and Fletcher 2017, Ancin-

Murguzur et al. 2020). In Wisconsin, this method would most commonly be used by WS-Wisconsin for BDM to assess beaver damage to property/resources, search stream reaches for the presence of beaver dams, or to monitor the functionality of water flow devices to determine if maintenance is required. UAS may be equipped with thermal imaging capability, spotlights, loudspeakers, or other accessories and could be used by WS-Wisconsin to aid in the collection of data for future beaver research projects.

Technical Assistance - Education/Outreach Only

The following methods and/or strategies are frequently provided as a response to requests for assistance with beaver damage as long-term strategies. As long-term strategies, there may be a higher level of cost, planning, and duration of project. These strategies are not suitable for most beaver damage complaints requiring an immediate resolution and may be better suited for implementation by private individuals, agencies or local governments with the ability to tolerate beaver damage and/or risk of beaver damage temporarily.

Habitat Management refers to vegetation and/or environmental manipulation to reduce the carrying capacity or attraction of a species, thereby reducing the potential for damage. Habitat management can be a complex method because of its potential to affect many other species and ecosystems. Habitat management may be an option but could be less desirable due to competing needs to manage habitats for other species.

Habitat alteration through forest type conversion might be the most effective long-term method of reducing beaver density in some areas (Payne 1989). Forest management practices that discourage the establishment of aspen and willow species while promoting long-lived hardwoods and conifers within 200-400 feet of streams may reduce beaver abundance on those streams. However, reduced food availability might force beaver colonies to move more often, possibly increasing damage and conflicts.

Habitat management may also involve manipulating beaver impoundment water levels to reduce damage or conflict caused by flooding. Water levels may sometimes also be lowered using a drain tube or pond leveler placed in the dam. At present, there appears to be no large-scale and consistent programs dealing with this beaver damage management strategy to reduce beaver populations but rather encouraged to promote beaver use of areas.

The continual breaching of beaver dams and removal of beaver dam construction materials will sometimes cause beavers to move to other locations. Environmental manipulation of water levels through water control structures or flow devices may also reduce an area's attractiveness to beaver or reduce/prevent beaver damage to a level acceptable to the resource manager. These two types of habitat management are commonly used to address beaver conflicts associated with flooding or impounded water and may be directly implemented by WS-Wisconsin, thus are discussed in detail individually.

Structural Changes or modifications could be methods that WS-Wisconsin recommends when providing technical assistance. For example, WS-Wisconsin could recommend that modifications occur to culvert design as a nonlethal way of reducing problems with beaver dams at culverts. Jensen et al. (2001) recommended that highway departments install over-sized culverts in areas where beaver may be present. The study stated, "*Due to the effects of stream gradients, culverts should be oversized to at least 2.1 m^2 (inlet opening area) for a 0% gradient stream and at least 0.8 m^2 for streams with gradients up to 3% to reduce the probability of plugging to 50%*". In addition, "*These recommendations should be considered minimum sizes, because culverts should be enlarged to at least a size that maintains the natural stream width*."

Structural changes would be methods the requester implements without any direct involvement by APHIS-WS personnel. Over the service life of a culvert, Jensen et al. (2001) speculated that installing oversized culverts by highway departments would be more cost effective than trapping, debris removal, or other short-term options to manage damage to roads associated with beaver. WS-Wisconsin would not be directly involved with making any of the structural changes, but our recommendations would likely involve changes or modifications to existing structures. Other strategies to avoid conflicts with beaver may include at-grade temporary forest roads for silvicultural management, constructed fords, broad-based dips and hard rock flow through structures on permanent forest roads and recreational trails which can be implemented to reduce infrastructure failure risk.

Tolerance of Beaver Presence is in some instances acceptable. The level of beaver damage that an individual is willing to accept is based upon their own personal beliefs and values. When assessing a beaver damage request for assistance, WS-Wisconsin staff ask the requestor what resource is at risk of or being damaged. If the requesting party does not place a higher economic or sociological value on the resource than they do on the personal or aesthetic value they attribute to the presence of beaver and/or a beaver pond, they may be tolerant of beaver damage. In these situations, WS-Wisconsin may recommend no action.

F.2 CAPTURE METHODS

For organizational purposes, all capture methods for use by WS-Wisconsin when conducting BDM are listed in this section. These capture methods, except body-grip traps, are designed to live-capture and hold a target animal. Without modification, these capture methods would be nonlethal techniques, however, per state regulation and protective measures established between WS-Wisconsin and WDNR NHC to reduce nontarget take, all foothold traps and cable devices set targeting beaver would be modified (equipped with one-way slides) and set in water of sufficient depth to facilitate the submersion and dispatch of captured beaver. Additionally, as noted in the method descriptions that follow, unless live-capture for relocation is the intended outcome, all beaver live-captured by WS-Wisconsin would be subsequently euthanized by shooting.

Body-grip traps (e.g., rotating jaw traps) are traps designed to cause the quick death of the animal that activates the trap. Body-grip traps are placed at various depths, but, in accordance with state regulations, at least half of the trap entrance must be submerged. The device is activated when the animal pushes against a trigger as it walks or swims through the device. Placement is in travel ways or at lodge or burrow entrances created or used by beaver. Due to trap placement in aquatic environments and below the water surface, body-grip traps set for beaver present a relatively low risk to nontarget animals, except those with similar habitat requirements and behavioral patterns (e.g., muskrat, river otter). Body-grip traps come in various sizes, those used for beaver removal have two capture arms, which move in a scissor fashion when triggered to grip the target animal (Figure F-3). The devices are designed to close on the neck or torso of the target animal with sufficient force to cause a rapid death. A size 330 body-grip trap is typically used for beaver. Size 330 body-grip traps have two springs and typically have a jaw spread of 10" x 10" (this varies among manufactures). Body-grip traps are anchored to prevent animals from escaping with the trap.

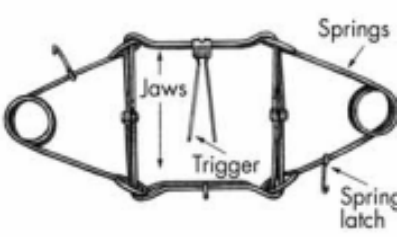


Figure F-3. Sample body-grip trap

Cable devices consist of a loop made of cable that tightens around the neck, body, or foot of the target animal (Figure F-4). Locking devices are attached to one end of the cable and the other end of the cable is run through an opening in the lock to create the loop. Cable devices can be used effectively wherever a target animal moves through a restricted lane of travel. The loop tightens when a captured animal pulls on the device. Cable devices used by WS-Wisconsin are equipped with a swivel to reduce injury to captured animals while minimizing cable twisting and fraying, thus reducing device breakage. Careful selection of loop size, loop height, device placement, cable, stop, and bait types reduce risks to nontarget species. Baits or attractants are not typically used in conjunction with cable devices. Cable devices primarily rely on placement in an active travel corridor to effectively capture target animals. Cable devices may have breakaway systems that allow the loop to break open when an animal larger than the target species is captured in the device. Stops can be used to set a minimum loop size. This enables smaller animals and the legs or appendages of larger animals, such as deer, to pull out of the cable device. Like body-grip and foothold traps, cable devices are anchored so captured animals cannot escape once captured. With modifications, cable devices may be used to live capture animals (e.g., cable restraints). All cable devices targeting lethal removal of beaver by WS-Wisconsin would be at least half submerged in water at placement and equipped with a one-way slide as a submersion set, where sufficient water depth is available. If beaver were inadvertently live captured in cable devices, they would likely be euthanized by shooting.

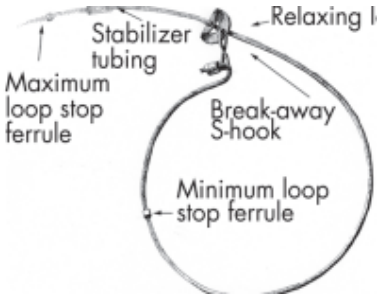


Figure F-4. Sample cable device (AFWA 2021).

Cage traps are typically made of wire mesh and are one of the more common types of traps available to live-capture animals. These traps are commercially available in numerous sizes and designs, which can help enhance trap efficacy and selectivity. Cage traps can range from the extremely small, intended for the capture of rodents and other small mammals to large traps used to live-capture feral hogs. Cage traps may also be referred to as box traps because they are enclosed on all sides, except for a door or doors that allow entrance into the enclosure (e.g., Figure F-5). The devices are usually triggered when an animal depresses a treadle in the box that causes the door(s) to close on the trap. Cage traps are sometimes enclosed using wood, sheet metal or hard plastic depending on the target animal. Cage traps are a live-capture device, however, unless live capture of beaver for relocation is the desired outcome, beaver captured in cage traps would be euthanized by shooting.

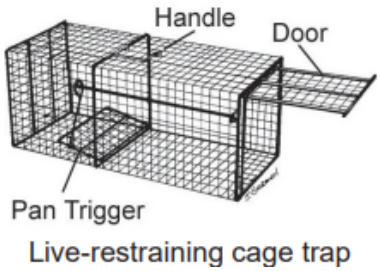


Figure F-5. Sample cage trap (AFWA 2021)

Foothold traps are typically constructed of two metal jaws which are closed by a single or double spring when an animal steps on the triggering device (pan) at the center of the open trap (e.g., Figure F-6). Pan tension devices that require a minimum amount of pressure to activate the device reduce the risk that an animal smaller than the target animal will activate the device. WS-Wisconsin sets all foothold traps intended to capture beaver in at least six inches of water, which helps reduce risks to nontarget species, including eagles. Trap placement, trap adjustment (e.g., pan tension devices), and selection and placement of appropriate lures contribute to the foothold trap's selectivity. Foothold traps are anchored so captured animals cannot escape with the trap attached to its foot. Foothold traps can be used as a live-capture device; however, WS-Wisconsin foothold traps set for beaver would be equipped with a cable and one-way slide and placed as submersion sets.

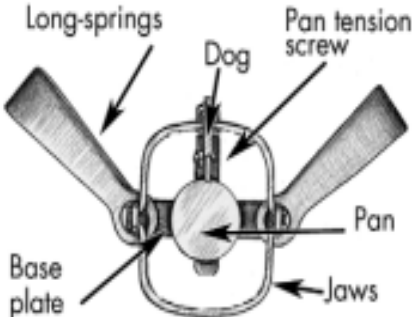


Figure F-6. Sample foothold trap (AFWA 2021).

Suitcase traps are designed to live-capture beaver for relocation or later disposition. The trap is constructed of a hinged metal frame covered with chain-link fence (e.g., Figure F-7). Large springs cause the trap to close when tripped. Trap appearance is similar to a large suitcase when closed. When set, the trap is opened into a flattened position to allow an animal to enter. When the trap fires, the sides of the trap close around the animal. Suitcase style traps are larger and heavier than the other capture methods listed above and would typically only be utilized if other capture methods were unavailable, or relocation is the desired outcome. Beaver live captured in suitcase traps would be

Figure F-7. Suitcase style live trap (set) (AFWA 2021).

relocated to privately owned land with the permission of the landowner or euthanized by shooting depending on the project goals.

F.3 LETHAL METHODS AND STRATEGIES

Shooting is the most selective method for removing target species and involves visually identifying the target animal followed using firearms (e.g., rifles, pistols, air rifles, shotguns). Shooting by WS-Wisconsin may involve the use of spotlights, night vision, and infrared imaging devices. Shooting is an effective method to euthanize or remove small numbers of individuals in damage situations, especially where trapping is not feasible. Removal of specific animals in the problem area can sometimes provide immediate relief from a problem. Shooting may be utilized as one of the first lethal damage management options because it offers the potential of solving a problem more quickly and selectively than some other methods, but it does not always work. Shooting may sometimes be one of the only damage management options available if other factors preclude setting of damage management equipment. WS personnel receive firearms safety training to use firearms while performing their duties (WS Directive 2.615), including the use of personal protective equipment (PPE). To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program prior to their use of firearms and annual training afterwards (WS Directive 2.615). To ensure APHIS-WS employees receive uniform firearms safety training, National Rifle Association (NRA) certified instructors and the NRA's curriculum for the basic pistol, rifle, and shotgun certification is the only officially recognized program of initial firearms safety training for new APHIS-WS employees. The training requirement for firearm-like devices, at a minimum, includes the NRA's curriculum for the basic pistol, rifle, or shotgun certification that best fits the device's profile. New APHIS-WS employees cannot use firearms in an official capacity until they have completed the NRA Basic Firearm Course pursuant to the firearms the employee will use on the job. Once that training is completed, annual firearms safety continuing education is required. WS personnel, who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Regulated Trapping may be recommended by WS-Wisconsin as a viable beaver damage management method during the time of year that the species may be legally trapped or harvested. Beavers are a furbearing species, of which, WDNR permits an annual licensed harvest season with no daily or seasonal harvest limit. Beaver conflicts which coincide with the beaver trapping season may be referred by WS-Wisconsin to private individuals or the Wisconsin Trappers Association. This method can provide individuals with additional trapping opportunities, food, and a valuable fur resource that can be marketed by trappers. Permission from the landowner or manager may be required. This method may be at no cost to the landowner or manager as they are providing the trapper with the opportunity to harvest a valuable species during the regulated season.

F.4 IMMOBILIZATION DRUGS

Immobilization drugs are used infrequently by WS-Wisconsin during BDM, primarily when needed to release an unintentionally captured animal that can't be safely restrained or to safely transport animals that can't be released on site. Immobilization drugs may be used on beaver in conjunction with research projects (e.g., to attach/implant GPS tags on a beaver) or for relocation. Immobilization drugs may also be used on nontarget animals captured during BMD activities in conjunction with research projects. For example, a nontarget wolf captured in good health may be immobilized and collared prior to release to help meet WDNR research/management objectives for that species.

Immobilization drugs can be administered with a hand syringe on a safely restrained animal, by jab stick, or dart gun. Drugs are used according to the Drug Enforcement Administration (DEA), FDA, and APHIS-WS' program policies/directives. Controlled substances are registered with DEA or FDA as appropriate. APHIS-WS' employees would follow approved procedures outlined in APHIS-WS' Field Manual for the Operational Use of Immobilizing and Euthanizing Drugs (Johnson et al. 2001). APHIS-WS' employees that use controlled substances are trained and certified to use controlled substances under the APHIS-WS certification program. Controlled substance use, storage, and disposal conform to label instruction and other applicable laws and regulations, including Executive Order 12898.

Immobilization agents that WS-Wisconsin may use include but are not limited to:

Ketamine (Ketamine HCl; Ketaset™) is a rapid acting, non-narcotic, non-barbiturate injectable anesthetic agent that immobilizes the animal and prevents the ability to feel pain (analgesia). The drug produces a state of dissociative unconsciousness, which does not affect the reflexes needed to sustain life, such as breathing, coughing, and swallowing. Ketamine is possibly the most versatile drug for chemical capture and has a wide safety margin (Fowler and Miller 1999). When used alone, this drug may produce muscle tension, resulting in shaking, staring, increased body heat, and, on occasion, seizures. Ketamine is often combined with other drugs, such as Xylazine, maximizing the reduction of stress and pain and increasing human and animal safety during handling. Following administration of recommended doses, animals become immobilized in about five minutes, with anesthesia lasting from 30 to 45 minutes. Depending on dosage, recovery may be as quick as four to five hours or may take as long as 24 hours. Recovery is generally smooth and uneventful. The combination of ketamine and xylazine (at a rate of 1:10 or 3:10 xylazine:ketamine) has been found to be adequate for minimally invasive procedures, but not for invasive surgical procedures on beavers in remote settings, though supplemental oxygen is recommended (Lair et al. 2023).

Xylazine is a sedative (analgesic) that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with Ketamine HCl to produce relaxed anesthesia. This combination can reduce heat production from muscle tension but can lead to lower body temperatures when working in cold conditions. Xylazine can also be used alone to facilitate physical restraint. Xylazine is not an anesthetic, therefore, sedated animals are usually responsive to stimuli. Personnel must minimize sight, sound, and

touch to minimize stress to the animal. Recommended dosages are administered through intramuscular injections, allowing the animal to become immobilized in about five minutes and lasting from 30 to 45 minutes. Yohimbine is a useful drug for reversing the effects of Xylazine.

Telazol™ is a combination of equal parts of tiletamine hydrochloride and zolazepam hydrochloride, and is a powerful anesthetic for larger animals, such as bears, coyotes, and cougars (Fowler and Miller 1999). Telazol™ produces dissociative unconsciousness, which does not affect the reflexes needed to sustain life, such as breathing, coughing, and swallowing. Following a deep intramuscular injection of Telazol™, onset of anesthetic effect usually occurs within five to 12 minutes. Muscle relaxation is optimum for about the first 20-to-25 minutes after administration and then diminishes. Recovery varies with the age and physical condition of the animal and the dose of Telazol™ administered but usually requires several hours.

Nal-Med-A (alternatively spelled NalMedA) is a drug combination consisting of 40 mg/mL nalbuphine HCl, 10 mg/mL medetomidine HCl, and 10 mg/mL azaperone, commonly called NAM used to immobilize wildlife. It has been shown to safely and effectively immobilize beaver and other wildlife (Wolfe et al. 2016, Roug et al. 2019, Hashem et al. 2024). One advantage of Nal-Med-A over other immobilization drugs is that it is an unscheduled drug combination, meaning it does not contain any controlled (i.e., regulated by the U.S. Drug Enforcement Agency) substances. In the limited published reports of its usage by non-veterinary persons on large carnivores, there were concerns about spontaneous arousals (Hashem et al. 2024) and that when used on beaver for tail transmitter placement, a supplemental anesthetic may be required (Roug et al. 2019). If used by WS-Wisconsin to immobilize beaver or nontarget species caught during BDM activities, caution will be taken to ensure the full analgesic effect of the drug prior to any surgical/research procedures on animals and to protect staff in the event of a spontaneous arousal.

To immobilize animals taken during BDM activities, WS-Wisconsin may use the combination of Ketamine HCl and Xylazine, Telazol™, NalMed-A, or other products at their discretion depending on drug availability, the size and weight of the animal, environmental factors, future research studies evaluating the use of these drugs on wildlife, or any combination of these factors. Antagonistic (reversal) agents which counter the sedative and analgesic effects of these drugs, such as atipamezole and/or naltrexone, are typically used to hasten the arousal and recovery of immobilized animals following sedation.

F.5 CARCASS DISPOSAL

All carcass disposal is consistent with APHIS-WS Directives 2.510 and 2.515 and state law unless otherwise exempted. WS-Wisconsin has been granted a conditional exemption from Wisconsin solid waste rules for the disposal of animal carcasses on the landscape by WDNR. This exemption allows WS-Wisconsin to dispose of beaver and other carcasses on the landscape when in remote locations with limited human use/activity. Chemically immobilized animal carcasses will be buried deep enough to prevent scavenging by other animals,

otherwise carcasses must be concealed from visual sight (i.e., buried, covered with leaves, grass, or brush).

Animal carcasses discarded on the landscape meet the definition of solid waste which is defined in s. 289.01(33), Wis. Stats. WDNR has authority in accordance with s. 289.43(8), Stats., and s. NR 500.08(4), Wis. Adm. Code, to grant an exemption from the requirements in chs. NR 500 to 538, Wis. Adm. Code, in special cases where disposal of the animal carcasses will not cause environmental pollution as defined in s. 299.01 (4), Stats.

WDNR has determined that disposal of animal carcasses on the landscape by WS-Wisconsin will not cause environmental pollution as defined in s. 299.01 (4), Wis, Stats. after taking into consideration the disposal locations and method, the amount of waste being disposed of, the geologic and hydrologic conditions at the disposal locations, and the physical and chemical characteristics of the animal carcass. A conditional grant of exemption from solid waste rules for the disposal of animal carcasses on the landscape has been issued to WS-Wisconsin by WDNR and renewed, as required (Natasha Gwidt, Waste and Materials Management Program, WDNR, pers. comm. January 24, 2022).

F.6 SUMMARY OF HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS FOR METHODS THAT MAY BE USED BY WS-WISCONSIN

Chapter	Lethal/Nonlethal	Methods Included	Summary of Findings
Chapter I. Introduction to Methods Used in Wildlife Damage Management	-	Annual average work tasks for each method	Summary of the overall national APHIS-WS program and the issues analyzed in subsequent chapters. Discusses risks to target and non-targets species, humans and pets, and humaneness then describes the risk assessment procedures.
Chapter II. The Use of Cage Traps in WDM	Lethal/Nonlethal	Cage traps (e.g., corral traps, walk-in and swim-in traps, decoy traps, bait station traps, Swedish goshawk traps, purse traps, nest box traps, colony traps); drive/herd traps	The analysis noted that USDA-WS personnel are professional with their use of cage traps and work to minimize the identified potential risks. Cage traps have minimal risks to people, pets, and nontarget species. Cage traps can capture nontarget species, but capture rates are low compared to overall take and nontarget species are often released unharmed from cage traps. The evaluation of risks to human health and safety and the environment from the use of cage traps are very minimal.
Chapter III. The Use of Cable Devices in WDM	Lethal/Nonlethal	Snares and cable restraints such as neck snares, foot cable restraints, foot-nooses, and catch-poles	The use of break-away cable devices and stops on snares and cable restraints has reduced nontarget captures by WS. The selective use and placement of cable devices by WS, including the use of established BMPs, minimizes the issue of humaneness and risk to humans, pets, and nontarget animals.
Chapter V. The Use of Aircraft in WDM	Lethal/Nonlethal	Shooting, tranquilizing, hazing, or surveying wildlife or dispersing vaccines and baits	Potential human health and environmental risks from aircraft use are minimal. WS pilots, contractors, crew members, and ground crews are trained and certified in low level flight safety. All aircraft owned by WS or flown WS contractors for WDM follow a stringent maintenance and replacement schedule to minimize the risk of mechanical failure.
Chapter IV. The Use of Foothold Traps in WDM	Nonlethal	Foothold traps	The use of foothold traps for bird damage management is generally limited to pole traps for live-capturing raptors. WS Directive 2.450 provides guidelines for the use of pole traps that reduces stress on trapped animals. Pole traps are monitored and are not generally accessible to the public or pets (due to their elevation), so there is minimal threat to human health and safety or the environment.
Chapter VI. The Use of Firearms in WDM	Lethal/Nonlethal	Firearms, (e.g., handgun, rifle, shotgun); firearm-like devices (e.g., dart guns, blowguns, paintball guns, net guns, pyrotechnic pistols, air rifles and pistols, air-	Firearms and firearm-like devices are very selective for target animals and used frequently in WDM for many different species. APHIS-WS personnel receive training in the proper use of firearms and firearm-like devices pursuant to WS directives and are effective and efficient at using these to focus their efforts on specific target animals, with very low risks to human safety and to the environment. APHIS-WS personnel have been

Chapter	Lethal/Nonlethal	Methods Included	Summary of Findings
		activated bolt traps); archery (e.g., bow and arrow, crossbow, arrow gun)	very effective in using firearms and relatively few personnel have been injured, and few accidents and incidents have occurred because of the use of firearms. Few nontarget species, mistaken identity for the most part, have been taken. Thus, the risk assessment concluded that the use of firearms is of low risk to WS personnel, the public, nontarget species, and environment.
Chapter XII. The Use of Lead in WDM	Lethal	Estimated lead based on firearm usage	Risk to human health from lead ammunition (e.g., through consumption of carcasses) is minimized by training WS personnel and the WS carcass disposal policy. Ecological impacts to aquatic resources are also expected to be minimal based on the low potential for exposure to most aquatic biota. In terrestrial systems the greatest potential for exposure and risk is to nontarget vertebrates that consume lead ammunition fragments inadvertently from the ground or from scavenging carcasses. Risks to nontarget animals are reduced when carcasses are removed and when non-lead ammunition can be used. The transition by APHIS-WS from lead to non-lead ammunition, as feasible, and the low concentrations of lead released by APHIS-WS into the environment suggest that significant adverse impacts to human health or the environment are unlikely.
Chapter XIV. The Use of Quick-Kill Traps in WDM	Lethal	Quick-kill traps (e.g., rotating jaw traps, snap traps, mole/gopher traps, captive bolt traps (A24).	Quick-kill traps pose a low risk to human health and safety and the environment, and their use can be fairly selective for the target animal. Advancements in the design of quick-kill traps and the response time to handling animals that are not killed have resulted in more effective and humane trapping of target animals while dramatically reducing the potential for nontarget animal captures.
Chapter XVIII. The Use of Hand Capture and Biological Sampling in WDM	Nonlethal	Hand Capture (e.g., hand gathering, catch poles, y-poles, hand tools); ladders and mobile elevated working platforms; biological sampling methods	APHIS evaluated the potential human health and environmental risks from WS' proposed use of hand capturing and hand tool methods and determined that the risks to human health and the environment are negligible. Risks to workers are low based on WS personnel being trained in the proper use of methods and wildlife handling. Risks to the public are negligible or beneficial because WS removes the sick or injured animal, minimizing exposure to the public. Hand capture methods primarily live-capture animals and are not methods that would contaminate water or result in the bioaccumulation of hazardous materials. Ecological hazards associated with hand capture methods are generally limited to the unintentional injury or death of the target species, primarily those entrapped in structures where easy capture or

Chapter	Lethal/Nonlethal	Methods Included	Summary of Findings
			removal may not be possible. Training of WS staff in animal handling techniques reduces the risks of injury or death to animals. Risks are negligible for nontarget animals based on how WS uses the different hand capture methods and tools.
Chapter XXI. The Use of Explosives/Pyrotechnics in WDM	Nonlethal	Pyrotechnics (e.g., CAPA cartridge, screamers, bangers, shell crackers, screamer banger rockers); Rocket nets and cannon nets; Incidental explosive materials (e.g., detonators, detonating cord, fuses, matches, and primers).	Environmental risks to nontarget animals are insignificant as animals are usually not affected by the noise produced by pyrotechnics or explosions, except for the occasional startling due to those methods. WS personnel are at risk of being injured or killed by explosives; however, WS trains personnel properly to handle explosive materials to minimize this risk. The annual average accidents in the last ten years were three or fewer, with less than one accident resulting in human injury annually. WS and public exposure to potentially toxic gases and solids produced from explosives are negligible.
Chapter XXII. The Use of Exclusion in WDM	Nonlethal	Exclusion (e.g., fencing, netting, overheard wires, fladry, anti-perching devices, one-way doors, fill seal gaps, entrance barriers)	The use of exclusion methods in WDM is an effective and non-lethal method for protecting resources. Exclusion barriers are exceptional in maintaining health, safety, and value in structures, gardens, orchards, and livestock production areas. Risks to nontarget animals are minimized by proper placement and selectivity of barriers. WS recommends the appropriate barrier for the situation to prevent nontarget effects, or by adding marking materials to reduce hazards to nontarget species from barriers. Risks to the general population are negligible because site selection and activity timing minimize public exposure.
Chapter XXIII. Carcass Disposal in WDM	-	Carcass disposal (e.g., left in field, human consumption, unlined and lined burial, open-air burning, composting and above ground burial, rendering, landfill, incinerator, alkaline hydrolysis tissue digester, anaerobic biodigester)	The risk to human health from carcass disposal is generally low for all methods when following applicable federal and state regulations and WS policies. WS personnel are at the greatest risk from handling carcasses, but risks are minimal or nullified if standard operating procedures are followed. Risks to ecological resources are also generally low.
Chapter XXVIII. The Use of Non-Chemical Deterrents (Physical/Visual/Sound) in WDM	Nonlethal	Physical (e.g., barriers, spikes, porcupine wire, beanbags, rubber ammunition, remote-controlled vehicles); Visual	Risks to the general population are negligible because site selection and timing of activities minimize exposure to the public. Nonchemical deterrents would not contaminate water or result in the bioaccumulation of chemicals or other hazardous materials. Environmental hazards associated with non-chemical deterrents are

Chapter	Lethal/Nonlethal	Methods Included	Summary of Findings
		(e.g., effigies, silhouettes, eye-spot balloons, flags, mylar reflecting tapes, flashing lights); Auditory (e.g., propane cannons, electronic distress signals).	generally limited to unintentional disturbances of nontarget animals that may be near a targeted animal.

APPENDIX G: HUMANENESS CONSIDERATIONS

G.1 PERCEPTIONS OF HUMANENESS

There are two components to humaneness considerations. The physiological component of humaneness refers to the impact of the method on the physiological condition of target and nontarget animals. There are concerns that some of the methods proposed for use such as foothold traps and cable devices may cause stress, distress, unintentional injury and death in target and nontarget animals including pets. This component of humaneness is addressed in Section 3.7 and this appendix.

The other component of humaneness pertains to perceptions of the appropriateness of an action and are dependent upon individual opinions, values, ethics, and experiences. The social component of humaneness is not an impact on the natural or physical environment *per se*, as it pertains to implementation of the NEPA (40 CFR 1502.16(b), 1508.1(m)). As such, we are not addressing this component of humaneness in the EA.

The physiological component of humaneness may be considered in context of stress, injury or death of animals. Animal suffering is often considered in terms of physical pain, physiological and emotional stress, and tissue, bone, and tooth damage that can reduce future survivability and health (Sneddon et al. 2014). Injury to an animal caused by trapping can range from losing a claw, breaking a tooth, tissue damage, and wounds, to bone fractures and death (Olsen et al. 1986, Onderka et al. 1990, Gruver et al. 1996, Engeman et al. 1997, International Organization for Standardization 1999). The conditions of physical trauma, such as the location of the wound, whether the animal is young, old, with young, female or male, can affect the long-term fecundity and survival when released (Iossa et al. 2007).

Assessing pain experienced by animals can be challenging (California Department of Fish and Game 1991, American Veterinary Medical Association 2020, White et al. 2021). The AVMA (American Veterinary Medical Association 2020) defines pain as "a sensation (perception) that results from nociceptive nerve impulses reaching areas of the brain capable of conscious perception via ascending neural pathways." We cannot directly ask an animal about its pain and as humans have different pain thresholds and have difficulty communicating a particular level of pain, it is difficult to quantify the nebulous concept of pain and suffering (Putman 1995, White et al. 2021).

Stress has been defined as the effect of physical, physiological or emotional factors (stressors) that induce an alteration in an animal's base or adaptive state. Responses to stimuli vary among animals based on the animals' experiences, age, species and current condition. Not all forms of stress result in adverse consequences for the animal and some forms of stress serve a positive, adaptive function for the animal (California Department of Fish and Game 1991, American Veterinary Medical Association 2013, 2020). Distress is defined as a state where an animal is unable to adapt to stressors and is no longer successfully coping with its environment, leading to negative impacts on its well-being (Moberg 1999, 2000). It is the intent of

professional WDM practitioners to minimize distress in animals to the maximum extent practicable.

Pain, anxiety, and stress caused by restraint and physical exertion due to struggling to escape can manifest physiologically through the sympathetic nervous system and interplay among hormones produced by the hypothalamus, pituitary and adrenal glands. Pain and stress can be measured through short-term increases in cortisol from the adrenal glands, heart rate, blood pressure, body temperature, and breathing rate, and a long-term loss of body weight. Although humans cannot be fully certain that animals can experience pain-like states, assuming animals can suffer pain ensures that we take appropriate steps to minimize that risk and treat the animal with respect (Kreeger et al. 1990, Iossa et al. 2007, Sneddon et al. 2014).

APHIS-WS policy and operations comply with the applicable guidelines of the American Veterinary Medical Association (American Veterinary Medical Association 2020), which states euthanasia is the act of "ending the life of an individual animal in a way that minimizes or eliminates pain and distress " and that "...that if an animal's life is to be taken, it is done with the highest degree of respect, and with an emphasis on making the death as painless and distress free as possible". This typically involves unconsciousness followed by cardiac or respiratory arrest, leading to loss of brain function, with minimized stress and discomfort prior to the animal losing consciousness. AVMA (2020) recognizes that there is "an inherent lack of control over free ranging wildlife, accepting that firearms may be the most appropriate approach to their euthanasia, and acknowledging that the quickest and most humane means of terminating the life of free-ranging wildlife in a given situation may not always meet all criteria established for euthanasia." In other words, the AVMA distinguishes between euthanasia, typically conducted on a restrained animal, and methods that are more accurately characterized as humane killing of unrestrained animals under field conditions.

Classification of a given method as a means of euthanasia or humane killing may vary by circumstances and species. These acknowledgments are not intended to condone a lower standard for the humane euthanasia of wildlife. The best methods possible under the circumstances must be applied, and new technology and methods demonstrated to be superior to previously used methods must be embraced. AVMA (2020) states that in field cases where sophisticated equipment is not available, the only practical means of killing an animal may be using a lethal method of trapping or if the animal is captured still alive and cannot (or should not) be released, or is unrestrained in the wild, is a killing gunshot. The AVMA (2020) states that personnel should be proficient and should use the proper firearm, ammunition, and trap for the species.

AVMA (2020) notes, "…it may still be an act of euthanasia to kill an animal in a manner that is not perfectly humane or that would not be considered appropriate in other contexts. For example, due to lack of control over free ranging wildlife and the stress associated with close human contact, use of a firearm may be the most appropriate means of euthanasia. Also, shooting a suffering animal that is at the point of death, instead of catching and transporting it

to a clinic to euthanize it using a method normally considered to be appropriate (e.g., barbiturates), is consistent with one interpretation of a good death. The former method promotes the animal's overall interests by ending its misery quickly, even though the latter technique may be considered more acceptable under normal conditions. Neither of these examples, however, absolves the individual from her or his responsibility to ensure that recommended methods and agents of euthanasia are preferentially used."

G.2 HUMANENESS OF METHODS USED IN BDM

The management of wildlife, especially if it involves lethal actions, can elicit varied emotional reactions from people, depending somewhat on geographic location and species, and these reactions can change over time (Littin et al. 2004, 2014, Haider and Jax 2007). The degree of interaction with natural resources appears to be a factor influencing value systems regarding wildlife. Manfredo et al. (2018) conducted a project administered by the Western Association of Fish and Wildlife Agencies and the Midwest Association of Fish and Wildlife Agencies to assess the social context of wildlife management in an attempt to understand the conflict between stakeholders that has increased over time. It was the first study that describes how U.S. residents think about wildlife at both the national and individual state level. The study identified two dimensions that are central to how people view wildlife. The first, domination, is the view that wildlife is subordinate to humans and may be used in ways that benefit humans. The second view is mutualism, or the belief that wildlife is part of a human's social network and are deserving of "rights like humans". In the study, humans' attitudes towards wildlife are not simply dominionistic or mutualistic but are measured by what degree of each dimension they feel in a given circumstance. The spectrum of attitudes can be similarly applied to the public's concern for humaneness.

Schmidt (1989) and Bekoff (2002) define advocates of "animal rights" as those who often place priority on individual animals, ranking animal rights as morally equal to human rights. These advocates believe that animals should not be used for human benefits (such as research, food, recreational use such as hunting and trapping, being displayed in zoos, protecting livestock or even being livestock, being used for laboratory research, or protecting natural resources from wildlife damage), unless that same action is morally acceptable when applied to humans. Advocates of "animal welfare" are those who are concerned with the welfare of animals in relation to human actions involving those animals, such as the level of suffering of individual animals, while recognizing that human benefits may sometimes justify costs to animals, such as the use of animals for research or food. Advocates for animal welfare believe that humans are obligated to manage animal populations to minimize animal suffering, including when ecological imbalances are caused by human actions (Varner 2011). As with most things, people have a range of attitudes and beliefs from one end of the spectrum to the other.

Several researchers and organizations have attempted to develop objective, comparable, and statistically relevant methods for evaluating selectivity and humaneness in captured animals (Olsen et al. 1986, Onderka et al. 1990, Phillips and Gruver 1996, Engeman et al. 1997, International Organization for Standardization 1999). AFWA, as the representative for state

wildlife agencies, has a test program for evaluating trap humaneness and effectiveness using five performance criteria: animal welfare, efficiency, selectivity, practicality, and safety to the user. AFWA's overarching goal regarding recreational trapping is to maintain the regulated use of trapping as a safe, efficient, and acceptable means of managing and harvesting wildlife for the benefits it provides to the public, while improving the welfare of trapped animals (Association of Fish and Wildlife Agencies 2021). This program has resulted in species-specific BMPs for use by recreational trappers for selecting traps and trapping practices considered to be effective and humane. These BMPs are updated as new information, traps, and practices are developed. The resulting information is provided to state and federal wildlife agencies, trapper associations, and state agency trapper education programs through workshops, internet, and interactive CDs. These testing and outreach programs have included funding from the USDA, the International Fur Trade Federation, and state wildlife management agencies. AFWA has tested and approved a variety of commercially available trap types and trapping practices that meet or exceed BMP standards and guidelines, and the AFWA recognizes that it is likely that additional traps may exist that have not yet been tested (Association of Fish and Wildlife Agencies 2021).

The Furbearer Conservation Technical Working Group of the AFWA has developed BMPs for beaver (Association of Fish and Wildlife Agencies 2016*a*, White et al. 2021) and a BMP for managing human-beaver conflicts is currently in review (Sundelius et al. 2026). The BMPs are based on the most extensive study of animal traps ever conducted in the U.S., and scientific research and professional experience regarding currently available traps and trapping technologies. Trapping BMPs identify both techniques and trap types that address the welfare of trapped animals and allow for the efficient, selective, safe, and practical capture of furbearers. They are intended to be a practical tool for recreational trappers, wildlife biologists, and wildlife agencies interested in improved traps and trapping practices. BMPs include technical recommendations from expert trappers and biologists, as well as a list of specifications of traps and/or trap types that meet or exceed BMP criteria. BMPs provide options, allowing for discretion and decision making in the field when trapping furbearers in various regions of the United States. They do not present a single choice that can or must be applied in all cases. WS-Wisconsin incorporates the trapping BMPs into its BDM activities.

The humaneness of trapping animals is improved by using trapping practices as well as trap types and designs which increase trap selectivity while minimizing animal injury and suffering. The use of BMPs incorporates practices that include equipment specifications, the knowledge of the person using the equipment, and how the equipment is set up (with accessories) and used. Although specific traps are tested, the characteristics of the traps are identified and described as features that, either by themselves or when incorporated with other practices and the experience of the applicator, improve animal welfare and increase trappers' efficiency and selectivity.

Animals captured in cage traps may have fewer physical and behavioral traumas than those captured in cable devices and foothold traps. Although injury rates in cage traps are lower than cables and footholds, use of cage traps is not without risk of injury to the captured animal

because animals can injure themselves attempting to escape the trap (e.g., swelling, damage to teeth and muscles; Shivik et al. 2005, Muñoz-Igualada et al. 2008). Generally, cage traps are used if the animal is intended to be released, however, as it pertains to this EA and as stated in the description of methods (Appendix F), beavers captured in cage traps would be euthanized via shooting if relocation is not intended. The AVMA guidelines list gunshot as a conditionally acceptable method of euthanasia for free-ranging wildlife, there is potential the method may not consistently produce a humane death (American Veterinary Medical Association 2020). WS-Wisconsin personnel that employ firearms to address beaver damage or threats to human safety would be trained in the proper placement of shots to ensure a timely and quick death.

WS-Wisconsin is aware of concerns regarding the humaneness of submersion trap sets for cable devices and foothold traps. There is debate and disagreement among animal interest groups, veterinarians, wildlife professionals, fur trappers, and private wildlife damage management agents on this issue. The AVMA considers submersion to be an unacceptable method of euthanasia because the death of the animal does not meet their definition of euthanasia for most cases (Beaver et al. 2001, American Veterinary Medical Association 2020), but AVMA acknowledges that "the quickest and most humane means of terminating the life of free-ranging wildlife in a given situation may not always meet all criteria established for euthanasia (i.e., distinguishes between euthanasia and methods that are more accurately characterized as humane killing)" (American Veterinary Medical Association 2020). Some entities have described the use of submersion as inhumane or unethical (e.g., Ludders et al. 1999). However, according to The American Society of Mammalogists (Sikes and Animal Care and Use Committee of the American Society of Mammalogists 2016), "… submersion trapping systems can be effective and appropriate for furbearers found in or near waterways." These systems cause the captured furbearer to quickly submerge until death. Animals that drown die relatively quickly (e.g., within minutes, (Gilbert and Gofton 1982) versus the possible stress of being restrained and harassed by people, dogs, and other wildlife before being euthanized. Submersion sets make the captured animal, along with the trap, less visible and prevent injury from the trapped animal (i.e., bites and scratches) to people who may otherwise approach a restrained animal and eliminate the risk of a trapped animal being killed by a predator while restrained. Sikes et al. (2016) found that submersion may reduce the amount of time an animal is exposed to stressful conditions. Animals held in traps for prolonged periods are vulnerable to predation and are unable to forage effectively. In situations where trapping compromises an animal's ability to defend and feed itself, the American Society of Mammalogists considers death by submersion to be a comparatively humane alternative to other trapping methods (Sikes and Animal Care and Use Committee of the American Society of Mammalogists 2016). Furthermore, submersion removes the dead animals from potential public visibility. Some sites may be unsuitable for body-gripping traps or cable devices because of unstable banks, deep water, or a pond with a soft bottom, but those sites could be suitable for foothold traps.

Submersion sets are a legal trapping modification commonly used by WS-Wisconsin and in many situations, the most efficient and humane trap setup for beaver due to site specific constraints. Submersion is not considered euthanasia, however, WS-Wisconsin concludes that using submersion sets which cause irreversible unconsciousness and subsequent death of the

captured animal quickly thereafter are acceptable and humane, provided that the captured animal must not be able to reach the surface after initial submersion. Use of this method requires experienced and professional trappers to verify that there is sufficient water depth to fully submerge the target animal (and any nontarget animals) to prevent undue stress and suffering of captured wildlife. WS-Wisconsin based the conclusion that lethal beaver trapping methods utilizing submersion sets are an acceptable method on the relatively short time period to death in comparison to the consequences of a land set, the possible analgesic effect of carbon dioxide buildup, the AVMA acceptance of hypoxemia as euthanasia, and the inclusion of submersion sets in the BMP trapping standards for beaver and muskrat (Association of Fish and Wildlife Agencies 2016*b*, 2021, Sundelius et al. 2026).

Research by the NWRC has improved the selectivity and humaneness of management techniques. Research is continuing to bring new findings and products to practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some methods are used in situations where nonlethal damage management methods are not practical or effective. WS-Wisconsin will continue to work to minimize animal suffering during BDM activities by encouraging the use of practical and effective nonlethal methods, incorporating practical and effective strategies that improve humaneness and selectivity of existing methods as they become available, and ensuring that WS-Wisconsin personnel are trained in effective and humane use of BDM methods.

G.3 APHIS-WS APPROACH TO HUMANENESS AND ANIMAL WELFARE

The APHIS-WS Code of Ethics (WS Directive 1.30129) outlines the standards that all APHIS-WS employees uphold. APHIS-WS believes that all professional personnel must have the skills, experience, and expertise to select the most effective, humane, and practical strategies suitable to the needs and circumstances. Continual learning and training are critical for ensuring that the most effective tools are used, and research and testing must be implemented continuously to improve the tools available and develop new tools. APHIS-WS also considers a tool's effectiveness in meeting the need as well as the effectiveness use of agency resources in implementing those tools. Factors such as weather, device selectivity and effectiveness, personnel considerations, public safety, and other factors must be considered. Selecting effective tools and methods while considering the potential to reduce the risk of suffering helps to increase the overall effectiveness and humaneness of BDM.

WS-Wisconsin employees are concerned about animal welfare and are aware that some members of the public believe that some BDM techniques are controversial and/or inappropriate. Wildlife professional organizations (e.g., AFWA and The Wildlife Society) recognize that traps and cable devices can be effective and humane for recreational and management use ((White et al. 2021), The Wildlife Society). Training, proper equipment, policy, directives, and the use of best practices in the field help ensure that these activities are conducted humanely and responsibly.

In addition, APHIS-WS and the NWRC strive to bring additional non-lethal damage management alternatives into practical use and to improve the selectivity and overall humaneness of wildlife management. APHIS-WS has improved the selectivity of management devices through research and development of pan-tension devices, break-away snares, and chemical immobilization/euthanasia procedures that minimize pain.

When implementing BDM activities, APHIS-WS evaluates all potential tools for their humaneness, effectiveness, and ability to target specific individuals as well as species, and potential impacts on human and nontarget species safety. APHIS-WS supports using humane, selective, and effective damage management techniques, and continues to incorporate advances into wildlife management activities. APHIS-WS field specialists conducting WDM are highly experienced professionals, skilled in the use of management methods and committed to minimizing pain and suffering. APHIS-WS has numerous policies and directives that provide direction to staff involved in wildlife control, reinforcing safety, effectiveness, and humaneness.

WS Directive 2.450 establishes guidelines for APHIS-WS personnel using certain types of capture devices and promotes training of its employees to improve efficiency, effectiveness, and humaneness. Additionally, all use by APHIS-WS complies with applicable federal, state, and local laws and regulations. Wisconsin state laws also regulate the use of traps, snares, and capture devices. Testing of traps and trapping systems by AFWA has continued to provide valuable information on the humaneness of traps and practices. As the information comes available, it is reviewed by APHIS-WS for its use and application in the field. Recent updates to the BMPs and forthcoming research publications indicate that there will be an increasing number of commercially available traps that meet and or exceed BMP guidelines. WS-Wisconsin continues to use and implement BMP tools and procedures as they become available and when appropriate for BDM. Recognizing the goals of the AFWA, APHIS-WS has voluntarily agreed to assist in the development of BMPs and to abide by the BMPs developed by this program, as applicable, using the APHIS-WS Decision Model in the field

APPENDIX H: WISCONSIN'S STATE T&E SPECIES LIST[17]

Class	Endangered	Common name	Scientific name
Mammal	Endangered	American Marten	*Martes americana*
Mammal	Threatened	Big Brown Bat	*Eptesicus fuscus*
Mammal	Threatened	Little Brown Bat	*Myotis lucifugus*
Mammal	Threatened	Northern Long-eared Bat	*Myotis septentrionalis*
Mammal	Threatened	Eastern Pipistrelle	*Perimyotis subflavus*
Bird	Endangered	Piping Plover	*Charadrius melodus*
Bird	Endangered	Black Tern	*Chlidonias niger*
Bird	Endangered	Peregrine Falcon	*Falco peregrinus*
Bird	Endangered	Worm-eating Warbler	*Helmitheros vermivorum*
Bird	Endangered	Caspian Tern	*Hydroprogne caspia*
Bird	Endangered	Loggerhead Shrike	*Lanius ludovicianus*
Bird	Endangered	Red-necked Grebe	*Podiceps grisegena*
Bird	Endangered	Yellow-throated Warbler	*Setophaga dominica*
Bird	Endangered	Kirtland's Warbler	*Setophaga kirtlandii*
Bird	Endangered	Forster's Tern	*Sterna forsteri*
Bird	Endangered	Common Tern	*Sterna hirundo*
Bird	Threatened	Henslow's Sparrow	*Ammodramus henslowii*
Bird	Threatened	Great Egret	*Ardea alba*
Bird	Threatened	Upland Sandpiper	*Bartramia longicauda*
Bird	Threatened	Red-shouldered Hawk	*Buteo lineatus*
Bird	Threatened	Yellow Rail	*Coturnicops noveboracensis*
Bird	Threatened	Acadian Flycatcher	*Empidonax virescens*
Bird	Threatened	Spruce Grouse	*Falcipennis canadensis*
Bird	Threatened	Kentucky Warbler	*Geothlypis formosa*
Bird	Threatened	Yellow-crowned Night-heron	*Nyctanassa violacea*
Bird	Threatened	Cerulean Warbler	*Setophaga cerulea*
Bird	Threatened	Hooded Warbler	*Setophaga citrina*
Bird	Threatened	Greater Prairie-chicken	*Tympanuchus cupido*
Bird	Threatened	Bell's Vireo	*Vireo bellii*
Amphibian	Endangered	Blanchard's Cricket Frog	*Acris blanchardi*
Reptile	Endangered	Slender Glass Lizard	*Ophisaurus attenuatus*
Reptile	Endangered	Queensnake	*Regina septemvittata*
Reptile	Endangered	Eastern Massasauga	*Sistrurus catenatus*
Reptile	Endangered	Ornate Box Turtle	*Terrapene ornata*
Reptile	Endangered	Western Ribbonsnake	*Thamnophis proximus*
Reptile	Endangered	Eastern Ribbonsnake	*Thamnophis sauritus*

[17] This is the current Wisconsin Endangered and Threatened Species Laws & List, last revised June 2021.

Class	Endangered	Common name	Scientific name
Reptile	Threatened	Wood Turtle	*Glyptemys insculpta*
Fish	Endangered	Skipjack Herring	*Alosa chrysochloris*
Fish	Endangered	Crystal Darter	*Crysallaria asperella*
Fish	Endangered	Gravel Chub	*Erimystax x-punctatus*
Fish	Endangered	Bluntnose Darter	*Etheostoma chlorosoma*
Fish	Endangered	Starhead Topminnow	*Fundulus dispar*
Fish	Endangered	Goldeye	*Hiodon alosoides*
Fish	Endangered	Pallid Shiner	*Hybopsis amnis*
Fish	Endangered	Striped Shiner	*Luxilus chrysocephalus*
Fish	Endangered	Black Redhorse	*Moxostoma duquesnei*
Fish	Endangered	Slender Madtom	*Noturus exilis*
Fish	Threatened	Blue Sucker	*Cycleptus elongatus*
Fish	Threatened	Black Buffalo	*Ictiobus niger*
Fish	Threatened	Longear Sunfish	*Lepomis megalotis*
Fish	Threatened	Redfin Shiner	*Lythrurus umbratilis*
Fish	Threatened	Shoal Chub	*Macrhybopsis hyostoma*
Fish	Threatened	River Redhorse	*Moxostoma carinatum*
Fish	Threatened	Pugnose Shiner	*Notropis anogenus*
Fish	Threatened	Ozark Minnow	*Notropis nubilus*
Fish	Threatened	Gilt Darter	*Percina evides*
Fish	Threatened	Paddlefish	*Polyodon spathula*
Mussels	Endangered	Spectaclecase	*Cumberlandia monodonta*
Mussels	Endangered	Purple Wartyback	*Cyclonaias tuberculata*
Mussels	Endangered	Butterfly	*Ellipsaria lineolata*
Mussels	Endangered	Elephant-Ear	*Elliptio crassidens*
Mussels	Endangered	Snuffbox	*Epioblasma triquetra*
Mussels	Endangered	Ebonyshell	*Fusconaia ebena*
Mussels	Endangered	Higgins Eye	*Lampsilis higginsi*
Mussels	Endangered	Yellow/Slough Sandshell	*Lampsilis teres*
Mussels	Endangered	Sheepnose	*Plethobasus cyphyus*
Mussels	Endangered	Winged Mapleleaf	*Quadrula fragosa*
Mussels	Endangered	Rainbow	*Villosa iris*
Mussels	Threatened	Slippershell mussel	*Alasmidonta viridis*
Mussels	Threatened	Rock-Pocketbook	*Arcidens confragosus*
Mussels	Threatened	Monkeyface	*Quadrula metanevra*
Mussels	Threatened	Wartyback	*Quadrula nodulata*
Mussels	Threatened	Salamander Mussel	*Simpsonaias ambigua*
Mussels	Threatened	Buckhorn	*Tritogonia verrucosa*
Mussels	Threatened	Fawnsfoot	*Truncilla donaciformis*
Mussels	Threatened	Ellipse	*Venustaconcha ellipsiformis*

Class	Endangered	Common name	Scientific name
Snail	Endangered	Midwest Pleistocene Vertigo	*Vertigo hubrichti*
Snail	Endangered	Occult Vertigo	*Vertigo occulta*
Snail	Threatened	Wing Snaggletooth	*Gastrocopta procera*
Snail	Threatened	Cherrystone Drop	*Hendersonia occulta*
Insect	Endangered	Pecatonica River Mayfly	*Acanthametropus pecatonica*
Insect	Endangered	Red-tailed Prairie Leafhopper	*Aflexia rubranura*
Insect	Endangered	Flat-headed Mayfly	*Spinadis simplex*
Insect	Endangered	A Leafhopper	*Attenuipyga vanduzeei*
Insect	Endangered	Swamp Metalmark	*Calephelis muticum*
Insect	Endangered	Hairy-necked Tiger Beetle	*Cicindela hirticollis rhodensis*
Insect	Endangered	Ottoe Skipper	*Hesperia ottoe*
Insect	Endangered	Northern Blue Butterfly	*Lycaeides idas*
Insect	Endangered	Giant Carrion Beetle	*Nicrophorus americanus*
Insect	Endangered	Poweshiek Skipperling	*Oarisma poweshiek*
Insect	Endangered	Extra-striped Snaketail	*Ophiogomphus anomalus*
Insect	Endangered	Saint Croix Snaketail	*Ophiogomphus susbehcha*
Insect	Endangered	Silphium Borer Moth	*Papaipema silphii*
Insect	Endangered	Phlox Moth	*Schinia indiana*
Insect	Endangered	Hine’s Emerald	*Somatochlora hineana*
Insect	Endangered	Incurvate Emerald	*Somatochlora incurvata*
Insect	Endangered	Regal Fritillary	*Speyeria idalia*
Insect	Endangered	Knobel’s Riffle Beetle	*Stenelmis knobeli*
Insect	Endangered	Lake Huron Locust	*Trimerotropis huroniana*
Insect	Threatened	An Issid Planthopper	*Fitchiella robertsoni*
Insect	Threatened	Frosted Elfin	*Callophrys irus*
Insect	Threatened	Prairie Leafhopper	*Polyamia dilata*
Insect	Threatened	Spatterdock Darner	*Rhionaeschna mutata*
Plant	Endangered	Pale False Foxglove	*Agalinis skinneriana*
Plant	Endangered	Carolina Anemone	*Anemone caroliniana*
Plant	Endangered	Cut-leaved Anemone	*Anemone multifida var. multifida*
Plant	Endangered	Large-leaved Sandwort	*Moehringia (=Arenaria) macrophylla*
Plant	Endangered	Lake Cress	*Armoracia lacustris*
Plant	Endangered	Purple Milkweed	*Asclepias purpurascens*
Plant	Endangered	Green Spleenwort	*Asplenium trichomanes-ramosum*
Plant	Endangered	Alpine Milk	*Vetch Astragalus*
Plant	Endangered	Prairie Plum	*Astragalus crassicarpus*
Plant	Endangered	Cooper's Milk	*Vetch Astragalus*
Plant	Endangered	Prairie Moonwort	*Botrychium campestre*
Plant	Endangered	Common Moonwort	*Botrychium lunaria*
Plant	Endangered	Goblin Fern	*Botrychium mormo*

Class	Endangered	Common name	Scientific name
Plant	Endangered	Floating Marsh	*Marigold Caltha*
Plant	Endangered	Wild Hyacinth	*Camassia scilloides*
Plant	Endangered	Ravenfoot Sedge	*Carex crus-corvi*
Plant	Endangered	Smooth-sheathed Sedge	*Carex laevivaginata*
Plant	Endangered	False Hop	*Sedge Carex*
Plant	Endangered	Intermediate Sedge	*Carex media*
Plant	Endangered	Schweinitz's Sedge	*Carex schweinitzii*
Plant	Endangered	Brook Grass	*Catabrosa aquatica*
Plant	Endangered	Hemlock-parsley	*Conioselinum chinense*
Plant	Endangered	Obovate Beak	*Grass Diarrhena*
Plant	Endangered	Hoary Whitlow-grass	*Draba cana*
Plant	Endangered	Neat Spike-rush	*Eleocharis nitida*
Plant	Endangered	Square-stem Spike-rush	*Eleocharis quadrangulata*
Plant	Endangered	Wolf's Spike-rush	*Eleocharis wolfii*
Plant	Endangered	Harbinger-of-Spring	*Erigenia bulbosa*
Plant	Endangered	Chestnut Sedge	*Fimbristylis puberula*
Plant	Endangered	Dwarf Umbrella Sedge	*Fuirena pumila*
Plant	Endangered	Northern Commandra	*Geocaulon lividum*
Plant	Endangered	Bog Rush	*Juncus stygius*
Plant	Endangered	Prairie Bush Clover	*Lespedeza leptostachya*
Plant	Endangered	Dotted Blazing Star	*Liatris punctata* var. *nebraskana*
Plant	Endangered	Auricled Twayblade	*Listera auriculata*
Plant	Endangered	Fly Honeysuckle	*Lonicera involucrata*
Plant	Endangered	Smith's Melic	*Grass Melica*
Plant	Endangered	Mat Muhly	*Muhlenbergia richardsonis*
Plant	Endangered	Louisiana Broomrape	*Orobanche ludoviciana*
Plant	Endangered	Fassett's Locoweed	*Oxytropis campestris* var. *chartacea*
Plant	Endangered	Small-flowered Grass-of-Parnassus	*Parnassia parviflora*
Plant	Endangered	Smooth Phlox	*Phlox glaberrima* ssp. *interior*
Plant	Endangered	Butterwort	*Pinguicula vulgaris*
Plant	Endangered	Heart-leaved Plantain	*Plantago cordata*
Plant	Endangered	Eastern Prairie White Fringed Orchid	*Platanthera leucophaea*
Plant	Endangered	Western Jacob's Ladder	*Polemonium occidentale* ssp. *lacustre*
Plant	Endangered	Pink Milkwort	*Polygala incarnata*
Plant	Endangered	Spotted Pondweed	*Potamogeton pulcher*
Plant	Endangered	Rough White	*Lettuce Prenanthes*
Plant	Endangered	Great White	*Lettuce Prenanthes*
Plant	Endangered	Pine-drops	*Pterospora andromedea*
Plant	Endangered	Small Shinleaf	*Pyrola minor*
Plant	Endangered	Small Yellow	*Water Crowfoot*

Class	Endangered	Common name	Scientific name
Plant	Endangered	Lapland Buttercup	*Ranunculus lapponicus*
Plant	Endangered	Lapland Rosebay	*Rhododendron lapponicum*
Plant	Endangered	Wild Petunia	*Ruellia humilis*
Plant	Endangered	Sand Dune	*Willow Salix*
Plant	Endangered	Satiny Willow	*Salix pellita*
Plant	Endangered	Hall's Bulrush	*Schoenoplectus hallii*
Plant	Endangered	Netted Nut-rush	*Scleria reticularis*
Plant	Endangered	Small Skullcap	*Scutellaria parvula*
Plant	Endangered	Low Spike-moss	*Selaginella selaginoides*
Plant	Endangered	Fire Pink	*Silene viginica*
Plant	Endangered	Blue-stemmed Goldenrod	*Solidago caesia*
Plant	Endangered	Lake Huron Tansy	*Tanacetum bipinnatum* ssp. *huronense*
Plant	Endangered	Hairy Meadow	*Parsnip Thaspium*
Plant	Endangered	Heartleaf Foamflower	*Tiarella cordifolia*
Plant	Endangered	Purple False Oats	*Trisetum melicoides*
Plant	Endangered	Dwarf Bilberry	*Vaccinium cespitosum*
Plant	Endangered	Mountain Cranberry	*Vaccinium vitis-idaea*
Plant	Endangered	Squashberry	*Viburnum edule*
Plant	Endangered	Sand Violet	*Viola sagittata*
Plant	Threatened	Northern Monkshood	*Aconitum noveboracense*
Plant	Threatened	Muskroot	*Adoxa moschatellina*
Plant	Threatened	Roundstem Foxglove	*Agalinis gattingeri*
Plant	Threatened	Round-leaved Orchis	*Amerorchis rotundifolia*
Plant	Threatened	Wooly Milkweed	*Asclepias lanuginosa*
Plant	Threatened	Dwarf Milkweed	*Asclepias ovalifolia*
Plant	Threatened	Prairie Milkweed	*Asclepias sullivantii*
Plant	Threatened	Spleenwort	*Asplenium pinnatifidum*
Plant	Threatened	Kitten Tails	*Besseya bullii*
Plant	Threatened	Sand Reedgrass	*Calamovilfa longifolia* var. *magna*
Plant	Threatened	Large Water	*Starwort Callitriche*
Plant	Threatened	Calypso Orchid	*Calypso bulbosa*
Plant	Threatened	Carey's Sedge	*Carex careyana*
Plant	Threatened	Sedge	*Carex concinna*
Plant	Threatened	Coast Sedge	*Carex exilis*
Plant	Threatened	Handsome Sedge	*Carex formosa*
Plant	Threatened	Elk Sedge	*Carex garberi*
Plant	Threatened	Lenticular Sedge	*Carex lenticularis*
Plant	Threatened	Michaux's Sedge	*Carex michauxiana*
Plant	Threatened	Hill's Thistle	*Cirsium hillii*
Plant	Threatened	Dune (Pitcher's) Thistle	*Cirsium pitcheri*

Class	Endangered	Common name	Scientific name
Plant	Threatened	Rams-head Lady's-slipper	*Cypripedium arietinum*
Plant	Threatened	White Lady's-slipper	*Cypripedium candidum*
Plant	Threatened	English Sundew	*Drosera anglica*
Plant	Threatened	Linear-leaved Sundew	*Drosera linearis*
Plant	Threatened	Pale Purple Coneflower	*Echinacea pallida*
Plant	Threatened	Beaked Spike-rush	*Eleocharis rostellata*
Plant	Threatened	Thickspike Wheatgrass	*Elymus lanceolatus (= Elytriga dasystachya)* ssp. *Psammophilus*
Plant	Threatened	Forked Aster	*Eurybia furcata*
Plant	Threatened	Western Fescue	*Festuca occidentalis*
Plant	Threatened	Blue Ash	*Fraxinus quadrangulata*
Plant	Threatened	Round Fruited St. John's Wort	*Hypericum sphaerocarpum*
Plant	Threatened	Dwarf Lake Iris	*Iris lacustris*
Plant	Threatened	Slender Bush Clover	*Lespedeza virginica*
Plant	Threatened	Bladderpod	*Lesquerella ludoviciana*
Plant	Threatened	Broad-leaved Twayblade	*Listera convallarioides*
Plant	Threatened	Brittle Prickly Pear	*Opuntia fragilis*
Plant	Threatened	Clustered Broomrape	*Orobanche fasciculata*
Plant	Threatened	Plains Ragwort	*Packera indecora*
Plant	Threatened	Marsh Grass-of-Parnassus	*Parnassia palustris*
Plant	Threatened	Sweet Colt's-foot	*Petasites sagittatus*
Plant	Threatened	Pale Green Orchid	*Platanthera flava var. herbiola*
Plant	Threatened	Braun's Holly Fern	*Polystichum braunii*
Plant	Threatened	Prairie-parsley	*Polytaenia nuttallii*
Plant	Threatened	Algae-leaved Pondweed	*Potamogeton confervoides*
Plant	Threatened	Cliff Cudweed	*Pseudognaphalium saxicola*
Plant	Threatened	Seaside Crowfoot	*Ranunculus cymbalaria*
Plant	Threatened	Long-beaked Bald-rush	*Rhynchospora scirpoides*
Plant	Threatened	Canadian Gooseberry	*Ribes oxyacanthoides* ssp. *Oxyacanthoides*
Plant	Threatened	Tea-leaved Willow	*Salix planifolia ssp. planifolia*
Plant	Threatened	Dune Goldenrod	*Solidago simplex var. gilmanii*
Plant	Threatened	Clustered Bur-reed	*Sparganium glomeratum*
Plant	Threatened	Sheathed Pondweed	*Stuckenia vaginata*
Plant	Threatened	FALSE Asphodel	*Triantha glutinosa*
Plant	Threatened	Tufted Bulrush	*Trichophorum cespitosum*
Plant	Threatened	Snow Trillium	*Trillium nivale*
Plant	Threatened	Spike Trisetum	*Trisetum spicatum*
Plant	Threatened	Marsh Valerian	*Valeriana uliginosa*

APPENDIX I: FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES WITH CURRENT RANGE BELIEVED OR KNOWN TO OCCUR IN WISCONSIN

Class	Scientific Name	Common Name	ESA Listing Status	Wisconsin Listing Status
Bird	*Charadrius melodus*	Piping Plover	Endangered*	Endangered
Bird	*Calidris canutus rufa*	Rufa Red Knot	Threatened	-
Bird	*Grus americana*	Whooping Crane	Experimental Population, Non-Essential	-
Clam	*Lampsilis higginsii*	Higgins Eye (pearly mussel)	Endangered	Endangered
Clam	*Simpsonaias ambigua*	Salamander Mussel	Proposed Endangered*	Threatened
Clam	*Plethobasus cyphyus*	Sheepnose Mussel	Endangered*	Endangered
Clam	*Epioblasma triquetra*	Snuffbox Mussel	Endangered*	Endangered
Clam	*Cumberlandia monodonta*	Spectaclecase (mussel)	Endangered*	Endangered
Clam	*Quadrula fragosa*	Winged Mapleleaf	Endangered	Endangered
Flowering plant	*Iris lacustris*	Dwarf Lake Iris	Threatened	Threatened
Flowering plant	*Platanthera leucophaea*	Eastern Prairie Fringed Orchid	Threatened	Endangered
Flowering plant	*Oxytropis campestris var. chartacea*	Fassett's Locoweed	Threatened	Endangered
Flowering plant	*Asclepias meadii*	Mead's Milkweed	Threatened	-
Flowering plant	*Aconitum noveboracense*	Northern Wild Monkshood	Threatened	Threatened
Flowering plant	*Cirsium pitcheri*	Pitcher's Thistle	Threatened	Threatened
Flowering plant	*Lespedeza leptostachya*	Prairie Bush-Clover	Threatened	Endangered
Insect	*Somatochlora hineana*	Hine's Emerald Dragonfly	Endangered*	Endangered
Insect	*Lycaeides melissa samuelis*	Karner Blue Butterfly	Endangered	-

Insect	*Danaus Plexippus*	Monarch Butterfly	Proposed Threatened	-
Insect	*Oarisma poweshiek*	Poweshiek Skipperling	Endangered*	Endangered
Insect	*Bombus affinis*	Rusty Patched Bumble Bee	Endangered	-
Insect	*Bombus suckleyi*	Suckley's Cuckoo Bumble Bee	Proposed Endangered	-
Insect	*Argynnis idalia occidentalis*	Western Regal Fritillary	Proposed Threatened	Endangered**
Mammal	*Lynx canadensis*	Canada Lynx	Threatened	-
Mammal	*Canis lupus*	Gray Wolf	Endangered	-
Mammal	*Myotis sodalis*	Indiana Bat	Endangered	-
Mammal	*Myotis septentrionalis*	Northern Long-eared Bat	Endangered	Threatened
Mammal	*Perimyotis subflavus*	Tricolored Bat	Proposed Endangered	Endangered
Reptile	*Sistrurus catenatus*	Eastern Massasauga	Threatened	Endangered
Snail	*Discus macclintocki*	Iowa Pleistocene Snail	Endangered	-

*Species also have federally designated or proposed critical habitat.

**Wisconsin's Endangered and Threatened Species List refers to *Speyeria idalia*, the old taxonomic name for the Regal Fritillary before it was taxonomically reorganized and divided into two officially recognized subspecies, the Eastern and Western Fritillary.

APPENDIX J: LIST OF PREPARERS, REVIEWERS, AND PERSONS CONSULTED

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APPENDIX L: SCOPING SUMMARY

This appendix summarizes the issues and alternative proposals provided during the public scoping period for the EA and the area in the EA where they are addressed.

ALTERNATIVES AND METHODS

- **WS-Wisconsin should not use lethal methods to take beaver**. Section E.2.2
- **No lethal take of beaver should be allowed by any entity in Wisconsin for any reason**. Alternative outside scope of analysis. WS-Wisconsin does not have the authority to set state beaver management policy and regulations. Section 1.1
- **Beavers should be restored to their full historical habitat**. Proposal outside scope of analysis. WS-Wisconsin authority limited to beaver damage management in Wisconsin. Section 1.1.
- **Consider an alternative that continues the current program**. Section 2.5.1.
- **Consider an alternative that increases WS-Wisconsin use of nonlethal methods.** Alternatives 2 and 3 (Sections 2.5.2 and 2.5.3) would increase WS-Wisconsin use of nonlethal methods. See also Section E.2.2 and E.2.10.
- **WS-Wisconsin should provide more education and demonstrations on the positive role of beaver in ecosystems and the use of nonlethal methods.** Education on the positive ecosystem services of beaver and management of the state's beaver population is primarily the responsibility of the WDNR. However, WS-Wisconsin provides education on the value of beavers and availability of nonlethal methods for addressing beaver damage and coexisting with beaver within the constraints of available resources (Sections 2.6.1.1 and E.2.10.
- **WS-Wisconsin should increase training of personnel on ways to reduce nontarget take during BDM. This includes training staff to use sets at beaver lodge entrances and feeding areas instead of dam spillways. Also encourage use of cage traps instead of foothold and body-grip traps or cable devices.** Sections 3.3 and 3.4, E.2.3, and F.2.
- **WS-Wisconsin should conduct additional beaver-trout studies in Wisconsin.** In general, this type of research is conducted by the agency requesting BDM for natural resources management and we are aware of an extensive study that is being conducted by the WDNR. APHIS-WS involvement in research is addressed in Section 2.6.1.3.
- **Do not use nonlethal methods for beaver**. It just moves the problem. Relocation addressed in Sections 2.6.4.1, E.2.3 and F.1. Exclusive use of nonlethal methods addressed in
- **WS-Wisconsin should not trap beaver in trout streams unless there is a dam. It prevents beaver dispersal into the streams.** Reducing beaver recolonization into treated areas to reduce the need for beaver dam removal is one of the goals of the coldwater fisheries project. Nonetheless, some immigration into the area is retained (Section 3.2).5.1.3).
- **Acknowledge that county highway and forestry departments are already working to implement nonlethal strategies to reduce risks.** Sections 2.6.4 and F.1.

- **Consider an alternative that addresses nonlethal before lethal.** Section E.2.7, also see E.2.2 and E.2.10. Alternatives 2 and 3 increase the requirement for WS-Wisconsin to use nonlethal methods.
- **Support Beaver Relocation**. Sections 2.6.4.1, E.2.3, E.2.10 and F.1.
- **Create a Beaver Damage Management Flow Chart to direct course of action for each site like the one used by City of Portland.** Section E.11.
- **Discontinue use of devices that slowly drown beavers in favor of nonlethal methods and quick-kill traps.** Section E.12.
- **On an annual basis, provide the public with data and information on WS-Wisconsin activities including information on target and nontarget take.** APHIS-WS program data reports including information on lethal take of target and nontarget species are provided annually. Data on WS-Wisconsin BDM activities is provided annually to the Wisconsin Beaver Task Force, and the reports are also available through FOIA. Section 2.5.1.
- **Consider that nonlethal methods can be cost-effective**. Section E.2.2, F.1.

ISSUES

- **EA should consider that beaver dams can help reduce flooding**. Section 3.5.
- **Consider the impact of beaver and beaver dam removal on biodiversity as it pertains to the high diversity of species supported by wetlands associated with beaver impoundments.** Section 3.3.
- **Consider how beaver removal affects the abundance of wetlands in the state.** Section 3.5.
- **Discuss the role of WS-Wisconsin in reductions of beaver population that occurred during the period of 1992-2008.** Section 3.2.
- **Consider the impact of beaver on Threatened and Endangered Species including listed bats.** Section 3.4.
- **Consider impact of nontarget take of animals in equipment used for BDM.** Section 3.3.
- **EA should consider risks to human and pet safety and increase use of nonlethal methods to reduce risks**. Risks to human and pet safety from BDM activities addressed in Section 3.6. WS increased use of nonlethal methods addressed in Sections 2.5.3 and 2.5.4.
- **Consider impacts of beaver dam and beaver wetland removal on the ability of ecosystems to withstand environmental extremes including high water events, drought, and wildfire, including reducing the potential for downstream flooding.** Section 3.5.
- **Consider the ability of beaver impoundments to improve water quality by retaining pollutants and sediment.** Section 3.5 and Appendix C.
- **Consider impact of BDM on recreational activities including wildlife watching and waterfowl hunting.** Section 3.8.1.
- **Consider impacts on tribal cultural practices and treaty rights.** Sections 1.8, 3.8.2, Appendix A, and E.1.8.

- **Consider that some of the best trout fishing can be behind beaver dams.** Short- and long-term impacts of beaver impoundments on coldwater fisheries including short term and long-term impacts and potential benefits are addressed in Section 1.5.4 and Appendix C.
- **EA needs an accurate beaver population estimate**. See Section 3.2 particularly 3.2.1.
- **EA needs to consider how relatively slow reproductive capacity of beaver impacts population recovery after reductions.** General biology is in Section 3.2.4. Response to removals including high population reduction addressed in Section 3.2.3 and 3.2.5.
- **Consider Impact on Hyporheic Zone**. Section 3.5 and Appendix C.
- **Consider ability of beaver to stabilize stream temperature.** Impacts of beaver on stream temperature are addressed In Sections 3.5 and Appendix C.
- **Consider impact of sediment release during dam removal.** Potential for sediment release addressed in Sections 3.4.1, 3.5 and Appendices C and D.
- **Consider impact of nontarget take of river otter.** Section 3.3.1.1.
- **Impacts are likely significant. WS-Wisconsin needs to prepare an EIS.** Purpose of this EA – Section 1.6.
- **Consider impacts of removals on beaver family groups.** Section 3.2. and 3.3.1.1
- **Consider that beaver impoundments will not affect all wetlands equally. In some cases, impounded water can adversely impact some wetland types and convert them from one type to another.** Section 1.5.4.2.
- **Review and explain how WS-Wisconsin will comply with Section 404 of the CWA.** Section B.9 and Appendix D.
- **Explain how impacts on beaver and nontarget species will be monitored.** Section 3.2.5.1 and 3.3.1.1.
- **Discuss the impact of WS-Wisconsin activities on the Milwaukee River Watershed.** Section E.2.4.