

9. Total Annual Island-wide Water Use

Target: Total water consumption is reliability tracked year to year

About this indicator: The total island-wide water consumption is calculated from four water users – Group A public water systems (PWS), Group B PWS, individuals and agricultural water users.

Influencing factors: Not all of the water users report their usage. Weather influences overall usage with drier years typically having higher annual totals

2010 Target: Total island-wide water consumption is calculated per year

2010 Finding: 2010 total water usage estimated to be 489 Million gallons per year (MGY)

2010 Status: Water use is estimated to be 489 Million gallons per year (MGY) Island-wide for 2010. The water usage is estimated from the following water users: 21 Group A PWS; 143 Group B PWS; over 1000 individual wells and almost 200 agricultural water users, Figure 1.

Public water systems serve approximately 90% of the island population with Group A PWS (~80%) and Group B PWS (~10%). The remaining (~10%) population get their water from individual wells.

Several studies have assessed the amount of recharge that potentially occurs annually on VMI and provides a range of recharge from 3200 to over 10,900 Million gallons per year. Not all of the recharge water is available for usage due to aquifer retention and recovery factors. The 2010 water use estimate of 489 MGY is 4 to 15% of the recharge range, Table 1.

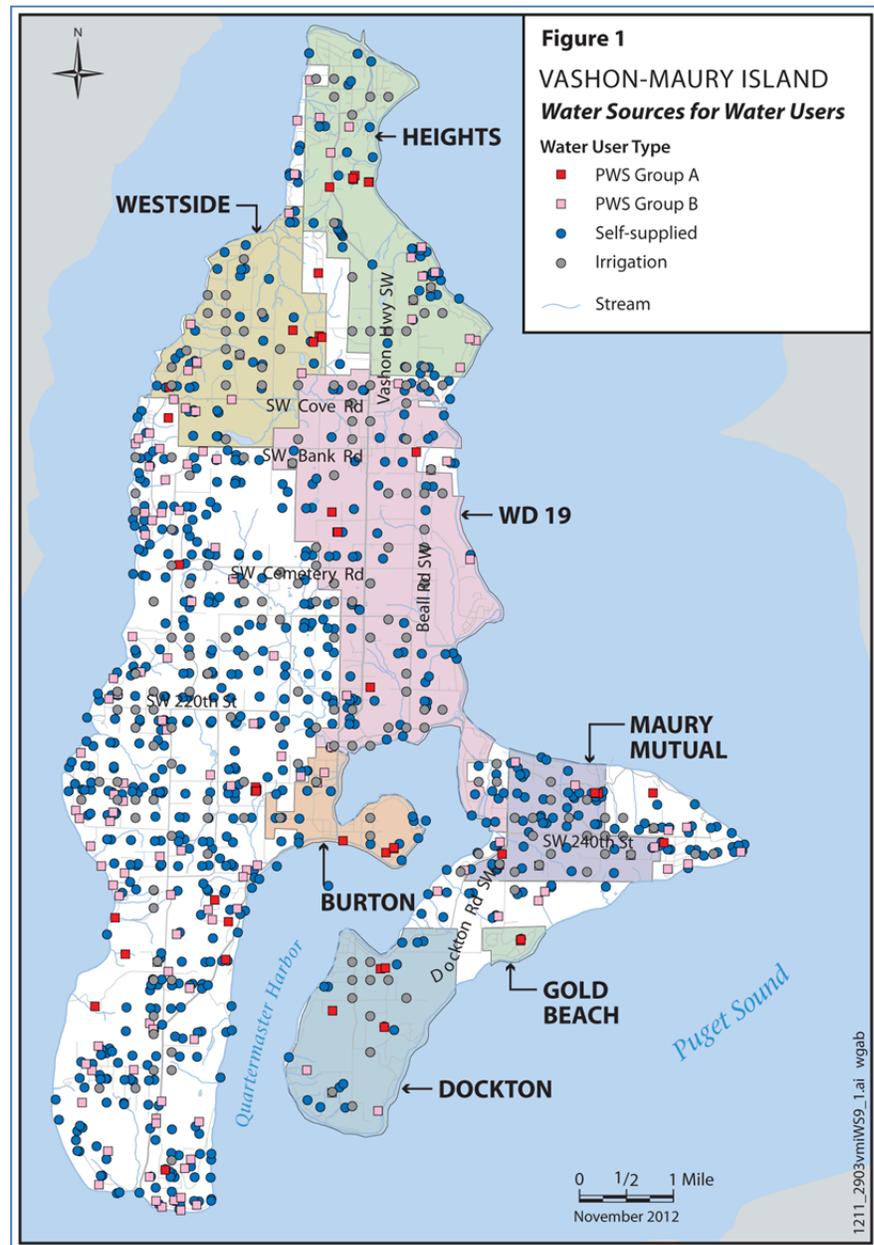
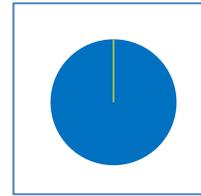


Figure 1. Location of water sources for four water users – Group A public water systems (PWS), Group B PWS, individuals and irrigators. The water service areas for seven Group A PWS are shown. These seven water service areas are the largest on the island serving an associated population of 7,500. In total, there are 21 Group A PWS; 143 Group B PWS; over 1000 individual wells and almost 200 agricultural water users.

2001-2010 Target: Total island-wide water consumption is tracked year to year

2001-2010 Assessment: Average annual consumption – 515 MPY from 2001-2010



2001-2010 Status: The 10 year (2001-2010) average of total Island-wide water consumption is 515 MGY. The annual total consumption ranged from 496 to 535 MGY during this period. Typically, consumption increased during periods with lower rainfall totals and decreased during periods with higher rainfall totals. Water use is estimated from four types of water users as noted in the Technical Notes section.

Technical Notes Annual Total Island-wide Water Consumption

Data source: The data for this indicator comes from Group A and Group B public water systems (PWS), individuals and agricultural water users. Group B PWS are not required to report their usage and individual wells do not typically have meters to assess their usage. Both of these user groups have a small subset that do report their usage. However, this subset of users and their usage data are not totally representative of the entire user group. The irrigation data was estimated based on agricultural categories [horticulture; livestock; mixed and unknown], input from King County agricultural program & King Conservation District. Irrigation rates are derived from NRCS – Natural Resources Conversation Service and refined based on irrigation practices on island.

Collection frequency: Group A PWS are required to keep track of their water usage. Recent changes require more Group A PWS to report their usage annually. Thirteen of the 21 Group A PWS have reported their usage for 2010 via the new state reporting requirement. The other water users are not required to report their usage. King County has volunteers who reported their usage. Two group B PWS report their usage along with eight individual well owners. Data from each of these user groups represent about 1% of their respective users. Water use data has been requested from a variety of users.

Methods for analysis: Annual data that is reported is compiled into island-wide totals. For systems without data, averages of reported data are applied to the remaining PWS. Recent modeling work on VMI required a gathering of water use information. Much of this data is based on that initial gathering and supplemented with a small subset of users who report their water usage.

Data Reliability and Quality: The data quality of this indicator can be good when data is reported from users. Estimates are based on a small subset of data users and compared to other published data – see collection frequency for number of reported users for each type. The reliability is fair based on the recent participation and should improve due to changes in reporting requirements for most Group A PWS. In total, there are 21 Group A PWS; 143 Group B PWS; over 1000 individual wells and almost 200 agricultural water users.

Data Reference: Water Purveyors; various King County programs including Groundwater, Agricultural, UTRC; and VMI Volunteer Monitoring Program who self report usage.

Carr / Assocs. 1983. Vashon / Maury Island Water Resources Study. Submitted to the King County Dept of Planning and Community Development. December 1983.

U.S. Geological Survey, 2004b, Estimated domestic, irrigation, and industrial water use in Washington, 2000: U.S. Geological Survey Scientific Investigations Report 2004-5015,16p.

Vashon-Maury Island Groundwater Advisory Committee (VMI GWAC). 1998. Vashon-Maury Island Ground Water Management Plan. Prepared by King County DNR and Seattle-King County Dept of Public Health. Final, submitted December 1998

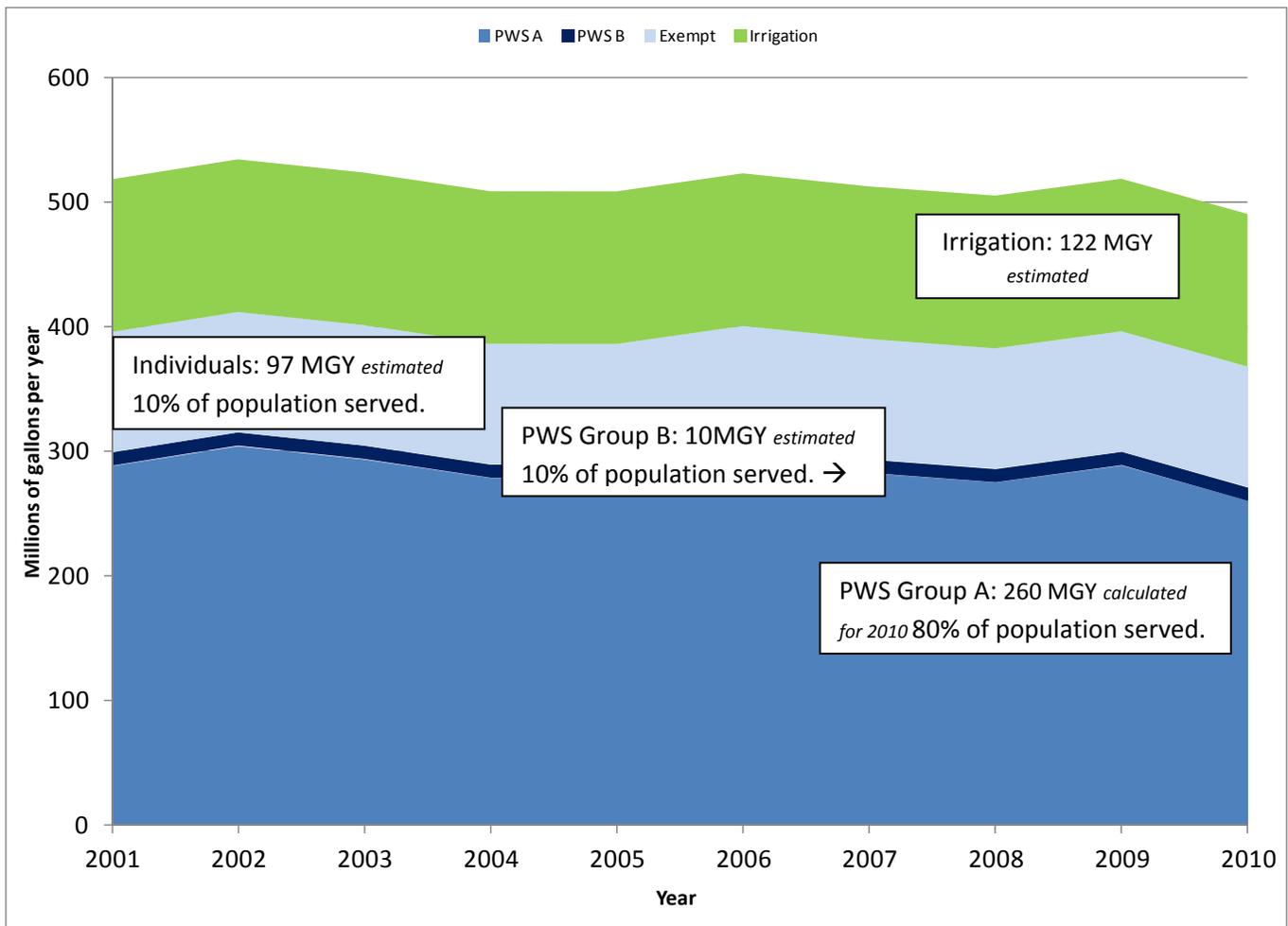


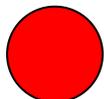
Figure 2. The total island-wide water consumption is calculated from four water users – Group A public water systems (PWS), Group B PWS, individuals and irrigators. The data are presented as millions of gallons per year (MGY). Only the Group A PWS report their water usage data on a regular basis. The other water users are shown with constant usage based on their estimations: PWS B = 10MGY; Exempt/Individuals = 97 MGY and Irrigators = 122 MGY. See technical notes section for more details about usage estimates.

Table 1. Amount of recharge that potentially occurs annually on Vashon-Maury Island. Several studies have provided a range of recharge from 3200 to over 10,900 Million gallons per year (MGY). Not all of the recharge water is available for usage due to aquifer retention and recovery factors. The 2010 Total Island-wide water use estimate of 489 MGY is 4 to 15% of the recharge range. Water balance data adapted from Carr, 1983 and VMI GWAC, 1998.

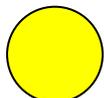
| Water Budget | GWMP | Carr |
|--------------|---------------------|------|
| | Units: MGY | |
| Recharge | 10973 | 3212 |
| 2010 usage | % of total recharge | |
| 489 | 4% | 15% |

Legend

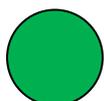
2010 Finding



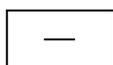
Poor Conditions: Reported data are above Maximum Contaminant Level (MCL) and/or fails to meet the state standard or criteria for a given indicator; needs improvement.



Fair Conditions: On average, data fell between the standard or criteria for “poor” and “good” and may be variable.

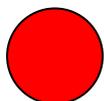


Good Conditions: Reported data are below MCL and/or meet the state standard or criteria for a given indicator.

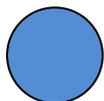


No Annual Assessment

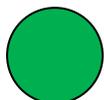
2001-2010 Status



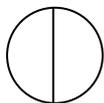
Downward Trajectory: 2001-2010 data shows decreasing or worsening conditions



No Change: 2001-2010 data shows no change with time.



Upward Trajectory: 2001-2010 data indicate increasing or improving conditions



Insufficient Data: reported data has too few data points and/or too short a period

