Thurston County

Nisqually Reach and Henderson Inlet Shellfish Protection Districts

Combined Shellfish District’s 2008 Annual Report

July 2008

Creating Solutions for Our Future
Thurston County

Nisqually Reach and Henderson Inlet
Shellfish Protection Districts

Combined Shellfish District 2008 Annual Report

Board of County Commissioners

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Diane Oberquell, Chairman District 2
Bob Macleod District 3

Don Krupp, Chief Administration Officer
Cynthia Stewart, Assistant Chief Administration Officer

Mark J. Swartout, Natural Resources Program Manager
Staff to the Shellfish Protection Districts
Acknowledgement

This work would not have been accomplished without the work of the Nisqually Reach and Henderson Inlet Shellfish Protection District Stakeholder Committees and with staff support from Thurston County; City of Lacey; City of Olympia; Thurston Conservation District; Washington Departments of Health and Ecology; Yelm School District; and non-profit organizations such as the Puget Sound Restoration Fund and Pacific Shellfish Institute.

Nisqually Reach Shellfish Protection District Stakeholder Committee:

Tris Carlson, Chair  Christine Buckley  Fred Michelson
Bryan D. Wilson  Linda Malatesta  David Troutt

Henderson Inlet Shellfish Protection District Stakeholder Committee:

Peter Heide  Mark Sloan  E. (Jerry) Yamashita
Andy Haub  Tim Wilson

Staff and guest support:

Mark J. Swartout, Art Starry, Sue Davis, Linda Hofstad, Chris Maun, and Rachel Laderman (Thurston County)
Tim Wilson (City of Lacey)
Andy Haub (City of Olympia)
Chris Hempleman and Kim McKee (Ecology)
Lawrence Sullivan, Stuart Glasoe, and Tim Determan (WA. Department of Health)
David Hall, Kathy Whalen and Ann Mills (Thurston Conservation District)
Betsy Peabody and Mark Fischer (Puget Sound Restoration Fund)
Mary Middleton (Pacific Shellfish District)
Sheila Edgerton, and Justin Hall (Nisqually River Education Project)
Brian Phipps and Diane Cooper (Taylor United Shellfish Company)
GLOSSARY

Introduction.........................................................................................................................page 1
Executive Summary............................................................................................................page 4
Conclusion ..........................................................................................................................page 5
Part I – Program Implementation Monitoring Report.........................................................page 6
Part II – Water Quality Monitoring Data............................................................................page 33
Part III – Water Clean Up Plan (TMDL) Recommended Actions......................................page 58
INTRODUCTION

In 2007 the Washington State Legislature passed Senate Bill 5778 which added to Chapter 90.72 RCW an annual reporting requirement for Shellfish Protection Districts. This report is generated to comply with Chapter 90.72.045 RCW.

Nisqually Reach Shellfish Protection District:

The water in the Nisqually Reach area is contaminated with fecal coliform bacteria resulting in closures to shellfish harvesting. In 1992 Washington Department of Health (DOH) reclassified the shellfish growing area at Nisqually Reach from “Approved” to “Conditionally Approved,” with closures to shellfish harvesting occurring after one half inch of rain in 24 hours. One year later, DOH adjusted the closure criterion to one inch in 24 hours. In 2000 DOH reclassified 74 acres to “restricted” status.

In July 2002 DOH found improvements in water quality and pollution sources resulting in a classification upgrade to “Approved” on nearly 1000 acres of tidelands located west of McAllister Creek and Luhr Beach. However, there remains about 40 acres of tideland in the “restricted” status near the mouth of McAllister Creek.

In 2000 when DOH closed 74 acres of commercial shellfish beds to harvesting in the Nisqually Reach Chapter 90.72 RCW required Thurston County to create a shellfish protection district and to adopt a shellfish protection program to be effective within the district.

In December 2001 the Thurston County Board of County Commissioners approved Ordinance No. 12680 creating the Nisqually Reach Shellfish Protection District. The purpose of the District is to address water quality problems in the Nisqually Reach and its tributary McAllister Creek and to develop long-term strategies to prevent further downgrades and restore commercial shellfish growing areas.

Next the Board of County Commissioner appointed 11 citizens that lived or worked within the District to a stakeholder committee. The charge of the stakeholders was to develop within 18 months recommendations for the Board to consider that would improve water quality over the shellfish beds.

The stakeholder group researched and recommended actions that if implemented would reduce fecal coliform bacteria loading resulting in upgrading commercial shellfish beds. The Board of County Commissioners adopted the stakeholder committee’s Nisqually Reach Shellfish Protection District Stakeholder Group Report and Recommendation in July, 2003.

In 2006 Washington Department of Health upgraded approximately 37 acres of restricted tidelands to approved near the mouth of McAllister Creek. About 118 acres of tidelands were downgraded from Approved to Prohibited near Puget Marina. Thurston County Environmental Health is continuing to identify and correction nonpoint pollution problems in the area.

Since the Nisqually River and McAllister Creek did not meet the state’s fecal coliform water quality standards the federal Clean Water Act required Washington Department of Ecology to do a Water Quality Implementation Plan. This was completed in 2007.
The water in Henderson Inlet is contaminated with fecal coliform bacteria resulting in closures to shellfish harvesting. Beginning in 1984, Washington Department of Health (DOH) reclassified 180 acres of the shellfish growing area in Henderson Inlet from “Approved” to “Conditionally Approved,” with closures to shellfish harvesting occurring after one inch of rain in 24 hours. One year later, DOH reclassified 120 acres the most southern portion of Henderson Inlet to “Prohibited”. There are now a total of 128 acres classified as “Prohibited” and 360 acres as “Conditionally Approved”.

In 2000, when DOH closed (Prohibited) an additional 8 acres of commercial shellfish beds to harvesting and in 2001 added 300 acres as “Conditionally Approved”, Chapter 90.72 RCW required Thurston County to create a shellfish protection district and to adopt a shellfish protection program to be effective within the district.

In December 2001, the Thurston County Board of County Commissioners approved Ordinance No. 12679 creating the Henderson Inlet Shellfish Protection District. The purpose of the District is to address water quality problems in the Henderson Inlet and its tributaries and to develop long-term strategies to prevent further downgrades and to restore commercial shellfish growing areas.

Next the Board of County Commissioner appointed 11 citizens that lived or worked within the District to a stakeholder committee. The charge of the stakeholders was to develop within 18 months recommendations for the Board to consider that would improve water quality over the shellfish beds.

The stakeholder group researched and recommended actions that if implemented would reduce fecal coliform bacteria loading resulting in upgrading commercial shellfish beds. The Board of County Commissioners adopted the stakeholder committee’s Henderson Inlet Shellfish Protection District Stakeholder Group Report and Recommendation in July, 2003.

In 2007 Washington Department of Health reports that the “conditionally approved” area was closed to commercial harvest for a total of 76 days in accordance with the current management plan requirements for a 5-day closure following a 24-hour rainfall accumulation of 0.5 inch or more. WDOH performed a shoreline survey in the area. No direct or indirect impacts that would change the classification of the shellfish area were identified.

Since Woodland, Woodard Creeks and the Henderson Inlet marine waters did not meet the state’s fecal coliform water quality standards the federal Clean Water Act required Washington Department of Ecology to do a Water Quality Implementation Plan. This was completed in 2006.

By the county creating both shellfish protection districts it met the following provisions of Chapter 90.72 RCW include:

- A shellfish protection district is a geographic area designed by a county to protect water quality and tideland resources.
- The program shall include any elements deemed appropriate to deal with the nonpoint pollution threatening water quality, including, but not limited to, requiring the elimination or decrease of contaminants in stormwater runoff; establishing monitoring, inspection,
and repair elements to ensure that on-site sewage systems are adequately maintained and working properly; assuring that animal grazing and manure management practices are consistent with best management practices; and establishing educational and public involvement programs to inform citizens on the causes of the threatening nonpoint pollution and what they can do to decrease it.

- The county shall have full jurisdiction and authority to manage, regulate, and control its programs and to fix, alter, regulate, and control fees for services provided and charges or rates as provided under those programs.
EXECUTIVE SUMMARY

The Nisqually Reach and Henderson Inlet Combined Shellfish Protection District Stakeholder committee spent considerable amount of time discussing the format for an annual report. The Stakeholder group wanted the report to include an evaluation of what has been implemented, an analysis of whether there has been a decline or an improvement of water quality due to the implemented actions, and identify additional actions that need to be taken to improve water quality. Therefore, this report is divided into 3 parts: Part 1 is implementation monitoring, Part 2 is data monitoring, and Part 3 is additional actions that need to be taken that came from Department of Ecology’s Water Clean Up Plans.

Part 1 is a matrix showing the current status of the implementation of the recommendations adopted by the Board of County Commissioners. The recommendations are separated into the following 5 categories: Septic Systems, Stormwater, Agriculture, Land-use, and Wildlife. The report shows many of the recommendations have been or are being implemented. The primary efforts have been in public education and outreach; the Henderson Inlet Watershed Protection Area septic system operation and maintenance program which begins in 2008; and down zoning about 2,500 acres in the rural areas of the districts.

Part 2 contains water quality monitoring data provided by the Washington Department of Health’s Office of Shellfish and Water Protection. The data is in two sections. The first section shows sampling results over a time period that varies from 1 ½ years to 4 years depending on the growing area and classification. The second section is a summary of data analysis, which shows the water quality trends.

In Henderson Inlet the trend analysis for 29 sampling stations is 16 are getting worse, 4 no change, 4 are getting better, and 5 are not determined. The area where the trends are worse is at the south end where Woodland Creek enters, the stations near Woodard and Chapman Bay, and along the East side of the inlet. In 2007 there were no changes to the previous status of the commercial shellfish beds. The Fecal Pollution Index graph, which includes data from 1998 to 2007, shows there was a slight improvement from 2006 to 2007. The Fecal Pollution Index graph calculates the index for the entire shellfish growing area not for any one sampling station. The Classification Status for the Inlet is it “Meets standards but threatened with a downgrade in classification”.

Along Nisqually Reach the trend analysis for 26 sampling stations is 10 are getting worse, 6 no change, 9 are getting better, and 1 not determined. The areas where the trends are worse are the lower Nisqually River, the Nisqually River delta, to the East of the mouth of McAllister Creek, and the station near Tolmie State Park. In 2007, there were no changes to the previous status of the commercial shellfish beds. The Fecal Pollution Index graph, which includes data from 1998 to 2007, shows there was relatively no change from 2006 to 2007. The Fecal Pollution Index graph calculates the index for the entire shellfish growing area not for any one sampling station. The Classification Status for the Inlet is it “Meets standards but some concerns”.

Part 3 – includes additional actions taken from Ecology’s Water Quality Improvement Plans as required by the Clean Water Act. These recommended actions were determined using a higher degree of scientific rigor than the shellfish district’s report of recommendations.
CONCLUSION

In conclusion it is very difficult to determine what effects the implemented actions have had on reducing fecal coliform bacteria contamination. For example the emphasis on public outreach and education can have an immediate benefit by changing the public’s behavior such as picking up dog waste and it can have a benefit that may take time to realize such as classes on septic system maintenance or agricultural best management practices. Down zoning 2,500 acres in the rural won’t have an immediate water quality benefit but will help prevent future sources of bacteria. The Henderson Inlet Watershed Protection Area septic system operation and maintenance program began in 2008. As this program identifies and corrects failing septic systems particularly along the marine shoreline there should be a concomitant decrease in fecal coliform contributions from humans as we’ve seen elsewhere.

The Stakeholders have determined that the highest priority actions that need to be implemented are:

- Duplicating the Henderson Inlet Watershed Protection Area septic system operation and maintenance program into the Nisqually Reach Shellfish Protection District after the program has been implemented and evaluated.
- Sewering Woodland Creek Estates, and retro-fitting the Tanglewilde stormwater system with infiltration ditches and treatment facilities to eliminate the direct stormwater discharge to the creek.
- Adopting the revised Stormwater Manual so Low Impact Development (LID) regulations can be developed.

The water quality trend graphs for each of the shellfish growing areas indicate that the changes in water quality are minimal; however this can be seen as a success since these are watersheds that are experiencing continuing new residential development. In 2007, seven out of the 12 water quality samples taken in Henderson Inlet were taken after heavy rainfall while the shellfish beds were closed to harvest. The results were better than anticipated; therefore the Washington Department of Health is considering upgrading the conditionally approved status from closures after ½ inch to ¾ of an inch of rainfall. This to some degree demonstrates that the implemented actions are helping prevent further degradation of water quality.

Additional resources will need to be obtained to implement the actions identified in Part 3 of this report to reduce bacteria levels and remove restrictions from commercial shellfish beds.
Part 1

Program Implementation Monitoring Report
## SEPTIC SYSTEM RECOMMENDATIONS

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<tr>
<th>Summary Recommendation</th>
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<tr>
<td>1. Declare both Districts as an “Area of Special Concern” for septic systems</td>
<td>Henderson Watershed Protection Area program approved November 2005 and implemented January 1, 2007. These actions created an Area of Special Concern for Henderson that includes the recommended dye-trace, operational certificate and education programs.</td>
<td>Complete implementation of Henderson program. Begin efforts to make Nisqually Reach a Marine Recovery Area modeled after the Henderson Watershed Protection Area.</td>
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<td>2. Require Operational Certificates and an Operational and Maintenance Program</td>
<td>Funds from the Department of Health and the Conservation District have been committed to allow implementation of the Henderson program. Efforts will focus on OSS owner education, O&amp;M data management and O&amp;M compliance.</td>
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<td>4. Perform follow-up inspections of new systems 6 to 12 months after installation.</td>
<td>The low interest loan program will be in place through 2008. A new feature of the program is the availability of grants for qualified Marine Shoreline Repairs that cost more than $5,000. Grants are available for up to 20% of the repairs costs, with a maximum grant amount of $3,000. The SPD small grant program will be funded again in 2008. This program allows property owners who are low income or on the county Senior/Disable tax deferral program to receive grants up to $500 for minor sewage system repairs and maintenance. The septic system riser rebate program will remain in effect for Henderson and Nisqually. Sewage system owners can receive up to $100 in rebates ($50 for each riser) when they install risers on their septic tanks. Installing risers makes it easier to monitor and maintain the septic tank.</td>
<td>Continue this program in future years.</td>
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<td>5. Provide low interest loans regardless of income for repair of failing systems.</td>
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1 Unless otherwise stated each recommendation comes from both the Nisqually Reach and Henderson Inlet Shellfish Protection District
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<td>6. Continue and possibly expand the education and outreach program.</td>
<td>Environmental Health Division (EHD) – Four general septic system workshops will take place this year, one in spring, one in fall, in both Nisqually and Henderson. The septic help line, which provides technical assistance to septic system owners, continues to be available to all residents of the county. Other county-wide information includes distributing written information at public locations and setting up a display at events (including the Lacey Library, Thurston County Fair, and Nisqually Watershed Festival); maintaining a website with thorough information on septic system care; and writing newspaper articles. EHD will continue to offer workshops for Henderson WPA residents who own gravity, pressure distribution, mound or Glendon biofilter systems who want to be certified to monitor and maintain their OSS. Several classes are offered each month. Additional funding from the Thurston Conservation District (TCD) was obtained to help provide classes to keep pace with demand. The Thurston County On-site Sewage System Management Plan recommends that the homeowner certification classes be offered in Nisqually and the rest of Thurston County. Unless additional staff and funding become available this will be difficult complete this recommendation. TCD (Thurston Conservation District) and EHD have implemented a watershed pledge program for both the Henderson and Nisqually Shellfish Protection Districts. There are now 96 participants in the program. Staff contact: Kathy Whalen (TCD) 754-3588 ext. 114 and Rachael Laderman (EHD) 754-4111 ext. 7244. The City of Lacey continues to sponsor the Henderson Inlet Watershed Tour each year to raise awareness of issues affecting shellfish harvest and water quality. Staff contact: Tim Wilson (Lacey) 438-2687</td>
<td>Need to continue at current level.</td>
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## SEPTIC SYSTEM RECOMMENDATIONS

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<td>Recommendation #6 (Continued)</td>
<td>Continue education and public outreach programs depending on available funding by grants, O&amp;M program which funds 6-8 workshops per year, the SPF (Shellfish Protection Fund), and other sources of funding. As an additional component of the education and public outreach program, Puget Sound Restoration Fund is giving away community-grown oysters to residents who have obtained an operational certificate as part of Thurston County’s new O&amp;M program. The oyster give-away, begun in 2007, provide incentives for homeowners to improve their practices and give residents a chance to enjoy the fruits of clean water.</td>
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## STORMWATER RECOMMENDATIONS

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<td>1. Support land-use and stormwater facilities that minimize the collection and transport of fecal coliform bacteria, optimize treatment, and ensure performance. This includes adopting LID (low-impact development) standards and revising the stormwater design manual.</td>
<td>Thurston County and Lacey continue their work on a revised stormwater manual that is consistent with WDOE requirements. Olympia has adopted the manual. However, the manual does not resolve the issue of fecal coliform in stormwater. Commonly used and current technology does not exist or is fiscally infeasible to treat stormwater for fecal coliform bacteria. Olympia’s manual was revised in 2005 and is considered consistent with WDOE requirements. The City of Lacey continues to be active with Storm Pond maintenance education and outreach. Also, the City provides free of charge 30 yard dumpsters and some maintenance tools for the maintenance of private ponds. In addition, the City provides educational signs to be posted at the private storm ponds, to education citizens as the function and proper use of the facilities. The County has completed a 2004 project to map stormwater facilities within the Henderson Inlet watershed. This should help in prioritizing private and public activities to improve maintenance of stormwater facilities. In 2005, the County Stormwater Utility intends to train representatives from 50 homeowner associations in pond maintenance and institute annual inspection reports from these trained volunteers. Signs will be installed at stormwater ponds. Also, instituting systematic County maintenance of facilities for which we have legal responsibility. Stormwater facilities with direct discharge to surface waters are a priority. In 2007 more than 100 HOA are participating in the pond maintenance program with about half having completed the pond maintenance training. Funded by stormwater utility rates.</td>
<td>Lacey and the county are expecting to adopt the manual at the end of 2008. When the county adopts it's revised stormwater manual the LID Steering Committee will resume their work in providing recommendations for revising regulations for LID. Local jurisdictions should track local, regional, and national evaluations of LID techniques and incorporate findings, both pro and con, into their problems.</td>
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Staff contacts: Andy Haub (Olympia) 753-8475; and Tim Wilson (Lacey) 438-2687; Chris Maun (County) 357-2491.
## STORMWATER RECOMMENDATIONS

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<td>Recommendation #1 (Continued)</td>
<td>Thurston County has created a LID Steering Committee to assist in the development of an action plan to create a Thurston County LID Ordinance. The Committee has been put on hold waiting for the adoption of the County Stormwater Manual. The LID Steering Committee has a representative from the shellfish protection district stakeholder committee. Staff Contact: Scott Clark 709-3005 (County) or Mark Swartout 709-3079.</td>
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<td>2. In areas with Hydrologic Soil Groups C &amp; D (tight soils) within the District:</td>
<td><strong>Zoning Changes:</strong> The county revised its zoning in the Districts in 2007. Limited Areas of More Intensive Rural Development (LAMIRDs) changed 18 acres from one unit per acre to one unit per 20 acres; 229 acres from one unit per acre to one unit per five acres; 1,946 acres from one unit per two acres to one unit per five acres; and 307 acres from one unit per five acres to one unit per 20 acres. This is a total of 2,500 acres downsized within the two shellfish protection districts. Contact: Scott Clark (County) 709-3005.</td>
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<td><strong>Cluster development ordinances:</strong> The Board has adopted an interim ordinance not allowing density bonuses for rural cluster developments. In 2008 a revised cluster development ordinance will be adopted. Contact Scott Clark 709-3005.</td>
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<td>Below are responses by the jurisdictions representatives: <strong>County:</strong> This should be considered in the Low Impact Development Ordinance for Thurston County. See #1 above. <strong>City of Lacey:</strong> Lacey’s current (1994) drainage manual specifies that all projects on sites with infiltration rates of 0.5 inches per hour or greater must infiltrate at least a portion of it, and sites with infiltration rates of six inches per hour or more must infiltrate 100% of the 100-year storm volume. If the infiltration rate is zero, and there is no reasonable alternative, there is no choice but to detain runoff and release it on the surface at the pre-development rate.</td>
<td>Lacey and the county need to adopt the revised stormwater manual. Further protections may be accomplished through work of the LID steering committee and implementation of Land Use recommendations.</td>
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<td>Recommendation 2 b (cont.)</td>
<td>This requirement could be included in the drainage manual as a new, more restrictive standard. However, inclusion in the drainage manual would require directive from electeds (city and county). Political will on a controversial issue – private property owners will object to restriction since alternatives are not yet proven / developed (LID standards and quantified positive impacts for shellfish issues lacking). Also, in the special case of steep slopes this approach is contradictory to the current approach by allowing development to pipe stormwater off-site for infiltration.</td>
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<td>City of Olympia: Olympia Zoning Development Standards provides the Green Cove Creek watershed’s low-impact development requirements. Approved by the City Council, the regulations require new developments to reduce sidewalks and streets, retain large treed areas, and fully disperse stormwater onsite. Olympia’s stormwater manual requires that the pre-development (forested condition) rate and duration of stormwater discharges be matched/not be increased, for frequencies ranging from 1/2 the 2-year event to the 50-year event. This provides excellent stream protection against streambank and channel erosion (for medium to large rain events). This protection level is the same as prescribed by Ecology in 2005.</td>
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<td>c. Require higher standards for OSS (On Site Septic System designs).</td>
<td>Article IV: Rules and Regulations of the Thurston County Board of Health – Governing Disposal of Sewage contains provisions to design OSS based on soil type. Article IV is also going through a revision. Olympia has essentially prohibited permitting of new OSS within its jurisdiction.</td>
<td>No further action required.</td>
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<td>3. Educate or regulate homeowners, recreational users, and businesses to dispose of pet waste and diapers properly, detect and correct overflowing septic systems, and identify and eliminate other sources of bacteria.</td>
<td>Olympia continues to implement broad and targeted environment evaluation programs as well as illicit discharge detection and water quality monitoring programs. TCD has aired several public access (TCTV) television shows and hold at least one workshop annually on water quality/agriculture. EHD/W&amp;WM (Water and Waste Management) in 2003 developed a new pet waste brochure and poster for distribution to the general public. In 2004 thirty posters and 10,000 brochures were distributed by EHD, W&amp;WM, PSI (Pacific Shellfish Institute), and Animal Control. Posters and brochures will be printed and distributed to 50 sites in 2005 by PSI. Funded by the Shellfish Protection Fund. This activity has continued through 2007. PSI delivered presentations on impact of dog waste to neighborhood associations and the Community Shellfish Farm. PSI distributed pet waste brochures and collect pledges at community events using Scooby-Doo, the mascot. Funded by the Shellfish Protection Fund. EHD reviewed Henderson and Nisqually publicly accessible shorelines to determine need for signs or facilities for dog waste disposal. Two dog waste disposal signs were installed at Odd Fellows Park and two at Luhr Beach with a brochure dispenser (both in Nisqually SPD). Funded by the Shellfish Protection Fund. The County W&amp;WM Storm and Surface Utility provided 14 “Don’t Let Your Pooch Pollute” signs and bag dispensers to Home Owners Associations (HOA) and property management companies all of which were installed in the Henderson Inlet watershed. City of Lacey Water Resources installed 25 such signs, minus bad dispensers in the Henderson Inlet watershed (2007).</td>
<td>Continue education programming at current levels. Action will continue depending on available funding</td>
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<td>Recommendation 3 (continued)</td>
<td>The Watershed Pledge Program (see Septic Recommendations) applies to this element. South Sound GREEN and Nisqually River Education Project included in their 2002/03 school year activities to bring a greater awareness of shellfish issues. These activities included: - Two major water quality bacteria monitoring events throughout South Sound. - Bacteria monitoring every month at nine stations by River Ridge, Yelm, and Timberline High School students. - The annual GREEN Student Congress includes the topic of shellfish bed downgrades in their data analysis. An afternoon workshop is offered about nearshore ecology and pollution sources, such as pet waste. - Students assisted in streamside revegetation projects. - South Sound GREEN sponsors Students, Shellfish &amp; the Shore at the Community Shellfish Farm. This program provides for 10 nearshore education field trips where students have an opportunity to sign the Scoopy Doo Pet Waste Pledge, two long-term studies by high school seniors related to Puget Sound health, two action projects to improve / maintain riparian / shoreline habitat, distributing 500 magnets / pencils for outreach to families, and maintenance / monitoring of restoration sites. - The Summer Teacher Institute, offered in June each year, deals with watershed protection issues. For South Sound GREEN contact Anne Milles (TCD) 754-3588 ext. 108 Contact Kathy Whalen (TCD) 754-3588 ext. 114 and Rachael Laderman (EHD) 754-4111 ext. 7244 and Mary Middleton (Pacific Shellfish Institute) 754-2741</td>
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<td>Recommendation 3 (continued)</td>
<td>Puget Sound Restoration Fund hosts the 10 annual educational tours for students at the Community Shellfish Farm and provides a live demonstration of shellfish farming techniques and instruction on the water quality conditions that are needed to sustain shellfish harvesting in Henderson Inlet. A laminated fact sheet has been developed for tour participants that include specific suggestions for reducing bacterial contamination. PSRF also installs shellfish gardens on private tidelands up and down the Inlet in order to actively engage shoreline property owners in reducing potential sources of bacterial contamination that may run off into Henderson Inlet. First-hand experience of shellfish farming at the Farm or on one’s own tidelands provides an added incentive to keep Henderson Inlet clean by improving one’s own practices and supporting local government programs designed to reduce bacterial contamination. Contact Betsy Peabody at 206.780.6947 or Mark Fischer 866.8960.</td>
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<tr>
<td>4. Educate and provide supplies for pet waste management at private stormwater ponds.</td>
<td>EHD/W&amp;WM and cities have held 8 stormwater pond maintenance workshops where the attendees learn of the negative impacts of dog waste to stormwater quality (2004). EHD/W&amp;WM created and posted two signs at Woodland Creek Community Park and a dog waste disposal station with dog waste bags at Lake Lois Park (2004). The cities and county have adapted the EHD sign and now offer the sign and optional bag dispensers to interested Homeowners Associations and homeowners for posting in common areas, planter strips, etc. In 2004, the County Stormwater Utility installed seven “don’t let your pooch pollute” signs, six of which have bag dispensers, at homeowner green spaces within Henderson Inlet. County</td>
<td>Consider expanding program to include more subdivisions in the two watersheds.</td>
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<td>Recommendation 4 (continued)</td>
<td>Stormwater Utility newsletter will continue to promote installation of dog waste signs. In 2007 more than 50 “don’t let your pooch pollute” signs were installed in neighborhoods and subdivisions. The utility public outreach program for private stormwater facilities in the rural area includes 2 workshops each year. Contact: Chris Maun (W&amp;WM) 357.2491 ext. 6377. City of Olympia installing new signage at residential stormwater ponds.</td>
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# AGRICULTURE RECOMMENDATIONS

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<tr>
<td>1. Enforce current agricultural regulations.</td>
<td>EHD will continue to investigate agriculture related water quality complaints. EHD works with the TCD to track landowners’ progress in developing and implementing resource management plans for those properties in violation of Article VI, Thurston County Nonpoint Source Pollution Ordinance. TCD responds to referrals from EHD, meets with the landowners, recommends corrective action, and/or prepared conservation plans for the land owners, and transmits the recommendations back to EHD. Currently enforcing the Thurston County Non-Point Ordinance, which is complaint driven. Staff contact: Kathy Whalen (TCD) 754-3588 ext. 114 and Sue Davis (EHD) 754.4111 ext.7316.</td>
<td>Need to continue at current level.</td>
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<tr>
<td>2. Review whether current regulations are enforceable</td>
<td>EHD reviewed that language in Article VI, the county’s non-point source pollution ordinance that pertains to pollution from livestock and animal waste. While there are some sections that could be updated or clarified, it is fairly effective tool as written.</td>
<td>Language changes were drafted and will be considered for adoption in the future.</td>
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<td>3. Conservation District will follow up on Conservation Plans and work with landowners on the implementation of best management practices (BMPs).</td>
<td>TCD will start work on a 3-year DOE Clean Water Fund grant in the Shellfish Protection Districts in January 2008. Farms located along streams and shorelines are being specifically targeted under this grant, however other upland farms will also receive assistance. Cooperators may receive conservation planning assistance, best management practice (BMP) implementation assistance/guidance. Any cooperators who previously developed conservation plans with the District will also receive assistance in implementing BMPs that were suggested in their plans. Funding is available from the TCD for the implementation of BMPs that address water quality issues through the Shellfish District Fund and the above DOE grant. Contact: Kathy Whalen (TCD) 754-3588 ext. 114.</td>
<td>Need to continue at current level.</td>
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**AGRICULTURE RECOMMENDATIONS**

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<tr>
<td>4. Hold workshops that address topics such as composting of manure, pasture management, etc</td>
<td>TCD has conducted six agricultural workshops in the Nisqually and one in the Henderson watersheds. Furthermore, the TCD has hosted three tours to sites in Henderson and Nisqually Shellfish Protection Districts. Contact: Kathy Whalen (TCD) 754-3588, ext. 114</td>
<td>Need to continue at current level.</td>
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<tr>
<td>5. Develop a program that would assist non-commercial farms that have livestock, but limited acreage and manure storage. This program would have a pickup service that would take the manure to a centralized composting area.</td>
<td>TCD continues to maintain a manure-brokering list that identifies farms that give away or sell manure. Brian Thompson (TCD) 754-3588, ext. 137.</td>
<td>Need to continue at current level.</td>
</tr>
<tr>
<td>6. Set up an on-going maintenance program for private and publicly owned tide gates in the McAllister Creek watershed (Nisqually SPD).</td>
<td>WSDOT (Washington State Department of Transportation) owns the publicly owned tidegates and are responsible for their maintenance.</td>
<td>Defer to TMDL (Total Maximum Daily Load) process to determine the need for (benefit of) implementation.</td>
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<tr>
<td>7. Set up guidelines to determine the appropriate number of animals per acre.</td>
<td>TCD provides to property owners a fact sheet that recommends animal densities base on soil, farm animal and other considerations. NRCS also provide technical assistance to farmers to determine what animal density is best. Contact: Kathy Whalen (TCD) 754-3588, ext 114.</td>
<td>No further action needed.</td>
</tr>
<tr>
<td>8. Develop and implement an ongoing program of water sampling of ditches and streams near farms to track the progress of best management farm practices.</td>
<td>TCD, EHD and DOE are reviewing the need for a monitoring study along portions of the McAllister Creek. DOE will conduct the monitoring.</td>
<td>As part of the TMDL process, TCD, EHD, and DOE (Ecology) should review need for and recommend, as needed, a program for ongoing monitoring.</td>
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<td>9. Reward landowners who do a good job with their farm practices.</td>
<td>The CREP (Conservation Reserve Enhancement Program) established by NRCS (Natural Resource Conservation Service) takes effect in 2004. This program will reward landowners who have installed conservation practices. TCD will proactively inform qualified property owners of this program. Contact: Mike Kuttel (TCD) ext. 118. TCD has a reward program in the Watershed Pledge Program, in which landowners receive a sun catcher when they have implemented action items. Furthermore, the District recognizes these folks at the District’s Open House event. Beginning in 2008, landowners that are doing well will be featured on the District’s website. TCD re-established their landowner recognition program for Thurston County. Awards were presented at the District’s Annual Open House. Contact Kathy Whalen (TCD) 754.3588 ext. 114.</td>
<td>Need to continue at current level.</td>
</tr>
<tr>
<td>10. Provide information on alternative sources of organic fertilizer for organic growers. (Nisqually SPD).</td>
<td>TCD currently provides information concerning alternative sources of organic fertilizer.</td>
<td>TCD should review potential water quality benefit, and if warranted, include this in development of farm plans and BMP recommendations.</td>
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<tr>
<td>11. Provide for WCC (Washington Conservation Corps) crews to assist landowners implementing farm practices such as fencing and creating riparian buffer areas. (Henderson SPD)</td>
<td>In 2004, the TCD has funded the WCC crew to assist landowners on four projects. The TCD is now without a WCC crew due to increasing program costs. Currently, labor/crew assistance can usually be arranged for private landowners on a case-by-case basis.</td>
<td>Continue to find replacement work crew.</td>
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<tr>
<td>12. Work with realtors to educate new property buyers on farm practices that protect water quality. (Henderson SPD)</td>
<td>TCD participates in the WSU (Washington State University) Extension Service program that provides in-service training to realtors on agricultural issues, as requested by WSU.</td>
<td>Need to continue at current level.</td>
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<td><strong>Summary Recommendation</strong></td>
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<td>13. Continue to encourage WSDOT to move McAllister Creek back to its original channel. (Nisqually SPD)</td>
<td>Need to assess the feasibility of this recommendation.</td>
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<tr>
<td>14. Require all agriculture lands with livestock to manage buffers along streams and rivers to reduce bacterial loading. (Henderson SPD)</td>
<td>TCD manages the Conservation Reserve Enhancement Program (CREP) that provides financial assistance to landowners to plant buffers and construct fences. The County’s Non-Point Ordinance already includes this provision (Section 4.2 (a).</td>
<td>Need to continue at current level.</td>
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<tr>
<td>15. Provide support and funding for the development and continuation of a Community Shellfish Farm that will promote community involvement and public awareness of water quality issues that effect shellfish harvesting. (Henderson SPD)</td>
<td>The Commissioners (County) and Supervisors (TCD) have continued to include the Community Shellfish Farm in the Shellfish Protection Fund annual work program. As an additional component of the education and public outreach program, Puget Sound Restoration Fund is giving away community-grown oysters to residents who have obtained an operational certificate as part of Thurston County’s new O&amp;M program. The oyster give-aways, begun in 2007, provide incentives for homeowners to improve their practices and give residents a chance to enjoy the fruits of clean water. Puget Sound Restoration Fund hosts the 10 annual educational tours for students at the Community Shellfish Farm and provides a live demonstration of shellfish farming techniques and instruction on the water quality conditions that are needed to sustain shellfish harvesting in Henderson Inlet. A laminated fact sheet has been developed for tour participants that include specific suggestions for reducing bacterial contamination. PSRF also installs shellfish gardens on private tidelands up and down the Inlet in order to actively engage shoreline property owners in reducing potential sources of bacterial contamination that may run off into Henderson Inlet. First-hand experience of shellfish farming at the Farm or on one’s own tidelands provides an added</td>
<td>Financial support of the Community Shellfish Farm through Shellfish Protection Funds should continue.</td>
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<td>Recommendation 15 (continued)</td>
<td>incentive to keep Henderson Inlet clean by improving one’s own practices and supporting local government programs designed to reduce bacterial contamination. Contact Betsy Peabody at 206.780.6947 or Mark Fischer 866.8960. TCD produced a television program on TCTV on the shellfish issue and highlighted the Community Shellfish Farm. TCD hosted a community leaders’ tour of the Henderson watershed and the Community Shellfish Farm in 2004 and again in 2006. South Sound GREEN has a cooperative project going on with the Community Shellfish Farm. See Stormwater Recommendations #3 for details.</td>
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<td>16. Locate drainage tiles and adjust agriculture practices near them that protect water quality. (Nisqually SPD).</td>
<td>TCD – no action on this recommendation. Funding and the inability to locate information on the location of the tiles have prevented the TCD from getting moving forward with this recommendation.</td>
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<td>17. Assist farmers in building composting and manure storage facilities by obtaining funding resources. (Nisqually SPD)</td>
<td>The EQIP Program established by NRCS provides cost share funding for manure storage facilities. Contacts: Jeff Swotek (NRCS) 704-7750. TCD notifies landowners of the availability of this program and funding. They have also advertised in the Nisqually Valley News and The Olympian newspapers. TCD has funding available for riparian planting and fencing. Contact: either Kathy Whalen or Mike Kuttel (TCD) 754.3588. Need to continue at current level.</td>
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## LAND USE RECOMMENDATIONS

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<td><strong>1. Require new development to meet Low Impact Development (LID) Standards in the areas of the district zoned 1 unit per acre or higher and are most prone to stormwater run-off.</strong>&lt;br&gt;a. Identify locations where LID Standards have practical application using criteria such as soil types, vegetation, and proximity to sensitive resources.</td>
<td>Olympia requires single-family in-fill development to achieve full dispersion of stormwater onsite using certain low-impact techniques, such as pervious pavements, roof water infiltration, compost-amended soils, and rain gardens consistent with WDOE requirements.&lt;br&gt;Lacey has adopted LMC 14.31, which provides those developing land the opportunity to demonstrate zero effective impervious surfaces and provides the opportunity to identify and evaluate potential substantive changes to land use development regulations which support and improve natural functions of watersheds. Furthermore, the City is in the process of working with consultants with the Puget Sound Action Team to develop an action plan to promote or require LID standards.&lt;br&gt;Thurston County has created a LID Steering Committee to assist in the development of an action plan to create a LID Ordinance for Thurston County. The SPD is represented on the LID Steering Committee. Contact Scott Clark 709-3005 or Mark Swartout 709-3079.</td>
<td>Defer to the work of the LID steering committee to identify where LID is needed based on soil types, proximity to surface waters, etc.&lt;br&gt;Track ongoing regional and national research on LID techniques. Incorporate into local development standards as appropriate.</td>
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<td>b. Immediately institute interim standards requiring 100% infiltration for development in areas based on soil type, proximity to sensitive areas, and areas zoned 1 residential unit per acre or higher while LID Standards are developed.</td>
<td>The County will need to take this to the Board for consideration through the LID considerations.&lt;br&gt;Need to determine whether this recommendation applies to the urban and urban growth areas.</td>
<td>County: Defer to the work of the LID steering committee to identify where LID is needed based on soil types, proximity to surface waters, etc.&lt;br&gt;See Stormwater recommendation 2 b.</td>
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<td>c. Request the City of Lacey to require LID in the northern area of the city boundaries in the Hawks Prairie Planned Community located near the marine shoreline of the Nisqually Reach.</td>
<td>Hawks Prairie Planned Community is already planned. The development plan has been approved for years (though all parcels haven’t yet been platted). Planners feel that we would not have any legal standing to impose this requirement at this point in the process. Also, as mentioned, LID standards have not been proven nor developed, and developers cannot be required to implement standards that don’t yet exist. The marine shoreline is a small portion of the planned community and is currently low density – 0-4 residents per acre. Developers can certainly be encouraged, educated to use LID techniques.</td>
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| 2. Develop regional LID standards: | County: The County’s LID Steering Committee is assessing the feasibility of regional standards. The results of their work will be forwarded to the BoCC for consideration.  
City of Lacey: City staff has been involved in an ongoing project with environmental consultants to determine appropriate steps necessary for implementing LID standards. Where appropriate, the voluntary implementation of LID, such as pervious parking areas, has been utilized.  
City of Olympia: Olympia’s staff and elected officials have shown interest in low-impact development requirements. Staff has worked with an Ecology committee to evaluate practices and has been encouraging LID technique use where appropriate. Staff has conducted test pours of several porous concrete products, and has demonstrated several sidewalk cleaning machines (which would maintain the porous surfaces). LID techniques are included in the revised stormwater manual. | Need to identify a process to coordinate LID standards across jurisdictions. |
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| 3. Declare an emergency down zone of 1 unit to 2 acres for rural areas that are currently zoned 1 unit to 1 acre within the shellfish protection district before further development occurs, and codify the down zone during the comprehensive plan update. (Nisqually SPD) | **Zoning Changes:** The county revised its zoning in the Districts in 2007. Limited Areas of More Intensive Rural Development (LAMIRDs) changed 18 acres from one unit per acre to one unit per 20 acres; 229 acres from one unit per acre to one unit per five acres; 1,946 acres from one unit per two acres to one unit per five acres; and 307 acres from one unit per five acres to one unit per 20 acres. This is a total of 2,500 acres downzoned within the two shellfish protection districts. Contact: Scott Clark 709-3005.  
**Cluster development ordinances:** The Board has approved an interim ordinance (PRRD) not allowing density bonuses in rural developments. The Board may be adopting a revised Cluster Development Ordinance in 2008.  
The “emergency” down zone is not being considered at this time and would need Board directive. To implement this recommendation further site-specific evaluation will need to occur to predict the impacts of bacteria loading to the marine waters. This evaluation will need to consider the natural runoff characteristics including slope, soils, vegetative cover, and effective impermeable surface to name a few. | No further action needed. |
| 4. Update current CAO (Critical Areas Ordinance) using best available science to provide adequate buffers that will remove bacteria from surface water. | The Best Available Science states that generally 100’ to 141’ buffers are sufficient to remove bacteria from surface flows.  
**County:** Updating its CAO (Critical Areas Ordinance) using Best Available Science. A draft CAO had a public hearing by the Planning Commission hearing in early-mid 2005. The Planning Commission continues to work on it but is subjected to other work program priorities.  
Contact County, Scott Clark 709-3005.  
**Olympia:** Olympia’s CAO provides such buffers. | SPD should review draft CAO upon its completion to determine whether the intent of this recommendation has been met. |
## LAND USE RECOMMENDATIONS

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<td>5. Use the Special Management Area provisions of the Critical Areas Ordinance in the unincorporated and rural areas of the Shellfish Protection Districts to: (Henderson SPD)</td>
<td>The revised CAO won’t include a Special Management Area provision.</td>
<td>Protections may be accomplished through work of the LID steering committee and implementation of other Land Use recommendations.</td>
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<tr>
<td>a. Develop stricter development standards.</td>
<td>The recommendation to develop stricter development standards and retain a 65-70% tree canopy applies to the zoning ordinance. An application will need to be submitted to have this placed on the docket for consideration. Contact: Scott Clark 709-3005.</td>
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<tr>
<td>b. Retain at least 65-70% tree canopy.</td>
<td>The revised CAO will most likely have greater setbacks for new development than the current regulation. Contact: Scott Clark 709-3079</td>
<td>SPD should review draft CAO upon its completion to determine whether the intent of this recommendation has been met.</td>
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<td>c. Increase setbacks from shoreline.</td>
<td></td>
<td>Need to continue at current level.</td>
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<tr>
<td>d. Set higher septic system standards.</td>
<td>The recommendation to set higher septic system standards are being addressed above in the Septic System section.</td>
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<td>6. Recommend wording change to Comprehensive Plan Chapter #3 – Natural Resource Lands – Propose Policy (Aquaculture Resources - #3). (Nisqually SPD only)</td>
<td>This was completed in 2003</td>
<td>No further action needed.</td>
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<td>Proposed Policy – Uses of lands that are adjacent to designated marine aquaculture areas should be compatible, such as forestry and low density rural residential. Those uses should not increase stormwater runoff or otherwise degrade water quality of aquaculture use.</td>
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<td>7. Natural Environment Chapter 9 should address not only commercial and recreational</td>
<td>This was completed in 2003</td>
<td>No further action needed.</td>
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<td>shellfish on public lands but also shellfish harvest on private lands. (Nisqually SPD)</td>
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<td>8. Continue program to purchase land and build regional stormwater facilities in</td>
<td>County: In 2004 stormwater treatment and flood elimination project is being constructed for the Thompson Place area,</td>
<td>No further action needed beyond current level, unless TMDL process identifies specific</td>
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<td>developed areas to meet newly revised stormwater retention standards as the opportunity</td>
<td>in the Woodland Creek basin. Mallard Pond (McAllister basin) improvements were completed in 2007. The goal is to improve</td>
<td>needs not currently included in local jurisdiction CIPs.</td>
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<td>arises. (Henderson SPD)</td>
<td>water quality, flood and erosion control to Little McAllister Creek. These projects were among the priority projects as</td>
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<td>determined by competitive rating process. Water and Waste Management was successful in obtaining a</td>
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<td>$750,000 grant for the Tanglewild neighborhood. The grant and matching funds will be used to retrofit existing stormwater</td>
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<td>drywells, install bioswales and raingardens, and provide education to the community on the impacts of stormwater</td>
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<td>entering Woodland Creek.</td>
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<td>City of Lacey: On-going - Lacey and Olympia previously completed the Fones Road Regional Stormwater Treatment</td>
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<td>Facility. Lacey has partnered with the St. Martin’s Abbey and has recently made operational the College Ditch</td>
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<td>Regional Stormwater Facility, which will collect and treat stormwater from approximately 400 acres of incorporated</td>
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<td>areas.</td>
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<td>City of Olympia: Two new ponds are in-place and functioning on the Fones Road Ditch, a headwater tributary to</td>
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<td>Woodard Creek. The facilities treat South Sound Center and Pacific Avenue stormwater, and are jointly managed by</td>
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<td>Lacey and Olympia. Additional projects will be pursued as appropriate.</td>
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<td>9. Use funding sources such as the Conservation Futures Fund to: (Henderson SPD).</td>
<td>a. Purchase of shoreline properties, if possible; or b. Purchase development rights or conservation easements from willing sellers. This is an effective tool to permanently protect valuable wildlife riparian areas as well as protect water quality from further degradation.</td>
<td>Funding sources beyond Conservation Futures should be pursued. Criteria need to be developed to assist in identifying appropriate properties.</td>
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<td>The Conservation Futures program allows this sort of acquisition but needs to compete with other proposed projects each year. If anyone knows of property that meets this criteria they will need to fill out a Conservation Futures Project Form. The proposed project will then compete against others during each cycle. Contact: Mark Swartout (DSD) 360.709.3079.</td>
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</table>
| 10. Increase enforcement of current land use regulations and institute adequate penalties to remove incentives to ignore the regulations. (Henderson SPD) | County: In 2003 the County created a five-person compliance section to increase enforcement of land use, building codes, and onsite septic systems regulations. The compliance section is authorized to issue civil infractions as needed. The penalty amounts are adequate at this time. Contact Guy Jacques 754-3355 ext. 6875  
City of Lacey: Lacey has a full-time enforcement officer. Still, even with a dedicated enforcement officer, it is difficult to catch violations before they are committed. On-going education – like consistent welcome packets and occasional reminders about land clearing restrictions – is essential.  
City of Olympia: Olympia has full-time land use and full-time environmental code enforcement officers. Code enforcement has been a City Council priority, and recent results have been deemed satisfactory. The City has enhanced its website with email complaint forms. |                                                                                                                                                                              |
## LAND USE RECOMMENDATIONS

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<td>11. Promote proactive assessment of streams and marine shorelines for buffer zone and other land use violations. (Henderson SPD)</td>
<td>Same as above #10.</td>
<td>Reassess the feasibility of this recommendation and refine if needed.</td>
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</table>
| 12. Educate stream and marine shoreline owners regarding the function and value of buffers of native vegetation dominated by mature conifers. Provide incentives and/or technical assistance to property owners interested in protecting and/or re-establishing native shoreline buffers. (Henderson SPD) | **County:** During the fall 2004, Native Plant Salvage Project, South Sound GREEN and Thurston County Storm and Surface Water Utility completed a project to restore the shoreline along Henderson Inlet at Harmony Farms (a Capital Land Trust easement property). Komachin Middle School students planted 300 native shrubs and conifers to help stabilize the habitat. Contact Anne Mills at Thurston Conservation District 754-3588 ext. 108.  
**City of Lacey:** Is continuing its Plant Grant program for streamside property owners along Woodland Creek to help reestablish riparian buffers. The City is continuing to revegetate along Woodland Creek Community Park. Contact: Tim Wilson (Lacey) 360.438.2687  
**City of Olympia:** Olympia has funds and work crews available to purchase and plant riparian vegetation. This action will also be included in the TCD and EHD watershed pledge program described earlier. | Need to continue at current level. |
## WILDLIFE

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<td>Fully address human and domestic animal source pollution (as recommended in other sections) and take remedial actions. If water quality does not improve, further investigate wildlife source pollution through following steps:</td>
<td>There are activities throughout this report to help fully address human and domestic animal source pollution. Environmental Health completed a DNA-typing study of E. coli bacteria for the McAllister Creek area in July 2004. The study helps identify the sources of bacterial pollution in the creek and Nisqually Reach. The results were presented to the Board of Health in June 2004, and to the shellfish committee in July 2004. A DNA study was also performed for Henderson Inlet and showed similar results.</td>
<td>As the recommendations are implemented a determination will need to be made whether wildlife is a significant contributor and what can be done to address it.</td>
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<td>1. Identify possible areas of wildlife concentrations and seasonal usage of sites.</td>
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<td>2. Develop strategies to identify species that contribute most to fecal coliform contamination.</td>
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<td>3. Monitor over a significant period of time the wildlife populations and any increase in populations in areas of greatest fecal contamination.</td>
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<td>4. If a direct correlation can be made between high fecal counts and specific species, formulate a remediation plan.</td>
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<td>5. Continue research and publication reviews on source identification methods.</td>
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<td>6. Explore new technologies and other techniques to lower fecal coliform levels such as mycoremediation and riparian zone revegetation.</td>
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# ADAPTIVE MANAGEMENT

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<td><strong>Adaptive Management Work Plan (Nisqually SPD)</strong></td>
<td>Data from current and past water quality sampling efforts that are part of the Clean Water Act TMDL process and ongoing WDOH (Washington Department of Health) shellfish area monitoring will be used as benchmarks to help measure success.</td>
<td>An adaptive management strategy will need to be developed once the TMDL process is completed and as major categories of recommendations are approved and implemented.</td>
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<td>See Part III of this report.</td>
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</table>

The implementing agencies will cooperate to develop an adaptive management strategy, and will use and refine it on a regular basis. The strategy will be consistent with WAC 365-195-900, which requires local governments to use adaptive management to protect critical areas (such as surface waters) when the best available science is inadequate. The strategy will also be consistent with local government, state, and federal goals and objectives. Changes in implementing agency work plans resulting from adaptive management will likely have budgetary impacts. As assignments change, both budget and funding must change. Therefore, adaptive management will also need to consider mechanisms to adjust income (such as shellfish district or stormwater utility fees) to provide necessary funding.

Adaptive Management Work Plan for implementing agencies: (Henderson SPD only)

1. Cooperate to develop an adaptive management strategy. The strategy will be consistent with federal, state, and local requirements.
2. Support monitoring programs needed to obtain environmental and performance-related data and information. Programs may target specific stream reaches or discharges, quality indicators, or runoff conditions.
3. Coordinate with government agencies or community based groups to assess data and measure performance.
4. Share information with the public and consider their feedback in revising programs.
5. Use data, assessments, and feedback to evaluate and modify programs, thereby improving predictability, efficiency, and cost-effectiveness, while working toward achieving bacteria standards.
## GOVERNANCE

<table>
<thead>
<tr>
<th>Summary Recommendation</th>
<th>Work being done to implement the recommendations</th>
<th>Additional work needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Oversight Committee: The stakeholders have determined that it is important that there be some form of continued citizen involvement during Phase 2 (implementation). It is recommended to combine the two shellfish district stakeholder groups into one committee for both. Their role would be to advise the Board of County Commissioners and City Councils, assist in developing a Phase 2 implementation work plan, and to track completed actions with effectiveness in improving water quality. They should meet only when necessary and each year the Board of County Commissioners will evaluate whether to continue the committee.</td>
<td>This action item is being implemented. The two district stakeholder groups have been combined. The Board of County Commissioners agreed that their role is to advise them on actions needed to address the water quality that is impacting shellfish beds. The joint stakeholder group is currently working on a Phase 2 implementation work plan. The joint group served as the core for an advisory group to develop a framework for the Risk Based Operation and Maintenance On-Site Sewage Program (addressing one of the recommendations above). The combined district stakeholder group will continue contingent on available funding.</td>
<td></td>
</tr>
<tr>
<td>Boundary (Nisqually SPD): The stakeholder group recommends the District boundary be reestablished based on surface water that influences the water quality of the shellfish beds in the Nisqually Reach and McAllister Creek areas. The new boundary should be determined using the most current topographical technology and information.</td>
<td>This issue has yet to be resolved. This issue will most likely be discussed at the time of implementation of a risk-based O&amp;M program for on-site sewage systems or at a time when implementing a recommendation will require an accurate assessment of what parcels should be included. Consideration should be made on whether the boundary should be changed or whether any new program should apply to a smaller number of property owners within the boundaries (e.g. the septic program). This may result in keeping the boundary but designating where the limited number of properties the program applies.</td>
<td>Recommendations for revision of the boundary should be made at the time that the proposed Risk Based O&amp;M program is considered for this watershed.</td>
</tr>
</tbody>
</table>
### GOVERNANCE

<table>
<thead>
<tr>
<th>Summary Recommendation</th>
<th>Work being done to implement the recommendations</th>
<th>Additional work needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boundary (Henderson SPD): The boundary for the Henderson Inlet Shellfish Protection District was based on using past basin planning areas with the intention that the stakeholder group would review and make recommendations as part of their final report. The stakeholder group is recommending that the District boundary be reestablished based on surface water runoff from land within the current District boundary that influences the water quality of the shellfish beds in Henderson Inlet, taking into consideration the travel time needed for viable fecal coliform bacteria to reach the Inlet. The new boundary should be determined using the most current topographical technology and information.</td>
<td>The District boundary has not changed. The Risk Based O&amp;M (Operation and Maintenance) On-Site Sewage Program implementation area is a smaller of the District. The area includes the marine shorelines and uplands that have direct influence of bacteria loading in the inlet. Consideration should be made on whether the boundary should be changed or whether any new program should apply to a smaller number of property owners within the boundaries (e.g. the septic program). This may result in keeping the boundary but designating where the limited number of properties the program applies.</td>
<td></td>
</tr>
</tbody>
</table>
Part II

Water Quality Monitoring Data
PREPARED BY: Lawrence Sullivan, Public Health Advisor

AREA: Henderson Inlet

YEAR ENDING: December 31, 2007

CLASSIFICATION: Approved, Conditionally Approved, Prohibited

ACTIVITIES IN THE GROWING AREA IN 2007:

Samples were collected monthly from Henderson Inlet. Six of these sample events were conducted while the “conditionally approved” portion of the growing area was in open status in accordance with NSSP SRS criteria. The “conditionally approved” area was closed to commercial harvest for a total of 79 days in accordance with the current management plan requirements for a 5-day closure following a 24-hour rainfall accumulation of 0.5 inch or more. A shoreline survey was completed in the area. No direct or indirect impacts that would change the classification of the shellfish area were identified. A copy of the shoreline survey report is contained in the Henderson Inlet growing area file.

ANALYTICAL RESULTS OF WATER SAMPLES:

Table #1 summarizes the most recent 30 samples collected from each of the “conditional” area stations when the area was open to harvest under the current management plan. Table #1 shows that all stations in the “conditionally approved” area pass the NSSP water quality standard however station #190, #195, and #197 are of concern due to elevated bacteria levels.

Table #2 summarizes the most recent 30 samples collected from each of the “approved” and “prohibited” area stations.

All stations in the “approved” portion of Henderson Inlet pass the NSSP water quality standard, however station #193 is threatened due to elevated bacteria levels. Station #203 is of concern due to elevated bacteria levels. Individual sample results for station #193 are shown in Table #3.

CHANGE IN ACTUAL POLLUTION SOURCES THAT IMPACT THE GROWING AREA:

We have no information indicating the presence of new pollution sources in the area.
CLASSIFICATION STATUS:

- Well within the classification standards
- Meets standards but some concerns
- x Meets standards but threatened with a downgrade in classification
- Fails to meet classification standards

REMARKS AND RECOMMENDATIONS:

Henderson Inlet is on the 303d list for fecal coliform. The Approved, Conditionally Approved and Prohibited areas in Henderson Inlet are correctly classified. Water quality results collected in December of 2007 indicate that an emergency closure during extreme rain events should be considered for Henderson Inlet.

MANAGEMENT PLAN EVALUATION – BRIEFLY DESCRIBE THE FOLLOWING COMPONENTS:

1. Have all parties involved complied with the conditions in the management plan
   Yes

2. Has reporting been adequate to manage the conditional area
   Yes

3. Does the area consistently meet approved area criteria when it is open for harvest
   Yes

4. Has a field inspection of critical pollution sources been conducted
   Yes
Table 1

**SUMMARY OF MARINE WATER DATA (SRS)**

Growing Area: **HENDERSON INLET**

Classification: **Conditionally Approved**

From **05/21/2004** To **09/06/2007**

**Fecal Coliform Organisms/100 ML**

Rainfall Information is **Day 0** for 4 days prior between **0.00** and **0.49**

<table>
<thead>
<tr>
<th>Station Number</th>
<th>Classification</th>
<th>Number of Samples</th>
<th>Range</th>
<th>Geometric Mean</th>
<th>Est. 90th Percentile</th>
<th>Meets Std.</th>
</tr>
</thead>
<tbody>
<tr>
<td>190</td>
<td>Conditionally Approved</td>
<td>30</td>
<td>1.7 - 49.0</td>
<td>7.3</td>
<td>29.0</td>
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</tr>
<tr>
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<td>Conditionally Approved</td>
<td>30</td>
<td>1.7 - 49.0</td>
<td>5.3</td>
<td>19.0</td>
<td>Yes</td>
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<tr>
<td>194</td>
<td>Conditionally Approved</td>
<td>30</td>
<td>1.7 - 49.0</td>
<td>4.3</td>
<td>14.0</td>
<td>Yes</td>
</tr>
<tr>
<td>195</td>
<td>Conditionally Approved</td>
<td>30</td>
<td>1.7 - 49.0</td>
<td>6.7</td>
<td>26.0</td>
<td>Yes</td>
</tr>
<tr>
<td>196</td>
<td>Conditionally Approved</td>
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<td>1.7 - 17.0</td>
<td>3.3</td>
<td>8.0</td>
<td>Yes</td>
</tr>
<tr>
<td>197</td>
<td>Conditionally Approved</td>
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<td>1.7 - 33.0</td>
<td>6.3</td>
<td>23.0</td>
<td>Yes</td>
</tr>
<tr>
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<td>1.7 - 49.0</td>
<td>4.3</td>
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</tr>
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<td>8.0</td>
<td>Yes</td>
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<tr>
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<td>1.7 - 46.0</td>
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<tr>
<td>201</td>
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<td>1.7 - 23.0</td>
<td>5.4</td>
<td>16.0</td>
<td>Yes</td>
</tr>
</tbody>
</table>

All tides information is presented.

The standard for approved shellfish growing waters is fecal coliform geometric mean not greater than 14 organisms/100 ml and an estimate of the 90th percentile not greater than 43 organisms/100 ml. The above table shows bacteriological results in relation to program standards.
Table 2
SUMMARY OF MARINE WATER DATA (SRS)
Growing Area: HENDERSON INLET
Classification: Approved, Prohibited, Unclassified
From 06/15/2005 To 12/05/2007

<table>
<thead>
<tr>
<th>Station Number</th>
<th>Classification</th>
<th>Number of Samples</th>
<th>Range</th>
<th>Geometric Mean</th>
<th>Est. 90th Percentile</th>
<th>Meets Std.</th>
</tr>
</thead>
<tbody>
<tr>
<td>192</td>
<td>Approved</td>
<td>30</td>
<td>1.7 - 110.0</td>
<td>4.2</td>
<td>17.0</td>
<td>Yes</td>
</tr>
<tr>
<td>193</td>
<td>Approved</td>
<td>31</td>
<td>1.7 - 350.0</td>
<td>8.5</td>
<td>42.0</td>
<td>Yes</td>
</tr>
<tr>
<td>202</td>
<td>Approved</td>
<td>31</td>
<td>1.0 - 130.0</td>
<td>5.0</td>
<td>19.0</td>
<td>Yes</td>
</tr>
<tr>
<td>203</td>
<td>Approved</td>
<td>31</td>
<td>1.7 - 240.0</td>
<td>5.7</td>
<td>26.0</td>
<td>Yes</td>
</tr>
<tr>
<td>204</td>
<td>Approved</td>
<td>32</td>
<td>1.7 - 49.0</td>
<td>3.6</td>
<td>13.0</td>
<td>Yes</td>
</tr>
<tr>
<td>205</td>
<td>Approved</td>
<td>31</td>
<td>1.7 - 33.0</td>
<td>4.6</td>
<td>15.0</td>
<td>Yes</td>
</tr>
<tr>
<td>206</td>
<td>Approved</td>
<td>31</td>
<td>1.7 - 350.0</td>
<td>3.6</td>
<td>19.0</td>
<td>Yes</td>
</tr>
<tr>
<td>207</td>
<td>Approved</td>
<td>31</td>
<td>1.7 - 49.0</td>
<td>2.5</td>
<td>6.0</td>
<td>Yes</td>
</tr>
<tr>
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<td>1.7 - 79.0</td>
<td>4.2</td>
<td>19.0</td>
<td>Yes</td>
</tr>
<tr>
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<td>1.7 - 17.0</td>
<td>2.5</td>
<td>6.0</td>
<td>Yes</td>
</tr>
<tr>
<td>698</td>
<td>Approved</td>
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<td>1.7 - 49.0</td>
<td>2.2</td>
<td>6.0</td>
<td>Yes</td>
</tr>
<tr>
<td>723</td>
<td>Approved</td>
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<td>1.7 - 79.0</td>
<td>5.0</td>
<td>33.0</td>
<td>*N/A</td>
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<td>2.0 - 1,600.0</td>
<td>27.9</td>
<td>175.0</td>
<td>No</td>
</tr>
<tr>
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<td>2.0 - 1,600.0</td>
<td>16.0</td>
<td>94.0</td>
<td>No</td>
</tr>
<tr>
<td>187</td>
<td>Prohibited</td>
<td>30</td>
<td>1.7 - 920.0</td>
<td>10.7</td>
<td>58.0</td>
<td>No</td>
</tr>
<tr>
<td>188</td>
<td>Prohibited</td>
<td>31</td>
<td>1.7 - 2,400.0</td>
<td>15.1</td>
<td>92.0</td>
<td>No</td>
</tr>
<tr>
<td>189</td>
<td>Prohibited</td>
<td>31</td>
<td>2.0 - 540.0</td>
<td>10.8</td>
<td>57.0</td>
<td>No</td>
</tr>
<tr>
<td>212</td>
<td>Prohibited</td>
<td>31</td>
<td>2.0 - 350.0</td>
<td>15.1</td>
<td>63.0</td>
<td>No</td>
</tr>
<tr>
<td>724</td>
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<td>6</td>
<td>1.7 - 130.0</td>
<td>9.9</td>
<td>64.0</td>
<td>*N/A</td>
</tr>
</tbody>
</table>

All tides information is presented

The standard for approved shellfish growing waters is fecal coliform geometric mean not greater than 14 organisms/100 ml and an estimate of the 90th percentile not greater than 43 organisms/100 ml. The above table shows bacteriological results in relation to program standards. * N/A - SRS criteria require a minimum of 30 samples from each station. ** N/A - SRS criteria require a minimum of 30 samples from each station. *
Table 3
SUMMARY OF SHELLFISH GROWING AREAS
WATER QUALITY STUDY RESULTS
Growing Area: **HENDERSON INLET**
Sampling Station Number: **193**
Classification: **Approved**

<table>
<thead>
<tr>
<th>Sample Date</th>
<th>Sample Time</th>
<th>Tide</th>
<th>Fcoli/100ml</th>
<th>Temperature</th>
<th>Salinity</th>
</tr>
</thead>
<tbody>
<tr>
<td>06/15/2005</td>
<td>08:59</td>
<td>Flood</td>
<td>7.8</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>07/12/2005</td>
<td>09:11</td>
<td>Flood</td>
<td>7.8</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td>08/10/2005</td>
<td>09:10</td>
<td>Flood</td>
<td>4.5</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>09/07/2005</td>
<td>09:25</td>
<td>Ebb</td>
<td>31</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td>10/19/2005</td>
<td>10:24</td>
<td>Ebb</td>
<td>11</td>
<td>13</td>
<td>29</td>
</tr>
<tr>
<td>11/01/2005</td>
<td>11:25</td>
<td>Ebb</td>
<td>350</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>12/20/2005</td>
<td>10:46</td>
<td>Ebb</td>
<td>7.8</td>
<td>6</td>
<td>28</td>
</tr>
<tr>
<td>01/24/2006</td>
<td>11:19</td>
<td>Flood</td>
<td>4.5</td>
<td>7</td>
<td>25</td>
</tr>
<tr>
<td>02/22/2006</td>
<td>09:30</td>
<td>Flood</td>
<td>17</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>03/07/2006</td>
<td>10:05</td>
<td>Flood</td>
<td>1.7</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>04/18/2006</td>
<td>10:48</td>
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<td>2</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>05/02/2006</td>
<td>10:21</td>
<td>Ebb</td>
<td>1.7</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>06/14/2006</td>
<td>11:43</td>
<td>Ebb</td>
<td>7.8</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>07/26/2006</td>
<td>07:50</td>
<td>Ebb</td>
<td>17</td>
<td>17</td>
<td>27</td>
</tr>
<tr>
<td>08/14/2006</td>
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<tr>
<td>09/25/2006</td>
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<td>28</td>
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<td>Ebb</td>
<td>6.8</td>
<td>13</td>
<td>29</td>
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<tr>
<td>11/12/2006</td>
<td>14:13</td>
<td>Ebb</td>
<td>2</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>12/11/2006</td>
<td>09:02</td>
<td>Flood</td>
<td>11</td>
<td>9</td>
<td>25</td>
</tr>
<tr>
<td>01/09/2007</td>
<td>10:24</td>
<td>Ebb</td>
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<td>8</td>
<td>23</td>
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<tr>
<td>02/13/2007</td>
<td>09:46</td>
<td>Flood</td>
<td>4</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>03/14/2007</td>
<td>13:29</td>
<td>Flood</td>
<td>2</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>04/10/2007</td>
<td>10:02</td>
<td>Flood</td>
<td>70</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>05/10/2007</td>
<td>11:52</td>
<td>Flood</td>
<td>1.7</td>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td>06/06/2007</td>
<td>10:27</td>
<td>Ebb</td>
<td>7.8</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>07/17/2007</td>
<td>08:49</td>
<td>Ebb</td>
<td>49</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>08/07/2007</td>
<td>12:06</td>
<td>Flood</td>
<td>7.8</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>09/06/2007</td>
<td>11:58</td>
<td>Flood</td>
<td>6.8</td>
<td>17</td>
<td>28</td>
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<td>11:54</td>
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<td>12</td>
<td>26</td>
</tr>
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<td>11:39</td>
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<td>110</td>
<td>8</td>
<td>20</td>
</tr>
</tbody>
</table>

Number of Samples: **31**
Geometric Mean: **8.5**

Range: **1.7 - 350**
Estimated 90th Percentile: **42**
WASHINGTON STATE DEPARTMENT OF HEALTH
OFFICE OF SHELLFISH AND WATER PROTECTION

ANNUAL GROWING AREA REVIEW

PREPARED BY: Lawrence Sullivan, Public Health Advisor

AREA: Nisqually Reach

YEAR ENDING: December 31, 2007

CLASSIFICATION: Approved, Restricted, Prohibited

ACTIVITIES IN THE GROWING AREA IN 2007:

Samples were collected from stations #237-#244 and stations #249-#252 seven times in 2007 using the systematic random sampling method. Samples were collected from stations #222-#236, stations #245-#248, and stations #253-#709 twelve times in 2007 using the systematic random sampling method.

ANALYTICAL RESULTS OF WATER SAMPLES:

Table #1 summarizes the results of all samples collected from stations #237-#244 and stations #249-#252. Table #2 summarizes the results of all samples collected from stations #222-#236, stations #245-#248, and from stations #253-#709. This summary shows that all stations in the area pass the NSSP water quality standard. Station #225 is of concern due to elevated bacteria levels.

CHANGE IN ACTUAL POLLUTION SOURCES THAT IMPACT THE GROWING AREA:

We currently have no information indicating that the area has new sources of pollution.

CLASSIFICATION STATUS:

- Well within the classification standards
- Meets standards but some concerns
- Meets standards but threatened with a downgrade in classification
- Fails to meet classification standards

REMARKS AND RECOMMENDATIONS:

Table #1 shows that all stations meet the NSSP water quality standards for approved classification and the area is correctly classified.
Table 1

SUMMARY OF MARINE WATER DATA (SRS)

Growing Area: NISQUALLY REACH

Classification: Approved, Prohibited, Unclassified,

From 10/16/2003 To 12/05/2007

<table>
<thead>
<tr>
<th>Station Number</th>
<th>Classification</th>
<th>Number of Samples</th>
<th>Range</th>
<th>Geometric Mean</th>
<th>Est. 90th Percentile</th>
<th>Meets Std.</th>
</tr>
</thead>
<tbody>
<tr>
<td>237</td>
<td>Approved</td>
<td>30</td>
<td>1.7 - 70.0</td>
<td>2.3</td>
<td>6.0</td>
<td>Yes</td>
</tr>
<tr>
<td>238</td>
<td>Approved</td>
<td>30</td>
<td>1.7 - 4.5</td>
<td>1.9</td>
<td>2.0</td>
<td>Yes</td>
</tr>
<tr>
<td>239</td>
<td>Approved</td>
<td>30</td>
<td>1.7 - 240.0</td>
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All tides information is presented

The standard for approved shellfish growing waters is fecal coliform geometric mean not greater than 14 organisms/100 ml and an estimate of the 90th percentile not greater than 43 organisms/100 ml. The above table shows bacteriological results in relation to program standards.

* N/A - SRS criteria require a minimum of 30 samples from each station. *
Table 2
SUMMARY OF MARINE WATER DATA (SRS)
Growing Area: NISQUALLY REACH

Classification: Approved, Prohibited, Unclassified, Restricted

From 02/02/2005 To 12/05/2007

<table>
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<th>Station Number</th>
<th>Classification</th>
<th>Number of Samples</th>
<th>Range</th>
<th>Geometric Mean</th>
<th>Est. 90th Percentile</th>
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</table>

All tides information is presented

The standard for approved shellfish growing waters is fecal coliform geometric mean not greater than 14 organisms/100 ml and an estimate of the 90th percentile not greater than 43 organisms/100 ml. The above table shows bacteriological results in relation to program standards. * N/A - SRS criteria require a minimum of 30 samples from each station.*
Summary Data Analysis for the Thurston County Henderson Inlet and Nisqually
Reach Shellfish Protection Districts

Fecal Coliform Pollution in Henderson Inlet and
Nisqually Reach through 2007

Washington State Department of
Health
Office of Shellfish and Water Protection
Status and trends in fecal coliform pollution in Henderson Inlet through 2007

STATUS
- GOOD: Statistic <=30 MPN/100ml;
- FAIR: Statistic >30 MPN/100ml, but <=43 MPN/100ml;
- BAD: Statistic >43 MPN/100ml.

TRENDS
- Getting worse
- No change
- Getting better
- Not Determined

Notes:
- Status applies to Calendar Year 2007.
- Status is the fraction of ninetieth percentiles in each category (GOOD, FAIR, or BAD).
Quantitative Measure of Fecal Pollution Status: the Fecal Pollution Index (FPI)

A Fecal Pollution Index (FPI) was developed as a quantitative tool to measure annual status of fecal pollution. Although the FPI can be applied at any geographic level (sampling station, growing area, regions within Puget Sound, or Puget-Sound wide), it is most useful at the level of the growing area.

All 90th percentiles from any given year and the selected geographical level (station, growing area, region, or Sound-wide) are pooled and sorted into three categories (GOOD, FAIR, BAD) as defined below:

- **GOOD** 90th percentiles do not exceed the DOH Early Warning threshold of 30 MPN per 100ml.
- **FAIR** 90th percentiles exceed the Early Warning threshold, but do not exceed the NSSP closure criterion of 43 MPN per 100ml.
- **BAD** 90th percentiles exceed the NSSP closure criterion of 43 MPN per 100ml.

All 90th percentiles are included regardless of the classification (Approved, Conditionally Approved, Restricted, or Prohibited).

The fraction of 90th percentiles within each category is then multiplied by a corresponding weighting factor (GOOD: x1.0; FAIR: x2.0; or BAD: x3.0).

The resulting weighted fractions were added to produce the FPI.

Simply stated, if all the 90th percentiles calculated in a year are GOOD, the index is 1.0 (100% of GOOD values × 1.0). An index of 3.0 means that all the 90th percentiles are BAD (100% of BAD values × 3.0). The FPI calculated from a mixture of categories will fall between 1.0 and 3.0.

“Standardized” FPIs can be used to measure trend in selected growing areas over time. To assure accurate “among-years” comparisons, each growing area is “standardized” by making sure that only continuously sampled stations are used for FPI calculations. Stations that were added or terminated during the period of interest are excluded before FPIs are calculated.
Trend in fecal pollution impact in Henderson Bay from 1998-2007 estimated by the “standardized” fecal pollution index (FPI).
Classification of Shellfish Growing Areas: DOH applies guidelines set by the National Shellfish Sanitation Program (NSSP) in its classification program (NSSP 2003). The NSSP guidelines ensure thorough assessment of fecal pollution. Harvest areas are classified into one or more of four categories:

- **An area is classified** Approved for unlimited harvest if water quality criteria are met and significant pollutant sources are absent.

- **An area is classified** Conditionally Approved if pollution events are *episodic and predictable*, such as rain-related runoff. Harvests from Conditionally Approved areas require a harvest management plan (see page 5).

- **An area is classified** Restricted if subject to *limited and unpredictable* pollution. Shellfish from Restricted areas cannot be harvested directly. They may be “relayed” under strict supervision to clean waters for natural cleansing.

- **If an area receives pollution that is chronically excessive and/or unpredictable, it is classified** Prohibited. Shellfish from Prohibited areas cannot be harvested for human consumption.

Before a growing area is classified, DOH needs fecal coliform results from at least 30 water samples from each sampling station in the area. The 30 samples are taken during many climatic, environmental, and hydrographic conditions. Two statistics (a geometric mean and a 90th percentile) are calculated from the 30 results. These are compared to the NSSP Growing Area Criteria:

1. The geometric mean shall not exceed 14 fecal coliform organisms (as most probable number or MPN) per 100 milliliters (ml) in water (applied in all cases).

2. The 90th percentile shall not exceed 43 fecal coliform organisms (as MPN) per 100 ml of water (applied to areas where only nonpoint sources are present); OR ten percent of the results are not to exceed 43 fecal coliform organisms (as MPN) per 100 ml of water (applied when one or more point sources of pollution are present).

Both water quality criteria must be met in order to meet NSSP requirements.

While data are collected, the upland watershed and the marine shoreline are carefully surveyed to find and assess pollution sources. An area cannot be approved for harvest if the shoreline survey reveals significant pollution threats, even if the water quality meets the NSSP criteria. After classification, DOH continues to monitor fecal coliform levels and periodically resurveys the shoreline.
Trend in geometric means and ninetieth percentiles (NSSP statistics) from 2004 through 2007 at selected DOH stations in Henderson Inlet.
Status and trends in fecal pollution in Nisqually Reach through 2007

GOOD: Statistic \leq 30 \text{ MPN/100ml};
FAIR: Statistic >30 \text{ MPN/100ml},
but \leq 43 \text{ MPN/100ml};
BAD: Statistic > 43 \text{ MPN/100ml}.

TRENDS
- Getting worse
- No change
- Getting better
- Not Determined

Notes:
- Status applies to Calendar Year 2007.
- Status is the fraction of ninetieth percentiles in each category (GOOD, FAIR, or BAD).
Trend in fecal pollution impact in Nisqually Reach from 1998-2007 estimated by the “standardized” fecal pollution index (FPI).
Trend in geometric means and ninetieth percentiles (NSSP statistics) from 2004 through 2007 at selected DOH stations in Nisqually Reach.
Part III

Water Clean Up Plan

Total Maximum Daily Load

Recommended Additional Actions
The combined Shellfish Protection Districts’ stakeholders have discussed how to develop an adaptive management strategy as recommended in their Report and Recommendations. The stakeholders have agreed that the three elements of an adaptive management strategy is implementation monitoring (Part I), water quality data (Part II), then an assessment of whether the actions that have been implemented are in fact reducing fecal coliform contamination. The assessment would also recommend other possible actions needed to meet the goal of reducing fecal coliform concentrations to meet the water quality standards for commercial shellfish harvesting.

The Washington Department of Ecology’s Water Quality Improvement Plans for the Henderson Inlet and Nisqually Reach assign the adaptive management responsibilities to Ecology. Future reports will include Ecology’s adaptive management results.


The actions listed below are beyond what were included in the Henderson Inlet and the Nisqually Reach Shellfish Protection District Stakeholder Groups’ Report and Recommendation.

**Henderson Inlet**


**Septic Systems:**
1. Strongly consider sewering Woodland Creek Estates.
2. Investigate septic system sources: Jorgenson Creek, especially upstream from Pleasant Glade Road; on Woodard Creek between river miles 6.2 and 3.4; upland septic sources adjacent to Sleepy Creek, the RV facility on Dobbs Creek; and along the Henderson Inlet shoreline.
3. In the Woodard Creek basin, leaking sewer lines and homeless campers are also potential sources.

**Implementation update:**
1. Thurston County received grant funds and hired a consultant whose study documents that sewering would be effective reducing pollutant load. The county is currently seeking funding for this project.
2. All of these septic systems are within the Henderson Watershed Protection Area Septic System O&M program. Every system will have been inspected by 2009.
3. No action to date
**Stormwater:**
1. Investigation and treatment of septic system sources in Tanglewilde to address the Martin Way discharge, which is the highest priority for source control in the Woodland Creek basin.
2. Working with neighborhoods adjacent to College between river mile 0.6 and 0.3 to address septic system and pet waste sources, and evaluating treatment options for stormwater discharge to College Creek.
3. Updating WSDOT stormwater facilities at Interstate 5.
4. Monitoring stormwater discharge to Taylor wetland (headwaters of Woodard Creek) regularly between December and March to determine treatment effectiveness. Stormwater discharge to this facility is a high priority for source control.
5. Investigating possible storm-event sources from stormwater facilities between Woodland Creek river mile 1.0 and 0.2.

**Implementation update:**
1. Thurston County has received a 750k grant to improve the stormwater treatment capacity in Tanglewilde.
2. All of these septic systems are within the Henderson Watershed Protection Area Septic System O&M program. Every system will have been inspected by 2009.
3. Contact WSDOT for update.
4. Sampling found the source to be around South Sound Mall in the city of Lacey.
5. No action to date.

**Agriculture:**
1. Control domestic animal access to Eagle Creek, especially during the dry period.
2. Investigate domestic animal access on Sleepy Creek.
3. Investigate possible sources from the horse boarding facility on Dobbs Creek, and referral to the Conservation District in necessary.
4. Control domestic animal access to Meyer Creek and wetland.

**Implementation update:**
TCD is conducting agricultural surveys to identify farms with water quality issues in Eagle, Sleepy, Meyer, Dobbs, Woodard, and Woodland Creeks. Upon completion of the survey work the District will work with participating landowners to implement best management practices.

**Land Use:**
1. Low Impact Development (LID) standards.
2. Protective rezoning where appropriate.
3. More protective development standards in some situations.
4. Continue program to purchase land and build stormwater facilities to new standards as opportunity arises.
5. Purchase development rights and conservation easements for sensitive locations.
6. Increased enforcement of current land use regulations.
7. Outreach to stream and marine shoreline owners regarding the function and value of healthy riparian areas.
Implementation update:
1. Will restart the LID study once the revised Stormwater Manual is adopted sometime in 2008.
2. The county revised its zoning in the Shellfish Districts in 2007. Limited Areas of More Intensive Rural Development (LAMIRDs) changed 18 acres from one unit per acre to one unit per 20 acres; 229 acres from one unit per acre to one unit per five acres; 1,946 acres from one unit per two acres to one unit per five acres; and 307 acres from one unit per five acres to one unit per 20 acres. This is a total of 2,500 acres downzoned within the two shellfish protection districts.
3. Included in the Shoreline Management Program update due to be completed in 2011.
4. This activity continues as priorities and funding becomes available.
5. No action
6. Continue the same level of enforcement.
7. Included in the Shoreline Management Program update due to be completed in 2011

Wildlife:
Look of opportunities to influence human practices that may contribute to contamination from wildlife concentrations, for instance, in garbage collection areas that may attract rodents or birds.

Implementation update: - No actions.

Nisqually Reach

Nisqually River Basin Fecal Coliform Bacteria and Dissolved Oxygen Total Maximum Daily Load – Water Quality Implementation Plan (May 2007) actions as it pertains to McAllister Creek and Nisqually Reach:

Septic Systems:
1. Thurston County Public Health Department will continue to investigate failing sewage systems in the area of Luhr Beach and any other failure brought to their attention.
2. Thurston County Public Health Department will conduct on-site sewage workshops and educational campaigns in the areas of concern near The Meadows subdivision.
3. Closely related but not applicable to septic systems is a suggestion for a placement of a portable toilet at creek access points during the fishing season (Steilacoom and Martin Way). Bacteria counts were elevated in this area where stream bank fishing occurred. There is no stakeholder identified to perform this action.

Implementation update:
1. This has been completed for all systems that have been identified as problems.
2. Thurston County Public Health Department continues on-site sewage workshops in the Nisqually watershed, which captures The Meadows subdivision.
3. No action to date – contact WDFW.
**Pet Waste:**
WSDOT has responsibility for pet waste that reaches McAllister Creek from their property near Exit 114 on I-5 by way of the dike. Residents of a nearby recreational vehicle park walk animals on the dike, and there is evidence of pet feces noted during the study. A pet waste station should be placed there, or access for pet walkers on the dike should be eliminated.

**Implementation update:**
Thurston County Public Health staff contacted the recreational vehicle park owners and found them to be uncooperative. Need to contact WSDOT for further action.

**Agriculture:**
The Thurston Conservation District will work with landowners in the Nisqually Basin to implement best management practices and develop conservation plans. They will also continue the shellfish pledge project, an incentive-based program aimed at helping people change their behaviors that have negative impact on water quality. They will also promote and/or administer financial assistance for implementing livestock exclusion fencing and plantings.

**Implementation update:**
The Thurston Conservation District staff has been actively implementing this action.

**Stormwater:**
1. Thurston County will implement some of the BMPs listed in the Washington State stormwater manual on ditches that are publicly owned to help in the reduction of the fecal coliform reaching the waterways.
2. Thurston County will perform monthly monitoring on McAllister Creek near the I-5 bridge.
3. WSDOT will perform maintenance on tide-gates one through 6 every other year.

**Implementation update:**
1. No action to date.
2. Water quality monitoring at this location is currently being implemented.
3. No action – contact WSDOT.