October 25, 2012

**Legislative Agenda Topic: Environment**

**GOAL:** Improve water and land

**ISSUES:** Stormwater runoff poses a serious threat to the health of Madison's lakes and beaches and shorelines. Road salt, sediment and phosphorus all contribute to water quality impairment. High levels of phosphorus result in increased growth of blue green algae which may pose a threat to human health and decreases the enjoyment and recreation value of Madison's lakes. Concerns about Madison drinking water quality are also of concern to residents. This memo is broken up into categories: road salt, phosphorus and sediment (sewer utility) & drinking water (water utility).

## I. ROAD SALT

**BACKGROUND:** The City of Madison applies about 250 tons of salt annually in the Wingra watershed alone as part of its ice and snow removal program; salt (chloride) levels in the lake have increased by about 15 times since the 1950s. City of Madison policy (adopted 1973) set a goal of decreasing salt use by 50% in the watershed, but salt use has steadily increased in the last 5 decades. Elevated salts in soils create osmotic imbalances in plants, inhibiting water absorption and seed germination, reducing root growth and root growth rates for grasses and wild flowers, and degrading native wetlands by favoring salt-tolerant plant species. [1]

A 2011 report by the Department of Public Health Madison-Dane County, states that "despite nearly 50 years of observation and efforts at reduction, the use of road salt continues to increase"[2] and both surface and ground water have increasing levels of salt. Madison is using amounts of salt that rival the amount used on County roads, yet "the City should be using far less. The counties are maintaining roadways that see a high volume of traffic at higher speeds."

**OPPORTUNITIES & CHALLENGES:** Road safety and good quality driving conditions are both vital to citizen well-being in Madison, Wisconsin. However Madison's salt use is higher than ever before and there is room to increase efficiency to maintain safety while reducing the impact of salt on our land and water. Application techniques including limiting the amount of salt loaded onto a truck, the speed the truck drives as it spreads salt, and using a salt water solution can reduce the amount of salt used.

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[1] Excerpts from Friends of Lake Wingra, Lake Wingra Watershed Management Plan – Storm Water. 2003 Retrieved from http://lakewingra.org/index.php?option=com_phocadownload&view=category&id=4:management-plans-and-reports&Itemid=11

[2] Wenta, Rick and Sorsa, Kirsti, Road Salt Report – 2011. Public Health Madison – Dane County 29 September 2011.

Challenges to reducing salt use are often based in human perceptions and expectations. What are good road conditions in the winter, do the roads have to be completely snow and ice free? The City of Madison may also have to consider salt use by private entities. Commercial parking lots and other private property also contribute to salt contamination in waterways and soils.

**STRATEGIES: "**The City can positively affect the chloride concentration in Lake Wingra, protect its drinking water, and serve as a model to neighboring municipalities, with a committed effort to reduce road salt use. However, mechanical and procedural improvements will not suffice. A clear reduction policy must be defined and implemented."[3]

## II. PHOSPHORUS AND SEDIMENT

**BACKGROUND:** High levels of phosphorus and sediment flow from urban and rural lands into the rivers and streams that feed the Madison lakes. As a result of excessive phosphorus blue-green algae blooms crop up frequently along beaches and shorelines. The economic costs to the City of Madison can be found in closed beaches, lost recreational opportunities, reduced quality of life for residents and reduced tourism.

Madison has been a leader in managing stormwater and reducing total suspended solids (TSS) including phosphorus through actions such as: street sweeping, reduced fertilizer use, stormwater management, leaf control and efforts to minimize erosion. Nevertheless, meeting the challenge of clean lakes requires even steeper reductions of phosphorus levels. In order to meet water quality goals we will need to maximize cross-jurisdictional cooperation and deepen the public commitment to clean lakes.

**OPPORTUNITIES & CHALLENGES:** Faced with a federal requirement to reduce the phosphorus load from its discharge waters, the Madison Metropolitan Sewerage District (MMSD) is spearheading the Yahara Watershed Improvement Network (Yahara WINs) – the pilot phase of Adaptive Management. Over twenty communities, eleven agencies and organizations, together with a coalition of farmers from the Dorn Creek watershed are part of the effort to reduce phosphorus loads by 16,000 lbs/year. The goal is to reduce phosphorus loading at its source, rather than building a new treatment plan estimated to cost $75,000,000. The approach should reduce phosphorus levels throughout Yahara waterways thereby improving water quality and preserving the values of rivers, lakes and streams.

**STRATEGIES:** The City of Madison continues to advance the objectives of the Yahara Capitol Lakes Environment Assessment and Needs (CLEAN) in partnership with Dane County, MMSD, the University of Wisconsin – Center for Limnology, and many others. Madison can continue to reduce phosphorus within the city limits through improved street sweeping, leaf management, erosion prevention and other techniques. The City included funding for a leaf management study to reduce phosphorus in the 2013 budget in an effort to further reduce phosphorus. The City has an opportunity to maximize the benefits from the Yahara WINs partnership by providing a strong example of how municipalities and other jurisdictions can

[3] Wenta, Rick and Sorsa, Kirsti, Road Salt Report – 2011. Public Health Madison – Dane County 29 September 2011.

best handle stormwater and other sources of phosphorus. While the Adaptive Management program can appear unduly burdensome for a "good-actor" such as Madison, it is also the best opportunity for Madison to contribute to the largest community wide effort to protect local lakes and streams. Madison should continue to be a strong player in this alliance, and muster all resources possible to ensure its success. Already the County and other partners are planning to invest more money to meet their obligations to control phosphorus than ever before. Now is the moment for Madison to capture the growing interest and investment in this issue and engage at all levels to make sure this program is a success.

Madison should maintain on-going programs such as leaf collection, rain barrels, pet waste information, the Plant Dane program, stormwater maintenance and construction erosion controls. There are other potential programs that could improve things further: new low-mow lawn seed mixes and increased use of pervious pavement for sidewalks or other construction. Madison should continue to seek opportunities to partner with Yahara WINs to raise the standards of all municipalities and engage new allies in the agriculture community. Another upcoming opportunity is the Yahara Lakes Community Breakfast, to be hosted on November 9th by the Clean Lakes Alliance (see attached update) and partners including MMSD, Dane County and others at the Monona Terrace. The event will be a key galvanizing moment for the efforts to clean the lakes.

## III. DRINKING WATER & WATER UTILITY

**BACKGROUND:** The City of Madison and surrounding communities obtain their water from the Water Utility which pumps drinking water from 24 deep wells that tap the underground aquifer. Madison's drinking water testing data shows that the water is within the acceptable ranges, as determined by the Environmental Protection Agency and the Wisconsin Department of Natural Resources (see attached Water Quality Table). Despite meeting all guidelines, certain substances (chromium-6, radium and chlorination byproducts, and manganese) are of concern to residents (see Notes).

**OPPORTUNITIES & CHALLENGES:** The Water Utility has prioritized the protection of the ground water aquifer – the source of Madison's drinking water to ensure both long-term supply and quality. The Utility has focused on well-head protection, proper disposal of potential contaminants, reduction of polluted run-off and good lawn and garden practices. They promote conservation through the toilet rebate program and promotion of rain barrels and other tools to reduce consumption. The Water Utility has been effective in its efforts towards residential conservation as per capita water usage has been declining overtime and is less than the national average. The new Smart Meter program is another tool that will help residential users and the Utility improve monitoring and conservation. The Water Utility is the largest energy consumer in Madison, and therefore all efforts to reduce aquifer pumping will have a positive impact reducing energy consumption and greenhouse gas emissions in Madison.

Opportunities still exist to further reduce contamination threats to the water supply and to strengthen efforts to conserve water especially for commercial and industrial customers.

**STRATEGIES:** The Water Utility could increase educational activities to prevent improper disposal of waste, and continue to invest in strategic well tests to ensure water safety. Another strategy to improve water conservation and save energy and reduce customer

costs will be to develop conservation programs targeted to commercial and industrial customers.

**MOVING FORWARD:**

**Relevant City Departments and Committees:**

City-County Liaison Committee
Common Council Organizational Committee
Committee on the Environment
Board of Estimates
Committee on Community Gardens
Board of Health for Madison & Dane County
Board of Park Commissioners
Pedestrian/Bicycle/Motor Vehicle Commission
Plan Commission
Public Safety Review Committee
Board of Public Works
Solid Waste Advisory Committee
Sustainable Madison Committee
Committee on Sweatfree Purchases
Transit & Parking Commission
Water Utility Board

- City Engineering
- Fire Department
- Fleet Services
- Parking Operations
- Parks Division
- Planning & Community & Economic Development
- Police Department
- Public Health Madison & Dane County
- Traffic Engineering
- Water Utility

**External Partners:**

Madison Metropolitan Sewerage District
Clean Lakes Alliance
Dane County
WI DNR
Clean Wisconsin
University of Wisconsin – Center for Limnology & Extension
United States Geological Survey
Lakes and Watershed Commission

**Timeline:**

- Road salt policy could be written within one year and implemented in years two through five.
- Phosphorus and sediment planning stages are complete but the pilot phase of Yahara WINs is just underway and will run through 2015. Estimates say that all efforts to reduce phosphorus together may take over ten years.
- Water utility policy development for commercial conservation could take one to two years to develop and five to ten to implement.

**Milestones / Tracking Progress:**

- Salt use and environmental impact is regularly tracked through the Public Health annual report to the Common Council.

- Blue-green algae blooms are an indicator of phosphorus levels, but a variety of tracking across the watershed will be required to monitor reductions and demonstrate success.
- Smart meters in homes and businesses can track consumption. Well testing monitors water quality.

**NOTES:**

**Chromium: "**The Water Utility annually tests all wells for total chromium. Results are typically below 3 ppb and have remained unchanged in over 30 years of testing. In 2011, the utility began voluntarily monitoring for chromium-6 (the potential carcinogen). The testing showed that chromium in Madison tap water primarily exists as chromium-6. Results ranged from non-detect [<0.02 ppb] to 2 ppb; nine of the twenty two wells had trace amounts (<0.1 ppb) of chromium-6."[4]

**Radium:** In July, a sample collected from Well 19 exceeded the MCL for combined radium (226 + 228). The sample measured 5.8 pCi/L compared to an MCL of 5 pCi/L. The high test result triggered additional monitoring to determine if radium levels were consistently above the regulatory limit. Compliance with the MCL for combined radium is determined by the running annual average of four quarterly samples; a violation occurs if the average exceeds 5 pCi/L. Further tests conducted in September through December showed that the combined radium level at Well 19 varied from 2.9 to 4.5 pCi/L. Since July, the trend for combined radium at Well 19 has been downward. Eight samples are planned for Well 19 in 2012."[5]

**Chlorination By-Products:** Two chlorination by-products (Halocetic Acids and Total Trihalomethanes (TTHM) have been detected through testing of Madison's water supplies. These substances are found at well below the "highest acceptable levels" though TTHM levels found exceed the ideal level of zero.

**Mangagnese**: Madison's water system consists of 24 deep wells located throughout the City. Three of those wells pump water that regularly includes manganese levels above the 50 ppb aesthetic standard. These wells are located on the near west side, on the east end of the Isthmus, and on the far east side. None of the 24 wells produce manganese at levels that are of health concern; however, when manganese sediment becomes stirred up in the distribution systems and is drawn into homes, levels above the EPA lifetime health advisory level may occur.

[4] Madison Water Utility, 2011 Drinking Water Quality Annual Report, April 2012. Retrieved from http://www.cityofmadison.com/water/news/documents/WaterQuality2012.pdf

[5] Madison Water Utility, 2011 Drinking Water Quality Annual Report, April 2012. Retrieved from http://www.cityofmadison.com/water/news/documents/WaterQuality2012.pdf

**Clean Lakes Alliance Update**

This memorandum explains the status of work of the Clean Lakes Alliance and its many partners (including the City of Madison, Dane County and the Madison Metropolitan Sewerage District) to improve water quality in the Madison lakes. The information was requested by Alder Clausius to identify opportunities for the Common Council to collaborate with the Clean Lakes Alliance to advance Madison's sustainability goals.

**Overview**

The 2011 Madison Sustainability Plan includes a goal to improve surface water quality. The plan calls for Madison to; *Continue in the same direction as Yahara Capital Lakes Environmental Assessment and Needs (CLEAN) Memorandum of Understanding and subsequent MOUs to implement strategies in the master planning effort, which will help the Clean Lakes Alliance find resources to implement projects.*

The Clean Lakes Alliance (CLA) is an innovative partnership working to bring key decision makers and stakeholders together to fund and implement effective solutions to improve the water quality of the Madison lakes. Founded in 2009 CLA has grown to undertake a range of public outreach and fundraising events as well as conducting critical research on water quality solutions. In 2010, CLA together with Dane County, City of Madison, Madison Metropolitan Sewerage District, private sponsors and other agencies commissioned a report building on the work of the Yahara Capitol Lakes Environmental Assessment and Needs (CLEAN) to identify the most efficient solutions to reduce phosphorus loads to the Yahara River and its Lakes. Now the report is poised to be finalized and shared with the public.

The report will be presented to the community at North American Lake Management Society (NALMS) conference. The conference to be held at the Monona Terrace November 6 – 9 is a major gathering for scientists and decision makers. A breakfast workshop hosted by CLA & partner organizations will highlight the planned actions, fundraising goals and policy recommendations called for by the Yahara CLEAN implementation process. Events throughout the day will provide opportunities for deeper learning and exploration of the threats to the Yahara Watershed and opportunities to protect and preserve local waterways.

The forthcoming report from the Clean Lakes Alliance details 22 priority actions to reduce nutrient and sediment runoff into Madison's streams, lakes and rivers. Of those actions, many of which were identified in the 2010 Yahara CLEAN report, eight are actions that can be undertaken in urban environments, actions that Madison may employ. The actions include: enhancing construction erosion control enforcement, improving storm water facility inspection and maintenance, improving leaf management and collection, stabilizing stream banks, harvesting wetland plants, and strengthening pet waste regulations. Madison can enhance its engagement at all levels with this partnership beginning with the community breakfast November 9, 2012.

# Water Quality Table

| Substance Detected (units) | Ideal Goal (MCLG) | Highest Level Allowed (MCL) | Median Level Found | Range of Results | Violation (Yes/No) | Wells with Detections | Typical Source of Substance |
|---|---|---|---|---|---|---|---|
| **Regulated Substances** | | | | | | | |
| Arsenic (ppb) | zero | 10 | non-detect | nd - 0.8 | NO | Ten wells | Erosion of natural deposits; Runoff from glass and electronics production wastes |
| Barium (ppb) | 2000 | 2000 | 18 | 8.0 - 53 | NO | All wells | Erosion of natural deposits; Discharge from metal refineries |
| Chromium, Total (ppb) | 100 | 100 | 0.9 | nd - 2.2 | NO | Eighteen wells | Erosion of natural deposits; Discharge from steel and pulp mills |
| 1,2-Dichloroethylene, cis (ppb) | 70 | 70 | non-detect | nd - 0.38 | NO | Well 8 & Well 11 | Discharge from industrial chemical factories |
| Ethylbenzene (ppb) | 700 | 700 | non-detect | nd - 0.14 | NO | Tower 225 | Discharge from chemical factories and petroleum factories |
| Fluoride (ppm) | 4 | 4 | 0.8 (after addition) | 0.4 - 1.0 | NO | All wells | Erosion of natural deposits; Water additive which promotes strong teeth |
| Nickel (ppb) | n/a | 100 | 0.8 | 0.4 - 2.7 | NO | All wells | Occurs naturally in soils, groundwater and surface water; Often used in electroplating, stainless steel, and alloy products |
| Nitrate (ppm) | 10 | 10 | 0.8 | nd - 8.7 | NO | Fifteen wells | Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits |
| Selenium (ppb) | 50 | 50 | 0.4 | nd - 1.0 | NO | Eleven wells | Erosion of natural deposits; Discharge from petroleum and metal refineries |
| Tetrachloroethylene [PCE] (ppb) | zero | 5 | non-detect | nd - 3.9 | NO | 6, 9, 11, 14, 15, 18, 27 | Discharge from factories and dry cleaners |
| Thallium (ppb) | 0.5 | 2 | non-detect | nd - 0.26 | NO | 6, 11, 12, 15, 17, 19, 27 | Leaching from ore processing sites; Discharge from electronic, glass, and drug factories |
| Trichloroethylene [TCE] (ppb) | zero | 5 | non-detect | nd - 0.41 | NO | 11, 14, 15, 18, 27 | Discharge from metal degreasing sites and other factories |
| Xylene, Total (ppb) | 10000 | 10000 | non-detect | nd - 1.1 | NO | Tower 225 | Discharge from chemical factories and petroleum factories |
| **Radionuclides** | | | | | | | |
| Gross Alpha (pCi/L) | zero | 15 | 5.8 | 0.8 - 14 | NO | Data from six wells: 7, 8, 15, 19, 27, 28 | Erosion of natural deposits |
| Gross Beta (pCi/L) | n/a | n/a | 4.9 | 1.0 - 15 | NO | | Decay of natural and man-made deposits |
| Radium, 226 + 228 (pCi/L) | zero | 5 | 3.4 | 1.2 - 5.8 | NO | | Erosion of natural deposits |
| Total Uranium (ppb) | zero | 30 | 0.9 | 0.3 - 1.6 | NO | | Erosion of natural deposits |
| **Disinfection By-Products (Distribution** | | | | | | | |
| Haloacetic Acids [HAA5] (ppb) | 60 | 60 | 0.4 | nd - 1.9 | NO | n/a | By-product of drinking water chlorination |
| Total Trihalomethanes [TTHM] (ppb) | zero | 80 | 4.3 | 0.6 - 9.9 | NO | n/a | By-product of drinking water chlorination |
| **Unregulated Substances** | | | | | | | |
| Bromodichloromethane (ppb) | n/a | n/a | non-detect | nd - 3.8 | NO | 7, 8, 9, 17, 19, 24, 26, 29 | By-product of drinking water chlorination |
| Bromoform (ppb) | n/a | n/a | non-detect | nd - 1.9 | NO | 6, 11, 14, 15, 24, 26 | By-product of drinking water chlorination |
| Chloroform (ppb) | n/a | n/a | non-detect | nd - 2.7 | NO | 7, 8, 9, 17, 19, 20, 24, 29 | By-product of drinking water chlorination |
| Dibromochloromethane (ppb) | n/a | n/a | non-detect | nd - 3.0 | NO | 9, 17, 19, 23, 24, 26, 29 | By-product of drinking water chlorination |
| Dichlorodifluoromethane (ppb) | n/a | n/a | non-detect | nd - 0.16 | NO | Well 14 | Discharge from industrial chemical factories |
| Trichlorofluoromethane (ppb) | n/a | n/a | non-detect | nd - 1.2 | NO | Well 11 | Discharge from industrial chemical factories |
| **Other Substances** | | **Aesthetic Goal** | | | | | |
| Calcium (ppm) | n/a | n/a | 69 | 52 - 104 | NO | All wells | Erosion of natural deposits |
| Chloride (ppm) | n/a | 250 | 14 | 2.0 - 108 | NO | All wells | Erosion of natural deposits; Road salt application |
| Hardness (ppm) | n/a | n/a | 336 | 260 - 475 | NO | All wells | Erosion of natural deposits |
| Iron (ppm) | n/a | 0.3 | 0.08 | nd - 0.55 | NO | All except 9, 14 , 20 | Erosion of natural deposits |
| Magnesium (ppm) | n/a | n/a | 40 | 31 - 52 | NO | All wells | Erosion of natural deposits |
| Manganese (ppb) | n/a | 50 | 13 | nd - 49 | NO | All except 14, 16 | Erosion of natural deposits |
| Sodium (ppm) | n/a | n/a | 6.7 | 2.1 - 36 | NO | All wells | Erosion of natural deposits; Road salt application |
| Sulfate (ppm) | n/a | 250 | 17 | 7.1 - 56 | NO | All wells | Erosion of natural deposits |

IMPORTANT NOTE ABOUT THE TABLE: The table reports the maximum and minimum concentrations for each substance found in at least one well. Several chemicals are found only in a few wells. Contaminant levels reported in the table may not be representative of the water quality at your home. Visit our website or call the Water Utility to get more information about water quality for the well that serves your home or business.