CHAPTER

5 WATER QUALITY Action Plan

Priority Problem

Bacteria and other pathogens from both point and non-point sources present a principal water quality problem. Bacterial pollution threatens public health through the ingestion of contaminated shellfish and water, or direct water contact. It also results in frequent closure of commercial shellfish harvesting areas. Many stream reaches do not meet water quality criteria for bacteria or temperature, and exceed recommended concentrations of suspended solids. Dissolved oxygen concentrations meet water quality standards in most areas of the Watershed except in lowland sloughs, where significant oxygen depression has been observed. Nutrient concentrations do not appear to adversely impact water quality except in lowland sloughs. No acute or chronic affects from toxic substances have been observed or monitored.

Goal

Promote Beneficial Uses of the Bay and Rivers

Bacteria contamination affects shellfish and water contact uses. Actions to reduce bacteria and other pathogens in the Bay and rivers will reduce closures of shellfish beds and lower risks to public health.

Goal

Improve Farm Management Practices

When not properly managed, storm runoff and process water from farms carries contaminants into surface water. These contaminants include bacteria, pathogens, and organic matter that deplete oxygen, raise turbidity, and cause other adverse impacts on water quality. Improving management practices on agricultural and rural lands will enhance water and habitat quality, and in many instances, improve farm productivity.

Goal

Assess and Upgrade Wastewater Treatment Infrastructure

With or without pretreatment, wastewater discharged directly into the Bay reduces water quality in the Bay. Significant sources of wastewater include treatment plants, industrial facilities, on-site disposal systems, and other sources. Assessing the treatment capacity of industrial, municipal, and residential sources will better focus resources on upgrading inadequate wastewater infrastructure.

Goal **Assess and Upgrade Urban Non-Point Runoff Treatment Infrastructure**

Nonpoint source pollution from urbanized areas significantly degrades water quality. The most common water quality alterations include increased bacteria, nutrients, sediments, and temperature. Upgrading the infrastructure available to control nonpoint source runoff will increase water quality throughout the Watershed.

Goal **Reduce Instream Temperatures to Meet Salmonid Requirements**

Many stream reaches in the Tillamook Bay Watershed do not meet water quality standards for temperature. Past and present human activities and many types of land and water uses have individually and cumulatively altered the aquatic environment for salmonids. Improving riparian buffer function and ensuring sufficient streamflow will provide the most effective ways to reduce instream temperatures over the long term.

Goal **Reduce Instream Suspended Sediments to Meet Salmonid Requirements**

Past and present human activities and land uses have individually and cumulatively increased sediment loading in the environment used by salmon. Reducing instream sediments will improve the productivity of spawning salmonids, survival of juveniles, and availability of prey.

Objectives

Achieve water quality standards for bacteria in the rivers and Bay by 2010[1]

Document at least a 25% reduction in bacteria loads to rivers, with apparent trends by 2005 and statistically significant results by 2010

Achieve at least a 25% reduction every four years in the number of days that the rivers are not in compliance with water quality standards for bacteria

Achieve in-stream temperatures that meet salmonid requirements by 2010[2]

Achieve in-stream suspended sediment concentrations that meet salmonid requirements by 2010[3]

Implement all appropriate measures contributing to water temperature and riparian vegetation goals by 2005

Document at least a 25% reduction in total suspended solids loads to rivers, with apparent trends by 2005 and statistically significant results by 2010

Achieve Senate Bill 1010 compliance among 100% of livestock operations by 2010

Inspect every CAFO annually by 2004

End wastewater treatment plant failures by 2002

Control runoff from all construction and development in urban areas by 2003(Erosion and Sedimentation objective)

Footnotes

1a. **Freshwater bacteria standard.** A 30-day log mean of 126 *E. coli* per 100 milliliter (ml) based on a minimum of five samples with no single sample exceeding 406 organisms per 100 ml.

1b. **Shellfish water bacteria standard.** A fecal coliform geometric mean or median of 15 or more samples shall not exceed 14 organisms per 100 ml, with not more than 10% of the samples exceeding 43 organisms per 100 ml.

2. **Freshwater temperature standard.** The average of the daily maximum water temperature over a moving seven day period shall not exceed 17.8°C (64°F).

3a. **Suspended sediment concentrations.** Average sediment concentrations will not exceed the following values over the specified times.

Measured as:	Hourly	Daily	Weekly	Monthly
TSS (mg/L)	1100	40	7	1
Turbidity (NTU)	455	25	5	3

In addition, no source may increase suspended sediments concentrations by more than 10%.

3b. The target total suspended solids (TSS) levels were obtained from the following document, Channel Suspended Sediment and Fisheries: A Synthesis for Quantitative Assessment of Risk and Impact by Charles Newcombe and Jorgen Jensen in the North American Journal of Fisheries Management Volume 16, November 1996.

Water Quality Action Plan

WAQ-01 Define, Implement, and Enforce Pollution Prevention and Control Measures on Agricultural Lands
WAQ-02 Implement Voluntary Farm Management Plans
WAQ-03 Implement Revised Confined Animal Feeding Operation (CAFO) Inspection Procedure
WAQ-04 Use Farm-Specific Agronomic Rates for Nutrient Management
WAQ-05 Provide Farm Management Training Programs
WAQ-06 Ensure Adequate Wastewater Treatment Capacity
WAQ-07 Expand Sewer Network
WAQ-08 Ensure Adequate Urban Runoff Treatment and Retention
WAQ-09 Ensure Properly Functioning On-Site Sewage Disposal Systems
WAQ-10 Implement Temperature Management Strategies
WAQ-11 Implement Suspended Sediments Management Strategies
WAQ-12 Evaluate Shellfish Growing Area Classifications
WAQ-13 Update Shellfish Management Plan Closure Criteria

TABLE 5-1: Conservation Practice Effectiveness in Treating Water Quality Problems

Conservation Practices	**Bacteria**	**Nutrients**	**Temperature**		**Dissolved Oxygen**	**Sediment**		**Application**				
			Shade	*Hydraulics*		*Bank Erosion*	*Overland Flow*	Applicable Everywhere	Site Specific	Farm/ Rural	Forest	Urban
Waterbody Buffers												
Grass infiltration strip	●	●	❍	❍	◗	◗	●	✓				
Riparian area (healthy riparian condition)	◗	◗	●	◗	◗	●	◗	✓				
Manure Management												
Wetlands (artificial or natural)	●	●	❍	●	●	❍	●			✓		✓
Manure storage	●	●	❍	❍	❍	❍	❍			✓		
Manure application at agronomic rates/timing	●	●	❍	❍	❍	❍	❍			✓	✓	
Source Separation												
Livestock access to riparian areas limited	◗	◗	◗	◗	❍	●	◗			✓		
Waste not directly linked to water body	●	●	❍	❍	◗	❍	❍			✓		
Riparian area (healthy riparian condition)	◗	◗	●	◗	◗	●	◗	✓				
Instream Structures												
Biotechnical barbs	❍	❍	◗	●	◗	◗	◗		✓			
Streambank Erosion Protection												
Off-stream watering	●	●	◗	◗	◗	●	❍			✓		
Riparian area (healthy riparian condition)	◗	◗	●	◗	◗	●	◗	✓				
Limit livestock access to water body	●	●	◗	◗	◗	●	❍			✓		
Stormwater												
Construction site erosion control	❍	❍	❍	●	◗	●	●	✓				
Stormwater treatment (swales, ponds, wetlands, etc.)	●	●	❍	●	●	❍	●	✓				
Eliminate cross connections (sewer inappropriately connected to storm system or vice-versa).	●	●	❍	❍	●	❍	❍					✓
●	= High	◗ = Medium			❍	= Low						

The information in this table shows how conservation practices can address more than one water quality problem at a time. Different practices improve water quality at various levels. A comparison of management measures can be used to address water quality problems on a site-specific basis. This is not a comprehensive list and should be used for illustrative purposes only.NRCS conservation practices are listed in the USDA Natural Resource Conservation Service Field Office Technical Guides, available in the Tillamook NRCS office.

WAQ-01 Define, Implement, and Enforce Pollution Prevention and Control Measures on Agricultural Lands

What

Define, implement and enforce any measures and/or avoidances necessary to prevent or control agricultural water pollution in the Tillamook Bay Watershed. Complete the North Coast Basin SB 1010 Plan.

Why

The North Coast Basin SB 1010 Agricultural Water Quality Management Area Plan shall comprehensively outline measures that will be taken to prevent and control water pollution from agricultural activities and soil erosion on agricultural and rural lands not in commercial forestry. A description of the pollution prevention and control measures (PCMs) deemed necessary to meet water quality goals and standards will be included in the plan.

PCMs are mandatory land conditions that can be achieved through flexible management solutions. Farmers may review their operations to determine if they are in compliance with PCMs. They may then develop their own site-specific strategy, comprising a mix of conservation practices, to meet those conditions, while improving farm efficiency and productivity. The North Coast Basin SB 1010 Plan and rules, currently being drafted, are the primary mechanisms to achieve conservation practices to meet PCMs. The voluntary water quality farm plan, designed to better address water quality and habitat issues, is outlined in WAQ-02.

How (Who.*When.)**

Step 1 Complete the North Coast Basin SB1010 Plan. (ODA. 1999.) The TBNEP recommends that, at a minimum, the local SB 1010 advisory committee define PCMs to ensure that landowners shall:

- restore/maintain riparian buffers on streams and potential fish-bearing ditches to a healthy riparian condition (HRC)[1];
- restore/maintain wetland areas to their natural condition within the economic objectives of the farm operation;
- maintain adequate pasture growth near riparian areas throughout the wet season to filter surface runoff;
- control livestock access to streams, wetlands, and ditches: provide off-stream watering facilities, salt sources, and additional shade as necessary;

[1]See Chapter 4: Key Habitat, HAB-06, for a definition of healthy riparian condition and zones.

* Coordinating entity; ensures that identified partners are on schedule.

** By end of named year.

- refrain from/minimize stream channel modifications that adversely affect fish and wildlife habitat (*e.g.*, stream cleaning, diking, dredging, channelizing, or bank armoring);
- minimize the number and size of stream crossings;
- design and construct stream crossings to withstand 25-year flood events with minimum disturbance of in-stream habitat;
- design and operate irrigation systems to minimize over-application;
- ensure that adequate manure storage facilities exist to provide flexibility in selecting dry periods for manure spreading;
- apply and store manure so that surface waters are not contaminated;
- keep records that indicate the quantity, location, and times of manure application;
- incorporate soil and manure testing into the record management system; and
- maintain tide gates in good operating condition.

Step 2 Promote and implement voluntary farm management plans that address prohibited and required conditions for agricultural and rural lands as required by SB 1010. See WAQ-02. (Landowners. By 2010, ongoing.)

Step 3 Enforce PCMs according to the provisions and civil penalties defined in Section 8 of SB 1010. (ODA. Ongoing.)

Where All agricultural lands in the Watershed.

Lead Agency ODA.

Other Partners Livestock operation managers, NRCS, TCCA, Oregon Dairy Farmers Association (ODFA), DEQ.

Anticipated Costs 1.0 FTE ODA staff for five years = $250,000.
Local Advisory Committee – time voluntary.

Monitoring Track CCMP objective:

- Achieve SB 1010 compliance among 100% of livestock operations by 2010.

Regulatory Issues SB 1010, CWA.

Related Actions

WAQ-02	Implement Voluntary Farm Management Plans
WAQ-03	Implement Revised CAFO Inspection Procedure
WAQ-04	Use Farm-Specific Agronomic Rates for Nutrient Management
HAB-09	Control Livestock Access to Streams
OPSW	ODA-1, 2 DEQ-1S, 6S, 9S, 11S, 14S, 20S, DLCD-1

WAQ-02 Implement Voluntary Farm Management Plans

What

Develop and implement voluntary farm management plans to better address water quality and habitat issues. Include the Pollution Prevention and Control Measures (PCMs) required by the Senate Bill 1010 Water Quality Management Area Plan.

Why

The SB 1010 Plan gives ODA the authority to develop basin agricultural/livestock management plans to protect water quality (see WAQ-01). Individual voluntary farm water quality plans provide the guidance for landowners to reduce water quality impacts of their land use and comply with the PCMs in the North Coast Basin SB 1010 Plan. Agricultural practices can significantly impact water quality and watershed health, and the implementation of voluntary farm water quality plans will greatly reduce negative impacts.

How (Who.When.)

Step 1 Develop, update, and implement voluntary farm management plans that meet the minimum standards for PCMs identified in WAQ-01 for all CAFOs and other farm and livestock landowners or managers in the Watershed. Update 20 CAFOs per year and 30 other operations per year, until all farms in the Watershed have voluntary farm management plans. (SWCD. By 2008.)

Step 2 Support ODA, SWCD, and NRCS in their efforts to provide voluntary farm management plans to all agricultural landowners in the Watershed. Identify and secure cost-share opportunities to design and implement the voluntary plans. (Performance Partnership. Ongoing.)

Where

All agricultural operations in the Watershed.

Lead Agency

SWCD.

Other Partners

NRCS, ODA, agricultural/livestock operation managers, TCCA, ODFA, OSU Extension Service, OWRD.

Anticipated Costs

NRCS – 1 engineer and 3 farm plan writers at $50,000 each for 8 years (total $1.6 million) to write farm plans for 77 CAFO farms that don't currently meet SB1010 requirements, plus 237 other farms.
Cost of implementing conservation practices – site specific – see USDA Natural Resource Conservation Service Field Office Technical Guide.

Monitoring

Track CCMP objective:

- Achieve SB 1010 compliance among 100% of livestock operations by 2010.

Regulatory Issues

SB 1010 Plan shall identify the necessary pollution prevention and control measures.

Related Actions

HAB-09	Control Livestock Access to Streams
HAB-10	Stabilize Streambanks Using Alternatives to Riprap
HAB-19	Protect and Enhance Tidal Marsh
WAQ-01	Define, Implement, and Enforce Pollution Prevention and Control Measures on Agricultural Lands
OPSW	ODA-1, 2
	DEQ-6S, 9S, 10S, 20S
	DLCD-1

WAQ-03 Implement Revised Confined Animal Feeding Operation (CAFO) Inspection Procedure

What

Increase the efficiency of the ODA CAFO inspection process and the percentage of CAFOs in compliance with their permits.

Why

Confined Animal Feeding Operations (CAFOs) produce large amounts of manure and can contribute bacteria to streams and the Bay. Although in 1997/1998 ODA significantly increased its CAFO inspection staff and capability, not all CAFOs can be inspected annually, as only one CAFO inspector is covering nearly 200 CAFOs in a 5-county area (including Tillamook County). Frequent inspections encourage operators to improve farm management and meet CAFO permit requirements. The ODA is currently reviewing the CAFO inspection program, using technical expertise from throughout the State, including representatives from the Tillamook Bay Watershed.

How (Who.When.)

Step 1 Prioritize CAFO inspections to target areas with the highest concentrations of bacteria. Recent studies[2] show high concentrations in the Tillamook, Trask, and Wilson River basins. (ODA.1999.)

Step 2 Support ODA's CAFO technical review team by including local agricultural representatives in the review process. (OSU Extension Service, NRCS. Ongoing.)

Step 3 Pursue additional funding for the ODA's CAFO program from which ODA can hire an additional CAFO inspector to locate in the Watershed. (Performance Partnership. By 2000.)

Step 4 Pursue achieving annual announced inspections of 100% of CAFOs. (ODA. By 2004.)

Step 5 Promote the following initiatives in a revised CAFO inspection program (Performance Partnership. By 2000.):

1) Conduct aerial surveys after storms twice annually;

2) Conduct unannounced inspections at 10% of CAFOs annually. Prioritize based on aerial surveys and/or complaints.

Step 6 Respond to complaints and where necessary develop and insure implementation of correction plans in a timely manner. (ODA. Ongoing.)

Where

All CAFOs in the Watershed.

[2] Sullivan, T., J. Bischoff, K. Vache. 1998. *Results of Storm Sampling in the Tillamook Bay Watershed*. E&S Environmental Chemistry. Prepared for the Tillamook Bay National Estuary Project, Garibaldi, OR.

Lead Agency ODA.

Other Partners NRCS, SWCD, OSU Extension Service, livestock operation managers.

Anticipated Costs
1 additional CAFO inspector at $50,000 per year.
OSU Extension Service – 0.25 FTE of dairy agent time.
Cost of flyovers: $5,000 per year.

Monitoring
Coordinate with riparian and wetland aerial surveys.

Track CCMP Objective:

- Inspect every CAFO annually by 2004.

Regulatory Issues State legislation determines CAFO inspection process and related funding.

Related Actions

HAB-16	Effectively Enforce Laws and Regulations
OPSW	ODA-2
	DEQ-6S, 9S, 10S
	DLCD-1

WAQ-04 Use Farm-Specific Agronomic Rates for Nutrient Management

What

Use farm-specific agronomic nutrient uptake rates to develop procedures in voluntary farm management plans that improve the operators' ability to apply nutrients to the land at agronomic capacity.

Why

Livestock manure has been identified as a contributor of bacteria to streams and the Bay. Effective manure and nutrient management can significantly improve water quality and watershed health. Currently, local farmers use agronomic rates based on literature values from outside the County. If farmers use data from their own farms, they will maximize forage production with minimal environmental impact, and reduce chemical fertilizer usage.

How (Who.When.)

Step 1 Collect nutrient cycling data in the Tillamook Bay Watershed to determine local agronomic rates, and demonstrate this process through seminars, on-farm talks, and newsletter articles so Basin farmers can track nutrients on their farms by 2001. Incorporate the new agronomic rate information into USDA NRCS Field Office Technical Guides and OSU Extension guidelines by 2003. (OSU Extension Service and NRCS. By 2003.)

Step 2 Include soil testing requirements in the voluntary farm management plan to monitor soil fertility and provide guidance for future manure and/or nutrient application timing, location, and rates so that agronomic capacity (or other specified loading rates) are not routinely exceeded. (NRCS. 2002.)

Step 3 Promote documentation of management practices as part of all voluntary farm management plans. Without accurate records farmers cannot document the effectiveness of their management practices. (ODA, SWCD, and NRCS. 2005.)

Step 4 Tie application of manure on all farms to agronomic capacity in order to improve nutrient use and efficiency and reduce bacteria transport to waterways (already required for CAFOs). (ODA. 2003.)

Where

All agricultural operations in the Watershed.

Lead Agencies

NRCS, ODA, SWCD, OSU Extension Service.

Other Partners

Livestock operation managers, DEQ.

Anticipated Costs

Initial study $30,000.
Farm operator time to keep records.
Soil tests: $100 per test.

Monitoring

Track CCMP Objective:

- Document at least a 25% reduction in bacteria and sediment loads to rivers with apparent trends by 2005 and statistically significant results by 2010.

Regulatory Issues

SB 1010.
State legislation determines permitted CAFO requirements. Change will require new legislation.

Related Actions

WAQ-01	Define, Implement, and Enforce Pollution Prevention and Control Measures on Agricultural Lands
WAQ-02	Implement Voluntary Farm Management Plans
WAQ-05	Provide Farm Management Training Programs
OPSW	DEQ-6S, 9S, 10S, 20S
	DLCD-1

WAQ-05 Provide Farm/Livestock Management Training Programs

What

Provide training to farm/livestock managers on the effects of management practices on water and habitat quality.

Why

Farm/livestock managers and workers have a tremendous impact on the natural system through their daily activities. Subtle improvements in the way managers conduct their operations can improve both the environment and farm productivity. Educational programs may be voluntary, tied to incentive programs, or tied to permit violations. Oregon State University Extension Service, NRCS, and others already have materials which can serve as the basis for educational programs.

How (Who.When.)

Step 1 Identify or design farm management curricula suitable for the Tillamook Bay Watershed / North Coast Basin. Conduct on-farm discussions about nutrient management. Offer farm management classes in the County. Document training for 50 farm managers per year. (OSU Extension. By 2000.)

Step 2 Add certification requirements and financial incentives through independent organizations to farm management education. (OSU Extension, ODFA, and Cattlemen's Association. 2002.)

Step 3 Increase recognition for farms whose managers and workers receive training (*e.g.*, SWCD Conservation Farmer of the Year, land posted, Headlight-Herald articles, etc.) (SWCD. By 2000.)

Step 4 Pursue mandatory training as part of the enforcement process for farm managers who violate water quality standards. This could include one-on-one education with an inspector or proof of attendance at a local farm management class/training within a specified period of time. Document a decreasing trend in permit violations over 10 years. (ODA. By 2001, ongoing.)

Where

N/A.

Lead Agencies

OSU Extension Service.

Other Partners

ODA, NRCS, SWCD, TCCA, Oregon Dairy Farmers' Association and other farm groups, livestock operation managers.

Anticipated Costs

OSU Extension – 0.25 FTE OSU Extension agent – $12,500 per year.

Monitoring

Track CCMP objective:

- Achieve SB 1010 compliance among 100% of all livestock operations by 1010.

Regulatory Issues

SB 1010 Agricultural Water Quality Management Area Plan.

Related Actions

WAQ-01	Define, Implement, and Enforce Pollution Prevention and Control Measures on Agricultural Lands
WAQ-02	Implement Voluntary Farm Management Plans
WAQ-03	Implement Revised CAFO Inspection Procedure
WAQ-04	Use Farm-Specific Agronomic Rates for Nutrient Management
CIT-01	Develop and Implement an Oregon State University Extension Watershed Masters Series
OPSW	ODA-1, 3 DEQ-9S, 10S DLCD-1

WAQ-06 Ensure Adequate Wastewater Treatment Capacity

What

Ensure adequate wastewater treatment plant (WTP) capacity and treatment as defined by each facility's current NPDES permit. Planning should include estimates of long-term population growth and upgrades needed to ensure future capacity needs. Ensure that wastewater treatment plant discharge meets instream and Bay water quality standards and that the discharge structure does not impede fish passage.

Why

When WTP capacity is exceeded, wastewater is either moved to some location and stored, discharged directly into the receiving water body without treatment, or rushed through the facility too quickly to be treated adequately. These activities contribute to increased bacteria concentrations and other pollutants in the Bay.

Few community members understand the waste stream, the importance of a fully functioning WTP, or their impact on that system. Community education helps deter mistreatment of the system by users. Because WTP upgrades are often funded by bond measures, community members and local decision-makers should understand more about WTP function.

How (Who.When.)

Step 1 Develop, promote, and deliver on-site WTP education program (tour) for children and adults that explains the waste stream (on-site disposal systems, city sanitary sewers, landfills, recycling, etc.) and the function of WTP in that process. County 5th graders should each tour a WTP and understand the waste stream as part of the school curriculum. (WTPs, Tillamook County, and schools. By 2000, ongoing.)

Step 2 Update or develop all public facilities plans. Public facilities (water and sewer) are regulated by Planning Goal 11 and OAR 660-11. A public facilities plan must be created and adopted before WTP can be upgraded. Plans should include a needs assessment, analysis of current capabilities, and prediction of future requirements. (Tillamook County and city governments. By 2002.)

Step 3 Based on public facilities plans, upgrade WTPs as appropriate. Obtain low interest revolving loans through DEQ and other sources for WTP and infrastructure upgrades. (Tillamook County and city governments. By 2010.)

Step 4 Review all WTP discharge mixing zones biennially. Document any water quality concerns such as chlorine or ammonia toxicity, temperature increases, or low dissolved oxygen. Determine the need to include seafood processor discharges in mixing zone assessments. (WTPs and DEQ. By 2002.)

Step 5 Require an annual facility summary report that describes capacity issues, maintenance concerns, future growth estimates, and funding needs. (WTPs, Tillamook County and city governments, and DEQ. By 1999, ongoing.)

Step 6 Conduct complete laboratory inspections by DEQ personnel to ensure that proper laboratory quality assurance and quality control procedures are being performed. (DEQ. By 2000, ongoing.)

Where Wastewater Treatment Plants of: Cities of Tillamook, Bay City, and Garibaldi; TCCA; Port of Tillamook Bay; and Pacific Campground.

Lead Agencies Tillamook County and city governments, WTPs, incorporated cities.

Other Partners DEQ, Performance Partnership, elementary schools.

Anticipated Cost

Construction: current upgrades – Garibaldi $4.5 million for WTP upgrade/expansion, plus ongoing work on infiltration problems. Cost of upgrades to meet developing TMDLs unknown.

Educational component: WTPs – Program development and tours; Schools – transportation costs, $4,000/20 years.
Personnel: DEQ – 0.25 FTE to conduct inspections, $125,000.
Facility plans: site and project specific.
Discharge mixing zone studies: $25,000–$50,000 each.

Monitoring Track CCMP objective:

- End WTP failures by 2002.

Regulatory Issues May require passage of bonds.
Oregon Statewide Planning Goal 11 and OAR 660-11

Related Actions

WAQ-07 Expand Sewer Network

WAQ-08 Ensure Adequate Urban Runoff Treatment and Retention

SED-06 Develop, Implement, and Enforce a Stormwater Management Ordinance

CIT-01 Implement an Oregon State University Extension Watershed Masters Series

OPSW DEQ-1S, 6S, 9S, 10S, 11S, 14S, 15S

WAQ-07 Expand Sewer Network

What

Expand City of Tillamook sewerage network to entire Urban Growth Boundary (UGB) and encourage those with on-site disposal systems (OSDSs) to convert to sewer.

Why

Tillamook's UGB extends some distance to the east beyond the current city limit and sewer system. This is an area designated for relatively high density urban development, but limited by high ground water and reliance on on-site sanitation. This can pose a threat to water quality and human health, and limit economic development opportunities. Extension of public sewer would address existing sanitation problems and provide for needed development in an appropriate area.

How (Who.When.)

Step 1 Developers near Tillamook now pay the costs of extending the system to their site and work with the City to establish system development charge credits as part of the capital project plan. Future ordinance will assist by forming reimbursement districts to repay the developer when intermediate property owners connect to the system. (Developers and City of Tillamook. Ongoing.)

Step 2 The City of Tillamook will procure funding to continue expansion of sewer service throughout the UGB, whenever and wherever possible as funding sources become available. (Tillamook city government. By 2005.)

Step 3 Evaluate opportunities to expand sewer systems outside designated UGBs of the three incorporated cities in the Watershed. (City governments. 2003.)

Step 4 Where failing septic systems pose a health hazard, cities will require connections to sewer systems as per state law. Develop an appropriate ordinance, as allowed by ORS standards. See WAQ-09 for on-site disposal system action. (DEQ and city governments. By 2001.)

Where

Urban areas throughout the Watershed (Tillamook, Bay City, and Garibaldi).

Lead Agency

Tillamook city government.

Other Partners

Developers, DEQ, Tillamook County Department of Community Development, DLCD.

Anticipated Costs

Construction costs: $300,000 to sewer 1,500 linear feet.
$1,500,000–1,800,000 to sewer entire remaining Tillamook UGB (~3 square miles).
Staff time: 0.5 FTE City Manager and Public Works Director.

Monitoring

Track CCMP objectives:

- Achieve water quality standards for bacteria in the rivers and Bay by 2010.
- Document at least a 25% reduction in bacteria loads to rivers, with apparent trends by 2005 and statistically significant results by 2010.
- Achieve at least a 25% reduction every four years in the number of days that the rivers are not in compliance with water quality standards for bacteria.

Regulatory Issues

May require bond passage.

Related Actions

WAQ-06	Ensure Adequate Wastewater Treatment Capacity
WAQ-08	Ensure Adequate Urban Runoff Treatment and Retention
WAQ-09	Ensure Properly Functioning On-Site Sewage Disposal Systems
OPSW	DEQ-6S, 9S, 10S, 19S
	WRD-S-9

WAQ-08 Ensure Adequate Urban Runoff Treatment and Retention

What

Assess and upgrade urban non-point runoff treatment infrastructure and preserve and enhance natural landscape features that improve water quality. Protect these features and their function through the urban planning process. Protect the natural integrity of water bodies and natural drainage systems during site development and building of roads, highways, and bridges. Reduce the amount of contaminants reaching Tillamook Bay via surface water.

Why

Recent studies conducted by TBNEP and DEQ have identified urban sources as important contributors to water quality problems in the Tillamook Bay Watershed. Non-point runoff from urban (commercial, industrial, and residential) lands can transport sediments, and contaminants such as bacteria, suspended solids, oil and grease, and nutrients, to surface waters. It can also elevate water temperature. Storm water systems should be modified to better filter and retain runoff. Maintaining and enhancing landscape features such as riparian areas, wetlands, natural drainage ways, and ground permeability will reduce contaminant loading and peak flow to surface waters.

How (Who.When.)

Step 1 Quantify the contribution of contaminants (TSS, bacteria, nutrients, temperature) from urban storm water discharge to surface waters. Urban areas include the cities of Tillamook, Bay City, and Garibaldi. (DEQ. By 2002.)

Step 2 Identify natural landscape features that protect water quality. Prioritize areas for enhancement, protection and/or possible acquisition. Update zoning maps. (County and cities. By 2001.)

Step 3 Implement projects to control pollution from non-point sources. See related actions HAB-01, 02, 04, 06, 08, and 15 for project details. (DEQ, county and city governments. By 2003.)

Step 4 Develop and enforce an ordinance that minimizes the use of impervious surfaces and favors onsite retention or treatment of storm water over downstream water treatment facilities. (Tillamook County and city governments. By 2002.)

Step 5 Develop and enforce an ordinance that sets protection of riparian, wetland, and natural drainage functions as a priority for new construction. See HAB-15. (Tillamook County and city governments. By 2002.)

Step 6 Develop and implement sanitation standards, as well as erosion control requirements for construction sites as defined in the CZARA Section 6217(g). (Tillamook County and city governments. By 2002.)

Where

Urban areas of the Watershed (Tillamook, Bay City, and Garibaldi).

Lead Agencies

Tillamook County Commissioners and city councils of Bay City, Garibaldi and City of Tillamook.

Other Partners

DEQ, DSL, landowners, developers.

Anticipated Costs

Engineering studies: $25,000–$50,000 each.
Construction: $10,000–$100,000.
Municipal planning and ordinance development: 0.5 FTE.
Developers will be responsible for much of the cost.

Monitoring

Track CCMP objectives:

- Achieve water quality standards for bacteria in the rivers and Bay by 2010.
- Document at least a 25% reduction in bacteria loads to rivers, with apparent trends by 2005 and statistically significant results by 2010.
- Achieve at least a 25% reduction every four years in the number of days that the rivers are not in compliance with water quality standards for bacteria.
- Control runoff from all construction and development in urban areas by 2003.

Regulatory Issues

CZARA Section 6217(g).
Phase II storm water requirements under the Clean Water Act will require construction site erosion control permits on sites one acre and larger in the next two years.

Related Actions

WAQ-06 Ensure Adequate Wastewater Treatment Capacity

SED-06 Develop, Implement, and Enforce a Stormwater Management Ordinance

OPSW DEQ-5S, 6S, 9S, 10S, 15S, 19S, 20S
DLCD-1, 5

WAQ-09 Ensure Properly Functioning On-Site Sewage Disposal Systems

What

Install new on-site disposal systems (OSDSs) in accordance with DEQ regulations. Test old OSDSs and upgrade where necessary. Provide adequate disposal systems for construction sites and boaters.

Why

Fecal coliform contamination of Tillamook Bay is due, in part, to failing OSDSs. On-site sewage disposal systems provide adequate treatment of domestic wastewater, provided they function properly and are not overly concentrated in one area. The proliferation of septic systems poses two problems: (1) increased potential for system failure, and (2) concentrations beyond the carrying capacity of the local hydrologic system. Inadequate temporary facilities at construction sites and for boaters may also contribute to bacteria loading during certain times of the year.

Insufficient data prevent a precise determination of the relative contribution of septic systems, individually or as a whole, to the Bay's water quality problems. However, recently-conducted studies using antibiotic resistance have identified human fecal bacteria as an important component of the total bacteria load in river and Bay waters. Transient boaters and other users of the Bay, rivers, and Watershed also need to dispose properly of body wastes in order to prevent disease transmission.

How (Who.When.)

Step 1 Maintain qualified County staff to administer DEQ on-site inspection program. (Tillamook County. Ongoing.)

Step 2 Conduct annual OSDS surveys using Shoreline Sanitation Survey methods. Conduct comprehensive surveys on one sub-basin each year, inspecting each at least once every six years. (Tillamook County. Complete new shoreline survey by 2005.)

Step 3 Coordinate education efforts with the surveys. Print brochures that explain the use, maintenance, and repair of OSDSs. (Tillamook County. Begin 2000, ongoing.)

Step 4 Implement CZARA 6217(g) Guidance Management Measures for OSDSs. (Tillamook County. By 2002.)

Step 5 Institute an ordinance that requires OSDS inspection with sale of property in the County. (Tillamook County. By 2002.)

Step 6 Encourage all property owners within the City of Tillamook UGB to connect to a public sewer system. (Performance Partnership. Ongoing.)

Step 7 Where appropriate, annex properties with failing OSDSs to the sewer system through ORS health hazard standards. See WAQ-07. (Tillamook County. Ongoing.)

Step 8 Reduce contamination from body wastes by installing a second floating head in Tillamook Bay during peak fishing season and reminding boaters to use this facility, or the Port of Garibaldi pump-out for their on-board toilets. Educate hunters, anglers, and other Bay and Watershed users about proper disposal of body wastes. (Port of Garibaldi. By 2001.)

Step 9 Require temporary restroom facilities on all construction sites where public facilities are not located nearby. (Tillamook County, city governments. By 2001.)

Where Watershed-wide.

Lead Agencies Tillamook County and Performance Partnership.

Other Partners ODA, DEQ, Oregon Marine Board, city governments, Port of Garibaldi, real estate sector, landowners.

Anticipated Cost
Surveys: $30,000 each.
Brochure development/updating: $1,000/year.
Ordinance development: $25,000.
Sewer annexations: $2,000–10,000 per parcel.
Floating head: $50,000/year.
0.5 FTE DEQ staff cost for 10 years = $250,000.

Monitoring Track CCMP objectives:

- Achieve water quality standards for bacteria in the rivers and Bay by 2010.
- Document at least a 25% reduction in bacteria loads to rivers, with apparent trends by 2005 and statistically significant results by 2010.
- Achieve at least a 25% reduction every four years in the number of days that the rivers are not in compliance with water quality standards for bacteria.
- End wastewater treatment plant failures by 2002.
- Control runoff from all construction and development in urban areas by 2003.

Regulatory Issues Coastal Zone Management Act (CZMA) 6217(g), city and County ordinances, County budget.

Related Actions
WAQ-06 Ensure Adequate Wastewater Treatment Capacity
WAQ-07 Expand Sewer Network
WAQ-08 Ensure Adequate Urban Runoff Treatment and Retention
OPSW DEQ-6S, 9S, 10S, 14S, 17S, 19S, 20S, OMB-2, DLCD-5

WAQ-10 Implement Temperature Management Strategies

What

Develop and implement temperature management plans for streams with segments on the 303(d) list. See list, Appendix A, or map, Figure 2-6.

Why

Water temperature is a key habitat element for salmonids. Maintaining stream temperature regimes similar to that in which salmonids have evolved and historically thrived is very important if Oregon is to succeed in maintaining and restoring salmonid populations. Riparian shade, which is poor in lowland areas, is a key factor in stream temperature moderation. Riparian trees also supply large wood for improving stream complexity, which also moderates water temperatures. DEQ currently lists several stream segments in the Tillamook Bay Watershed as water quality limited for temperature. Species affected by high temperatures include coho salmon, listed by NMFS as Threatened (63 FR 13347, Aug. 10, 1998), and steelhead. Temperature regimes influence migration, egg maturation, spawning, incubation success, growth, inter-and intraspecific competitive ability, and resistance to diseases and pollutants. Increased temperature can worsen the synergistic effects of dissolved oxygen, pH, salinity, photoperiod, and chemicals on fish reproduction and survival. Water temperature correlates highly with instream flow and loss of riparian vegetation. Temperature is especially a problem in Tillamook Bay tributaries during critical low flows (July through September) each year.

How (Who.When.)

Step 1 Using the TMDL process, identify those stream segments where rapid heating occurs – especially for salmonid rearing, spawning, and migration areas – and prioritize for restoration. (DEQ. By 2000.)

Step 2 Complete an analysis of instream flows on Tillamook Bay tributary streams to determine flow and temperature relationships. Develop hydrodynamic models to demonstrate this relationship. See HAB-09 and FLD-01. (OWRD and DEQ. By 2002.)

Step 3 Analyze methods by which diversions can be returned to tributary streams. Analyze water rights not currently in use that can be converted to instream rights. Identify and prohibit unpermitted withdrawals. (OWRD. By 2002.)

Step 4 Assess the role of forest practices in temperature listings. If current forest practices may be linked to temperature problems, request the Board of Forestry to "direct (a) task force to analyze conditions within the Watershed and recommend watershed-specific practices to ensure water quality achievement or species maintenance." (According to FPA [OAR 629-635-120(3)]). (Performance Partnership. 2002.)

Step 5 Develop and deliver outreach tools that present water quality information and monitoring results in the Watershed. Outreach tools may include: a Web site; articles in local newspapers and water bills; K–12 curriculum development; and adult classes for watershed councils, etc. (TBCC, Performance Partnership. By 2001.)

Step 6 Plan, assist with funding, and coordinate efforts to meet temperature TMDLs by fostering healthy riparian condition, enhancing instream flows and instream habitat, and other activities as needed (see cross-referenced actions below). (Performance Partnership and DEQ. By 2002.)

Where Watershed-wide, with 303(d) listed streams as priority.

Lead Agencies DEQ, OWRD.

Other Partners ODF, ODFW, BLM, USFS, USFWS, NMFS, NRCS, SCWD, TBCC, Performance Partnership.

Anticipated Costs Instream flow study costs: OWRD and ODFW, 1.0 FTE each, $200,000. On-the ground costs: site-specific.

Monitoring Track CCMP objective:

- Achieve in-stream temperatures that meet salmonid requirements by 2010.

Regulatory Issues SB 1010, Forest Practices Act (FPA), Endangered Species Act (ESA), Oregon Plan, Clean Water Act (CWA), CZMA 6217(g).

Related Actions

HAB-05	Protect and Enhance Upland Riparian Areas
HAB-06	Protect and Enhance Floodplain/Lowland Riparian Areas
HAB-07	Protect and Enhance Instream Habitat
HAB-25	Reconnect Sloughs and Rivers to Improve Water Flow.
SED-02	Implement Practices That Will Improve Sediment Storage and Routing
WAQ-06	Ensure Adequate Wastewater Treatment Capacity
OPSW	DEQ-1S, 2S, 6S, 15S, 19S
	ODF-8S, 19S, 20S, 21S, 22S
	WRD-S-1, 2, 4, 6, 8, 12, 14, 15, 16, 17, 20, 21, 22, 29
	ODFW-IVA3, IVA8
	BLM/USFS-14
	NOAA/NMFS-41

WAQ-11 Implement Suspended Sediments Management Strategies

What

Develop suspended sediments management plans for streams on the 303(d) list. See Appendix A. Identify those stream segments, especially for core and essential fish areas, where excessive suspended sediments occur and prioritize for restoration by 2000. Implement all enhancement activities by 2010. Regularly monitor suspended sediment loading in rivers and streams as an indicator of overall erosion, and of success in controlling erosion.

Why

Excessive suspended sediments in the water or excessive fines embedded in stream gravels impact aquatic biota, especially salmonid species, in various stages of their life histories. Excess sediment can clog gills, reduce a fish's ability to locate prey, cause fish to leave or avoid an area, suffocate eggs, and reduce oxygen availability. Total suspended solids (or turbidity based on site-specific statistical analyses of the relationship between TSS and turbidity) is one of the few ways that sediment loading can be monitored accurately.

How (Who.When.)

Step 1 Using the TMDL process and water quality storm monitoring data, identify stream segments where excessive suspended sediments or turbidities occur and prioritize sites for enhancement. (DEQ. By 2001.)

Step 2 Implement site-specific enhancement activities at sites from the prioritized list. Assist with promoting the OPSW restoration guidelines. See NRCS list of conservation practices in Table 5-1. (Performance Partnership. By 2002.)

Step 3 Develop and deliver outreach tools that present information and results regarding sediments in the Watershed. Outreach tools may include: a Web site; articles in local newspapers, water, or power bills; K–12 curriculum development; and adult TBCC classes for watershed council members. (OSU Extension, TBCC, Performance Partnership. Initiate in 2000, ongoing.)

Step 4 Develop and conduct suspended sediment monitoring in the Tillamook Bay Watershed to evaluate the effectiveness of enhancement activities. (DEQ. 2000, ongoing.)

Where

Watershed-wide, with 303(d) listed streams as priority.

Lead Agency

DEQ.

Other Partners

ODF, ODFW, BLM, USFS, NOAA, NMFS, USFWS, NRCS, SWCD, TBCC, Performance Partnership.

Anticipated Costs

0.5 FTE DEQ staff costs for plan administration and monitoring 10 years = $250,000.

$50,000 for study.

Construction, protection/enhancement projects: site specific.

0.25 FTE TBPP staff outreach, class development/delivery: at $12,500/year.

Monitoring

Track CCMP objective:

- Achieve in-stream suspended sediment concentrations that meet salmonid requirements by 2010.
- Control runoff from all construction and development in urban areas by 2003.

Regulatory Issues

Clean Water Act.

Endangered Species Act.

Coastal Zone Management Act 6217(g).

Senate Bill 1010.

Forest Practices Act.

Related Actions

HAB-05	Protect and Enhance Upland Riparian Areas
HAB-06	Protect and Enhance Floodplain/Lowland Riparian Areas
HAB-07	Protect and Enhance Instream Habitat
HAB-09	Control Livestock Access to Streams
HAB-10	Stabilize Streambanks Using Alternatives to Riprap
HAB-11	Encourage Protection and Enhancement on Private Lands
HAB-12	Sponsor a Native Vegetation Planting Day
HAB-15	Revise Local Ordinances to Increase Protection of Riparian Areas, Wetlands, and Instream Habitat
SED-01	Implement Road Erosion and Risk Reduction Projects
SED-02	Implement Practices That Will Improve Sediment Storage and Routing
SED-03	Reduce Risks in Landslide-Prone Areas
SED-05	Reduce Sedimentation from Non-Forest Management Roads
OPSW	DEQ-1S, 2S, 5S, 6S, 12S, 19S DSL 6 ODF-15S ODFW-IVA5, IVA6 NOAA/NMFS-41

WAQ-12 Evaluate Shellfish Growing Area Classifications

What

Evaluate shellfish growing area classifications and update the shellfish management plan on a continual basis to correlate water quality with shellfish sanitation.

Why

The FDA sets standards and provides guidance to manage shellfish growing areas. ODA administers the local management plan for shellfish growing. Based on water quality sampling and shellfish meat data, ODA defines three areas for shellfish harvest:

- conditionally approved,
- restricted, and
- prohibited.

ODA and DEQ collect Main Bay bacteria and (bio)toxin samples to support mandates of the National Shellfish Sanitation Program and NPDES permits, respectively.

By the end of 1998, the various agencies had collected much new data about bacterial concentrations in the Bay. These data include:

- ODA/DEQ monthly water quality monitoring in shellfish growing areas;
- ODA intensive monitoring under adverse conditions;
- ODA shellfish sanitary survey every 12 years;
- Tillamook County shoreline septic tank study;
- TBNEP storm runoff data; and
- DEQ wastewater treatment plant data (NPDES permits).

See Chapter 10, Monitoring and Research Needs, for more information.

ODA will use these and other relevant data to reevaluate the shellfish growing area classifications. This evaluation could result in increased or decreased areas with restrictive classifications, and subsequently increased (or decreased) overall shellfish harvest levels.

How (Who.When.)

Step 1 Evaluate the current shellfish growing area classifications in Tillamook Bay based on updated ODA shellfish sanitary survey data. See related action WAQ-09. (ODA. By 2000.)

Step 2 Redraw classification boundaries for shellfish harvest in Tillamook Bay, if appropriate. (ODA. By 2000.)

Step 3 Continue upgrading the shellfish waters monitoring strategy, including the addition of more sampling stations in the actual harvesting areas. (ODA. Ongoing.)

Where	Estuary-wide. Sanitary surveys conducted for properties within 500 feet of a mapped stream, Watershed-wide.
Lead Agency	ODA.
Other Partners	DEQ, FDA, shellfish harvesters/growers.
Anticipated Cost	0.15–0.25FTE ODA staff time for one year = $7,500–12,500.
Monitoring	Implementation.
Regulatory Issues	OAR 603-100-010–603-100-030 and OAR 340-41-0215 (2)(e and f) (North Coast). FDA National Shellfish Sanitation Program.
Related Actions	WAQ-13 Update Shellfish Management Plan Closure Criteria HAB-18 Prioritize Tidal Sites for Protection and Restoration

WAQ-13 Update Shellfish Management Plan Closure Criteria

What

Update the shellfish management plan closure criteria to more accurately reflect public health risks associated with bacterial water pollution.

Why

The Bay is closed to shellfish harvest closure about 90 days per year as a result of sampling studies (or trends) that indicate that during certain rain-fall or river stage conditions the Bay water quality does not comply with the FDA fecal coliform standards for commercial shellfish growing areas. Harvesting may also be closed for other reasons, such as presence of biotoxins or chemicals. Closures cause economic disruption to shellfish growers.

The current shellfish plan was adapted in 1991 as a state (ODA) response to federal (FDA) studies of water column bacteria and oyster meats in the 1970s. The current plan links shellfish closures to rainfall and river flow, which may not accurately portray bacterial concentrations in the Bay. Tillamook Bay is now divided into five shellfish management areas. ODA allows no harvesting from prohibited areas and harvest from conditional areas only when these zones are open. All conditionally approved areas close when the Wilson River rises to 7 feet, (or 25,000 cubic feet per second) and reopen five days after the river peaks. The Cape Meares area reopens seven days after the river peaks, or seven days after it rains more than one inch in 24 hours.

Better information about main Bay bacterial concentration, fate, and distribution should allow ODA officials to reevaluate shellfish closure and reopening criteria to make sure they reflect water quality and human health. The evaluation could result in fewer (or more) closure days per year and subsequent increases (or losses) in net revenue to shellfish growers.

How (Who.When.)

Step 1 Use statistically rigorous methodologies on recently collected data to determine which parameters (river stage heights, bacteria loading by river, extent of contamination in shellfish meats, WTP loading during storm events, CAFO data, precipitation, antecedent weather conditions, ground saturation, etc.) provide closure and opening criteria for Tillamook Bay that assure the area complies with the shellfish standard when in the "open status" and protects shellfish consumers. (ODA and DEQ. By 2000, ongoing.)

Step 2 Use statistically rigorous methodologies and recently collected data to determine which parameters best describe the appropriate length of closure for predictable closure conditions in Tillamook Bay. Continue to meet FDA requirements for interstate trade in shellfish meats (230 FCB/100 grams of meat). (ODA. By 2000, ongoing.)

Step 3 Reevaluate sampling strategies and station locations based on recently collected data and hydrology information, and redefine if appropriate. (ODA and DEQ. 1999, ongoing.)

Step 4 Revise shellfish closure criteria. (ODA. By 2000.)

Where Estuary-wide.

Lead Agency ODA.

Other Partners DEQ, FDA, shellfish harvesters/growers.

Anticipated Costs 1.0 FTE ODA/DEQ staff time = $50,000 per year.
$25,000 per year for surveys, monitoring, and data analysis.

Monitoring Implementation.

Regulatory Issues OAR 603-100-010–603-100-030, OAR 340-41-0215 (2)(e and f) (North Coast).
FDA National Shellfish Sanitation Program.

Related Actions WAQ-12 Evaluate Shellfish Growing Area Classifications