LOB #363:

OCCOQUAN MONITORING CONTRIBUTORY PROGRAM

Purpose

The purpose of the Occoquan Watershed Monitoring Program is to monitor streams and reservoirs within the Occoquan Watershed (e.g. Bull Run) for flow quantity and quality throughout the year and at all levels of flow from the lowest drought discharges to the largest flood peaks. Monitoring is done through continuous automated sampling at strategic locations within Fairfax County and throughout the Occoquan watershed. The data are reported to the program's sponsors through several channels including an annual presentation before the Occoquan Subcommittee, through informal conversations with County professionals (e.g. those at the Upper Occoquan Service Authority in Centreville, VA), and through the program's public website at http://owml.vt.edu. The monitoring effort of this program is done to ensure water quality ultimately reaching the Fairfax County Water Authority for treatment.

Description

The Occoquan Watershed Monitoring Program is a single program that continuously monitors water quantity and quality throughout the Occoquan watershed. Work is performed by staff out of the Occoquan Laboratory (a part of Virginia Tech, Department of Civil and Environmental Engineering) located in Manassas, VA. Approximately 13 individuals at the lab are partially or wholly supported by this program (approximately 6.7 FTE in aggregate). These individuals include: field personnel who collect samples and maintain monitoring stations deployed throughout the watershed; analytical personnel who test collected water (and other) samples; and professional engineering personnel who oversee operations and track collected information. The lab generally maintains a normal business (Monday through Friday) schedule although some activities require effort on weekends and odd hours depending on the weather. Field stations collect information around the clock. The Occoquan Monitoring Program has existed and been supported by Fairfax County since 1972.

Benefits

The Occoquan Watershed Monitoring Program benefits all those in the County on public water supply from the Fairfax County Water Authority, and especially those residents and businesses of Fairfax County that are located within the Occoquan watershed itself. Specific benefits include:

- Continuous monitoring of multiple water quality constituents such as stage, discharge, dissolved oxygen, temperature, pH, specific conductance, turbidity, and nitrate. This has value for rapidly identify abnormal levels in any of the above constituents compared to standards or historical averages; for comparing nutrient loading rates against mandated TMDLs associated with efforts to maintain and restore the Chesapeake Bay; and for identify trends in any/all of the above constituents over a 40+ year time series giving perspective to conservation measures, effects of land development, and even effects of climate change.
- The program's laboratory has coupled monitoring with modeling efforts. The modeling has helped make informed decisions on consequences of proposed large land development plans and led to a novel nitrate discharge management technique that has saved considerable funds in the operations of the Upper Occoquan Service Authority (UOSA) while actually improving downstream water quality as a source of raw drinking water to the Fairfax County Water Authority.

- The program's website serves both the technical community and general public with specialized data and general information about current and past conditions within the watershed.
- In 2017, the Chesapeake Bay Midpoint Assessment (MPA) will arrive. This assessment is designed as a mid-course check on progress to allow necessary adjustments in strategies to ensure that contributing states/counties can achieve their 2025 goals for putting the necessary practices in place to restore the Bay.
- Data collected as part of the regular operations (and perhaps more targeted operations going forward) will provide objective information as to the status of contributions from those geographic areas of Fairfax County that contribute to the Occoquan watershed and ultimately to the Chesapeake Bay.

Mandates

In 1971, the Virginia State Water Control Board adopted a policy for waste treatment and water quality management in the Occoquan watershed (the Occoquan Policy), which outlined a course of action to control point source pollution in the watershed. The policy was adopted pursuant to authority vested in the State Water Control Board by § 62.1-44.15 of the State Water Control Law. The Occoquan Watershed Monitoring Program (OWMP) was established in 1972 with an operational mission to gather, analyze, and report stream and reservoir information and conditions.

Trends and Challenges

The trends that are related to this LOB include:

- Urbanization and land development within the Occoquan watershed overall, and led by highly urbanized areas such as in the Bull Run watershed in Fairfax County, increasingly contribute to urban, non-point source stormwater affecting both water quantity (flooding) and water quality (nutrient and other pollutant loads).
- Eutrophic conditions at the Occoquan dam are actually on the decline in recent years although the watershed is still classified as hypereutrophic.

The challenges that this LOB faces include:

- Stormwater management / Best Management Practices (BMPs) are the engineering analog for issues of non-point source pollution as water and wastewater treatment plants are for point source pollution. The technologies and performance of treatment plants have greatly reduced point source concerns in the Occoquan watershed. Increasingly, it is the non-point source pollution (i.e. stormwater) that is of greater concern because land development continues and because the performance of BMPs is far less certain and understood.
- From FY 2011 to FY 2015, the Occoquan Watershed Monitoring program has been in a flat-funding condition with the Fairfax contribution being approximately $112,500. Overall, real losses in spending power were approximately 8 percent over just the flat funding period. These conditions have forced the program's lab to postpone plans for capital replacement costs on field vehicles and major analytical equipment. The program's FY 2016 budget was successfully increased by about 2.7 percent; however, Virginia Tech mandated salary increases consumed this increase, further delaying equipment replacement plans. New leadership at the Occoquan Lab is seeking new and reactive ways to address these needs, but it is anticipated that there will be a need to seek an increase in the program's budget to address pressing capital replacement needs.

Resources

Category	FY 2014 Actual	FY 2015 Actual	FY 2016 Adopted
LOB #363: Occoquan Monitoring Contributory Program			
FUNDING			
Expenditures:			
Capital Projects	$112,559	$112,559	$115,611
Total Expenditures	$112,559	$112,559	$115,611
Total Revenue	$112,559	$112,559	$115,611
POSITIONS			
Authorized Positions/Full-Time Equivalents (FTEs)			
Positions:			
Regular	0 / 0	0 / 0	0 / 0
Total Positions	0 / 0	0 / 0	0 / 0

Metrics

Metric Indicator	FY 2013 Actual	FY 2014 Actual	FY 2015 Actual	FY 2016 Estimate	FY 2017 Estimate
Aggregate number of stream, reservoir, and storm samples	921	853	850	850	850

Execution of the Occoquan Watershed Monitoring Program entails the collection of both manual and automatic samples distributed across stream stations, reservoir stations, and the additional collection of samples during storm events. Regular sampling frequency is greater during the growing season owing to greater concern towards water quality during this period. Storm sampling is driven by the weather and the actual number of storm events that occur. There are 9 active stream stations (3 are located in Fairfax County) and 8 active reservoir locations (the Occoquan Reservoir forms part of the southern border of Fairfax County, so all reservoir locations are arguably within or adjacent to the County).

The metric for this LOB is the aggregate number of stream, reservoir, and storm samples taken. This metric shows a 7.4 percent decline in visits from FY 2013 to FY 2014 with a projected stable number of visits for the next few years. There are several reasons for the decline from FY 2013 to FY 2014:

- Variable weather:
  - Reservoir visits are reduced if storm activity leaves the reservoir too muddy to sample
  - Reservoir visits may be reduced due to frozen conditions in winter
  - Storm visits will vary up/down depending on the number of storm events in a given year
- Funding constraints:
  - Due to budget constraints Occoquan Watershed Monitoring Program made the difficult decision to conserve financial resources by curtailing warm weather sampling frequency from every 7 to every 10 days. (This decision was made in consultation with the Occoquan Watershed Monitoring.) This change to a new sampling schedule took place during FY 2013, so the greater metric value for this year versus FY 2014 and projected beyond that reflects the full implementation of the new sampling schedule.