

Section F: Designated Protected Uses and Additional Desired Water Uses

Comprehensive watershed plan updates conducted with funding under Section 319 of the federal Clean Water Act must determine whether or not surface waterbodies within the watershed meet the designated, protected uses specifically identified in the state water pollution control statutes and promulgated rules established consistent with the authority delegated under federal law. That determination includes an assessment of compliance with Michigan Water Quality Standards (WQS) established to protect those uses. In addition, watershed plans usually identify other desired uses of the surface waters and groundwater within the watershed and assess the level of protection needed to sustain such uses. This section also describes the future threats, problems, and concerns related to surface and groundwater uses identified by the stakeholders of the Greater Bear Watershed.

DESIGNATED, PROTECTED USES OF SURFACE WATER

Under Michigan's water pollution control statute (Natural Resources and Environmental Protection Act, Public Act 451 of 1994, Sec. 324.3109), discharges to surface waters are unlawful that are or may become injurious to

- public health, safety or welfare,
- domestic, commercial, industrial, agricultural, recreational, or other uses that are being made or may be made of such waters,
- value or utility of riparian lands, or
- livestock, wild animals, birds, fish, aquatic life, or plants or to their growth or propagation or the value of fish and game.

Promulgated Michigan water quality rules based on this state law and the federal Clean Water Act establish as a minimum that all waters of the state are designated and protected for the following uses:

- Agriculture
- Navigation
- Industrial water supply
- Warmwater fishery
- Other indigenous aquatic life and wildlife
- Partial body contact recreation
- Total body contact recreation from May 1 to October 31
- Fish consumption

In addition, protected uses include the following if identified by the state of Michigan:

- Coldwater (trout) lakes and coldwater (trout) streams are protected for coldwater fisheries.
- Migratory routes for anadromous salmonids
- Public water supply intakes

Under state rules, both numerical and narrative water quality standards are established for designated and protected uses. In all cases where waters are designated for more than one of these protected uses, the most restrictive water quality standards apply. In the case of the Greater Bear Watershed, *Migratory*

routes for anadromous salmonids (trout and salmon) and *designated trout streams* would apply as an additional protected use in Bear Creek and its tributaries. The other two conditions for protected uses do not apply. Bear Lake is designated as a warmwater lake for application of water quality standards and it is therefore not protected under the standards for designated coldwater or trout lakes. Likewise, there are no surface water public water supply intakes in the watershed although two communities, the villages of Kaleva and Bear Lake, provide a public water supply from groundwater sources within the watershed.

Every two years the state issues a determination on the status of water quality conditions for designated uses of waterbodies within the state as part of its requirements under the federal Clean Water Act. These determinations are summarized in the Integrated Report, which was reviewed for the Greater Bear Watershed. For each subwatershed in the Greater Bear, Exhibit 74 shows the designated uses and the use determination made by the state. The state categorizes the status of designated uses by the following:

- Fully supporting (the waterbody meets state water quality standards)
- Not supporting (the waterbody does not meet state water quality standards)
- Insufficient information (available information is insufficient to determine if state water quality standards have been met)
- Not assessed (the water body was not assessed to determine if state water quality standards were met)

In instances where there is a lack of information, the state assumes that state water quality standards are being met.

The 2012 Integrated Report indicates that all of the subwatersheds are listed as not attaining the fish consumption standards because of PCBs. The Bear Creek subwatershed is listed as not supporting state water quality standards for the Other Indigenous Aquatic Life and Wildlife designated use because of mercury. The fish consumption advisories and contaminant concerns apply to certain species from contaminant sources outside the watershed that are likely to occur because of atmospheric deposition. These fish consumption advisories are not uncommon throughout Northern Michigan or the Manistee River Watershed to which Bear Creek is a tributary. There are similar use restrictions for the Manistee River upriver and downriver from its confluence with Bear Creek. As of the time of this report, the Michigan Department of Community Health has not issued consumption advisories in the Greater Bear Watershed that are more restrictive than the general advisories for Northern Michigan.

Additional information available from local entities that may not have been evaluated by the state when it made use determinations for the Greater Bear as part of the 2012 Integrated Report was also reviewed as part of this watershed plan and compared to state water quality standards.

Exhibit 75 lists the: (1) categories of designated protected uses under statute and regulations; (2) water quality standards that apply to each designated protected use; (3) existing activities and uses; and (4) existing conditions compared to the water quality standards. There is an absence of current data to determine whether or not full and partial body contact recreation standards (*E. coli* bacteria counts) are being met in either Bear Lake or Bear Creek and tributaries. Fish consumption advisories for larger predator species have been established by the Michigan Department of Community Health (MDCH) for certain species in both Bear Lake and Bear Creek due to sources of contaminants generated outside of the watershed.

Exhibit 76 lists potential new or increased future surface water uses that are protected under state regulations. It also outlines the likelihood that such uses would occur and whether or not existing water quality is sufficient to protect these future uses. In general, the water quality standards designed to be protective of total body contact, aquatic life and wildlife, and warmwater fish, or in the case of Bear Creek and tributaries, trout and salmon, are more restrictive than needed to protect most if not all agricultural, industrial, and commercial uses. Current water quality conditions would support such

expanded uses should they occur. It is unlikely that future municipal water supplies would withdraw surface water within the watershed, but would instead rely on groundwater.

EXHIBIT 74. Greater Bear Watershed: Designated Protected Use Determinations

	Dutchman Creek - Bear Creek (HUC 40601030501)	Little Bear Creek (HUC 40601030502)	Lemon Creek - Bear Creek (HUC 40601030503)	Little Beaver Creek - Bear Creek (HUC 40601030504)	Bear Creek (HUC 40601030505)
Designated Use					
Total body contact recreation	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed	insufficient information
Partial body contact recreation	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed	Insufficient information
Navigation	Fully supporting	Fully supporting	Fully supporting	Fully supporting	Fully supporting
Industrial water supply	Fully supporting	Fully supporting	Fully supporting	Fully supporting	Fully supporting
Agriculture	Fully supporting	Fully supporting	Fully supporting	Fully supporting	Fully supporting
Warmwater fishery	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed
Other indigenous aquatic life and wildlife	Fully supporting	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed	Not supporting - mercury in water column
Coldwater fishery	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed	Fully supporting/not assessed
Fish consumption	Not supporting - pcb in water column	Not supporting - pcb in water column	Not supporting - pcb in water column	Not supporting - pcb in water column	Not supporting - pcb in water column

SOURCE: Public Sector Consultants Inc., 2013. Using data from the 2012 Integrated Report

EXHIBIT 75. Comparison of Standards for Protected Uses versus State Water Quality Standards

Designated protected uses (Part 31 of Michigan Act 451, 324.3109)	Michigan Water Quality Standards	Existing activities and uses	Existing conditions compared to standard
Total body contact recreation (all waterbodies)	Colony counts 130 or less <i>Escherichia coli</i> (E. coli) per 100 ml monthly average and 300 or less <i>E. coli</i> at any time	Swimming, SCUBA, snorkeling, water skiing, tubing, and related full body contact recreation activities	Compliance with standard not known, additional sampling needed
Partial body contact recreation (all waterbodies)	Colony counts of 1,000 or less for <i>E. coli</i> per 100 ml	Canoeing, kayaking, cruising, sailing, and related boating activities	Compliance with standard not known, additional sampling needed
Warmwater fishery (Bear Lake)	Dissolved oxygen (DO) not less than 5.0 mg/l (ppm) at any time in epilimnion (uppermost layer of the lake) during summer stratification and 5.0 mg/l rest of year Limits any increase in temperature from discharges based upon classification of receiving water	Warmwater fish populations for recreational fishing and related aquatic food organisms There are no state permitted surface discharges in the Greater Bear Watershed	Existing - one sample per day DO measurements appear to meet standard in Bear Lake; however, early morning readings needed to confirm compliance Maximum temperatures in Bear Lake conform to Warmwater Lake standards
Coldwater fishery (Bear Creek and tributaries)	Dissolved oxygen (DO) not less than 6.0 mg/l (ppm) during summer low flow and not less than 7.0 mg/l rest of the year Limits any increase in temperature from discharges based upon classification of receiving water	Trout, salmon for recreational fishing and related coldwater organisms There are no state permitted surface discharges in the Greater Bear Watershed	Two locations in 1994 indicated non-attainment of standard. Additional DO testing on diurnal basis needed to confirm compliance with standard Bear Creek has areas that exceed the summer maximum temperature of 68°F designed to protect trout and salmon
Fish consumption	Triggers established by MDCH for mercury and various organic compounds	Recreational fishing in Bear Lake and Bear Creek and tributaries	Fish consumption advisories apply to certain species from contaminant sources outside of watershed
Other indigenous aquatic life and wildlife (pH, ammonia, nitrate, nitrites, organic nitrogen, phosphorus, and metals)	Various limits primarily on discharges as needed to protect fish, wildlife, and aquatic organisms, and prevent nuisance algae blooms	Fish, wildlife, ecosystem health	Attainment of both numerical and narrative standards for all subwatersheds but Bear Creek, which is listed for mercury because from contaminant sources outside the watershed.

SOURCE: Public Sector Consultants Inc., 2011.

**EXHIBIT 76. Greater Bear Watershed State Designated Uses for
Potential Future Uses of Surface Waters, Likelihood of Future Use, and Existing Condition**

Designated, protected uses <small>(Part 3.1 of Act 451, 324.3109)</small>	Potential future uses	Likelihood that designated/surface water use may be made in the future	Ability of existing water quality to support use
Public water supply	New public water supply from surface waters	Adequate quality and quantity of groundwater in watershed for expected domestic water demand	Drinking water quality standards higher than existing surface water quality and additional treatment would be required to meet state drinking water standards for surface water sources
Industrial water supply	New industrial/commercial surface water supplies	Future demand unknown, but likely major industrial use would draw from groundwater resources rather than surface water	Most industrial/commercial uses could be accommodated by exiting surface water quality
Agricultural	New agricultural surface water uses or expanded small quantity uses for domestic lawn watering and gardens by riparians	Tributary streams too small to support significant agricultural withdrawals and there are not expected significant agricultural uses riparian to Bear Lake	Agricultural uses could be supported by existing water quality in surface waters

SOURCE: Public Sector Consultants Inc., 2011

PROTECTED USES OF GROUNDWATER

Groundwater is also protected under Michigan laws and promulgated rules. Under state regulations groundwater discharges must meet a non-degradation standard to protect existing or potential uses such as domestic water supplies, irrigation, stock watering, etc. The greatest threats to groundwater in the watershed are related to the unlawful release of hazardous materials (e.g., from storage and handling facilities or historical disposal sites) and accidental release of contaminants from spills and discharges that either gain direct access to groundwater or which enter otherwise protected groundwater aquifers through improperly plugged and/or abandoned hydrocarbon and mineral wells, or domestic water wells.

The villages of Bear Lake and Kaleva have wellhead protection programs and local regulations that encompass the surface area which contributes groundwater to the well water supplies of both villages.

As noted in the Watershed Conditions section, Michigan has adopted water withdrawal regulations under a series of new state laws (2008, Public Acts 179-190), based in part on this unique coldwater groundwater resource. One of the new laws requiring permits is especially focused on groundwater withdrawals that occur near designated trout streams such as Bear Creek and most, if not all, of its tributaries.

ADDITIONAL DESIRED USES

Although the focus of the watershed plan is on water-related uses, the surrounding land uses, the economic viability, and the quality of life and related recreational uses are interrelated to the sustainable use and protection of water and other natural resources of the watershed. Thus, certain non-water uses of natural resources and coordinated planning to preserve and protect those uses have been included at the request of stakeholders as additional desired uses. Exhibit 77 lists the additional desired uses that those participating in the Greater Bear Watershed planning process have specifically identified as important to the overall success of a watershed plan. Some of these additional desired uses relate directly to the aquatic resources of the watershed, while others address the need to incorporate those uses that are historically and culturally important to the residents and visitors, and address both the quality of life and economic viability of the watershed area.

**EXHIBIT 77. Additional Desired Uses Not Protected under Water Quality Standards
Location, Purpose, Applicable Laws, and Additional Protections under Consideration to Preserve and Protect these Uses**

Desired use	Location	Purpose	Applicable laws/regulations/programs	Potential additional protections
Maintain existing undeveloped shoreline habitat	Bear Lake and Bear Creek riparian properties	Preserve critical fish habitat, provide filter for land-based storm water runoff, maintain biological diversity	State wetlands and inland lakes and streams laws and regulations	Education of landowners, fee simple purchase or easements by governmental or nonprofit conservation organizations, adoption of local ordinances/zoning related to new development, natural river zoning, control of invasive species
Preserve diverse upland ecotypes	Need to identify	Maintain ecological diversity, habitat for rare and endangered species, study sites for understanding ecological functions/processes	State and federal laws for the protection of critical habitat for endangered and threatened species, and state/local property tax exemptions	Education of landowners, fee purchase or easements by governmental or nonprofit conservation organizations, local ordinances or zoning, control of invasive species
Preserve economically important and historically unique agricultural activities	Selected areas or zones	Maintain examples of cultural heritage of region for the education/ enrichment of residents and visitors	Michigan Centennial Farm recognition program, Farmland Preservation Act, land conservancy programs, accommodation of local zoning requirements	Promotion of locally grown agricultural products through market days, farm roadside products, and tourist information, featuring locally grown produce in area restaurants and markets
Protect and preserve culturally and/or historically significant buildings and sites	Selected areas or zones	Increase awareness and understanding of historical uses of the natural resources of the area by Native Americans and early European settlers by maintaining and developing sites and preserving buildings of interest to residents and visitors	Designation as Michigan/National Historical Site	Collaboration with Little River Band of Ottawa Indians and local historical groups to identify, interpret, and map sites of significance
Maintain scenic vistas	Selected areas or zones	Continue to provide aesthetically pleasing landscape views for residents and visitors to the area	State and local highway rest areas, picnic areas, and scenic turnouts, local parks, nonprofit conservation areas, federal and state recreation lands	Provide public information on scenic road touring, education of landowners, promotion with local, state, federal, and tribal landowners and agencies
Encourage sustainable economic development	Selected areas	Provide opportunities that support permanent employment which stems out-migration of youth and enhances community stability and diversity of age groups	State, federal, local, and private grants/loans targeted for sustainable economic development	Encourage use of local businesses by residents and visitors for basic needs and services, seek grants to support investments in sustainable economic development

SOURCE: Public Sector Consultants Inc., 2011

Public Access to Bear Creek and Conflicts with the Use of Private Property

During the preparation of this Greater Bear Watershed Management Plan the concerns of private property owners on Bear Creek over trespass and related issues associated with public fishing and boating on the river were heightened when the Department of Natural Resources (MDNR) purchased a parcel on the river to provide public access near 9 Mile Road west of the village of Kaleva. While intended to accommodate public use, primarily fishing, in an area where public access was limited and trespass of private property by anglers was a significant problem, many nearby property owners believed that providing unlimited public angler access and boat launching at this location would further accelerate the problems they were experiencing with abuses that had significantly impacted their use of their private properties along the river. A public open house in October of 2012 hosted by the MDNR at the nearby Big Bear Sportsman's Club provided the property owners and well as public recreational users of Bear Creek an opportunity to express their concerns and suggest design, permitted public uses and operation/maintenance of the access site that would minimize conflicts. Following the open house the MDNR, indicated that they would take into consideration the legitimate concerns of the property owners in the final design and allowed public uses on the property. The final MDNR determination on the design and use of the site was still pending at the time this report was finalized.

EXISTING CONDITIONS COMPARED TO STATE STANDARDS

Human Pathogens – Full and Partial Body Contact Recreation

Public swimming, wading, and related non-boating, nearshore recreational water uses occur at the Michigan Department of Natural Resources (MDNR) boating access site and Hopkins Park on Bear Lake. Similarly, full and partial body contact recreational activities occur at road endings where the public has access to the water, in front of riparian properties, and in the open water of Bear Lake in association with various boating and water sports activities. Periodic bacteria samples were taken at various locations in Bear Lake between 1991 and 2007 (ASI Environmental Technologies, Inc. 2007). These sample results were reported as coliform bacteria colonies per 100 milliliters (col/100 ml) rather than the *E. coli* bacteria col/100 ml standard that is established under the WQS. Coliform bacteria include *E. coli* as well as other bacteria found in fecal matter associated with warm blooded animals. Both measures are used as an indicator of possible fecal contamination associated with serious disease causing bacteria, viruses, protozoa, and multi-cellular parasites. The WQS for **Full-Body Contact Recreation** is 130 or less *Escherichia coli* (*E. coli*) colony counts per 100 milliliter sample (130 *E. coli* col/100 ml or less) based upon a monthly geometric mean, or 300 *E. coli* col/100 ml or less at any time. The WQS for **Partial-Body Contact Recreation** is 1,000 *E. coli* col/100 ml or less.

The results for the 1991 through 2007 sampling period identify several locations where coliform counts were elevated. Repeat samples were not taken at the same sites over a monthly period in order to determine the monthly means. During the 17-year period, samples were taken at 42 different dates at 10 locations in Bear Lake and at 2 locations at the outlet in Little Bear Creek. Only 14 of the sample dates in this 17-year period were during June, July, and August when water temperatures favoring bacteria growth are ideal, the maximum recreational uses are expected to occur, and when the loadings to onsite wastewater treatment systems (OWTS) (e.g., septic tanks and tile fields, dry wells, gray-water barrels) around the lake would be the greatest. Of the 154 samples taken on the 16 days during June, July, and August in Bear Lake, over 11 percent showed elevated coliform levels (50 col/100 ml or greater) with the highest being 1,842 col/100 ml and the next highest 399 col/100 ml. Every lake site sampled had at least one coliform result over 100 col/100 ml during the 16 years of sampling. The two sites sampled on Little Bear Creek below the outlet to Bear Lake showed the most consistent elevation of coliform levels with many sample results over 200 col/100 ml.

E. coli standards to protect for full body contact recreation in Bear Lake may not be met during the heavy use period of June, July, and August. Additional sampling targeted during this critical period at the popular public swimming areas would provide better information on whether or not the standard intended to protect public health is being met. Only one sample in 1992, in one location on Bear Lake, of the 154 samples taken during June, July, and August, indicated that the partial body contact recreation standard, based on coliform bacteria data, was not met. That sample was taken at the northeast side of Bear Lake off Little Bay. Repeated samples since that time at the same location during the same time of year did not indicate that the partial body contact recreation standard was exceeded.

The only known samples for bacteria from Bear Creek and its tributaries are those taken just below the outlet of Bear Lake in Little Bear Creek. Those samples from Little Bear Creek below the Bear Lake outlet showed consistent elevated levels of coliform bacteria, many of which would suggest the total body contact standard for *E. coli* is not being met all of the time during the summer season. Follow-up sampling of Bear Creek is needed to confirm that the *E. coli* standards for both full and partial body contact recreation are not being exceeded.

Hazardous Materials, Fish Consumption Advisories, and other Water Quality Limits

There are no National Pollutant Discharge Elimination System (NPDES) permits for commercial, industrial, or municipal discharges into Bear Lake, Bear Creek, or any Bear Creek tributary. There are no known current surface water discharges or discharges from historical releases to Bear Lake or Bear Creek and its tributaries containing chemicals at concentrations known to be causing injury to fish, wildlife, or aquatic organisms. There are no recent chemical contaminant analyses of tissue from fish collected from either Bear Lake or Bear Creek and its tributaries. However, based upon the migratory habits of at least larger brown trout, steelhead, and Chinook and coho salmon caught in Bear Creek and tributaries, the fish consumption warnings currently applicable to those species in the Manistee River, Manistee Lake, and Lake Michigan would apply to fish taken in Bear Creek and its tributaries. Atmospheric deposition of mercury, largely due to the burning of fossil fuels, and potentially similar air depositions of PCBs (Polychlorinated Biphenyls) from burning waste, likely concentrate in certain species in Bear Lake at or above levels that trigger fish consumption warnings. The most recent Michigan fish consumption advisories can be found on the MDCH website (Michigan Department of Community Health 2011).

Because no test results are specifically available for fish from Bear Lake, the MDCH recommends the general fish consumption guidance given in Exhibit 78.

**EXHIBIT 78. Michigan Department of Community Health
General Fish Consumption Guidance**

<p style="text-align: center;">Eat one meal or less per WEEK of ONE of the following:</p> <ul style="list-style-type: none"> • Rock bass (over 9 inches long) • Yellow perch (over 9 inches long) • Crappie (over 9 inches long) • Largemouth bass (any size) • Smallmouth bass (any size) • Walleye (any size) • Northern pike (any size) • Muskellunge (any size) <p><small>*Advisory for males 15 years or older and females 45 years or older.</small></p>	<p style="text-align: center;">Eat one meal or less per MONTH of ONE of the following:</p> <ul style="list-style-type: none"> • Rock bass (over 9 inches long) • Yellow perch (over 9 inches long) • Crappie (over 9 inches long) • Largemouth bass (any size) • Smallmouth bass (any size) • Walleye (any size) • Northern pike (any size) • Muskellunge (any size) <p><small>Advisory for boys and girls under the age of 15 and females ages 15–45 years old.</small></p>
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SOURCE: Michigan Department of Community Health, 2011.

All the species of fish listed in the general consumption guidance have been identified in Bear Lake with the exception of muskellunge.

Historical test results and observations on Bear Lake, Bear Creek, and tributary streams indicate there are no current exceedances of numeric or narrative WQS intended to protect designated uses with possibly two exceptions. A dissolved oxygen value of less than the minimum 24-hour standard was reported at two locations in Little Bear Creek within the Headwaters Subwatershed in 1994. The pH values recorded for Bear Lake, Bear Creek, and tributary streams in the various studies cited previously show a range of pH values (6.3–8.2) that are within the range established to protect designated uses. Other chemical parameters including nitrites, nitrates, ammonia, organic nitrogen, phosphorus, and alkalinity levels reported from both Bear Lake (warmwater lake) and Bear Creek and tributaries (trout streams) are all within the range of values expected from warmwater lakes and designated trout streams in Michigan.

While control of invasive Eurasian milfoil is an issue in Bear Lake, nuisance algal blooms, the prevention of which is specifically stated in the WQS standards, is not a significant problem according to lake residents. Temperature is also a regulated water quality standard. Permitted discharges to surface waters are limited in temperature depending upon the classification of the receiving river or lake. While there are no permitted discharges to surface waters of Bear Creek, water temperatures above the standard for trout streams (summer maximum of 68 degrees Fahrenheit) have been recorded in portions of Bear Creek and are most likely related to the removal of streamside shade trees and sedimentation resulting from historical logging practices in the watershed.