

**Technical Report #05-99**

**Evaluation of the Management Framework for  
the Tillamook Bay National Estuary Project  
Priority Problems**

**Phase III of the Base Programs Analysis**

**May 1999**

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# **Evaluation of the Management Framework for the Tillamook Bay National Estuary Project Priority Problems**

## **Phase III of the Base Programs Analysis**

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# Acronyms

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BLM	Bureau of Land Management
BMP	Best Management Practices
CAFO	Confined Animal Feeding Operation
CCMP	Comprehensive Conservation and Management Plan
COE	U.S. Army Corps of Engineers
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CSRI	Coastal Salmon Restoration Initiative
CZARA	Coastal Zone Act Reauthorization Amendments
CZMA	Coastal Zone Management Act
DCD	Tillamook Co. Department of Community Development
DEQ	Oregon Department of Environmental Quality
DLCD	Oregon Department of Land Conservation and Development
DSL	Oregon Division of State Lands
EDC	Tillamook Co. Economic Development Council
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
EQC	Oregon Environmental Quality Control Commission
EQIP	Environmental Quality Incentive Program
ESA	Endangered Species Act
FDA	U.S. Food and Drug Administration
FEMA	Federal Emergency Management Agency
FHZ	Flood Hazard Overlay Zone
FHMP	Flood Hazard Mitigation Plan
FIP	Forest Incentives Program
FPA	Forest Practices Act
FPF	Forest Practice Forester
GIS	Geographic Information Systems
FTE	Full Time Employee
GWEB	Governor's Watershed Enhancement Board
HCP	Habitat Conservation Plan
HSP	Healthy Streams Partnership
LCDC	Land Conservation and Development Commission
LUO	Tillamook County Land Use Ordinance
LWD	Large Woody Debris



MEAD	Methane Energy and Agricultural Development
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resource Conservation Service
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OPSW	Oregon Plan for Salmon and Watersheds
ORS	Oregon Revised Statutes
ORV	Off-Road Vehicle
OSDS	On-site Disposal System
OSP	Oregon State Police
OSU	Oregon State University
OWRD	Oregon Water Resources Department
RCWP	Rural Clean Water Project
RMA	Riparian Management Area
SB	Senate Bill
SWCD	Tillamook County Soil and Water Conservation District
TBCC	Tillamook Bay Community College
TBWC	Tillamook Bay Watershed Council
TBNEP	Tillamook Bay National Estuary Project
TCCA	Tillamook County Creamery Association
TCWRC	Tillamook Coastal Watershed Resource Center
TEA	Transportation Equity Act
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USDA	United States Department of Agriculture
USFS	United States Forest Service
WHIP	Wildlife Habitat Incentive Program
WRD	Water Resources Department
WRP	Wetland Reserve Program

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# Executive Summary

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The Base Programs Analysis provides an inventory and assessment of the management framework that governs the Tillamook Bay watershed's priority problems. The Tillamook Bay National Estuary Project (TBNEP) identifies these problems generally as:

- Pathogenic contamination of the bay and lowland rivers;
- Watershed-wide erosion and sedimentation;
- Degraded fish and wildlife habitat; and
- Increased flooding.

This Base Programs Analysis provides the last of three phases. Its objectives are as follows.

- Update Phases One and Two of the Base Programs Analysis to reflect recent changes in natural resource policy that impact the management of the TBNEP's priority problems.
- Evaluate the management framework for flooding, which was identified as a priority problem after Phases One and Two were written.
- Provide the Performance Partnership with a comprehensive discussion of current resource management programs and regulations as well as recommendations for improvement to the current management framework.

This report is divided into five chapters.

Chapter One discusses the major plans and policies that impact the management of the Tillamook Bay watershed's priority problems. Numerous local, state, and federal policies comprise the management framework, and many influence more than a single priority problem. Many of these are currently being developed and will play a pivotal role in managing resource use in the years to come.

Most notably, Oregon developed the Oregon Plan for Salmon and Watersheds as a way to restore depleted salmonid populations and avoid a federal 'endangered species' listing for the coastal coho. This multi-agency plan provides hundreds of measures for habitat and water quality restoration and impacts virtually every facet of natural resource management in the Tillamook Bay basin.

Chapter two discusses the management framework governing water quality in the Tillamook Bay basin. Major sources of pathogenic contamination in the basin include confined animal feeding operations (most commonly found on dairy pastures), sewage treatment plants, and, to a lesser degree, failing septic systems. Contamination of the bay causes closures to shellfish harvest, which is regulated under the Oregon Department of Agriculture's (ODA) Shellfish Management Plan.

Confined Animal Feeding Operations are regulated by ODA through a permitting and inspection program. Despite this program and attempts at improving manure management under programs like the Rural Clean Water Project, CAFOs continue to contribute significant bacterial loads into the bay and rivers. As a result, ODA is writing a Water Quality Management Area Plan as defined under state Senate Bill 1010. Individual farm operations will have to comply with the standards described in this plan.

The Department of Environmental Quality (DEQ) administers a comprehensive water quality regulatory program, much of which is mandated under the federal Clean Water Act. The agency is currently in the process of setting Total Maximum Daily Loads for temperature and bacterial contamination in the basin and also collects data on nutrients, dissolved oxygen, and other water quality parameters. The agency also regulates stormwater discharge using National Pollution Discharge Elimination System permits.

To reduce nonpoint source pollution, the federal Coastal Nonpoint Source Pollution Control Program requires Oregon to implement measures that will reduce water quality contamination. This program works with state and local governments. Many of these agencies already have strict provisions aimed at water quality.

Despite these policies, several improvements could be made to the current water quality management framework. Recommendations include the following:

- Increase protection and restoration of riparian zones;
- Strengthen the CAFO inspection process;
- Update the shellfish plan and growing classifications;
- Safeguard on site disposal systems; and
- Increase public education on water quality issues.

Chapter three summarizes the policies that have been set in place to control sediment loading into the rivers and bay. Considerable disagreement exists concerning the extent to which sedimentation is a problem in the Tillamook Bay basin. Because of a series of fires during the middle part of this century

(the Tillamook Burn) and the breach of the Bay Ocean Spit, it has been difficult for TBNEP to ascertain the actual impact of *current* levels of sedimentation.

Sedimentation is regulated by DEQ on all on-farm and forest land. Efforts to control sedimentation are focused in the upper watershed, which was the site of massive erosion after the Tillamook Burn and continues to deliver significant loads. The Forest Practices Act regulates sedimentation and establishes sediment reduction measures from harvesting activities that apply to all non-federal forest lands.

In the lowlands, agricultural lands are not regulated in this way, although SB 1010 will provide enforceable sediment control measures. The DEQ regulates sediment from urban areas using National Pollution Discharge Elimination System permits. Dredge and Fill activities also impact sediment loading and are regulated by state and federal agencies.

Recommendations for improvement to the management of sediment and erosion include the following:

- Increase incentives for stewardship on private forest lands;
- Research stability of steep slopes after harvests;
- Improve lowland riparian zones; and
- Accelerate forest road closures.

Chapter four evaluates the management of key habitats. Although actions contained in the CCMP will positively benefit numerous plant and animal species, most were developed with the improvement of salmonid habitat in mind. Consequently, considerable agreement exists between the Oregon Plan and the CCMP. Within the basin, both plans emphasize the critical roles of both the Oregon Department of Fish and Wildlife (ODFW) and the Department of Forestry (ODF).

Little habitat regulation exists per se. Habitat protection occurs through a variety of policies and at a range of scales. Some habitats are addressed on a basin wide scale like those managed under the Endangered Species Act, Oregon Plan, or ODFW harvest limits (for ‘human predation.’) Most habitats, however, are managed based on the land use under which they occur. Policies promulgated by ODA manage habitats on agricultural lands, and those by ODF govern forest habitats. The Tillamook County Department of Community Development carries out statewide planning goals on non-farm and forest lands. These goals are defined under the Oregon Land Use Planning Program and have significant influence over the conservation of habitats.

Some habitats suffer due to fragmented, multi-agency management. The degradation of riparian habitats provides the most manifest example of this. The Performance Partnership has a unique opportunity to address problems caused by multi-agency management.

Recommendations to improve habitat management include:

- Improve education;
- Improve protection of riparian zones;
- Improve government incentive programs; and
- Maintain TBNEP subcommittees under the Performance Partnership.

Chapter five discusses the management framework established to reduce the risk of and damage caused by flood events. In recent years anecdotal evidence suggests that flood events are becoming more common and more damaging. Although opinions are divided regarding the causes (many residents believe it is due to discontinuing dredging while most scientists refer to a simplification of river systems and alteration of the floodplain), recent catastrophic floods have taken a natural and human toll on the basin.

To mitigate future flood impacts, the county developed the *Tillamook County Flood Hazard Mitigation Plan*. In addition, the County Land Use Ordinance outlines special regulations for development in the floodplain. The federal government has responded to Tillamook's flood problems. The Army Corps of Engineers performed a Reconnaissance Study of the basin and currently works with local sources to find matching funds for a hydrologic model of the basin. Finally, the Federal Emergency Management Agency designated Tillamook County a disaster resistant community under its disaster prevention program, Project Impact.

Recommendations to improve flood mitigation efforts in the basin include the following:

- Combine efforts at flood mitigation with habitat restoration;
- Lobby funding for Army Corps of Engineers' Challenge 21;
- Target mitigation efforts at unprotected property;
- Implement projects based on relative priorities;
- Update floodplain map and restrict development in the floodplain; and
- Involve private businesses in Project Impact.

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# Introduction

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## ***Background and Purpose of this Report***

The Base Programs Analysis provides one of two characterizations required of a National Estuary Project. The first, the scientific and technical characterization report, investigates the sources and impacts of pollution in the bay, as well as other physical, chemical, and biological alterations to the bay environment. The second, this document, inventories and evaluates the management framework that governs the Tillamook Bay watershed's priority problems. As stated by the Tillamook Bay National Estuary Project (TBNEP) management conference, these priority problems include:

### **Water Quality**

Bacteria and other pathogens from both point and nonpoint sources present a principle water quality problem. Pathogenic contamination threatens public health through the ingestion of contaminated shellfish and water, or direct water contact. It also results in frequent closure of commercial shellfish harvesting areas. In addition to pathogenic contamination, many stream reaches do not meet water quality criteria for temperature and suspended solids. Dissolved oxygen concentrations meet water quality standards in most areas of the watershed except in lowland sloughs. Nutrient concentrations do not appear to adversely impact water quality except in the lowland sloughs. No acute or chronic effects from toxic substances have been observed.

### **Sedimentation**

Current levels of erosion and sedimentation may adversely impact the human and natural environment. Historic increases in sediment may have caused the loss of spawning and rearing habitat, degradation of estuarine habitats, and changes in the bay depth, circulation patterns, and response to floods.

### **Critical Habitat**

Loss and simplification of key habitat and past and present fisheries practices have contributed to declines in salmonids and other aquatic and estuarine-associated organisms. Important riparian, instream, freshwater, off-channel, tidal slough, and estuarine habitats have been lost or

degraded. Fishery practices include the management of natural production, hatcheries, and harvest.

## **Flooding**

The interaction of human activities with dynamic natural systems has increased the magnitude, frequency, and impacts of flood events. These events affect water quality, cause erosion, imperil fish and aquatic wildlife, damage and destroy property, and threaten life.

## **Introduction**

This Base Programs Analysis serves as the last of three editions prepared for the TBNEP and the U.S. Environmental Protection Agency (EPA). Phase One, completed in April of 1995, inventoried the management framework that affected the TBNEP's priority problems. In August of 1996, Phase Two used this inventory to evaluate the effectiveness of these management activities and recommend alternatives to the regulatory framework. That analysis critiqued the overall management structure and recommended approaches to streamlining inter-agency coordination. Phase Two also examined the strengths and weaknesses of specific government programs.

This third phase of the Base Programs analysis aims at many of the same points and its overriding purpose—to evaluate the management framework—is fundamentally the same. However, it is important to distinguish the objectives of this edition from its predecessors. First, because Phases One and Two were completed prior to the enactment and/or implementation of several important policies, this edition emphasizes new programs and regulations. Second, Phase Three contains a chapter on flooding, which the TBNEP added as a priority problem after the publication of Phases One and Two. Finally, this document contains a more detailed discussion of policies and programs than its predecessors. As a result, the Performance Partnership may find it a useful tool for educational purposes.

The information contained in this report and the conclusions reached were derived from a review of federal, state, and local plans, as well as the insights of those actively involved in the management of the Tillamook Bay watershed's resources. The TBNEP has merged a portion of this report's findings into the action plans and text of the Comprehensive Conservation and Management Plan (CCMP). These action plans comprise the bulk of the CCMP and will define explicitly what activities should be undertaken to address each priority problem. This report aims to increase the ease and likelihood of carrying out recommended actions.





## ***Organization of this Report***

This report consists of five chapters. Chapter One summarizes the major policies that influence the management and use of the Tillamook Bay watershed's resources. This chapter initially separates these policies from the priority problem chapters because their influence extends beyond a single issue. For example, the planning process outlined in Senate Bill 1010 will impact water quality but is also likely to impact sediment, habitat, and flooding as well. Providing background on the major policies emphasizes their importance and scope while reducing duplication in the chapters that follow.

The following four chapters discuss how these and other programs affect each of the Tillamook Bay watershed's four priority problems (water quality, sedimentation, critical habitat, and flooding.) Each chapter evaluates the management framework through the following sections.

### **Inventory**

The issues presented in the CCMP fall under the authority of many local, state, and federal agencies and jurisdictions. This inventory comprises the bulk of each chapter and will provide the reader with an overview of the existing policies put forth by these agencies. Specifically, it discusses the regulatory, resource management, planning, volunteer, funding, and technical assistance programs which impact the four priority problems.

### **Update of Phase II**

Phase II of the Base Programs Analysis was completed in July 1996 and contained a number of recommendations concerning alternative approaches to managing the basin's priority problems. This section evaluates the success of management activities over the last two years in responding to the TBNEP's earlier recommendations.

### **Recommendations**

Based on the inventory and update discussed above, this section highlights the most important deficiencies in the current management framework. It makes specific recommendations to resource managers, policy makers, and stakeholders regarding the best approaches to more effectively managing the watershed's priority problems.

Specifically, recommendations focus on:

- policies/laws that need better enforcement;
- present and future policies for which TBNEP recommends support;
- data gaps which impact managers' effectiveness in dealing with issue(s);
- education programs that will increase citizen stewardship and benefit natural systems; and
- others as applicable.

As a final note, the reader will find that this document provides very little discussion of natural processes. Although each of the four issues is based on important ecological principles, this document assumes a basic understanding of these principles and how they relate to water quality, sedimentation, salmonid habitat, and flooding. For a comprehensive discussion of the processes that impact the priority problems, please consult the Tillamook Bay Scientific and Technical Characterization Report.



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# Chapter 1: Major Plans & Policies

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Countless state and federal policies and plans exist which influence the way the Tillamook Bay area manages its resources. In order to reduce redundancies among the chapters, this section provides a brief overview of those policies that significantly impact more than one priority problem. The summaries presented here are intended to provide background on the major policies and to update their status locally. The specific impact of these policies, as they relate to the TBNEP, are discussed within each priority problem chapter. Policies discussed include the following.

- Oregon Plan for Salmon and Watersheds
- Coho and steelhead restoration plans (formally known as the CSRI)
- Healthy Streams Partnership
- Oregon Land Use Planning Program
- Senate Bill 1010 Agricultural Water Quality Management Area Plans
- 1996 USDA Farm Bill
- April 1998 Draft Northwest Oregon State Forest Management Plan
- April 1998 Draft Western Oregon State Forests Habitat Conservation Plan
- Oregon Forest Practices Act
- Coastal Zone Management Act
- Coastal Nonpoint Source Pollution Control Program
- Oregon Shines
- Tillamook County Performance Partnership
- Tillamook County Strategic Vision

## **Statewide Planning**

Two statewide policies dramatically impact land use and resource policy in Oregon and the Tillamook Bay watershed: the Oregon Plan for Salmon and Watersheds and the Oregon Land Use Planning Program.

### **The Oregon Plan for Salmon and Watersheds**

The state of Oregon initiated the Oregon Plan as a means to restore salmon populations to support a sustainable fishery and prevent the need for a federal endangered species listing for coastal coho populations. Since its inception, the plan has evolved to include steelhead and emphasize the restoration of both native fish populations and the aquatic systems that support them.

The Oregon Plan's watershed approach emphasizes four points:

1. coordination among all involved parties (agencies, industries, volunteers, etc.);
2. locally-based actions and solutions;
3. extensive monitoring; and
4. adaptive management.

This broad based and multi-faceted approach is carried out principally through two measures: coho and steelhead restoration plans and the Healthy Streams Partnership.

### **Coho and Steelhead Restoration Plans**

Two restoration plans evolved to comprise the backbone of the Oregon Plan: the Coastal Salmon Restoration Initiative (CSRI) and the CSRI Steelhead Supplement. Completed in March 1997 and December 1997, respectively, the fundamental goal of both plans is to restore coastal salmonid runs in Oregon to support a viable recreational and commercial fishery. The plans are comprehensive, scientifically-based efforts that outline the range of public and private, locally-based activities both planned and underway to restore salmonid populations and their habitat. They rely on existing state regulations and provide extensive measures for individuals, citizens' groups, industry, landowners, and government agencies to restore their watersheds through focused and coordinated efforts. Support for the plans' implementation comes from state, local, and private funds.

***In the Tillamook Bay Watershed.*** Individual landowners, citizens' groups, and numerous state agencies are involved with implementing these

restoration plans in the Tillamook Bay watershed. Specific initiatives and the agencies responsible for their implementation are discussed throughout this Base Programs Analysis.

### **The Healthy Streams Partnership**

The Healthy Streams Partnership (HSP) is another critical component of the Oregon Plan. Underscoring the Oregon Plan's emphasis on multi-party coordination, the HSP represents a commitment among numerous public and private interests to restore water quality in Oregon's streams. Most notably, the HSP outlines an agreement between Oregon's Department of Environmental Quality (DEQ) and Department of Agriculture (ODA) to design specific plans aimed at improving water quality in watersheds throughout the state. For each agency, the partnership prioritizes watersheds to reflect the state's salmonid restoration effort and sets a specific timeline for the planning process.

The ODA and DEQ each have very specific guidelines for their planning processes. The ODA process is governed by Oregon Senate Bill 1010 and is discussed on page eleven. The DEQ process is driven by the EPA's requirement under the Clean Water Act that each state identify and plan for the improvement of its "water quality limited streams." This planning process sets 'Total Maximum Daily Loads', or TMDLs, for the states' 303(d) listed (those identified as water quality limited) streams. TMDLs are enforceable management plans that: 1) provide strategies to reduce chemical, physical (e.g. heat), nutrient, biological, and sediment loading and 2) set daily limits on the amount and type of pollutants that can enter the stream. TMDLs also include enforcement mechanisms when they are violated.

***In the Tillamook Bay Watershed.*** The DEQ is in the process of establishing TMDLs in the watershed. The agency will release a draft bacteria TMDL for public review in June 1999. This will go to EPA in August or September. The temperature TMDL is currently under internal review and will be available for public comment in the summer of 1999. DEQ will submit it to EPA following the public comment phase.

### **Oregon Statewide Land Use Planning Program**

In 1973, the Oregon legislature adopted Senate Bill 100, which enacted the Statewide Land Use Planning Program. The foundation of this program is comprised of 19 statewide planning goals which have the legal status of administrative rules. Local governments, both county and city, have primary responsibility for administering this program through locally developed and adopted comprehensive plans and implementing ordinances. These ordinances impact all of the priority problems addressed in the CCMP.

***In the Tillamook Bay Watershed.*** Below is a brief description of the statewide planning goals that most directly affect the management of the TBNEP priority problems.

Estuary and Coastal Goals. The objectives of Goal 16: Estuarine Resources are “to recognize and protect the unique environmental, economic, and social values of each estuary and associated wetlands [and to protect, maintain, develop, and restore the benefits of Oregon’s estuaries.]” See Chapter Four: Critical Habitats for specific policy measures and their local implementation.

Goal 17: Coastal Shorelands applies fundamentally the same objectives as Goal 16 to the protection of coastal shorelands adjacent to bays and rivers up to head of tide.

Watershed Goals. Numerous other planning goals affect the TBNEP priority problems basinwide.

- Goal 3: Agricultural Lands. Implementation of this goal includes the regulation of lands zoned for agriculture but does not involve the regulation of agricultural practices, except for those which affect riparian areas.
- Goal 4: Forest Lands. Goal four regulates the uses and land zoned for forests, though not the specific practices which are used on them.
- Goal 5: Open Spaces, Scenic and Historic Areas, and Natural Resources. This broad resource protection goal includes wetlands, watershed and groundwater resources, fish and wildlife habitats, ecologically and scientifically significant natural areas, and mineral and aggregate resources.
- Goal 7: Areas Subject to Natural Disasters and Hazards. This goal includes flood and geologic hazards, both of which are present within the watershed.
- Goal 11: Public Facilities and Services. Goal 11 establishes distinctions between urban and rural levels of utility services, most notably wastewater treatment.
- Goal 12: Transportation. This goal outlines road requirements and land use impacts. In Tillamook County, the Land Division Ordinance contains road requirements for development.
- Goal 14: Urbanization. This goal requires the establishment of an urban growth boundary to identify and separate “urbanizable” land from rural land.

## ***Policies on Agricultural Lands***

Two major agricultural policies that impact TBNEP's priority problems include Senate Bill 1010 and the 1996 USDA Farm Bill.

### **SB 1010: Agricultural Water Quality Management Area Plans**

Senate Bill 1010 comprises the bulk of ODA's contribution to the Healthy Streams Partnership. Senate Bill 1010 directs ODA to work with farmers, ranchers, and other parties to develop Agricultural Water Quality Management Area Plans. The ODA develops these plans for agricultural regions that contribute to water quality limited streams or wherever a water quality management plan is required by law. Agricultural Water Quality Management Area Plans identify problems that need to be addressed, outline the "best management practices" available to correct them, and provide enforceable pollution prevention control measures. The use of these measures is flexible; they may be defined as "standards," "prohibited conditions," or some other similar terminology.

***In the Tillamook Bay Watershed.*** The North Coast Basin is a tier one (highest priority) watershed under the Oregon Plan. The ODA expects to finish the North Coast Basin Plan, which includes the Tillamook watershed within its three county scope, in 1999.

### **The USDA 1996 Farm Bill**

The 1996 USDA Farm Bill contains a number of incentive programs for landowners to improve natural resource management on private lands. Programs aim to improve water quality and enhance fish and wildlife habitats. Specific incentives contained in the programs include rental payments for short and long term conservation easements, purchase of marginal lands, and cost sharing opportunities. Programs that impact the TBNEP priority problems include the Conservation Reserve Program, Conservation Reserve Enhancement Program, Environmental Quality Incentive Program, Wildlife Habitat Incentive Program, Stewardship Incentive Program, Wetlands Reserve Program, and Forest Incentive Program.

***In the Tillamook Bay Watershed.*** Implementation of specific programs varies based on fund availability and applicability to the basin's unique natural resources. A Natural Resource Conservation Service and Farm Services Agency office is located within the basin. These agencies are responsible for administering the 1996 Farm Bill.



## ***Policies on Forest Lands***

Three forest management policies impact (or will impact) the TBNEP's priority problems. These include the Northwest Oregon State Forest Management Plan, the Western Oregon State Forest Habitat Conservation Plan, and the Forest Practices Act. (Both the State Forest Management Plan and Habitat Conservation Plan are currently in draft form.)

### **Northwest Oregon State Forest Management Plan**

The April 1998 Draft Northwest Oregon State Forest Management Plan articulates the Oregon Department of Forestry's (ODF) goals and strategies for the management of all forest resources including: agricultural and grazing sites; fish and wildlife; plants and soils; air, land, and water; energy and minerals; cultural and scenic areas; timber and other forest commodities; and recreation. Due to be adopted in 1999, the plan provides guiding principles for the northwest Oregon state forests by integrating legal and policy mandates with the best available forest management science. The plan does not impose rules or regulations like the Forest Practices Act but rather creates a long-term vision of the forest to be achieved through implementation of the plan's strategies.

The overall forest management strategy is characterized by an evolving concept known as 'structure based management.' According to the draft plan, "structure based management is a silvicultural approach that balances and maintains an array of forest stand structures across the landscape." The goal of structure based management is to maintain a stable, structurally diverse forest that provides fish and wildlife habitats and long-term timber production.

***In the Tillamook Bay Watershed.*** The Tillamook State Forest accounts for roughly 85% of the forested watershed. As a result, the management plan will have significant influence over harvesting schedules and other management practices in the watershed. Actual impacts of the plan can be better assessed when ODF releases the final draft in the winter of 1999.

### **Western Oregon State Forest Habitat Conservation Plan**

As part its Draft State Forest Management Plan, the ODF released the Draft Western Oregon State Forest Habitat Conservation Plan (HCP) to meet the incidental take permit requirements of the Endangered Species Act. The HCP functions as a request to the National Marine Fisheries Service and US Fish and Wildlife Service for a permit to allow the incidental take of certain federally listed species. This plan (and the subsequent permit issued) release Oregon state forests from the restrictive federal controls normally associated with an endangered species

listing. It describes the impacts of possible incidental takes and outlines the strategies that the ODF will employ to mitigate these impacts and manage habitat. The HCP also anticipates potential future listings of additional species that may be found on state lands.

***In the Tillamook Bay Watershed.*** The ODF will submit an updated draft of the HCP to the Oregon Board of Forestry in June of 1999. If accepted by the Board, ODF will submit it for federal review. Upon final public review and federal approval, the HCP will be finalized upon receipt of an incidental take permit as defined under the ESA. Specific provisions of the April 1998 Draft HCP will be summarized in the following chapters.

### **Forest Practices Act**

The first effort by the state to comprehensively regulate forest management activities through Oregon Administrative Rules (legislation) occurred in the Forest Practices Act (FPA) of 1971. The periodically-revised FPA regulates forest practices on all non-federal forest land, defining standards for such activities as slash disposal, harvesting, road construction, reforestation, and the application of chemicals.

Amendments to the Act, adopted in 1991 under SB 1125, strengthened rules governing the following areas: water protection and classification, clearcut size limits, snag and green tree retention, landslide prevention, regulation within urban growth boundaries, reforestation, impacts of harvesting on anadromous fish, improved monitoring, and other minor amendments. In consultation with other agencies, the Board of Forestry develops and implements all rules relating to these and other issues.

***In the Tillamook Bay Watershed.*** State and private forest lands make up approximately 98% of the forested watershed. Operations on these lands must, by law, apply the practices and standards outlined in the FPA.

## ***Policies on Coastal Lands***

The two most influential coastal policies are both federal and include the Coastal Zone Management Act and the Coastal Nonpoint Source Pollution Control (6217) Program.

### **Coastal Zone Management Act**

In 1972, Congress passed the Coastal Zone Management Act (CZMA) to “preserve, protect, develop, and where possible, to restore or enhance the resources of the nation’s coastal zone.” The CZMA did not provide any new land use regulations directly but encouraged states to conserve their coastal areas by developing and implementing coastal land and water use programs according to the guidelines it established. A voluntary program,

the CZMA encouraged states' participation by providing funding incentives and technical expertise to state planning and policy-making efforts. An important feature of the Coastal Zone Management Program is the federal consistency provision that requires federal activities to be consistent with enforceable policies of state programs.

### **Coastal Nonpoint Source Pollution Control (6217) Program**

In 1990, the Coastal Zone Act Reauthorization Amendments (CZARA) specifically cited improved water quality as a purpose of the CZMA and strengthened the CZMA's regulation of non-point source pollution. Toward these ends, Section 6217 of the CZARA established a federal requirement that all coastal states with an approved coastal zone management program must develop and implement plans that provide enforceable measures to reduce nonpoint source pollution. This Coastal Nonpoint Source Pollution (or 6217) Program mandated that these plans must address all pollution sources found within agricultural, urban, forest, and marine uses.

The EPA guide, *Guidance Specifying Management Measures for Sources of Nonpoint Source Pollution in Coastal Waters*, outlines 56 specific management measures that must be considered within these four uses. Management measures are defined in the publication as economically achievable measures which reflect the best available technology for reducing pollutants. States may implement any combination of activities outlined within the measure to achieve the degree of pollution control which the measure requires. These measures (though not the specific activities) are summarized in Chapters 2 and 3.

The goal of the 6217 Program was not to replace other nonpoint source plans (like those developed through section 319 of the Clean Water Act) but to encourage collaboration among federal, state, and local sources in coastal resource management, land use planning, and nonpoint source pollution reduction. At the federal level, the EPA and the National Oceanic and Atmospheric Administration administer the program by: 1) designing management measures for states to employ in reducing non-point source pollution program and 2) approving state plans. Locally, DEQ and DLCD share responsibility for developing Oregon's program. Full scale implementation of the program will include the involvement of virtually all of Oregon's land use agencies.

***In Oregon and Tillamook Bay Watershed.*** Oregon has had an approved coastal program since 1977 and was, therefore, required to create a nonpoint source pollution control plan. Oregon submitted its draft Pollution Prevention Control Program for Oregon's Coastal Waters for review in 1996. The EPA and NOAA recommended revisions, and the

state is incorporating them into a revised plan. No timeline has been established for re-submittal, although many of the types of measures outlined in 6217 are already being implemented locally. Examples include the development of TMDLs, the North Coast Basin Agricultural Water Quality Management Area Plan, local farm plans, the County Land Use Plan, and virtually any other plan or policy that impacts nonpoint source pollution.

## ***Strategic Plans and Partnerships***

Several innovative planning activities impact the Tillamook Bay watershed and the management of its resources. Three of the most influential include Oregon Shines, the Tillamook County Performance Partnership, and the Tillamook County Strategic Vision.

### **Oregon Shines**

In 1989, Oregon adopted its strategic plan known as Oregon Shines. Developed by 150 business, government, and community leaders, the vision outlined goals for the state to achieve and the benchmarks by which to measure the state's progress. The Oregon Progress Board, a group of nine appointed members and three staff, manage and update the plan under the principle of keeping Oregonians focused on the future.

The Oregon Progress Board updated Oregon Shines in 1997. Oregon Shines II focuses on three basic goals: quality jobs; safe, caring, and engaged communities; and healthy, sustainable surroundings. The Board developed and categorized its benchmarks around economic performance, education, civic involvement, social support, public safety, community development, and the environment. All of the Oregon Benchmarks are measurable and outcome-based. Throughout the state, the shift to outcome-based activities has impacted the way many state agencies assess the success of their programs.

***In the Tillamook Bay Watershed.*** The Oregon Shines model plays an important role in several activities currently developing in the watershed. The TBNEP, Tillamook County Performance Partnership, and Tillamook County Futures Council all define their goals around the Oregon Benchmarks. The latter two are discussed below.

### **Tillamook County Performance Partnership**

A Performance Partnership is an agreement among all levels of government to streamline inputs (capital, labor, etc.) into mutually agreed-upon programs or projects. Derived from Vice President Gore's campaign to reinvent government (known as the National Performance Review), a

Performance Partnership is a results-based program that evaluates the success of a program on its ability to meet stated and agreed-upon goals. A Performance Partnership provides increased flexibility for how a program operates in exchange for increased accountability of results from those implementing it. Examples of increased flexibility include greater leverage of local resources, consolidated funding streams, reduced paperwork, and increased local control over projects.

The Performance Partnership has been most commonly used when: a) the federal government delivers services to local and state authorities; b) all parties agree on desired outcomes; and/or c) progress is measurable. Commonly used to address social issues, Tillamook County uses the Performance Partnership as a tool for ecosystem restoration. Tillamook County will apply the Oregon Benchmarks to the specific environmental restoration goals of the region.

***In the Tillamook Bay Watershed.*** As stated in its bylaws (amended March 17, 1999) “the purpose of the Tillamook County Performance Partnership is to provide a dynamic, results driven mechanism that will build relationships to facilitate coordinated environmental restoration and economic development.” Specific objectives include:

- Prioritizing ecosystem problems and the projects to address them;
- Finding funding and coordinating existing funding streams to accomplish projects;
- Monitoring and evaluating projects;
- Transferring information through GIS; and
- Implementing the CCMP.

The ‘Tillamook County Performance Partnership for Ecosystem Restoration and Economic Development’ has recently been staffed and currently operates as a department within county government. It is organized in a structure similar to the TBNEP Management Conference. The Stewardship Council is the governing body and consists of stakeholders throughout the county. It prioritizes projects and facilitates and oversees implementation. An Executive Board oversees staffing, contracts, and similar duties. Technical subcommittees will work on specific management issues as necessary and make recommendations to the Stewardship Council.

## **Tillamook County Strategic Vision**

In 1997, the Tillamook County Commissioners appointed a 14-member group of citizens and local agency representatives to serve as the Tillamook County Futures Council. The mission of the council was to develop a long range-vision for the county using broad-based citizen input. A University of Oregon planning team contracted with the Council to assist them in survey development and the creation of the Tillamook County Strategic Vision.

***In the Tillamook Bay Watershed.*** One of the four elements of the Strategic Vision is titled '*Environment and Natural Resources.*' The strategic visioning process has revealed the importance of clean water, healthy salmonid populations, and properly functioning habitats to Tillamook County residents. The emphasis placed on healthy natural systems may impact future land use decisions within the watershed. Similarly, the strategic visioning process and the increasing awareness of degraded natural systems will support implementation of the CCMP.



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# Chapter 2: Water Quality

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## ***The Issue***

*Bacteria and other pathogens from both point and nonpoint sources present a principle water quality problem. Pathogenic contamination threatens public health through the ingestion of contaminated shellfish and water, or direct water contact. It also results in frequent closure of commercial shellfish harvesting areas. In addition to pathogenic contamination, many stream reaches do not meet water quality criteria for temperature and suspended solids. Dissolved oxygen concentrations meet water quality standards in most areas of the watershed except in lowland sloughs. Nutrient concentrations do not appear to adversely impact water quality except in the lowland sloughs. No acute or chronic effects from toxic substances have been observed.*

## ***Introduction to Management Framework***

This chapter describes the management of the two water quality standards frequently violated in the basin's surface waterways: bacterial concentrations and water temperature. Sedimentation and suspended solids (other water quality parameters with potentially elevated levels) are mostly upland issues. Because the uplands do not contribute significantly to bacterial contamination and elevated temperature this chapter will not contain a 'water quality management in the uplands' section. The management approaches that govern sedimentation and suspended solids are discussed in Chapter Three: Sediment and Erosion Control.



## Major Activities

Several agencies' activities, both past and present, significantly impact water quality in the basin. They include:

**DEQ:** The Department of Environmental Quality regulates, monitors, and plans for water quality through the development of Total Maximum Daily Loads. The agency also regulates discharge from wastewater treatment facilities and stormwater runoff through National Pollution Discharge Elimination System Permits and stormwater runoff permits, respectively. The DEQ also administers funding for water quality enhancement projects.

**DLCD and DEQ:** Under the federal Coastal Nonpoint Source Pollution Program, DEQ and the Department of Land Conservation and Development are developing a plan to implement management measures that will reduce nonpoint source pollution.

**DCD:** The Tillamook County Department of Community Development administers the Tillamook County Land Use Ordinance, which establishes specific land use requirements that maintain water quality. Wetland and riparian ordinances provide the most significant protection. The county also regulates on-site disposal systems.

**ODA:** Senate Bill 1010 provides the Oregon Department of Agriculture with the authority to develop Agricultural Water Quality Management Area Plans for agricultural regions with water quality limited rivers, lakes, and streams. The SB 1010 North Coast Basin Plan will include the basin.

The ODA also administers Confined Animal Feeding Operation permits. These permits present the primary regulatory tool of dairy activities. In addition, ODA also oversees the Tillamook Shellfish Harvest Management Plan, which regulates the harvesting of shellfish to meet standards for interstate commerce.

**NRCS and FSA:** The Natural Resource Conservation Service assists farm operators in developing farm management plans. Their sister agency, the Farm Services Agency, helps farm operators locate funding to implement BMPs and other "water friendly" farm practices.

**SWCD:** The Tillamook County Soil and Water Conservation District initiated the Tillamook County Rural Clean Water Project in 1980 to improve water quality through the implementation of best management practices on farms. They also assist farmers with funding and developing farm management plans and BMP implementation. The SWCD is developing the Methane Energy and Agricultural Development Project.

## ***Water Quality Management through Regulation and Regional Planning***

Across all land uses within the watershed, many agencies actively plan for and regulate water quality. At the federal level, the Clean Water Act and Coastal Nonpoint Pollution Control Act establish guidelines for state and local management of water quality. Statewide, the Department of Environmental Quality (DEQ) and Department of Land Conservation and Development (DLCD) regulate water quality and land use respectively. Locally, Tillamook County's Land Use Ordinance applies state and federal land use recommendations and requirements.

### **State Water Quality Standards and TMDLs (DEQ)**

As the chief environmental regulator in the state, DEQ undertakes water quality monitoring, regulation, and enforcement activities in the Tillamook Bay watershed. The agency carries out these activities under mandate of the Clean Water Act.

*Water Quality Standards.* Section 303 of the Clean Water Act requires states to set water quality standards for surface water bodies. In Oregon, DEQ sets these standards through OAR 340-41 on all water quality parameters including temperature, suspended solids, pH, nutrients, biota, dissolved oxygen, bacteria, chemicals, heavy metals, and other criteria. The Oregon Environmental Quality Commission and DEQ review these standards every three years. **Table 2-1** on the following page shows a list of selected water quality standards that apply to the Tillamook Bay basin.

**Table 2-1**  
**Selected Water Quality Standards**  
**in the Tillamook Bay Basin**

Parameter	Reference	Description
<b>Bacteria in Shellfish Waters</b>	OAR 340-41-(North Coast) (2) (e and f)  OAR 603-100-(000-030)	A median fecal coliform concentration in water overlying shellfish areas shall not be greater than 14 colonies per 100 mls, and no more than 10 percent of the samples shall exceed 43 colonies per 100 mls.  A geometric mean of 15 or more samples shall not exceed 14 colonies per 100 mls, and no more than 10 percent of the samples shall exceed 43 colonies per 100 mls.
<b>Recreational Water Contact</b>	OAR 340-41-(North Coast) (2) (e and f)	A 30 day log mean of no less than 5 samples of <i>E. coli</i> shall not exceed 406 organisms per 100 mls of sample.
<b>Water Temperature</b>	OAR 340-41-(North Coast) (2) (b)	A seven day moving average of the maximum daily temperature shall not exceed 55° F in waters during seasons that support salmon spawning, egg incubation, and fry emergence, or 64° otherwise.
<b>pH</b>	OAR 340-41-(North Coast) (2) (d)	pH shall not be lower than 6.5 nor higher than 8.5 standard pH units.
<b>Dissolved Oxygen (DO)</b>	OAR 340-41-(North Coast) (2) (a)	During salmonid spawning periods, dissolved oxygen must not be lower than 11 mg/L unless intergravel DO exceeds 8.0, or where altitude and temperature conditions preclude attainment of the standard, when DO must be at least 95% of saturation. In water bodies that support cold water aquatic life dissolved oxygen must be 8 mg/L or if diurnal monitoring data are available, the minimum shall not fall below 6.5 mg/L. For estuarine waters, DO concentrations must exceed 6.5 mg/L.
<b>Sedimentation</b>	OAR 340-41-(North Coast) (2) (j)	Sedimentation is a problem when any of several biologic community scores are lower than 76% of that for an appropriate reference site, and the impairment is attributed to appreciable deposits of any organic or inorganic material deleterious to fish or aquatic life or to public health, recreation, or industry.

Source: TBNEP Scientific and Technical Characterization, 1998 (also OAR 340-41)

**TMDLs.** Section 303(d) of the Clean Water Act requires states to develop a list of surface water bodies that do not meet established standards for water quality (or are unable to meet the beneficial uses that have been assigned to them.) The Act further requires states to develop water quality management strategies known as Total Maximum Daily Loads, or TMDLs. In simplest terms, a TMDL defines the amount of a pollutant that can be assimilated by a surface water body and allow it to still meet water quality standards.

TMDLs address the sources and degrees of pollution in the ‘water quality limited’ or 303 (d)-listed streams, rivers, and lakes. According to the DEQ’s Guidance for Developing Water Quality Management Plans that function as TMDLs (April 1997), “a TMDL addresses pollution problems by systematically identifying problems, linking them to watershed characteristics and management practices, establishing water quality improvement objectives, and identifying and implementing new or altered management measures designed to achieve those objectives.” In Tillamook Bay and the surrounding rivers, TMDLs will:

- determine the sources and degrees of reduced water quality;
- assess the water bodies’ capacity for individual contaminants determining an allowable load allocation for each; and
- designate Total Maximum Daily Load allocations to each of the sources of pollution, both point and nonpoint.

Each TMDL will also provide the following background information:

- summary of applicable water quality standards;
- summary and analysis of available data;
- implementation schedule; and
- summary of the public participation process.

The EPA is currently reviewing its guidelines for TMDLs. One important revision they are considering is the removal of water quality limited streams from the 303(d) list only when water quality standards are met. Currently, Oregon removes water quality limited bodies from the 303(d) list when TMDLs are in place and implementation has begun.

## TMDLs in the Tillamook Bay Basin (DEQ)

On the following page **Table 2-2** shows the water quality limited streams (or stream segments) in the Tillamook Bay watershed. Parameters listed include bacteria and temperature. DEQ is currently collecting data on dissolved oxygen, nutrients, and sedimentation.

***Bacteria and Temperature.*** The approach to drafting TMDLs for the parameters shown in Table 2-2 will vary based on the amount of data available. TMDLs designed to maintain water temperature will likely be more specific than those designed to limit bacterial loading. Specifically, load allocations for temperature will probably be determined by land uses *within each of the major sub basins*. The DEQ will likely construct less specific TMDLs for bacteria, basing load allocations on land uses across the entire Tillamook Bay basin. Implementation of all TMDLs will focus on land use, however.

Recently, EPA and DEQ agreed that DEQ will also submit implementation plans along with TMDLs. Details of the agreement are not yet known; specifically, how other plans (like SB 1010 and the CCMP) will fit into the implementation plan or how closely EPA will scrutinize implementation plans.

***Other parameters.*** Notice that dissolved oxygen (DO), although believed to be in violation of state water quality standards in many of the sloughs, does not appear in **Table 2-2**. At this time, DEQ has not collected sufficient data to declare DO levels in sloughs in violation. The TMDL may make provisions for DO under Section 303 (d)-3 of the Clean Water Act, however. This section provides that states should assess waters not currently listed on the 303 (d) list “for the specific purposes of developing information.” In addition to DO, DEQ will also conduct a sediment risk assessment as part of their efforts in drafting TMDLs. This assessment will focus on identifying the sources and degrees of sedimentation across all land uses within the basin.

The DEQ is in the process of establishing TMDLs in the watershed. The agency will release a draft bacteria TMDL for public review in mid June. This will go to EPA in August or September. The temperature TMDL is currently under internal review and will be available for public comment in the Summer of 1999. DEQ will submit it to EPA following the public comment phase.

**Table 2-2**  
**Water Quality Limited Streams in**  
**the Tillamook Bay Basin**

<b>Stream Name &amp; Description</b>	<b>Parameter</b>	<b>Criteria</b>	<b>Season</b>
<b>Bewley Creek</b>	Bacteria	Recreational Contact	All
<b>Coal Creek</b>	Temperature	Habitat-Rearing	Summer
<b>Dougherty Slough</b>	Bacteria	Recreational Contact	All
<b>Fawcett Creek</b>	Temperature	Habitat-Rearing	Summer
<b>Holden Creek</b>	Bacteria	Recreational Contact	All
<b>Hoquarton Slough</b>	Bacteria	Recreational Contact	All
<b>Kilchis River</b>	Bacteria	Recreational Contact	Summer
	Temperature	Habitat-Rearing	Summer
<b>Killiam Creek</b>	Bacteria	Recreational Contact	All
<b>Miami River</b>	Bacteria	Recreational Contact	All
	Temperature	Habitat-Rearing	Summer
<b>Mill Creek</b>	Bacteria	Recreational Contact	All
	Temperature	Habitat-Rearing	Summer
<b>Murphy Creek</b>	Bacteria	Recreational Contact	All
	Temperature	Habitat-Rearing	Summer
<b>Myrtle Creek</b>	Temperature	Habitat-Rearing	Summer
<b>Simmons Creek</b>	Bacteria	Recreational Contact	All
<b>Tillamook Bay-Main &amp; Upper</b>	Bacteria	Marine and Shellfish Growing Area	All
<b>Tillamook River</b>	Bacteria	Recreational Contact	All
<b>Trask River &amp; North Fork</b>	Temperature	Habitat-Rearing	Summer
<b>Wilson River</b>	Bacteria	Recreational Contact	All
	Temperature	Habitat-Rearing	Summer

Source: Department of Environmental Quality, *TMDLS in the North Coast Basin*. 1999.

## **Coastal Nonpoint Source Pollution Control (6217) Program (DEQ and DLCDC)**

Section 6217 of the Coastal Zone Act Reauthorization Amendments defines the federal Coastal Nonpoint Source Pollution Program, which mandates that all states with coastal zone management plans must incorporate specific management measures into enforceable policies that reduce nonpoint source pollution. As defined in the *Guidance Specifying Management Measures for Sources of Nonpoint Source Pollution in Coastal Waters*, measures focus on agricultural, urban, forest, and marine sources of non point source pollution. Hydromodification and riparian degradation, which can occur across the range of land uses, are also listed.

**Table 2-3** on the facing page summarizes the sources of nonpoint source pollution and the categories of management measures under which the 6217 Program addresses them. Although DEQ and DLCDC share responsibility for developing Oregon’s program, full scale implementation of these measures will include all of Oregon’s land use and resource management agencies.

## **Local Land Use Controls Affecting Water Quality (Tillamook County DCD)**

Outside the boundaries of the basin’s incorporated communities (Garibaldi, Bay City, and Tillamook), the Tillamook County Land Use Ordinance (LUO) and Land Division Ordinance govern land use within the Tillamook Bay watershed. The land use ordinances that most directly impact water quality involve riparian protection (LUO 4.080) and wetland protection (LUO 3.092).

Riparian and wetland ordinances do not apply to forest zones because they fall under the Forest Practices Act. Likewise, agricultural practices supercede the authority of the LUO. On agricultural lands, the county can govern only the location of structures, not the agricultural practices that occur there. Chapter Four: Critical Habitat discusses these exemptions in greater detail.

***Riparian Protection.*** The LUO presently defines riparian zones as areas within 50 feet of estuaries, lakes larger than one acre, and the main stems of several rivers and streams where widths exceed 15 feet. Within the watershed these include the Tillamook, Trask, Kilchis, Wilson, and Miami Rivers. Other rivers within the watershed which are not included but still reach at least 15 feet in width are designated 25 foot riparian zones. The LUO designates all other perennial streams 15 foot riparian zones.

**Table 2-3**  
**Sources and Management of Nonpoint Source Pollution**

Source	Category of management measure
<b>Agriculture</b>	Soil erosion and sedimentation; CAFO wastewater runoff; nutrient loading; grazing damage; irrigation water
<b>Forestry</b>	Preharvest planning and harvest; streamside management areas; road construction and management; site preparation and forest regeneration; fire management; revegetation of disturbed areas; wetland forest management
<b>Urban</b>	New development; watershed protection; site development; construction site erosion, sediment, and chemical control; existing development; onsite disposal systems; pollution prevention; roads, highways, and bridges
<b>Marine</b>	Marina flushing; water quality and habitat assessments; shoreline stabilization; stormwater runoff; sewage facility; solid waste; fish waste; liquid materials; petroleum control; boat cleaning; public education; boat operation
<b>Hydromodification</b>	Channel modification; streambank and shoreline erosion; protection of wetlands and riparian areas
<b>Riparian Degradation</b>	Wetlands and riparian areas; vegetated treatment systems

Source: EPA, Management Measures for Coastal Nonpoint Pollution (1993)

The DLCD recently amended its Goal Five: Open Spaces, Scenic and Historic Areas, and Natural Resources provisions by expanding the required riparian buffer. By its next periodic review, due around 2003, the LUO will have to incorporate DLCD's amendments. Specifically, the 50 foot buffers now required by the LUO will be expanded to 75 feet, and the 25 and 15 foot buffer requirements will both be expanded to 50 feet. These changes to the LUO will most likely take place well before the 2003 deadline.



The LUO prohibits development within the riparian zones, except for bridges and water-dependent uses. It grants exemptions to reduce the riparian setback (the area where development is prohibited) in certain areas where pre-existing lots are not large enough to provide a reasonable building envelope. The Department of Community Development allows riparian exceptions if it determines that either the natural features allow a smaller riparian area to protect equivalent habitat values or that an area is so degraded that additional development will have minimal negative impact.

In addition to restricting development, the LUO also limits alteration of riparian zones by prohibiting the removal of trees and/or more than 50% of the understory vegetation.

***Wetland Protection.*** The Tillamook County Comprehensive Plan maps and identifies significant wetland areas under Goal Five (freshwater) and Goal 17 (coastal). The LUO protects these significant areas from development providing that development is only allowed if it will not result in major impacts to the wetland areas.

Whether identified as significant or not by Tillamook County, all wetlands fall under the jurisdiction of the Oregon Division of State Lands and Army Corps of Engineers. For a discussion on how these agencies manage these areas see Regulation of Dredge and Fill/Gravel Removal Activities in Chapter Three: Sedimentation.

## ***Water Quality Management on Agricultural Lands***

Agricultural lands contribute significantly to degraded water quality. Within the Tillamook Bay watershed, confined animal feeding operations (CAFOs) are the primary agricultural activity. The Oregon Department of Agriculture (ODA) manages CAFOs through permits and periodic inspections. Since 1980 and the beginning of the Tillamook County Rural Clean Water Project, resource agencies like the Natural Resource Conservation Service (NRCS) and Tillamook County Soil and Water Conservation District (SWCD) have worked with CAFO and other farm operators to reduce contamination from agricultural lands.

Presently, ODA is developing a Water Quality Management Area Plan for agricultural areas in the North Coast Basin under Senate Bill 1010. Measures included in the basin plan will be implemented on local farms with cost assistance provided by various sources, most notably, the US Department of Agriculture (USDA) under the 1996 Farm Bill.

## **Riparian Management on Agricultural Lands (ODA)**

The ODA manages agricultural activities throughout the state. Historically, ODA policy (and agricultural management as a whole) has not emphasized the value of riparian zones in providing habitat and maintaining water quality. In recent years, however, the agricultural community has begun to recognize the function and importance of maintaining riparian corridors. The ODA is improving stewardship on agricultural lands through Senate Bill (SB) 1010. Evidence of the agricultural community's increased emphasis on water quality also appears in the efforts of the NRCS and SWCD.

For a discussion of riparian management on agricultural lands see Chapter Four: Critical Habitats.

## **Senate Bill 1010: Agricultural Water Quality Management Area Plans (ODA)**

The primary role of ODA in addressing water quality in the watershed occurs through the development of Agricultural Water Quality Management Area Plans. Under Senate Bill (SB) 1010, ODA must draw up basin wide plans for agricultural and rural lands where a plan is required by law (such as those on or near water quality limited streams.) Area plans identify both the factors contributing to nonpoint source pollution and the measures to correct them. As stated in OAR 603-90-010, the goal of the plan is to “prevent and control water pollution from agricultural activities and soil erosion to achieve water quality standards.”

During plan development, ODA receives extensive local input and works with a Local Water Quality Management Area Advisory Committee which “represents a balance of affected persons.” Based on the amount of information available to a given watershed, the scope of a plan may vary. Those locations that have undergone a watershed assessment, for example, will design a more specific plan, while those lacking scientific information will produce a less precise plan. Despite this variation, all of the SB 1010 Plans will include the following components (as outlined in OAR 603-90-010):

- a description of the geographical area and physical setting;
- a listing of water quality issues of concern;
- a list of beneficial uses that are being adversely affected;
- a goal statement;
- a statement of the water quality objectives of the plan;

- a description of the pollution prevention and control measures to achieve the goal;
- an implementation schedule and specific guidelines; and
- guidelines for public participation.

Implementation of the North Coast Basin Plan relies on enforceable pollution prevention and control measures. The ODA will provide technical resource assistance and limited enforcement “safe harbor” (basically, adopting the Oregon Land Use Planning guidelines) as incentives for landowners to develop voluntary conservation plans. Farm operators, a consultant, the NRCS, or the Tillamook County SWCD may develop a farm management plan. To varying degrees, they typically follow a farm management plan template included in the SB 1010 Plan.

Regardless of the local plan used, the backbone of both the Water Quality Management Area Plan and the individual farm plan is the cluster of BMPs recommended for on the ground implementation. The BMPs included in the basin plan represent a range of activities that producers may undertake to reduce nonpoint source pollution from their lands. Operators will not have to implement all of the BMPs listed in the Basin Plan but only those that are applicable to their operations. **Table 2-4** lists several examples of the BMPs and measures that will be contained in the North Coast Basin Plan and individual farm plans.

**Table 2-4  
Agricultural Management Measures and  
Associated Best Management Practices**

Measure	Best Management Practice (BMP)
Nutrient Management	Soil testing, management budgets, crediting for manure applications
Erosion Control	Cover cropping, filter strips, grassed waterways
Pasture Management	Cross fencing, rotational grazing
Livestock/Manure Management	Clean water diversions, covered manure storage areas
Riparian Area Management	Streambank stabilization, riparian buffers, off-stream watering for livestock

Source: ODA Early Action Guide

Implementation of SB 1010 relies primarily on good land stewardship and the design and implementation of farm or land management plans. However, SB 1010 requires basin plans to define enforcement measures, and, once written, all farms will have to comply with the standards the basin plan sets. The ODA will have the authority to levy civil penalties if land owner compliance with the measures, standards, and/or prohibited conditions (terminology will depend on the plan) are not achieved. With only 1.5 FTE enforcement agents covering the state, however, little active enforcement of SB 1010 will likely take place. Enforcement that does occur will aim at those operators who blatantly disregard laws and cause the most harm to the environment. Citizen complaints will drive the enforcement process.

### **Individual Farm Plans (NRCS and SWCD)**

The task of writing individual farm plans and getting BMPs on the ground rests with NRCS and in some cases the SWCD. A service arm of the USDA, NRCS prepares Resource Management Plans for each agricultural operation requesting the service. The NRCS first inventories and assesses the resources (numbers of animals, acreage, soil type, etc) found on each farm. The agency then tailors a plan that establishes the appropriate BMPs and conservation practices necessary to reduce water pollution resulting from the operation. The local NRCS office in Tillamook aims to have farm plans in place throughout the North Coast basin.

### **Landowner Incentives (NRCS and FSA)**

The NRCS and Farm Services Agency (FSA) often work with operators to write and finance farm plans that take advantage of new federal conservation programs. The 1996 Farm Bill authorized the NRCS to implement a number of voluntary, incentive driven programs designed to promote stewardship practices by farm operators. Those funding programs available to agriculture operators that primarily address water quality include the following.

***Environmental Quality Incentives Program (EQIP):*** NRCS provides planning, technical, and financial assistance to help agricultural landowners meet water quality standards by drafting and implementing farm management plans. The program provides incentives like technical assistance, payments, and cost sharing to improve manure management, erosion control, and other practices which benefit water quality.

The EQIP contracts normally last for five to ten years. Because funding does not meet demand for the program, the NRCS designed a complex scoring system through which project selection is based on the cost incurred by the government and the relative environmental benefits of the proposed action(s). The lack of staff time creates the greatest obstacle to

timely and efficient implementation. Landowners may apply any time, although NRCS only selects projects as funding permits.

After its first two years the program funded a total of eleven producers. The program will fund roughly five contracts per year. At least 55-60 farms require treatment to implement adequate waste management systems. The Nehalem, Tillamook, and Netarts Bay Basins have been designated by the federal government as “geographic priority areas.” Projects in these areas will receive a higher priority during the project selection process. As a result, the number of EQIP projects undertaken in the watershed may increase.

***Conservation Reserve Program (CRP).*** The CRP encourages the conversion of highly erodible cropland or other environmentally sensitive acreage to vegetative cover. Focused on riparian areas, CRP aims to improve water quality by reducing soil erosion and the infiltration of animal wastes and other farm contaminants into a body of water. The NRCS shares conversion costs with the operator for implementation of riparian buffers, filter strips, shallow water areas for wildlife, and shelter belts.

Under CRP, the federal government provides an annual rent payment to participant landowners for the period of a multi year contract. Contracts may be written for 10, 20, or 30 year periods. Payment rates in Tillamook County range from \$33 to \$87 per acre depending on the productivity of the land. No acreage has been enrolled in the CRP within the Tillamook Bay watershed. Local landowners are concerned about the long term costs associated with the lease, and payments simply do not meet the land’s market or conversion value. However, increased payments to farmers resulting from CREP (below) could improve its appeal.

***Conservation Reserve Enhancement Program (CREP).*** The USDA will provide additional funding to Oregon’s CRP under the federal CREP. This program provides the state with federal funds to match local CRP contracts. Even with CREP, CRP is likely to be used on only the most marginal of grazing lands that would cost the program about \$175 per acre.

***Clean Water Act 319 Funds.*** Established by the Clean Water Act Amendments of 1987, the 319 Program provides money to states to implement “on-the-ground” projects to improve water quality through the reduction of nonpoint source pollution. Funded projects are often a part of larger undertakings in which resource managers or other stakeholders have completed watershed assessments and/or restoration plans.

Although the Clean Water Act does not designate 319 funds exclusively to agricultural lands, stakeholders in Tillamook County who apply for funds

often spend them here. In 1997, DEQ placed a representative in the City of Tillamook to administer 319 funds throughout the North Coast Basin. One of three such positions in the state, it is likely that operators within the Tillamook Bay watershed will receive increased funding over past years with the new representation.

**SRF Loans.** The state of Oregon provides low-interest loans to public agencies for publicly-owned water pollution control projects. Although the Clean Water State Revolving Loan Fund is not designated to agriculture per se, a significant portion does go to non-point source pollution. At the time this document was published, almost \$30 million dollars was available statewide for water quality improvement projects.

The SWCD also assists agricultural landowners in managing their lands to reduce water quality degradation. Presently, the agency staffs two specialists to assist landowners in developing farm plans. Although they do not manage federal programs like the NRCS, SWCD also plays an active role in assisting operators with on the ground projects like fencing and livestock management. In addition to securing funds for environmental restoration projects on agricultural lands, they also provide field and office support for watershed council activities, environmental assessments, and public outreach.

### **Rural Clean Water Project (SWCD)**

In 1979, the SWCD began the Agricultural Non-Point Source Pollution Abatement Plan (better known as the Rural Clean Water Project, which is the federal program under which the local plan developed.) Operating until 1995 under funding from Section 208 of the Clean Water Act, the plan stated an aim to “reduce agricultural pollution in Tillamook Bay through a voluntary program [that] gave producers technical and financial assistance” to implement BMPs on their farms. Best management practices included constructing waste treatment lagoons and storage structures on farms, roofing and guttering on barns, fences on rivers, and numerous other measures to reduce the flow of contaminants into rivers.

After fifteen years and 4.5 million dollars, it is not clear how much success the project achieved in meeting its stated goal. At the start of the program, managers set a goal of a 70% reduction in fecal coliform bacteria entering the bay. Unfortunately, because of limited staffing, the project suffered from inadequate monitoring, which made it difficult to place a statistically valid percent reduction in bacteria. On the following page **Table 2-5** shows the BMPs recommended for use in the watershed and the degree to which they achieved target implementation. Regardless of available data,

**Table 2-5**  
**Project Implementation under the Tillamook**  
**Rural Clean Water Project (12/95)**

<b>Best Management Practice</b>	<b>Units</b>	<b>Project Goal</b>	<b>Units Installed</b>	<b>Farms Participating</b>	<b>Percent Achieved</b>
Pastures/Hayland Mngmnt	Acres	704	535	11	76%
Pastures/Hayland Planting	Acres	450	121	10	27%
Dry Waste Storage Struct.	Number	100	79	70	79%
Liquid Waste Storage Str.	Number	105	83	65	79%
Guttering	Feet	52,000	41,492	77	80%
Roofing	Sq. Feet	490,500	449,448	80	92%
Buried Mainline	Feet	21,290	44,039	13	207%
Waste Treat. Lagoon	Number	1	1	1	100%
Conduit	Feet	1,320	622	3	47%
Curbing	Feet	11,980	5,948	50	50%
Dike	Feet	45	0	0	0%
Diversions	Number	58	38	29	66%
Subsurface Drains	Acres	1,462	1,949	50	133%
Surface Drains	Feet	4,000	14,043	6	156%
Waste Mngmnt. Systems	Number	101	65	101	64%
Pipeline	Feet	8,150	2,150	1	26%
Trough or Tank	Number	20	8	1	40%
Stock Trails/Walkways	Number	6	5	4	83%
Streambank Protection	Feet	0	2,416	6	100%
Fencing	Feet	15,515	17,154	7	110%
Critical Area Planting	Acres	25	30	8	120%
Water Control Structures	Number	6	5	5	83%
Waste Utilization	Acres	8,805	7,428	101	84%

Source: Tillamook County SWCD Rural Clean Water Project Summary

anecdotal evidence suggests that the Rural Clean Water Project certainly had some impact on decreasing bacterial loading from agricultural lands.

### **Confined Animal Feeding Operations (ODA)**

Most of the dairy farms in Tillamook County have a confined animal feeding operation (CAFO) in which animals are fed and held during the wet season. Authority to regulate CAFOs stems from the state's general water pollution control authority which states "it is the policy of Oregon to protect the quality of the waters of the state by preventing animal wastes from discharging into [state waters]." As a result of this no discharge rule, dairy farmers store wastes during rainy weather in lagoons or holding facilities and apply it to their fields on sunny days when the risk of runoff is lowest.

In order to monitor and control a CAFO's waste storage and application, the ODA administers a Water Pollution Control Facilities Permit. This permit, which may be either a general or individual permit depending on whether unique conditions apply to an application, defines waste disposal standards, compliance requirements, fees/penalties, and other general operating provisions for CAFOs. The ODA took the primary responsibility for the CAFO program in 1988 from DEQ. The ODA, Oregon State University Extension, NRCS, and FSA entered into several Memorandums of Agreement which describe each agency's role(s) in the CAFO program. The latest MOA defines ODA's responsibilities for issuing permits, investigating and resolving violations, and providing information to CAFO operators on BMPs. The OSU Extension office provides informal CAFO education programs at the state and county levels while NRCS provides technical assistance in the planning and construction of waste management systems. Finally, FSA provides cost share assistance to producers.

For many years, those concerned with elevated bacterial levels in the north coast's surface waters have criticized ODA for inadequate inspection and regulation of CAFOs. As part of the Healthy Streams Partnership, ODA placed a CAFO inspector on the North Coast in 1997. Stationed in Tillamook, this inspector actively inspects CAFOs throughout the North Coast including the approximately 100 operations within the Tillamook Bay watershed. The inspector's primary goal is to ensure that CAFOs operating in Tillamook, Clatsop, Yamhill, Columbia, and (one in) Lincoln County comply with their permits.

The primary purpose of CAFO inspections is not to seek out permit violations and punish operators but mostly to educate them. Although enforcement activities will occur through the issuance of "notices of non-compliance", the development of "plans of correction", and citations where necessary, ODA emphasizes the importance of routine visits and inspector



visibility. The North Coast Inspector presently inspects CAFOs in the basin at least once every two years (most are visited more often), and is hopeful that as more operations come into compliance, routine inspections can occur once per year. The ODA is confident that such visibility and the opportunity to educate and develop relationships with operators will significantly reduce bacterial contamination resulting from CAFOs.

### **Tillamook Bay Commercial Shellfish Harvest Plan (ODA)**

The ODA administers the Oregon Shellfish Program, which manages commercial shellfish harvesting throughout the state. Under OAR 603-100, this program adopts the standards set for acceptable bacterial concentrations established in the federal Food and Drug Administration's (FDA's) National Shellfish Sanitation Program. This standard states that "a median fecal coliform concentration in water overlying shellfish areas shall not be greater than 14 colonies per 100 mls, and no more than 10 percent of the samples shall exceed 43 colonies per 100 mls." At least 15 samples must be taken during adverse weather conditions.

Because of consistently high bacterial concentrations found in Tillamook Bay oysters, the FDA, in 1987, threatened to close the bay to shellfish harvest used for interstate trade. As a result, the Oregon State Health Division developed the Tillamook Bay Commercial Shellfish Harvest Plan. Designed under the state and federal programs described above, the Tillamook Bay Commercial Shellfish Harvest Plan establishes two significant controls on commercial shellfish harvesting in the Bay: management areas and closure criteria. The plan also makes provisions to safeguard recreational harvesting. The ODA administers and periodically revises all elements of the plan.

***Management Areas.*** The ODA follows federal standards and divides the bay into three shellfish management areas: prohibited, restricted, and conditionally approved. (An area can also be designated "approved", although no areas in Tillamook Bay are due to the presence of point source pollution and the normally elevated bacterial levels in wet weather.) Please refer to the map on the facing page for the boundaries of each management area.



- Conditionally Approved Areas. Areas that meet standards during normal conditions (no periods of extreme rain), are classified as conditionally approved. These areas, the “Main Bay and “Cape Meares”, include the lower half of the bay except for areas adjacent to Garibaldi and its marinas, called “Lower Bay”.
- Restricted Areas. Within restricted areas, shellfish may be grown but not harvested for market. The only restricted area within the bay is found just south of Bay City in an area called “Flower Pot.”
- Prohibited Areas. Finally, commercial harvesting is not allowed under any conditions within prohibited areas. All of the “Upper Bay” is closed under this designation because it receives most of the bacteria that washes downstream from dairy operations and the city of Tillamook. Similarly, ODA designates a small area adjacent to the city of Garibaldi called “Lower Bay” as prohibited.

**Closure Criteria.** The Tillamook Bay Shellfish Harvest Plan moderates shellfish harvest when bacteria levels are believed present at concentrations that threaten human health. The plan applies state water quality standards as the maximum bacterial concentration. Because constant monitoring of bacterial concentrations in oysters is virtually impossible, Tillamook Bay closure is based on a correlation found between river levels and bacterial contamination in the Bay. The ODA applies this correlation to three areas in defining its closure criteria: Flower Pot, Cape Meares, and Main Bay.

Operators may grow oysters in Flower Pot but may not harvest them from there. The Main Bay and Cape Meares areas are usually open to commercial harvest, closing only when the Wilson River reaches seven feet in gauge height (2,500 cfs). Main Bay and Lower Bay reopen five days after peak flow on the Wilson. Cape Meares reopens seven days after peak flow but is closed if one inch of rain falls in a 24 hour period.

**Recreational Harvest.** The Shellfish Program also makes provisions to notify the public when recreational shellfish harvest may put citizens at risk. Recreational standards are less stringent than those applied by commercial regulations, but should a threat exist, ODA works with the County Health Department and Oregon Department of Fish and Wildlife (ODFW) to notify the general public. Unlike ODA, the Health Department and ODFW have the authority to close the bay to recreational harvesting. The ODA’s main responsibility is to notify the public of dangerous conditions.

## **Methane Energy and Agricultural Development (SWCD)**

Currently in the financing stage at SWCD, the Methane Energy and Agricultural Development (MEAD) Project will use the anaerobic digestion of animal wastes to produce gas which fuels a heat and energy-producing generation plant. The MEAD project aims to convert the waste produced by Tillamook County's roughly 30,000 dairy cattle into useable outputs like energy, potting soil, soil amendments, and hot water. The facility will have a capacity of 450 tons of animal waste (and 50 tons of food waste) per day. Potting soil will produce roughly 75% of the revenue generated by the processing of these wastes.

After completing a feasibility study that supported the project's implementation, Tillamook People's Utility District and SWCD joined to pursue the effort. Presently, under EPA and Department of Energy funding, the MEAD project has moved along as far as it can without private financing. Investors have sought financing for the plant for some time and have had little success. If stakeholders can locate financing, construction will begin shortly after.

## ***Wastewater Management on Developed Lands***

Three sources of wastewater contribute to degraded water quality in the bay: wastewater treatment plants, stormwater runoff, and septic systems. The DEQ administers the Clean Water Act provisions governing wastewater and stormwater. Tillamook County manages septic systems under an agreement with DEQ.

## **National Pollution Discharge Elimination System Permits (DEQ)**

National Pollution Discharge Elimination System (NPDES) permits govern all point sources discharging into navigable waters. Under legal guidelines established by Section 402 of the Clean Water Act and EPA, DEQ administers the NPDES program, which limits the amount of pollutants that may be discharged into state waters. Limits are based on the best available technology used to treat wastewater. As a result, NPDES permits become increasingly more stringent as technology improves. The present standard establishes that the monthly geometric mean of effluent samples must be 200 fecal coliform bacteria (FCB) per 100 mls with no more than 10% of the samples above 400 FCB/100 mls.

The NPDES permits provide the primary regulatory tool of wastewater treatment facilities. In the Tillamook Bay watershed, six treatment

facilities operate; four are public and two private. Publicly owned treatment installations include the facilities in Tillamook, Bay City, Garibaldi, and the Port of Tillamook. The privately owned facilities are located in the City of Tillamook at the Tillamook County Creamery and the Pacific Campground and Overnight Trailer Park. **Table 2-6** provides summary information on the plants located in the Tillamook Bay watershed. The location of each plant is indicated on the map on the following page.

**Table 2-6**  
**Summary Table of Tillamook Bay Basin**  
**Wastewater Treatment Plants**

<b>Plant</b>	<b>Discharge point (mile)</b>	<b>Capacity (mgd)</b>	<b>Average Flow /Peak Flow</b>	<b>Comment</b>
<b>City of Garibaldi</b>	Tillamook Bay	.5	.4/.9	Bypasses untreated wastewater when more than 3-4" of rain fall in 24 hours. Will meet permit requirements by 2001.
<b>City of Bay City</b>	Tillamook Bay	.3	.241/1.45	New facility. Overflow is stored.
<b>Tillamook County Creamery Assoc.</b>	Wilson River (1.7)	.5	.25	No problems at point of compliance. High bacterial concentrations at end of shared outflow pipe .8 miles from plant.
<b>Pacific Campground</b>	Wilson River (1.5)	.003		Few problems. Bacteria OK. Clarity of treated water sometimes marginal.
<b>City of Tillamook</b>	Trask River (1.9)	2.0	.6 summer/ 4.5 winter	Inadequate capacity in winter. Capacity being upgraded to 5.6 mgd.
<b>Port of Tillamook Bay</b>	Trask River (5.2)	.56	.77/1.7 (no summer flow)	Few Problems. Facilities constructed in 1940s. Upgrades recently completed meet flows.

Source: TBNEP Scientific and Technical Characterization, 1998



**Monitoring and Reporting.** In the permitting process, DEQ evaluates the effluent produced and the character of the receiving water body. Based on these factors, the agency issues an NPDES permit specifying effluent limits. Under the permit, minimum fecal discharge standards define a weekly average of 400 fecal coliform organisms per 100 ml and 200 organisms per 100 ml over one month.

Under each facility's permit, discharge testing must be completed by the operator at least once a month and for some as much as twice a week. Larger facilities and those with a higher frequency of violations must report more often, although the testing schedule (days and times) is normally flexible. The DEQ makes two inspections, one announced and one unannounced, each year to insure accurate testing results. The facility reports test results in a monthly report. Providing regular and accurate reporting occurs, a permit lasts five years.

**Enforcement.** Regular enforcement of the permit is largely driven by citizen complaints. If the DEQ finds permit violations, the owner/operator of the facility may be assessed a civil penalty, lose permitting, and/or, in the case of negligence or malice, may receive a misdemeanor charge. Facilities in Tillamook County operate under a Memorandum of Agreement which provides leniency from the strict application of the permit during storm events. If violations do occur, they can work with DEQ to write a draft compliance schedule detailing mitigation efforts needed and the time required to bring the facility back into compliance.

**Waste Disposal.** When solid wastes from water treatment plants accumulate, treatment facilities dispose of the wastes under a DEQ-approved plan to apply wastes to pasturelands. Limits on application are defined under each facility's NPDES permit. The permit also defines minimum setbacks from surface waters, minimum vertical separation from groundwater, and other general health provisions. The DEQ is concerned that the minimum vertical separation from groundwater is often violated due to lack of adequate water table data.

### **On-Site Sewage Disposal System Management (Tillamook County)**

The Environmental Quality Commission (EQC) established standards for the design, construction, operation, and maintenance of on site sewage disposal systems through ORS 454.615. The DEQ enforces these guidelines and contracts responsibility locally for permitting, inspections, and certification to Tillamook County.

Septic systems can only be used if community sewers are not available at the time of development. Once designed and built under EQC guidelines, no legal requirements are in place at the state level for maintaining or monitoring the system. Inspections occur when the county receives complaints about a possible failure or suspect a failure because of high bacterial concentrations in areas where other possible sources are not present.

The federal Food and Drug Administration requires a periodic survey of septic systems near commercial shellfish harvesting water bodies. Under the County Health Department and Department of Community Development, volunteers and professionals survey septic systems on properties that adjoin waterways that discharge into Tillamook Bay. Teams look for evidence of failures and contact property owners when possible violations occur. Owners then receive advice from the county on how to repair failing systems. The most recent survey occurred in 1998, and volunteers inspected roughly 1,000 septic systems. Results of that survey indicate that only a small percentage of on site sewage disposal systems are failing. Tillamook County conducted a more extensive survey throughout the county from 1988 to 1991, and less than five percent of systems failed.

### **Stormwater Control permits (DEQ)**

Stormwater runoff is another potential source of contamination in Tillamook Bay. It can carry fecal coliform bacteria as well as gasoline, oil, residue from equipment and machinery, chemicals, and pesticides from residential and agricultural activities. When unchecked, construction activity is a significant source of contaminated stormwater runoff.

Under the Clean Water Act, DEQ requires permits for construction projects of five or more acres and calls for twice a year self-monitoring by the permit holder. Developments requiring permits may be reduced to one or more acres of disturbance under proposed 1999 EPA rules. The most important provision of the stormwater permit is the requirement of an Erosion Control Plan. This plan outlines the measures that developers will implement to reduce stormwater runoff. Examples of measures include sediment ponds, gravel drives, and runoff buffers. Like wastewater treatment facility inspections, stormwater permit inspections occur upon complaint.



## **Transportation Equity Act (USDOT)**

Under the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21), Congress authorized over \$200 billion to improve the nation's transportation infrastructure, enhance economic growth, and protect the environment. Administered by the U.S. Department of Transportation, several provisions of TEA-21 create new opportunities for water quality improvements as well as wetlands and other habitat restoration.

In order for areas in the Tillamook Bay watershed to be eligible to receive TEA-21 assistance, the state of Oregon must include the watershed in its transportation improvement plan. If included, TEA-21 offers a number of provisions that could be used for local water quality improvements as well as implementation of the CCMP.

Significant TEA-21 provisions and examples of each include:

- **Transportation Enhancements:** acquisition or conservation of scenic easements, highway-caused water pollution mitigation projects.
- **Environmental Restoration and Pollution Abatement:** BMP implementation, retrofit of sewer treatment plants, and riparian and wetland restoration.
- **Wetlands Restoration:** wetlands restoration for areas negatively affected by federal-aid highway projects.
- TEA-21 also makes provisions for wetlands mitigation banking, environmental streamlining, community transportation planning, and research.

The program provides new funding for road maintenance and upgrades, and it will allow for watershed enhancement projects in areas where roads impact wetlands or critical habitats.

## ***Progress on Phase II Recommendations***

The following section summarizes the success of management activities in effectively responding to past TBNEP management recommendations. These are found in chapter one (pages 12-16) of Phase II of the Base Programs Analysis.

### **Increased bay wide monitoring and data collection**

In partnership with DEQ, ODA, OSU and the Tillamook County Creamery Association, TBNEP has conducted extensive water quality monitoring projects since the most recent phase of the Base Programs Analysis. (Far too many to discuss here, these activities are summarized on the TBNEP's web site.) This monitoring has not conclusively designated the sources and amounts of bacterial contamination entering the rivers and bay, but has provided a much better understanding of how the system "processes" bacteria as well as the locations of major contributors. One surprising result, preliminary data suggests that urban and rural residential areas may contribute a much larger amount of bacteria than previously thought. As the TBNEP monitoring program continues under the Performance Partnership and the bay circulation model is completed, area managers will continue to improve their understanding and management of bacterial contamination.

### **Establishment of a dairy agent for Tillamook County**

Oregon Department of Agriculture added a dairy agent in 1997. This individual is fulfilling the duties recommended in the Phase II Analysis.

### **Improvements to regulations on dairy waste management**

***Agronomic Rates.*** An agronomic rate has still not been established for the unique soils and climate of Tillamook County. However, TBNEP funds a project that is collecting the necessary data. Agency representatives are confident that this and other data will determine an agronomic rate. The TBNEP has also recommended it as an action in the water quality action plan of the CCMP.

***Farm Plans.*** Since the Phase II Analysis, NRCS and SWCD have been very active in assisting farm operators in the development of individual farm plans. With the passage of the North Coast Basin Plan on the horizon, both agencies will certainly continue developing them in the future. The number of plans produced is severely hampered by limited NRCS and SWCD staffing, however.

## **Development of the MEAD project**

The MEAD project has been well financed and is fully designed on paper. However, project managers have had difficulty locating financing. Until financing can be established, which looks increasingly difficult, the project will remain on the drawing board.

## **Public education**

Little has been done to educate the general public as to what constitutes a violation of an environmental ordinance (riparian ordinances, land use ordinances, water quality ordinances etc.) During CCMP development, the TBNEP has considered a number of measures, however, including local enforcement/representation of resource agencies, a page in the yellow pages regarding enforcement contacts, and increased use of the media. The TBNEP incorporated these and other ideas into the CCMP. It is important to emphasize that environmental education programs should be administered by all representatives of the resource agencies and not just the few individuals whose positions focus on education.

## ***Recommendations for Critical Management Issues***

The following recommendations represent a significant degree of consensus among local resource managers, public officials, and the general public regarding deficiencies in the current management framework. Implementation of these recommendations will improve the management of water quality.

- Increase protection and restoration of riparian zones
- Strengthen CAFO inspection process
- Update shellfish plan and growing classifications
- Safeguard on site disposal systems
- Increase public education on water quality issues

### **Increase protection of riparian zones**

(See Chapter Four: Critical Habitat Recommendations)

### **Strengthen CAFO inspection process**

The ODA took a major step in addressing water quality contamination on the watershed's agricultural lands through the appointment of a CAFO inspector for the North Coast Basin. Because a locally-based inspector brings the ODA significantly higher visibility among CAFO operators, conditions on farms should steadily improve. However, with over 200 CAFOs to inspect over a five county basin, regular annual inspections (an ODA and CCMP goal) are not likely to occur for several years. In addition, flagrant violators will continue to create water quality problems even with routine inspections.

***CAFO Review.*** Under the Oregon Plan, ODA is currently reviewing the CAFO inspection program, and improvements could be made to the program before ODA reaches its goal of routine annual inspections and infrequent violations. As ODA reviews this program, the following should be considered.

First, CAFO inspections should be prioritized so that sub watersheds with the highest concentrations of bacterial contamination are inspected first. The ODA does have a broadly-defined geographic priority system based on salmonid habitat and the Oregon Plan, but ODA must also prioritize sub-basins based on bacterial loading. Research conducted by TBNEP, DEQ, and ODA can provide this information.

Second, enforcement procedures should include the option of issuing standardized tickets to cite significant violations on the spot. The present citation system uses a series of steps including a notice of non-compliance, a plan of correction, and administrative review. By making the enforcement process more expedient, standardized and on the spot citations (like traffic tickets) may reduce noncompliance.

***Aerial Surveys.*** Perhaps the most common criticism of the ODA CAFO inspection process is the inability of the program to catch the worst offenders. While most operators conform to permit requirements and practice good stewardship, a very small minority discharge large quantities of wastes from holding tanks into rivers during storm events. Although these offenders are few and far between, the damage they do creates major water quality contamination and compromises the efforts of all conforming operators.

In order to catch these offenders, ODA should reinstate aerial surveys and conduct them after storm events twice annually. Surveys would consist of flying over tanks before and after storm events and comparing the level of waste in each operator's tank(s). If major reductions in waste levels are found on a given operation, that operation should receive an unannounced inspection from ODA and/or DEQ. The ODA conducted aerial surveys in the past and received criticism for the high costs they incurred. However, because it is the bad actors who are responsible for the most egregious offenses, the benefit of stopping these operators from illegally discharging offsets the cost. In short, fly-overs provide the most bang for the enforcement buck.

***Agronomic Rates.*** CAFO permits outline the manure application rates that correspond to a pasture's "agronomic rates", or the rate at which vegetation can uptake the nutrients. Rates used in the basin were developed using accepted criteria from soil types around the United States. Because Tillamook County has many soils types that may not be adequately reflected in the accepted standard, agronomic rates may not be properly determined in the basin.

Although data are being collected, managers have still not adequately identified rates in the Tillamook Bay watershed. In order to properly apply wastes over pasturelands and minimize bacterial contamination in surface waters, these rates will have to be determined. Once this occurs, ODA should incorporate the new agronomic rates into CAFO permits.

## **Update shellfish plan and growing classifications**

As discussed earlier in the chapter, ODA closes commercial shellfish harvesting based on the correlation found between river levels and bacterial contamination in the Bay and also allows a “purge time” during which shellfish naturally flush their systems of bacteria. The Main Bay, and Cape Meares areas are usually open to commercial harvest, closing only when the Wilson River reaches seven feet in gauge height (2,500 cfs). Main Bay and Lower Bay reopen five days after peak flow on the Wilson. Cape Meares reopens seven days after peak flow.

Since ODA drafted the Tillamook Bay Shellfish Plan, the public has not reported an incidence of food poisoning from the ingestion of Tillamook Bay oysters. Despite this, oyster farmers criticize the ODA commercial shellfish harvest closure criteria for providing only “a best guess” regarding when bacterial levels are too high. Specifically, they complain that the criteria sets the reopening standard too high and that they are too often restricted from harvesting their oysters.

The ODA based the current bay closure criteria on data collected in the early 1980s. In early 1997, ODA, DEQ, and TBNEP began a program to collect data on bacterial concentrations in the bay and rivers. In addition to other relevant data on wastewater treatment plants, hydrology, eelgrass habitat, and shoreline pollution, this bacterial data provides a better understanding of how the system produces and processes bacteria. The ODA should use this information to reevaluate both shellfish area growing classifications as well as bay closure criteria.

## **Safeguard on-site disposal systems**

Currently, Tillamook County inspects on site disposal systems only when a complaint occurs or if it resides near commercial shellfish harvesting water bodies. Although few complaints are reported and roughly 95% of systems pass routine inspection, on site disposal systems are aging throughout the county and could pose a hazard to water quality in the future. To prevent future health risks, Tillamook County and/or area cities should institute a policy under which every home sale requires a septic system test. Similar to other home inspections (like an oil tank test or structural examination), evaluating on site disposal systems could be made another step in the home buying process. In addition to preventing recent home buyers from receiving an expensive surprise, such inspections would also drastically reduce the threat of long term seepage from septic systems.

## **Increase public education on water quality issues**

Changing behavior is arguably the most difficult challenge facing environmental policy makers. However, it provides what is perhaps the only solution to the question of how to restore altered or degraded natural systems over the long term. The first step in changing behavior is through education. Yet, few comprehensive educational programs exist for local residents.

In so many of its environmental policies, Oregon has relied on volunteer, citizen-based efforts. Due in great part to the voluntary-based Oregon Plan, new watershed councils are forming all over the state, including here in Tillamook County. Unfortunately, many Tillamook Bay Watershed Council members have an inadequate understanding of the natural processes that they have volunteered to steward.

Because the Tillamook Bay Watershed Council provides a potential front line of citizen education, it is imperative that members of the council thoroughly understand natural resource processes and the management issues that surround them. Tillamook County, OSU Extension, the Tillamook Bay Community College and other public stakeholders should develop a seminar series aimed exclusively at educating watershed councils. A series of lectures and discussions could emphasize how land use and individual activities affect water quality as well as how individuals can assist in insuring its sustained quality. Once watershed councils receive training and education, they should initiate projects that educate the community on the role that community members can play in maintaining their natural environment.







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# Chapter 3: Sediment & Erosion Control

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## ***The Issue***

*Current levels of erosion and sedimentation may adversely impact the human and natural environment. Historic increases in sediment may have caused the loss of spawning and rearing habitat, degradation of estuarine habitats, and changes in the bay depth, circulation patterns, and response to floods.*

## ***Introduction to Management Framework***

Under OAR 340-41, DEQ regulates sediment loading in a water body using the water quality parameters ‘turbidity’ and ‘sedimentation.’ (‘Total suspended solids’ is another useful parameter, but at this time standards have not been developed for its enforcement.) Sediment loading in a water body, and the degree to which sedimentation and/or erosion occur, contribute to turbidity. As discussed above, many policies and programs aim at maintaining water quality. Several of these have a direct impact on parameters like temperature or bacterial concentrations and only a secondary impact on sedimentation and turbidity. In order to reduce redundancies between this chapter and the water quality chapter, only those policies that primarily impact sedimentation and turbidity are discussed here. For a complete review of sediment-related policies, the reader is encouraged to also review Chapter Two: Water Quality.

## Major Activities

Sediment loading comes from many sources, and many agencies actively manage it. In addition to other agencies that also make important contributions, three state agencies play pivotal roles in managing and regulating sedimentation in the Tillamook Bay watershed: the Department of Forestry, the Department of Environmental Quality, and the Department of Agriculture. Below is a summary of all of the agencies that play a significant part in managing the sedimentation of Tillamook Bay and its rivers.

**DEQ:** The Department of Environmental Quality sets sediment-related standards for surface waters of the state. These standards directly affect all activities that potentially increase the amount of sediment entering a water body including agricultural and dairy activities, logging, development, and storm water discharge.

**DLCD & Tillamook Co DCD:** Under Oregon's Statewide Land Use Planning Program, the Tillamook County Land Use Ordinance regulates land uses to reduce sediment loading.

**ODF:** The Oregon Department of Forestry administers the Forest Practices Act, which defines operating standards for all non-federal forestry activities in the state. In addition to regulating silvicultural practices, ODF committed to reduce sediment loading under the Oregon Plan for Salmon and Watersheds.

**ODA:** Under SB 1010, the Oregon Department of Agriculture is writing an Agricultural Water Quality Management Area Plan for the North Coast Basin. This plan will identify sources of sedimentation on farms and recommend the BMPs to reduce them.

**NRCS and FSA:** The Natural Resource Conservation Service assists landowners in writing and implementing farm management plans. The Farm Services Agency also helps landowners locate funding for restoration projects through the U.S. Department of Agriculture and other agencies.

**DSL & COE:** The Division of State Lands and Corps of Engineers regulate the dredging of waterways and wetlands, and disposal/use of fill materials.

# ***Sediment Management through Water Quality Regulation and Regional Planning***

As the chief environmental regulator in the state, the Department of Environmental Quality (DEQ) plays an active role in managing sediment loading to Tillamook Bay and the rivers which feed it. In addition, DEQ and the Department of Land Conservation and Development (DLCD) are active in long range planning for the sustained health of the watershed.

## **Water Quality Standards and TMDLs (DEQ)**

The DEQ places standards on water quality parameters relating to sediment loading. When water bodies violate these standards, DEQ develops and enforces Total Maximum Daily Loads (TMDLs).

***Standards.*** Standards that relate to sediment loading include sedimentation, turbidity, and total suspended solids.

- ***Sedimentation*** is “a problem [on the North coast] when any of several biologic community scores are lower than 76% of that for an appropriate reference site, and the impairment is attributed to appreciable deposits of any organic or inorganic material deleterious to fish or aquatic life or to public health, recreation or industry.” (OAR 340-41)
- ***Turbidity.*** “No wastes shall be discharged and no activities shall be conducted which.... will cause.... more than a ten percent cumulative increase in natural stream turbidity.... as measured relative to a control point immediately upstream of the turbidity-causing activity.” (OAR 340-41-205 (2))

Although exceptions are granted in some instances, like development or dredging, this standard can only be violated with an Emergency Activities Approval Permit (developed through DEQ and ODFW), coordinated with a Clean Water Act Section 401 or Section 404 Permit. (These permits are discussed later in the chapter.)

- ***Total Suspended Solids.*** The DEQ is currently developing standards for total suspended solids. Proposed standards, which are referenced in the water quality chapter of the CCMP, could affect land use practices in Tillamook County that cause measurable sediment delivery.

***TMDLs.*** The second role DEQ plays in controlling sediment loading is as water quality planner/regulator. The DEQ must develop TMDLs for water quality limited surface water bodies in the Tillamook Bay watershed.

Where sedimentation causes a waterway to be out of compliance with water quality standards, and the surface water body is found to be “water quality limited”, DEQ will develop a TMDL to control sedimentation. Sedimentation has not been sufficiently documented to declare it in violation throughout the watershed. The DEQ presently monitors water bodies throughout the watershed to develop this data.

**Coastal Nonpoint Source Pollution Control (6217) Program (DEQ and DLCD)**

The federal Coastal Nonpoint Source Pollution Program, as defined under Section 6217 of the Coastal Zone Act Reauthorization Amendments, mandates that all states with coastal zone management plans must incorporate specific nonpoint source pollution control measures into enforceable policies. These measures are found in the EPA’s *Guidance Specifying Management Measures for Sources of Nonpoint Source Pollution in Coastal Waters*. **Table 3-1** below summarizes the sources of nonpoint source pollution and the categories of management measures which address them. Oregon has not completed its final plan, which is under development by DEQ and DLCD.

**Table 3-1  
Management Measures for Sources of Erosion**

Source	Category of management measure
Agriculture	Harvest practices, crop rotation, structural controls, farm design
Forestry	Road construction and reconstruction, timber harvesting.
Urban	Development, road and bridge construction.
Marine	Shoreline stabilization, stormwater runoff.

Source: EPA’s *Guidance Specifying Management Measures for Sources of Nonpoint Source Pollution in Coastal Waters* (1993)

**Statewide Planning (DLCD)**

The DLCD works with county and city governments to oversee the ongoing implementation of Oregon’s Statewide Land Use Planning Goals. The agency contributes to sediment management in the Tillamook Bay watershed primarily through coastal zone and riparian planning. Although DLCD measures do have substantial impacts on sediment loading, the same measures have a significantly greater impact on water quality and salmonid habitat. As a result, DLCD’s statewide planning activities are summarized in Chapter Two: Water Quality and Chapter Four: Habitat.

## ***Sediment Management on Forest Lands***

Roughly 85% of the upper Tillamook Bay watershed is forested. The majority of this land (85%) falls within the Tillamook State Forest. Private and federal forests make up the remaining area, owning 13% and 2% of forested lands, respectively. Because forest practices in these upland areas greatly influence sediment loading, the ODF plays the lead role in addressing sedimentation in the upper watershed. (The federal Northwest Forest Management Plan governs the lands owned by the Bureau of Land Management and Forest Service, which are not managed for timber production. Because these lands produce relatively little sediment, their management will not be discussed here.)

Three principal policies support ODF's management of erosion and sedimentation. These include the Forest Practices Act, the Oregon Plan for Salmon and Watersheds, and the Draft Northwest State Forest Management Plan.

### **The Forest Practices Act (ODF)**

The Forest Practices Act (FPA) governs silvicultural and other forest management activities on private and state lands. As stated in ORS 527.765, it also “establishes best management practices and other rules applying to forest practices as necessary to insure that . . . nonpoint source discharge of pollutants resulting from forest operations . . . do not impair the water quality standards established by the Environmental Quality Commission for the waters of the state.” The FPA uses the state water quality standards as operating standards for sediment loading on forest lands. This establishes that no more than a ten percent cumulative increase in natural stream turbidity shall result from any forest activity.

The most significant provisions of the FPA with regard to sediment loading include the regulation and oversight of timber harvesting and forest roads. In addition, the FPA also establishes water protection rules through OAR 629-635-100 “to ensure that . . . nonpoint source discharges of pollutants resulting from forest operations do not impair the achievement and maintenance of water quality standards.” Riparian Management Area (RMA) regulations comprise the backbone of these rules.

Timber harvesting, road construction, and activities within the RMA generally require prior approval from a state Forest Practices Act Forester before an operation can begin. After summarizing the sediment control mechanisms established by ODF in these areas, this section discusses the permitting processes for potential sediment-producing forest activities.

**Timber Harvesting.** The FPA establishes standards for forest harvesting under OAR 629-630-000 “that will maintain the productivity of the forest land, minimize soil and debris entering the waters of the state, and protect fish and wildlife.” Regulations include standards on skidding and yarding, development of landings and drainage systems, treatment of waste materials, and specific provisions for harvesting on high-risk sites in western Oregon.

**Forest Roads.** The FPA manages forest roads to prevent nonpoint source pollution from entering surface waters by regulating road location, design, construction, and maintenance. Specific examples of provisions include road, culvert, and crossing design; debris and structure placement; road maintenance and closure requirements; and other provisions. Below, the “Oregon Plan on Forest Lands” section provides more information on road-related activities across the state and in the basin.

**Riparian Management Areas.** As defined under OAR 629-635-300, the FPA establishes RMA widths “to provide adequate areas along streams, lakes, and significant wetlands to retain the physical components and maintain the functions necessary to...meet the protection goals for water quality, fish, and wildlife.” These areas act as filters, catching much of the sediment before it enters the stream. Because RMAs are the primary habitat conservation mechanism established in the FPA, they are discussed in more detail in Chapter Four: Critical Habitats.

**Permit Review Process.** In most cases, a private operator must submit a Notification of Operation prior to beginning a forest operation. The notification contains information necessary to judge an operation’s potential for affecting water quality and other resources. The ODF distributes notifications to interested parties. Public comments receive a written response from ODF. In Tillamook, ODF works very closely in reviewing permits with agencies like Oregon’s Department of Fish and Wildlife, Division of State Lands, Department of Environmental Quality and the Tillamook County Department of Community Development.

Based on review and/or consultation from various agencies, notifications of operation are listed as high, medium, or low priority. Forest Practice Foresters (FPFs) typically examine all high and medium priority sites prior to acceptance. Two FPFs manage Tillamook County activities, handling roughly 400 operations per year. Foresters state that this is a manageable workload.

To confirm the operator’s understanding of necessary practices, the forester may provide written recommendations. Written instructions are employed under two conditions: 1) operations for which the FPA requires prior approval (usually those involving water quality, like road building

near streams or operations on steep slopes), or 2) operations that affect a resource specified in the FPA as meriting protection, such as major fish bearing streams or sites containing threatened, endangered, or sensitive species.

***Enforcement.*** Forest Practice Foresters review all aspects of an operation, including the use of and correct application of BMPs. Alternatives to BMPs may be used if approved in writing by the Forest Practices Forester. Failure by the operator to implement BMPs results in a citation and possibly civil or criminal prosecution, depending on the extent of the operator's negligence. This happens very infrequently within the Tillamook Bay watershed.

If operators do not follow written plans or if FPFs observe the potential for excessive damage to terrestrial and aquatic resources, ODF can issue a Notification of Unsatisfactory Conditions to the operator. If excessive erosion and sedimentation (or other violation) occurs after an operator has been provided both notice and time to remedy the violation, ODF can pursue civil or criminal penalties. In cases where enforcement is required, ODF rarely pursues criminal penalties.

Within the watershed and the entire range of the two FPFs, very little punitive enforcement is required. Of the roughly 400 operations that ODF reviewed last year in the district, the agency only found a dozen to be out of compliance, and most of those were "paperwork infractions." Two reasons exist for such high compliance among local loggers and landowners. First, ODF focuses on education as the primary compliance tool. Specifically, they continually educate both landowners and operators on new FPA regulations and timber practices. Second, large timber companies own much of the forestland in the district. Large forest landowners generally recognize their responsibility under the FPA.

When major violations do occur (once every three or four years, according to the FPFs), they usually result from out of town logging operations that take advantage of small landowners. Because these small landowners may not be familiar with FPA rules, "cut out and get out" operators can easily perform illegal activities like improper road building and/or harvesting within the RMA. Most of these violators operate outside of Tillamook County and/or the state of Oregon, and locating and punishing them is costly and difficult.



## The Oregon Plan on Forest Lands (ODF)

The Oregon Plan for Salmon and Watersheds (OPSW) provides several measures that will reduce sediment loading from upland forests in the watershed. These address forest road maintenance, revisions to the FPA, and other miscellaneous provisions.

**Forest Roads.** Old and failing forest roads are a major source of erosion and sedimentation in the Tillamook Bay watershed. As part of its OPSW commitment, ODF and state forest landowners are undertaking extensive road inventories on private and state forests. These “road erosion and risk projects” emphasize locating and improving those roads built prior to the FPA (1971) which demonstrate, among other hazards, high erosion potential. According to the OPSW, “roads assessed, [upgraded, and sometimes closed] by this project will include all roads on non-federal forest land used as part of an industrial or state forest operation since 1972, regardless of when they were constructed. Emphasis will be given to road systems constructed prior to current forest practice standards and road systems in core areas.”

These assessment and restoration activities will take place through the year 2002. The ODF is focusing this project on the Tillamook State Forest in phase II of its OPSW implementation plan. **Table 3-3** summarizes the work that ODF has already undertaken within the Tillamook District.

**Table 3-2**  
**Road Work Performed by Oregon Department of Forestry**  
**in Tillamook District of State Forest\* (1994-present)**

Year	Culverts Installed	Bridges Built	Rock Spread (cu. yards)	New Road Constructed (miles)	Road Improved (miles)	Road Closed (miles)	Cost (millions)
1994	191	1	121,000	4.6	77	0	\$2.5
1995	505	5	107,000	4.2	109	0	3.6
1996	383	1	148,000	5	80	0	2.9
1997	404	7	130,000	5.5	113	3.5	4.8
1998**	425	2	196,000	8.9	90	3.5	4.1
<b>Totals</b>	1,908	16	702,000	28.2	469	7.0	17.9

Source: Oregon Department of Forestry, Tillamook District

\* Figures include timber sale contracts, service contracts, and FEMA work.

\*\* 1998 figures are not final.

**Forest Practice Rule Reviews.** As part of the OPSW, ODF is conducting a BMP audit compliance program. As stated in the OPSW, this program aims “to identify the level of overall forest operations in compliance with the forest practice rules and determine if adjustments to the compliance program or program administration are needed.” Specifically, this exercise will identify the level of operator compliance with BMPs and improving the administration of the FPA.

ODF is also currently conducting a review of the FPA to: a) evaluate the implementation of forest practice BMPs (implementation monitoring); b) determine if the BMPs are meeting their intended purpose (effectiveness monitoring); c) validate assumptions on which rules may have been developed; and d) encourage coordinated monitoring.

In addition to the BMP audit compliance program discussed in Chapter Two, the Board of Forestry is reviewing two Forest Practices Rules that may impact sediment loading in the Tillamook Bay basin. First, Measure 3 of ODF’s OPSW Implementation Plan includes analyzing landslide information gathered after the storms of 1996 and a “review of rules and administrative processes related to slope stability.” Among its other objectives, this action intends to assess the impacts of forest design and road construction on slides and subsequent sediment loading.

Measure 36 implements and monitors the change to road construction BMPs passed in 1994. This change requires that excavation and amount of road fill be minimized at stream crossings. The objective of the revision, which will be implemented over the next five years, is to reduce the likelihood of ‘dam break floods’ from stream crossing failures.

**Other Provisions.** Numerous other measures found in the ODF’s OPSW Implementation Plan will impact sediment loading in the Tillamook Bay and rivers over the long term. Improvements to riparian areas, limits on clearcuts, area wide planning under the Northwest Oregon State Forest Management Plan, education initiatives and economic incentives to landowners like the Professional Logger Program, Forest Resources Trust, Stewardship Incentive Program, and Landowner Stewardship Award are all aimed (entirely, or in part) at reducing sediment loads entering rivers. For a more complete look at these measures and their impacts on sediment loading and stream capacity, see the ODF Implementation Plan found in the Steelhead Supplement of the OPSW.

## **Northwest State Forest Management Plan (ODF)**

The ODF breaks down the April 1998 Draft Oregon Northwest State Forest Management Plan into several broad strategies that collectively aim to conserve the forest for long term health and use. Due for adoption in 1999, the plan provides a long range vision of the management of state forests under an approach called “structure-based management.” The goal of structure-based management is to manage state forest lands in a manner that provides a complex variety of habitat types across the landscape to contribute to healthy populations of all indigenous fish and wildlife species.

### **Sediment Control on Recreational Areas**

The ODF recently developed a recreation plan for the Tillamook State Forest. Recreation poses a threat of accelerated erosion and sedimentation from the Tillamook State Forest, particularly due to Off-Road Vehicle (ORV) use. The ODF sponsors an average of 25 ORV events per year which attract approximately 150 people each, and some weekends 300–500 ORV users occupy the Tillamook State Forest. Under its plan, ODF designed a trail system that runs through high production (harvest) areas where soils and slopes meet design criteria imposed to limit erosion. In addition, ODF levies ORV user fees for the maintenance of trails, signage, and the evaluation of impacts.

## ***Sediment Management on Agricultural Lands***

Agricultural lands account for approximately 6.5% of the watershed’s total area and comprise the majority of the “unurbanized” lower watershed. Dairy farms make up most of these agricultural lands. As a result of riparian vegetation removal when dairies began operations as well as constant grazing and trampling thereafter, many of these farms have unvegetated riparian zones. These denuded riparian zones accelerate bank erosion and increase sediment delivery. Although sediment loading from these lowland agricultural areas is less (in total mass) than that produced in the upper, forested watershed, it is still an important source of sediment in the bay and rivers. In fact, per unit area, the lower watershed actually produces a greater percentage of total sediment loading than the upper watershed.

The first significant attempt at reducing sediment loading from agricultural lands in the Tillamook Bay basin began with the Rural Clean Water Project. Aimed primarily at reducing bacterial runoff, the project also set a 30 percent reduction in sediment entering the bay. Although

USDA scrapped the target, deeming it unattainable, the BMPs implemented under the Rural Clean Water Project still reduced sediment loading. Currently, the SB 1010 process and federal incentive programs address sedimentation from agricultural lands.

### **Senate Bill 1010 (ODA)**

The ODA's primary role in addressing sediment loading in the watershed is based on the development of Agricultural Water Quality Management Area Plans. As discussed in Chapter Two, these regional plans describe BMPs that should be implemented on farms to reduce water quality contamination as well as prohibited conditions that degrade water quality.

Many of these practices will have a direct impact on sedimentation. As outlined in the ODA Early Action Guide, the recommended sediment and erosion-reducing BMPs include the use of cover cropping, filter strips, and grassed waterways to prevent erosion of streambanks and loss of top soil. For a more detailed discussion on SB 1010, Water Quality Management Area Plans and BMPs see Chapter Two: Water Quality

### **Farm Management Plans (NRCS and FSA)**

The NRCS writes individual farm plans that design the BMPs to be used on farms. The service arm of the U.S. Department of Agriculture, NRCS assists farm operators in inventorying, assessing, and planning for the conservation of their natural resources. Their sister agency, the FSA, assists landowners in financing the implementation of BMPs.

Recently, the NRCS has begun working with operators to write farm plans that take advantage of new federal conservation programs. Specifically, the 1996 Farm Bill authorized the NRCS to implement a number of voluntary, incentive-driven programs designed to promote stewardship among farm operators. Those that significantly address sedimentation include the following.

***Conservation Reserve Program.*** Operators receive an annual rent payment to convert environmentally sensitive areas to vegetative cover. Conversion costs are shared between the operator and federal government. Because this program is aimed at all water quality pollutants and not just sediment, please see Chapter Two: Water Quality for more information on CRP and the corresponding Conservation Reserve Enhancement Program (CREP).

***Forest Incentive Program.*** In the FIP program, operators are paid up to 65% of the costs of tree planting and related activities. The NRCS encourages planting in the riparian zone to reduce bank erosion.

***Environmental Quality Incentives Program (EQIP).*** The NRCS and FSA provide planning, technical, and financial assistance to help agricultural landowners meet water quality standards by drafting farm plans. Erosion control is one element emphasized in these water quality plans. Because this program is aimed at all water quality pollutants and not just sediment, please see Chapter Two for more information on EQIP.

The SWCD also assists landowners in managing their lands for reduced sediment loading. Although they do not manage federal programs, they are the lead local agency in assisting operators with on the ground projects like fencing and livestock management. The SWCD also provides field and office support for environmental assessments, public outreach, and other natural resource management services.

## ***Sediment Management on Urban Lands***

Because of extensive building and paving, urban areas typically do not cause the degree of sedimentation relative to other sources. However, stormwater runoff from construction can contribute significantly to sedimentation. The DEQ regulates stormwater through stormwater permits.

### **Stormwater Control Permits (DEQ)**

Construction often causes sediment to wash into storm drains. The DEQ requires permits for construction projects of five or more acres and calls for twice a year self-monitoring by the permit holder. Projects requiring permits may be reduced to one or more acres of disturbance under proposed 1999 EPA rules. The most important provision of the stormwater permit is the requirement of an Erosion Control Plan. This plan outlines the measures that developers must implement to reduce stormwater runoff. These include measures like sediment ponds, gravel drives, and runoff buffers. Complaints drive most enforcement activities.

## ***Regulation of Dredge and Fill/Gravel Removal Activities***

In recent years, the regulation of filling and dredging wetland areas has become increasingly strict. The Corps of Engineers (COE) and the Oregon Division of State Lands (DSL) manage these activities.

## **Dredge and Fill Management (DSL and COE)**

In regulating dredge and fill activities, COE and DSL use Section 404 and Removal Fill Permits, respectively. They also both issue General Authorization Permits for small-scale projects.

**404 and Removal-Fill Permits.** The COE and DSL require permits to limit development in and around water bodies and mitigate the impacts of permitted projects. Under the Clean Water Act, dredge and fill activities affecting rivers, streams, wetlands, lakes, and bays must receive approval from the COE's 404 Permit. The National Marine Fisheries Service, US Fish & Wildlife Service, and Oregon Department of Fish and Wildlife also review the project's impact on fish and wildlife. The EPA also must provide certification under Section 401 of the Clean Water Act. EPA delegates this service to DEQ.

The DSL administers state Removal-Fill Permits under Oregon's Removal and Fill Law (ORS 196.800). This law requires authorization from the DSL for any activity that removes 50 or more cubic yards of material per year from state waters and/or places an equal amount into state waters. (Legislation is pending to require permits for 50 cubic yards or less within areas designated "essential fish habitat." This is discussed further in Chapter Four: Critical Habitats.) Any such activity must request a joint DSL/COE permit that regulates those (and other) activities mentioned below. Once issued, enforcement of Removal-Fill permits relies heavily on citizens and agency field staff, although the DSL does assign agency Resource Coordinators to each of their districts.

Some commonly regulated activities include bank stabilization projects (riprap, barbs), wetlands alteration (fill for development, dikes, tidegates etc.), and in-water construction (docks, pilings etc.) Criteria used for review include the project's impact on municipal water quality, shellfish beds, fishery areas, wildlife, and recreational areas.

Presently, these federal, state, and local agencies are in the process of updating Removal-Fill permits to identify and develop BMPs available to developers. Among other goals, these BMPs aim to heighten protection for salmonid habitat. An important piece of this effort will be to limit sediment loading from development sites.

Locally, the DSL and COE entered into an agreement with the ODFW and various aggregate producers to terminate all instream gravel removal from the Kilchis, Wilson, Trask, Miami, (and Nestucca) rivers, effective October 1997. Although this agreement has obvious water quality and habitat benefits, it is often criticized locally as a cause of increased flooding. This is discussed further in Chapter Five: Flooding.

**General Authorization Permits.** Under the Removal-Fill Law, DSL provides General Authorization (GA) Permits when wetland activities pose minimal environmental risk. The permit is distributed for signatures to relevant state resource agencies like ODFW, ODA, Water Resources Department, etc. and finally reviewed by DSL. The DSL is attempting to reduce sediment loading by revising its GA permits for road construction. Relevant revisions include increased emphasis on bridge construction instead of culverts, bioengineered streambank stabilization over structural stabilization, and provisions for road removal.

Law requires the DSL to notify local authorities and the general public when an application is submitted. An application can not be approved if it violates local statutes or the comprehensive plan. Most local statutes found in the Tillamook County Land Use Ordinance defer to state requirements, though may be more restrictive in specific areas.

In 1995, COE began authorizing general permits for fill activities that benefit, restore, and/or enhance wetland function. Known as “Nationwide Permits,” they minimize federal regulatory processes when DSL has already signed off on a project with a GA. It works in the same manner as a GA permit, with other Oregon land use agencies signing off on the project, and DSL providing final review. The DSL notifies COE when a permit is complete.

### **Highway Construction**

The Oregon Department of Transportation (ODOT) applies DEQ’s pollution discharge standards to a variety of projects, including construction projects that affect less than five acres. (The DEQ permits activities affecting more than five acres.) In addition to developing a statewide erosion control handbook, ODOT is also performing a culvert inventory, assessment, and remediation process for all state and county culverts in the coastal area.

## ***Progress on Phase II Recommendations***

The following section summarizes the success of management activities in effectively responding to past TBNEP management recommendations. These are found in chapter two (pages 23-25) of Phase II of the Base Programs Analysis.

### **Identification of problem areas**

Over the last few years, ODF has begun a major program to inventory, assess, and improve forest roads on state lands. Partnered with other state and federal agencies (including the TBNEP), ODF has spent roughly \$15 million dollars since May 1998. ODF's road program has yielded important information detailing road failures and threats of mass wasting throughout the watershed. The road inventory program will continue over the next several years and will be a focus of the Tillamook County Performance Partnership.

### **Management of riparian areas to control erosion and sedimentation**

The Tillamook County Performance Partnership will monitor on-the-ground restoration projects like riparian planting and fencing. The Tillamook Coastal Watershed Resource Center will organize riparian projects into a single database that will summarize the extent and status of riparian projects. Criteria for project assessments will likely include both the degree of project implementation (miles fenced, planted, or restored) as well as changes in major water quality parameters like dissolved oxygen, turbidity, temperature, etc. Centralizing monitoring efforts and project reporting should answer some of the concerns raised in Phase II of the Base Programs Analysis. These include recommendations regarding the effectiveness of present monitoring efforts, coordination of multi-agency projects, and the lack of a centralized project clearinghouse.

### **Public education**

This recommendation focuses primarily on the need for increased education of citizens on what constitutes a riparian violation and why riparian zones are important. The SWCD has been most involved in the education of landowners with regard to riparian functioning, but no other major efforts have been made in the basin. The TBNEP includes education initiatives within several CCMP actions addressing riparian enhancement.



## ***Recommendations for Critical Management Issues***

The following recommendations represent a significant degree of consensus among local resource managers, public officials, and the general public regarding deficiencies in the current management framework. Implementation of the recommendations will improve the management of sediment loading into the rivers and bay.

- Increase incentives for stewardship on private forest lands
- Research stability of steep slopes after harvests
- Improve lowland riparian zones
- Accelerate forest road closures

### **Increase incentives for stewardship on private forestlands**

In natural resource management, incentives often prove more effective in producing conservation and stewardship than disincentives like monetary penalties. Agriculture provides a good example of where incentive programs have successfully initiated shifts in on-the-ground resource management. Programs like the Conservation Reserve Program, Wildlife Habitat Incentive Program, and Wetland Reserve Program (all initiated under the 1996 Farm Bill) create incentives for agricultural landowners to conserve their resources for multiple uses (habitat, water quality etc.) The U.S. Forest Service and, to the extent financially possible, ODF should increase the financial incentives available to private landowners for reforestation.

Possible programs that could be offered include funding for riparian conservation (increased subsidies for keeping larger buffers than required under the FPA), increased monitoring and maintenance of forest roads, and increased maintenance and repair of culverts. In addition, any incentive programs that incorporate these and other initiatives should emphasize monitoring to insure government expenditures are getting the desired return. If incentive programs do not provide the expected outcomes, then the Board of Forestry should amend the FPA to require tighter restrictions on the conservation of riparian vegetation.

## **Research stability of steep slopes after harvests**

The ODF currently allows harvesting on state and private forests with lands greater than a 60% slope angle. Forested areas in the Coast Range that have a slope angle of 60% are often unstable. Because of this instability, further destabilization by forestry activities can increase the rate of landslides. Increased research is needed regarding the stability of steep Coast Range slopes after harvesting activities.

If research indicates a need to modify forest practices on steep slopes the following is recommended: 1) further refining of ODF methods and criteria to evaluate the risk of landslides, and 2) strengthening the FPA to require Level Three analysis (an approach used by the U.S. Forest Service) and mitigation for harvesting on coastal slopes greater than 60%.

## **Improve lowland riparian zones**

(See Chapter Four: Critical Habitat Recommendations)

## **Accelerate forest road closures**

Forest road failures are a major source of sediment loading into the rivers and streams of the Tillamook Bay watershed. The majority of failures result from roads that were not built according to today's more rigorous design standards. Many such roads were constructed during and after the series of fires known as the Tillamook Burn and are now more than a half-century old.

The ODF plans to decommission roughly fifty miles of failing forest management roads over the next ten years. Because old, poorly designed roads contribute a disproportionately high level of sediment, the Performance Partnership should make road closures a high priority and allocate funds accordingly. Although road closures are extremely costly, they provide a very high (and permanent) return on the investment with regard to reducing sediment loading.



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# Chapter 4: Critical Habitats

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## ***The Issue***

*Loss and simplification of key habitat and past and present fisheries practices have contributed to declines in salmonids and other aquatic and estuarine-associated organisms. Important riparian, instream, freshwater, off-channel, tidal slough, and estuarine habitats have been lost or degraded. Fishery practices include the management of natural production, hatcheries, and harvest.*

## ***Introduction to Management Framework***

The TBNEP considered a range of fish and wildlife habitats during the creation of the CCMP's critical habitat action plan. During the development of the CCMP, however, the TBNEP gave special attention to the decline of salmonids in the watershed. This occurred for two reasons. First, salmonids provide a good indicator of watershed health. Because of their complex life histories, wild salmonid populations indicate whether habitat protection and restoration activities positively impact ecosystems throughout the watershed.

Second, the crash of salmonid populations dominates natural resource policy in the Pacific Northwest. The decline of salmonids throughout the region is a crisis in social, political, economic, and ecological contexts. Because it is both an ecological and sociological imperative, TBNEP dedicates itself to the regional effort of restoring healthy salmonid populations. Like the CCMP, this chapter focuses primarily on critical habitats for salmonids.

## **Organization of this Chapter**

This chapter organizes management activities around two approaches. The first section of this chapter discusses policy approaches that conserve, improve, and/or protect salmonid habitats *watershed wide*. The second approach manages salmonid habitat based on a specific *land use or habitat type* and attempts to mitigate the negative impacts of that use on salmonid habitat. This chapter organizes these more focused policies around the habitat types and/or the geographic area in which salmonid habitat occurs (estuary, forest, wetland, etc.) As a final note, although water quality is a vital habitat component, this chapter does not discuss it in detail. For a review of water quality management activities, see Chapter Two: Water Quality and Chapter Three: Sediment and Erosion Control.

## **Major Activities**

The following agencies' activities impact salmonid habitats.

**NMFS:** Under the Endangered Species Act, the National Marine Fisheries Service lists marine species as threatened or endangered and supervises their recovery.

**ODFW:** Oregon Department of Fish and Wildlife sets harvest limits on recreational and commercial fisheries and provides technical assistance to agencies and the general public. They also play a major role in the implementation of the Oregon Plan for Salmon and Watersheds.

**DLCD and Tillamook County DCD:** The Department of Land Conservation and Development administers Oregon's Land Use Planning Program, which provides goals for the Tillamook County Department of Community Development to meet in their comprehensive land use planning process.

**COE:** The Army Corps of Engineers is presently conducting a feasibility study of potential flood mitigation and habitat restoration projects in the Tillamook Bay watershed. Challenge 21 may implement potential projects.

**Multi-agency:** The Northwest Economic Adjustment Initiative and its programs have produced a significant amount of habitat restoration within the watershed.

**NRCS and FSA:** Under the USDA 1996 Farm Bill, the Natural Resource Conservation Service and Farm Services Agency provide incentives for habitat conservation and protection.

**ODF:** Oregon Department of Forestry manages forest lands under the Forest Practices Act and is developing a Habitat Conservation Plan for state-owned forest lands. They also play an important role in implementing the Oregon Plan for Salmon and Watersheds.

## ***Basin-wide Habitat Regulation***

Resources that create salmonid habitat are generally managed based on a specific land use type. For example, riparian vegetation, which provides vital inputs to salmonid habitat, is managed differently on forested, agricultural, and other county lands. However, a few policies exist that transcend specific locales or land uses and provide regionally-based resource management. The most important include the management of threatened and endangered species and the regulation of recreational and commercial fishing.

### **The Endangered Species Act\* (NMFS and USFWS)**

In 1966, Congress passed the Endangered Species Preservation Act as a means to slow the loss of animal species to extinction. Subsequent amendments to the Act, passed in 1969 and 1973, added a new category of listing (“threatened”), expanded the Act’s scope to include flora, and prohibited the trade of protected species. The provisions included in these three pieces of legislation provide the bulk of the Act recognized today as the Endangered Species Act (ESA). Congress passed further amendments to the Act in 1978, 1982, and 1988.

The federal ESA is perhaps the most forceful piece of environmental legislation passed to date in the U.S. To a greater degree than any other environmental policy, it can restrict the utilization of private or public land due to a critical habitat designation. In the Tillamook Bay watershed, a federal listing of salmonids will likely result in reduced timber harvests from public and private lands, reduced recreational and commercial salmonid harvest, and a host of land use provisions aimed at protecting habitat and curtailing habitat degradation.

***Definitions.*** Section three of the ESA classifies an “endangered species” for protection when it *is in danger of extinction* within the foreseeable future throughout all or a significant portion of its range. A “threatened” classification is provided to a species *likely to become endangered* within the foreseeable future throughout all or a significant portion of its range.

***Governing Agencies.*** Under the ESA, the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service share responsibility for listing and overseeing the restoration of populations of threatened and

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\* This information has been adapted from the USFWS ESA web site (<http://www.fws.gov/r9endspp.endspp/html>)

endangered species. The NMFS oversees all ESA responsibilities for anadromous salmonids and other marine listings. The agencies' responsibilities include: deciding on and reviewing species' status; designating "critical habitats"; reviewing other agencies' activities and plans for compliance with the ESA; enforcing laws; and developing and reviewing species recovery plans. Oregon Department of Fish and Wildlife (ODFW) administers a statewide ESA that limits the activities of state agencies on state lands. Where overlap exists, the more restrictive federal ESA is enforced.

***Incidental Take Permits.*** An important provision of the ESA is the "incidental takings" clause. Section nine of the ESA prohibits the take of federally listed species without appropriate authorization. The ESA provides this authorization by issuing "incidental take" permits. An incidental taking is the "killing, harming, or harassment" of a federally listed species due to activities which are not aimed at disrupting the species and are otherwise lawful. Incidental take permits include the following:

- the amount (number of species) or extent (habitat loss) of anticipated take, if any;
- measures considered reasonable and prudent to minimize the take; and
- nondiscretionary terms and conditions to implement the reasonable and prudent measures, including the procedures used to handle or dispose of any individuals of the species actually taken.

***Habitat Conservation Plan.*** Application for an incidental take permit is subject to a number of requirements. One method is the preparation by the permit applicant of a conservation plan known as a Habitat Conservation Plan (HCP). Development of an HCP and application for an incidental take permit are voluntary; although, in the absence of appropriate authorization, no take can lawfully occur.

An HCP must specify the following:

- measures the applicant will undertake to monitor, minimize, and mitigate such impacts; the funding that will be made available to undertake such measures; and the procedures to deal with unforeseen circumstances;
- alternative actions the applicant considered that would not result in take, and the reasons why such alternatives are not being utilized;
- impacts likely to result from the proposed taking of federally listed species; and
- additional measures that NMFS may require as necessary or appropriate for the purposes of the conservation plan, such as an

Implementing Agreement that spells out the roles and responsibilities of all parties.

### **Fisheries Management (ODFW)**

In the face of dwindling salmonid stocks, ODFW must manage the state's wildlife to provide optimum wild populations of salmonids while enhancing the public's enjoyment of the resource. Reconciling these two demands—sustaining wild populations while also providing optimum abundance for public use—places ODFW in a difficult position. Salmonid populations are a function of numerous habitat components: predation, water quality, and trophic systems, for example. The ODFW, however, has little regulatory authority beyond the resource that they are charged with managing. Land use activities impacting salmonid habitats fall to the agency primarily in charge of the activity (ODA on agricultural lands and ODF on forest lands, for example.) The ODFW often advises these agencies on land use decisions, but the extent of their regulatory authority is to define harvest limits for recreational and commercial fisheries.

The Oregon Fish and Game Commission sets harvest limits every two years (although ODFW conducts an informal review yearly to insure that regulations meet federal requirements and for general “housekeeping” purposes.) The process actively involves the general public, who both review new regulations proposed by ODFW and propose their own. Whether initiated by the public or ODFW, proposed rule changes are reviewed first by the district(s) they impact. District staff review proposals primarily based on biological need or feasibility, enforceability, and simplicity or compatibility with existing regulations. The ODFW then ranks proposals into three categories based on level of agreement (everyone in favor, no agreement, or everyone opposes) and forwards them to the Oregon Fish and Game Commission. The Commission makes the final determination on all proposals.

### ***Basin-wide Habitat Enhancement and Protection Activities***

In addition to the basin wide regulatory approaches discussed above, many programs have emerged as critical contributors in the effort to restore salmonid habitat. Most notably, the Oregon Plan for Salmon and Watersheds (OPSW) defines roughly 100 measures for ODFW to undertake in assessing and restoring salmonid habitat. (Other agency activities under the OPSW are discussed later in this chapter.) In addition, programs like Jobs in the Woods, Hire the Fishers, and various restoration projects undertaken by private citizens have also been actively implemented throughout the watershed.



## **The Oregon Plan for Salmon and Watersheds (multi-partner)**

To prevent the need for federal restrictions imposed under the ESA, Oregon developed the OPSW as the tool to rebuild depleted salmonid stocks. (See Chapter One: Major Policies for a summary of the plan.) Accepted by NMFS as a viable plan to halt dwindling coho salmon (and later, steelhead trout) populations, NMFS temporarily delayed listing these two species under the ESA.

By “accepting” the OPSW, NMFS agreed to delay a federal listing for a period of two years, at which time the agency planned to review the progress made during the plan’s implementation. Since its passage, however, conservation groups have criticized the OPSW, claiming the plan relies too heavily on voluntary commitments and lacks the strength to reverse declining numbers of fish. (The OPSW depends heavily on coordination of state agency activities and, in the private sector, relies almost entirely on voluntary actions.) In June 1998, a federal magistrate ordered NMFS to immediately reconsider listing coastal coho, calling the agency’s decision to accept the OPSW “arbitrary and capricious.”

The following October, NMFS listed the coastal coho as threatened. Although it is too early to completely understand the long term ramifications of the listing, threatened status will certainly restrict activities previously allowed on public and private lands. In the short term, the listing may reduce restoration conducted by private landowners and also disrupt state funding available to watershed councils for habitat restoration activities. Despite the listing, Oregon continues implementation of the OPSW.

## **ODFW and the Oregon Plan for Salmon and Watersheds**

As discussed above, ODFW has little regulatory authority over salmonid habitat. Their role in *protecting* habitat is limited to assisting other agencies like ODF, DLCD, and the Tillamook County Department of Community Development during permit review processes, as well as educating and working with the general public on restoration projects. The OPSW does not expand the scope of ODFW’s authority but does organize and focus the agency’s activities around the task of salmonid restoration. Within the Tillamook Bay watershed, ODFW’s responsibilities under the OPSW focus primarily on physical habitat assessments/improvements and technical assistance.

***Physical Habitat Assessments and Improvements.*** The ODFW commonly works with volunteers like the Salmon Trout Enhancement Program and area watershed councils in conducting on-the-ground habitat restoration projects.

In the Tillamook Bay watershed, the agency's efforts include:

- habitat assessments and monitoring of stream conditions;
- habitat restoration activities and coordination of volunteer assistance;
- instream flow protection and the prevention of large woody debris removal;
- the development of a guide to project selection for fish enhancement; and
- predator management (cormorants).

**Technical Assistance.** Because ODFW is a non-regulatory agency, one of its primary functions is to act as consultant for state and federal agencies and the general public. In the Tillamook Bay watershed, it routinely reviews land use permit applications and project details. Common situations where ODFW assists agencies include forest operations, wetland dredge and fill activities, general construction and development, and instream work. Although ODFW permitting is rarely required for these operations, agencies and the public trust and rely on the scientific review process available there.

The ODFW also educates the general public in stream/watershed ecology and function. Examples of ODFW technical assistance and/or education activities include:

- promoting the use of beavers to restore Coho habitat;
- using hatchery carcasses to increase instream productivity;
- fencing livestock out of streams; and
- educating the public about fish needs and resources.

### **Challenge 21 (Army Corps of Engineers)**

As part of the federal Clean Water Action Plan, the Army Corps of Engineers seeks funding from Congress to initiate their Challenge 21 Program. Challenge 21 aims to mitigate the impacts of flooding while restoring wetland and riverine habitats. If implemented locally, Challenge 21 presents a significant opportunity to enhance basin habitats. Because it is primarily a flood control program, however, it is discussed in more detail in Chapter Five: Flooding.

### **Local Habitat Conservation Programs and Infrastructure**

Within the last several years, a number of important programs have emerged to restore degraded habitats in the Tillamook Bay basin. These range from federally sponsored programs that employ displaced natural

resource workers to the local development of a watershed resource center that provides GIS technical support and training.

***The Northwest Economic Adjustment Initiative*** originated from the President's Northwest Forest Management Plan and spawned the Jobs in the Woods and Hire the Fishers programs. The federal government created these programs to provide employment in habitat restoration for individuals displaced from natural resource-dependant occupations.

The Tillamook County SWCD has administered two Hire the Fishers projects since May 1995, the second concluding in December 1997. Over its two years, the program constructed roughly 37 miles of riparian fencing, 7 miles of off stream watering pipe, and other habitat-benefiting projects.

Jobs in the Woods employees worked with several agencies including SWCD, ODF, ODFW, and others. As a result of its widespread implementation, no summary information is currently available on the cumulative activities of the program. Many workers who trained under both programs continue to work today with SWCD stream enhancement crews.

***EDC Revolving Loan Fund.*** The Tillamook County Economic Development Council (EDC) administers the Ecosystem Investment Revolving Loan Fund. The EDC created the Loan Fund to support business start-ups by displaced timber workers who graduated from Northwest Economic Adjustment Initiative training. The Revolving Loan Fund allows EDC to provide money to those who often lack access to start-up capital. The EDC focuses funds on start up operations that foster the development of "ecosystems industries" and related activities.

***Tillamook Coastal Watershed Resource Center.*** The EDC, TBNEP, and Tillamook Bay Community College developed and operate the Tillamook Coastal Watershed Resource Center. 'The Center' is a Geographic Information Systems (GIS) center that supports eight GIS/ArcView-ready computers, a large database of GIS layers, and a state of the art plotter for the production of oversized maps. Its primary function is to provide resource assistance to the community and public agencies in order to foster environmental stewardship through education and technical support.

In pursuit of this, The Center will develop into a self-sustaining, regional center for watershed assessments, habitat restoration, and GIS. Specific objectives for The Center include:

- offering training in environmental (watershed) assessments, restoration, and computer mapping;

- providing technical assistance to local watershed councils and resource agencies;
- serving as a regional clearinghouse for land use information, including maps, photos, and digital imagery; and
- incubating small businesses and entrepreneurial efforts to serve the habitat assessment and restoration markets.

***Watershed Councils.*** The Tillamook Bay Watershed Council (TBWC) convened in 1997 and wrote their charter in early 1998. Like most watershed councils, TBWC will be active in streamside and habitat restoration projects. The Governor’s Watershed Enhancement board will likely provide funding for many of the restoration activities undertaken by the TBWC.

***Central Coast Land Conservancy.*** The Central Coast Land Conservancy is a relatively new land trust that seeks to acquire and manage lands within the Tillamook Bay watershed and other areas around Tillamook and Lincoln Counties. A nonprofit, tax exempt organization, their purpose is to hold (and restore, maintain, and enhance) for public benefit lands that “constitute the natural heritage of Tillamook” and other counties. The Conservancy’s focuses primarily on lands that contribute to critical wildlife habitats, although they also pursue lands with native plant communities, cultural/historic significance, and open space, recreational, and/or scenic areas. Acquisition techniques employed by the Conservancy will include donations, outright purchase, life estates, and easements.

## ***Habitat Management in the Estuary, Sloughs, and Intertidal Zones***

Critical salmonid habitat issues in the estuarine zone (open water areas, shallow subtidal and intertidal zones, beaches and riparian vegetation) include degraded water quality, impaired eelgrass beds, and reduced woody debris. Most of the habitat management activities in the estuary and intertidal lowlands revolve around improving water quality. These activities are summarized in Chapter Two: Water Quality. Management activities involving habitat elements other than water quality include estuary management by DLCD and the Tillamook County Dept. of Community Development.

### **State Land Use Planning (DLCD)**

As part of the Oregon Land Use Planning Program, DLCD administers Goal 16: Estuarine Resources “to recognize and protect the unique environmental, economic, and social values of each estuary and associated

wetlands [and to protect, maintain, develop, and restore the benefits of Oregon’s estuaries.]” Goal 16 provides for the management of estuarine habitats in three ways:

- Under OAR 660-17, the Statewide Land Use Planning Program establishes a coastwide classification system to maintain diversity among the state’s estuaries. The classifications include natural, conservation, shallow draft development, and deep draft development. Tillamook Bay is classified as a shallow draft development estuary, which is defined as “[an estuary] with maintained jetties and a main channel maintained by dredging at 22 feet or less.”
- Individual estuary plans designate appropriate uses for management units within each estuary classification. These units and the management of each are summarized in the ‘Tillamook Bay Zoning’ section below.
- Local plans must provide for review of estuarine alterations to assure that they are as compatible as possible with the protection of estuarine values, including habitat.

Under the Oregon Plan, DLCD will identify estuarine restoration opportunities by assisting local governments in amending their estuary management plans. The DLCD also aims to identify diked tidelands which are suitable for restoration of estuarine function and habitat. Likewise, they will inventory and assess all of the potential restoration sites in Oregon. Because the Tillamook Bay watershed is extensively diked, such activities could have a very direct impact on salmonid-habitat improvement efforts throughout the lower watershed.

### **Tillamook Bay Zoning (Tillamook County)**

The Tillamook County Comprehensive Plan establishes the long range plan for management of the estuary. Despite the bay’s classification as a “development” estuary, the plan establishes habitat conservation methods aimed at the long-term stability of the bay’s resources. The plan is carried out through the ordinances that govern the bay (contained in the LUO) and the land use map that designates much of the bay as “estuary natural.”

As mentioned, Oregon classifies Tillamook Bay as a ‘shallow draft development estuary’ under its land use planning system. Under this classification, Section 3.1 of the Tillamook County LUO implements the following estuary zoning classifications:

***Estuary Development (ED).*** ED areas are “designated for navigational and other water-dependent commercial, industrial or recreational uses.” Habitat features are considered to be minimal. This zone is only found in and around development near the Bay.

***Estuary Conservation 2 (EC2).*** EC2 areas “provide for long-term use of renewable resources that do not require major alterations of the estuary except for purposes of restoration.” Habitat areas are recognized as partially altered and do not qualify for inclusion in EC1 or EN.

***Estuary Conservation 1 (EC1).*** EC1 areas are designated to “1) provide for long-term utilization of areas which support, or have the potential to support valuable biological resources, and 2) provide for long-term maintenance and enhancement of biological productivity and aesthetic values.” EC1 areas possess significant habitat values in the forms of tidal marshes, tideflats, seagrasses, and algae beds. This zone comprises much of the interface between terrestrial and aquatic habitats.

***Estuary Conservation Aquaculture (ECA).*** “The purpose of the ECA Zone is to promote the continuing utilization of designated shellfish culture areas, while providing for low-intensity, water-dependent recreation, commercial and recreational fishing and crabbing.” Habitat values are recognized as high and are protected for “scientific, research or educational purposes.”

***Estuary Natural (EN).*** EN areas are designated to “provide for preservation and protection of significant fish and wildlife habitats and other areas which make an essential contribution to estuarine productivity or fulfill scientific, research or educational needs.” Most of Tillamook Bay is classified EN except for a significant tract of ECA in the Main Bay and ED zones near urbanized areas.

### **Habitat in the Sloughs**

As part of the estuary, slough habitats also fall under Statewide Planning Goal 16. However, because most sloughs in the basin run through agricultural lands (pastures), Tillamook County does not regulate much of their range due to an exemption that exists for agricultural land uses from statewide land use regulations. (This is discussed below.) Presently, many sloughs suffer from low levels of dissolved oxygen, elevated temperatures, bacterial contamination, and reduced large woody debris. Like rivers that run through agricultural lands, TBNEP supports measures in the North Coast Basin Water Quality Management (SB 1010) Plan that will restore slough habitats.

## ***Riparian Habitat Management***

Properly functioning vegetated riparian zones contribute several critical salmonid habitat benefits including bank stabilization, large woody debris, stream shading, and others. Management of riparian habitats varies based on land uses.

### **Statewide Regulations (DLCD)**

Goal Five: Open Spaces, Scenic and Historic Areas, and Natural Resources of Oregon's Land Use Planning Program provides clear goals and guidelines for the management of the state's riparian zones. In October 1996, DLCD revised Goal Five, increasing the riparian buffers required on Oregon's streams. In the revisions, DLCD also promoted measures that prohibit riparian degradation due to vegetative removal, paving, urban and rural construction/development, and structures on forest and agricultural lands. These amendments will provide salmonid habitats in the Tillamook Bay watershed through the adoption of stronger provisions in local plans and ordinances.

### **Local Regulations (Tillamook County DCD)**

The Tillamook County Land Use Ordinance (LUO) implements the goals contained in the State Land Use Planning Program. Presently, the LUO defines riparian zones as areas within 50 feet of estuaries, lakes larger than one acre, and the main stems of several rivers where widths are greater than 15 feet. Within the watershed these include the Tillamook, Trask, Kilchis, Wilson, and Miami. Other rivers within the watershed that are not included but still reach at least 15 feet in width are designated 25 foot riparian zones, and all other perennial streams are designated 15 foot riparian zones.

Because of DLCD's Goal Five revision, the LUO will have to incorporate these requirements by the county's next periodic review, due around 2003. Specifically, the 50 foot buffers that the Ordinance now requires will be expanded to 75 feet, and the 25 and 15 foot buffer requirements will both be expanded to 50 feet. The county will likely adopt an updated ordinance well before the state's 2003 deadline.

The LUO prohibits development within the riparian zones, except for bridges and water-dependant uses. Exemptions to reduce the riparian setback (the area where development is prohibited) may be granted in certain areas where pre-existing lots are not large enough to provide a reasonable building envelope when the riparian setback is applied. Exceptions to the riparian setback can also be allowed if the county

determines that either the natural features allow a smaller riparian area to protect equivalent habitat values or that an area is so degraded that additional development will have minimal negative impact.

In addition to restricting development, the LUO also limits removal of riparian vegetation by prohibiting removal of any trees, or more than 50% of the understory vegetation within the riparian area.

### **ODA and ODF Exemptions**

Goal Five of the Oregon Land Use Planning Program mandates local governments to develop enforceable ordinances protecting riparian vegetation and the stability of riparian zones. As discussed above, the LUO implements the standards required by the state. However, the county does not apply these standards on agricultural or forest lands.

Although Goal Five provides the authority for local riparian ordinances to affect agricultural lands, county governments (including Tillamook) effectively yield this authority to ODA under SB 502. The legislature drafted Senate Bill 502 after the passage of SB 1010 to clarify the role of ODA in managing water quality on agricultural lands. Senate Bill 502 gives ODA exclusive authority to develop and implement any program or rule (like SB 1010) that regulates farming practices for the purpose of protecting water quality. No other agency can directly regulate *farming practices*, although the county can still regulate the placement of structures on agricultural lands.

Likewise, lands zones for forest uses do not fall under the LUO. Under ORS 527.630 (3), the state of Oregon recognizes “the State Board of Forestry’s exclusive authority to develop and enforce statewide and regional rules...and to coordinate with other state agencies and local governments which are concerned with the forest environment.” As a result, the Forest Practices Act provides all regulations and management provisions pertaining to riparian zones on non-federal lands zoned for forest use.

The following sections discuss specific riparian management measures established for riparian zones on agricultural and forest land.



# ***Habitat Management on Agricultural Lands***

Both ODA and USDA work with farm operators to improve wildlife habitat on agricultural lands. The USDA provides incentives to restore habitat under the 1996 Farm Bill. The ODA's habitat improvement efforts focus primarily on improving water quality under SB 1010 and the CAFO inspection process.

## **ODA and the Oregon Plan: Improved Riparian Habitats and Water Quality**

Historically, ODA has done little to promote agricultural practices that emphasize the conservation of riparian vegetation. Today, however, under the Healthy Streams Partnership and Senate Bill 1010, ODA is dedicated to enhancing riparian zones and improving water quality on agricultural lands. Agricultural managers will focus these policies locally through the development of farm management plans that must comply with the North Coast Basin (SB 1010) Water Quality Management Plan currently under development. Under the riparian management measures established in this plan, riparian areas throughout the lower watershed should improve over the long term. Similarly, increased attention to the CAFO inspection process will also improve riparian habitats and maintain water quality.

Because SB 1010 and the Healthy Streams Partnership are foremost water quality management tools, they are discussed in Chapter Two: Water Quality.

## **Habitat Restoration Incentive Programs**

Under the USDA Farm Bill, the federal government initiated several programs to improve habitat on agricultural lands. In addition to those conservation incentives discussed in Chapter Two, NRCS and FSA also administer the Wildlife Habitat Improvement Program and Wetlands Reserve Program.

***Wildlife Habitat Improvement Program.*** As part of the USDA's 1996 Farm Bill, NRCS administers the Wildlife Habitat Incentive Program (WHIP). The WHIP is a voluntary, incentive-based approach to help private landowners improve fish and wildlife habitat. Under WHIP, landowners create and implement habitat improvement plans with technical assistance from the NRCS. The FSA shares up to 75% of the implementation costs (sharing a maximum \$10,000) through what is commonly a ten year contract between USDA and the landowner.

WHIP has not been significantly utilized within the watershed. This is primarily due to a very small allocation of funds to the North Coast Basin.

***Wetlands Reserve Program.*** The Wetlands Reserve Program (WRP) works similarly to the Conservation Reserve Program. Instead of protecting significant riparian buffers, the WRP establishes 30 year or permanent conservation easements to protect important wetland areas. The FSA also provides cost sharing for restoration if an operator does not want an easement.

## ***Habitat Management on Forest Lands***

Riparian Management Areas (RMAs) provide the most critical salmonid habitat management measures established by the Forest Practices Act (FPA). The ODF released the Draft Northwest State Forest Management Plan and Draft Western Oregon State Forest Habitat Conservation Plan (HCP) in April 1998. Increased protection of riparian and aquatic habitats constitute important provisions of both plans. The OPSW also commits ODF to improving salmonid habitat on forest lands.

### **The Forest Practices Act: Riparian Management Areas (ODF)**

The FPA establishes RMA widths under OAR 629-635-300 “to provide adequate areas along streams, lakes, and significant wetlands to retain the physical components and maintain the functions necessary to...meet the protection goals for water quality, fish, and wildlife.” The FPA dedicates a great deal of attention to RMAs and establishes a range of rules. These rules primarily dictate the amount of vegetative retention (trees kept) required on a unit of a land to attain the desired condition of that land. Like the amount of trees that need to be retained, the desired condition will vary depending on factors like stream type (presence or absence of fish, use as drinking water etc.), stand type (hardwood or conifer), and geographic area (the state is divided into seven zones.)

Because of the breadth of rules established by the FPA with regard to RMAs in different areas, this document will not go into detail about specific requirements. On the following page **Table 4-1** summarizes the RMA widths for each stream type.

**Table 4-1  
RMA Widths\* for Streams of Various Sizes  
and Beneficial Uses**

<b>Water Body**</b>	<b>Type F</b>	<b>Type D</b>	<b>Type N</b>
<b>Large</b>	100 feet	70 feet	70feet
<b>Medium</b>	70 feet	50 feet	50 feet
<b>Small</b>	50 feet	20 feet	See OAR 629-640-200

\*See OAR 629-640-200

\*\*Type F=Fish Bearing Stream, Type D=Domestic Water Use, Type N=Non fish-bearing  
Source: Forest Practices Act (OAR 629-635-310)

### **Western Oregon State Forest Habitat Conservation Plan (ODF)**

The ODF developed the April 1998 Draft Western Oregon State Forests Habitat Conservation Plan to meet the incidental take requirements of the ESA. The Draft HCP states that its objective for riparian habitat is to manage riparian areas in a manner that:

- maintains or restores properly functioning aquatic habitats and achieves specific objectives for aquatic habitats over time;
- contributes to habitat needs of riparian obligate species;
- contributes to the maintenance of habitats for terrestrial species by complementing and linking to upslope habitats; and
- contributes to the timely recovery of species identified as sensitive, threatened, or endangered.

In the Draft HCP, ODF proposes to achieve these objectives through strategies that “retain a substantial number of large diameter trees along Type F and Type N streams, and maintain and restore riparian functions through silvicultural practices where appropriate.”

### **ODF and the Oregon Plan**

The ODF has a major role under the OPSW. Statewide, they are responsible for 60 actions under the initial CSRI, a number which increased with the steelhead supplement. Throughout the watershed, ODF’s Oregon Plan measures may be summarized into four types of activity: instream and streamside restoration, environmental assessments, operational changes, and road maintenance.

**Restoration.** Simplification of river systems has dramatically reduced habitat for juvenile and adult salmonids. In the uplands, ODF is involved in the following restoration activities:

- converting alder dominated riparian zones to conifer;
- placing coarse woody debris in rivers; and
- providing technical assistance to private landowners on riparian habitat restoration work.

**Environmental Assessments.** Under the OPSW, ODF is also conducting an increasing number of environmental assessments to better understand the condition and use of the upper watershed by salmonids. The ODF conducts the following environmental evaluations within the Tillamook Bay watershed:

- stream habitat assessments;
- fish passage evaluations (and review of updated fish passage design criteria);
- fish presence/absence surveys and population assessments; and
- riparian management review, focused on the effectiveness of RMAs in providing coarse woody debris.

**Operational Changes.** Under the OPSW, ODF has revised many of its practices in order to protect salmonid habitat. Significant operational changes adopted by ODF include:

- additional conifer retention along fish bearing streams in core salmonid habitat areas;
- placement of large woody debris during forest operations;
- increased riparian protection during forest operations under the FPA;
- incentives to private landowners for large woody debris recruitment; and
- improved best management practices on stream crossing structures.

**Road Maintenance.** The OPSW places a high priority on maintaining and upgrading forest roads. Because it is primarily a sediment-related activity, road maintenance is discussed at length in Chapter Three.

## ***Progress on Phase II Recommendations***

The following section summarizes the success of management activities in effectively responding to recommendations found in Phase II of the Base Programs Analysis. These are found in chapter three (pages 32-34) of Phase II.

### **Improve fish counting methods**

ODFW uses the same random stratified counting technique as it did when the Phase II Analysis came out. This method is widely held to be an accurate method of counting spawners and is a great improvement over the index stream method (sampling the same spots each year) used up until the early 1990s. The Phase II Analysis calls for more extensive monitoring by ODFW. As this is tied strictly to funding, it is doubtful that ODFW will be able to increase monitoring without a significant budget increase or reallocation of existing funding.

### **Coordinate watershed restoration and habitat enhancement work**

At the time the Phase II Analysis was written, no coordinating body existed for environmental restoration work. Since this recommendation, the Tillamook County Performance Partnership has developed to provide coordinated resource management and integrated decision making on restoration goals and strategies.

***Coordinating Projects.*** The Performance Partnership aims to increase the efficiency with which money is allocated to environmental restoration and increase the accountability of local agencies. An important element of this effort is collaboration among the entire resource management community on project prioritization and allocation of available funds. By prioritizing work and allocating funds, the Performance Partnership serves as a coordinating body for much of the restoration work taking place in the Tillamook Bay Basin and Tillamook County.

***Monitoring.*** The Performance Partnership will also focus on monitoring the implementation and outcome of its restoration projects. Because accountability is a critical element of a Performance Partnership, the monitoring results will be available in a centralized location, the Tillamook Coastal Watershed Resource Center. Using GIS, the Performance Partnership hopes to establish a regularly updated online monitoring database. Managers will design and report monitoring results according to the Oregon Benchmarks, which will improve federal, state, and local coordination.

## **Public education on fish and wildlife habitat issues**

With the passage of the Oregon Plan and presence of the TBNEP, public education has likely improved over the last several years. However, although many agencies do have educational programs regarding habitat issues, no comprehensive environmental educational program exists in the basin. Again, the Performance Partnership appears to be the most likely solution to this problem. This chapter discusses education further in the 'Recommendations' section below.

## **Alternative land ownership options for habitat protection**

Little land has been set aside in the watershed through easements or other land acquisition strategies. However, the TBNEP recommends in the CCMP adopting a local land trust and putting increased funding into reserve programs like those offered through the 1996 Farm Bill (Conservation Reserve Program and Wetlands Reserve Program.) Local agencies certainly recognize the benefits of setting land aside for habitat conservation purposes. Unfortunately, lack of both landowner interest and available money for land purchasing makes such efforts very difficult. Lands have been purchased in both north and central Tillamook County under U.S. Fish and Wildlife and other programs, however. It is likely that with continued efforts by land trusts and resource agencies like the NRCS, over time some lands in Tillamook County will be set aside for habitat.

## ***Recommendations for Critical Management Issues***

The following recommendations represent a significant degree of consensus among local resource managers, public officials, and the general public regarding deficiencies in the current management framework. This chapter presents the following recommendations to improve the management of critical salmonid habitats:

- Improve education
- Improve protection of riparian zones
- Improve government incentive programs
- Maintain TBNEP subcommittees under the Performance Partnership

### **Improve education**

As stated above in response to the recommendations contained in Phase II of the Base Programs Analysis, no comprehensive programs exist to educate the general public with regard to habitat conservation. Various agencies and organizations sponsor restoration events and/or undertake public outreach activities, but at this time no broad-based effort exists. The Performance Partnership can change this.

The Performance Partnership should adopt environmental education as a priority and pursue projects dedicated to educating the community about resource conservation. By bringing all of the land use and resource agencies to the same table, the Performance Partnership provides a unique forum to design and finance a “curriculum” that targets education efforts at high priority habitat issues.

Currently, the Performance Partnership may have one such opportunity. Although the group focuses on on-the-ground restoration, a large and reputable private foundation that focuses on education appears to have interest in linking education to the Performance Partnership. Currently, the Performance Partnership has not solidified a project, but discussions have begun regarding how to link the goals of the Performance Partnership with the educational opportunities presented by the foundation. This foundation may offer the opportunity for the Performance Partnership to incorporate education with many of its habitat-related activities. Because individual behavior can only change for the long term through education, the Performance Partnership should make this foundation’s involvement a priority.

## **Increase Protection of Riparian Zones**

Particularly in the agricultural and urbanized areas found in the lower watershed, riparian degradation is an important contributor to degraded water quality, increased sediment loading, and reduced salmonid habitat. The regulatory framework's failure to conserve lowland riparian zones is a complex issue involving local and state policies.

***SB 1010 and Agricultural Lands.*** Within the Tillamook Bay basin, the most manifest riparian degradation exists in the lowland areas, particularly on agricultural lands. As discussed earlier in this chapter, historically ODA has placed little emphasis on promoting policies aimed at the conservation of vegetation in riparian zones. Under the Oregon Plan, however, ODA now commits to restoring functioning riparian zones through the implementation of SB 1010.

Throughout the planning phase, both TBNEP and the North Coast Basin SB 1010 Advisory Committee wrestled with the most effective and feasible riparian restoration approach. One alternative promoted mandatory buffer widths on agricultural lands similar to those established on forest lands under the FPA and other lands under the county LUO. The second recommended variable riparian widths on a parcel of land that changed across the landscape based on factors like drainage, slope, habitat potential and so on. Because of many factors, most notably the potential public outcry from the agricultural community due to loss of productive land, both plans promote the variable approach.

The management of this approach poses important issues that must be worked out prior to the passage of the North Coast Basin Agricultural Water Quality Management Area Plan. First, the local dairy industry does not provide enough cream to support the local creamery. As a result, the industry can not support any policy that removes yet more land from production. Using variable riparian buffers without an established minimum puts local managers and landowners in the difficult position of meeting the required conditions established under the North Coast Basin Plan and not compromising local dairy production.

Because of the inherent flexibility afforded to riparian management on agricultural lands under SB 1010, effective enforcement appears to be an issue. The primary virtue of the minimum standards imposed under the LUO and Forest Practices Act is the ease of enforcement. The variable buffer widths that ODA will establish in the North Coast Basin Plan do not provide this. Although the basin plan will establish enforceable conditions, these may not link effectively with on the ground conditions. Therefore, it is critical that the North Coast Basin (SB 1010) Plan create very explicit and enforceable prohibited riparian conditions and devise an



enforcement process that insures farm operators implement their farm management plans.

Ultimately, the question of riparian enforcement revolves around the fact that, at present, there is no clear delineation of enforcement authority. Full scale implementation of SB 1010 relies on the implementation of individualized farm management plans. Time will demonstrate the effectiveness of this approach. If, over time, farm management plans are not being implemented or their implementation proves ineffective with respect to riparian “health,” ODA will have to both bolster their riparian policies to better meet Goal Five requirements and improve enforcement. Both of these scenarios highlight the need for increased cooperation with Tillamook County Department of Community Development (DCD).

SB 502 establishes that only ODA shall develop rules that directly regulate farming practices. As a result, Tillamook County has had little involvement in the inspection or enforcement of agricultural riparian violations. Because SB 1010 has not established that ODA will have the manpower to effectively enforce riparian violations, alternative enforcement procedures should be developed. One potentially effective enforcement approach involves a cooperative agreement between DCD and ODA officials to share inspection and enforcement procedures. Because it has established trust with area farm operators, ODA should handle farm inspections. Where riparian violations are found, the county should provide enforcement as they do on many other lands throughout the county.

As a final note, if results do not appear over time, the state should consider adopting an Agricultural Practices Act similar to the Forest Practices Act. Due to a lack of public outcry that often results from timber harvests, the agricultural community has not endured the same public scrutiny as the forest industry. As a result, the agricultural industry has not been regulated to the same degree. If, over the long term, agricultural practices continue to degrade water quality and other habitat parameters, they will have to be regulated with greater efficacy.

***Tillamook County and Riparian Violation Enforcement.*** Although established guidelines exist for how much riparian vegetation must be retained on non-agriculture and forest lands, violations of these guidelines occur frequently throughout the watershed. Enforcement of riparian violations fails on two points. First, staffing is inadequate. The DCD has one enforcement officer who is responsible for seeking compliance and issuing citations. This officer only works part time with the DCD as he also enforces codes for the health and public works departments.

Second, the penalty imposed on a violator does not meet the ecological cost of lost riparian habitat. The benefits a landowner derives from clearing riparian areas (e.g. providing a view of a river or more open space) far outweigh the nominal costs associated with the violations (\$100–250 fine). In addition, the policy of the DCD has been to obtain compliance and spread awareness of the regulations. As a result, those who violate riparian regulations have typically been given an opportunity to come back into compliance before they are cited. However, leeway in imposing citations depends upon the severity of the violation.

***Education of Judiciary.*** Although DCD has emphasized awareness and compliance, riparian violations have become flagrant enough and common enough to prompt the department to step up its pursuit of monetary penalties. Unfortunately, the local judiciary does not recognize the importance of riparian vegetation, and often times the cost of prosecuting a riparian violation is greater than money received from the penalty. Because the DCD often loses money in pursuing riparian violations, it is critical for the county or other representative(s) to educate the local judiciary regarding the importance of riparian zones. The judiciary has responded favorably to levying larger penalties for more blatant environmental crimes like harvesting wild coho and illegally dumping toxins into the water. If they are made aware that riparian violations are perhaps even more damaging environmental offences, they would likely respond with penalties that better fit the crime.

***Public Education.*** Property owners who buy land with riparian areas need to know these regulations prior to purchasing. Improved information on what can and cannot be done in riparian areas, as well as clear information on the risk of owning riverfront property, must become a standard element of buying land along waterways. The Tillamook County Soil and Water Conservation District is sponsoring a video for homebuyers along rivers. This video will explain the importance of riparian zones and the regulations governing their protection. It should be distributed to homebuyers along waterways.

### **Improve government incentives under NRCS programs**

The USDA programs do not provide adequate resources to meet the needs of area farm operators. First, funding is extremely competitive with other NRCS basins throughout Oregon. Only one WHIP contract was financed, for example, in Tillamook County (an it was outside of the Tillamook Bay basin.) Second, the current North Coast Basin NRCS staff is not adequate to take advantage of labor-intensive incentive programs. The local NRCS devotes most of its resources to implementing EQIP. Third, under USDA/NRCS lease and technical assistance programs, incentives usually do not provide adequate compensation for the lost pasture (and other agricultural) land. CRP is the best example of this.

The Performance Partnership was developed around the concepts of breaking down institutional barriers and funneling resources into areas where they are most in need. Working directly with landowners, the NRCS is “on the front line” of environmental resource management. As a result of the trust that they have built up with landowners and the vital programs that they are charged with managing, NRCS is in an opportune position to improve habitats on and around agricultural lands. However, without necessary funding they can not implement the programs that will help the community restore habitats and reach the goals of the CCMP. The Performance Partnership should, therefore, make an effort to route increased resources into NRCS programs and staffing.

### **Maintain TBNEP subcommittees under the Performance Partnership**

The Performance Partnership is an innovative approach to resource management. It invites all of the county’s natural resource stakeholders (including the general public) to the same table to prioritize, finance, implement, and monitor resource management programs and projects county-wide. A stated objective of the Partnership is to implement the CCMP. Because of its broad scope, however, the Partnership also plays a major role in the implementation of other major programs like SB 1010 and TMDLs. Because of National Estuary Program requirements, the CCMP must take into account these environmental programs and incorporate them into recommended actions. As a result, the Partnership’s broad focus should not pose a problem to CCMP implementation.

Despite this, the Partnership should maintain TBNEP institutions for the purposes of monitoring CCMP implementation. Because of the basin’s unique qualities and problems, the CCMP makes specific recommendations that, in some cases, may not be applicable to other areas in the county. It is critical that these localized actions are not “lost in the shuffle” of county-wide project prioritization. The best way to safeguard against this is to maintain the TBNEP subcommittees and require them to meet at regular (yearly or bi-yearly) intervals to track implementation of their section of the CCMP. After meetings, subcommittees should report back to the Stewardship Council updating the Partnership on the status of CCMP implementation.

This will provide many benefits. Most importantly, because subcommittees are comprised of many resource management professionals in a particular field (water quality, habitat etc.) members can champion the actions. As such, they can continue to identify funding opportunities, coordinate implementation, measure progress, acknowledge regulatory changes, and redirect actions where necessary. In short, maintaining the subcommittees and integrating them into the institutional fabric of the Partnership will insure effective and timely implementation of the CCMP.



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# Chapter 5: Flooding

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## ***The Issue***

*The interaction of human activities with dynamic natural systems has increased the magnitude, frequency, and impacts of flood events. These events affect water quality, cause erosion, imperil fish and aquatic wildlife, damage and destroy property, and threaten life.*

## **Introduction to Management Framework**

Unlike the other priority problems addressed by TBNEP, flooding is an event—identifiable and relatively discrete. It is not a constant problem, but an ongoing concern as it poses a threat to life and property during many months of the year. The TBNEP added flooding as a priority problem in early 1998, roughly two years after one catastrophic flood event occurred; this was known locally as the ‘Great Flood of 1996.’

The flood of 1996 shocked much of Tillamook County into action. The response from both the public and private sector has been swift and committed to insuring that the county is better prepared for future flood events. Efforts at preparing for the next flood focus on both a proactive approach—what can be done to mitigate the impact of future flood events—and the reactive—how can the community better respond after the next flood hits. This chapter summarizes the management measures to mitigate both flooding and the economic and environmental damage it causes.

## Major Activities

The agencies and policies discussed include the following:

***Tillamook County:*** Tillamook County's Land Use Ordinance outlines special regulations for development within a floodplain. The county also wrote the *Tillamook County Flood Hazard Mitigation Plan* after the flood of 1996.

***Flood Group:*** The Tillamook County Flood Control Group is a citizens' group that is working to mitigate the impacts of flooding in the county.

***Flood Insurance:*** The National Flood Insurance Program insures property located in flood prone areas throughout Tillamook County.

***USCOE:*** The US Army Corps of Engineers is studying the basin to find ways to reduce flooding in and around Tillamook City. The COE may undertake flood mitigation projects under the Challenge XXI Program.

***FEMA:*** The Federal Emergency Management Agency selected Tillamook County to participate in its disaster resistance program called *Project Impact*.

## ***Regulatory Approaches and Local Planning***

Since the flood of 1996, Tillamook County has focused increased attention on flood mitigation. In addition to existing ordinances found in the Tillamook County Land Use Ordinance (LUO), the county has also adopted a flood mitigation plan and been designated a disaster resistant community by the Federal Emergency Management Agency (FEMA) under Project Impact. The Tillamook County Flood Control Group also emerged after the flood and is active in developing flood mitigation projects and pursuing flood assistance programs.

### **Tillamook County Land Use Ordinance (DCD)**

Section 3.060 of the Tillamook County LUO contains standards for development in flood prone areas. The LUO contains a Flood Overlay Zone, which restricts or prohibits development (including structures and fill) in designated flood-prone areas. The FH Zone restricts any uses that threaten community health and safety as a result of flood or erosion and requires flood damage protection for uses within the zone. The FH Ordinance also regulates the alteration of floodplains and the construction or alteration of barriers to flood water within the Overlay Zone. Finally, the Land Use Ordinance also requires structures within the zone to have the first floor at least one foot above the required 100 year flood elevation, although in some areas, three feet is required.

The LUO applies stricter standards to designated floodways, although at this time no floodways have been established in the watershed. The LUO has jurisdiction only in unincorporated areas of the county.

### **Tillamook County Flood Hazard Mitigation Plan (Tillamook County)**

Completed and adopted by Tillamook County in October of 1996, the Tillamook County Flood Hazard Mitigation Plan (FHMP) aims to “reduce the environmental and economic impacts of flooding as well as the long-term costs of flood control and floodplain management.” A non-regulatory document, the plan recommends:

- structure relocation and elevation projects;
- structural capital improvements;
- increased maintenance and monitoring of projects;
- increased floodplain and river planning;
- increased flood hazard education;
- improved flood warning and emergency response systems; and
- increased intergovernmental cooperation.

Many of the specific recommendations found in the categories above highlight what is already widely known and accepted. However, the plan makes several recommendations that rely on the latest and best understanding of flood mitigation efforts. The most innovative policies discussed in the plan include structure relocation, new design standards for capital improvement projects, and improved coordination with neighboring county and city governments.

***Relocation projects.*** Arguably the most groundbreaking policy recommended in the plan is for the relocation or elevation of homes and structures located in flood-prone areas. The county views relocation as a viable way to reduce long-term flood damage because it provides a one-time expenditure. Also, since it is federally supported, FEMA will provide funding for decades to pursue relocation projects. FEMA and the Office of Emergency Management have provided most of the funding for relocation projects to date.

***Structural improvement and improved design standards.*** An extensive system of dikes and levees controls flooding in the lower watershed, dividing it into a mosaic of independent diking districts. Many of these structures are old (and some are failing) and require constant maintenance. This makes diking districts good candidates for the implementation of new design standards through either retrofitting or complete rebuilding.

Proponents of structural improvements may have to convince diking districts, however, as many of the districts may not be receptive to new design initiatives. If the districts approve structural changes, new design methods which are likely to be implemented include: increased use of soil biostabilization instead of riprap, set back levees that increase channel capacity during flood events, over-bank channels, and vegetative benches along the river which could also improve habitat.

***Improved intergovernmental coordination.*** This policy area focuses on improving the manner in which governments recognize the inter-jurisdictional nature of floods and floodplains. Although inter-county relationships would not impact the watershed (the Tillamook Bay basin does not share a county boundary in the lower watershed) improved coordination with cities, most notably Tillamook, would benefit flood mitigation efforts.

## **The Tillamook County Flood Control Group**

The Tillamook County Flood Control Group established themselves after the Flood of 1996. Strictly a citizens' group with no formal political authority, the group's mission is to reduce the occurrence of major flooding and mitigate the economic impacts of major events. Much of the



initial efforts of the Flood Group focused on dredging as the primary flood reduction tool. However, after discussions with the Corps of Engineers (COE) and other agencies, the Flood Group recognizes the limitations of dredging as short term and not cost effective. As a result, they actively explore other means of flood mitigation and damage reduction. Examples include flood preparedness exercises, public education, opening of sloughs, selective dike breaches, and other efforts.

In 1998, the Flood Control Group sought to establish a Flood Control District that could collect taxes and apply for grants for flood mitigation work. A major motivator for this was the group's interest in contracting with the COE on projects and raising money to provide matching funds. Because the Flood Group was not able to establish an adequate mill rate under a Tillamook County Soil and Water Conservation District taxing ballot, the idea was shelved. Many members of the group still hope to establish a self-supporting taxing district.

## ***Federal Assistance***

Because of county government and civic efforts at flood mitigation, the federal government implements several flood mitigation policies in the county. Specifically, the National Flood Insurance Program, COE studies, and Project Impact all focus federal funds toward local mitigation efforts.

### **Federal Flood Insurance (FEMA)**

By adopting and enforcing the Flood Hazard section of its LUO, Tillamook County qualifies for federal flood insurance under the National Flood Insurance Program (NFIP). Established by Congress in 1968, the NFIP offers flood insurance to private landowners and disaster assistance to local governments.

Because of the Flood Hazard Mitigation Plan, Tillamook County takes advantage of an incentive offered by the NFIP for communities that exceed the minimum requirements for flood insurance. Tillamook County's high NFIP rating provides significant discounts to policy holders in Tillamook County. In 1997, NFIP carried 1,099 policies in Tillamook, with a total value of \$122 million.

### **US Army Corps of Engineers Projects**

The Corps has operated in the bay since just before the turn of the century. In the lower bay, the Corps dredged and maintained channels to Bay City and Tillamook for shallow draught commercial vessels. Until 1972, the Corps dredged the lower Wilson and Trask rivers to reduce flooding. Since that time dredging has only taken place around the port of Garibaldi.

***Reconnaissance and Feasibility Studies.*** The Corps initiated and funded a Reconnaissance Study in March 1998 to determine a federal interest in funding a detailed Feasibility Study of flood mitigation and ecosystem restoration activities in Tillamook basin. This study justifies a federal interest in further studies, and the SWCD now seeks a nonfederal match to host the Corps. A multi-year Feasibility Study would develop a hydrologic model of the basin and may identify and design specific flood mitigation and habitat restoration projects. Local sources will have to match costs for the Feasibility Study and future projects at 50% and 35%, respectively. Because of the high price of feasibility studies and flood mitigation projects, SWCD may find it difficult to locate non-federal matching funds.

***Challenge 21.*** The Corps currently seeks funding from Congress to initiate their Challenge 21 Program under the federal Clean Water Action Plan. Unlike past COE flood reduction efforts, which focused on structural control measures like levees and floodwalls, Challenge 21 aims to mitigate the impacts of flooding while also restoring the ecological functioning of wetland and riverine habitats.

The Corps has submitted Tillamook Bay as a potential candidate for the Challenge 21 program. If Challenge 21 is funded and Tillamook Bay accepted, this voluntary program will partner communities and agencies to implement both structural and nonstructural mechanisms for flood relief and ecosystem restoration. Specific measures will likely include floodplain restoration, house raising and relocation from floodways, selective and voluntary dike/levee breaches and/or setbacks, and other mitigation and restoration activities.

### **Project Impact (FEMA)**

Because of exhibited citizen interest in flood mitigation and the creation of the Tillamook County Performance Partnership, the Federal Emergency Management Agency (FEMA) in June 1998 chose Tillamook County as a Project Impact site. FEMA initiated Project Impact to enable natural disaster-prone communities to better safeguard against loss of life and property during major events. A community based approach, it provides seed money for communities to leverage private and public funds to finance disaster mitigation projects.

Project Impact emphasizes partnerships between public and private stakeholders with an emphasis on long term private investment. In addition, it seeks specific, tangible results for all projects financed under the program. As a result, the success of local Project Impact efforts depends almost entirely on local leadership and commitment. Rather than place all of the cost burden on federal resources, as in the past, FEMA

hopes that successes arising out of the private sector will spawn increased local support. This support will serve to perpetuate disaster mitigation efforts which will outlive FEMA funding.

### **U.S. Fish and Wildlife Service**

The U.S. Fish and Wildlife is currently conducting a study of the relationships among floodplain restoration, flood impacts, and improving salmonid habitat. Findings of this study will benefit activities undertaken to restore the natural functioning of the lower watershed.

## ***Progress on Phase II Recommendations***

The TBNEP adopted flooding as a priority problem after the first two phases of the Base Programs Evaluation were written. As a result, no prior recommendations exist.

## ***Recommendations for Critical Management Issues***

The following recommendations represent a significant degree of consensus among local resource managers, public officials, and the general public regarding deficiencies in the current management framework. This chapter recommends the following to improve flood mitigation and response efforts.

- Combine efforts at flood mitigation with habitat restoration
- Lobby funding for Army Corps of Engineers' Challenge 21
- Target mitigation efforts at unprotected property
- Implement projects based on relative priorities
- Update floodplain map and restrict development in floodplain
- Involve private businesses in Project Impact

### **Combine efforts at flood mitigation with habitat restoration**

All of the TBNEP-identified priority problems highlight the consequences of failed or non-existent resource-use policy. Sedimentation, reduced habitats, degraded water quality, and increased flooding are all (partially) the results of policies that focused on extracting from or otherwise manipulating the natural system in order to achieve *a single benefit*. Depending on the project, these benefits were many—increased pastureland, increased timber harvest, economic growth, reduced operating costs, etc.—but ultimately society has been forced to bear the long term costs associated with the environmental instability and resource decline.

Flood mitigation efforts have historically created projects which focus on grand scale manipulation of natural hydrological systems. Dams, dikes, and levees are classic examples of modern flood mitigation techniques. The impact of these engineered solutions on numerous other elements of the ecosystem, most notably salmon, have been severe. Because of the increased understanding of the interconnectedness of environmental problems, it is critical that decision makers now focus on resource policies

that examine the effects of programs and projects on all segments of the natural system.

Flood mitigation efforts locally provide a unique opportunity to not only ensure “low impact” alterations to present systems, but also to design solutions which benefit multiple environmental issues. Within the watershed, flood control and pasture improvement projects, like draining wetlands and diking rivers, have destroyed significant lowland salmonid rearing habitat. Now agencies are actively seeking alternative types of structural remedies which will improve floodplain capacity, increase habitat, improve water quality, and protect property. Examples of these types of projects include setback levees, created wetlands, biotechnical bank stabilization, and others.

Projects *are* still being pitched, however, which, though popular in segments of the community, provide only expensive, short term relief to flood problems (large scale dredging, for example.) As flood mitigation projects are pursued in the Tillamook Bay watershed, salmonid habitat restoration and water quality enhancement must be considered in all funding allocations and policy decisions. At present, COE’s Challenge 21 provides the most comprehensive approach to local flood mitigation efforts which also benefit other environmental problems.

### **Lobby funding for Army Corps of Engineers’ Challenge 21**

Natural resource policy has matured to a point where policy makers routinely consider ecosystem function over single resource management. In recent years, COE has recognized that the manipulation of natural systems can bring about significant losses of natural resources and, in the worst case, cause catastrophic losses of human life and property. On the heels of such natural disasters as the collapse of the Everglades ecosystem and the Mississippi River floods, the Corps has developed a new approach to its land use practices. The Corps promulgates this approach through programs like Challenge 21 and their efforts in California’s flood-prone NAPA Valley. These programs are rooted in the concept that a resource agency can not focus on a single resource issue while ignoring or discounting all others. Efforts must be geared toward methods which use the mechanics of a system to define how or whether it can be altered.

The Corps recently-completed Reconnaissance Study of the Tillamook Bay basin that will be followed by a Feasibility Study if state and local matching funds become available. Once this study is complete, the implementation of specific projects will require significant federal investment (as well as local match). Presently, the Water Resources Development Act of 1998 is awaiting passage through Congress. This bill includes Challenge 21, the Corps’ program to mitigate flooding while

enhancing habitat and water quality. While discussing the bill, several Public Works Subcommittee members voiced the opinion that the Corps should focus on infrastructure and engineering projects and leave environmental efforts to resource protection and conservation agencies.

A decision to keep COE out of resource conservation would be, to say the least, unfortunate. It is difficult to justify the rationale through which members of Congress tell an agency that routinely deals with vital natural resource issues ‘not to be concerned with conservation.’ The Corps is recognized for massive engineering projects that altered and, at times, devastated the landscape throughout much of this century. Today, the federal government bails out communities devastated by floods worsened by Corps levees (Mississippi River floods) and ponders tearing down Corps’ dams in much of the west (Snake River dams, for example.) The unwillingness of Congress to recognize the Corps’ new path of structural flood relief combined with environmental stewardship would be an error rooted in politicians’ lack of understanding of both natural systems and the history and evolution of federal resource policy. Because of the importance of Challenge 21 to Tillamook Bay, it is imperative that politicians and resource managers support Challenge 21 and, where possible, lobby policy makers for its support.

### **Target mitigation efforts at unprotected property**

In the flood of 1996, Tillamook County (and particularly the Tillamook and Nehalem Bay watersheds) suffered massive property losses. A significant percentage of private property losses were due to inadequate structural protection, uncompensated damages due to lacking insurance coverage, and poorly understood claim procedures. As Tillamook County begins investing in large scale flood mitigation programs, it is important that initial efforts are prioritized around those risks not presently insured or structurally protected.

Once unprotected flood risks are identified and inventoried, mitigation efforts should be based on criteria outlined in the Tillamook County Flood Hazard Mitigation Plan. These criteria include the following:

- immediacy of flood threat,
- analysis of cost verses benefit of mitigation activity,
- analysis of environmental impact, and
- conformity of activity with existing land uses.

## **Implement projects based on relative priorities**

In addition to identifying and insuring unprotected risks, Tillamook County must also make sure that citizens who endure flood damage understand their insurance coverage and the process for obtaining FEMA relief funds. It is difficult to calculate how much insurance money was lost to individual policy holders who did not understand their coverage. However, after the Flood of 1996, FEMA allocated five million dollars of post-flood emergency funds to the state of Oregon. Tillamook received two million, which was routed into the Farm Service Agency's Emergency Conservation Program (ECP). The ECP distributed \$354,000 to agricultural and farm owners and returned the remaining \$1.65 million to the federal government. The FSA returned funds because of overly strict allocation requirements and lack of applicants.

Given the catastrophic damage that occurred, particularly in the north county, a greater percentage of these funds should have reached flood sufferers. Before the next catastrophic event hits the county, it is important that citizens are educated regarding the disaster relief funds available to them. In addition, they need to be aware of the processes involved to locate and receive this money. The Tillamook County Flood Control Group should make this type of public education a major priority. Compared to many of the group's proposed projects, education requires little capital investment and provides a vital service to the community.

## **Update floodplain map and restrict development in floodplain**

The Tillamook Bay watershed's 100 year floodplain has undergone significant urbanization over the last quarter century, and many local residents claim flooding has increased during this time. Although an attempt at drawing a correlation regarding any short term flood event is speculative at best, significant consensus exists among the general public and government officials that flooding has been exacerbated by increased floodplain development. Certainly little doubt exists regarding the impact that floodplain modification has on a region's long term capacity to "absorb" flood waters.

Because it is more expensive over the long term to continually restrain floodwaters, repair infrastructure, and subsidize damages, most development in the floodplain is simply not cost effective. Despite this, the city of Tillamook has steadily developed the city's commercial corridor which now sprawls north through the floodplain until it stops just south of the Wilson River. Although it is unlikely that Tillamook is going to remove existing development for the purpose of flood relief, steps can be taken to ensure that the alteration of the watershed's floodplain does not continue.

The first priority of county planners and policy makers should be to update the county's existing floodplain map. This map can be used to better define development boundaries and floodways within county and city limits. Once the map is generated and boundaries determined, the city of Tillamook and Tillamook County should develop (or revise as necessary) the appropriate ordinances to curtail floodplain modification.

### **Involve private businesses in Project Impact**

Project Impact is an effort by FEMA to enable natural disaster-prone communities to better safeguard against major loss of life and property during major events. A community based approach, it emphasizes partnerships between public and private stakeholders with an emphasis on long term private investment. Because of this emphasis, it is vital that Tillamook County actively solicits community interest in and response to Project Impact.

Engaging Tillamook County's private sector in Project Impact can be accomplished in several ways. Tillamook County government could take the lead in drumming up support. Citizens groups like the Tillamook County Flood Control Group could lead the process. The Tillamook County Chamber of Commerce could work with and educate possible private sponsors. The Performance Partnership could seek sponsors. And so on. Regardless of how the private sponsorship is attained (and the most likely scenario is a combination of all these plus other approaches), FEMA emphasizes that investment is critical because Project Impact is not a grant program. It is a community-based partnership that requires long term investment and extensive private sector involvement. Other Project Impact communities have been very successful in leveraging private investment, along with FEMA seed money, into major disaster mitigation projects. In order to enjoy similar successes, stakeholders throughout Tillamook County must get the ball rolling as soon as possible.







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