



State of Oregon  
Department of  
Environmental  
Quality

# Water Quality Status and Action Plan: North Coast Basin

March 2011



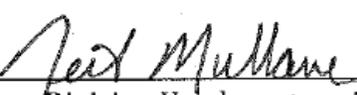
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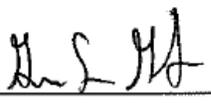
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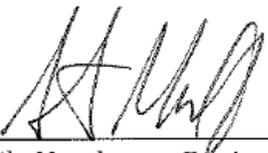
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# Concurrences

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# Executive Summary

The Department of Environmental Quality (DEQ) is undertaking a Watershed Approach (WA) to assist in managing water quality in the State of Oregon. This approach will provide a broad assessment of the status of water quality and other environmental indicators within a basin, greater opportunities for stakeholder involvement and interagency cooperation. This approach will also address some of the limitations of the Total Maximum Daily Load (TMDL) process and improve internal DEQ sub-program coordination. The North Coast WQ Status and Action Plan consist of a status report and an action plan that summarizes the important water quality problems and the strategies needing to be implemented. Together these two “halves” of the plan will allow for the adaptive management of water quality in this geographic area.

It is intended that the Watershed Approach process will be implemented state-wide. It is hoped that this broad-based approach will allow greater flexibility in the assessment process and more assurance that the watershed management will be iterative in nature. It is currently envisioned that each DEQ region (Eastern, Western and Northwest Oregon) will complete a status and action plan for one basin each year. There are approximately 15 basins within the state. This would allow the findings of the status and action plan to be revisited and updated every 5 years.

The watershed approach is intended to provide a basin-scale resource assessment process with more opportunities for direct, interactive feedback from local stakeholders than the TMDL process. Unlike a TMDL, this process is not limited to addressing 303(d) listings using available water quality data. It addresses surface water status for both 303(d) listings and other surface water related concerns, groundwater and upland conditions, and provides an evaluation of the environmental status of the basin as a whole. While the watershed approach is designed to address some of the limitations of the TMDL process, it will not replace TMDLs. This process does not have the regulatory authority of a TMDL and should be viewed more as a guidance document than a set of regulatory requirements.

## What is the water quality status of the North Coast?

To date most of the beneficial use impairment and the pollutants responsible have been identified in the North Coast sub-basins. While there are some uses and suspected pollutants that need further evaluation, the assessment and management strategies being employed at present are, for the most part, on the way to achieving the water quality goals. Below summarizes the status of important uses and water quality conditions (see Water Quality Status for detailed discussion).

### Water Quality Status Summary

- Bacteria are still an important pollutant in the Tillamook watershed and continue to threaten the shellfish industry and contact recreation uses. Recent monitoring has helped identify stream reaches where improvements have been made such as the lower Wilson River. The monitoring data has also identified stream reaches where sources like leaking septic systems and stormwater are as significant as the more typical dairy land sources. Continued effectiveness monitoring targeting pollution reductions efforts for bacterial contamination reduction is critical to the Tillamook and other sub-basins in the North Coast.

- Toxic contamination of shellfish is another concern in the Tillamook estuary. Recent monitoring has shown no heavy metal, industrial organics or pesticides at concentrations that pose a threat to human consumption.
- Drinking water concerns exist for both surface and ground water sources in the North Coast. Surface water pollutants of concern related to watershed activities are primarily turbidity and bacteria (intake contamination) and less frequently, organics, turbidity, and bacteria in treated water. Groundwater concerns consist of potential region-wide nitrate and bacterial contamination, as well as, lead pollution in the Clatsop Plains and Tillamook aquifers.
- There are a number of pollutants and habitat impairments that threaten Fish and Aquatic Life uses. A number of studies, including the Coastal Coho Stream Assessment, in which incorporated biological surveys together with water and habitat surveys have identified temperature, sediment, total solids, habitat modification and dissolved oxygen as concerns. The studies show that temperature and sediment impacts due to poor riparian condition and land use activities degrade the biological condition and are north coast wide. Equally important to the aquatic community, but affecting only specific sites or reaches are poor dissolved oxygen and related parameters (nutrients, pH, etc.).
- The long term ambient monitoring program generates valuable status and trends information using the Oregon Water Quality Index. For the North Coast most sites are classified as in “Good” condition. However, the trend at all 10 ambient sites is downward and the primary pollutant responsible is total solids. Other pollutants trending downward include Biochemical Oxygen Demand (BOD) and phosphorus. These results corroborate many of the other studies in the basin and point to both stream specific and basin wide management concerns.
- Other toxic monitoring activities are on-going and will yield important information concerning emerging pollutants like pharmaceuticals and personal care products.

### **What are key actions for the North Coast?**

Future needs of the Department and its basin partners will be to continue with status and trend (effectiveness) monitoring and look for opportunities to align the existing and emerging water quality problems with the priority actions needed to address them. Emphasis will be placed on improving the partnerships that are inherent in the Department’s sub-program activities and the various stakeholder actions in the basin. The following is a summary of opportunities for water quality improvement and partnership efficiencies (see Action Plan for detailed discussion):

### **Action Plan Summary**

- **North Coast Water Quality Priority Actions** - To protect the human uses of shellfish harvesting and recreational contact, the Department needs to continue the bacteria source identification work for the estuaries, streams, and beaches. This includes identifying the high priority actions that agriculture (dairy farming), cities (sewage and stormwater) and rural homeowners (on-site systems) can do to address the sources of bacteria that they can control. Also riparian and stream restoration that improves habitat and streamside shade, reduces sediment, bacteria and associated pollutants will continue to be a focus in every watershed of the North Coast.
- **Standards and Assessment Actions** – Sedimentation has been identified as a basin-wide concern and there is need for guidance in implementing the narrative standard. There is also a need for clarification on the uses and appropriate criteria for dissolved oxygen in the lower reaches and sloughs. Finally, there is a need to update the Assessment database with the most current information from the lab and external partners, as well as, a number of database housekeeping tasks.

- **Basin Planning Actions** - Continue the outreach and education efforts with an emphasis on collaborative problem solving with local stakeholders. Key partnerships include those with the private, state, and federal forest management organizations, as well as, county, city and local groups. Some key partnerships include Tillamook Estuaries Partnership, Tillamook County Creamery Association, Oregon Department of Agriculture, and local watershed councils. Identify and communicate regularly with a core regional external team to discuss current activities, new information, monitoring and actions that are occurring or need further attention.
- **Water Quality Permit Municipal & Industrial Program Actions** – Improve outreach to small communities with aging wastewater infrastructure, identify opportunities for the beneficial reuse of municipal and industrial biosolids, municipal wastewater, and continue work with the groundwater and NPS programs to provide outreach to graywater users to ensure systems adequately protect water quality.
- **Water Quality Permit Stormwater, Onsite, & 401 Program Actions** – Stormwater priority work will continue to be the routine permitting as the program addresses the issues related to the expired 1200C permit. The On-site program priority is its on-going work, as well as, pursuing a policy option package and a senate bill to ensure a stable funding for the program. For the 401 program, in addition to its core work, an important task will be to evaluate the results of the coastal USGS studies on gravel removal and erosion control that will help determine potential program implementation changes.
- **Source Water Protection Program Actions** - The drinking water program has identified working with forestry to ensure compliance with the Forest Practices Act and identifying important sources of turbidity that may be adversely impacting drinking water intakes as high priorities. Also needed is more data on toxics, including toxic algae, bacteria and turbidity for source water streams. In the Underground Injection Control (UIC) program, coordination of the permit programs (NPDES, WPCF and UIC) to bring the basin UICs into Safe Drinking Water Act compliance will be the focus. In particular there are a number of educational opportunities that could be pursued with municipalities about UICs, stormwater and infrastructure needs (especially in high risk areas), financial assistance programs (SRF), program rules and enforcement.
- **Investments with 319 and SFR Program Actions** - 319 grant priorities for 2011 through 2015 will continue to be working with partners to implement actions that will result in temperature, bacteria and sediment improvements on urban, agricultural and forested lands, as well as, addressing stormwater in urban areas. SRF focus will be to prioritize future projects for facilities that discharge to water quality limited streams (for bacteria) and to expand the program to address non-point source areas of concern, such as supporting communities in implementing stormwater, UIC and potentially the assistance of the Confined Animal Feeding Operations program.
- **Monitoring Program Actions** (Status & Trend, Effectiveness and Toxics monitoring) - Take a lead role in building a regional, collaborative monitoring network consisting of the Tillamook Estuary Partnership, watershed councils, sister natural resource agencies (Forestry, Agriculture, Fish and Wildlife). Emphasis will be to collect and analyze watershed water quality data for interpreting compliance with water quality standards, assessing status and trends in water quality conditions, and identifying the effectiveness of management activities and emerging water quality stressors.
- **Sub-program Alignment Actions** - Maintain a cross program team consisting of regional, headquarters and laboratory staff that meets regularly to discuss current activities, new information, new concerns and actions that are occurring or need further attention.

The North Coast Basin Plan will employ adaptive management principles and therefore refinements will be continuous. The Status Report and Action Plan is not the final product of the Basin WA process and both will be updated or amended with further input and interaction from

## North Coast Basin Watershed Approach

DEQ staff and stakeholders. This plan is a first version based on available information. The plan will be formally updated on a five year schedule.

# North Coast – Water Quality Status

## Purpose

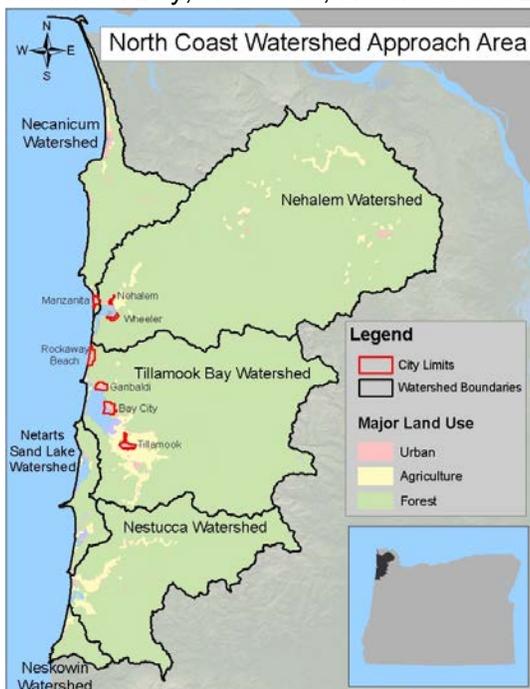
This Water Quality Status summarizes DEQ’s knowledge of the water quality conditions and a brief overview of management implementation for the North Coast Subbasin. It will be used in conjunction with the Action Plan to help guide DEQ’s water quality management for the next five years (2011-2015). This report builds on previous management history, water quality studies and assessments, and summarizes this information in a way that is useful for identifying future actions. The goal is to update the WQ Status and Action Plan for the North Coast subbasins in 2015 but new information will be considered throughout the process.

The North Coast Basin WQ Status is divided into four primary sections: Basin Setting, Beneficial Uses and Water Quality Pollutants of Concern, Water Quality Status and Trends (organized by use and pollutant), and Management (summary of implementation efforts in the basin).

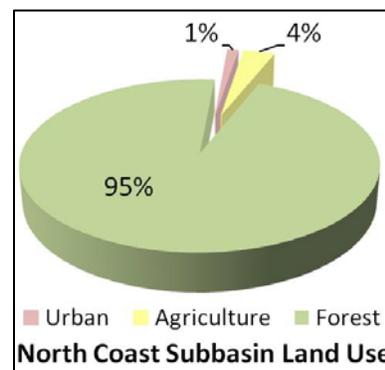
**Action Plan** - The North Coast Action Plan describes in greater detail the future actions that are prompted by the WQ Status. The plan covers both the work that DEQ’s various Water Quality sub-programs (e.g., TMDLs, 319, Monitoring) will be doing, as well as, the important efforts that our watershed partners will be conducting. While the WQ Status documents where we are to date and is retrospective, the Action Plan is prospective and intended to chart a course for where we are heading.

## Basin Setting

The North Coast Subbasin extends from the Columbia River to the southern Tillamook County line and consists of six watersheds that drain to the Pacific Ocean: Necanicum, Nehalem, Tillamook Bay, Nestucca, Netarts/Sand Lake and Neskowin. It includes portions of Clatsop, Columbia, and Tillamook counties and the major cities of Tillamook, Vernonia, Cannon Beach, and Rockaway Beach.



The three largest bays of Tillamook, Nehalem and Netarts provide for economic and recreational opportunities in the region. Chief among them is commercial and recreational shellfishing with over 2.3 million pounds of oysters and clams harvested annually in Oregon. Other important aquatic resources include the freshwater streams that provide critical habitat for native salmon and drinking water for over 77,000 residents. Finally, the beaches, lakes, streams and estuaries all provide numerous recreational (swimming, fishing,



boating, etc.) opportunities throughout the region.

Forestry is the predominant land use in the subbasin covering nearly 95% of the landscape, with the Tillamook State Forest covering nearly 79% of this area. Agricultural land use is about 4% of the subbasin with most of it occurring in the lower portions of the rivers and near the bays. The dairy industry makes up much of this use with dairies located in the lower Tillamook, Nestucca and Nehalem watersheds. Cities are generally located in the coastal plains, adjacent to the bays or the ocean.

# Beneficial Uses and Water Quality Pollutants of Concern

## Human Health Uses

Bacteria, toxics (e.g., metals, pesticides), sediment (in the form of turbidity) and nitrates are pollutants that can directly affect people's health. In the North Coast there are three principle ways in which people can be exposed to these pollutants: via drinking (surface water and groundwater sources), recreational contact (swimming, boating, and fishing), and the consumption of fish, oysters, clams and crabs.

Tillamook and Netarts Bay support commercial oyster operations with clamming occurring in all the estuaries and along the coastline. Commercial shellfish harvesting in Tillamook Bay is periodically closed during periods of high rainfall due to bacterial pollution. Additionally, water contact advisories in the lower rivers and at several ocean beaches due to bacterial contamination periodically occur. Sources of the contamination include dairy operation run-off, failing on-site septic systems, urban runoff and, in some cases, wildlife.



**Sediment after a significant rain fall event from a forest road/hillside failure at the confluence of Luebke Creek and the Wilson River.**

Several water supplies experience periodic shutdowns due to high turbidity levels. Elevated nitrate concentrations in groundwater due to various land use practices are a potential concern in areas serving as city drinking water sources. Toxics, including pesticides and pharmaceuticals from agricultural and urban stormwater sources, have been identified as a potential concern in the basin that could affect the surface water

supplies as well as fish and aquatic life but little data has been collected to assess the risk.

Sunset Lake and Lake Lytle have aquatic weed problems that interfere with boating and other recreation resulting from invasive exotic weed introductions and nutrient enrichment.

## Aquatic Life and Fish Uses

Spawning and rearing habitat for Coho and Chinook salmon, Steelhead and Cutthroat trout is distributed throughout most of the streams and rivers of the North Coast Subbasin. Chum salmon use lower-elevation reaches upstream of tidewater for spawning. These fish also use the estuaries and bays as they migrate between the rivers and ocean. Coho are currently listed as a threatened species and Steelhead is listed as a species of concern in the North Coast. Studies conducted by DEQ and ODFW showed poor condition for fish (15% of stream miles) and macro-invertebrates (40% of stream miles) in the North Coast [1]. Temperature, sediment (bedded, total solids and turbidity) and dissolved oxygen have been identified as pollutant stressors that affect these fish and aquatic life throughout North Coast subbasin in part due to inadequate streamside shading and vegetation, and in the case of temperature, warm water discharges. In the estuarine sloughs of Tillamook Bay and potentially in spawning reaches in the Wilson, Trask, Nehalem and Nestucca River's low dissolved oxygen have been identified as a concern.

These parameters of concern and their affect on beneficial uses will be discussed in more detail in the following sections.

## Water Quality Status and Trends

In the following sections we will discuss water quality and its relationship to human health concerns and fish & aquatic life needs. We will discuss the relative contribution of various pollutant(s) identified as responsible for the water quality impairment. Where the data and analysis is available the water quality trending for these uses and pollutants will also be discussed.

### Water Contact Recreation – Bacteria Status

While much work has been done, bacteria problems still exist in the lower portions of most rivers and estuaries in the North Coast where urban and agricultural land use occurs. Levels of fecal bacteria (bacteria contributed by warm-blooded animals and humans such as fecal coliform, *Escherichia coli*, and *Enterococcus* spp.) in water are used as an indicator of the potential contamination and spread of water-borne diseases. To protect shellfish growing, the estuaries have a fecal coliform bacteria standard that is lower than the standard for water contact recreation (*E.coli*). Low concentrations of fecal coliform bacteria in an estuary can become concentrated in shellfish tissues, making them unsafe to eat. This is especially true for oysters which are often eaten raw. TMDLs [2] were developed to protect shellfish and human health in 2001, 2002 and 2003 and cover all of North Coast watersheds (both fresh and estuarine waters), with the exception of the Netarts/Sand Lake and Neskowin watersheds.

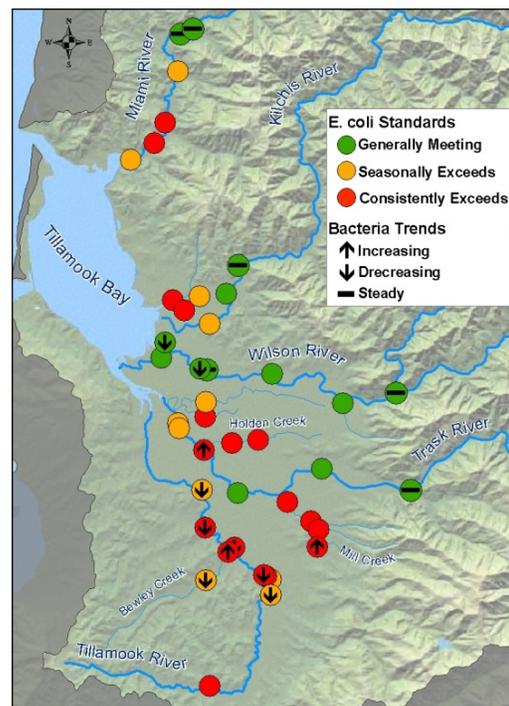
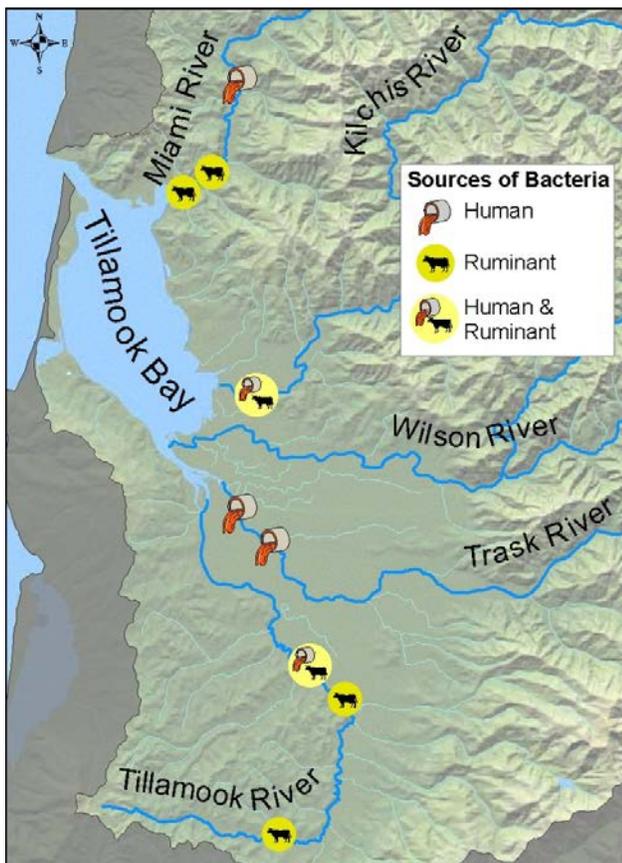


Figure 1: Tillamook Bay Watershed bacteria trend monitoring. Symbols represent *E.coli* standards status in 2008 and trend from 1997 to 2008.

## Trending and Source Identification - Tillamook Watershed

The 1998 303(d) list and subsequent 2001 Tillamook Bay TMDL identified several major reaches in the watershed that did not meet the water quality standards for bacteria. These reaches include the lower Wilson, Trask, Kilchis, and Miami Rivers and the entire mainstem of the Tillamook River. DEQ analyzed *E. coli* data from 43 sites collected from 1997 through 2008 as part of the Tillamook Estuary Partnership (TEP) Volunteer Monitoring Program. Results indicated that four of the five rivers in the watershed still exceeded Oregon’s water quality standard for recreational contact, however they also showed that improvements in reducing bacteria occurred (Figure 1). For example, the Wilson River is currently meeting standards for recreational use and has been since 2005. Progress has also been made in the Tillamook River watershed although most sites continue to exceed standards. Results of the analysis show that a majority of sites in the 5 watersheds have decreasing trends of *E. coli*. Increasing levels of *E. coli* are occurring at Mill, Bewley and Holden Creeks. Resources will need to be focused in these reaches to address the increasing trends and continued monitoring will be required to document progress in the future.



**Figure 2: Tillamook Bay Watershed OSU bacteria source tracking study results. Symbols represent sources of *E. coli* from DNA fingerprinting evaluation that were above the basin average.**

*E. coli* bacteria can come from several different sources; both point source and non point source (NPS), human and animal. To better discriminate bacteria sources, TEP worked with Oregon State University to do a bacterial DNA marker study [3]. Researchers sought to identify bacterial sources by detecting host-specific genetic markers. The DNA study was reliably able to identify bacteria associated with humans or ruminants (animals such as cows and elks). Results indicated widespread contamination from ruminants and, in certain river segments of the Trask, Miami, and Tillamook Rivers and Holden Creek, significant contamination from humans. This independent report concluded that “a watershed manager’s best strategy for decreasing indicators of fecal pollution in this watershed is to mitigate runoff from ruminant sources”.

The human sources of bacteria that have been identified in the Tillamook Bay Watershed include important point sources, such as Tillamook Wastewater Treatment Plant (WWTP), city stormwater and failing septic systems. DEQ has facilitated an upgrade to the Tillamook WWTP through the permit renewal process. With the completed WWTP upgrade the City will begin to address sewer and stormwater cross-

connections. For example, DEQ is working with the City of Tillamook to complete a stormwater management plan. Finally, DEQ’s On-site program has recommended that Tillamook County investigate potential failing septic systems in the stream reaches where bacteria DNA indicated human sources were contributing to water quality problems.

**Beach Monitoring.** In October 2000, Congress passed the Beaches Environmental Assessment and Coastal Health (BEACH) Act which directs the U.S. Environmental Protection Agency to fund beach monitoring for bacteria [4]. The Oregon Beach Monitoring Program (OBMP) is a partnership between DEQ and the Office of Environmental Public Health (OEPH) to monitor marine waters along Oregon's coastline for *Enterococcus*, an indicator of fecal contamination. High levels of *Enterococcus* bacteria are associated with the presence of other infectious microbes. Sources of *Enterococcus* are the same as other fecal bacteria (storm water runoff, animal and seabird waste, failing septic systems, sewage treatment plant spills, and boating waste). The North Coast OBMP program includes ten beaches and 41 samples locations. Beach selection is based on public use information, public input, potential pollution sources, and previous monitoring data. Sampling locations are re-evaluated every other year. For these sites the beach advisory criteria has been exceeded 2.5% of the time from August of 2002 to November of 2010. Since the fall of 2009, Cannon Beach, Tolovana State Park, Hug Point State Park, and Seaside have had one advisory each. The DEQ and OEPH also work with nonprofit groups such as Surfrider and Earth 911 to do additional sampling based on state agency results. Current status of Oregon ocean beaches is mapped on the Earth 911 website [5].



**Figure 3: Oregon Beach Monitoring Program bacteria monitoring sites and advisories since fall of 2009. Single sample beach bacteria advisory level is set at bacteria concentrations: >158cfu/100mL.**

## Future Bacteria Trending Work

**Nehalem Watershed.** Due to the success and applicability of the *E. coli* status and trend monitoring effort in the Tillamook Bay watershed, TEP in 2009 expanded their monitoring program to include the lower Nehalem watershed. Data is being collected from eight locations in the lower Nehalem, North Fork Nehalem and selected tributaries. It is anticipated that starting in 2011 DEQ will be able to perform an analysis similar to the Tillamook, which may lead to bacteria source tracking studies as well.

**Necanicum Watershed.** Limited bacteria data is available for the Necanicum watershed. There is only one ambient monitoring site in the basin and data has been collected on a quarterly basis since 2001. A watershed scale monitoring effort has not been established at this time. However, DEQ's Volunteer Monitoring and North Coast Basin Coordinator have been working with the Necanicum Watershed Council to develop a Sampling and Analysis Plan (SAP). The SAP has been approved by DEQ and the watershed council is scheduled to begin implementing the plan soon. Surfrider has also been collecting bacteria data in Ecola Creek.



## Water Contact Recreation – Aquatic Weeds and Algae

**Status.** Lake Lytle and Sunset Lake are water quality limited for aquatic weeds which have interfered with recreation of boating and swimming. Lake Lytle does not need a TMDL, as nutrients were not found to be a key factor causing the growth of the invasive aquatic weed Eurasian Milfoil. This weed was found to be the dominant species in a 1994 Clean Lakes Study. An Integrated Aquatic Vegetation Management Plan (IAVMP) was developed for Lake Lytle and the City of Rockaway Beach by Portland State University [6]. Sunset Lake was listed as water quality limited based on the growth of the invasive fragrant water lily (*Nymphaea odorata*). An IAVMP was put together for Sunset Lake by Portland State University [7]. DEQ needs to determine if a nutrient TMDL is still needed for Sunset Lake. The implementation status of both plans is unknown at this time. Cape Meares Lake was also identified in the Atlas of Oregon Lakes [8] as being of potential concern for aquatic weeds and algae based, but additional data is needed. No lakes in the North Coast have had health advisories for Harmful Algal Blooms.

## Shellfish Consumption – Toxics

**Status – Tillamook and Netarts Bay.** Development of industry, agriculture, and urban areas in the Tillamook Bay Watershed has led to an increased potential for a variety of pollutants to affect fish and shellfish. In addition to bacteria concerns in Tillamook Bay, toxics were also identified as a potential contaminant risk to shellfish.

In 1999, DEQ sampled fish tissue and sediments from approximately 30 sites in Tillamook Bay as part of EPA's Environmental Monitoring & Assessment Program. EMAP is designed to assess ecological risks, not human health risks. Whole juvenile fish were analyzed for metals, chlorinated pesticides, and Polychlorinated biphenyls (PCBs). Surface sediments were analyzed for Polycyclic Aromatic Hydrocarbons in addition to the contaminants analyzed in whole fish. The list of contaminants found in whole fish and sediment suggested that other organisms such as shellfish may also be contaminated [9].

To address this concern, TEP and DEQ partnered with Oregon Department Fish and Wildlife (ODFW), and Oregon Department of Human Services (DHS) to further investigate toxics in Tillamook Bay by sampling shellfish (clam) tissue. Clams (Figure 4) and sediments were collected at 25 randomly selected sites from areas that were identified by ODFW as typical harvesting locations in Tillamook Bay and three locations in Netarts Bay. The Netarts Bay samples were used to help establish naturally occurring levels of contaminants for comparison to the Tillamook Bay samples.

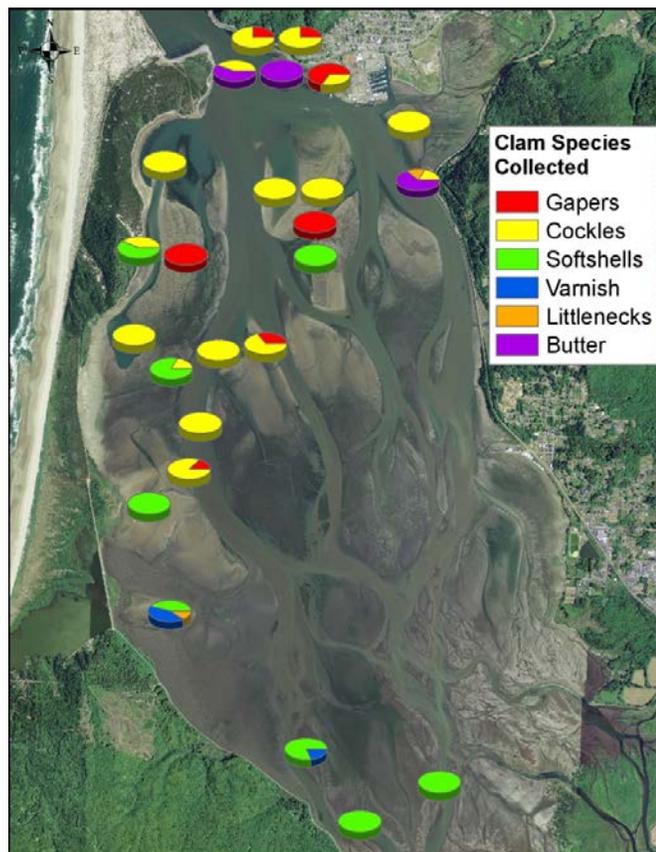
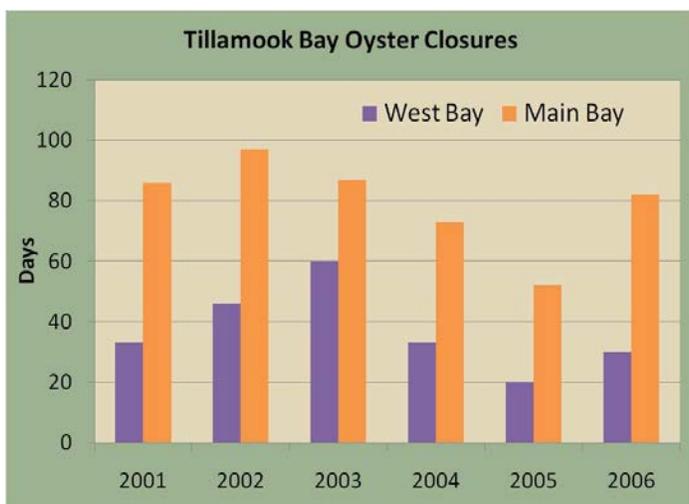


Figure 4. Tillamook Bay clam sampling locations and species collected for the 2006 toxics study.

Clam tissues were analyzed for the following bioaccumulative pollutants: metals, PCBs (polychlorinated biphenyls), PAHs (polycyclic aromatic hydrocarbons), chlorinated pesticides, and dioxins. The sediment samples were not analyzed initially, but were held for later analysis if results from tissue sample warranted additional investigation. The most frequently detected metals in clam tissues were aluminum, arsenic, chromium, iron, and nickel. Dioxins were detected in only one tissue sample. PCBs, PAHs, chlorinated pesticides, and mercury were not detected in any of the samples. These analytical results were provided to the Environmental Toxicology Section of the Office of Environmental Public Health at DHS to determine if the levels detected could pose a risk to human health and whether a consumption advisory was warranted for the bay. Based on a screening value risk assessment, DHS determined consumption of Tillamook Bay clams did not pose an unsafe risk to the public at this time.

### Shellfish Consumption – Bacteria

ODA monitors fecal coliform levels in Tillamook Bay and regulates the commercial oyster harvest based on the results. Oyster harvesting is frequently closed, particularly after rainfall, due to unsafe fecal coliform levels in the Bay (see chart below). Additionally, areas of the bay that are closer to the major rivers are either closed or are more restricted for commercial harvesting due to their proximity to sources of contamination.



direct result of monitoring the recent water quality improvements.

### Drinking Water – Toxics, Bacteria, and Turbidity

**Status.** The majority of drinking water sources that supply drinking water to communities on the North Coast are surface water intakes in small mostly forested watersheds. The drinking water treatment plants are generally small and provide minimum (sand filtering typically) treatment. In the North Coast, most drinking water source areas (DWSAs) do not have restricted or protected land use. Therefore, many drinking water sources are at risk to pollution entering surface waters. In the North Coast contaminants include turbidity, pesticides, and to a lesser extent, pharmaceuticals and personal care products. There are 18 public drinking water systems within the North Coast Basin that are supplied in whole or in part by surface water intakes [10]. These water systems serve over 479,000 people.

Management plans have focused on addressing bacterial sources in the watershed and should lead to fewer closures and to opening more areas for oyster harvesting. In fact, ODA is presently in the process of opening approximately 400-acres (or roughly 10% more) of additional tidelands in Tillamook Bay for shellfish propagation as



Figure 5. Drinking Water Source Areas present in the

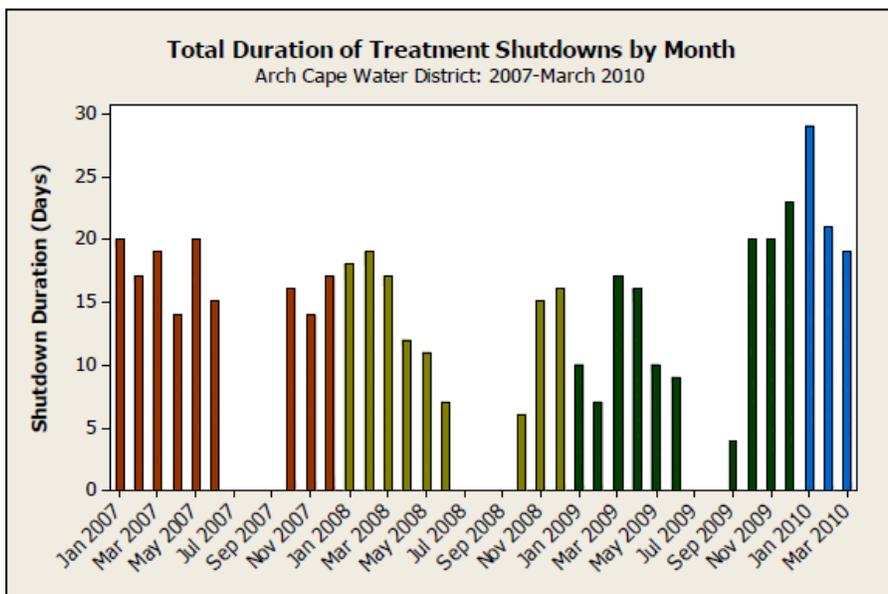
Safe Drinking Water Act (SDWA) monitoring data indicates that seven water systems served by surface water have experienced contamination problems in treated water. Contaminants of concern include volatile organic compounds (4 systems), synthetic organic compounds (2 systems), turbidity (3 system), and bacteria (1 system). In addition, low levels of DEET (an insecticide), cholesterol, and phthalates were found in Seaside’s raw drinking water as part of DEQ’s Drinking Water Source Monitoring Project.

As part of the SDWA requirements, a number of public drinking water systems with intakes in the North Coast Basin were required to conduct up to two years of *E.coli* monitoring to determine if they are at risk from *Cryptosporidium* or other pathogenic microorganisms entering the drinking water supply. Fourteen public water systems in the North Coast reported *E. coli* counts over 100 per 100mL during the two-year period.

Turbidity is also an issue for basin public water systems. Elevated turbidity often results in increased backflushing and additional chemicals in the treatment process, thus increasing overall treatment costs to the public water systems and communities. Contaminants adsorbed to the surface of entrained particles in turbid water can also pose a threat. In addition, high turbidity due to organic matter in untreated water requires more chemicals to treat and is associated with the formation of disinfection byproducts during the drinking water treatment process. Eleven of the eighteen surface water supplied public water systems in the North Coast basin have received DHS alerts over the years for high levels of trihalomethanes and haloacetic acids in their source water.

In 2010 DEQ has evaluated eight public water systems in the north and middle Oregon Coast Range with the goal of evaluating available turbidity data for long-term trends [11]. DEQ found that long term turbidity trends are generally increasing in five DWSAs, stable in one area, and is decreasing in two other areas.

The Arch Cape Water District was one of the five DWSAs that showed an increasing trend (see chart below) and is the only one of the eight examined that is located in the North Coast Watershed. High turbidity levels may be the result of natural watershed characteristics and events such as storms, slides, and bank erosion, as well as, land uses such as forestry, agriculture, suburbanization, and road building.



While Oceanside Water District was not included in the broader study, in recent years it has also experienced higher turbidity levels than the treatment plant could filter. The high turbidity occurred during the summer and was not associated with rainfall. A DEQ investigation determined that a gravel mining operation de-watering pit was responsible for the high turbidity levels.

In addition to Arch Cape and Oceanside, there are 23 additional communities that rely, at least partially, on surface water sources. Results from the Coast range study and the Oceanside example suggest that it is possible that similar situations could exist in other North Coast DWSAs. Another indicator of the susceptibility of surface DWSAs to landscape changes and subsequent sediment delivery is the significant declines identified in Oregon Water Quality Index due to total solids (see OWQI discussion).

**Future Work.** In 2010, DEQ developed a Pesticide and Pharmaceuticals Monitoring Project to target surface waters and surface and groundwater drinking water sources in the lower Tillamook Bay Watershed. To detect for water soluble organics (pesticides and pharmaceuticals) Polar Organic Chemical Integrative Samplers (a 30 day integrated sampler) were used to sample at eight locations in the fall of 2010. The sampling locations included two City of Tillamook surface drinking water intakes. The two surface drinking water sources serve not only the City of Tillamook but the South Prairie and Pleasant Valley Water Districts as well. It is expected that the analytical results will be available in the spring of 2011.

The Pesticide and Pharmaceuticals Monitoring Project builds on the limited data available from the North Coast ambient network. During this effort in April of 2009, one-time grab samples were screened for the presence of pesticides. No pesticides were observed above detection limits at any of the ten ambient sites. However, there were some pesticides detected at ambient sites in the South Coast. Thus a more detailed monitoring is necessary to adequately determine toxic contamination in

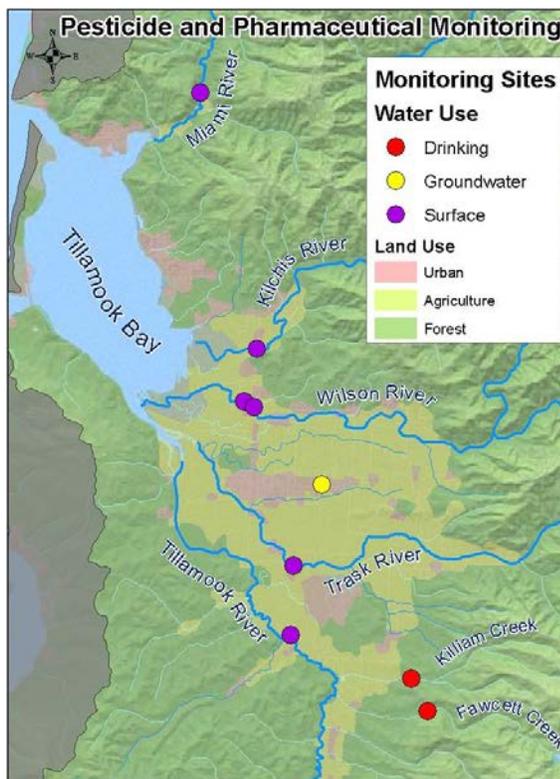


Figure 6. TEP and DEQ pesticide and pharmaceutical monitoring location for the Tillamook Bay Watershed collected in 2010.



Photo 2. POCIS monitoring device being prepared for deployment in a stream.

the North Coast.

Other source of information on the North Coast will come from the monitoring associated with Senate Bill 737 (SB737). SB737, passed in 2007, requires DEQ to develop a list of persistent pollutants that have a documented effect on human health, wildlife and aquatic life (“P3 List”).

The list includes 118 toxic chemicals that are divided into 2 groups: 69 persistent pollutants and 49 legacy (banned or restricted) pollutants. Oregon’s 52 largest municipal wastewater

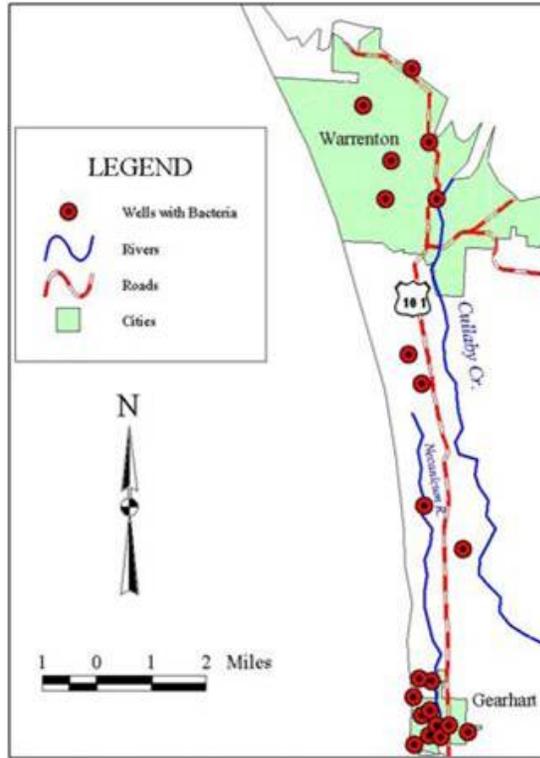
treatment facilities are monitoring their effluent and must submit reduction plans to DEQ by July

2011 to address persistent pollutants detected in wastewater above a certain level. DEQ is working with municipalities to coordinate sampling and analysis and is providing technical assistance for developing reduction plans. In the North Coast, the cities of Seaside and Tillamook are monitoring their effluent for persistent pollutants.

**Groundwater – Nitrate, Bacteria, and Lead**

Oregon’s North Coast includes unique and sensitive groundwater aquifers. Groundwater studies have focused on the areas with the highest population and commercial and agricultural activity. The Clatsop Plains aquifer is in an area that has sustained high growth and development. Productive aquifers are also present in the Tillamook area in shallow alluvial sediments. In the North Coast basin, there are 62 public water systems relying in whole or in part on groundwater serving a total population of almost 24,000 residents. Typical aquifers in the area are shallow, occurring in sedimentary sand and gravel near the coastline and adjacent to the major rivers.

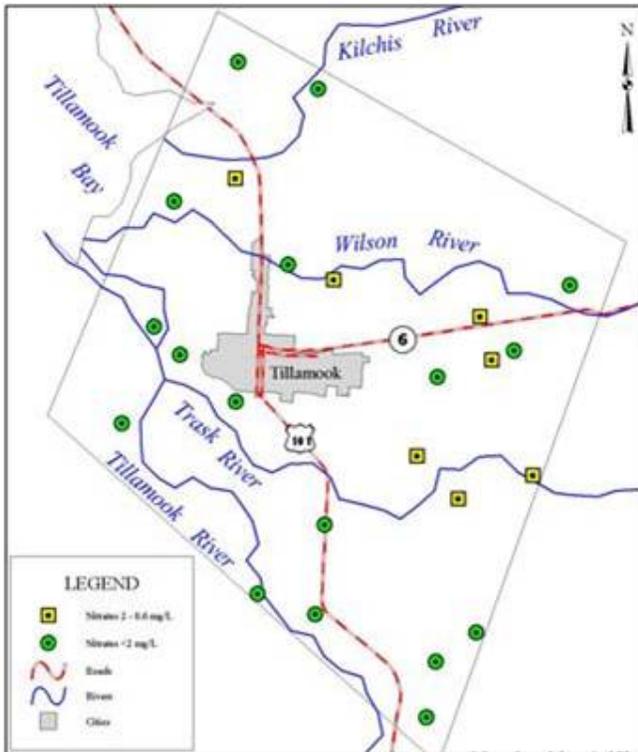
North Coast basin studies show nitrate, bacteria, and lead impact shallow groundwater in some areas. Results from the Clatsop Plains area indicated that elevated groundwater nitrate and bacteria concentrations occur in the area [\[12\]](#). It



**Figure 7. Clatsop Plains well locations monitored as part of the DEQ Groundwater Quality Report for the North**

was concluded that elevated bacteria concentrations may be from poor well construction and maintenance rather than aquifer-wide bacteria problem. Lead was also detected above drinking water action levels in a few wells sampled in the Clatsop Plains. Other pollutants that have been detected in the area are arsenic, copper, cadmium, chromium, and barium, but these pollutants were not confirmed when wells were re-sampled.

Groundwater in the Tillamook area is also a source of drinking water. Lead has been detected above actions levels in one well in the area. In addition, antimony and bacteria has also been detected but not confirmed in follow up sampling. There is also some indication that bacteria and nitrates are a problem on a regional scale. The real estate transaction database indicated that 9%



**Figure 8. Tillamook well locations monitored as part of the DEQ Groundwater Quality Report for the North Coast Basin, Oregon.**

of drinking water wells were positive for bacteria while approximately 1.5% had nitrate levels above drinking water standards.

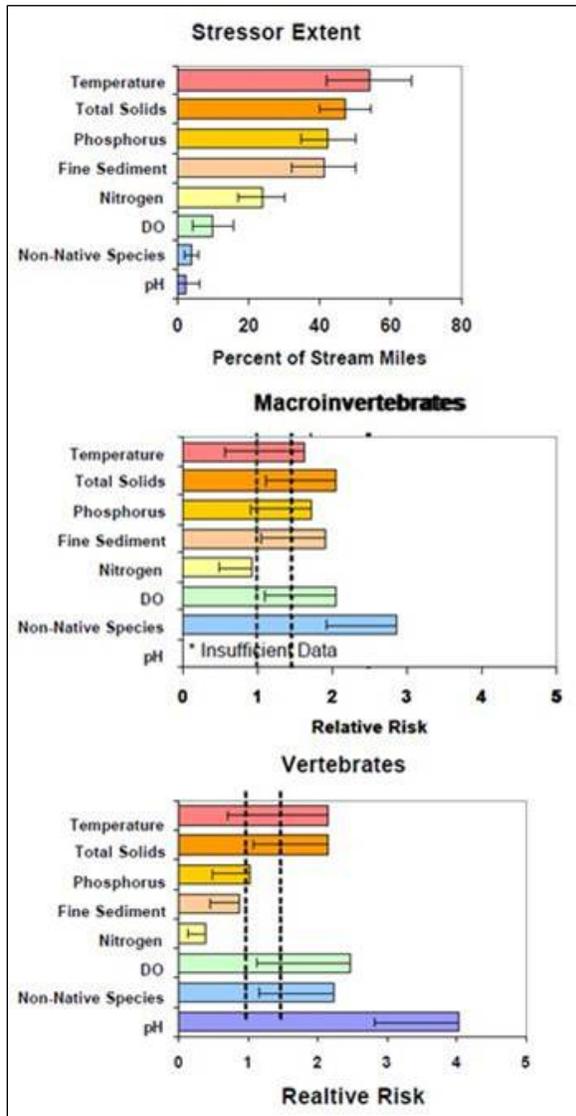
## Fish and Aquatic Life

In many of the same ways that humans are affected by pollution, fish and aquatic life that live in surface water are also affected. Elevated temperature, toxics, sediment (in the form of excess turbidity or total solids, and poor quality bed sediments), and excessive nutrients are all forms of pollution that can adversely affect aquatic life. Aquatic life is in direct contact with these pollutants and therefore will be most impacted by it. Also since an ability to sustain a balanced biotic community is one of the best indicators of the potential for beneficial use, a well balanced monitoring program should seek to assess "biological integrity". For this reason judging the health of aquatic communities is an important measure of water quality pollution. In the North Coast there is a suite of indicators that can help evaluate aquatic health: macro-invertebrate community structure, salmon populations, and pollutant parameters.

### Fish and Aquatic Life – Biological Indicators Coastal Coho Evolutionarily Significant Unit (ESU) Study

As part of the Oregon Plan for Salmon and Watersheds [13], DEQ collected information on aquatic vertebrate (fish and amphibians) and macroinvertebrate (insects, snails, worms, etc.) communities. A summary report of conditions for biological communities and stressors was released in 2005, based on data collected from 1994- 2003 [14]. These surveys were part of a random study design, allowing for a smaller number of samples to estimate conditions across the entire stream network. Results are representative of all wadeable stream miles in the Coastal Coho ESU which extends from North Coast to just above the South Coast just above the California border.

Results from this survey showed that approximately 15% of the North Coast streams were in poor condition for aquatic vertebrates. This was the lowest of any of the other basins included in the ESU (Mid Coast, Mid-South Coast, and Umpqua). However, assessments of



**Figure 9. Extent of stream miles in poor condition for various stressors (top panel) in the Coastal Coho ESU. The risk associated with each stressor to macroinvertebrates (middle panel) and aquatic vertebrates (lower panel) are also shown. Error bars are 95% confidence intervals. Risks are considered significant if the magnitude is greater than 1.5 and the lower confidence is greater than 1.0.**

macroinvertebrates were markedly different, with 40% of the North Coast in poor condition (highest of the four ESU basins). The difference between the two results may be related to the invertebrate sensitivity to sediment conditions (see discussion below).

**Stressors Extent and Risk.** In addition to sampling biological communities, we also collected information on potential water quality and habitat stressors to the biological communities. We determined the extent of streams in poor condition for these stressors, as well as the potential risk to the biological community associated with poor habitat or water quality conditions.

At the broader Coastal Coho ESU scale (results were not summarized specifically for the North Coast), the most extensive stressors were temperature, sediments (total solids and fines), and nutrients (phosphorus and nitrogen). Stressors that posed the greatest risk to the aquatic life were total solids, fine sediment, dissolved oxygen, the presence of non-native fish, and pH. Parameters like pH and dissolved oxygen, while posing significant risks to the biology, were not extensive. While temperatures frequently exceeded the water quality standard, the risk to fish and macroinvertebrates does not appear to be significant. Results from this analysis may be influenced by fact that the some reference sites also show temperature impairment. This is an important point because of it indicates that improving water temperature conditions will be a challenge. Parameters like total solids and fine sediments were frequently in poor condition and posed a significant risk to the biological communities. Given these results, it appears that future improvements to fish and aquatic life uses would be maximized by comprehensively addressing these widespread and high risk stressors.

**Relationship to contemporary data.** DEQ and ODFW, as part of the Oregon Plan, have recently collected more data on macroinvertebrate communities in the North Coast. From 2000-2008, 100 random samples in the North Coast showed 27% of sites in poor condition. About 8% of the North Coast sites showed temperature stress and 18% showed fine sediment stress. Stress for temperature and fine sediments was determined by utilizing species specific information related to tolerances to both stressors [15]. However, the percent of **stream miles** associated with these sites has not been determined, making direct comparisons of trends between the two data sets difficult. Future assessments of biological conditions should estimate the percent of stream miles for the 2000-2008 data, allowing for more direct comparisons across reporting periods. This will require coordination with ODFW Oregon Plan staff.

Currently, there are no funds, including Oregon Plan funding, available to routinely collect macroinvertebrate or aquatic vertebrate community information in the North Coast. Future biological assessments in the North Coast are in jeopardy and will yield a “data gap” without some investment in this form of monitoring.

### Fish and Aquatic Life – Temperature

**Status.** Temperature problems occur throughout the North Coast Subbasin. Three separate TMDLs that cover the entire North Coast were developed [2] to protect for the beneficial use of fish and aquatic life, in particular migration, spawning, rearing, and threatened and endangered criteria for salmonids.

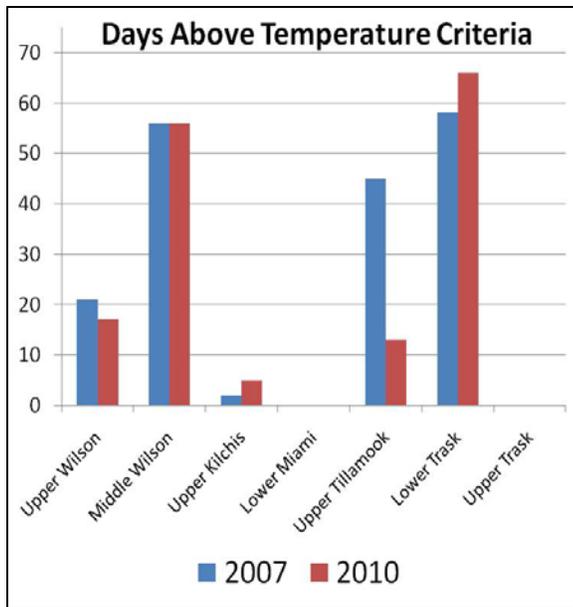
There are two primary sources of this heat loading generally occurring in the North Coast Basin: increased solar radiation



**Figure 10: North Coast streams water quality limited for temperature and covered by TMDLs**

due to riparian alterations, and heat from warm water point source discharges. As mentioned in the introduction the majority of the watershed is in public and private forestry management. The Oregon Department of Forestry (ODF) manages State public land under the Forest Practices Act. On federal lands, the US Forest Service follows the Northwest Forest Plan for forest management. On agricultural land, Oregon Department of Agriculture implements measures established in Senate Bill 1010 through the North Coast Basin Agricultural Water Quality Management Area Plan.

### Trending – Tillamook Bay Watershed



DEQ has been working to establish long-term temperature trends in the Tillamook Bay Watershed. DEQ has temperature data for 20 long-term monitoring sites over a 10 year period. Data analyses indicates that water temperatures are still exceeding rearing and migration and spawning criteria for the five salmon species in the North Coast.

Continued analysis and data collection is needed to fully evaluate surface water temperatures in this area. One metric that could be used for determining trends is the number of days per year that a site exceeds temperature criteria. The graph at left shows an example of this data for 7 sites in 2007 and 2010. By accounting for “wet versus dry” years and then comparing among years, this analysis may be more sensitive in detecting temperature improvement than strictly tracking how many stream sites are

violating the criteria.

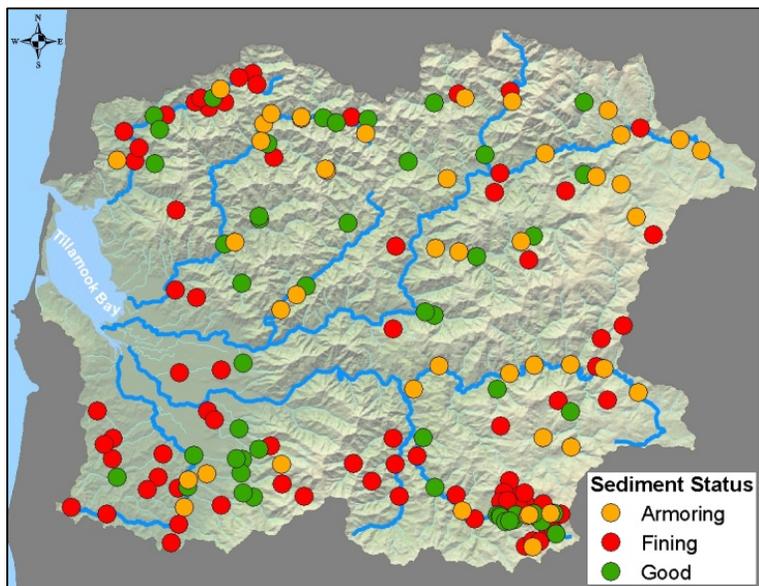
### Nehalem and Nestucca Watersheds

Building on the large data set in the Tillamook Bay Watershed DEQ has also started monitoring temperature at 5 locations each in the Nehalem and Nestucca watersheds in 2009. This data will be used to determine TMDL effectiveness and will be included in the next round of North Coast temperature TMDL updates.

### Fish and Aquatic Life – Sediment and Habitat Modification

**Water quality status.** Sedimentation is the process of particles settling out of the water column and depositing on a streambed or estuary floor. In a healthy system, a balance between sediment deposition and sediment transport is maintained. Several factors contribute to sediment transport and deposition in coastal streams. These include stream power (flow and slope), large woody debris (LWD), stream width, bank stability, and riparian and upland conditions. If these factors are altered such that the balance between deposition and transport is disrupted, excess deposition of fine sediments or a depletion of fines-sands-gravels (scour and armoring) of the bed can occur. These conditions can adversely affect salmon egg and fry survival, spawning habitat quality, and other aquatic life such as macroinvertebrates (see above section).

**Tillamook watershed.** In 2006, DEQ partnered with Tillamook Estuary Partnership to conduct a three year study to characterize stream sediment conditions in the watershed [16]. This study



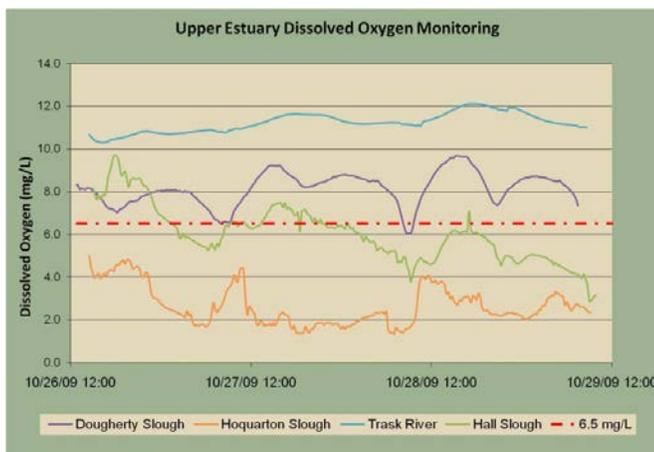
**Figure 11. Monitoring locations in the Tillamook Bay Watershed and Relative Bed Stability Index results.**

used an EPA EMAP design that enabled robust statistical analyses on 172 sites spread across the 5 watersheds in the Tillamook Bay basin. Previous sediment surveys had identified excess fine sediment accumulation as a potential problem in the Bay. The TEP study supports the view that the historical source of the fine sediment is from the stream network of the bay's watershed. That is, the 2006 work revealed that the mainstem stream habitats are degraded more by excess scour and lack of large wood than from excess fine sediment deposition. Scour indicates that the average stream bed particle size is larger (cobbles and boulders) than expected given

the physical characteristics of the streams. This appears to be due, in part, to a lack of wood which can slow stream flow allowing for deposition and also actively retain stream gravel. However, the study did identify localized reaches in the mainstem Tillamook River, lower mainstem Miami River, and the Trask River with high amounts of fine sediments.

**Nestucca watershed.** In 2004, the BLM initiated a three year assessment [17] of the Nestucca River stream network in 2004 to validate the initial 303(d) listing for sediment impairment and to provide some data necessary for the development of a Water Quality Restoration Plan (WQRP) on BLM land in the basin. The results of the study indicate that the Nestucca River stream network is generally not impaired by fine sediment. Furthermore, the amount of large woody debris, pool frequency, and bankfull width to depth ratios are within normal ranges of the reference data. However, the Nestucca River was analyzed separately and it appears to have an elevated fine sediment supply and lacks sufficient large wood, it also has a larger than expected width-to-depth ratio. Additionally, the Nestucca tributaries have decreased pool depths.

**Nehalem watershed.** DEQ has been working with the Upper Nehalem Watershed Council to develop and maintain a long-term turbidity monitoring network in the upper Nehalem Watershed. At this time results have not been analyzed to establish status and trend information.



### Fish and Aquatic Life – Dissolved Oxygen

**Water quality status.** Fish and other aquatic organisms rely on oxygen dissolved in water to sustain life. As dissolved oxygen levels in water drop, aquatic life is stressed. If the concentration drops to low enough levels (e.g., 1-2 mg/l for a few hours) it can result in fish kills.

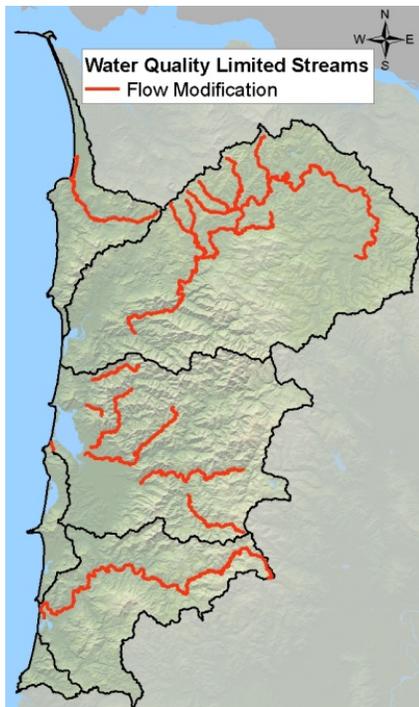
The water quality criterion for DO in estuaries is 6.5 mg/l and is based on the minimum level required to support aquatic life (particularly juvenile salmon). Oxygen levels are affected by temperature, algae growth, nutrients, flow, and other factors.

**Tillamook Watershed**

DEQ has designated Dougherty, Hoquarton, Hall, and Hathaway sloughs as water quality limited for DO. DEQ and TEP initiated a project in 2007 to gather oxygen data from these sloughs to understand the important drivers and potential sources of oxygen demanding materials in these brackish waters.

Results of the monitoring indicate that DO in Tillamook Bay sloughs regularly drops below 6.5 mg/L during spring, summer, and fall seasons putting salmon at risk. Hoquarton (see graph above) and Hall sloughs are most frequently impaired. In contrast, the lower Trask River (near the confluence of the Hoquarton and Dougherty sloughs) appears to maintain adequate DO levels year round. An assessment is underway to determine the sources of oxygen demanding

material leading to the low dissolved oxygen in the sloughs and strategies for implementation measures to address them. The assessment may include a modeling component that will, among other things, establish a natural system potential for DO in these highly altered sloughs.



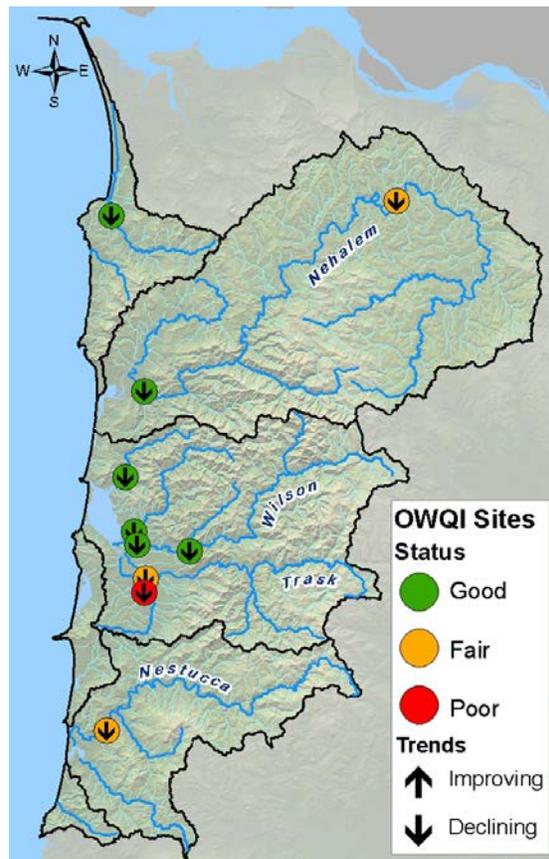
**Figure 12. North Coast basin streams water quality limited for flow.**

**Fish and Aquatic Life – Flow Modification**

Flow modification has been identified as a potential concern in the North Coast [18]. At this time data is not available to determine flow status. DEQ has partnered with Oregon Water Resource Department

(OWRD), ODA, and ODFW to develop Oregon’s

Integrated Water Resource Strategy [19]. The Strategy will allow the agencies to combine resource to address the lack of flow data and plan for future scenarios. Flow modification can contribute to the negative effects of temperature, sedimentation and impacts to aquatic life.



**Figure 13. Oregon Water Quality Index monitoring locations, status and trend in the North Coast.**

## Multiple Uses – General Water Quality Conditions

### Oregon water quality index - status

The 10 year mean Oregon Water Quality Index [\[20\]](#) scores were evaluated for DEQ's long term ambient sites in the North Coast. This index provides a general assessment of water quality at a site by combining information from eight water quality parameters into a single score. Sub-indices can report on conditions of temperature, dissolved oxygen, pH, BOD, total solids, nitrogen, phosphorus, and bacteria. The index scores are classified into five condition classes from excellent to very poor. Six out of the ten ambient water quality monitoring sites in the North Coast had "excellent" or "good" water quality as depicted by the OWQI. Three sites were in "fair" condition and one location was categorized as "very poor". For simplicity of reporting, the map at right has combined the five categories into three: Good, Fair, and Poor.

### Trending

OWQI trends were analyzed in two ways: the value of the single score and the values of each of the eight individual parameters. All ten North Coast ambient sites showed declining trends in OWQI scores from 1999 to 2009. Total solids, which are highly correlated with turbidity, showed significantly declining sub-index scores at eight of the ten North Coast ambient sites (all except upper Nehalem and lower Wilson River sites). The BOD sub-index showed declining trends at four sites (Nehalem, Trask, and Tillamook River sites). Declining sub-index values were observed for phosphorus (Nehalem River site) and nitrogen (Kilchis River site).

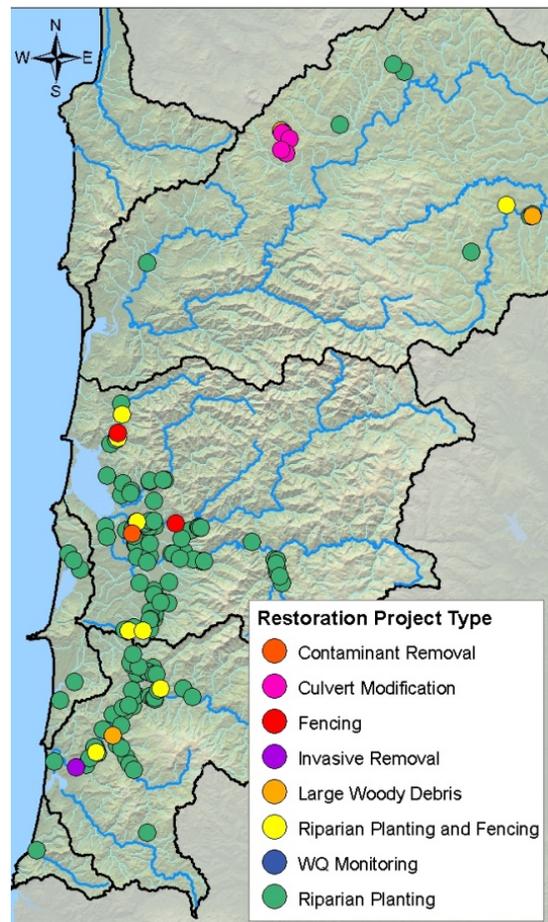
# Management History Overview

Agencies and stakeholders responsible for most of the water quality management in the North Coast consist of a network of federal and state agencies and local organizations, as well as private landowners. Agency partners include the Bureau of Land Management (BLM), Oregon Department of Agriculture (ODA) Confined Animal Feed Operation (CAFO) program, Oregon Watershed Enhancement Board (OWEB), Oregon Department of Fish and Wildlife (ODFW) and the Oregon Department of Forestry (ODF). Other major partners in the North Coast include the Upper and Lower Nehalem, Tillamook Bay and Nestucca-Neskowin Watershed Councils, the Tillamook Soil and Water Conservation District (SWCD), the Tillamook County Creamery Association (TCCA) and the Tillamook Estuaries Partnership (TEP). Oregon DEQ and TEP's role is to facilitate and maximize the opportunities with these stakeholders to protect, enhance, restore and monitor the North Coast watersheds.

## Implementation Highlights

In 1994, Tillamook Bay was designated as a "Bay of National Significance" under the EPA's National Estuary Program. This led to the formation of what is now known as the Tillamook Estuaries Partnership (TEP) and to the development and implementation of the Comprehensive Conservation and Management Plan (CCMP) [21], approved by EPA in 1999. The CCMP addresses the issues of temperature, bacteria and sedimentation, as well as habitat and flooding concerns. In 2002, TEP expanded its mission to include all of Tillamook County's estuaries and watersheds. This includes five of the six watersheds in the North Coast (all but the Necanicum).

DEQ developed Total Maximum Daily Loads (TMDLs) for temperature and bacteria for Tillamook Bay (2001), Nestucca Bay (2002), which also included sedimentation, and for the remainder of the North Coast Basin, including the Nehalem and Necanicum (2003) [2]. DEQ and TEP are also co-funding a Monitoring Coordinator position which has led to the development of an effectiveness monitoring program with funding to do trending analysis in all Tillamook County's estuaries and watersheds.



**Figure 14. CWA 319 projects implemented in the North Coast between 2000 and 2010.**

Significant water quality achievements in this area have resulted from a variety of activities and management strategies. As information from the North Coast TMDLs data became available, DEQ began to plan for and initiate restoration projects that led to water quality improvements. The DEQ North Coast Basin Coordinator identified partners in the basin that could assist with on-the-ground projects and used 319 grant dollars to leverage and engage the work of local organizations. Restoration projects were tailored to address water quality concerns and began before the TMDLs were complete. TMDL implementation through on-the-ground projects has been happening for more than 10 years and continues in the basin. To date approximately 165 riparian restoration projects have been implemented in the North Coast. These projects equate

to restoration of approximately 200 miles of the 320 miles of stream miles identified in the TMDLs.

One program established with 319 funds and continued through a partnership with TEP was a volunteer monitoring program. This program has been collecting bacteria data in the Tillamook Bay Watershed since 1997. The data generated through this program has allowed DEQ to document water quality improvements in the Wilson River and better identify sources throughout the five sub-watersheds.

A number of projects contributed to the reduction of bacteria concentrations in the Wilson River (see bacteria section). A suite of Best Management Practices (BMPs) have been implemented by DEQ and its partners through various projects. Some of the BMPs implemented include, but are not limited to, the following: riparian planting, livestock exclusions, wet and dry storage of manure, constructing off-channel watering stations, and burying manure main-lines.

To address the temperature concerns of their effluent discharge into the Wilson River, the Tillamook County Creamery moved their outfall to an upstream wetland location. This has contributed to improved water quality and was made possible because the DEQ and the TCCA worked together to find a creative solution that met each other's needs and complied with the TMDL.

In 1996, the City of Tillamook entered into a Mutual Agreement and Order (MAO) with DEQ to evaluate and plan for upgrades to their Waste Water Treatment Plant (WWTP). The WWTP was not meeting all permit conditions and needed upgrading. DEQ's SRF and Permit program worked with the City of Tillamook to establish a timeline and requirements for the facility upgrade. In 2010 the upgrades to the plant were complete. The upgrades have increased the plant's capacity and will allow the facility to



address stormwater/sewer cross-connections in the eastern section of the urban growth boundary. The cross-connections were identified as contribution bacteria pollution to Holden Creek and possibly Hoquarten Slough. These two waterbodies have been identified as having bacteria concentrations above recreational use criteria. DEQ will continue to analyze monitoring data from the area on a biannual basis and expects to document water quality improvement as the WWTP and cross-connections are fully addressed.

Another project is the Conservation Effectiveness Partnership. This effort is currently a three-way partnership between the USDA Natural Resource Conservation Service, Oregon Watershed Enhancement Board, and DEQ. The purpose of the partnership is to collaboratively monitor, evaluate, and report the effectiveness of cumulative conservation and restoration actions. This partnership will enable each agency to move beyond administrative measures of success (such as dollars spent, or TMDLs approved) and report environmental outcomes instead. This type of cumulative effectiveness monitoring can play a key role in demonstrating the accountability, success, and value of restoration investments.

# North Coast Action Plan

## Purpose

As stated above the Department of Environmental Quality (DEQ) is undertaking a Watershed Approach to assist in managing water quality in the State of Oregon. A key component of this approach is an Action Plan that can be used along with an assessment of the status of water quality (Status Report) in the adaptive management of the water quality in a geographic area. This Action Plan will help guide DEQ's water quality management in this geographic area for the next five years, 2011 – 2015. Periodic updates may occur and the next major update will be done in 2015.

## Goals

The goal of the North Coast Basin Action Plan is to identify water quality program priorities and identify actions to address and mitigate existing and future water quality problems (identified in the Status Report) in the North Coast Basin. Ideally the plan will incorporate key Management Strategies, a timeline for Implementation, and provisions for measuring performance (Monitoring Plan Outline?). Where possible the Plan should also identify technical and funding partners for the strategies and monitoring. Finally, this document can facilitate Agency program goals to identifying alignment opportunities for water quality monitoring, permit issuance, TMDL development and non-point source implementation, drinking and groundwater protection in basin plans.

The table below depicts the Various WQ Program elements (both DEQ sub-programs and example external Partners) and the corresponding Watershed Approach documents that summarize the information for the basin planning efforts.

<b>Table 1 - Watershed Approach and WQ Program Elements</b>			
Watershed Approach	WQ Program Elements		
Goals & Objectives	CWA, SDWA, Legislative and Agency Priorities		
Status Report	WQ Assessment (Priority WQ Concerns - 303d Impaired, DW & NPS threats)		
Action Plan	Watershed Planning (TMDLs, Permits, Implementation Plans, Grants&Loans)		
	<b>Standards &amp; Assessment</b>		
	↓		
	<b>Basin Planning, TMDL &amp; related work (Region, HQ, LEAD)</b>		
	↓	↓	↓
	<b>Wastewater</b>	<b>Drinking Water</b>	<b>Partners</b>
	•Industrial/Domestic	•Source protection	•DMAs/Permittees
	•Stormwater (MS4/1200)	•Groundwater & UIC	•Ag (CAFO, Area Plans)
	•401 (Dredge&Fill, Hydro)	<b>Financial Assistance</b>	•Forestry
	•On-site	•NPS 319	•OWEB
	•Re-Use	•SRF	•Watershed Councils/SWCDs
	•Pretreatment/Biosolids	<b>Enforcement</b>	
	↓	↓	↓
Monitoring Plan	<b>Status and Trend Monitoring (DEQ &amp; Partners)</b>		
	<b>WQ Monitoring (LEAD)</b>	<b>Basin Planning (Region, HQ)</b>	<b>Partners</b>
	•Ambient (Beach, Groundwater)		•Watershed Councils/SWCDs
	•Toxics (Wastewater)		•OWEB & Sister agencies
	•Oregon Plan, EMAP		•Forestry & Ag
	•TMDL/Effectiveness		•Universities

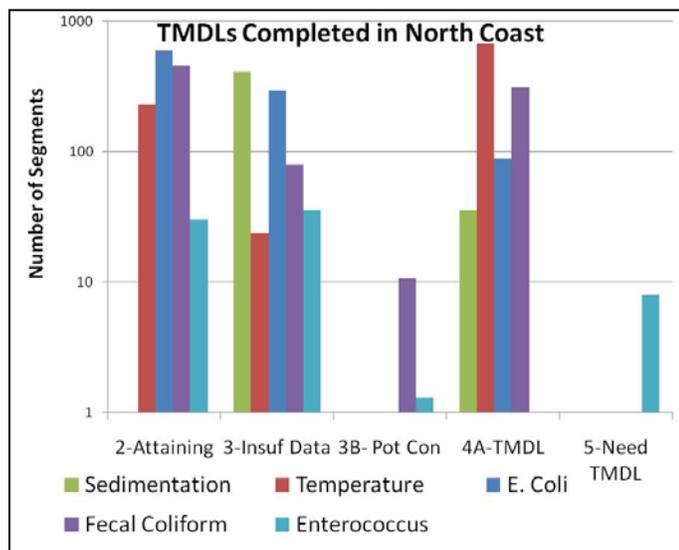
### Action Plan Overview

The following section describes DEQ program and External Partner Implementation, as well as, potential actions and alignment opportunities needed in the future. The DEQ sub-programs (broken into major sections of Standards & Assessment, Basin Planning & TMDLs, Wastewater, Drinking Water, Investments, and Monitoring covering approximately 17 subprograms) are discussed in detail and are intended to cover background on the program, status and future opportunities. To complete the basin planning picture, the Action Plan also discusses the important External Partner actions that have been identified and are critical to an successful and integrated (both internally and externally) Watershed Approach.

## DEQ Sub-Program Implementation

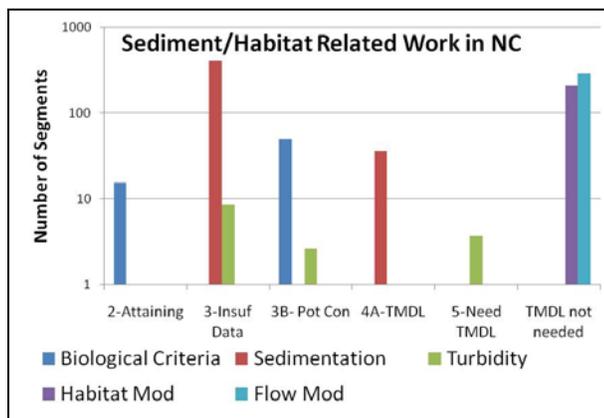
### Standards and Assessment

Water quality standards are benchmarks established to assess whether the quality of Oregon's rivers and lakes is adequate for fish and other aquatic life, recreation, drinking, agriculture, industry and other uses [22]. Another aspect to this sub-program is that approximately every two years, DEQ is required to assess water quality and report to EPA on the condition of Oregon's waters. DEQ prepares an integrated report that meets the requirements of the federal Clean Water Act (CWA) for Section 305(b) and Section 303(d). CWA Section 305(b) requires a report on the overall condition of Oregon's waters. CWA Section 303(d) requires identifying waters that do not meet water quality standards where a Total Maximum Daily Load (TMDL) needs to be developed. Three TMDLs have been completed for the North Coast Watershed Approach (NCWA) area: Tillamook Bay 2001, Nestucca Bay 2002, and the North Coast Subbasins 2003 [2]. The pollutants of concern that were covered by these TMDLs are temperature and bacteria. Sediment was also addressed in the Nestucca Bay TMDL.



### Standards and Assessment Actions and Opportunities

**Sedimentation.** Sedimentation issues exist in a number of North Coast watersheds. To understand the extent of the potential problem, monitoring has occurred in select sub-basins (Tillamook, Nestucca). However there is, at present, only a narrative sediment standard that can be applied. This has led to a lack of certainty regarding how to list sediment concerns and what type of monitoring data can and should be used to inform management decisions. Therefore, a key need for the Standards program is the development of numeric sediment criteria or some clear guidance on how the existing language



should be used. A couple techniques that could be applied are a standardized approach to applying the narrative criteria, much like as has been done with biological criteria (bugs only) and/or use bioassessments to identify sediment as a stressor. Some efforts have been made along these lines, more needs to be done to complete the task.

**Dissolved oxygen & bacteria.** There is also a need for a clarification of the uses and the correct criterion for dissolved oxygen in the coastal sloughs and lower tributaries. This relates to nature potential of coastal sloughs to meet DO criteria and how and when to apply the spawning criteria to rivers when spawning is triggered by rainfall and may not correspond to an assigned date. Another clarification of standards in estuarine areas concerns bacteria monitoring in upstream reaches that flow into shellfish areas.

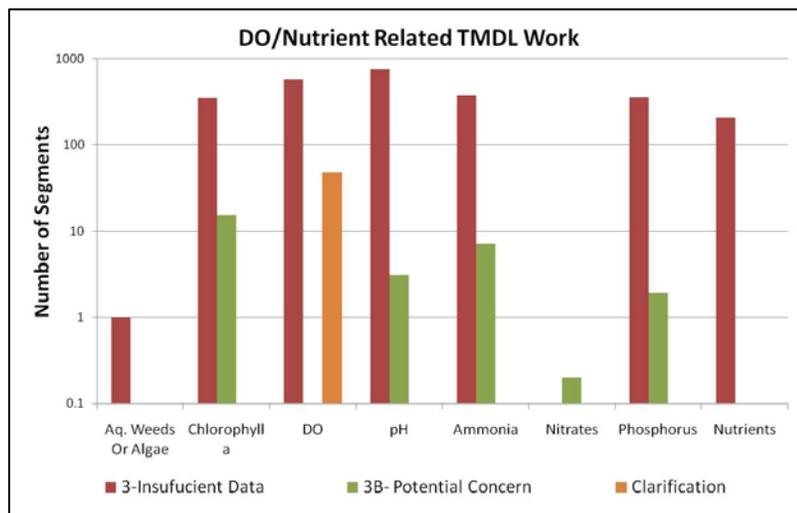
**Integrated Report Alignment.-** There is an opportunity to have the assessment described by the Integrated Report database [23] more closely align with that in the Status Report or other assessments conducted in this area. Below are some recommendations for work that could be done to facilitate this.

**303d updates & database corrections.** Work with 303(d) coordinator to update database to reflect status of recent on-going monitoring of temperature and bacteria – especially for segments where we are meeting standard (e.g. Wilson River for bacteria). It should be noted that in the Draft Assessment (out in early 2001) appears to reflect current updates of *Enterococcus* (reflects Beach input), Aquatic weeds and algae (reflects lake input), turbidity (reflects source water), and biocriteria (reflects lab input).

**Bacteria listings corrected.** Fecal coliform/*E. coli* listings need to be corrected. The database was developed when standard was shifted from fecal to *E. coli* and some freshwater listings were based on fecal coliform (rather than shellfish). Some need for freshwater/estuary determinations to be clearer (i.e., some areas were noted as shellfish and are not)

**“Insufficient data” versus “Potential concern” listings.**

Some question on how these terms were used and what they actually show (especially insufficient data listings). Some information, especially sedimentation, nutrient and aquatic weeds and algae data which came from information originally entered from 1988 NPS Assessment says “insufficient” data where it should probably should be “potential concern”. Also insufficient data label was



used for sites with few samples showing no problems; if value exceeded a standard, then it was listed as a potential concern. Need to clarify the use of the category “insufficient data” or subcategorize it (data indicating a concern or not a concern but insufficient to draw a conclusion...) or not use it where there are only one or two data points.

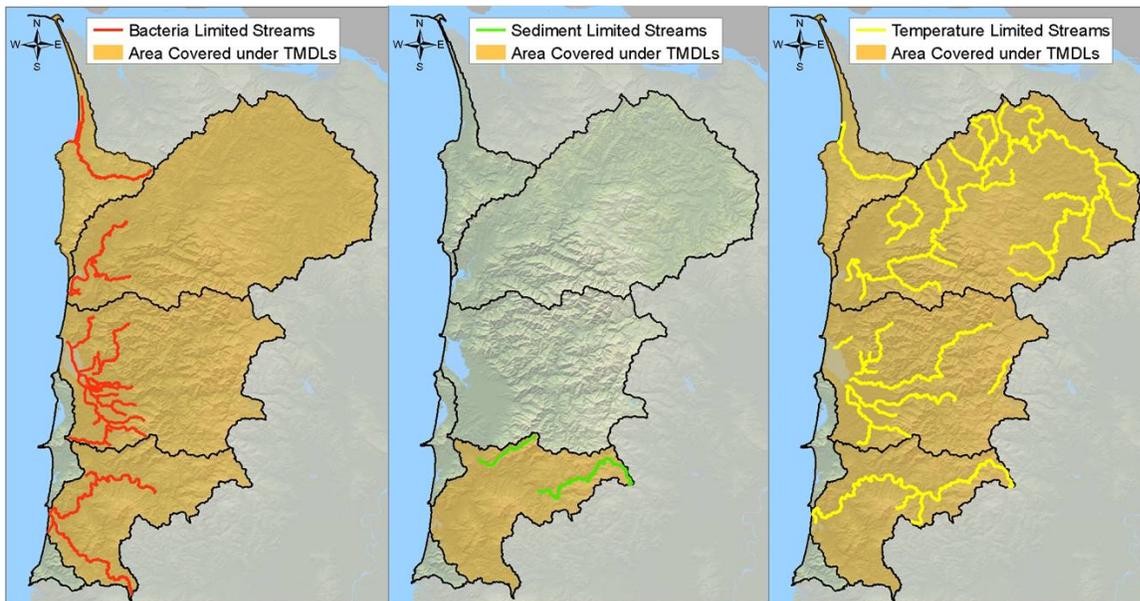
**Turbidity not listed.** Note that turbidity was not entered from 1988 NPS Assessment – but is of concern in the basin.

**pH, metals and natural conditions.** There are a few low pH and low alkalinity listings of potential concern that may reflect naturally existing conditions (rainfall). It is unlikely that any action will be taken with them under TMDLs or other efforts and it is suggested that the listings be examined in future standard reviews. Iron, Manganese and Arsenic listings are not likely a concern and it appears that the listings will change next cycle when standard changes.

## Basin Planning, TMDLs, and Related Work

### Completed TMDLs

TMDLs for temperature and bacteria have been developed for nearly the entire North Coast Sub-basin as shown in the table and figure below. The Netarts/Sand Lake and Neskowin watershed were not covered by the bacteria TMDL. The temperature TMDL was updated to reflect a change in the temperature standard in 2006. A sedimentation TMDL was developed for the Nestucca Watershed in 2002.



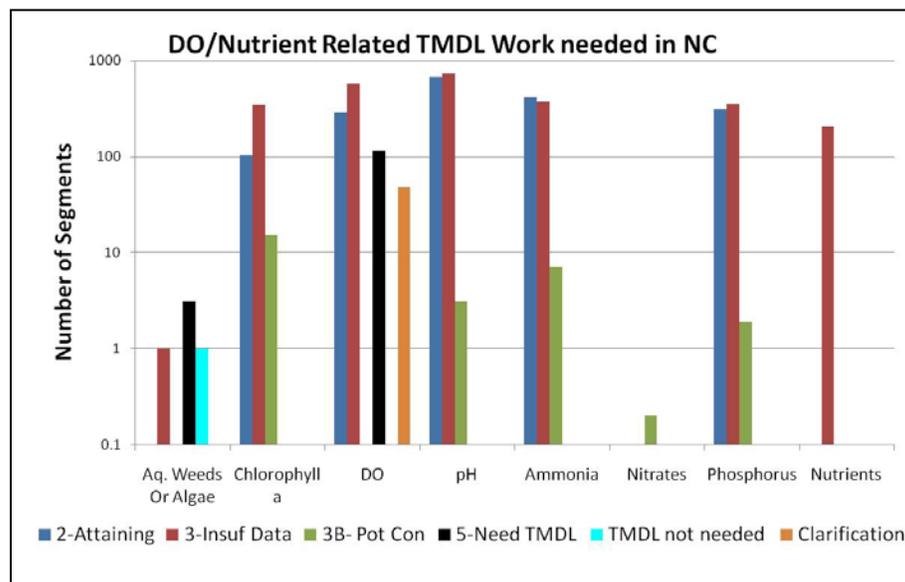
**Figure 15. TMDLs Completed for the North Coast Subbasin. Bacteria TMDL (left panel) covers Necanicum, Nehalem, Nestucca and Tillamook basins. Sediment TMDL (middle panel) covers the Nestucca basin. Temperature TMDL (right panel) covers Necanicum, Nehalem, Neskowin, Nestucca, Netarts/Sand Lake and Tillamook basins.**

Table 2 - Status of TMDLs or Studies That Address 303(d) Listings			
Watershed	TMDL [2] or Equivalent Plan Completed	Studies Underway with a TMDL or equivalent plan pending <sup>1</sup>	Permit Cycle (5 year cycle)
Necanicum	<a href="#">Bacteria (2003)</a> ; <a href="#">Temperature (2003; updated 2006)</a> ; Clatsop Plains Geographic Rule (1983) ( <a href="#">OAR 340-071-0400(5)</a> ).	<a href="#">Sunset Lake (PSU, 2005)</a>	2011; 2016; 2021
Nehalem	<a href="#">Bacteria (2003)</a> ; <a href="#">Temperature (2003; updated 2006)</a>		2011; 2016; 2021
Neskowin	<a href="#">Temperature (2002; updated 2006)</a>		2011; 2016; 2021
Nestucca	<a href="#">Bacteria (2002)</a> ; <a href="#">Temperature (2002; updated 2006)</a> ; <a href="#">Sedimentation (2002)</a>		2011; 2016; 2021
Netarts/Sand Lake	<a href="#">Temperature (2001; updated 2006)</a>		2011; 2016; 2021
Tillamook	<a href="#">Bacteria (2001)</a> ; <a href="#">Temperature (2001; updated 2006)</a> ; Lake Lytle (1995)	Dissolved Oxygen; Sedimentation	2011; 2016; 2021
<sup>1</sup> These studies would need TMDL or equivalent Plan developed, ideally prior to next permit renewal if a point source is affected.			

Implementation of these TMDLs has been a major focus in the subbasin over the past 10 years and will continue to be for the next 5 years as identified in this Action Plan. A study to address aquatic weeds concerns for Lake Lytle was completed in 1995 and found that a TMDL was not needed for nutrients as nutrient enrichment was not the cause of the invasive water milfoil in the lake. An Aquatic Weed Management Plan was developed but systematic implementation by the City of Rockaway was not completed due to concern about the need for a permit to apply herbicides.

### TMDL and Related Work for 2011 – 2015

Addressing sedimentation concerns in all of the North Coast Subbasins is a priority. Studies have been conducted in the upper Tillamook Bay watershed to provide data to address sedimentation, either through the development of a TMDL or by other means. Further



guidance for interpretation of the sedimentation narrative standard may be needed before a TMDL can be developed. In addition to the Tillamook sediment assessment, similar work was

performed by BLM in the Upper Nestucca River [18]. Data collected in this effort could be reanalyzed based on an updated sediment assessment method. Finally, sediment monitoring and assessment of in some form will be required in the Nehalem watershed which may have similar sediment issue but less data.

Priorities for developing additional TMDLs include addressing low dissolved oxygen found in the sloughs in Tillamook Bay and mainstem rivers throughout the North Coast Watersheds. Studies have been conducted in the estuarine slough of Tillamook Bay since 2007 to support the development of TMDL to address low dissolved oxygen. Initial DO monitoring began in the Wilson and Trask Rivers main-stems and Hoquarten, Dougherty, and Hall Sloughs. Further monitoring is required in these systems, as well as, addressing listings in the Nehalem and Nestucca Rivers.

Additionally, investigative studies into aquatic weeds and nutrients were conducted on Sunset Lake along with Coffenbury, Cullaby and Smith Lakes in the Lower Columbia Subbasin by Portland State University. These studies could provide the basis for TMDLs or the equivalent for these waterbodies, if needed, to address nutrients. As part of the PSU report [8], individual Integrated Aquatic Vegetation Management Plans were developed for each of the four lakes.

A groundwater study in the Clatsop Plains is work that is needed but not likely to get underway in the next five year period. It may be needed to determine the adequacy and impact of the geographic rule (OAR 340-071-0400(5)).

Finally, DEQ will need to develop Oregon's Coastal Zone Management Area Nonpoint Pollution Control Program. This program will address gaps in current programs for coast area that are mandated by the Coastal Zone Management Act (CZMA) under NOAA Coastal Zone Act Reauthorization Amendments (CZARA) Section 6217 Requirements. In order for Oregon to receive program approval, DEQ must commit to developing Implementation Ready TMDLs and Implementation Plans for state and private forestry lands using BMPs addressing riparian and landslide-prone areas, and road Issues. This will require an update to or revision of the current temperature, bacteria, and sediment TMDLs in place on the North Coast.

## **External Partner Management Plans**

### **Basin-wide plans**

- Tillamook Estuaries Partnership. Tillamook Bay Comprehensive Conservation and Management Plan. December 1999. [\[21\]](#)
- Coastal Zone Management Program [\[24\]](#)
- Oregon Plan for Salmon and Watersheds [\[13\]](#)

### **Agricultural, fish and forestry plans**

- North Coast Basin Local Advisory Committee, Oregon Department of Agriculture. North Coast Basin Agricultural Water Quality Management Area Plan. September 2009. [\[25\]](#)
- Tillamook River Coho Restoration Strategy; A Limiting Factors Analysis – 2008 [\[26\]](#)
- Tillamook Bay Rapid Bio-Assessment – 2005, 2006, 2007 [\[27\]](#)
- Coastal Coast Coho Conservation Plan [\[28\]](#)
- Nehalem River Limiting Factors: 2008 OWEB [\[29\]](#)
- Tillamook State Forest Plan [\[30\]](#)
- Miami (2005), Trask (2003), and Wilson (2008) River Watershed Analysis [\[31\]](#)

### **Local and watershed scale Plans/reports**

- Bay City, City of Cannon Beach, Manzanita, Tillamook, and Wheeler Stormwater Plans
- Tillamook Bay Watershed Environmental Characterization – 1998
- Trask River Watershed Assessment – 1998
- Trask River Action Plan – 1999
- Trask River Assessment – 2001
- Wilson River Watershed Assessment – 2001
- Kilchis River Analysis – 1998
- Vaughn Creek Action Plan – 2004
- Miami River Watershed Assessment – 2001
- Tillamook Bay Watershed Data Synthesis – 2008
- Oregon Plan Biennial Report 2005-2007
- Nehalem Subbasin Assessment: 2000 Up. Nehalem Watershed Council 319 Grant OR-99-46-319
- Nehalem River Watershed Assessment: 2001 Portland State University 319 Grant OR-20-319
- East Fork Nehalem Watershed Analysis: 2008 UNWC/Demeter Design
- Nestucca Watershed Analysis: 1994 USFS & BLM
- Nestucca-Neskowin Watershed Analysis: 1998 NN Watershed Council DEQ Grant OR-97-09-319
- Nestucca-Neskowin Management & Action Plan: 1999 NNWC DEQ Grant OR-99-19-319

### **Plans that need development**

- Tillamook County Stormwater Plan

### **Basin Partner Building and Outreach**

To improve and continue partnership building and solicit input from local stakeholder and current partners, DEQ basin staff have presented water quality results and program priorities via public, board, and advisory committee meetings, as well as other group forums. This outreach and education effort ensures that partners are fully aware of the water quality information DEQ is using to manage the resource. It also allows for the establishment of the important synergistic relationships needed to accomplish the goals that both DEQ and the stakeholders hold in common. The following table is a list partner building and outreach efforts and target audiences for the past 5 years.

<b>Table 3 - DEQ Partner Building and Outreach Efforts 2005-2011</b>		
<b>Water Quality Topics</b>	<b>Date</b>	<b>Audience and Partners</b>
2005 TEP Board: Water Quality Summary	Dec 06	TEP Board of Directors representing the following: DEQ, ODFW, Tillamook County Board of Commissioners , Economic Development Council of Tillamook County, Local Ports, Tillamook County Soil & Water Conservation District, Cities, Tillamook Bay Community College, Tillamook County Creamery Association, Tillamook Bay Habitat & Estuary Improvement District, Shellfish Industry, Marinas, Sportfish Industry, Land Trusts, Local Citizens, ODA, EPA, Region 10, Oregon Economic and Community Development Department and ODF
Tillamook Bay WC: Bacteria Summary	Mar 07	Tillamook Bay Watershed Council
PEPA: Water Quality Monitoring Summary	Jun 07	PEPA Stakeholder Group (Tillamook SWCD, Farmers, ODA CAFO)
ODA North Coast Ag Management: Bacteria Summary	Jul 07	ODA SB1010 Northwest Region Staff and Local Advisory Committee (LAC) Members
Tillamook County: 2006 Bacteria Summary	Sep 07	County Commissioners and public
ODA Water Quality Staff: Bacteria Summary	Oct 07	ODA State-wide Water Quality Staff
Tillamook Bay Bacteria Summary	Oct 07	Netarts Community Plan Advisory Committee
TEP Board: 2006 Water Quality Summary	Dec 07	TEP Board of Directors representing the following: DEQ, ODFW, Tillamook County Board of Commissioners , Economic Development Council of Tillamook County, Local Ports, Tillamook County Soil & Water Conservation District, Cities, Tillamook Bay Community College, Tillamook County Creamery Association, Tillamook Bay Habitat & Estuary Improvement District, Shellfish Industry, Marinas, Sportfish Industry, Land Trusts, Local Citizens, ODA, EPA, Region 10, Oregon Economic and Community Development Department and ODF
Tillamook County:2008 Bacteria Summary	Jan 08	County Commissioners and public
TEP Speaker Series: Bacteria Summary	Jan 08	General Public Forum
TEP Board: 2007 Water Quality Summary	Feb 08	TEP Board of Directors representing the following: DEQ, ODFW, Tillamook County Board of Commissioners , Economic Development Council of Tillamook County, Local Ports, Tillamook County Soil & Water Conservation District, Cities, Tillamook Bay Community College, Tillamook County Creamery Association, Tillamook Bay Habitat & Estuary Improvement District, Shellfish Industry, Marinas, Sportfish Industry, Land Trusts, Local Citizens, ODA, EPA, Region 10, Oregon Economic and Community Development Department and ODF
SWCD: Bacteria Summary	Jun 08	Tillamook Soil and Water Conservation District Board of Directors and Staff
EPA: Water Quality Summary	Jun 08	EPA Region 10 National Estuary Project Staff

North Coast Basin Watershed Approach

OACD: Bacteria Summary	Oct 08	Oregon Association of Conservation Districts District
TEP Advisory Committee: Water Quality Summary	Apr 09	TEP Advisory Committee represent by United States Environmental Protection Agency, United States Fish & Wildlife, Governors Office on Natural Resources, Oregon Dept. of Environmental Quality, Oregon Dept. Fish & Wildlife, Oregon Dept. of Forestry, Tillamook County Board of Commissioners, Tillamook Cities, municipalities, Tillamook County Creamery Association, Tillamook County Education k-14, Tillamook County Watershed Councils, Lower Nehalem Watershed Council, Nestucca Neskowin Watershed Council, Commercial Shellfish Industry, Marina's and Recreation, Sport Fishing, Central Coast Land Conservancy, Lower Nehalem Land Trust, Private Citizens, Paddlers/Kayak, OSU Ext. Service, Oregon Coast Trail Association, Oregon Watershed Enhancement Board, and Tillamook Economic Development Council
Bounty on the Bay: DO and Temperature	May 09	General Public Fishing Tournament Funder Raiser
ODA North Coast Ag Management: Bacteria Summary	Sep 09	ODA SB1010 Northwest Region Staff and Local Advisory Committee (LAC) Members
TEP Board: 2009 Water Quality Summary	Dec 09	New TEP Board
State of the Bay Health Report	Apr 10	General Public Forum including ODFW, ODA CAFO and Shellfish, ODF, and EPA Western Ecology Division
USGS: Sediment Presentation	Jun 10	USGS, NOAA, OWRD, and Oregon Health & Science University Staff
Tillamook Bay WC: Sediment Presentation	Jun 10	Tillamook Bay Watershed Council
Tillamook SWCD Annual Event: Bacteria Summary	Sep 10	Tillamook Soil and Water Conservation District Board of Directors, Staff and public
TEP Board: 2010 Water Quality Summary	Dec 10	New TEP Board
NRCS District Conservationists: Bacteria Summary	Dec 10	NRCS State-wide District Conservationist
County Commissioners: Water Quality Summary	Jan 11	County Commissioners, County Planner, Solid Waste staff, and public

**Basin Planning Actions and Opportunities**

Continue the outreach and education efforts with an emphasis on collaborative problem solving with local stakeholders. Key partnerships include those with the private, state, and federal forest management organizations, as well as, county and local groups. The table below identifies many of the important stakeholders, DEQ program partners and the priority watershed actions in the North Coast.

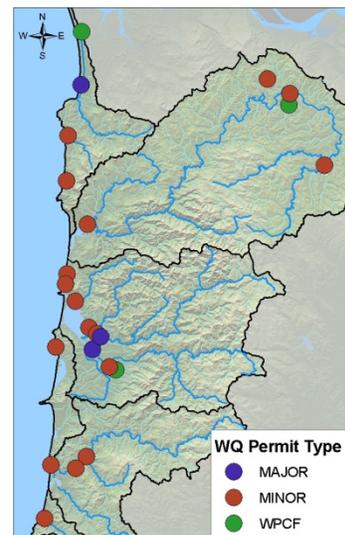
Table 4 – North Coast Partners, DEQ programs and Key Actions		
Partners	DEQ Programs	Key Actions
Tillamook Estuaries Partnership	TMDL & NPS, 319, Monitoring	TMDL & basin planning, grant coordination, Restoration project implementation
Oregon Watershed Enhancement Board Oregon Dept of Forestry Oregon Dept of Fish & Wildlife Oregon Dept of Agriculture	TMDL & NPS, 319, Monitoring, Assessment	Oregon Plan coordination, grant project coordination, Water Quality Assessment Studies
Tillamook Bay Watershed Council Upper Nehalem Watershed Council Lower Nehalem Watershed Council Nestucca-Neskowin Watershed Council Necanicum Watershed Council Many Private Landowners	Monitoring, 319	Restoration coordination and implementation, Monitoring activity and coordination
Tillamook County Soil & Water Conservation District U.S. Natural Resources Conservation Service Oregon State University Extension	Monitoring, 319	Restoration coordination, Monitoring activity and coordination
City of Bay City City of Tillamook Netarts – Oceanside	TMDL, WQ Permits, SRF	Facilities upgrade
Green Diamond Resource Company Stimson Lumber Company Tillamook County Creamery Association	Monitoring	Watershed management, Monitoring site access
Tillamook Native Plant Cooperative The Nature Conservancy, Oregon Chapter Trust for Public Lands Association of Northwest Steelheaders	TMDL & NPS, 319	Restoration coordination and project implementation

## Water Quality Permit Programs

### **Wastewater Program - municipal and industrial permits.**

There are 3 major and 17 minor individual NPDES and 3 individual WPCF permits in the basin. All permits, with the exception of the City of Tillamook wastewater treatment plant, expire in 2011. DEQ will renew 15 permits in 2011, with the possibility of renewing four additional permits depending upon permit staffing resources for FY 2011-13.

In addition to the permit renewal work, priority program work in the watershed includes; 1) Improved outreach to small communities with aging wastewater infrastructure; 2) Integration of *Enterococci* bacteria limits in marine discharge permits and *E. coli* limits to freshwater discharge permits ; and 3) Establishing ultraviolet disinfection performance expectations.



**Senate Bill 737**, passed in 2007, requires DEQ to develop a list of persistent pollutants that have a documented effect on human health, wildlife and aquatic life [32]. The list includes 118 toxic chemicals that are divided into 2 groups: 69 persistent pollutants and 49 legacy (banned or restricted) pollutants. Oregon’s 52 largest municipal wastewater treatment facilities are monitoring their effluent and must submit reduction plans to DEQ by July 2011 to address persistent pollutants detected in wastewater above a certain level. DEQ is working with municipalities to coordinate sampling and analysis and is providing technical assistance for developing reduction plans.

**Pretreatment.** Presently no municipal source has a pretreatment program in the North Coast. The cities of Seaside and Tillamook are monitoring their effluent for persistent pollutants under the SB 737 monitoring program. If the analytical results show that there are constituents above trigger levels and they originate from industrial sources, then a municipality may need to develop a pretreatment program to address the pollutant of concern.

<b>Table 5 – North Coast Permitted Municipal and Industrial Sources</b>			
<b>File #</b>	<b>Common Name</b>	<b>Class</b>	<b>Expiration/ Renew in 2011?</b>
3300	ARCH CAPE STP	Minor	2011/Yes
6667	BAY CITY STP	minor	2011/No
64802	CAMP RILEA STP	WPCF	2011/Yes
13729	CANNON BEACH STP	Minor	2011/Yes
17318	CLOVERDALE STP	Minor	2011/Yes
29850	FISHHAWK LAKE ESTATES	Minor	2011/Yes
32087	GARIBALDI STP	Minor	2011/Yes
100058	HEBO JWSA	Minor	2011/Yes
74486	MIST GAS FIELD	WPCF	2011/Yes
61787	NEHALEM BAY STP	Minor	2011/Yes
60335	NESKOWIN REGIONAL STP	Minor	2011/Yes
60420	NETARTS-OCEANSIDE STP	Minor	2011/No
110362	OLYMPIC FOREST PRODUCTS	Minor	2011/Yes
66063	PACIFIC CAMPGROUND	Minor	2011/Yes
66100	PCJWSA	Minor	2011/Yes
109726	PORT OF TILLAMOOK BAY	WPCF	2011/Yes
75825	ROCKAWAY BEACH STP	Minor	2011/Yes
79929	SEASIDE STP	<b>Major</b>	2011/Yes
88665	TILLAMOOK STP	<b>Major</b>	2014/No
88729	TILLAMOOK CREAMERY	<b>Major</b>	2011/Yes
70615	TILLAMOOK INDUSTRIAL PARK STP	Minor	2011/No
90578	TWIN ROCKS STP	Minor	2011/Yes
92773	VERNONIA STP	Minor	2011/Yes

**Biosolids and Industrial Wastewater Solids Reuse**

The Biosolids program regulates municipal wastewater solids and domestic septage that have undergone sufficient treatment to allow its beneficial use as a soil amendment or fertilizer through land application. Biosolids and domestic septage are regulated through NPDES or

WPCF water quality permits issued by DEQ. Land application activities are described in biosolids management plans and site authorization letters that are reviewed and approved by DEQ. Additionally, DEQ works with domestic wastewater treatment facilities to assure biosolids are adequately stabilized and land application operations and management meet federal and state regulations. DEQ requires wastewater treatment facilities to monitor and report on biosolids activities. Similar activities and requirements apply to wastewater solids generated by industrial facilities.

Statewide, 95 percent of biosolids are beneficially reused as a soil amendment or fertilizer. Municipal wastewater treatment facilities in the North Coast Basin generated less than 1 percent of the total biosolids generated in the state as a whole. In general, the climate and topography of the North Coast Basin have challenged wastewater treatment facilities trying to develop robust reuse programs. Some facilities have abandoned beneficial reuse programs or looked for opportunities outside of the immediate area. In 2009, approximately 273 dry tons of biosolids generated from four municipal wastewater treatment facilities in the North Coast Basin were beneficially reused locally. One industrial facility, Tillamook County Creamery Association, produced approximately 855 dry tons of wastewater solids which were beneficially reused as a soil amendment or fertilizer on local hay fields.

**Actions.** Continue to require monitoring and reporting on biosolids activities, review monitoring results, take prompt and appropriate action when potential issues arise, provide technical assistance for facility owners and operators when needed. Coordinate with wastewater treatment facilities and identify opportunities for the beneficial reuse of biosolids and industrial wastewater solids generated in the North Coast Basin.

**Alignment Opportunity.** Provide assistance to the drinking water program, groundwater program, nonpoint source program, and ODA in areas where nutrient are a limiting factor in order to minimize negative water quality impacts.

## Water Reuse

Water reuse for non-potable purposes allows municipalities and industrial facilities an option for managing treated effluent. State regulations require a water quality permit for this option and allow treated effluent to be used for beneficial purposes, most of which occurs through the irrigation of crops and golf courses. DEQ works with the Department of Human Services - Health Services Division and Water Resources Department on the permitting of this practice. DEQ staff also work with municipal and industrial facilities to ensure proper operation and management of wastewater treatment facilities that pursue water reuse. Facility permits require management plans for water reuse. Water reuse in the North Coast Basin is relatively small compared with other parts of the state.

**Actions.** Coordinate with wastewater treatment facilities and continue to explore opportunities for water reuse from municipal facilities.

On June 12, 2009, Governor Kulongoski signed House Bill 2080 into law, legalizing the use of graywater for beneficial uses in Oregon. Graywater refers to wastewater from the shower and bath, bathroom sink, kitchen sink, and laundry. This bill expanded water reuse opportunities from municipalities and industrial facilities to individual property owners. The bill specified that a person may not construct, install or operate a graywater reuse and disposal system without obtaining a permit from DEQ. The bill further directed the EQC to adopt rules for graywater permitting and to consider the recommendations of an advisory committee. DEQ initiated a rulemaking process in December 2009 and expects final for adoption by the Commission at the August 2011 meeting.

**Alignment Opportunity.** Nonpoint source staff can assist with local stakeholder outreach as part of the rulemaking process. Once systems are installed, work with the groundwater and NPS programs to provide outreach to graywater users to ensure systems are maintained to protect water quality.

**Stormwater Program.** Industrial & Construction permits  
Stormwater runoff from land and from impervious areas, such as paved streets, parking lots, and building rooftops, often contain pollutants that could adversely affect water quality. National Pollutant Discharge Elimination System (NPDES) permits are required for storm water discharges to surface waters from construction and industrial activities, and municipalities, if stormwater from rain or snow melt leaves the site through a "point source" and reaches surface waters either directly or through storm drainage.

There are 3 types of General NPDES Stormwater Permits located in the North Coast Basin: 1200-Z permits, which cover a number of industrial activities; 1200-A permits, which are specific to mining or asphalt/concrete, batch plants activities; and 1200-C permits, which cover construction activities. An additional type of permit on the North Coast is a Water Pollution Control Facility (WPCF) permit. Sites with WPCF permits have no direct discharge to surface water.

**1200Z.** The nine Industrial 1200-Z permits in this category are involved in businesses related to timber, composting, dairy, and transfer stations. The nature of several of these businesses typically involves constant movement of product and related processes. The water quality concerns with these industries are primarily related to sedimentation and turbid stormwater runoff, and at times, bacteria and pH from organic material processing. Inspection occurred at all 9 sites in 2009 and 2010.

**1200A.** Of the 27 Industrial 1200-A permits in this region, 24 are administered by the Department of Geology and Mineral Industries (DOGMI), our Administrative Agent; DEQ oversight for these permits is minimal. The three permits that DEQ administers were inspected in the past two years. Water quality concerns for two of the sites were inadequate control measures for erosion and sedimentation, creating turbidity problems. The other site has no discharge and may qualify for a WPCF permit.

**1200C.** Common water quality construction related compliance issues in the North Coast are poor implementation of the Erosion and Sediment Control Plans (ESCP), and Best Management Practices (BMPs), resulting in erosion and sediment control problems. Additionally, the weather and soil conditions often make vegetative stabilization a challenge. Another problem frequently encountered is that plans for project changes are not submitted at all, or in a timely manner, for Department review and approval.

**WPCF.** There are 3 facilities in the North Coast Basin that hold a WPCF permit.

### **Section 401 Certification**

Section 401 of the federal Clean Water Act requires that any federal license or permit to conduct an activity that may result in a discharge to waters of the United States must first receive a Water Quality Certification (WQC) from the state [\[33\]](#) in which the activity will occur. DEQ 401 program staff evaluate project proposals for potential impacts to water quality and beneficial uses. Certifications may be: 1) issued for the project as proposed, 2) issued with conditions intended to eliminate or minimize impacts, 3) denied, or 4) waived if DEQ takes no action within one year of receiving the request for 401 WQC. The majority of applications receive 401 WQC with conditions. Most certification requests come to DEQ through either the Federal Energy

Regulatory Commission (FERC) process for **hydroelectric projects**, or through US Army Corps of Engineers (USACE) permits for **removal and fill activities**.

### **Section 401 Removal/Fill Certification**

A proposal to conduct work in waterways or wetlands requires a Joint Permit Application submitted to both the USACE and the Department of State Lands (DSL). These agencies process the applications separately. DEQ's 401 WQC process is triggered when USACE makes a determination that an application 1) requires a permit and 2) may result in a discharge.

**Status 2005-2009.** Approximately 22 projects were considered for 401 WQC in the North Coast basin during this period. Ten of these were for gravel removal operations in Tillamook Bay streams (Trask, Miami, Kilchis, Wilson) and the Nehalem River, which have been undertaken annually for several decades. Also in the North Coast watersheds during this time period, there were approximately 8 residential/commercial/industrial development projects, 3 resource/habitat enhancement projects (including a small dam removal on Coalbank Slough), a flood control project, a minor dredging in the Bay (at Garibaldi) and a jetty repair. Finally, in the Necanicum watershed there was a resource enhancement project (Gearhart Ridge Path Row).

For all of the development projects (8 of 23 total or 35%) there is a 401 certification requirement for implementation of an approved Stormwater Management Plan (SWMP). This ensures that treatment of stormwater runoff from all associated impervious surfaces will occur for the lives of the project.

### **Section 401 Hydropower Certification**

There are no Section 401 Hydropower Projects in the North Coast.

### **Onsite Program**

Over 30 percent of Oregonians currently treat their wastewater through the use of onsite septic systems, primarily residential systems. DEQ regulates the siting, design, installation and ongoing operation and maintenance of onsite septic systems. Without careful maintenance, septic systems can fail prematurely resulting in polluted streams and groundwater.

In the North Coast, DEQ directly manages the onsite program in Clatsop County and provides oversight of the onsite program in Tillamook and Columbia Counties where they manage the program under contract with DEQ. DEQ and its contract agents also ensure that septic tank pumpers have the necessary equipment to safely pump and transport septage. In addition, DEQ certifies and licenses installers, pumpers, and maintenance providers, and reviews and approves products such as septic tanks, alternative treatment technologies, and alternative drainfield products.

Under current budgets, complaints of sewage surfacing in the North Coast largely go uninvestigated because the DEQ does not have the personnel for follow up. Our current response is to send out letters notifying complainants of alleged violations, requesting compliance if the alleged violation is accurate. A discharge of sewage into a road-side ditch may degrade the water quality of the nearest surface water and could create a public health hazard. The DEQ has a policy for the Onsite program that there will be no general fund money to support the program. This means the application fees must cover the costs of issuing permits or evaluating sites for potential septic approvals and the costs for enforcement and complaint investigation. During times when we have high volumes of applications, we may have more dollars to spend on enforcement but then the issue is time constraints. People with outstanding

applications want immediate action and there is little time to follow up on complaints. During our current recessionary period we don't have the money to hire the people to do field visits on complaints. There are septic systems out there that are failing and a properly funded complaint investigation program would allow follow up and correction of systems that are contributing to surface water pollution and creating public health problems in Oregon.

**Actions.** Policy package #120 proposes to add staff to oversee the time of transfer evaluation and septic tank pumping event program in the coastal zone (includes all of the North Coast). DEQ has also introduced Senate Bill 83 to have all fines for onsite septic system violations returned to the program to fund training, education and outreach, repair or replacement of failing septic systems and working with communities on area-wide septic system problems. The policy package, Senate Bill, and subsequent rulemaking will help the program be long-term and sustainable.

**Alignment Opportunity.** Provide data where needed to support efforts such as the Tillamook Estuaries Partnership water quality improvement programs. Data on stream segments that may indicate the presence of sewage caused by septic system failures might help us focus on priority areas.

## **WQ Permit Program Actions & Opportunities**

**Pretreatment.** Wastewater treatment facility permit renewals should prioritize upgrades based on facility age and water quality compliance issues. Specifically, the Tillamook Wastewater Treatment Plant should focus on addressing sewer and stormwater cross-connection that are contributing human sources of bacteria to Holden Creek. Bacteria and toxics monitoring requirements should reflect the appropriate parameter identified in the Water Quality Status Plan (e.g., *E. coli* versus *Enterococcus* and toxics). All WWTPs should be required to collect and analyze surface water samples when unauthorized discharge or spills occur to verify that surface water is not violating water quality standards. Samples could be collected once a day for 3 days following a spill event.

**Bio-solids and Re-use.** Continue to require monitoring and reporting on biosolids activities, review monitoring results, take prompt and appropriate action when potential issues arise, provide technical assistance for facility owners and operators when needed. Coordinate with wastewater treatment facilities and identify opportunities for the beneficial reuse of biosolids and industrial wastewater solids generated in the North Coast Basin. Also identifying the location and extent of existing and future biosolids application sites will assist subprograms, (i.e., Source Water Protection) in properly monitoring and mitigating potential contamination. Coordinate with wastewater treatment facilities and continue to explore opportunities for water reuse from municipal facilities.

**Stormwater Permitting.** The Construction permit (1200-C) program is presently undergoing a number of changes. Permit tracking is difficult with many projects being suspended or canceled because of the severe downturn in the economy. The General 1200-C expired in November 2010, forcing DEQ to administratively terminate a number of permits for permit holders who did not submit requests for renewal. Additional resources will be required to sort out the canceled permits.

The interaction of agencies responsible for water quality management in the North Coast Basin poses both challenges and opportunities as we hopefully coordinate efforts to identify common goals, leverage our resources, and work together more effectively. DEQ's work with ODOT to address water quality management issues by developing a comprehensive approach to permits, TMDLs and associated water quality protection programs should continue.

An NPDES permit may need to be developed to address forest practices related to stormwater management based on the decision of the 9<sup>th</sup> Circuit Court of Appeals case (NEDC v. Brown). This case was a citizen suit against Oregon Department of Forestry and several timber companies alleging failure to obtain NPDES permits for forest roads. The case is a collateral challenge to EPA’s silvicultural rule that defines discharges from most logging activities as nonpoint source pollution rather than industrial stormwater.

**401 Certification.** Water quality and habitat degradation concerns have been raised with the on-going gravel removal and erosion control projects (11 of 23 or 48%). Studies are underway (by US Geological Service (USGS) to determine the potential sediment delivery regimes for these streams and the extent of alteration of the physical and biological systems for these streams. Results of these studies may warrant further evaluation of these actions to protect water quality and beneficial uses of these streams. The Mitigated Gravel Agreement developed by a Tillamook County [\[34\]](#) coalition may need to meet additional water quality requirement to correspond with similar gravel operation throughout the State.

**Onsite Program.** Work with Tillamook County to address human sources of bacteria identified through OSU Bacteria DNA study in Holden Creek and segments of the Miami and Tillamook Rivers. Provide data where needed to support efforts such as the Tillamook Estuaries Partnership water quality improvement programs. Data on stream segments that may indicate the presence of sewage caused by septic system failures might help us focus on priority areas. Follow through on the policy option package, the senate bill subsequent rulemaking proposals to add staff and insure program sustainability.

## Drinking Water

### Surface and Groundwater Source Water Protection

There are 18 public drinking water systems within the North Coast Basin that are supplied in whole or in part by surface water intakes. These water systems serve over 479,000 people both in and outside the North Coast. Drinking water pollution in the North Coast can therefore affect populations beyond watershed boundaries. In the North Coast Basin, there are 62 public water systems relying on in whole or in part on groundwater serving a total population of almost 24,000 residents. Table 6 below summarizes the larger communities (>1000 population) that are served by either surface or ground water.

Table 6 – North Coast Community Drinking Systems (>1000 population)					
Sub-Basin	County	Public Water System	Drinking Water Source	Pop.	System Type <sup>1</sup>
Necanicum	Clatsop	City of Cannon Beach	Elk Creek - West Fork	3100	C
Necanicum	Clatsop	Seaside Water Department	Necanicum River and S.F. Necancium River	6000	C
Nehalem	Tillamook	City of Nehalem	Bob's Creek	1600	C
Necanicum	Clatsop	City of Cannon Beach	Groundwater	3100	C
Nehalem	Tillamook	Rockaway Beach Water District	Jetty Creek	2600	C
Nehalem	Tillamook	Manzanita Water Department	North Fork, Middle Fork and West Fork Anderson Creek	3200	C
Nehalem	Columbia	City of Vernonia	Rock Creek	2475	C

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Nehalem	Tillamook	Rockaway Beach Water Dept	Groundwater	2600	C
Wilson-Trask-Nestucca	Tillamook	Beaver Water District	Beaver Creek	600	C
Table 6 – North Coast Community Drinking Systems (>1000 population)					
Sub-Basin	County	Public Water System	Drinking Water Source	Pop.	System Type <sup>1</sup>
Wilson-Trask-Nestucca	Yamhill	McMinnville Water & Light	McGuire Reservoir <sup>2</sup>	32000	C
Wilson-Trask-Nestucca	Tillamook	Netarts Water District	East Fall Creek	1800	C
Wilson-Trask-Nestucca	Tillamook	City of Tillamook Water Department	Killam and Fawcett Creek	4400	C
Wilson-Trask-Nestucca	Washington	Hillsboro & JWC Plant	North Fork Trask River <sup>3</sup>	41976 5	C
Wilson-Trask-Nestucca	Tillamook	Kilchis Regional Water District	Groundwater	1265	C
Wilson-Trask-Nestucca	Tillamook	Pacific City JWSA	Groundwater	1000	C
Wilson-Trask-Nestucca	Tillamook	City of Tillamook Water Dept	Groundwater	4400	C
Wilson-Trask-Nestucca	Tillamook	Fairview Water District	Groundwater	1540	C
<sup>1</sup> C - "Community Water System (C)" means a public water system that has 15 or more service connections used by year-round residents, or that regularly serves 25 or more year-round residents. 2 - (note: McMinnville also uses Haskins Reservoir in the Tualatin Subbasin), 3 - (Barney reservoir) Note: during the summer peak season, water from this source is used to supplement JWC water supply from the Tualatin River). Groundwater sources are shaded.					

Safe Drinking Water Act (SDWA) monitoring data indicates contaminants of concern in the North Coast include volatile organic compounds, synthetic organic compounds, turbidity, and bacteria. In addition, low levels of DEET (an insecticide), cholesterol, and phthalates were found in raw drinking water as part of DEQ’s Drinking Water Source Monitoring Project. For more details refer to the Status Report.

Note that this section only addresses drinking water issues identified for PUBLIC water systems. A recent query of WRD’s water rights database for private domestic points of diversion (using a threshold of 0.005 cubic feet/second for domestic water rights that are household use only, not irrigation) identified 185 private domestic water rights in the North Coast basin. There are also numerous private groundwater wells for domestic use.

Existing data shows that there is potential groundwater and surface water impacts but we have very little data in surface water upstream of intakes. SDWA monitoring data is required for finished (post-treatment) water only. There are no requirements for testing other contaminants that pose potential risks to public water systems, including “emerging contaminants” such as pharmaceuticals, chemicals associated with personal care products, and many ubiquitous pesticides and semi-volatile and volatile organic chemicals. DEQ and the Department of Human Services have initiated a statewide monitoring project to determine if there are levels of concern of emerging contaminants in source waters (see Status Report). Limited monitoring for these contaminants has occurred in this area through the Drinking Water Source Water Monitoring project to date. More data is especially needed in the North Coast Basin to help assess whether source water is being negatively impacted by biosolids applications, high density septic systems, pesticide applications, and forest management practices.

### **Underground Injection Control (UIC) Program**

The UIC program was enacted in 1974, under the Safe Drinking Water Act (SDWA). Oregon DEQ regulates this program under the OAR Chapter 340, Division 44. Injection systems are any man-made design, structure or activity which discharges below the ground or subsurface. Common uses include: stormwater discharge, industrial/commercial and process waste water disposal, large domestic onsite systems and cesspools, sewage drill holes, aquifer remediation systems, motor vehicle waste disposal, agricultural drainage, geothermal systems and aquifer storage and recovery (ASR). Common designs include drywells, trench drains, sumps, perforated piping, floor drains, drain fields and drill holes. The intent of the program is to protect groundwater resources, primarily used for drinking water, from contamination. All groundwater aquifers in Oregon are considered suitable as drinking water.

**North Coast.** In the North Coast the primary UIC related concerns are due to high groundwater elevations. UICs can't discharge directly to or within 5 ft of high seasonal aquifers and these type of discharges can contaminate unconfined dunal aquifers. Many of the cities and counties and private sites use the existing dunal aquifers as their water supply which may be the only local source. Many aquifers were identified in the 1990's by the DEQ Groundwater Section as having high nitrates due to the density of domestic on-sites septic systems in use. The key beneficial use that is impacted is drinking water, specifically municipal and domestic drinking water wells. Potential groundwater contaminant sources include unregistered UICs that DEQ regional staff have noted are in use and may discharge directly into the high seasonal groundwater with no pretreatment. Certain illegal UIC types (e.g., motor vehicle waste disposal at gas stations, auto shops) may also still be a concern as legacy issues.

### **Drinking Water Program Actions & Opportunities**

**Source Water Protection.** Data is lacking for surface water upstream from drinking water system intakes. The Source Water Protection Program has identified toxics, including toxic algae, bacteria and turbidity as priority pollutants for additional monitoring in source water streams [35]. This will assist DEQ in identifying areas where there is a potential risk of contamination and where additional drinking water treatment is required. Identifying the location and extent of existing and future biosolids applications sites will also assist in prioritizing monitoring efforts. Toxics monitoring should include pharmaceuticals, personal care products and other emerging contaminants and be prioritized to focus in vicinity of high density septic systems and biosolids application sites.

Data is needed to assess transport of contaminants via groundwater inputs to surface water drinking sources. Additional data is also needed to better characterize the risks to public water systems from elevated turbidity and pesticide sources associated with forest management practices and other land use patterns or disturbances. DEQ should facilitate greater communication with the Environmental Public Health Tracking & Healthy Waters Program at Oregon Health Authority to dissemination toxic algae data and advisories.

**Underground Injection Control.** Coordination of the permit programs (NPDES, WPCF and UIC) to bring the basin UICs into SDWA compliance (e.g., Mist WPCF permit update). In particular there are a number of educational opportunities that could be pursued with municipalities about UICs, stormwater, infrastructure needs (especially in high risk areas), financial assistance programs (SRF), and program rules and enforcement.

## Investments

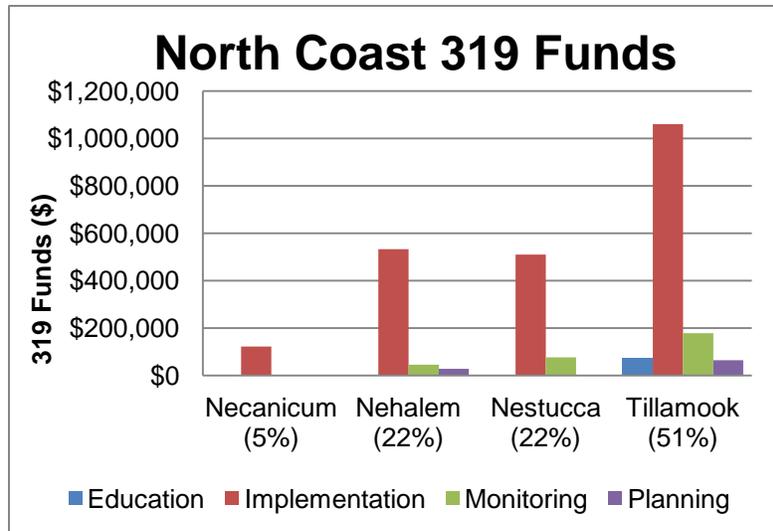
### Clean Water State Revolving Fund

DEQ administers the Clean Water State Revolving Fund loan program which is capitalized through federal appropriations [36]. The CWSRF program assists local governments with solving water quality problems and applying for financial assistance. Since 2000, CWSRF loans in the North Coast Subbasin have totaled \$55,247,705. The focus of this work has been to update aging infrastructure as many of the sewage treatment plants were built in the 1960s. This will continue to be the focus of the program and approximately \$31 million of future projects have been identified.

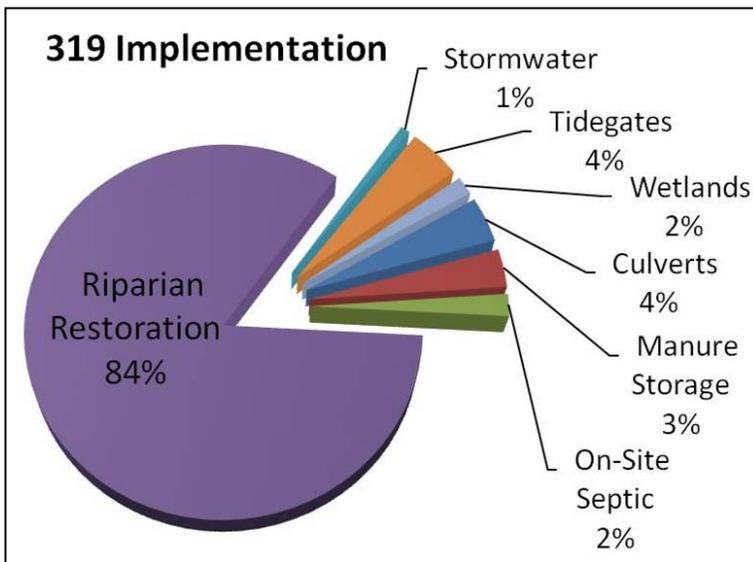
Table 7 – North Coast CWSRF 10 Year Loan History (2000-2010) and Needs		
Community	Total Amount	Activity
Arch Cape SD	\$ 2,774,700	Planning, System Improvements, Land Purchase
Netarts-Oceanside SD	\$ 7,303,171	Planning, Pump Station Improvement, Outfall
Rockaway Beach	\$27,000,000	WWTP Improvement
Tillamook	\$18,169,834	Planning, WWTP expansion
<b>Total:</b>	<b>\$55,247,705</b>	
Community Needs, WQ, Facility Concern Summary		
Common Name	Compliance/WQ Concern	Known SRF Needs (\$\$)
Arch Cape STP		Upgrade of Sewer Lines (\$225,000)
Bay City STP	Ongoing Inflow and Infiltration issues	Pump Station Upgrade (\$2.1M)
Cannon Beach STP	Rehab/Replace sewers, Treatment plant general upgrades	Land Purchase to protect water sources (\$3.8M)
Cloverdale STP	Replacement of effluent filter	
Fishhawk Lake Estates	Ongoing Inflow and Infiltration issues	
Garibaldi STP		Replace Old Pump Station (\$150,000)
Netarts-Oceanside STP	Under MAO to construct new facility	WWTP Replacement (\$23M)
Rockaway Beach STP		Pump Station Upgrade (\$4.6M)
Tillamook STP	Cross-Connections	
Twin Rocks STP		Pump Station Upgrade (\$400,000)
Vernonia STP	Headworks & pump station upgrades	
Nonpoint Source Related Needs:	<b>Stormwater, UIC:</b> supporting cities in implementing their stormwater plans. <b>CAFO related:</b> including composters, methane generators, etc to manage animal wastes	

### 319 Grant Program

The focus of 319 grant program [37] in the North Coast Subbasin has been to address water quality problems that have been identified in the TMDLs or in the Tillamook Estuary Partnership Comprehensive Conservation and Management Plan (CCMP). Approximately \$2.6 million of 319 grant money has been spent in the subbasin since 2000, with about 51% of it spent in the Tillamook watershed, 22% spent in each of the Nehalem and Nestucca watersheds and 5% in the Necanicum watershed.



Approximately 83% of the grant funds have focused on implementation activities (primarily riparian restoration), 11% on monitoring and 3% each on planning and educational activities. The educational grant support has partially funded the Tillamook County Children’s Clean Water Festival, which is open to school children throughout the county.



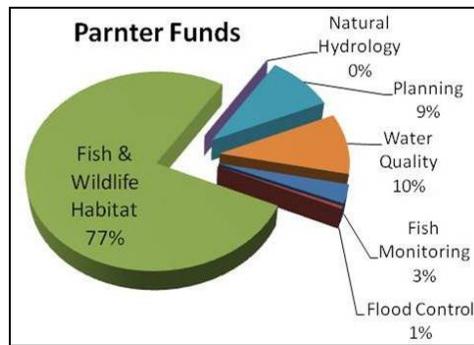
Priorities for 2011 through 2015 will not change. The focus will continue to be working with basin partners to implement actions that will result in clear temperature, bacteria and sediment improvements on urban, agricultural and forested lands, as well as, addressing storm water issues in urban areas.

**Table 8 - 319 Grant Activities 2000-2010 Summary**

Watershed/ Category	319 Funds	Total	Activity	Partners
<b>Necanicum</b>				
Riparian Restoration	\$ 77,535	\$129,225	9.5 miles new; 1.5 maintenance	Clatsop SWCD; Columbia River
Manure Storage	\$ 23,660	\$ 39,433	2 small manure storage facilities	Estuary Study Task Force; North Coast
Wetlands	\$ 20,500	\$ 34,166	5 acres restored	Land Conservancy
Total:	<b>\$121,695</b>	<b>\$202,824</b>		
<b>Nehalem</b>				
Riparian Restoration	\$532,811	\$ 888,017	64 miles new; 49 miles maintenance	City of Wheeler; Lower Nehalem
Monitoring	\$ 45,310	\$ 75,517	Source evaluation for bacteria & sediment	Watershed Council; Tillamook SWCD;
Stormwater Planning	\$ 28,200	\$ 47,000	Storm water Mgt Plan - City of Wheeler	Upper Nehalem Watershed Council
Total:	<b>\$606,321</b>	<b>\$1,010,534</b>		
<b>Nestucca-Neskowin-Sand Lake</b>				
Riparian Restoration	\$509,699	\$849,499	49.5 miles new; 56 miles maintenance	Nestucca-Neskowin WC; Tillamook
Monitoring	\$ 75,468	\$125,780	Source eval. data for bacteria, sed. & temp.	Estuary Partnership; Tillamook SWCD
Total:	<b>\$585,167</b>	<b>\$975,279</b>		
<b>Tillamook</b>				
Riparian Restoration	\$ 747,173	\$1,245,290	84 miles new; 80 miles maintenance	City of Bay City; City of Tillamook;
Monitoring	\$ 177,779	\$ 296,298	Source evaluation data for bacteria & Temp.	Port of Garibaldi; Tillamook County;
Tidegates	\$ 99,840	\$ 166,400	8 tidegates replaced	Tillamook Creamery
Culverts	\$ 87,810	\$ 146,350	10 culverts replaced	Assn; Tillamook
Education	\$ 75,000	\$ 124,998	Tillamook Children's Clean Water Festival	Estuary Program; Tillamook SWCD;
Stormwater Planning	\$ 64,000	\$ 106,667	Stormwater Plans Tillamook & Garibaldi	Tillamook School Dist #9;
Manure Storage	\$ 50,000	\$ 83,333	5 small storage facilities	Or. Dept of Forestry;
Onsite Septic	\$ 42,700	\$ 71,167	Inspect on-site systems in Tillamook Co.	Oregon Grad. Inst.; Portland State Univ
Stormwater Implementation	\$ 17,538	\$ 29,230	4 stormwater vaults, Port of Garibaldi	
Wetlands	\$ 15,000	\$ 25,000	7 acres wetlands restored	
Total:	<b>\$1,376,840</b>	<b>\$2,294,733</b>		
<b>Totals by Activity</b>				
Implementation	\$2,224,266	\$4,483,370	207 stream miles restored; 186 miles maintained; 12 acres wetlands restored; stormwater containment – Port Garibaldi; 10 culverts & 8 tidegates replaced; 7 manure storage facilities constructed; on-site inspections	
Monitoring	\$298,557	\$497,595	Source Evaluation & trend data	
Planning	\$92,200	\$153,667	3 city plans	
Education	\$75,000	\$124,998	Children's Clean Water Festival	
Grand Total:	<b>\$2,690,023</b>	<b>\$4,483,370</b>		

### Partner Investments

DEQ investments in the North Coast through 319 and SRF represent only a portion of the funds being spent for watershed improvements. TEP has tracked all restoration projects in most of their study area (all but the Necanicum watershed) as part of their Government Performance and Results Act (GPRA) reporting requirements to the EPA. Their GPRA database has the total investment from DEQ and partners at \$68 million from 2000 through 2009 (this includes 319 funds).



### Investment Actions & Opportunities

**Clean Water State Revolving Fund.** Prioritize future projects for facilities that discharge to bacteria water quality limited stream reaches. Expand the program to address non-point source areas of concern, such as supporting communities in implementing stormwater plans (e.g., City of Tillamook) and fund tracking of current and abandoned UICs. CWSRF could also expand its assistance of the Confined Animal Feeding Operations program with infrastructure improvements which would include composters or methane generators that manage animal wastes.

**319 Grant.** The 319 program will continue to focus on implement actions that will result in temperature, bacteria and sediment improvements on urban, agricultural and forested lands, and that address stormwater in urban areas.

## Monitoring

### Monitoring Program Background

The North Coast Watershed Approach area contains five individual watersheds. Many of the monitoring programs are attempting to answer water quality status and trend [38]. Information will need to be gathered at different scales, time periods and will help to inform the statewide Ambient monitoring network (and therefore the OWQI) or within watershed boundaries for TMDL Effectiveness Monitoring. Each program will have different requirements and time frames based on the goal of the monitoring effort. For this reason the monitoring efforts will be discussed individually. Where efficiencies can be identified they will be incorporated into any overall monitoring strategy.

### Ambient and Beach Monitoring Program

**Ambient - Current Monitoring.** For decades DEQ has produced water quality information about Oregon’s rivers and streams through its long-term water quality monitoring program. Monitoring staff collect data six times a year at 144 fixed sites throughout the state (10 in the North Coast). The Oregon Water Quality Index is an important way to track the status and trend of general water quality across the state. The Ambient program is expected to continue into the foreseeable future.

**Future Needs** The Ambient monitoring network could assist the North Coast by rotating in toxic and other emerging parameters that are not typically included in Ambient sampling suite. This could help identify new pollutant parameters that may need additional monitoring in other programs.

**Beach Monitoring - Current Monitoring.** The existing beach monitoring program should continue with the possible expansion of the program discussed below.

Future Needs

DEQ should consider including estuary monitoring location in the Beach monitoring program. This could provide needed information on water quality in estuaries where recreational harvesting takes place with a minimum of additional resources.

**Basin Planning/TMDL - Effectiveness Monitoring**

**Bacteria - Current Monitoring.** DEQ should continue to assist the Tillamook Estuaries Partnership (TEP) in maintaining its Volunteer Monitoring Program In the Tillamook Bay watershed. This program monitors 43 sites in the Tillamook Bay Watershed for *E. coli* bacteria. The sampling began in 1997 and samples are collected twice a month year round. TEP has extended this effort to include 8 sites in the Nehalem watershed beginning in 2009, hopefully continuing into the future. Beginning in 2011 TEP will be collecting *Enterococcus* samples in Tillamook and Nehalem Bays. Samples will be collected at three sites in each of the bays, twice a month on a year round basis. This data will supplement the Oregon Department of Agriculture (ODA) shellfish monitoring data. ODA monitors Tillamook Bay once a month during oyster harvesting season.

Future Needs

DEQ should assist or encourage TEP to extend its Volunteer Monitoring Program into the Nestucca watershed. Monitoring sites should be established on the mainstem Nestucca from just above tidewater in the lower to the extent of the listed reaches, a couple miles upstream of the town of Blaine. In addition, monitoring sites should be established for the length of the Little Nestucca mainstem. Sampling frequency should occur at a rate of twice monthly and continue year round.

DEQ should also assist or encourage the Necanicum Watershed Council to implement the bacteria monitoring program that they developed with the assistance of the DEQ LEAD Volunteer Monitoring Program. The Necanicum Watershed Council drafted and got approval for a Sampling and Analysis Plan (SAP) that established candidate sites that will be monitored for *E. coli* and *Enterococcus*. Sampling frequency should be twice a month, year round.

DEQ should assist in bacteria DNA analysis for problem areas in the Tillamook Bay Watershed identified in TEP Volunteer Monitoring Program. This information would allow the agency to focus improvement effort on the appropriate sources (e.g., septic systems, agriculture, or nuisance wildlife).

**Dissolved Oxygen - Current Monitoring.** DEQ is currently partnering with TEP to monitor 5 sites in Tillamook Bay sloughs. The sampling involves continuous monitoring dataloggers deployed for one week each in the spring, summer, and fall. So far data has been collected in 2007 through 2010. This monitoring schedule should continue until an evaluation of the data or TMDL has been completed. In addition to the monitoring described above, a more intense monitoring effort was performed in 2008 in order to provide additional data for potential TMDL development. Weekly DO field readings were collected in Hoquarten and Dougherty Slough to document long term DO variation patterns. Flow and other continuous monitoring parameters were also collected in Hoquarten and Dougherty Slough by lab staff in the reaches downstream of Highway 101.

In an effort to verify DO listings in the Wilson and Trask mainstem Rivers, interstitial gravel dissolved oxygen (IGDO) samples were collected with paired water column samples in the fall of 2009. Results in the Trask River verified the listing with IGDO values of 3 mg/L.

#### Future Needs

Develop a monitoring plan for DO listings in the Trask, Wilson, Nehalem, and Nestucca Rivers, as well as, Holden and Bewley Creeks. Determine whether a TMDL or another assessment should be performed in combination with slough DO listings or kept as a separate effort.

***Sediment/Turbidity.- Current Monitoring.*** In 2009 TEP completed a sediment characterization of the Tillamook Bay Watershed. The modified EMAP methodology was employed to collect data from 180 sites in the, including 30 sites in the Oregon Department of Forestry Trask Watershed Study area. A component of the monitoring plan is to revisit 30 sites once every two years until all 180 sites have been re-sampled. The goal of the resample will be to establish long-trends in the watershed. The trend monitoring began in 2010 and will continue into the foreseeable future.

Also the Upper Nehalem Watershed Council has established 17 long-term turbidity monitoring sites in the in the upper Nehalem Watershed. Data is collected once a month and during two storm events per year.

#### Future Needs

DEQ should continue the supporting role in executing the long-term sediment monitoring effort in the Tillamook Bay Watershed. DEQ can assist by allocating lab staff for collection of sediment data every two years. In addition, the effort would be greatly improved if DEQ could add additional monitoring locations in the lower reaches of the watershed using EMAP non-wadeable stream monitoring protocol.

***Temperature - Current Monitoring.*** The temperature TMDLs in the North Coast helped established several temperatures monitoring sites in the region. DEQ North Coast staff have been collecting TMDL effectiveness monitoring data at only a portion of these sites in the Tillamook, Nehalem, and Nestucca watershed. This will be important datasets as implementation continues in the watersheds.

Additional temperature monitoring has been conducted through an ODFW Salmon and Trout Enhancement Program (STEP) project in the Salmonberry Watershed, a tributary to the Nehalem. Ian Fergusson completed a study, "Effects of Debris Torrents on Summer Water Temperatures: Salmonberry River (Nehalem Basin), Oregon" [\[39\]](#), in which the temperature data is summarized.

#### Future Needs

A limitation to collecting continuous temperature data in the North Coast is the availability of continuous temperature dataloggers. DEQ could facilitate this work by providing an adequate amount of dataloggers to the North Coast monitoring program. This would not only support the ongoing monitoring, but would allow for additional monitoring locations to be established.

DEQ should assist or encourage the Necanicum Watershed Council to implement the temperature monitoring program that they developed with the assistance of the DEQ Laboratory and Environmental Assessment Volunteer Monitoring Program. The Necanicum Watershed Council drafted an approved Sampling and Analysis Plan (SAP) that established a number monitoring sites that will collect continuous temperature if implemented.

Another opportunity to address temperature monitoring would be to establish a monitoring system to collect shade data. Equipment like the Solarmetric Suneye 210 could provide an efficient way of collecting a large amount of shade data. This could be useful for measuring TMDL targets as well as monitor riparian and reach specific restoration projects.

**Bio-Monitoring- Current Monitoring** – At present there are no resources available to continue biological monitoring in the North Coast.

#### Future Needs

Macroinvertebrate monitoring could be a valuable tool in verifying and documented water quality degradation and its effects on aquatic life in the North Coast basin, as well as, its use as an important tool in communicating the effectiveness of improvements to the public in a more understandable format. DEQ could facilitate additional monitoring by working with the Basin Coordinators and monitoring partners to establish monitoring plans and funding mechanisms for this work.

### **Wastewater, Toxics, and Special Studies**

**Pesticides and Pharmaceuticals - Current Monitoring.** In the fall of 2010, TEP partnered with DEQ to initiate pesticide and pharmaceutical monitoring of surface water in the North Coast. Polar Organic Chemical Integrative Samplers (POCIS) were deployed at 2 surface drinking water intakes, one in each of the five major river systems, and one below Tillamook County Creamery Association discharge.

#### Future Needs

Based on results of the 2010 POCIS deployment additional and more extensive pesticide and pharmaceutical monitor may be required. In addition, monitoring should be extended to include the other watersheds in the North Coast, such as, Necanicum, Nehalem, and Nestucca. Water column samples collected at beginning and end of POCIS deployment may also improve the applicability of analytical results.

### **Drinking Water and Groundwater**

**Current Monitoring.** As discussed earlier, DEQ is implementing a Drinking Water Source Monitoring Project that includes collecting groundwater and surface water samples from high-risk drinking water sources. DEQ Laboratory staff are collecting the samples above surface water intakes and at wells. The scope of the project is limited. The analyte list includes Oregon-specific herbicides, insecticides, pharmaceuticals, volatile organic compounds, fire retardants, PAHs, and plasticizers. The purpose of the Source Monitoring is to collect data from multiple contaminant sources to assist in determining priorities for technical assistance and prevention, and to collect screening level data on whether there are potential human health risks beyond those routinely monitored within the SDWA regulations.

The Tillamook Estuary Partnership has conducted water quality sampling in the North Coast Basin in the fall of 2010 – analytical results are not yet available and will be conducting additional sampling in 2011. This effort will yield important data on the presence of toxics in untreated drinking water in the Basin. However, there may be remaining data gaps for locations upstream of drinking water intakes that are not presently selected as sampling sites with this project.

#### Future Needs

A number of public water systems have continuous turbidity monitoring equipment that yield high quality data on turbidity levels of untreated drinking water. A plan for installing this

equipment at public water systems throughout the Basin would be a major improvement in assessing potential source water impacts. Continued coordination with partnering agencies to share research results, monitoring data, and mapping is also recommended.

As for Groundwater, further investigations and monitoring are warranted in local areas where nitrate and bacteria have been found. Specific recommendations include; 1) Reviewing the effectiveness of the current Clatsop Plains Geographic Rule, 2) determining if the Clatsop Plains contaminant loading predictions have been met, 3) review the existing Clatsop Plains information to determine if the area should be declared an Area of Groundwater Concern, or a Groundwater Management Area, and 4) conduct further groundwater investigations to determine lead levels and extent of contamination in the Clatsop Plains areas.

### **Monitoring Actions & Opportunities**

In addition to the prioritizing the Future Needs identified above , it is recommended that DEQ facilitate an integrated monitoring effort that would include the coordination of the TEP, DEQ 319 and TMDL programs, various watershed council efforts, the Oregon Plan monitoring (Oregon Department of Fish & Wildlife), the Oregon Department of Forestry work (e.g., Trask study). The concept of forming a “North Coast Monitoring Council” or equivalent group could be explored over the next five years. In the interim a more comprehensive basin monitoring plan & strategy should be developed over the next year in coordination with DEQ regional and LEAD staff together with the various basin partners.

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# Appendix

North Coast Watershed Approach Sub-Program Priorities																						
Identified Actions Near Field = N (next 18 months), Mid Field = M (18 months - 3 years), Far Field = F (3 to 5 years)	Timeline	Bio-Solids	Water Reuse	CWSRF	Drinking Water	Groundwater	On-Site	UIC	401 dredge/fill	Standard/Assess	Pre-treatment	Municipal	Stormwater	319	TMDLs	Monitoring	Nonpoint	401 by/zero	Industrial	Permits	Partners	Partners Organization
Sedimentation: development of numeric sediment criteria or some clear guidance on how the existing language should be used	N								X													
Dissolved oxygen: clarification of the uses and the correct criterion for dissolved oxygen in the coastal sloughs and lower tributaries	N								X													
Bacteria: estuarine bacteria monitoring in upstream reaches that flow into shellfish areas	N								X													
Sedimentation assessment high priority in all of the North Coast Subbasins	N												X	X						X		TEP, Nehalem WC
Address dissolved oxygen listings in sloughs and mainstem rivers	N												X	X						X		TEP
Tillamook Wastewater Treatment Plant should focus on addressing sewer and stormwater cross-connection	N									X												
Permit monitoring requirements reflect the appropriate parameter (e.g., E. coli versus Enterococcus and toxics)	N									X												
Local stakeholder outreach	N	X																				
Identify resource priorities for canceled 1200C permits	N										X											
Determine needs for NPDES permit to address forest practices related to SW mgmt	N											X										
Mitigated Gravel Agreement may need to meet additional water quality requirement to correspond with similar gravel operation throughout the State	N							X														
Follow up for the septic policy option package	N					X																
Characterization for risk of source water streams to toxics, including toxic algae, bacteria and turbidity	N		X												X					X		TEP
Better characterization of risks to public water systems from elevated turbidity and pesticide sources associated with forest management practices	N		X												X					X		TEP
Coordination of the permit programs (NPDES, WPCF and UIC) to bring the basin UICs into SDWA compliance (e.g., Mist WPCF permit update)	N						X															
Prioritize future projects for facilities that discharge to bacteria water quality limited stream reaches	N		X												X					X		TEP
The 319 program will continue to focus on implement actions that will result in temperature, bacteria and sediment improvements on urban, agricultural and forested lands, and that address stormwater in urban areas	N											X				X						
See Monitoring Plan and Priority List for additional monitoring activities	N														X							
North Coast Basin Coordinator to implement Watershed Approach through partner and sub-program coordination, data collection and compiling, and water quality assessment	N															X						TEP, Watershed Councils, ODA, ODFW, OSU
Renew and update priority municipal permits	N									X						X						
Integrated Report Alignment: Integrated Report database more closely align with that in the WA Status Report or other assessments	M							X														
Review effectiveness of the current Clatsop Plains Geographic Rule, determining if the contaminant loading predictions have been met, determine if the area should be declared an Area of Groundwater Concern, or a Groundwater Management Area	M			X																		
303d updates & database corrections: Work with 303(d) coordinator to update database to reflect status of recent on-going monitoring	M							X														
Bacteria listings corrected: Fecal coliform/E. coli listings need to be corrected	M							X														
Turbidity not listed: Note that turbidity was not entered from 1988 NPS Assessment – but is of concern in the basin	M							X														
Develop Implementation Ready TMDLs and Implementation Plans for temperature, bacteria, and sediment TMDLs currently in place	M											X	X	X						X		TEP
Aquatic weeds and nutrients for Sunset, Coffenbury, Cullaby and Smith Lakes	M											X	X							X		PSU
WWTPs should be required to collect and analysis surface water samples when unauthorized discharge or spills occur	M							X														
Coordinate with wastewater treatment facilities and identify opportunities for the beneficial reuse of biosolids and industrial wastewater solids	M	X																				
Work with Tillamook County to address human sources of bacteria identified through OSU Bacteria DNA study in Holden Creek and segments of the Miami and Tillamook Rivers	M				X										X							TEP
Identifying the location and extent of existing and future biosolids applications sites to prioritize monitoring efforts	M		X																			
Communication with the Environmental Public Health Tracking & Healthy Waters Program to dissemination toxic algae data and advisories	M		X												X							Lower Nehalem WC
Expand the program to address non-point source areas of concern, such as supporting communities in implementing stormwater plans (e.g., City of Tillamook) and fund tracking of current and abandoned UICs	M		X			X																Local Municipalities
CWSRF could also expand its assistance of the Confined Animal Feeding Operations program with infrastructure improvements which would include composters or methane generators that manage animal wastes	M		X																	X		ODA
Develop a comprehensive approach to ODOT permits	M									X						X						
"Insufficient data" versus "Potential concern" listings: how these terms were used and what they actually show (especially insufficient data listings)	F							X														
pH, metals and natural conditions: a few low pH and low alkalinity listings of potential concern that may reflect naturally existing conditions (rainfall)	F							X														
Groundwater study in the Clatsop Plains	F				X																	
Characterization to assess transport of contaminants via groundwater inputs to surface water drinking sources	F		X	X											X							