WATER MANAGEMENT PLAN, REVISION 2

Large Lakes Research Station, Grosse Ile, Michigan

OARM Sustainable and Transportation Solutions Branch (STSB) March 2016

Overview

This report summarizes the findings and recommendations associated with a desk-based water use and conservation assessment conducted for the U.S. Environmental Protection Agency's (EPA's) Large Lakes Research Station (LLRS) in Grosse Ile, Michigan. Based on the findings of this assessment, the LLRS has implemented all cost-effective water conservation and efficiency projects that have been previously identified. Under this Water Management Plan, the LLRS will continue to operate with regard to water conservation best practices. The Water Management Plan describes the facility's water reduction goals, water use trends, end uses of water, completed water efficiency projects, and drought management plans.

Background

Executive Order (EO) 13693, *Planning for Federal Sustainability in the Next Decade*, signed in March 2015, requires agencies to reduce potable water consumption intensity, measured in gallons per gross square foot (gsf), by 36 percent by fiscal year (FY) 2025. Reductions are measured relative to the agency's baseline water consumption in FY 2007, through reductions of 2 percent annually. In addition to the potable water use reduction requirements in EO 13693, the order requires that agencies reduce industrial, landscaping, and agricultural (ILA) water consumption by 2 percent annually or 30 percent by the end of FY 2025 relative to an FY 2010 baseline (including nonpotable sources). Agencies also should install water meters and utilize building and facility water balance data to improve water conservation and management.

The implementing instructions of EO 13693 require that, where applicable, agencies should purchase WaterSense® labeled products and choose irrigation contractors who are certified through a WaterSense labeled program.

The Energy Independence and Security Act (EISA) of 2007 directs agencies to complete comprehensive energy and water evaluations for 25 percent of covered facilities (i.e., those accounting for 75 percent of total agency energy use) each year, resulting in each covered facility being assessed once every four years. It also directs agencies to implement cost-effective measures identified through life cycle analyses, and measure and verify water savings.

To achieve greater agencywide water efficiency and to meet EISA requirements, a desk-based water assessment was conducted for the LLRS on March 16, 2016.

Figure 1: View of Large Lakes Research Station, Grosse Ile, Michigan

Facility Information

The LLRS has been occupied by the EPA since 1970, and was renovated to its current configuration in 1974. The laboratory is a 32,477-square-foot facility located in Grosse Ile, Michigan. The building is owned and operated by the EPA, and the EPA is responsible for all water, sewer, and other utility bills.

The LLRS houses staff from the Large Lakes and Rivers Forecasting Research Branch within the Mid-Continent Ecology Division; EPA Region 5 Superfund Emergency Response Section; Office of Enforcement and Compliance Assurance—Region 5 Criminal Investigation Division; Region 5 Great Lakes National Program Office; U.S. Fish and Wildlife Service; and support contractors. Approximately 53 personnel from various groups occupy the LLRS; however, due to the part-time and remote status of some employees, the number of full-time equivalent occupants is 47.

EPA Office of Research and Development (ORD), which is responsible for the LLRS, plans to vacate the facility in 2017. Future use of the facility has not been determined.

Water Management Goals

The LLRS achieves its resource conservation goals by implementing the EPA ORD-wide Environmental Management System (EMS). The Water Management Environmental Management Program (EMP) within the ORD's EMS sets objectives and targets related to water use to reduce the impact on natural resources by reducing the consumption of water from facility and laboratory operations and by properly managing stormwater runoff. Targets established under this objective call for:

- Achieve the agency ConservW targets (set annually by EPA's Sustainable and Transportation Solutions Branch) as a cumulative total of all seven locations.
- Identify potential water conservation or stormwater management projects for their sites to be completed by FY 2017.

Although not expressly stated, the ORD's objectives and targets for water management imply a goal of achieving a 36 percent potable water reduction by the end of FY 2025, compared to an FY 2007 baseline, and of achieving a 30 percent ILA water reduction by the end of FY 2025, compared to an FY 2010 baseline, as set forth in EO 13693.

Water Supply, Measurement, and Historical Use

The LLRS's water use has significantly decreased since the last water use assessment in 2011, as the facility has implemented many changes that affect water use. In addition, research requirements at the facility have been eliminated. Therefore, the LLRS uses water exclusively for sanitary needs and building heating. The following sections provide additional details on the facility's water use.

Water Supply

The LLRS's potable water and sewer service is provided by the Grosse Ile Township Department of Public Services. The LLRS also collects rainwater from building roofs in four rain barrels. This nonpotable water is used for grounds watering to supplement natural precipitation.

Meters and Submeters

Two supply lines provide potable water, one each to the main laboratory building and the carpenter shop. Each supply line is metered. Virtually all of the water used is delivered through the meter to the main laboratory. The meter in the carpenter shop, which supplies two utility sinks, has not registered more than 1,000 gallons per year since FY 2007.

There is also a meter in the boat shop, but the township does not bill the LLRS for this meter, and there are no major water uses supplied by it any longer. There is one tap located in the boat shop, which is rarely used.

Historical Water Use

In response to EO 13693 and the executive orders that preceded it, the LLRS established an FY 2007 water use intensity baseline of 14.10 gallons per gsf. In FY 2015, water use intensity was reduced to 1.48 gallons per gsf—a decrease of 89.5 percent compared to the FY 2007 baseline. Figure 2 provides a graph of the LLRS's water use from FY 2007 through FY 2015.

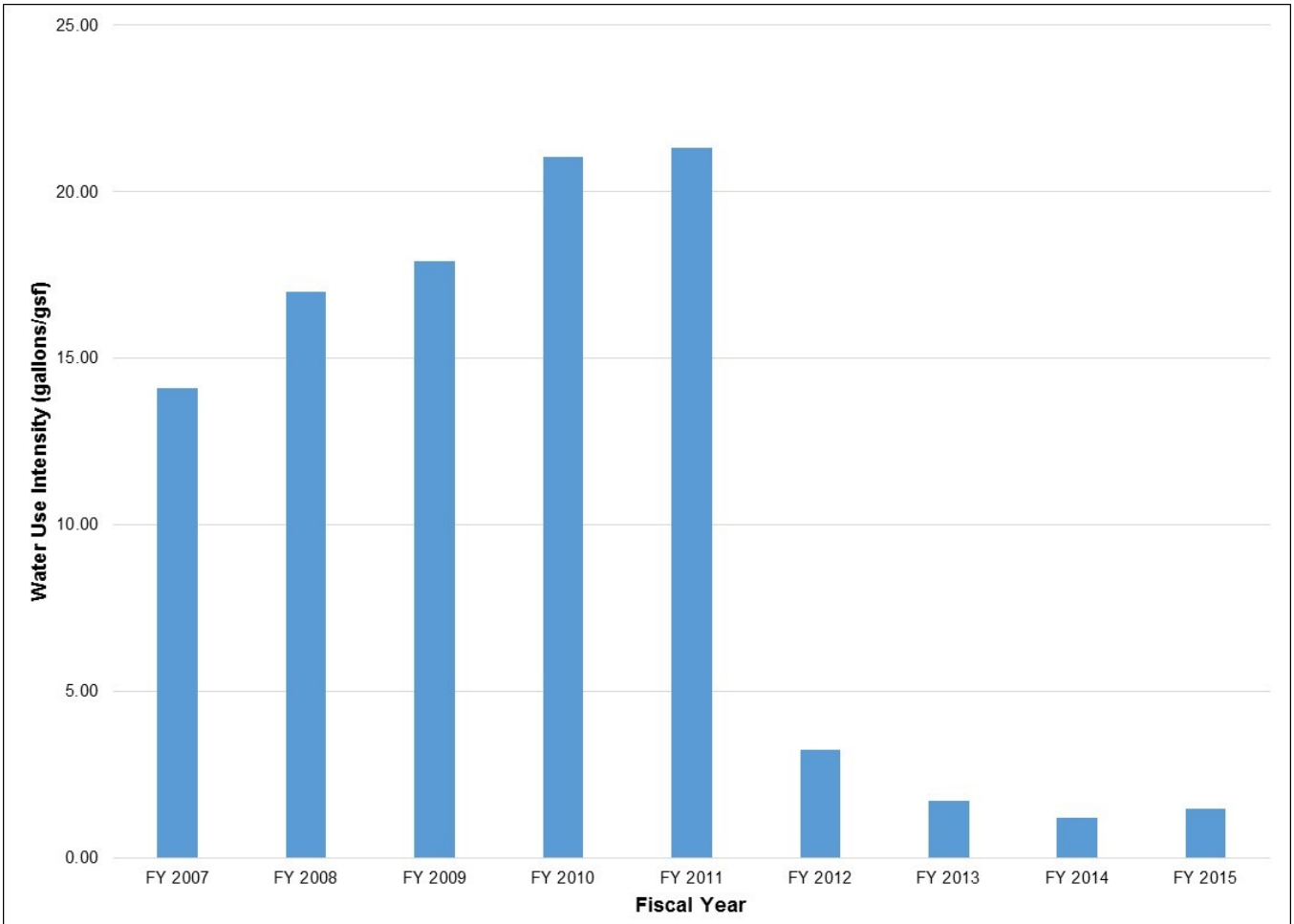

Figure 2: Large Lakes Research Station s Water Use Intensity, FY 2007 to FY 2015

End Uses of Water

Table 1 identifies the end uses of water at the LLRS. The uses are described in more detail below.

Table 1. Major Potable Water Uses at LLRS, Fiscal Year 2015

Major Process	FY 2015 Annual Water Use (gallons)	Total Water Use (%)	Basis of Estimate
Restroom use and steam boiler system	48,000	100.0	Facility water use, identified through the building water meter, is used exclusively for sanitary purposes and for building heating.
Total Water Use	**48,000**	**100.0**	**Sum of all building metered totals. Data provided by the facility.**

Restroom and Other Sanitary Fixtures

All of the LLRS's restroom fixtures are compliant with 1992 Energy Policy Act (EPAct 1992) water efficiency requirements (1.6 gpf toilets, 1.0 gpf urinals, and 2.5 gpm or less showerheads). Four of five flushometer-valve toilets are equipped with dual-flush flushometer valves with a 1.6 gallon per flush (gpf) full flush option and 1.1 gpf reduced flush option. The fifth toilet flushes at 1.6 gpf, which is EPAct-compliant. The four urinals at the facility are WaterSense labeled models that flush at 0.125 gpf.

Lavatory faucets have been equipped with 0.5 gallon per minute (gpm) faucet aerators. This is sufficient for hand washing and is considered a best practice for lavatory sinks in public settings. No showerheads are installed at the facility.

Table 2 provides an inventory of sanitary fixtures.

Table 2. Sanitary Fixtures Inventory, LLRS

Fixture Type	Flow Rate	Total Number
Toilets	1.6 gpf/1.1 gpf (dual-flush)	4
	1.6 gpf	1
Urinals	0.125 gpf	4
Lavatory faucets	0.5 gallons per minute	6
Showerheads	Not applicable	0

Steam Boilers

The LLRS is equipped with two steam boilers installed in 2009 to replace old boilers that were at the end of their useful life. Steam is currently generated to supply primary heat to the building air handlers. One boiler fires up into standby mode when the outside temperature drops below 60 degrees Fahrenheit, and the second boiler fires up if the outside temperature drops below 20 degrees. The steam boilers are not used in the summer. Steam condensate is collected and returned to the boilers. A small quantity of steam is blown down from the boilers periodically as a preventative maintenance measure. No chemical treatment of the boiler water is provided.

Rainwater Collection and Use

In support of its stormwater management program, the LLRS installed four rain barrel collection devices to collect rainfall from building roofs. Three 500-gallon rain barrels and one 300-gallon rain barrel were installed. Water collected in the rain barrels is used for grounds watering. According to the LLRS, approximately 26,000 gallons of water are collected and used annually for vegetation watering.

Figure 3: Four rain barrels collect rainwater to use for grounds watering.

Completed Water Efficiency Projects

As described in Table 3, the LLRS has completed five water efficiency projects since FY 2007.

Table 3. Completed Water Efficiency Projects at LLRS Since FY 2007

Project	Estimated Annual Water	Completion	Additional Notes
Rainwater Collection	26,000	FY 2013	Four rain barrels were installed to collect rainfall from building roofs. Water is used for grounds watering.
Toilets	106,000	FY 2012	Four dual flush (1.6 gpf/1/1 gpf) flushometer-valve toilets were installed in place of existing 3.5 gpf toilets.
Urinals	52,000	FY 2012	Four WaterSense labeled urinals flushing at 0.125 gpf were installed in place of existing 1.5 gpf urinals.
Faucet Aerators	14,000	FY 2011	The LLRS installed 0.5 gpm faucet aerators following the 2011 water assessment.
Single-Pass Cooling	103,000	FY 2011	Due to changes in the laboratory's mission, the air conditioner was taken out of service in October 2010.

Drought Contingency Plan

Drought Risk

The LLRS is located in an area that rarely experiences drought. The LLRS's water is supplied by the Grosse Ile Water Department, which purchases water from the Detroit Water and Sewerage Department (DWSD). The DWSD system uses water drawn from Detroit River, which flows between Lake St. Clair and Lake Erie. Due to the abundance of water in the region, Grosse Ile Township does not have a specific drought management plan.

In the event that voluntary or mandatory water conservation reductions are instituted by the township or state of Michigan, the LLRS has little opportunity for further water use reductions, as all current uses of water are required for facility operation and human health.

Recent Contributions to Drought Contingency

The LLRS has reduced its water use intensity baseline of 14.10 gallons per gsf, set in FY 2007, to 1.48 gallons per gsf in FY 2015—an 89.5 percent reduction. LLRS staff will continue to monitor water meters so that leaks or other malfunctions resulting in increased water use can be identified and resolved.

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