On-site Sewage

On-site sewage systems, commonly known as septic systems, are widely used around Puget Sound on properties not served by municipal sewers. These systems safeguard public health and water quality, and allow people the flexibility to live and work in all parts of the region. There are more than a half-million systems in the Puget Sound region.

Systems that receive good use and care will provide very good treatment of sewage. However, when homeowners don't take care of their systems through regular inspections and repair—including pumping as needed—the systems can break down, leaking sewage into the groundwater and putting people and water resources at risk. Inadequately treated sewage can contaminate marine and freshwaters and impact drinking water supplies, swimming beaches, and shellfish beds for recreational and commercial uses.

All on-site systems need periodic inspections and good operation and maintenance to ensure effective, ongoing treatment.

On-site Sewage

INDICATOR:

On-site Sewage Inspection, Repair, and Maintenance

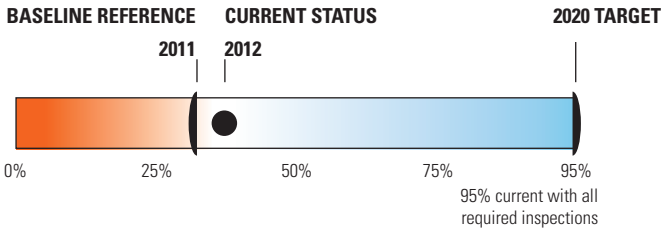
Indicator lead: Stuart Glasoe, Washington State Department of Health

TARGET:
Part 1: Inventory on-site sewage systems and fix all failures in Marine Recovery Areas and other specially designated areas, and to be current with inspections at 95%.

Part 2: Phase in an extension of this program to cover 90% of Puget Sound's unsewered marine shoreline.

PROGRESS:

IS THE TARGET MET?	IS THERE PROGRESS? Part 1	Part 2
NO	YES	NO



As of July 1, 2012, inspections were current on 38% of on-site sewage systems in Marine Recovery Areas and other specially designated areas. The total number of systems inventoried was nearly 60,000 and the percent documented was 91%. Reporting on the percent of failed systems fixed or mitigated will be phased in.

Progress Towards 2020 Target

The target has not been met. This is a relatively new target in the state's existing performance management programs. The 12 Puget Sound local health jurisdictions (LHJs) report data semiannually to the Washington State Department of Health (DOH). Only three reporting cycles have been completed so far.

The results of the first three cycles show an increase in the percent of systems current with inspections from 33% to 38% (Figure 1). During this same period, the total number of systems inventoried increased by about 7,000 and the percent of systems documented rose from 86% to 91%.

The interim inspection target is 60% by January 2015. The designated areas currently cover about 10% of the region's on-site systems. This coverage will continue to expand as more areas and on-site systems are designated for enhanced management, resulting in more systems to inventory and inspect.

The second target will be phased in, and the implementing agencies will need to develop a system to measure and report results. DOH estimates that the existing designated areas cover approximately 450 miles of unsewered Puget Sound shoreline. This represents roughly 20% of Puget Sound's unsewered shorelines, compared to the 90% target for 2020.

Number of On-site Sewage Systems Inventoried and Inspected in Designated[1] Areas
Semi Annual Figures 2011-2012

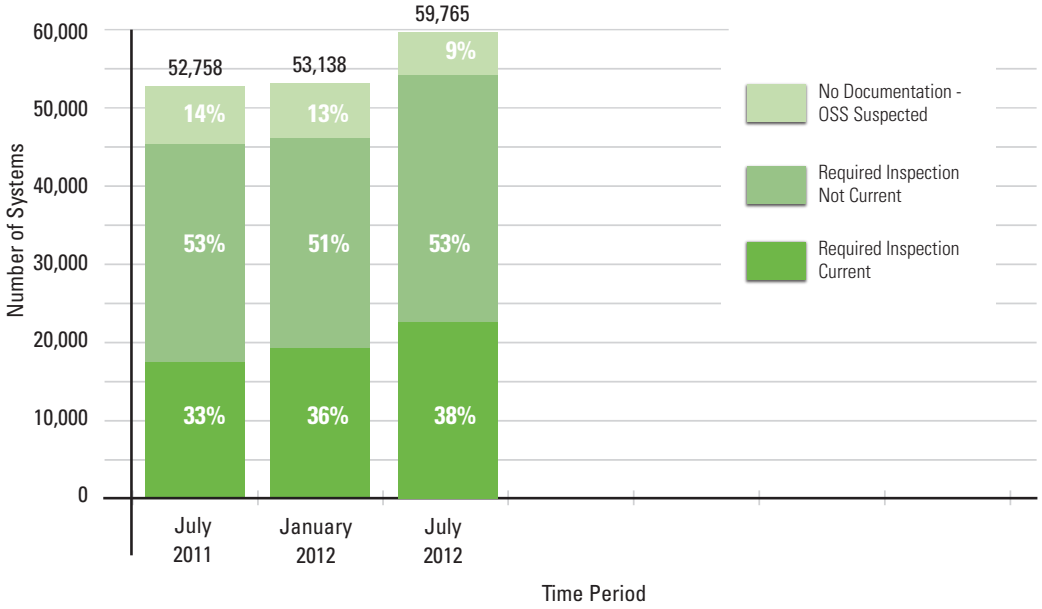


Figure 1.
Source: Washington State Department of Health, Office of Shellfish and Water Protection

[1] Designated areas include Marine Recovery Areas and other areas with comparable requirements.

What Is This Indicator?

The goal of this indicator is to track and advance the proper use and care of on-site sewage systems in sensitive and high-risk areas of Puget Sound to protect public health and water quality.

State rules require all homeowners to regularly inspect and maintain their on-site sewage systems. However, in marine recovery areas and other designated areas, LHJs engage more directly with homeowners to help ensure systems are inspected and maintained to reduce public health risks.

All 12 Puget Sound LHJs have adopted comprehensive management plans for on-site sewage systems under the state on-site sewage rule. The management plans frame the local Operation and Maintenance (O&M) programs. The local O&M programs share a set of common elements but they are all uniquely designed and implemented. DOH oversees the statewide on-site sewage rule and collects and interprets data for the Puget Sound targets.

Interpretation of Data

The LHJs are currently working to adapt and align their programs to fit with these ambitious regional targets.

The Puget Sound O&M programs are inherently complex and costly to implement. They all work from the same rule requirements and core elements, but are all tailored to local conditions, budgets, and ways of doing business. They require significant planning, infrastructure, personnel, public education, political support, community buy-in, financial resources, and smart execution.

At all levels of government, funding for decentralized wastewater programs and infrastructure dramatically lags behind public investment in centralized sewer systems. State financial support for the Puget Sound O&M programs has never materialized at a scale originally envisioned when the state on-site sewage and MRA laws were enacted. Most O&M program costs are covered locally and are complemented by state and federal grants. In 2009 the Puget Sound counties conservatively estimated unmet needs at approximately $4 million annually. State pass-through funds and federal EPA Pathogen Funds administered by DOH help augment this shortfall, adding

On-site Sewage

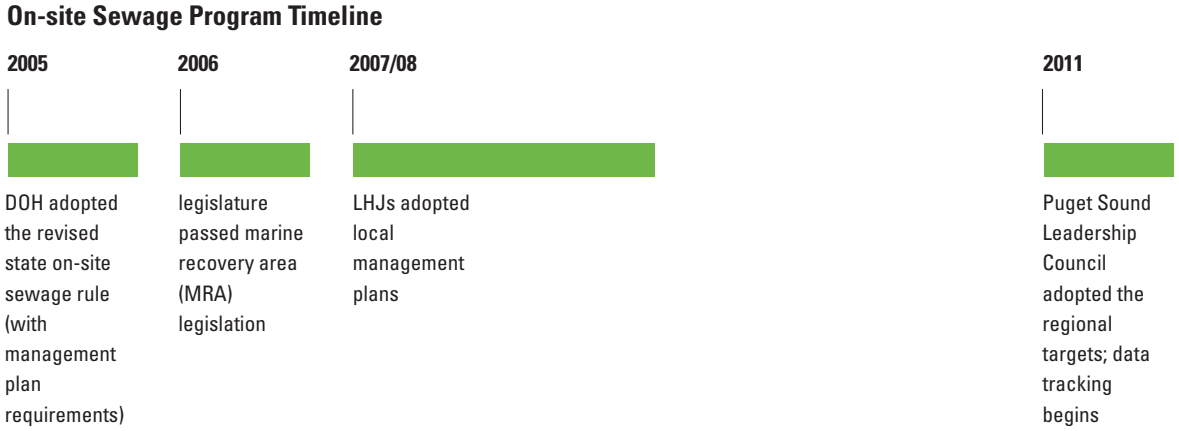


Figure 2. Several key milestones have been achieved for the On-Site Sewage Program

about $4 million to work by the Puget Sound counties in the 2011-2013 biennium.

The targets provide a small window into the workings of the local O&M programs. These programs include such diverse activities as financial lending for system repairs, code enforcement, homeowner inspection training, data management, certification of O&M professionals, homeowner notification and reporting, and community outreach.

"Management"—characterized here as O&M—has long been recognized as the weak link in the widespread use of on-site sewages systems when compared to centralized sewers. This picture is gradually changing in the Puget Sound region as local O&M programs take root, but it will continue to take significant investments and smart thinking to effectively design and deliver these utility-style programs and services on an ever-expanding scale.

Homeowners and elected officials alike are increasingly seeing the need for and benefits of these programs. The Action Agenda and regional targets will continue to shape and guide these efforts.

Swimming Beaches

On a warm day, the waters of Puget Sound present an alluring invitation to wade, swim, or SCUBA dive. Although many of our beaches meet high standards for water quality, every year beaches are closed to the public because of high bacteria counts.

In 2011, one quarter of our monitored beaches were unsafe for swimming because they failed to meet water quality standards. Swimming in contaminated waters can result in a variety of illnesses and other unpleasant outcomes. As our region grows in population, we can expect both an increase in the demand for recreational swimming opportunities, and in the sources of contamination from wastewater and stormwater runoff.

Clean water, free of harmful bacteria or chemicals, is an important goal in our efforts to restore and protect the Sound. We want the water to be as clean as possible so that we can enjoy the Sound without worrying about our health.

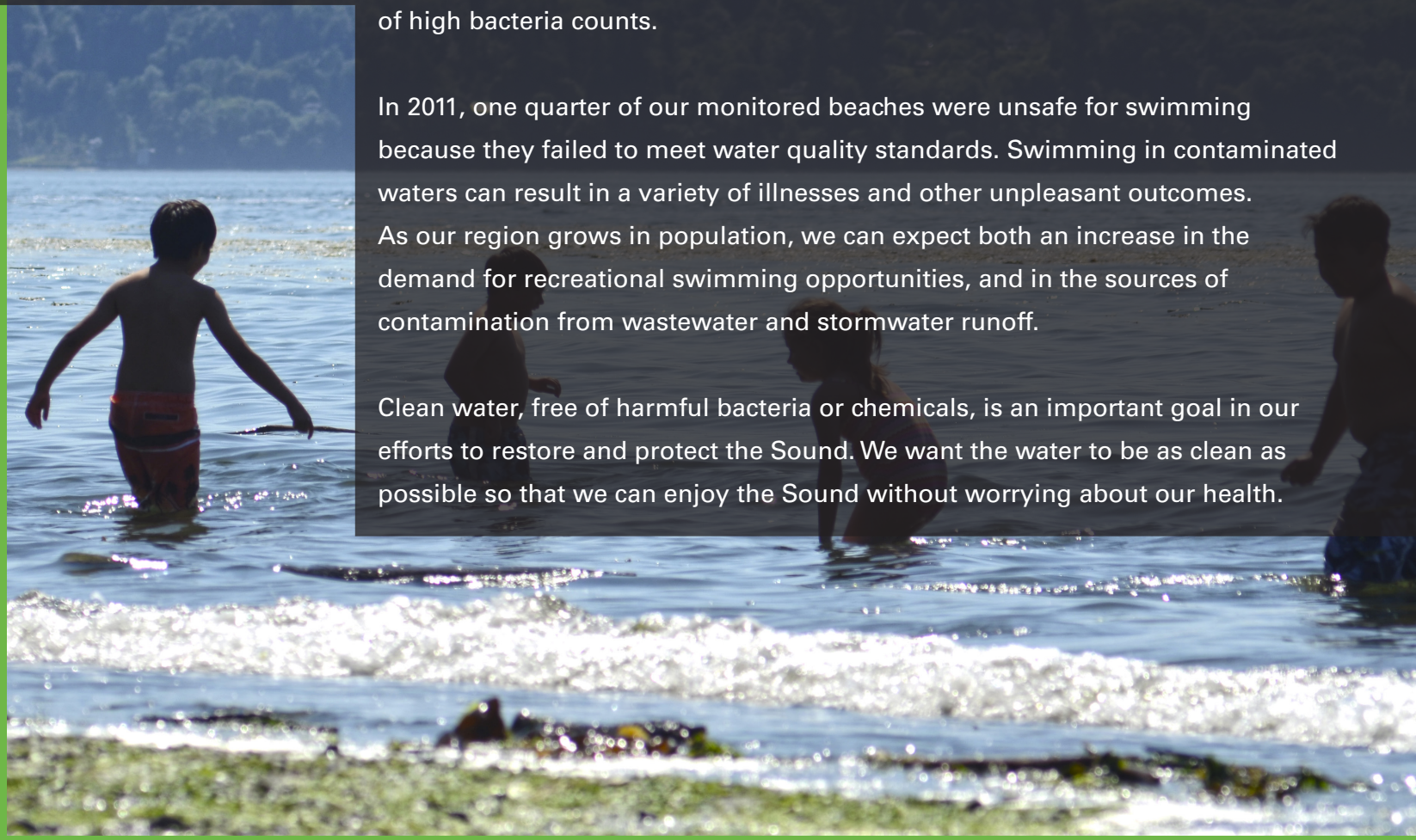


Photo Credit: Jon Bridgman, Puget Sound Partnership

Swimming Beaches

INDICATOR:

Conditions of Swimming Beaches

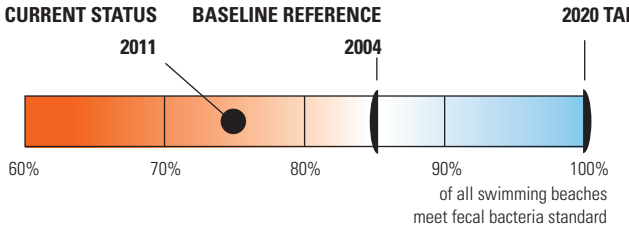
Indicator lead: Julie Lowe, Washington Department of Ecology

TARGET:

To have all monitored beaches in Puget Sound meet standards for what is called *enterococcus*, a type of fecal bacteria.

PROGRESS:

IS THE TARGET MET?	NO	IS THERE PROGRESS?	NO



In 2011, 75% of all monitored swimming beaches met fecal bacteria standards, which is down 12% from the 2004 baseline reference of 85%.

Progress Towards 2020 Target

Statewide monitoring of water quality at marine recreational beaches was initiated in 2004 by the Washington State's BEACH (Beach Environment Assessment, Communication, and Health) program. The target of 100% of all monitored swimming beaches meeting the EPA standards has not been met to date. Furthermore, no progress has been made relative to the 2004 baseline. In fact, the percent of core swimming beaches meeting standards initially improved, but subsequently declined, indicating that the conditions at swimming beaches have somewhat worsened.

What Is This Indicator?

The swimming beaches indicator reflects marine water quality conditions in areas heavily used for recreation. Conditions are measured using the percent of monitored Puget Sound swimming beaches that meet EPA water quality standards for the fecal bacteria *enterococcus*. Swimming beaches not meeting *enterococci* water quality standards indicate poor water quality that can result in negative human health outcomes such as gastrointestinal illnesses, respiratory illnesses, and skin infections.

Washington's BEACH Program was launched in 2003 in response to the BEACH Act, which amended the US Clean Water Act in 2000. A collaboration between the Department of Ecology and Department of Health, the program monitors high use/high risk beaches throughout the Puget Sound and Washington's coast.

The number of monitored beaches varied from year to year (Table 1). However, a total of approximately 47 core swimming beaches are monitored every year. Core beaches are those that are heavily used by the public and also present a higher risk to human health. A certain number of additional swimming beaches are monitored every year depending on funding, public

input, and local health jurisdiction feedback.

For the purposes of this indicator, a beach is considered to meet EPA standards for a particular year if the beach has only one or less instance of a weekly result greater than or equal to 104 cfu/100mL.

The output of the indicator goal may not adequately reflect a long-term outlook for the quality of our beaches, since the number of beaches monitored changes from year to year.

Interpretation of Data

Status and Trend

Overall, the majority of monitored swimming beaches met *enterococcus* standards every year since 2004, the first year when the program was in full operation (Table 1). However, the number of beaches meeting the standards has varied from year to year ranging from a low of 74% in 2010 to a high of 88% in 2005 (Table 1). Monitored swimming beaches that did not meet standards in 2011 are scattered throughout Central and North Puget Sound (Figure 1).

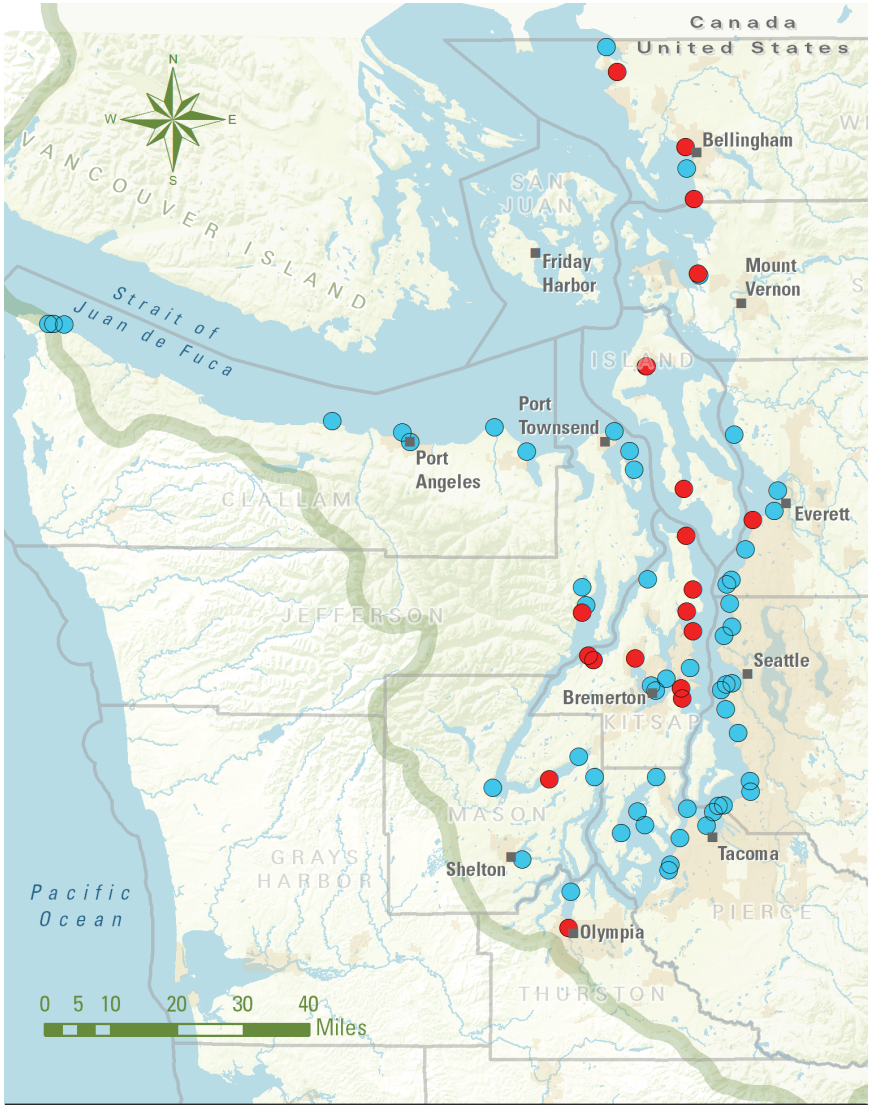


Figure 1. Distribution of all monitored swimming beaches, categorized by whether they passed or failed to meet water quality standards during the 2011 swimming season.
Source: Washington Department of Ecology, BEACH program

Swimming Beaches

Furthermore, some swimming beaches have had multiple violations since 2004. Five of the 19 swimming beaches that failed to meet standards in 2011 are considered beaches with chronic bacteria issues, namely:

- Freeland County Park, Holmes Harbor
- Larrabee State Park, Wildcat Cove
- Pomeroy Park, Manchester Beach
- Silverdale Waterfront Park
- Windjammer Park

The remaining 14 Puget Sound beaches that did not meet standards failed to do so during routine weekly sampling; however, they have met the standard on most occasions.

When the sample size is reduced to just the core beaches and tracked over time, the number of beaches meeting standards has slightly decreased since 2004, although numbers have varied from year to year (Figure 2).

Core Puget Sound Swimming Beaches Meeting *Enterococcus* Standards
Annual, 2004-2011

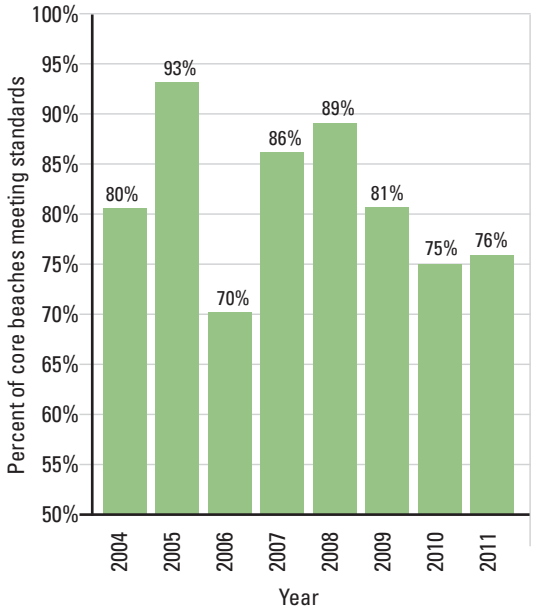


Figure 2. The percentage of core Puget Sound swimming beaches meeting *enterococcus* standards every year since 2004.
Source: Washington Department of Ecology, BEACH program

Monitoring Results for Conditions at All Monitored Swimming Beaches in Puget Sound.

	2004	2005	2006	2007	2008	2009	2010	2011
Number of swimming beaches sampled	68	67	71	62	53	68	46	75
Percentage of swimming beaches failing to meet standards	15%	12%	20%	12%	13%	22%	26%	25%
Percentage of swimming beaches meeting standards	85%	88%	80%	87%	87%	78%	74%	75%

Table 1. Monitoring results for conditions at swimming beaches in Puget Sound.
Source: Washington Department of Ecology, BEACH program

Shellfish Beds

At low tide, the waters of Puget Sound reveal an amazing abundance of oysters, clams, mussels, and more—a bounty unparalleled elsewhere. Gathering shellfish is a time-honored tradition for the public, and today it is an industry that supports thousands of jobs and brings millions of dollars into the region.

Around Puget Sound, there are an estimated 190,000 acres of classified commercial and recreational shellfish beds. However, about 36,000 acres of shellfish beds—approximately 19%—are closed due to pollution, most of which comes from fecal bacteria from humans, livestock, and pets. When fecal bacteria and other contaminants get into the water, they threaten the areas where these prized oysters, clams, and other bivalve shellfish grow.

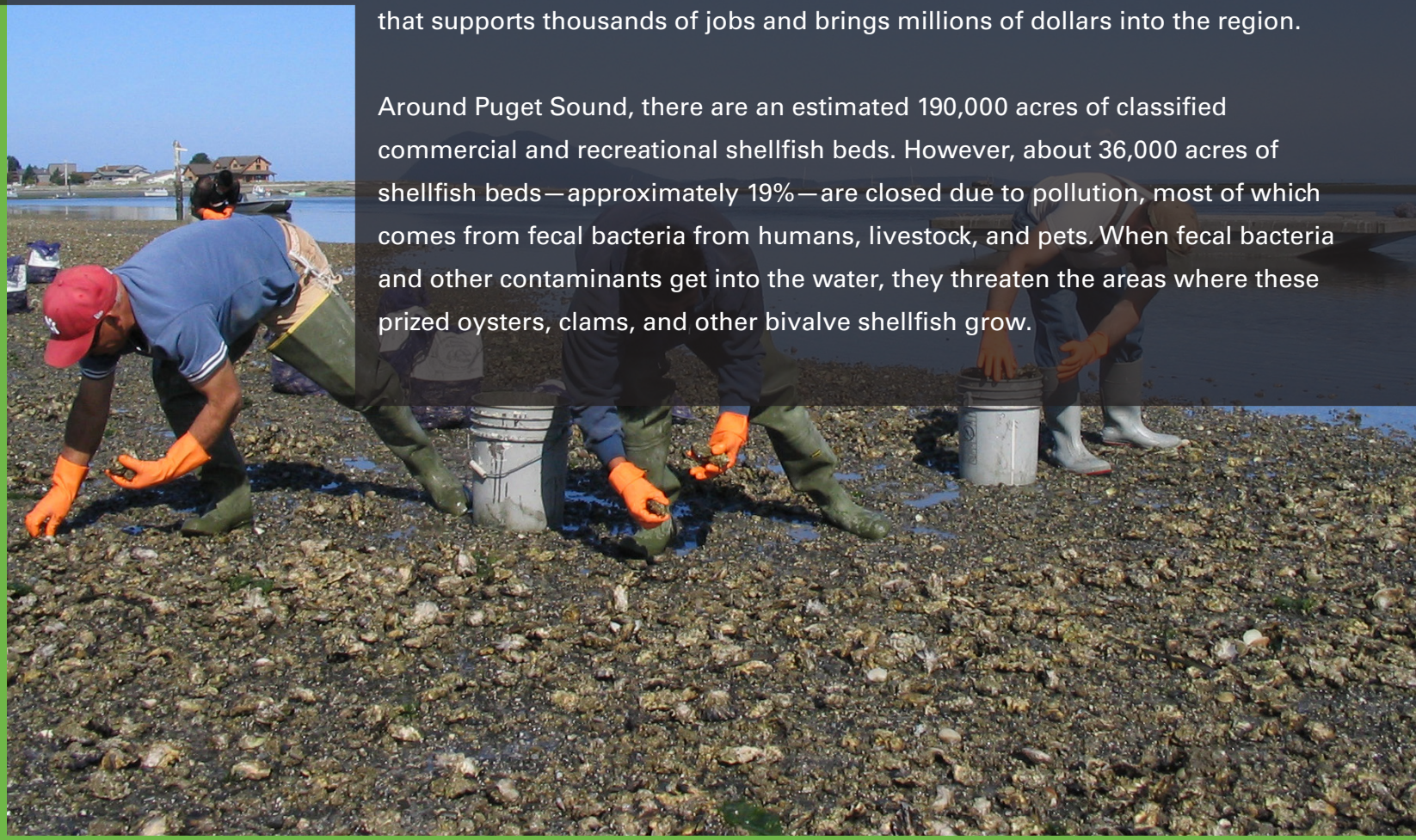


Photo Credit: Taylor Shellfish

Shellfish Beds

INDICATOR:

Acres of harvestable shellfish beds

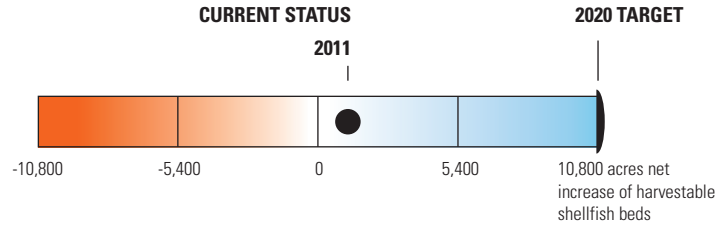
Indicator lead: Scott Berbells, Washington State Department of Health

TARGET:

A net increase of 10,800 harvestable shellfish acres, including 7,000 acres where harvest had been prohibited, between 2007 to 2020.

PROGRESS:

IS THE TARGET MET?	NO	IS THERE PROGRESS?	YES



Since 2007, some shellfish harvest areas were upgraded while others were downgraded. The net result was an increase of 1,384 acres of shellfish beds open for harvest.

Progress Towards 2020 Target

The 2020 target has not been reached yet, but there has been some progress. Shellfish beds are considered harvestable when their status is upgraded. Between 2007 and 2011, more acres of shellfish beds were upgraded than downgraded across all classifications, resulting in a net increase of 1,384 acres of harvestable shellfish beds. A net 3,290 acres of shellfish beds were upgraded from the prohibited classification (3,437 acres upgraded minus 147 acres downgraded to prohibited).

However, these upgrades in growing area classifications from 2007 through 2011 were dramatically offset by the recent downgrade of the Samish Bay shellfish growing area (4,037 acres), impacting the overall net acreage gained since 2007 and slowing progress toward the 2020 goal.

What Is this Indicator?

The shellfish harvest area classification process is defined in federal rules and adopted in state regulations. The Department of Health (DOH) implements the rules at the state level. The purpose of the DOH program is to assure that harvested shellfish are safe to consume. This also includes making certain that pollution sources are continually assessed and marine water quality monitored around every classified harvest area. The data collected for the classification process not only represent the conditions that dictate shellfish harvest, but their trends can also indicate a healthier Puget Sound.

Classification of Shellfish Areas in Puget Sound.

Classification	Definition	Acreage in 2011
Approved: commercial harvest for direct marketing allowed	Sanitary survey shows the area is not subject to contamination that presents an actual or potential public health hazard.	141,081
Conditionally Approved: opened or closed for predictable periods of time	Meets Approved criteria some of the time, but not during predictable periods. The length of closure is based on data that show the amount of time it takes for water quality to recover before the area can be reopened.	11,384
Restricted: cannot be marketed directly and must be transplanted to Approved growing areas for a specified amount of time	Meets standards for Approved criteria, but the sanitary survey indicates a limited degree of pollution from non-human sources. Harvest must be transplanted to Approved growing areas to allow shellfish to naturally cleanse themselves of contaminants before they can be marketed.	307
Prohibited: closed to commercial and recreational harvest	When the sanitary survey indicates that harmful substances may be present in concentrations that pose a health risk. Growing areas that have not undergone a sanitary survey are also classified as Prohibited.	35,683

Table 1. Classification of shellfish areas in Puget Sound and number of acres in each class in 2011.

DOH classifies 91 different shellfish growing areas in Puget Sound, covering roughly 190,000 acres. Sites are classified as "approved," "conditionally approved," "restricted," or "prohibited" (Table 1). Upgrades in classification mean that water quality has improved, allowing for fewer restrictions on shellfish harvest. Downgrades mean there are either more restrictions on when shellfish may be harvested or no harvest is allowed at any time. Downgrades are generally caused by fecal bacteria or other pollutants in the water that make the shellfish unsafe to eat. The "acres of harvestable shellfish beds" indicator refers to those shellfish harvest areas that have been upgraded.

DOH samples over 1,200 marine water stations between six and 12 times each year for fecal coliform bacteria, salinity, and temperature. Between 2.5 to five years of bacteria sampling data are used in the classification of each marine water station. In addition, shoreline pollution sources, including wastewater treatment plants, individual on-site sewage systems, marinas, farms, and any other activity with the potential to impact the shellfish area, are evaluated periodically and results are integrated in the classification process.

Shellfish Beds

Interpretation of Data

Status and Trend

Of the total harvest area classified in 2011, 152,465 acres or 81% was approved or conditionally approved for harvest (Table 1). Thus, shellfish harvest is possible in most of the areas under DOH jurisdiction, and these areas are distributed across all sub-basins of Puget Sound (Figure 1).

In contrast, over 35,000 acres (19%) of shellfish harvest areas were classified as prohibited due to the proximity of pollution sources or poor water quality (Table 1). Over 60% of this acreage is prohibited because of a nearby wastewater treatment plant outfall, 29% because of nonpoint pollution sources, 8% because of marinas, and 2% because of other factors that could impact public health.

From 2007 through 2011 improved sanitary conditions resulted in net upgrades in classifications totaling 1,384 acres (Figure 1). A classification downgrade in April 2011 within the Samish Bay shellfish growing area (4,037 acres) dramatically impacted the net acreage gained since 2007.

The DOH predicted that 8,738 acres could potentially be upgraded between 2012 and 2020. This analysis incorporates information about the known or suspected

Acres of Upgraded and Downgraded Shellfish Beds in Puget Sound
2000–2011

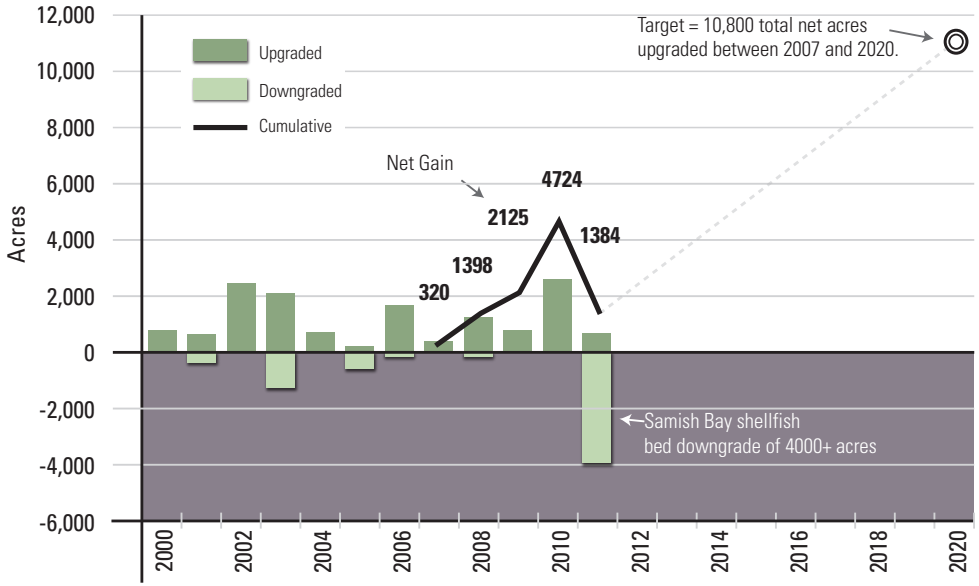


Figure 1. Number of acres in Puget Sound by annual harvest area classification changes from 2000 through 2011. Also shown is the cumulative net improvement from 2007 and 2011. The large green downgrade in 2011 relates to Samish Bay.

Source: *Source: Washington Department of Health, Office of Shellfish and Water Protection*

causes of harvest restrictions and an area-by-area evaluation of the current activities and water quality trends. These projections, coupled with the current 2007 through 2011 net acreage increase of 1,384 acres, results in a predicted increase of 10,122 acres by 2020, just short of the 10,800 acres target value. However, downgrades are almost certain to occur during the same timeframe, thereby counteracting the upgrades and further widening the gap to the target value.

Although the Sound-wide trend in improvement is positive, many factors affect the long-term ability to reach the target. Intensive efforts to restore growing areas, such as in the Samish harvest area, are counter-balanced by shoreline development and polluted runoff from stormwater, on-site septic systems, and farms near existing open areas. Unless there are aggressive actions to improve wastewater treatment plant outfall locations, on-site septic system operation and maintenance, and agricultural best management practices, the 2020 target will likely not be met.

Figure 2. Distribution of classified shellfish harvest areas in Puget Sound as of the end of 2011.
Source: Washington Department of Health, Office of Shellfish and Water Protection

Skagit Stream Team and Storm Team

LOCAL STORY

Stream Team

Sponsored by the Skagit Conservation District in partnership with the Padilla Bay National Estuarine Research Reserve, the cities of Mount Vernon, Anacortes, Burlington, Sedro-Woolley, and Skagit County, the Skagit Stream Team began in 1998 with a mission to educate and involve local citizens in the protection and stewardship of local streams. Currently, 70 dedicated Stream Team volunteers regularly measure water quality in ten watersheds in Skagit County.

STORM Team

A high fecal coliform result during a heavy rain event in 2008 in the Samish watershed, an important commercial shellfish growing area, raised concerns and led to the creation of the Storm Team. Although Samish Bay usually has good water quality, tests showed that during storms large volumes of pollutants wash off the landscape into local streams and rivers and contaminate the bay.

The Storm Team is a dedicated core of volunteers that head out in the middle of rainstorms as streams and rivers are rising to collect water samples for fecal coliform bacteria testing. Testing during high flow conditions is an important complement to the Stream Team's regular ambient monitoring, and it has been instrumental in identifying priority areas for clean up efforts.

Initial Storm Team efforts in the Samish watershed helped establish baseline data for the river during storm events for the Washington State Department of Health (DOH) Office of Shellfish & Water Protection, which regulates the commercial shellfish industry. DOH uses fecal coliform loading to determine when to issue a pollution closure.

As a result of Storm Team and Skagit County sampling, DOH changed the classification of most of Samish Bay from Approved to Conditionally Approved in 2011. Samish Bay commercial shellfish growing areas are now closed automatically when the river reaches 4.7 trillion fecal coliform colonies per day—a level determined to pose a risk for shellfish consumption.

Storm Team sampling efforts were critical in documenting fecal coliform contamination problems in the Samish watershed. The Clean Samish Initiative (CSI), a partnership of local, state, and federal agencies and organizations, was launched in 2010 by Skagit County with funding from the US Environmental Protection Agency. The CSI effort was put together to identify sources of fecal contamination and to find ways to correct them. With increased County sampling efforts under the CSI, the Skagit Storm Team has been able to redirect efforts over the last two years to the Bay View and No Name Slough drainages in the Padilla Bay watershed.

More information about the Skagit Stream Team and Storm Team can be found at:
www.skagitcd.org/stream_team

Information about the Clean Samish Initiative can be found at:
www.skagitcounty.net/cleanwater

Samish River | Photo: Eutrophication&hypoxia @flickr

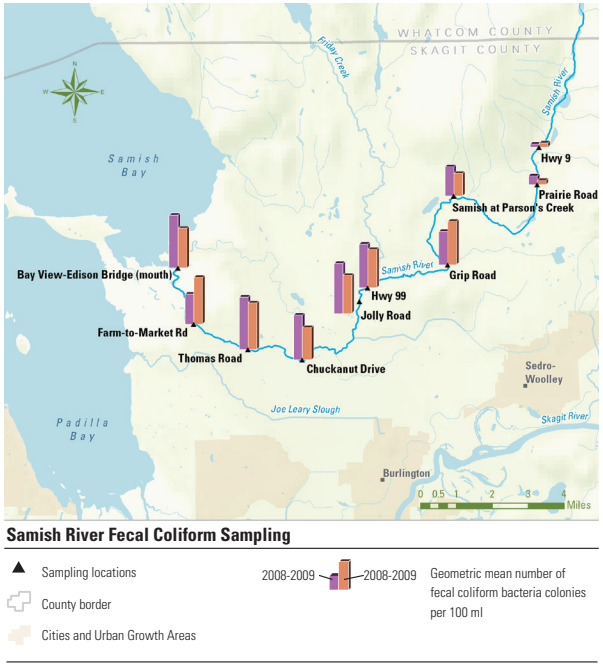


Figure 1. Fecal Coliform counts in Samish river