

## 7. Stream Benthic Macroinvertebrate Monitoring

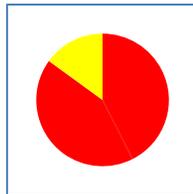
**Target:** BIBI scores are ranked ‘Good’ to ‘Excellent’ each year

**About this indicator:** Benthic macroinvertebrates are monitored because they are good indicators of the biological health of stream systems and play a crucial role in the stream ecosystem.

**Influencing factors:** Stream flows, increased sedimentation in stream flows – increased sediment typically infers low benthic community diversity; and excessive nutrients/contaminants in stream can have a negative effect on benthic communities.

**2010 Target:** The Benthic Index of Biologic Integrity (BIBI) scores are ranked Good to Excellent indicating diverse biological conditions in local creeks.

**2010 Finding:**  
 14 sites have data in 2010:  
 4 sites – Fair;  
 10 sites – Poor & Very Poor



**2010 Status:**

Fourteen sites in eight different stream basins were monitored in 2010. All sites ranked Fair to Very Poor in 2010, Figure 1. Four sites ranked as ‘Fair’ while 2 other sites ranked as ‘Very Poor’. The remaining 8 sites were ranked ‘Poor’. See Table 1 for comparisons to previous data. Data collection started in 2005 at three sites.

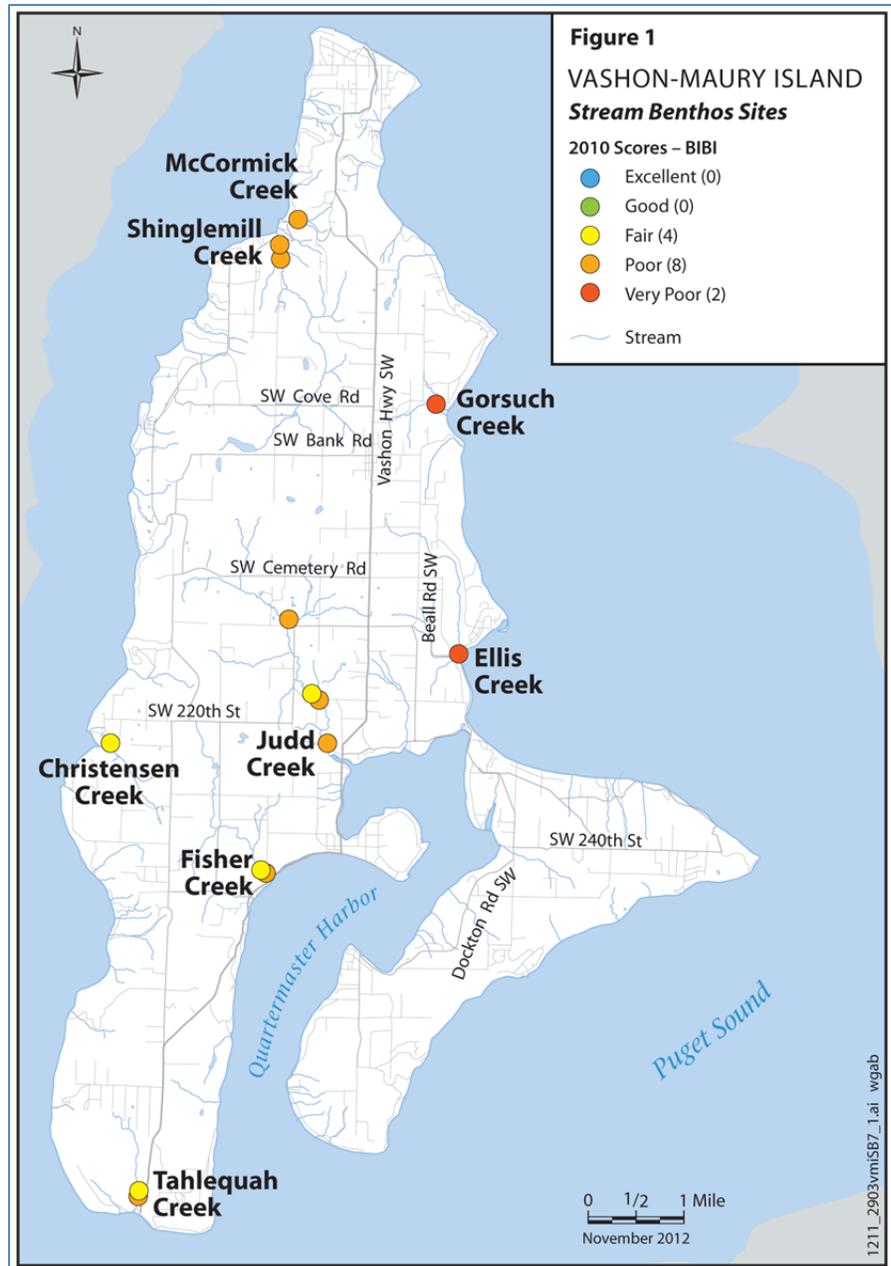
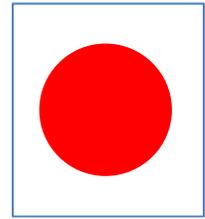


Figure 1. Stream Benthos locations used in this indicator – color shown are for 2010 scores. Fourteen sites in 8 stream basins were monitored in 2010. All sites ranked in the Fair/Poor/Very Poor categories. Fisher and Tahlequah creeks have 2 sites each that are close in proximity. These sites are graphically shown apart to display their rankings.

**2001-2010 Target:** BIBI scores are maintained or improved with time.

**2001-2010 Assessment:** Overall Island BIBI scores decreased from 2005 to 2010.



**2001-2010 Status:** Annual BIBI scores for each stream are shown in Figure 2 and Table 1 for years 2005-2010. The sites appear to have slight annual variability with a few sites improving from 2009 to 2010. Overall, the island wide average has decreased since 2005 to 2010 from a score of 28.0 to 24.5.

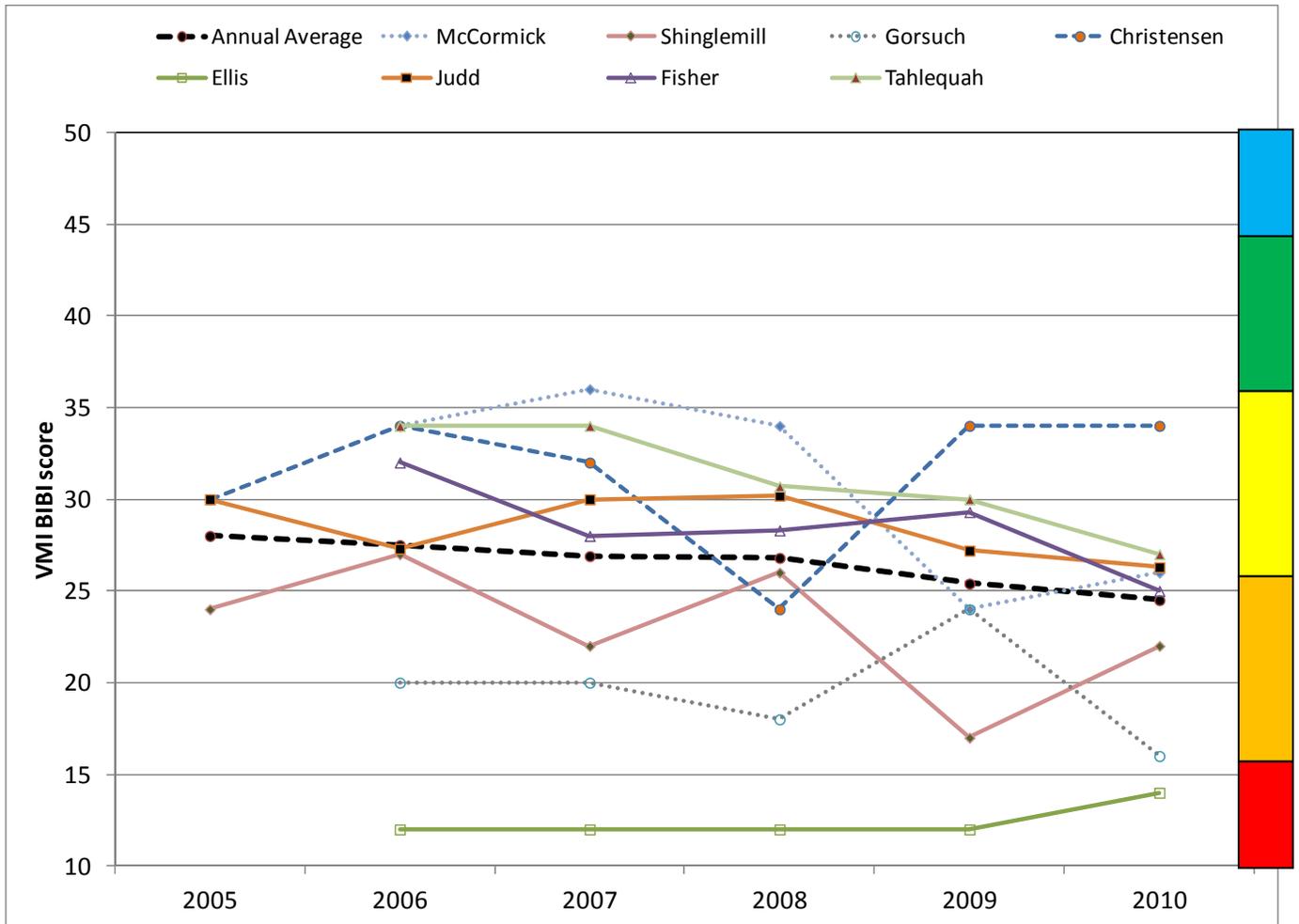


Figure 2. BIBI score for all Vashon Island sites from 2005 to 2010. All sites rank Fair to Very Poor based on the BIBI categories, see Table 1. An averaged Island-wide score was calculated and shows a decline from 2005 to 2010. This decline starts in Year 2005 ranked as Fair while the remaining years are ranked as Poor. Rankings are as follows: Very Poor 10-17 + red color; P = Poor 18-27 + orange color; F = Fair 28-37 + yellow color; G = Good 38-45 + green color; E = Excellent 46-50 + blue color

## Technical Notes Stream Benthic Macroinvertebrate Monitoring

**Data source:** The data for this indicator comes from sampling efforts done by two King County departments: Transportation - Roads and Natural Resources and Parks.

**Collection frequency:** Initial annual stream benthos sampling started in 2005 at three locations. The number of sites has increased since then to 14 locations monitored in 2010. A total of eight different stream basins are being monitored annually – McCormick; Shinglemill, Christenson, Tahlequah, Fisher, Judd, Ellis, and Gorsuch.

**Methods for analysis:** The BIBI scoring system is a quantitative method for determining and comparing the biological condition of streams. The Puget Sound Lowlands BIBI is calculated three different ways based on the taxonomic resolution of macro-invertebrate data: Species-Family, Species-Genus, and Family. Each of the BIBI scoring methods is composed of these metrics which are then added together for the single, integrated overall BIBI score. The overall BIBI score is associated with one of the following biological condition categories. The categories are Excellent, Good, Fair, Poor and Very Poor. The BIBI scores can range from 10 (Very Poor) to 50 (Excellent). An example of category totals for Species-Family is: Very Poor [10-16]; Poor [18, 26]; Fair [28, 36]; Good [38, 44]; Excellent [46, 50].

**Data Reliability and Quality:** The data quality of this indicator is high based on the KC SAP/SOP of sampling collection. The reliability is good based on the consistent and regular collection of the data. Vashon-Maury Island has 75 mapped streams discharging into Puget Sound.

**Data Reference:** Puget Sound Stream Benthos <http://pugetsoundstreambenthos.org/default.aspx>

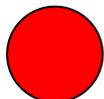
Table 1 Benthic Index of Biologic Integrity (BIBI) scores for all Vashon Island creeks from 2005 to 2010. For creeks with more than one site, the score represents an average. All sites rank between Fair to Very Poor based on the BIBI categories. An Island-wide score was calculated by averaging all the data into a single score and shows a decline from 2005 to 2010.

Creeks\Year	2005	2006	2007	2008	2009	2010
Christensen	30	34	32	24	34	34
Ellis	—	12	12	12	12	14
Fisher	—	32	28	28.3	29.3	25
Gorsuch	—	20	20	18	24	16
Judd	30	27.3	30	30.2	27.2	26.3
McCormick	—	34	36	34	24	26
Shinglemill	24	27	22	26	17	22
Tahlequah	—	34	34	30.7	30	27
Annual Average	28.0	27.5	26.9	26.8	25.4	24.5

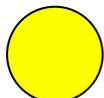
**Ranks:** Very Poor =10-17 + red color; Poor = 18-27 + orange color;  
Fair = 28-37 + yellow color; Good = 38-45 + green color;  
Excellent = 46-50 + blue color

## Legend

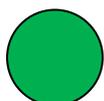
### 2010 Finding



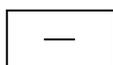
**Poor Conditions:** Reported data are above Maximum Contaminant Level (MCL) and/or fails to meet the state standard or criteria for a given indicator; needs improvement.



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

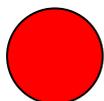


**Good Conditions:** Reported data are below MCL and/or meet the state standard or criteria for a given indicator.



**No Annual Assessment**

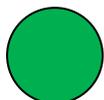
### 2001-2010 Status



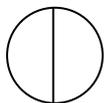
**Downward Trajectory:** 2001-2010 data shows decreasing or worsening conditions



**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

