

Vashon Maury Island Groundwater Protection Committee
Sustainability Definition, Indicators and Measures
July 28, 2010

DEFINITION

Sustainable: Water use rate at which neither water quality nor available quantity is perceptibly diminished. (Appendix B - p.10 Vashon-Maury Island Watershed Plan, June 6, 2005)

BACKGROUND

While surface water currently meets a portion of Vashon-Maury Island water demand, ground water is expected to be the primary source of the Island's future water supply. Island streams, although tapped by a number of Islanders, are too small to sustain much use. Springs and shallow wells are used by many Island water systems. All of these – streams, springs, and aquifer – form an integral hydrologic system. We want to insure that our groundwater resource can provide a safe, sustainable source of supply to meet forecasted population growth and future water demand, while protecting the island's hydrologic system. (p. 4-7 Vashon-Maury Island Watershed Plan)

We recognize that:

- Island water sources are not replenished by off-island snow melt or aquifers, but only by island rain water.
- Surface and ground water resources are interrelated.
- Both water quality and quantity need to be maintained to provide water for present and future use.
- Preservation of our natural hydrology is directly related to preservation of our water supplies.

GOALS The Watershed Plan discusses a range of issues related to the preservation of our water supply. In order to preserve the quality and quantity of our water resources, we will strive to achieve the following goals.

- An “early warning system” of sustainability indicators needs to be developed to identify any decline in water quality and quantity since once a decline is identified; it is very difficult to reverse.
- Maintain water quality at current levels.
- Maintain water quantity without decline.
- Use our water supply more efficiently.
- Protect and enhance groundwater recharge.
- Ensure water resource needs of all future inhabitants are not compromised.
- Use both preventive and adaptive strategies to maintain and enhance the integrity of the hydrologic system.
- Use the best available science in the decision-making process.

INDICATORS - Indicators are used to measure the status of water resources. These provide ways we can measure how well we are adhering to the goals described above, and are used to report progress. The Vashon-Maury Island Ground Water Protection Committee (GWPC) plans to use the sustainability indicators to measure progress in meeting their goals to preserve the quality and quantity of water resources as guided by the Vashon-Maury Island Watershed Plan. The GWPC will assess the indicators and monitor changing water resource conditions to identify trends. The GWPC will identify specific strategies in response to observed trends to achieve the sustainability goals.

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MEASURE	METHOD	DATA ANALYSIS	TARGET
Indicators for Sustainable Water Quality			
1. Groundwater quality	Measure groundwater quality in Group A wells, Group B wells and the 19 long term monitoring wells. This indicator is implemented by annually obtaining reported test results for applicable water quality parameters from public health (DOH and PSHC) and the KC WLRD monitoring.	Water quality results are compared to adopted drinking water standards	Groundwater quality meets or exceeds drinking water quality standards (test results are below the Maximum Contaminant Level) and there is no increase greater than 10% over baseline for any parameter over two years for nitrate or since prior test results for all other standards.
2. Stream water quality	This indicator is implemented by monthly measuring bacteria, nutrients, and conventional parameters in 5 streams.	Stream water quality results are compared to Washington State water quality standards	Stream water quality meets or exceeds surface water quality standards for the protection of aquatic life and there is no increase greater than 10% over baseline for any parameter over two years.
3. Quartermaster Harbor water quality	This indicator is implemented by conducting continuous and monthly oxygen monitoring and monthly bacteria monitoring in Quartermaster Harbor	Quartermaster Harbor water quality results are compared to Washington State water quality standards for marine waters	Quartermaster Harbor water quality meets or exceeds surface water quality standards for the protection of aquatic and shellfish harvesting and there is no increase in bacteria or decrease in oxygen greater than 10% over baseline for any parameter over two years.
Indicators for Sustainable Water Quantity			
4. Seasonal groundwater levels	This indicator is measured by continuous monitoring in 10 KC WLRD monitoring wells and 2 private wells near the Glacier gravel mine, along with monthly monitoring in volunteer wells	Annual and seasonal groundwater levels are graphed and trends over time are analyzed	Groundwater levels are maintained or improved
5. Summer instream flows	This indicator is measured by using continuous flow data from 4 stream gages maintained by King County (Shinglemill, Judd, Tahlequah, and Fisher) and 1 stream gage maintained by Water District 19 (Beal)	The annual minimum 7-day average low flows are calculated and tracked from year-to-year	Summer low flows are maintained or increased over time
6. Stream flashiness	This indicator is measured by using gage data for the same 6 streams	The percent of time per year that each stream's flow exceeds its average flow for that year will be calculated and tracked from year-to-year. Decreases in percent of time exceeding the annual average are generally associated with increased development and impervious area.	The percent of time that flow exceeds the average flow is maintained or increased over time.
Indicators of Healthy Ecosystem			
7. Stream benthic macroinvertebrate populations	This indicator is measured by conducting annual stream benthic macroinvertebrate monitoring at three locations by KC WLRD and eight locations by KC Roads	The Benthic Index of Biologic Integrity (BIBI) will be calculated for each site and tracked from year-to-year.	The BIBI scores are maintained or improved.
8. Salmon populations	This indicator is measured by using data from the Salmon Watcher Program that estimate the number of salmon returning to spawn on Vashon-Maury Island	The number of salmon returning to spawn will be estimated each year and compared from year-to-year.	The number of salmon returning to spawn in Vashon-Maury Island streams is maintained or increased.
Indicators of Sustainable Water Resources Use and Management			
9. Annual total island-wide water consumption	This indicator is measured by obtaining annual withdrawal data from Group A water systems via DOH and withdrawal data from individual volunteer well owners as part of the Water Resources Evaluation. No Group B system data are currently available. Eight exempt well owners voluntarily provide usage data as part of an assessment of permit-exempt wells.	Annual total consumption calculated by estimating Group B and exempt well withdrawals and adding them to the Group A withdrawals. Total annual consumption is tracked from year-to-year.	
10. Per capita water consumption	This indicator is measured by using the same consumption data as above, along with population data from the assessor office.	Per capita consumption is calculated by dividing total annual consumption by total population and is tracked from year-to-year.	Per capita consumption does not increase.
11. Summer water use peaking factor	This indicator is measured using monthly withdrawal data, obtained from Larger Group A PWS and comparing to their Water System Plan peaking factor.	Monthly summer water withdrawals are divided by monthly winter water withdrawals to calculate the summer peaking factor. Peaking factor is tracked from year-to-year.	Summer water use peaking factors do not increase.
12. Vashon-Maury Island watershed plan implementation	This indicator is measured by tracking the number of GWPC priority implementation items that are accomplished each year.	The cumulative number of items accomplished is divided by the number of priority items in the plan to calculate the percent of priority items completed.	The percent of priority items completed increases year-to-year.

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Other Possible Indicators to be Implemented Should Funding and/or Data Become Available

13. Land cover is maintained in a manner that allows for maintenance of a natural hydrologic cycle. This indicator is measured by comparing the percent of land cover classified as “impervious” and the percent classified as “forest” every two years by subbasin on Vashon-Maury Island. Impervious land cover targets for each subbasin are less than 10% and forested land cover targets for each subbasin are greater than 65%. (Note: Fine scale land cover data is available for 1995 and 2002 to provide a base line if measurement can be funded in the future)
14. Public attitudes and involvement demonstrate strong support for water resource stewardship. This indicator is measured by conducting a survey of public attitudes about water resources every 2 years, and tracking changes in attitudes over time.
15. Groundwater recharge and quality, and stream flows and water quality are protected and enhanced through aggressive implementation of Low Impact Development techniques. This indicator is measured by calculating the acres of land developed per year using Low Impact Development techniques, and tracking trends over time.
16. Groundwater and stream water quality are protected and enhanced through improved design, operation, and maintenance of on-site septic systems. This indicator is measured by determining the number of on-site septic systems that have been inspected each year and the number upgraded to meet code each year based on information from SKCPH, and tracking trends over time.
17. Groundwater and stream water quality are protected and enhanced by reducing the amount of pesticides applied to Vashon landscapes. This indicator is measured by obtaining the annual amount of different pesticides sold by island retailers and tracking trends over time.
18. Basins are opened or closed to water allocations based on better understanding of surface water / groundwater interaction and sustainability. This indicator is measured by identifying the number of basin reviews DOE completes where surface water/groundwater interaction and sustainability are substantially considered.

STRATEGIES FOR SUSTAINABILITY –The following strategies could be undertaken by the GWPC in the future to further implementation of the sustainability goals:

- Continue efforts to implement the recommendations contained in the VMI Watershed Plan. Near term identify policy recommendations to improve water resource management including nitrogen reduction for consideration in the 2012 amendment to the King County Comprehensive Plan.
- Revise the scope of the ongoing monitoring by KC WLRD to compile, evaluate, review and the report the findings on indicators 1-10 to the GWPC and other interested parties including the general public, on an annual basis. Develop strategies to fill data gaps for sustainability indicators 1-11.
- Identify and evaluate hydrologic management and sustainability techniques being developed in other island communities for application on VMI.
- Evaluate the potential benefits or liabilities and feasibility of modifying the WRIA designation for VMI.