

Amendment Requests #851-21-000440-PLNG, #851-21-000441-PLNG and #851-21-000442-PLNG.

NOW, THEREFORE, THE BOARD OF COUNTY COMMISSIONERS FOR TILAMOOK COUNTY, OREGON, ORDERS AS FOLLOWS:

Section 1. Legislative Text Amendment and Zone Map Amendment Requests #851-21-000440-PLNG, #851-21-000441-PLNG and #851-21-000442-PLNG are **APPROVED**.

Section 2. The Tillamook County Comprehensive Plan Map and Zone Map is hereby amended to replace the 1975 USDA Beaches and Dunes of the Oregon Coast with the Oregon Department of Geology and Mineral Industries (DOGAMI) Open File Report O-20-04, Temporal and Spatial Changes in Coastal Morphology, Tillamook County, Oregon to identify dune classifications and properties within the Beach and Dune Overlay (BD) Zone.

Section 3. Article 3 of the Tillamook County Land Use Ordinance is hereby amended to reflect the adopted amendments included in “Exhibits B-D” contained in Section 3.510: Flood Hazard Overlay (FH) Zone, Section 3.530: Beach and Dune Overlay (BD) Zone, Section 4.130: Development Requirements for Geologic Hazard Areas and Article 11: Definitions.

Section 4. The Tillamook County Comprehensive Plan Goal 7 Hazards element is hereby amended to add new plan policies and map references for development in areas of geologic hazard as reflected in “Exhibit E”.

Section 5. The Tillamook County Comprehensive Plan Goal 18 Beaches and Dunes element is hereby amended to add new plan policies and map references for identification of dune classifications and properties within the Beach and Dune Overlay (BD) Zone as reflected in “Exhibit F”.




Section 6. The findings contained in the Staff Report dated February 3, 2022, included as “Exhibit A” are hereby incorporated into this Order.

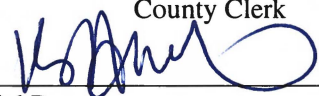
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DATED this 11th day of May 2022.

BOARD OF COUNTY COMMISSIONERS
FOR TILLAMOOK COUNTY, OREGON

	Aye	Nay	Abstain/Absent
 _____ David Yamamoto, Chair	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 _____ Erin D. Skaar, Vice-Chair	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 _____ Mary Faith Bell, Commissioner	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ATTEST: Tassi O'Neil,
County Clerk


Special Deputy

APPROVED AS TO FORM:


William K. Sargent, County Counsel



“EXHIBIT A”

Tillamook County



DEPARTMENT OF COMMUNITY DEVELOPMENT
BUILDING, PLANNING & ON-SITE SANITATION SECTIONS

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Tillamook, Oregon 97141
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TEXT AMENDMENT/ZONE CHANGE/MAP AMENDMENT REQUEST

#851-21-000442-PLNG: Beach & Dune Overlay Zone

#851-21-000441-PLNG: TCLUO Section 4.130

#851-21-000440-PLNG: TCLUO Section 3.530

STAFF REPORT DATE: February 3, 2022

TILLAMOOK COUNTY PLANNING COMMISSION HEARING DATE: February 10, 2022

BOARD OF COMMISSIONERS HEARING DATE: April 6, 2022 & April 27, 2022

PREPARED BY: Sarah Absher, CFM, Director

I. GENERAL INFORMATION & SUMMARY OF PROPOSED AMENDMENTS

Initiated By: Tillamook County Department of Community Development

Requested actions: A legislative amendment request and map amendment request to amend the Tillamook County Land Use Ordinance (TCLUO), Tillamook County Comprehensive Plan Map & Tillamook County Zoning Map and Tillamook County Comprehensive Plan as follows:

#851-21-000442-PLNG TCLUO Section 3.530: Beach and Dune Overlay (BD) Zone and Tillamook County Comprehensive Plan Goal 18: Beach and Dune Element: Open File Report O-20-04, Temporal and Spatial Changes in Coastal Morphology, Tillamook County, Oregon by the Oregon Department of Geology and Mineral Industries (DOGAMI) to replace 1975 USDA Beaches and Dunes of the Oregon Coast as Comprehensive Plan map to identify dune classifications and properties within the Beach and Dune Overlay (BD) Zone. Beach and Dune Hazard Report now referenced as Dune Area Development Permit. Clarification of activities exempt from a Dune Area Development Permit and update criteria for approval of a Dune Area Development Permit including specific standards that must be addressed in the accompanying geologic report (Engineering Geologic Report and Geotechnical Engineering Report). Adds section to address habitat restoration and enhancement projects for purposes of wildlife and plant habitat; codifies development requirements for remedial grading activities, removes language for sand mining activities; updates to requirements for beachfront protective structures; addition of certification compliance; add definition of “Geoprofessional” to TCLUO Article 11. Added requirement for

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certification of compliance prior to final building inspection and issuance of Certificate of Occupancy. Permits will continue to be reviewed under a Type I land use review process.

#851-21-000441-PLNG TCLUO Section 4.130: Development Requirements for Geologic Hazard Areas and Tillamook County Comprehensive Plan Goal 7: Hazards Element: Applicability section updated to use best available data to identify areas considered to be potentially geologically hazardous including replacement of 1979 DOGAMI Bulletin with DOGAMI Open File Report O-20-13, Landslide hazard and risk study of Tillamook County, Oregon. Updated geologic assessment review and expanded list of activities exempt from geologic assessment review. Updated Geologic Report (Engineering Geologic Report and Geotechnical Engineering Report) standards. Added section for review of historical, cultural and archaeological resources. Added requirement for certification of compliance prior to final building inspection and issuance of Certificate of Occupancy. Definitions added to Article 11 of TCLUO to define “Geoprofessional”. Permits will continue to be reviewed under a Type I land use review process.

#851-21-000440-PLNG TCLUO Section 3.530 [3.510]: Flood Hazard Overlay (FH) Zone: Update definitions to reflect definition language in FEMA Code of Federal Regulations; reference for coordination with State of Oregon Specialty Codes; addition of compliance and penalties for non-compliance language; modification to variance criteria to reference “functionally-dependent use”; language for compliance measures when altering a watercourse; addition of language for installation of underground and above-ground tanks and clarification language for installation of utilities; specifications for construction of garages and accessory structures; clarification of development requirements for the placement of manufactured homes and recreational vehicles; specifications for construction of public restroom facilities.

II. BACKGROUND

The Tillamook County Department of Community Development is making efforts to update the coastal planning program and these efforts are now reflected in a series of proposed amendments to the Tillamook County Land Use Ordinance (TCLUO) and Tillamook County Comprehensive Plan. Updates include legislative text amendments to TCLUO Section 3.510: Flood Hazard Overlay (FH) Zone, TCLUO Section 3.530: Beach and Dune Overlay (BD) Zone, TCLUO Section 4.130: Development Requirements for Geologic Hazard Areas and TCLUO Article 11: Definitions. Updates also include incorporation of digital hazard mapping tools produced by the Oregon Department of Oregon Geology and Mineral Industries (DOGAMI) that if adopted, will become planning and comprehensive plan maps for areas of known geologic hazards, beaches and dunes. Amendments to Tillamook County Comprehensive Plan Goal element 7: Hazards and Goal element 18: Beaches and Dunes to reflect updates to the aforementioned Tillamook County Land Use Ordinance are also proposed as part of these planning update efforts.

These long-range planning efforts are ongoing county-wide efforts and are part of the County’s overall efforts to mitigate risk and to reduce the loss of life and property in coastal communities. The public, planners, emergency managers and first responders, elected officials, and community partners benefit from these efforts to increase community resiliency from the presence of natural hazards in Tillamook County.

It is not the intent or purpose of proposed amendments to require relocation of or otherwise regulate existing development within the Beach and Dune Hazard Overlay Zone. Adoption of the proposed amendments will not have the effect of rendering any lawfully established use or structure nonconforming. All uses permitted pursuant to the provisions of the underlying zones may be permitted, subject to the additional requirements and limitations of this section, and all applicable supplemental standards of the Tillamook County Land Use Ordinance.

It should be noted that overall residential density cannot exceed what is allowed in the underlying zone and density shall be computed based on the total gross land area of the subject property. With the Flexible Design Option, development standards for setbacks, lot area, width and depth requirements, lot coverage

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requirements, building height and similar dimensional requirements may be reduced, adjusted or otherwise modified as necessary to achieve the design objectives of the development and fulfill the purposes of the proposed amendments.

III. APPLICABLE STATE LAW, COUNTY ORDINANCE AND COMPREHENSIVE PLAN PROVISIONS

1. Tillamook County Comprehensive Plan
2. Tillamook County Land Use Ordinance, Article IX, Amendment Process

IV. ANALYSIS:

1. *Statewide Planning Goal & Tillamook County Comprehensive Plan Discussion*

Oregon's 19 statewide planning goals are adopted as Administrative Rule and express the state's policies on land use as well as land use related topics. Each county is required to have a comprehensive plan consistent with the statewide planning goals as well as zoning and land division ordinances for implementation of plan policies and objectives. The Tillamook County Comprehensive Plan contains 17 of the 19 Statewide Planning Goal Elements. A Goal 15 Element (Willamette Valley) and Goal 19 Element (Ocean Resources) are absent from the Tillamook County Comprehensive Plan as the goals and policies for the Willamette Valley do not apply to Tillamook County and the Ocean Resources Element was created after the adoption of the County's comprehensive plan.

The Comprehensive Plan provides the County with an important opportunity to make a detailed statement describing the needs and desires of its citizens for the future use of the County's land and water resources, and to guide future development of the County through agreed upon policy statements which give direction to County actions and programs. The policies provide a basis for coordination of the programs of other governmental entities and are also intended to assist the private sector in reaching development decisions which are beneficial to the citizens of the County generally as well as to the private property owner.

The plan must also be in conformance with the adopted statewide planning goals and policy statements are to be based upon required inventories of resource and other pertinent information and findings related to analysis of problems and opportunities existing in Tillamook County. In order that the plan will be used to guide actions for problem-solving, the state goals also require local adoption of implementation measures appropriate for dealing with the identified problems and needs.

The following Goal Summaries are a combination of excerpts from the Department of Land Conservation and Development's introductory information on Oregon's statewide planning goals which can be found on their website at <http://www.oregon.gov/LCD/docs/goals/goalsummary.PDF> and the [Tillamook County Comprehensive Plan](https://www.co.tillamook.or.us/gov/ComDev/Planning/compplan.htm) <https://www.co.tillamook.or.us/gov/ComDev/Planning/compplan.htm>. These summaries are intended to provide a general context for discussion of the general compatibility of this conditional use request with the goal elements of the Tillamook County Comprehensive Plan.

- Tillamook County Comprehensive Plan Goal 1 Element: The Planning Process
Summary: Goal 1 calls for "the opportunity for citizens to be involved in all phases of the planning process." It requires each city and county to have a citizen involvement program containing six components specified in the goal. It also requires local governments to have a committee for citizen involvement (CCI) to monitor and encourage public participation in planning.

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A Measure 56 notice was required for the proposed amendments to the Beach and Dune Overlay Zone, including adoption of the Open File Report O-20-04, Temporal and Spatial Changes in Coastal Morphology, Tillamook County, Oregon by the Oregon Department of Geology and Mineral Industries (DOGAMI) to replace 1975 USDA Beaches and Dunes of the Oregon Coast as Comprehensive Plan map. Included with this Measure 56 notice were notice of the proposed amendments to TCLUO Section 4.130: Development Requirements for Geologic Hazard Areas, amendments to TCLUO Section 3.530: Flood Hazard Overlay Zone, TCLUO Article 11: Definitions as well as amendments to the Goal 7 and 18 elements of the Tillamook County Comprehensive Plan reflective of the proposed amendments to the various sections of the TCLUO.

Community meetings are scheduled to take place as follows:

Tierra Del Mar Community Association February 3, 2022
Oceanside Neighborhood Association (CAC) February 5, 2022
Neskowin CAC February 12, 2022
Pacific City/Woods CAC February 19, 2022

Along with the Measure 56 Notice, a FAQ Guide has been provided on the Department website for the public’s review. A copy has been included with this report.

- **Tillamook County Comprehensive Plan Goal 2 Element: THE LAND USE PLAN**
Summary: Goal 2 outlines the basic procedures of Oregon’s statewide planning program and describes the development of Tillamook County’s Comprehensive Plan including justification for identifying exception areas.

The proposed amendments are consistent with the Goal 2 element and an exception is not required for this process.

- **Tillamook County Comprehensive Plan Goal 3 Element: AGRICULTURAL LANDS**
Summary: Goal 3 defines "agricultural lands." It then requires counties to inventory such lands and to "preserve and maintain" them through farm zoning. Details on the uses allowed in farm zones are found in ORS Chapter 215 and in Oregon Administrative Rules, Chapter 660, Division 33.
- **Tillamook County Comprehensive Plan Goal 4 Element: FOREST LANDS**
Summary: This goal defines forest lands and requires counties to inventory them and adopt policies and ordinances that will "conserve forest lands for forest uses."

The proposed amendments only apply to resource lands related to development within Areas of Special Flood Hazard where a Floodplain Development Permit is required or if development is occurring in an area of geologic hazard where a geotechnical investigation is required under TCLUO Section 4.130. These permitting requirements are existing requirements contained within the TCLUO.

- **Tillamook County Comprehensive Plan Goal 5 Element: NATURAL RESOURCES**
Summary: The purpose of Goal 5 is to protect natural resources, and conserve scenic and historic areas and open space. Goal 5 covers more than a dozen natural and cultural resources such as wildlife habitats and wetlands. It establishes a process for each resource to be inventoried and evaluated. If a resource or site is found to be significant, a local government has three policy choices: preserve the resource, allow proposed uses that conflict with it, or strike some sort of a balance between the resource and the uses that would conflict with it.

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- Tillamook County Comprehensive Plan Goal 6 Element: AIR, WATER AND LAND RESOURCES QUALITY

Summary: This goal requires local comprehensive plans and implementing measures to be consistent with state and federal regulations on matters such as groundwater pollution and noise control in Tillamook County.

The proposed amendments are not in conflict with any of the policies outlined in the Goal 5 and Goal 6 elements. The proposed amendments will not result in the conversion of inventoried cultural or historical structures and uses non-conforming uses or structures.

- Tillamook County Comprehensive Plan Goal 7 Element: HAZARDS

Summary: Goal 7 deals with development in places subject to natural hazards such as floods or landslides. It requires that jurisdictions apply "appropriate safeguards" (floodplain zoning, for example) when planning for development there. In Tillamook County, the purpose of addressing hazards is not meant to restrict properties from development, but to institute policies concerning potential problems, so they can be considered before financial losses and possible injury which may be avoided by the application of the policies formulated in the Comprehensive Plan.

Hazards identified in the Goal 7 Hazards element of the Tillamook County Comprehensive Plan include: ocean and stream flooding, groundwater, erosion and deposition, landslides, earthquakes, weak foundation soils, and “other unique local hazards”. The proposed amendments and comprehensive plan policies updates are consistent with the guidelines and policies of Goal 7.

The proposed amendments speak strongly to the policies contained within the Goal 7 element of the Tillamook County Comprehensive Plan. Specifically, the amendment efforts are largely focused on updating permitting review processes for development in these inventoried areas of hazard throughout Tillamook County.

- Tillamook County Comprehensive Plan Goal 8 Element: RECREATION

Summary: This goal calls for each community to evaluate its areas and facilities for recreation and develop plans to deal with the projected demand for them. It also sets forth detailed standards for expedited siting of destination resorts. In Tillamook County, the main issue surrounding recreation is that of quantity, location and orientation. This Goal element recognizes that the tourism sector of the County's economy is rapidly growing, and some feel tourism places too large a burden on local public facilities and services.

Development of recreational facilities within Areas of Special Flood Hazard where a Floodplain Development Permit is currently required (TCLUO Section 3.530 Flood Hazard Overlay Zone), development of recreational facilities within the Beach and Dune Overlay Zone where a beach and dune hazard report are required (TCLUO Section 3.510 Beach and Dune Overlay Zone), and compliance with development standards where development occurring in an area of geologic hazard continue to apply. It is not anticipated that the proposed amendments will result in additional limitations or prohibitions for recreational opportunities.

- Tillamook County Comprehensive Plan Goal 9 Element: POPULATION AND ECONOMY

Summary: Goal 9 calls for diversification and improvement of the economy. It asks communities to inventory commercial and industrial lands, project future needs for such lands, and plan and zone enough land to meet those needs. Projections in this Element of the Comprehensive Plan extend to year 2000. The importance of cottage industry, rural industry and light industry is recognized throughout this Element, stating that regulations be adopted to permit low-impact light manufacturing activity in suitable rural zones.

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The Tillamook County Comprehensive Plan does not include updated population projections. The proposed amendments largely do not apply to lands zoned for industrial development and should not result in the prohibition of low-impact light manufacturing activities. The proposed amendments are not in conflict with policies related to long-range planning and zoning efforts to meet future needs of communities.

- **Tillamook County Comprehensive Plan Goal 10 Element: HOUSING**

Summary: This goal specifies that each city must plan for and accommodate needed housing types, such as multifamily and manufactured housing. It requires each city to inventory its buildable residential lands, project future needs for such lands, and plan and zone enough buildable land to meet those needs. It also prohibits local plans from discriminating against needed housing types. This Goal element within the Tillamook County Comprehensive Plan focuses on the separation of housing needs and opportunities in both rural and urban areas. There is a strong tie to the Goal 11: Public Facilities and Goal 14: Urbanization elements of the Comprehensive Plan in this section.

The proposed amendments do not prohibit or limit residential development and additional regulatory language has not been proposed that would further limit or impair existing residential development opportunities beyond the provisions contained within the Goal 18 element of the Tillamook County Comprehensive Plan. In recognition of Tillamook County’s housing crisis and severe housing shortage, careful consideration has been made to ensure the proposed amendments do not conflict or create barriers to housing opportunities within unincorporated communities.

- **Tillamook County Comprehensive Plan Goal 11 Element: PUBLIC FACILITIES**

Summary: Goal 11 calls for efficient planning of public services such as sewers, water, law enforcement, and fire protection. The goal's central concept is that public services should be planned in accordance with a community's needs and capacities rather than be forced to respond to development as it occurs. This Element of the Comprehensive Plan outlines types and levels of urban and rural facilities and services, with guidance to ensure timely, orderly and efficient arrangement of public facilities and services in Tillamook County.

Continued planning to ensure adequate public services such as sewer, water, law enforcement and fire protection is critical to the public health, welfare and safety of Tillamook County communities and its residents. In recognition of Tillamook County’s continued growth and need for new development of public facilities, careful consideration has been made to ensure the proposed amendments do not prevent future development of public facilities within unincorporated communities.

- **Tillamook County Comprehensive Plan Goal 12 Element: TRANSPORTATION**

Summary: The goal aims to provide "a safe, convenient and economic transportation system." It asks for communities to address the needs of the "transportation disadvantaged." Policies outlined in this Goal element of the Tillamook County Comprehensive Plan require the County to protect the function, operation and safety of existing and planned roadways as identified in the County’s Transportation Plan, consider land use impacts on existing or planned transportation facilities in all land use decisions, plan for multi-modal networks, and coordinate transportation planning efforts with other jurisdictions to assure adequate connections to streets and transportation systems between incorporated and unincorporated areas.

Future construction needs or opportunities for transportation facilities are not limited or compromised by the proposed amendments.

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- **Tillamook County Comprehensive Plan Goal 13 Element: ENERGY CONSERVATION**
Summary: Goal 13 declares that "land and uses developed on the land shall be managed and controlled so as to maximize the conservation of all forms of energy, based upon sound economic principles." Planning for energy conservation and opportunities to promote the installation of renewable energy systems are discussed in this Goal element of the Tillamook County Comprehensive Plan.

Existing opportunities for renewable energy conservation systems and efforts to maximize conservation of existing energy facilities are not affected by the proposed amendments.

- **Tillamook County Comprehensive Plan Goal 14 Element: URBANIZATION**
Summary: This goal requires cities to estimate future growth and needs for land and then plan and zone enough land to meet those needs. It calls for each city to establish an "urban growth boundary" (UGB) to "identify and separate urbanizable land from rural land." It specifies seven factors that must be considered in drawing up a UGB. It also lists four criteria to be applied when undeveloped land within a UGB is to be converted to urban uses. This Goal element of the Tillamook County Comprehensive Plan focuses largely on development within unincorporated communities, public facility limitations to rural areas, and impacts of urban sprawl on resource lands.

As stated in response to Goal 11 Comprehensive Plan policies, continued planning to ensure adequate public services such as sewer, water, law enforcement and fire protection is critical to the public health, welfare and safety of Tillamook County communities and its residents.

The proposed comprehensive plan policies recognize the need for future expansion of urban uses in unincorporated communities. A Goal Exception is currently required to expand a community growth boundary and criteria that consider impacts to adjacent resource activities on resource zoned properties is built into existing review procedures. The policies related to expansion and relocation of urbanized areas must also demonstrate that a proposal does not result in urban sprawl on resource lands through existing already established land use review processes.

- **Tillamook County Comprehensive Plan Goal 16 Element: ESTUARINE RESOURCES**
Summary: This goal requires local governments to classify Oregon's 22 major estuaries in four categories: natural, conservation, shallow-draft development, and deep-draft development. It then describes types of land uses and activities that are permissible in those "management units." Five estuaries are inventoried and described in this element of the Tillamook County Comprehensive Plan, the Nehalem Estuary, Tillamook Estuary, Netarts Estuary, Sandlake Estuary and Nestucca Estuary.
- **Tillamook County Comprehensive Plan Goal 17 Element: COASTAL SHORELANDS**
Summary: The goal defines a planning area bounded by the ocean beaches on the west and the coast highway (State Route 101) on the east. It specifies how certain types of land and resources there are to be managed: major marshes, for example, are to be protected. Sites best suited for unique coastal land uses (port facilities, for example) are reserved for "water-dependent" or "water related" uses. Coastal Shorelands inventoried in Tillamook County as described in this element are Nehalem Estuary Shorelands, Tillamook Estuary Shorelands, Netarts Estuary Shorelands, Sandlake Estuary Shorelands, and Nestucca Estuary Shorelands.
- **Tillamook County Comprehensive Plan Goal 18 Element: BEACHES AND DUNES**
Summary: Goal 18 sets planning standards for development on various types of dunes. It prohibits residential development on beaches and active foredunes but allows some other types of development if they meet key criteria. The goal also deals with dune grading, groundwater drawdown in dunal

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aquifers, and the breaching of foredunes. Several categories of dunes are described and discussed in this element of the Tillamook County Comprehensive Plan, and includes discussion about where residential, commercial and industrial uses are prohibited. Goal 18 Exception areas are also inventoried within this element which allow for residential, industrial and commercial uses in dune areas that would otherwise be prohibited.

The proposed amendments are not in conflict with the goals and policies of the coastal elements and support Goal 18 policies related to where development is permitted to occur, promote maintenance and stabilization of dunes and add additional regulatory framework for dune management practices- specifically habitat restoration projects.

2. *Tillamook County Land Use Ordinance, Article IX, Amendment Process*

A. **Section 9.020: Map Amendment Procedure and Criteria**

1. Section 9.020(1): Map Amendment Notice Procedure:

Findings: Notice of hearing for this request was completed in accordance with the provisions outlined in Article 10 of the TCLUO and included a PAPA notice to DLCD within the required 35 days prior to the first evidentiary hearing, Measure 56 notification mailed to property owners within the affected areas of the Beach and Dune Overlay Zone, as well as publication of hearings within the Headlight Herald in accordance with the procedures outlined in Article 10 of the TCLUO. Comments received are included as “Exhibit E” of this report.

Tillamook County was required to provide Measure 56 Notice to all properties within the community boundaries of the 5 unincorporated boundaries as well as Cape Meares and Tierra Del Mar. An estimated 6,500 properties received a copy of the Measure 56 notice. Funds to cover mailing costs were secured through a DLCD grant.

2. Section 9.020(2): Map Amendment Analysis: The Department shall prepare an analysis of the site and the surrounding area in the form of a map and report, considering the following factors:

- (a) Size, shape and orientation of the subject parcel.
- (b) Surrounding parcel sizes.
- (c) Topography, drainage, hazards, and other physical site characteristics.
- (d) Parcel ownership and current use.
- (e) Economic and population data for the affected area that may be contained in the Comprehensive Plan.
- (f) Traffic circulation.
- (g) Zoning history of the subject parcel.
- (h) Compatibility of the proposed new zone with the surrounding zoning and land uses.
- (i) Availability and feasibility for development of nearby properties in the proposed zone.
- (j) Aesthetics.
- (k) Availability of public facilities and services.
- (l) Land use objectives of both the applicable and the proposed zoning.

Findings: Tillamook County was required to provide Measure 56 Notice to all properties within the community boundaries of the 5 unincorporated boundaries as well as Cape Meares

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and Tierra Del Mar. An estimated 6,500 properties received a copy of the Measure 56 notice. Properties vary in size, shape, orientation and location within unincorporated Tillamook County. Topography, drainage, hazards and other physical site characteristics vary from property to property. Properties are designated for residential, commercial, industrial and resource uses, and zoning history of the potentially affected properties varies.

As mentioned throughout this report, it is not the intent or purpose of the proposed amendments to require the relocation of or otherwise regulate existing development within the Beach and Dune Overlay Zone.

The availability and feasibility for development of nearby properties remains unchanged. There is not adequate economic and population data for the affected areas. Traffic circulation is not affected by the adoption of the proposed amendments. Aesthetics are not substantially impacted as a result of the adoption of the proposed amendments. Availability of public facilities and services remains within these affected areas and does not compromise or limit future construction of needed utility infrastructure improvements. Land use objectives and purpose of the proposed amendments are discussed below in further detail:

Beach and Dune Overlay Zone Updates (TCLUO Section 3.530)

Type of dune classifications with accompanying policies contained within the Goal 18 Beaches and Dunes element of the Tillamook County Comprehensive Plan and Tillamook County Land Use Ordinance determine what type of use and development activity is allowed on beaches and dunes, and what is required for development.

The adopted beach and dune maps made part of the Beach and Dune Overlay Zone and Tillamook County Comprehensive Plan are the USDA maps of Oregon’s beaches and dunes produced in 1975. The 1975 maps were adopted by Tillamook County and are part of administration of the land use program for properties within the Beach and Dune Overlay Zone.

Beach and dune environments are very dynamic. The Oregon Department of Geology and Mineral Industries (DOGAMI) recently completed a mapping project of Tillamook County’s beaches and dunes. The Department of Community Development is proposing to adopt the new data produced by DOGAMI to update Tillamook County’s Beach and Dune Overlay Zone and associated maps and policies. The goal of these efforts will result in new data, mapping and ordinance language to ensure future development protects coastal resources and lessens impacts to properties and communities from coastal hazards.

Included with this process are proposed updates to subsections of Section 3.530 that outline the required information to be contained within a beach and dune hazard report also known as a geotechnical investigation report for new development activities on properties within the Beach and Dune Overlay Zone. These reports are currently required for development of a property and must be reviewed by Community Development in conjunction with zoning and building permits or prior to the submittal of zoning and building permits. The proposed updates include additional standards or investigative findings a geotechnical professional is required to address when completing a hazard report for future development of a property.

It should be noted that proposed ordinance language includes a limitation on the number of years a hazard report is valid if not yet submitted to the Department for review in conjunction with a new development proposal. Proposed language limits validity of a hazard report for

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up to 5 years. What this means is that if you have not yet developed your property but already have a hazard report for future development, you will want to make sure the hazard report was completed by a geotechnical professional within five years of the date of submittal of the report to the Department for review.

Other updates associated with development where a hazard report is required include a proposal to require the geotechnical professional to provide certification in writing that the development as constructed meets the recommendations and standards outlined in the report and that this certification be required prior to a final inspection or issuance of a certificate of occupancy by the Building Official and for dune areas that foredune stabilization measures have been implemented.

TCLUO Section 4.130: Development Requirements for Geologic Hazard Areas

It is important to understand that this section of the Tillamook County Land Use Ordinance is not a zoning district or an overlay zoning district, and therefore does not determine what uses are permitted on a property. This section of the Tillamook County Land Use Ordinance contains additional development standards that must be met when developing a property in a geologic hazard area. Allowable “use” of the property has already been determined by the underlying zone or an overlay zone.

As with updating mapping for Tillamook County’s beaches and dunes, one of the significant updates to Section 4.130 of the Tillamook County Land Use Ordinance is to include new maps and data for administration of the requirements of this section.

Existing maps identifying areas of geologic hazard in Tillamook County include 1974 and 1979 DOGAMI bulletins as well as the 1964 USDA Soil Conservation Service soil survey maps. The Department of Community Development is proposing to adopt current landside map (SLIDO maps) and data produced by DOGAMI to better identify areas of geologic hazard.

Updates to this section of the Tillamook County Land Use Ordinance also include updating report requirements and investigation information contained within a geologic hazard report for development of a property located in an area of geologic hazard. These reports are currently required for development of properties within geologic hazard areas and must be reviewed by Community Development in conjunction with zoning and building permits or prior to the submittal of zoning and building permits for development of a property. The proposed updates reflect what a geotechnical professional is required to address when completing one of these reports for development of properties within areas of geologic hazard.

It should be noted that proposed ordinance language includes a limitation on the number of years a geologic hazard report is valid if not yet submitted to the Department for review in conjunction with a new development proposal. Proposed language limits validity of a geologic hazard report for up to 5 years. What this means is that if you have not yet developed your property but already have a prepared geologic hazard report for future development, you will want to make sure the report was completed by a geotechnical professional within five years of the date of submittal of the report to the Department for review.

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Updates also include a proposal to require the geotechnical professional to provide certification in writing that the development as constructed meets the recommendations and standards outlined in the report and that this certification be required prior to a final inspection or issuance of a certificate of occupancy by the Building Official.

Flood Hazard Overlay Zone Updates (TCLUO Section 3.510)

Tillamook County completed a series of updates and amendments to the Flood Hazard Overlay Zone in 2018 that included adoption of new FEMA Flood Insurance Rate Maps (FIRMS). These updates were required by FEMA for program consistency with the FEMA Code of Federal Regulations for development of properties within Areas of Special Flood Hazard (regulated flood zones) as part of our obligation as a participating community in the National Flood Insurance Program (NFIP).

New proposed amendments to the Flood Hazard Overlay Zone section of the Tillamook County Land Use Ordinance consist of a series of updates and housekeeping tasks required by FEMA. The updates include addition of definitions or refinement of existing definitions, clarification to development and construction code requirements, and addition of several sections at the end of the ordinance related to administration and enforcement. All updates proposed are required by FEMA and must be adopted to remain in good standing with the National Flood Insurance Program.

There are no map changes to the adopted 2018 FEMA FIRMs proposed or made part of this update process. The criteria for which a decision is made to approve a Floodplain Development Permit remain the same.

3. Section 9.020(3): Map Amendment Criteria:

- (a) The proposed new zone is consistent with applicable Comprehensive Plan policies.*
- (b) The proposed new zone shall not result in the conversion of resource lands to non-resource use without an approved exception to applicable state resource protection Goals.*
- (c) The site under consideration is better suited to the purposes of the proposed zone than it is to the purposes of the existing zone.*
- (d) Development anticipated to result from the proposed zone shall not impair the actual or the legally designated uses of surrounding properties.*
- (e) The amendment must conform to Section 9.040 Transportations Planning Rule Compliance.*

Findings: As stated previously, the proposed amendments are not in conflict with the applicable Comprehensive Plan policies and are consistent with the purpose and policies outlined in the Goal 7 Hazards Element and Goal 18 Beaches and Dunes Element of the Tillamook County Comprehensive Plan. The proposed comprehensive plan/zone map amendments will not result in the conversion of resource lands to non-resource lands. Future development of properties affected by these proposed amendments will be subject to the development standards and requirements outlined in TCLUO Section 3.530: Beach and Dune Overlay Zone, TCLUO Section 3.510: Flood Hazard Overlay Zone and TCLUO Section 4.130: Development Requirements for Geologic Hazard Areas. All of these sections and overlay zones currently exist, and the purpose of this long-range planning effort is to update these sections of the TCLUO as previously described.

“EXHIBIT A”

The Beach and Dune Overlay Zone is not an underlying zone and does not adjust existing boundaries of existing underlying zones. Development anticipated to result from the proposed amendments shall not impair the actual or legally designated uses of surrounding properties outside of the Beach and Dune Overlay Zone. The proposed amendments do not conflict with Transportation Planning Rule Compliance.

B. Section 9.030: Text Amendment Procedure

If County initiated, Article 9 requires the Department to prepare an analysis of the proposed amendments addressing such issues as the intent of the applicable Comprehensive Plan policies; the intent of the provisions being amended; the effect on the land use patterns in the County; the effect on the productivity of resource lands in the County; administration and enforcement; and the benefits or costs to Departmental resources resulting from the proposed amendment.

Staff finds as follows:

- The purpose of the proposed amendments is to increase the resilience of communities by updating maps, standards, requirements, incentives, and other measures to be applied in the review and authorization of land use and development activities in areas subject geologic and flood hazards.
- Analysis of the proposed amendments in relation to existing Comprehensive Plan policies has been addressed previously in this report.
- The proposed amendments do not impair legally designated uses permitted outright or conditionally in the established underlying zones.
- The Department does not anticipate a significant impact on County administration or enforcement of development of properties in relation to the proposed amendments. A fee structure already exists for required land use, zoning and building permit application(s) which will continue to apply to development requests of properties located within areas subject to the provisions of TCLUO Section 3.530; TCLUO Section 3.510 and TCLUO Section 4.130.

EXHIBITS:

- Exhibit A: Proposed Amendments to TCLUO Section 3.530: Beach and Dune Overlay Zone
Exhibit B: Proposed Amendments to TCLUO Section 3.510: Flood Hazard Overlay Zone
Exhibit C: Proposed Amendments to TCLUO Section 4.130: Development Requirements for Geologic Hazard Areas
Exhibit D: FAQ Guide
Exhibit E: Measure 56 Notice
Exhibit F: Public Comment

*Due to the size, the DOGAMI Open File Reports and Comprehensive Plan Goal Elements 7 and 18 can be reviewed here: <https://www.co.tillamook.or.us/commdev/project/851-21-000440-plng851-21-000441-plng851-21-000442-plng>

“EXHIBIT A”

“EXHIBIT B”

SECTION 3.510: FLOOD HAZARD OVERLAY ZONE (FH)

The State of Oregon has in ORS 203.035 (COUNTIES) OR ORS 197.175 (CITIES) delegated the responsibility to local governmental units to adopt floodplain management regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, Tillamook County, does ordain as follows:

- A. The flood hazard areas of Tillamook County are subject to periodic inundation which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.*
- B. These flood losses may be caused by the cumulative effect of obstructions in areas of special flood hazards that increase flood heights and velocities, and when inadvertently anchored, damage uses in other areas. Uses that are inadequately flood proofed, elevated, or otherwise protected from flood damage also contribute to the flood loss.*

Pursuant to the requirement established in ORS 455 that Tillamook County administers and enforces the State of Oregon Specialty Codes, Tillamook County does hereby acknowledge that the Oregon Specialty Codes contain certain provisions that apply to the design and construction of buildings and structures located in special flood hazard areas. Therefore, this ordinance is intended to be administered and enforced in conjunction with the Oregon Specialty Codes.

- (1) PURPOSE: It is the purpose of the FH zone to promote the public health, safety and general welfare and to minimize public and private losses or damages due to flood conditions in specific areas of unincorporated Tillamook County by provisions designed to:
 - (a) Protect human life and health;
 - (b) Minimize expenditure of public money for costly flood control projects;
 - (c) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the public;
 - (d) Minimize prolonged business interruptions;
 - (e) Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazards;
 - (f) Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;
 - (g) Ensure that potential buyers are notified that property is in an area of special flood hazard; and
 - (h) Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

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- (i) Maintain the functions and values associated with Special Flood Hazard Areas which reduce the risk of flooding.
- (2) **BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD:** The areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled “The Flood Insurance Study for Tillamook County” dated September 28, 2018, with an accompanying Flood Insurance Rate Maps (FIRMs), are hereby adopted by reference and declared to be a part of this ordinance. The Flood Insurance Study and the FIRM are on file at the Tillamook County Department of Community Development at 1510-B Third Street, Tillamook, OR 97141. The best available information for flood hazard area identification as outlined in this Section shall be the basis for regulation until a new FIRM is issued that incorporates data utilized under this Section.
- (3) **CONTENT:** In order to accomplish this purpose, this Section of the Land Use Ordinance includes methods and provisions for:
 - (a) Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
 - (b) Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
 - (c) Maintaining the natural and existing flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
 - (d) Minimizing and controlling filling, grading, dredging, and other development which may increase flood damage or may increase flood hazards in other areas;
 - (e) Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas;
 - (f) Encouraging mitigation and restoration programs in "exchange" (in addition to) for alteration of Special Flood Hazard Areas, existing and natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters
- (4) **DEFINITIONS:** Unless specifically defined below or in Article XI of this ordinance, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

AREA OF SPECIAL FLOOD HAZARD: The land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. It is shown on the Flood Insurance Rate Map (FIRM) as zone A, AO, AH, A1-30, AE, A99, AR (V, VO, V1-30, VE). “Special flood hazard area” is synonymous in meaning with the phrase “area of special flood hazard”.

AREA OF SHALLOW FLOODING: A designated AO, AH, AR/AO, AR/AH, or VO zone on a community's Flood Insurance Rate Map (FIRM) with a 1 percent or greater annual chance of flooding to an average depth of 1 to 3 feet where a clearly defined channel does not exist, where the path of flooding is unpredictable, and where velocity flow may be evident. Such flooding is

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characterized by ponding or sheet flow. (Note: Flood Zones are included in this definition (NFIP definition CFR 59.1) that are not located in Tillamook County.)

ADDITION: An alteration to an existing structure that results in any increase in its ground floor area.

BASE FLOOD: Flood having a one percent chance of being equaled or exceeded in any given year. Also referred to as the "100-year flood". Designation on maps always includes the letters A, A1-A30, AE, AO, V, V1-V30 or VE.

BASE FLOOD ELEVATION (BFE): The elevation to which floodwater is anticipated to rise during the base flood.

BASEMENT: Any area of a building having its floor subgrade (below ground level) on all sides.

BREAKAWAY WALL: A wall that is not a part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.

COASTAL HIGH HAZARD AREA: An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The area is designated on the FIRM as Zone V1-V30, VE or V.

CONDITIONAL LETTER OF MAP REVISION (CLOMR): Letter from FEMA commenting on whether a proposed project, if built as proposed, would meet the minimum National Flood Insurance Program standards for proposed hydrology changes. If the project, built as proposed, revises the Flood Insurance Rate Map and/or Flood Insurance Study, a Letter of Map Revision (LOMR) is required to be submitted no later than six months after project completion.

CRITICAL FACILITY: A facility for which even a slight chance of flooding might be too great. Critical facilities include, but are not limited to schools, nursing homes, hospitals, police, fire and emergency response installations, installations which produce, use or store hazardous materials or hazardous waste.

DEVELOPMENT: Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations or the storage of equipment or materials located within the area of special flood hazard.

ENHANCEMENT: The process of improving upon the natural functions and/or values of an area or feature which has been degraded by human activity.

FILL: Any material such as, but not limited to, sand, gravel, soil, rock or gravel that is placed on land including existing and natural floodplains, or in waterways, for the purposes of development or redevelopment.

FLOOD OR FLOODING:

(a) A general and temporary condition of partial or complete inundation of normally dry land areas from:

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- (1) The overflow of inland or tidal waters.
 - (2) The unusual and rapid accumulation or runoff of surface waters from any source.
 - (3) Mudslides (i.e., mudflows) which are proximately caused by flooding as defined in paragraph (a)(2) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.
- (b) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph (a)(1) of this definition.

FLOOD BOUNDARY & FLOODWAY MAP: Historical maps issued by the Federal Emergency Management Agency where the boundaries of the area of special flood hazards applicable to Tillamook County have been designated as Zones A, AE or A1-A30.

FLOOD ELEVATION STUDY: An examination, evaluation and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudslide (i.e., mudflow) and/or flood-related erosion hazards. Also known as a Flood Insurance Study (FIS).

FLOOD INSURANCE RATE MAP (FIRM): An official map of a community, on which the Federal Insurance Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community. A FIRM that has been made available digitally is called a Digital Flood Insurance Rate Map (DFIRM).

FLOOD INSURANCE STUDY: The official report provided by the Federal Insurance Administrator that includes flood profiles, the Flood Insurance Rate Map, Flood Boundary & Floodway Map, and the water surface elevation of the base flood.

FLOOD PLAIN: Any land area susceptible to being inundated by water from the sources specified in the flood(ing) definition.

FLOOD PLAIN MANAGEMENT REGULATIONS: The provisions of this ordinance in addition to the Land Division Ordinance, building codes, health regulations, and other applications of police power. The term describes such state or local regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

FLOODWAY: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Also referred to as "Regulatory Floodway."

FLOODWAY, REGULATORY: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot. The regulatory floodway is delineated by the Federal Emergency Management Agency on the Flood Insurance Study, Flood Insurance Rate Map and/or the Flood Boundary and Floodway Map.

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FUNCTIONALLY DEPENDENT USE: A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, and does not include long term storage or related manufacturing facilities.

HIGHEST ADJACENT GRADE: The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

HIGHWAY READY: The status of a recreational vehicle that is on wheels or a jacking system, is attached to the site by quick disconnect type utilities and security devices only, and has no permanently attached additions. ‘Highway Ready’ includes having a plan and making provision to remove the unit in the event of flood.

HYDROSTATIC LOADS: Loads caused by water either above or below the ground surface, free or confined, which is either stagnant or moves at very low velocities, of up to five (5) feet per second. These loads are equal to the product of the water pressure times the surface area on which the water acts. The pressure at any point is equal to the product of the unit weight of water (62.5 pounds per cubic foot) multiplied by the height of water above that point or by the height to which confined water would rise if free to do so.

HYDRODYNAMIC LOADS: Loads induced on buildings or structures by the flow of flood water moving at moderate or high velocity around the buildings or structures or parts thereof, above ground level when openings or conduits exist which allow the free flow of flood waters. Hydrodynamic loads are basically of the lateral type and relate to direct impact loads by the moving mass of water, and to drag forces as the water flows around the obstruction.

IRREVOCABLY COMMITTED: Any platted area with improved streets, sewer, water, and fire districts, as well as established commercial and high density residential uses as of June 2, 1978.

LETTER OF MAP CHANGE (LOMC): An official FEMA determination, by letter, to amend or revise effective Flood Insurance Rate Maps and/or Flood Insurance Studies. LOMC’s are issued in the following categories:

- (a) Letter of Map Amendment (LOMA): An amendment to the Flood Insurance Rate Maps based on technical data showing that an existing structure, parcel of land or portion of a parcel of land that has not been elevated by fill (natural grade) was inadvertently included in the special flood hazard area because of an area of naturally high ground above the base flood.
- (b) Letter of Map Revision (LOMR):
 - (1) LOMR-F (Letter of Map Revision based on Fill) is a letter from FEMA stating that an existing structure or parcel of land that has been elevated by fill would not be inundated by the base flood.
 - (2) A LOMR revises the current Flood Insurance Rate Map and/or Flood Insurance Study to show changes to the floodplains, floodways or flood elevations. LOMRs are generally based on manmade alterations that affected the hydrologic or hydraulic characteristics of a flooding source and thus result in modification to the existing regulatory floodway, the effective base flood elevation, or the special flood hazard area. A Conditional Letter of Map Revision (CLOMR) may be approved by FEMA

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prior to issuing a permit to start a project if the project has a potential to affect the special flood hazard area.

LOWEST FLOOR: The lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking or vehicles, building access or storage, in an area other than a basement area, is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.

MANUFACTURED DWELLING: A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term “manufactured home” does not include a “recreational vehicle” but does include the following:

Residential Trailer: a structure, greater than 400 square feet, constructed for movement on the public highways that was constructed before January 1, 1962.

Mobile Home: A structure having at least 400 square feet of floor area and which is transportable in one or more sections. A structure constructed for movement on the public highways that was constructed between January 1, 1962 and June 15, 1976, and met the construction requirements of Oregon mobile home law in effect at the time of construction.

Manufactured Dwelling: A structure constructed for movement on the public highways, after June 15, 1976, that was constructed in accordance with federal manufactured housing construction and safety standards and regulations in effect at the time of construction.

MANUFACTURED DWELLING PARK OR SUBDIVISION: A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

MANUFACTURED DWELLING PARK OR SUBDIVISION, EXISTING: A manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufacture homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, an either final site grading or the pouring of concrete pads) is completed before August 1, 1978, the effective date of the floodplain management regulations.

MEAN SEA LEVEL: For purposes of the National Flood Insurance Program (NFIP), the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which Base Flood Elevations (BFE) shown on a community’s Flood Insurance Rate Map (FIRM) are referenced.

MECHANICAL EQUIPMENT: Electrical, heating, ventilation, plumbing, and air conditioning equipment, storage tanks and other service facilities.

MITIGATION: The reduction of adverse effects of a proposed project by considering, in the following order:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action;
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

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- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action by monitoring and taking appropriate measures; and
- (e) Mitigating for the impact by replacing or providing comparable substitute floodplain areas.

NEW CONSTRUCTION: For the purposes of determining insurance rates, structures for which the “start of construction” commenced on or after the effective date of an initial FIRM or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. For floodplain management purposes, *new construction* means structures for which the *start of construction* commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

PERMANENT FOUNDATION: A natural or manufactured support system to which a structure is anchored or attached. A ‘permanent foundation’ is capable of resisting flood forces and may include posts, piles, poured concrete or reinforced block walls, properly compacted fill, or other systems of comparable flood resistivity and strength.

REACH: A hydraulic engineering term used to describe longitudinal segments along a stream of water. A reach will generally include a segment of the flood hazard area where flood heights are primarily controlled by man-made or natural obstructions or constrictions. In an urban area an example of a reach would be the segment of a stream or river between two consecutive bridge crossings.

RECONSTRUCTION: The repair of a structure damaged by any cause (not limited to flooding) without increasing the floor area of the structure.

RECREATIONAL VEHICLE: A vehicle built on a single chassis; 400 square feet or less when measured at the largest horizontal projection; designed to be self-propelled or permanently towable by a light duty truck; designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel or seasonal use; and includes the following:

- (a) **CAMPER:** A structure containing a floor that is designed to be temporarily mounted upon a motor vehicle, and which is designed to provide facilities for temporary human habitation.
- (b) **MOTOR HOME:** A motor vehicle with a permanently attached camper, or that is originally designed, reconstructed or permanently altered to provide facilities for temporary human habitation.
- (c) **TRAVEL TRAILER:** A trailer that is capable of being used for temporary human habitation, which is not more than eight feet wide, and except in the case of a tent trailer, has four permanent walls when it is in the usual travel position.
- (d) **SELF-CONTAINED RECREATIONAL VEHICLE:** A vehicle that contains a factory-equipped, on-board system for the storage and disposal of gray water and sewage.

REHABILITATION: Any improvements and repairs made to the interior and exterior of an existing structure that do not result in an increase in the ground floor area of the structure. Examples include remodeling a kitchen, gutting a structure and redoing the interior, or adding a second story.

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REINFORCED PIER: A pier with a footing adequate to support the weight of the manufactured dwelling under saturated soil conditions. Concrete blocks may be used if vertical steel reinforcing rods are placed in the hollows of the blocks and the hollows are filled with concrete or high strength mortar. Dry stacking concrete blocks does not constitute a ‘reinforced pier’.

REPETITIVE LOSS: Flood-related damages sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before damage occurred.

RESTORATION: The process of returning a disturbed or altered area or feature to a previously existing natural condition. Restoration activities reestablish the ecological structure, function, and/or diversity to that which occurred prior to impacts caused by human activity.

SPECIAL FLOOD HAZARD AREA (SFHA): Zones on Flood Insurance Rate Maps that depict the land in the floodplain within a community that is subject to a one percent or greater chance of flooding in any given year. Special Flood Hazard Area is synonymous with “Area of Special Flood Hazard.” Special Flood Hazard Areas on Flood Insurance Rate Maps are always designated as Zones A, A1-A30, AE, AO, V, V1-V30 or VE.

START OF CONSTRUCTION: Includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement or other improvement occurred within 180 days of the permit date. The actual start means either the first placement of permanent construction of the structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the state of excavation; or the placement of a manufactured dwelling on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of street and/or walkways; nor does it include excavation for a basement, footings, piers, or foundation or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

STRUCTURE: For the purposes of this Section, a walled and roofed building, a modular or temporary building, or a gas or liquid storage tank that is principally above ground.

SUBSTANTIAL DAMAGE: Damage of any origin sustained by a structure where the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

SUBSTANTIAL IMPROVEMENT: Any reconstruction, rehabilitation, addition or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement. The term includes structures which have incurred substantial damage regardless of the actual repair work performed. The market value of the structure is:

- (1) The real market value of the structure prior to the start of the initial repair or improvement. Substantial Improvements shall be calculated cumulatively over a

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five year period using the real market value in County Assessor records at the beginning of the five year period; or

- (2) In the case of damage, the real market value of the structure prior to the damage occurring.

The term substantial improvement does not, however, include either:

- (3) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by local code enforcement prior to substantial improvement or substantial damage and which are solely necessary to assure safe living conditions, or
- (4) Any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places provided that the alteration will not preclude the structure’s continued designation as a historic structure.

WATER SURFACE ELEVATION: Heights, in relation to mean sea level, of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

- (5) **GENERAL STANDARDS:** In all areas of special flood hazards the following standards are required:

LETTER OF MAP REVISION

If hydrologic and hydraulic analysis indicates an increase in flood levels, the applicant shall obtain a Conditional Letter of Map Revision (CLOMR) from FEMA before any encroachment, including fill, new construction, substantial improvement, or other development is permitted. Upon completion of the project, but no later than six months after project completion, a Letter of Map Revision (LOMR) shall be submitted to FEMA to reflect the changes on the FIRM and/or Flood Insurance Study. A LOMR is required only when the CLOMR documents an increase in flood levels during the occurrence of the base flood or where post-development conditions do not reflect what was proposed on the CLOMR

ALTERATION OF WATER COURSES

- (b) The flood carrying capacity within the altered or relocated portion of said watercourse shall be maintained. A maintenance plan for the altered or relocated portion of said watercourse shall be submitted to the Department to ensure that the flood carrying capacity is not diminished.

ANCHORING

- c) All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure.
- (d) All manufactured dwellings shall likewise be anchored to prevent flotation, collapse or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (See FEMA’s "Manufactured Home Installation in Flood Hazard Areas" guidebook for techniques). A certificate signed by a registered architect or

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engineer which certifies that the anchoring system is in conformance with FEMA regulations shall be submitted prior to final inspection approval.

CONSTRUCTION MATERIALS AND METHODS

- (e) All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.
- (f) All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.
- (g) Electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be elevated to prevent water from entering or accumulating within the components during conditions of flooding. In Flood Zones A, A1-A30, AE, V, V1-V30 or VE, such facilities shall be elevated three feet above base flood elevation. In Flood Zone AO, such facilities shall be elevated above the highest grade adjacent to the building, a minimum of one foot above the depth number specified on the FIRM (at least two feet above the highest adjacent grade if no depth number is specified).

UTILITIES:

- (h) Electrical, heating, ventilating, air-conditioning, plumbing, duct systems, and other equipment and service facilities shall be elevated at or above the base flood level or shall be designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during conditions of flooding. In addition, electrical, heating, ventilating, air-conditioning, plumbing, duct systems, and other equipment and service facilities shall:
 - (1) If replaced as part of a substantial improvement meet all the requirements of this section.
 - (2) Not be mounted on or penetrate through breakaway walls.
- (i) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood water into the system.
- (j) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters.
- (k) On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding, consistent with Oregon Department of Environmental Quality (DEQ) standards.

TANKS

- (l) Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood.

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- (m) Above-ground tanks shall be installed at or above the base flood level or shall be anchored to prevent flotation, collapse, and lateral movement under conditions of the base flood.
- (n) In coastal flood zones (V Zones or coastal A Zones) when elevated on platforms, the platforms shall be cantilevered from or knee braced to the building or shall be supported on foundations that conform to the requirements of the State of Oregon Specialty Code.

SUBDIVISION AND PARTITION PROPOSALS

- (o) All subdivision (including proposals for manufactured dwelling parks and subdivision) and partition proposals governed by the Land Division Ordinance shall be consistent with the need to minimize flood damage.
- (p) All subdivision (including proposals for manufactured dwelling parks and subdivision) and partition proposals governed by the Land Division Ordinance shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.
- (q) All subdivisions (including proposals for manufactured dwelling parks and subdivision) and partition proposals governed by the Land Division Ordinance shall have adequate drainage provided to reduce exposure to flood hazards.
- (r) Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated for subdivision and partition proposals governed by the Land Division Ordinance and other proposed developments which contain at least 50 lots or 5 acres (whichever is less).

REVIEW OF BUILDING AND MANUFACTURED DWELLING PERMITS

- (s) Where elevation data is not available either through the Flood Insurance Study or from another authoritative source, applications for building permits and/or manufactured dwelling permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past floodings, etc., where available. Failure to elevate at least three feet above grade in these zones may result in higher insurance rates.

GARAGES

- (t) Attached garages may be constructed with the garage floor slab below the Base Flood Elevation (BFE) in riverine flood zones, if the following requirements are met:
 - (1) If located within a floodway the proposed garage shall comply with the requirements of Section 3.510(9);
 - (2) The floors are at or above grade on not less than one side;
 - (3) The garage is used solely for parking, building access, and/or storage;
 - (4) The garage is constructed with flood openings to equalize hydrostatic flood forces on

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exterior walls by allowing for the automatic entry and exit of floodwater.

5. The portions of the garage constructed below the BFE are constructed with materials resistant to flood damage;

6. The garage is constructed in compliance with the applicable standards of this ordinance; and

7. The garage is constructed with electrical, and other service facilities located and installed so as to prevent water from entering or accumulating within the components during conditions of the base flood.

B. Detached garages shall be constructed in compliance with the applicable standards of this ordinance.

APPURTENANT (ACCESSORY) STRUCTURES

(u) Relief from elevation or floodproofing requirements for residential and non-residential structures in Riverine (Non-Coastal) flood zones may be granted for appurtenant structures that meet the following requirements:

(1) Appurtenant structures located partially or entirely within the floodway shall comply with requirements for development within a floodway.

(2) Appurtenant structures shall only be used for parking, access, and/or storage and shall not be used for human habitation;

(3) In compliance with State of Oregon Specialty Codes, appurtenant structures on properties that are zoned residential are limited to one-story structures less than 200 square feet, or 400 square feet if the property is greater than two (2) acres in area and the proposed appurtenant structure will be located a minimum of 20 feet from all property lines. Appurtenant structures on properties that are zoned as non-residential are limited in size to 120 square feet.

(4) The portions of the appurtenant structure located below the Base Flood Elevation shall be built using flood resistant materials;

(5) The appurtenant structure shall be adequately anchored to prevent flotation, collapse, and lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the base flood.

(6) The appurtenant structure shall be designed and constructed to equalize hydrostatic flood forces on exterior walls and comply with the requirements for flood openings;

(7) Appurtenant structures shall be located and constructed to have low damage potential;

(8) Appurtenant structures shall not be used to store toxic material, oil, or gasoline, or any priority persistent pollutant identified by the Oregon Department of Environmental Quality unless confined in a tank installed in compliance with this ordinance.

(9) Appurtenant structures shall be constructed with electrical, mechanical, and other service facilities located and installed so as to prevent water from entering or accumulating within the components during conditions of the base flood.

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USE OF OTHER FLOOD DATA

- (v) When Base Flood Elevation data has not been provided the local floodplain administrator shall obtain, review, and reasonably utilize any Base Flood Elevation data available from a federal, state, or other source, in order to administer the provisions of this ordinance. All new subdivision proposals and other proposed new developments (including proposals for manufactured dwelling parks and subdivisions) shall meet the requirements for development as set forth in this ordinance.

Base Flood Elevations shall be determined for development proposals that are 5 acres or more in size or are 50 lots or more, whichever is lesser in any A zone that does not have an established base flood elevation. Development proposals located within a riverine unnumbered A Zone shall be reasonably safe from flooding; the test of reasonableness includes use of historical data, high water marks, FEMA provided Base Level Engineering data, and photographs of past flooding, etc... where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

STRUCTURES LOCATED IN MULTIPLE OR PARTIAL FLOOD ZONES

- (w) In coordination with the State of Oregon Specialty Codes:

- (1) When a structure is located in multiple flood zones on the community’s Flood Insurance Rate Maps (FIRM) the provisions for the more restrictive flood zone shall apply.

- (2) When a structure is partially located in a special flood hazard area, the entire structure shall meet the requirements for new construction and substantial improvements.

- (6) SPECIFIC STANDARDS FOR A ZONES (A, AE or A1-A30): In all areas of special flood hazards where base flood data has been provided as set forth in Section 3.510(2) or other base flood data are utilized, the following provisions are required:

RESIDENTIAL CONSTRUCTION

- (a) New construction and substantial improvement of any residential structure, including manufactured dwellings, shall have the lowest floor, including basement, at a minimum of three feet above base flood elevation.
- (b) Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement shall either be certified by a registered professional engineer or shall meet or exceed the following minimum criteria:

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- (1) A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.
- (2) The bottom of all openings shall be no higher than one foot above grade.
- (3) Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

NONRESIDENTIAL CONSTRUCTION

- (c) New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall have either the lowest floor including basement elevated to three feet above the level of the base flood elevation or higher; or, together with attendant utility and sanitary facilities, shall:
 - (1) Be floodproofed so that the portion of the structure that lies below the portion that is three feet or more above the base flood level is watertight with walls substantially impermeable to the passage of water.
 - (2) Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.
 - (3) Be certified by a registered professional engineer or architect that the design and methods of construction are in compliance with accepted standards of practice for meeting provisions of this Subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the Community Development Director.
 - (4) Nonresidential structures that are elevated, not floodproofed, shall meet the same standards for space below the lowest floor as described for residential construction in Section 3.510(6)(a) and (b).
 - (5) Applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g. a building constructed to the base flood level will be rated as one foot below that level).

(7) MANUFACTURED DWELLINGS

- (d) Any manufactured dwelling which incurs substantial damage as the result of a flood, shall be elevated to the standards listed in (e) or (f) below.
- (e) All manufactured dwellings to be placed or substantially improved within Zones ~~A~~, AE or A1-30 shall be elevated on a permanent foundation such that the lowest floor of the manufactured dwelling is at or above three feet above the base flood elevation and shall be securely anchored to an adequately anchored foundation system in accordance with Section 3.510(5) and requirements of the Oregon Residential Specialty Code.

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- (1) New or substantially improved manufactured dwellings supported on solid foundation walls shall be constructed with flood openings that comply with Section 3.510(6);
 - (2) The bottom of the longitudinal chassis frame beam shall be at or above Base Flood Elevation;
 - (3) New or substantially improved manufactured dwellings shall be anchored to prevent flotation, collapse, and lateral movement during the base flood. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (Reference FEMA’s “Manufactured Home Installation in Flood Hazard Areas” guidebook for additional techniques), and;
 - (4) Electrical crossover connections shall be a minimum of twelve (12) inches above Base Flood Elevation (BFE).
- (f) Manufactured dwellings to be placed or substantially improved on sites in a Velocity (V1-V30, VE, V or Coastal A) Zones shall meet the following requirements:
- (1) The bottom of the longitudinal chassis frame beam of the manufactured dwelling ~~home~~ is elevated to a minimum of three feet above the base flood elevation, ~~or~~ and
 - (2) Development complies with the standards outlined in Section 3.510(10) of this ordinance.
 - (3) Electrical crossover connections shall be a minimum of 12 inches above base flood elevation.
- (8) **RECREATIONAL VEHICLES:** Recreational vehicles may occupy a site in a Special Flood Hazard Area for periods of 180 consecutive days or less provided they are fully licensed and highway ready. Recreational vehicles are on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices and has no permanently attached additions. Recreational vehicles that do not meet these criteria become manufactured dwellings and shall be anchored and elevated pursuant to this ordinance.
- (9) **SPECIFIC STANDARDS FOR FLOODWAYS:** Located within areas of special flood hazard established in Section 3.510(2) are areas designated as regulatory floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply:
- (a) Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless certification by a registered professional civil engineer is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment shall not result in any increase in flood levels within the community during the occurrence of the base flood discharge;
 - (b) If Subsection 9(a) is satisfied, all new construction and substantial improvement shall comply with all applicable flood hazard reduction provisions of Section 3.510(5) and (6).

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- (c) A community may permit encroachments within the adopted regulatory floodway that would result in an increase in base flood elevations, provided that a Conditional Letter of Map Revision (CLOMR) is applied for and approved by the Federal Insurance Administrator, and the requirements for such revision as established under Volume 44 of the Code of Federal Regulations, section 65.12 are fulfilled.
 - (d) Projects for stream habitat restoration may be permitted in the floodway provided:
 - (1) The civil engineer shall, as a minimum, provide a feasibility analysis and certification that the project was designed to keep any rise in 100-year flood levels and that no structures will be impacted by a potential rise in flood elevation; and,
 - (2) An agreement to monitor the project, correct problems, and ensure that flood carrying capacity remains unchanged is included as part of the local approval.
 - (e) Before a Regulatory Floodway is determined in an A1-A30 or AE Zone: In areas where a regulatory floodway has not been designated, no new construction, substantial improvements or other development (including fill) shall occur within an AE Zone designated on the community’s Flood Insurance Rate Map, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.
 - (f) As noted in “The Flood Insurance Study for Tillamook County” as revised on September 28, 2018, certain areas of Tillamook County are subject to heavy tidal influence and sheet flows. Floodways are not applicable in this type of flooding. Thus, the following areas are not subject to the requirement of Section (9)(e) above:
 - (1) Nehalem River downstream of cross-section A
 - (2) Nestucca River where it joins Nestucca Bay
 - (3) Tillamook River
 - (4) Wilson River from cross-sections A to Y
 - (5) Trask River from cross-sections A to AF
 - (6) Kilchis River downstream of cross-section C
 - (g) In areas where a regulatory floodway has not been designated, no new construction, substantial improvement, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community’s Flood Insurance Rate Map (FIRM), unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.
- (10) **SPECIFIC STANDARDS FOR COASTAL HIGH HAZARD AREAS (V, VE or V1-V30 ZONES):** Located within areas of special flood hazard established in Section 3.510(2) are Coastal High Hazard Areas. These areas have special flood hazards associated with high velocity waters from tidal surges and, therefore, in addition to meeting all provisions in this Section the following provisions shall apply to residential, non-residential, manufactured dwellings and other development in Coastal High Hazard Areas:

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- (a) All new construction and substantial improvements in Zones V1-V30, VE, V-and coastal A zones (where base flood elevation data is available) shall be elevated on pilings and columns so that:
- (1) The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated ~~to or above~~ a minimum of one foot above the base flood level: and
 - (2) The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values used shall be those associated with the base flood. Wind loading values used shall be those specified by the State of Oregon Specialty Codes.
- (b) A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of (a)(1) and (a)(2) above. A certificate shall be submitted, signed by the registered professional engineer or architect that the requirements of this Section will be met.
- (c) Obtain the elevation (in relation to mean sea level) of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures in Zones V1-30, VE, and V and whether or not such structures contain a basement. The Community Development Director shall maintain a record of all such information.
- (d) All new construction shall be located landward of the reach of mean high tide.
- (e) Provide that all new construction and substantial improvements have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system, For the purpose of this Section a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or state codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:
- (1) Breakaway wall collapse shall result from a water load less than that which would occur during the base flood; and
 - (2) The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and nonstructural). Maximum wind and water loading values to be used in this determination shall each have a one percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval).

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- (f) If breakaway walls are utilized, such enclosed space shall be usable solely for parking of vehicles, building access, or storage. Such space shall not be used for human habitation.
 - (g) Prohibit the use of fill for structural support of buildings.
 - (h) Prohibit man-made alteration of sand dunes, including vegetation removal, which would increase potential flood damage.
- (11) **SPECIFIC STANDARDS FOR AREAS OF SHALLOW FLOODING (AO ZONE):** Shallow flooding areas appear on FIRM's as AO zones with depth designations. The base flood depths in these zones range from 1 to 3 feet where a clearly defined channel does not exist, or where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is usually characterized as sheet flow. In these areas the following provisions apply:
- (a) Require adequate drainage paths around structures on slopes to guide floodwaters around and away from proposed structures.

RESIDENTIAL

- (b) New construction and substantial improvements of residential structures (including manufactured dwellings) within AO zones shall have the lowest floor (including basement) elevated above the highest grade adjacent to the building, a minimum of one foot above the depth number specified on the FIRM (at least two feet above the highest adjacent grade if no depth number is specified). For manufactured dwellings the lowest floor is considered to be the bottom of the longitudinal chassis frame beam.

NON-RESIDENTIAL

- (c) New construction and substantial improvements of nonresidential structures, including manufactured dwellings used for non-residential purposes, within AO zones shall either:
 - Have the lowest floor (including basement) elevated above the highest adjacent grade to the building, a minimum of one foot above the depth number specified on the FIRM (at least two feet above the highest adjacent grade if no depth number is specified) or
 - Together with attendant utility and sanitary facilities, be completely floodproofed to one foot above the depth number specified on the FIRM so that any space below that level is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. If this method is used, compliance shall be certified by a registered professional engineer or architect as in Subsection (6)(c)(3) of this Section.
- (3) Recreational vehicles placed on sites within AO Zones on the community's Flood Insurance Rate Maps (FIRM) shall either:
 - a. Be on the site for fewer than 180 consecutive days, and

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- b. Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or
- c. Meet the elevation requirements of this ordinance and the anchoring and other requirements for manufactured dwellings.
- d. In AO zones, new and substantially improved appurtenant structures shall comply with the applicable requirements outlined in Section 3.510(5) and (6).
- e. In AO zones, enclosed areas beneath elevated structures shall comply with the applicable requirements outlined in Section 3.510(5) and (6).

(13) SPECIAL ADMINISTRATIVE PROVISIONS FOR FH ZONE:

- (a) Designation of the Local Administrator: The Community Development Director of Tillamook County is hereby appointed to administer and implement the provisions of this Flood Hazard Overlay Zone by granting or denying development permit applications in accordance with its provisions.
- (b) Duties of the Community Development Director shall include, but not be limited to:
 - (1) Review of all Floodplain Development Permits for construction and other development within an Area of Special Flood Hazard identified on the Flood Insurance Rate Map to assure that the requirements of this Section have been satisfied and that all other necessary permits have been obtained from those federal, state or local governmental agencies from which prior approval is required.
 - (2) Review all other permit applications to determine compliance with this Section.
 - (3) Notify adjacent communities and the Department of Land Conservation and Development prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration.
 - (4) Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capability is not diminished.
 - (5) Provide base flood elevation and structure elevation requirements to the Building Official.
 - (6) Determine if structures meet substantial improvement or substantial damage thresholds.
 - (7) Where base flood elevation data is provided through the Flood Insurance Study or required within this Section, obtain and record on an Elevation Certificate the actual elevation (in relation to mean sea level) of the lowest floor (including basement) of all new or substantially improved structures, and whether or not the structure contains a basement.

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- (8) For all new or substantially improved floodproofed structures:
 - (a) Verify and record the actual elevation (in relation to mean sea level), and
 - (b) Maintain the floodproofing certifications required in this Section.
 - (9) Maintain for inspection in perpetuity the affidavits of certification required in this Section. Affidavits of certification, such as elevation certificates, V zone certification, floodproofing, breakaway walls, floodway no-rise, etc., are required to be submitted by the permit applicant for elevations and structural requirements as specified in this Section, both pre- and post-construction, utilizing forms provided for this purpose by FEMA. Elevations may be certified by a licensed surveyor or a registered professional architect or engineer. Structural requirements may be certified by a registered professional architect or engineer.
 - (10) Where interpretation is needed requiring the boundaries of the areas of special flood hazard, the Community Development Director will make the necessary interpretation. The person contesting the ruling of the Community Development Director shall be given a reasonable opportunity to appeal the ruling as provided in Section 3.510(15).
 - (11) When base flood elevation has not been provided as set forth in Section 3.510(2), the Community Development Director shall obtain, review and reasonably utilize any base flood data and floodway available from federal, state, or other source in order to administer the provisions of Section 3.510.
 - (12) All records pertaining to the provisions of this Section shall be maintained in the Tillamook County Community Development Department and shall be open for public inspection.
 - (13) When a Variance is granted, the Community Development Director shall give written notice that the structure will be allowed to be built with the lowest floor elevation at or below base flood elevation, and that the cost of flood insurance will be commensurate with the increased risk resulting from the lowest floor elevation.
- (c) Restrict the location of structures placed on undeveloped parcels between Brooten Road and the Nestucca River, from the Woods Bridge downstream to map cross-section line F on the amended floodway map for the Nestucca River.

Such structures shall occupy no more than 62.5% of the lot width of the parcel to be built upon. This requirement does not apply if the structure is built upon pilings with the area beneath the structure open to permit passage of flood water.

Any such structure shall comply with all other requirements of this Section and shall provide a regulatory floodway analysis for structures in the floodway. The intent of this Subsection is to maintain a minimum of 1000 feet of open space on the east bank of the Nestucca River, between Brooten Road and the river, from the Woods Bridge structure downstream to map cross-section line F on the amended floodway map for the Nestucca River.

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(d) Publicly owned open land recreation parks and accessory restroom facilities, where allowed in the underlying zone, shall be allowed in floodplain areas below the base flood elevation. The accessory restroom facilities shall be located outside of floodplain areas if possible. If it is not possible, the restroom structures shall be located:

- (1) On the highest portion of the park grounds; and
- (2) Be wet-floodproofed; and
- (3) Maintain riparian setbacks; and
- (4) Adequate backflow valves shall be installed;

If the structure is located in a designated floodway, it shall conform to 1 through 4 above and shall be small enough and positioned so that it will not divert floodwaters. Any structure located within the regulatory floodway shall have a floodway analysis to assure there is no-rise in base flood elevation.

(e) All residential and non-residential development and substantial improvements, within the Pacific City Airport Overlay Zone where the height is restricted by the PAO zone, below that allowed by the underlying zone, shall conform to the FH zone regulations except that the lowest floor elevation and the floodproofing shall be certified at the base flood elevation given on the FIRM maps instead of the required three foot above base flood elevation level. Any structure located within the regulatory floodway shall have a floodway analysis to assure there is no-rise in base flood elevation.

(14) **DEVELOPMENT PERMIT PROCEDURES:** A development permit shall be obtained before construction or development begins within any area of special flood hazard zone. The permit shall be for all structures including manufactured dwellings, and for all development including fill and other development activities, as set forth in the Definitions contained in this Section of the Land Use Ordinance.

(a) Application for a development permit shall be made on forms furnished by the Community Development Director and shall include but not necessarily be limited to: plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question, existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically, the following information in 3.510(14)(a)(1)–(4) is required and Development Permits required under this Section are subject to the Review Criteria put forth in Section 3.510(14)(b):

- (1) Elevation in relation to mean sea level of the lowest floor, including basement, of all structures as documented on an Elevation Certificate;
- (2) Elevation in relation to mean sea level to which any proposed structure will be floodproofed as documented on an Elevation Certificate;
- (3) If applicable, certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria in Subsection (6)(c)(3) of this Section; and

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- (4) Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.
- (b) Development Permit Review Criteria
- (1) The fill is not within a Coastal High Hazard Area.
 - (2) Fill placed within the Regulatory Floodway shall not result in any increase in flood levels during the occurrence of the base flood discharge.
 - (3) The fill is necessary for an approved use on the property.
 - (4) The fill is the minimum amount necessary to achieve the approved use.
 - (5) No feasible alternative upland locations exist on the property.
 - (6) The fill does not impede or alter drainage or the flow of floodwaters.
 - (7) If the proposal is for a new critical facility, no feasible alternative site is available.
 - (8) For creation of new, and modification of, Flood Refuge Platforms, the following apply, in addition to (14)(a)(1-4) and (b)(1-5):
 - i. The fill is not within a floodway, wetland, riparian area or other sensitive area regulated by the Tillamook County Land Use Ordinance.
 - ii. The property is actively used for livestock and/or farm purposes,
 - iii. Maximum platform size = 10 sq ft of platform surface per acre of pasture in use, or 30 sq ft per animal, with a 10-ft wide buffer around the outside of the platform,
 - iv. Platform surface shall be at least 1 ft above base flood elevation,
 - v. Slope of fill shall be no steeper than 1.5 horizontal to 1 vertical,
 - vi. Slope shall be constructed and/or fenced in a manner so as to prevent and avoid erosion.
- Conditions of approval may require that if the fill is found to not meet criterion (5), the fill shall be removed or, where reasonable and practical, appropriate mitigation measures shall be required of the property owner. Such measures shall be verified by a certified engineer or hydrologist that the mitigation measures will not result in a net rise in floodwaters and be in coordination with applicable state, federal and local agencies, including the Oregon Department of Fish and Wildlife.
- (c) Before approving a development permit application for other than a building, the Community Development Director may determine that a public hearing should be held on the application. Such hearing shall be held before the Planning Commission and a decision made by the Planning Commission in accordance with the provisions of Article 10.
- (15) APPEALS, REDUCTIONS AND VARIANCES:

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- (a) An appeal of the ruling of the Community Development Director regarding a requirement of this Section may be made to the Tillamook County Planning Commission pursuant to Section 10.100.
- (b) Reductions of the "3 feet above base flood elevation" standard may be granted by the Community Development Director, upon findings that:
 - (1) Strict application of the three-foot standard would produce an unreasonable or inequitable result; and
 - (2) A lesser elevation requirement will not result in an appreciable increase in flood damage.

Reductions to below 1 foot above base flood elevation require a Variance as described in (c), below.

The intent of this provision is to limit this application of the Director's discretion to those rare and unusual circumstances where the three-foot standard would result in unnecessary and burdensome development requirements.

- (c) Variances to the standards contained in Section 3.510 shall be issued only in accordance with the following criteria:
 - (1) Generally, the only condition under which a variance from the elevation standard may be issued is for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing the items in subsection (15)(c)(2) have been fully considered. As the lot size increases the technical justification required for issuing the variance increases.
 - (2) The following items shall be considered in review of variance applications:
 - (i) The danger that materials may be swept onto other lands to the injury of others;
 - (ii) The danger to life and property due to flooding or erosion damage;
 - (iii) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;
 - (iv) The importance of the services provided by the proposed facility to the community;
 - (v) The necessity to the facility of a waterfront location, where applicable;
 - (vi) The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;
 - (vii) The compatibility of the proposed use with existing and anticipated development;
 - (viii) The relationship of the proposed use to the comprehensive plan and flood plain management program for that area;
 - (ix) The safety of access to the property in times of flood for ordinary and emergency vehicles;
 - (x) The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and,

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- (xi) The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges.
- (3) Variances may be issued for the reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places or the Statewide Inventory of Historic Properties, without regard to the procedures set forth in this section.
- (4) Variances shall not be issued within a designated floodway if any increase in flood levels during the base flood discharge would result.
- (5) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
- (6) Variances shall be issued only upon:
 - (i) A showing of good and sufficient cause;
 - (ii) A determination that failure to grant the variance would result in exceptional hardship to the applicant;
 - (iii) A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public as identified in subsection (15)(c)(2), or conflict with existing local laws or ordinances.
- (7) Variances as interpreted in the National Flood Insurance Program are based on the general zoning law principle that they pertain to a physical piece of property; they are not personal in nature and do not pertain to the structure, its inhabitants, economic or financial circumstances. They primarily address small lots in densely populated residential neighborhoods. As such, variances from the flood elevations should be quite rare.
- (8) Variances may be issued for nonresidential buildings in very limited circumstances to allow a lesser degree of floodproofing than watertight or dry-floodproofing, where it can be determined that such action will have low damage potential, complies with all other variance criteria except subsection (15)(c)(1), and otherwise complies with general standards in Section 3.510(5).
- (9) Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor elevation below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.
 - (d) The procedures for reviewing and taking action on a variance under the provisions of this Section shall be pursuant to the procedures for a Type II review in accordance with Article 10 of the TCLUO.
- (16) REQUIREMENTS TO NOTIFY OTHER ENTITIES AND SUBMIT NEW TECHNICAL DATA:
 - (A) COMMUNITY BOUNDARY ALTERATIONS: The Floodplain Administrator shall notify the Federal Insurance Administrator in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed authority or

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no longer has authority to adopt and enforce floodplain management regulations for a particular area, to ensure that all Flood Hazard Boundary Maps (FHBM) and Flood Insurance Rate Maps (FIRM) accurately represent the community’s boundaries. Include within such notification a copy of a map of the community suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished floodplain management regulatory authority.

- (B) **WATERCOURSE ALTERATIONS:** The Floodplain Administrator shall notify the Federal Insurance Administrator in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed authority or no longer has authority to adopt and enforce floodplain management regulations for a particular area, to ensure that all Flood Hazard Boundary Maps (FHBM) and Flood Insurance Rate Maps (FIRM) accurately represent the community’s boundaries. Include within such notification a copy of a map of the community suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished floodplain management regulatory authority.
- (C) **REQUIREMENT TO SUBMIT NEW TECHNICAL DATA:** A community’s base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify the Federal Insurance Administrator of the changes by submitting technical or scientific data in accordance with Section 44 of the Code of Federal Regulations (CFR), Sub-Section 65.3. The community may require the applicant to submit such data and review fees required for compliance with this section through the applicable FEMA Letter of Map Change (LOMC) process.

The Floodplain Administrator shall require a Conditional Letter of Map Revision prior to the issuance of a floodplain development permit for:
A. Proposed floodway encroachments that increase the base flood elevation; and
B. Proposed development which increases the base flood elevation by more than one foot in areas where FEMA has provided base flood elevations but no floodway.

An applicant shall notify FEMA within six (6) months of project completion when an applicant has obtained a Conditional Letter of Map Revision (CLOMR) from FEMA. This notification to FEMA shall be provided as a Letter of Map Revision (LOMR).

SUBSTANTIAL IMPROVEMENT AND SUBSTANTIAL DAMAGE ASSESSMENTS AND DETERMINATION: Conduct Substantial Improvement (SI) reviews for all structural development proposal applications and maintain a record of SI calculations within permit files. Conduct Substantial Damage (SD) assessments when structures are damaged due to a natural hazard event or other causes. Make SD determinations whenever structures within the special flood hazard area are damaged to the extent that the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the real market value of the structure before the damage occurred.

- (17) **COMPLIANCE:** All development within special flood hazard areas is subject to the terms of this ordinance and other applicable regulations.
- (18) **PENALTIES FOR NONCOMPLIANCE:** No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations. Violations of the provisions of this ordinance by failure to comply with any of its requirements (including violations of conditions and safeguards established in

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connection with conditions) shall be subject to citation and fines in addition to and not in lieu of any other enforcement and penalties contained in this Ordinance or other County Ordinance or State law and . Nothing contained herein shall prevent Tillamook County from taking such other lawful action as is necessary to prevent or remedy any violation.

- (19) **ABROGATION:** This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.
- (20) **SEVERABILITY:** This ordinance and the various parts thereof are hereby declared to be severable. If any section clause, sentence, or phrase of the Ordinance is held to be invalid or unconstitutional by any court of competent jurisdiction, then said holding shall in no way effect the validity of the remaining portions of this Ordinance.
- (21) **INTERPRETATION:** In the interpretation and application of this ordinance, all provisions shall be:
 - 1) Considered as minimum requirements;
 - 2) Liberally construed in favor of the governing body; and,
 - 3) Deemed neither to limit nor repeal any other powers granted under state statutes.
- (22) **WARNING:** The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages.
- (23) **DISCLAIMER OF LIABILITY:** This ordinance shall not create liability on the part of Tillamook County, any officer or employee thereof, or the Federal Insurance Administrator for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.
- (24) **PROVISIONS:** The provisions of Section 3.510 shall take precedence over all prior resolutions or orders of the Board of County Commissioners relating to Floodplain Management.

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SECTION 3.530: BEACH AND DUNE OVERLAY ZONE (BD)

(1) **PURPOSE:** The purpose of the Beach and Dune Overlay Zone is to establish criteria and performance standards to direct and manage development and other activities in beach and dune areas in a manner that:

- (a) Conserves, protects and, where appropriate, restores the resources and benefits of coastal beach and dune areas;
- (b) Reduces the risks to life and property from natural and man-induced actions on these inherently dynamic landforms; and
- (c) Ensures that the siting and design of development in beach and dune areas is consistent with Statewide Planning Goals 7 and 18, and the Hazards Element and Beaches and Dunes Element of the Tillamook County Comprehensive Plan.

Risk is ever present in identified beach and dune areas. The provisions and requirements of this section are intended to provide for identification and assessment of risk from beach and dune natural hazards, and to establish standards that limit overall risk to the community from identified hazards to a level acceptable to the community.

Development in identified hazard areas is subject to increased levels of risk, and these risks must be acknowledged and accepted by present and future property owners who proceed with development in these areas.

(2) **AREAS INCLUDED:** All beach and dune areas categorized in the table below and as identified in Open File Report O-20-04, Temporal and Spatial Changes in Coastal Morphology, Tillamook County, Oregon by the Oregon Department of Geology and Mineral Industries (DOGAMI) are subject to the provisions of this section. Beach and dune landforms are identified and mapped in this DOGAMI report. The following table provides a crosswalk between the categories mapped in O-20-04 and the categories subject to the provisions of this Section 3.530 and the Beaches and Dunes Element of the Tillamook County Comprehensive Plan.

DOGAMI Inventory Classification	Goal 18, DLCD Classification	Mapping Code
Beach	Beach	B
Active Foredune	Foredune, Active	FDA
Active Dune Hummocks	Hummocks, Active	H
Recently Stabilized Foredune	Foredune, Conditionally Stable	FD
Dune Complex	Dune Complex	DC

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Younger Stabilized Dunes	Dune, Younger Stabilized	DS
Older Stabilized Dunes	Dune, Older Stabilized	ODS
Open Dune Sand	Dune, Active/Dune, Parabolic	OS
Open Dune Sand Conditionally Stable	Dune, Conditionally Stable	OSC
Active Inland Dune	Dune, Active	AID
Wet Interdune	Interdune	W
Wet Deflation Plain	Deflation Plain	WDP

- (3) PERMITTED USES: Within the Beach and Dune Overlay Zone, all uses permitted pursuant to the provisions of the underlying zone may be permitted, subject to the additional requirements and limitations of this section.
- (4) HABITAT RESTORATION & ENHANCEMENT: Permits for the enhancement or restoration of beach and dune landforms for the purposes of wildlife and plant habitat are permitted in the Beach and Dune Overlay Zone subject to the following requirements:
- (a) Any proposed vegetation removal shall be the minimum extent necessary to carry out the purpose of the habitat restoration or enhancement project.
 - (b) Activities shall demonstrate compliance with the requirements of the Flood Hazard Overlay Zone, if applicable.
 - (c) Activities shall be tied to an existing conservation plan, wildlife strategy, Endangered Species Act requirement, or other applicable document.
 - (d) The permit application shall include a clear plan for what activities will be carried out, the timing of the activities, and include:
 - (A) Temporary and permanent stabilization programs, sand contouring, and the planned maintenance of new and existing vegetation over at least a five-year period from completion of work;
 - (B) Methods for protecting the surrounding area from any adverse effects of the restoration or enhancement activities; and
 - (C) Minimize to insignificant levels hazards to life, public and private property, and the natural environment which may be caused by the proposed activities.
 - (e) Application, review, decisions, and appeals for permits for habitat restoration or enhancement shall be a Type I procedure in accordance with Article 10.

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(5) DUNE AREA DEVELOPMENT PERMIT:

- (a) Except for activities identified in subsection (5)(b) as exempt, any new development, new construction, substantial improvement, shoreline alteration (including activities outside of OPRD’s jurisdiction) or grading activity in an area subject to the provisions of this section shall require a Dune Area Development Permit. The Dune Area Development Permit may be applied for prior to or in conjunction with a building permit, grading permit, or any other permit or land use approval required by Tillamook County.

- (b) The following activities are exempt from the requirement for a Dune Area Development Permit:
 - (A) Maintenance, repair, or alterations to existing structures that do not alter the building footprint or foundation and do not constitute substantial improvement as defined in Article 11;
 - (B) Exploratory excavations under the direction of a certified engineering geologist or registered geotechnical engineer;
 - (C) Construction of structures for which a building permit is not required;
 - (D) An excavation which is less than two feet in depth, or which involves less than twenty-five cubic yards of volume;
 - (E) Fill that is less than two feet in depth or that involves less than twenty-five cubic yards of volume;
 - (F) Yard area vegetation maintenance on slopes less than 20%;
 - (G) Removal of trees smaller than 8 inches dbh (diameter breast height);
 - (H) Removal of trees larger than 8 inches dbh provided the canopy area of the trees that are removed is any one-year period is less than 25% of the lot or parcel area;
 - (I) Forest operations subject to regulation under ORS 527 (the Oregon Forest Practices Act);
 - (J) Maintenance and reconstruction of public and private roads, streets, parking lots, driveways, and utility lines, provided the work does not extend outside the existing right-of-way boundary;

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- (K) Maintenance and repair of utility lines, and the installation of individual utility service connections;
 - (L) Emergency response activities intended to reduce or eliminate an immediate danger to life, property, or flood or fire hazard;
 - (M) Restoration, repair, or replacement of a lawfully established structure damaged or destroyed by fire or other casualty in accordance with subsection (15) of this section;
 - (N) Beachfront protective structures subject only to regulation by the Oregon Parks and Recreation Department under OAR Chapter 736, division 20;
 - (O) Remedial sand grading authorized by a Remedial Sand Grading Permit issued pursuant to subsection (11) of this section; and
 - (P) Foredune grading authorized by a Foredune Grading Permit issued pursuant to subsection (12) of this section.
 - (Q) Lots or parcels less than 20,000 square feet in size located on an Older Stabilized Dune where the average existing slope is less than 19% measured from the highest to lowest point of the property.
 - (P) Lots or parcels greater than 20,000 square feet in size located on an Older Stabilized Dune where the average existing slope of the building footprint or area to be disturbed measured from the highest to lowest point within the footprint or area to be disturbed is 29 percent or greater.
- (d) Application, review, decisions, and appeals for Dune Area Development Permits shall be a Type I procedure in accordance with Article 10.
 - (e) In addition to a completed application as prescribed in Article 10, an application for a Dune Area Development Permit shall include the following:
 - (A) A site plan that illustrates areas of disturbance, ground topography (contours), roads and driveways, an outline of wooded or naturally vegetated areas, watercourses, erosion control measures, and trees with a diameter of 8-inches dbh (diameter breast height) or larger proposed for removal;
 - (B) An estimate of depths and the extent of all proposed excavation and fill work;

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- (C) Identification of the coastal erosion hazard zone for the parcel or lot upon which development is to occur;
 - (D) Identification of all natural hazards potentially present and estimated sea level rise expected for the parcel or lot upon which development is to occur.
 - (E) A Geologic Hazard Report prepared by a qualified licensed geoprofessional (as defined in Article 11) which meets the content requirements of subsection (6); and
 - (F) If engineering remediation is required to make the site suitable for the proposed development, an engineering report, prepared by a registered civil engineer (with experience relating to coastal processes), geotechnical engineer, or certified engineering geologist which provides design and construction specifications for the required remediation.
- (f) A decision to approve a Dune Area Development Permit shall be based upon findings of compliance with the following standards:
- (A) The proposed development complies with the applicable requirements and standards of subsections (7), (8), (9), (10), and (13) of this section;
 - (B) Any proposed foredune grading for site preparation cannot go below the Base Flood Elevation plus four feet; shall be the minimum area necessary for the construction of a structure; shall include plans for temporary and permanent stabilization of the site, including a re-vegetation plan of exposed sand areas; and shall conform with the requirements of subsection (11)(b) of this section. Additionally, all graded sand shall remain in the beach-foredune system;
 - € The Geologic Hazard Report conforms to the standards for such reports set forth in subsection (6) of this section; and
 - (D) The development plans for the application conform, or can be made to conform, with all recommendations and specifications contained in the Geologic Hazard Report.
- (g) In approving a Dune Area Development Permit, the decision maker may impose any conditions which are necessary to ensure compliance with the provisions of

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this section or with any other applicable provisions of the Tillamook County Land Use Ordinance.

- (h) In the event the decision maker determines that additional review of the Geologic Hazard Report by a qualified licensed geoprofessional is necessary to determine compliance with this section, Tillamook County may retain the services of such a professional for this purpose. The applicant shall be responsible for all costs associated with the additional review. The results of that evaluation shall be considered in deciding on the Dune Area Development Permit.

(6) GEOLOGIC HAZARD REPORT STANDARDS

- (a) For the purposes of Section 3.530, a Geologic Hazard Report refers to engineering geologic reports, geotechnical reports, and geotechnical engineering reports.
- (b) Geologic Hazard Reports required by this section shall be prepared consistent with standard geologic practices employing generally accepted scientific and engineering principles, and shall, at a minimum, contain the applicable provisions outlined in the Oregon State Board of Geologist Examiners publication "Guidelines for the Preparation of Engineering Geologic Reports", 2nd Edition, 5/30/2014 or other published best practice guidelines for engineering geologic or geotechnical engineering reports, consistent with current scientific and engineering principles. Reports shall reference the published guidelines upon which they are based.
 - (c) Geologic Hazard Reports required by this section shall include the following from the preparer(s) of the report:
 - (A) A statement that all the applicable content requirements of this subsection have been addressed or are not applicable to the review. An explanation shall be accompanied with any requirement identified as not applicable;
 - (B) A description of the qualifications of the professional(s) that prepared the report. If multiple licensed professionals contributed to the report, each professional shall individually sign and stamp their own work products and
 - (C) A statement by the preparer(s) that they have the appropriate qualifications to have completed the report and all its contents.

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- (d) All Geologic Hazard Reports are valid for purposes of meeting the requirements of this section for a period of five (5) years from the date of preparation. Such reports are valid only for the development plan addressed in the report. Tillamook County assumes no responsibility for the quality or accuracy of such reports. Within that five-year period, the Planning Director can require at their discretion an addendum by a qualified licensed geoprofessional certifying that site conditions have not changed from the original report. If site conditions have changed, a new Geologic Hazard Report will be required.
- (e) For development activities that are subject both to this section and Section 4.130: Development Requirements for Geologic Hazard Areas, one complete Geologic Hazard Report can be used for meeting the requirements of this section and Section 4.130. The report shall include requirements for both sections as applicable.
- (f) In addition to the requirements set forth in subsections (b) and (c), Geologic Hazard Reports for lots or parcels abutting the ocean shore shall, to the extent applicable and based on best available information, include the following information, analyses, and recommendations:
 - (A) Site description:
 - (i) The history of the site and surrounding areas, such as previous riprap or dune grading permits, erosion events, exposed trees on the beach, or other relevant local knowledge of the site.
 - (ii) Topography, including elevations and slopes on the property itself.
 - (iii) Vegetation cover.
 - (iv) Subsurface materials – the nature of the rocks and soils.
 - (v) Conditions of the seaward front of the property, particularly for sites having a sea cliff.
 - (vi) Presence of drift logs or other flotsam on or within the property.
 - (vii) Description of streams or other drainage that might influence erosion or locally reduce the level of the beach.

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- (viii) Proximity of nearby headlands or jetties which might block the longshore movement of beach sediments, thereby affecting the level of the beach in front of the property.
 - (ix) Description of any shore protection structures that may exist on the property or on nearby properties.
 - (x) Presence of pathways or stairs from the property to the beach.
 - (xi) Existing human impacts on the site, particularly that might alter the resistance to wave attack.
 - (xii) Location and condition of nearby beach access sites.
- (B) Description of the fronting beach:
- (i) Average widths of the beach during the summer and winter.
 - (ii) Median grain size of beach sediment.
 - (iii) Average beach slopes during the summer and winter.
 - (iv) Elevations above mean sea level of the beach at the seaward edge of the property during summer and winter.
 - (v) Presence of rip currents and rip embayments that can locally reduce the elevation of the fronting beach.
 - (vi) Presence of rock outcrops and sea stacks, both offshore or within the beach zone.
 - (vii) Information regarding the depth of beach sand down to bedrock at the seaward edge of the property.
- (C) Analyses of Erosion and Flooding Potential:
- (i) Analysis of DOGAMI beach monitoring data for the site or nearby area (if available).
 - (ii) Analysis of human activities affecting shoreline erosion.
 - (iii) Analysis of possible mass wasting, including weathering processes, land sliding or slumping.

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- (iv) Calculation of wave run-up beyond mean water elevation that might result in erosion of the sea cliff or foredune (see Stockdon, 1996).
 - (v) Evaluation of frequency that erosion-inducing processes could occur, considering the most extreme potential conditions of unusually high-water levels together with severe storm wave energy.
 - (vii) For dune-backed shorelines, use established geometric model to assess the potential distance of property erosion and compare the results with direct evidence obtained during site visit, aerial photo analysis, or analysis of DOGAMI beach monitoring data.
 - (viii) Description of expected local sea level rise over the next 50 years and impacts of that sea level change on the site, including during severe storm conditions.
- (D) Assessment of potential reactions to erosion episodes:
- (i) Determination of eligibility for beachfront protective structures as prescribed in subsection (13).
 - (ii) Assessment of potential reactions to erosion events, under climate change conditions, addressing the need for future erosion control measures, building relocation, or building foundation and utility repairs.
- (g) Geologic Hazard Reports for land divisions as deemed needed by the Director and for development requiring building permits, except for activities listed as exempt in subsection (5)(b), shall also include the following recommendations:
- (A) Use results from the above analyses to establish setbacks (beyond any minimums set by this section), building techniques, or other mitigation to ensure an acceptable level of safety and compliance with all local requirements.
 - (B) Recommend a foundation design, or designs, that render the proposed structures ready moveable.
 - (C) Recommend a plan for preservation of vegetation and existing grade

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within the setback area, if appropriate.

- (D) Include a consideration of a local variance process to reduce the building setback on the side of the property opposite the ocean, if this reduction helps to lessen the risk of erosion, flooding, bluff failure or other hazard.
 - (E) Recommend methods to control and direct water drainage away from the ocean (e.g., to an approved storm water system), or if not possible, to direct water in such a way so as to not cause erosion or visual impacts.
- (h) Erosion Control Measures: All uses subject to a Dune Area Development Permit and Geologic Hazard Report shall address the following erosion control measure requirements, designed by a qualified licensed geoprofessional within the Geologic Hazard Report:
- (A) Stripping of vegetation, grading, or other soil disturbance shall be done in a manner which will minimize soil erosion, stabilize the soil as quickly as practicable, and expose the smallest practical area at any one-time during construction;
 - (B) Development plans shall minimize cut or fill operations so as to prevent off-site impacts;
 - (C) Temporary vegetation and/or mulching shall be used to protect exposed critical areas during development;
 - (D) Permanent plantings and any required structural erosion control and drainage measures shall be installed as soon as practical;
 - (E) Provisions shall be made to effectively accommodate increased runoff caused by altered soil and surface conditions during and after development. The rate of surface water runoff shall be structurally retarded where necessary;
 - (F) Provisions shall be made to prevent surface water from damaging the cut face of excavations or the sloping surface of fills by installation of temporary or permanent drainage across or above such areas, or by other suitable stabilization measures such as mulching, seeding, planting, or armoring with rolled erosion control products, stone, or other similar methods;

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- (G) All drainage provisions shall be designed to adequately carry existing and potential surface runoff from the twenty-year frequency storm to suitable drainageways such as storm drains, natural watercourses, or drainage swales. In no case shall runoff be directed in such a way that it significantly decreases the stability of known landslides or areas identified as unstable slopes prone to earth movement, either by erosion or increase of groundwater pressure;
- (H) Where drainage swales are used to divert surface waters, they shall be vegetated or protected as necessary to prevent offsite erosion and sediment transport;
- (I) Erosion and sediment control devices shall be required where necessary to prevent polluting discharges from occurring. Control devices and measures which may be required include, but are not limited to:
 - (i) Energy absorbing devices to reduce runoff water velocity;
 - (ii) Sedimentation controls such as sediment or debris basins. Any trapped materials shall be removed to an approved disposal site on an approved schedule;
 - (iii) Dispersal of water runoff from developed areas over large undisturbed areas.
- (J) Disposed spoil material or stockpiled topsoil shall be prevented from eroding into streams or drainageways by applying mulch or other protective covering; or by location at a sufficient distance from streams or drainageways; or by other sediment reduction measures; and
- (K) Such non-erosion pollution associated with construction such as pesticides, fertilizers, petrochemicals, solid wastes, construction chemicals, or wastewaters shall be prevented from leaving the construction site through proper handling, disposal, site monitoring and clean-up activities.

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(7) ADDITIONAL DEVELOPMENT LIMITATIONS IN DUNE AREAS: In addition to the conditions, requirements, and limitations imposed by any required Geologic Hazard Report, all development subject to a Dune Area Development Permit shall conform to the following requirements:

- (a) Construction of residential, commercial, or industrial buildings is prohibited on beaches, active foredunes, other foredunes that are conditionally stable and subject to ocean undercutting or wave overtopping, interdune areas (deflation plains) that are subject to ocean flooding, and within an area identified by FEMA FIRM maps to be subject to ocean flooding, except on lands that are subject to an approved exception to Goal 18, Implementation Requirement 2, as set forth in Section 6.1 of the Beaches and Dunes Element of the Tillamook County Comprehensive Plan.
- (b) Other development in these beach and dune areas shall be permitted only if adequate findings are provided to the County which demonstrate that the proposed development is adequately protected from any geologic hazards, wind erosion, undercutting, ocean flooding and storm waves; and is designed to minimize adverse environmental effects. In addition, findings shall be provided to address the following:
 - (A) The type of use proposed and the adverse effects it might have on the site and adjacent areas;
 - (B) Temporary and permanent stabilization programs and the planned maintenance of new and existing vegetation;
 - (C) Methods for protecting the surrounding area from any adverse effects of the development; and
 - (D) Hazards to life, public and private property, and the natural environment that may be caused by the proposed use.
- (d) Safest site requirement: All new construction or substantial improvements shall be located within the area most suitable for development based on the least exposure to risk from coastal hazards as determined by a qualified licensed geoprofessional as part of a Geologic Hazard Report prepared in accordance with subsection (6). Notwithstanding the provisions of the underlying zone, as necessary to comply with this requirement, any required yard or setback except for the Oceanfront Setback outlined in subsection (8) may be reduced by 10

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feet or up to 50%, whichever is greater.

- (e) Building heights shall be measured from the existing (pre-construction) grade. Only in Foredune Management Areas shall additional fill be allowed on an oceanfront lot to achieve the required four feet plus Base Flood Elevation, consistent with the provisions of Section 3.510: Flood Hazard Overlay Zone. In this instance, building height shall be measured on the foredune grade from four feet plus Base Flood Elevation.
- (f) Accessory structures and on-site sewage disposal systems, which the Department determines are consistent with the purpose of this zone, may be permitted oceanward of the Oceanfront Setback Line, subject to the standards of this section and the following provisions:
 - (A) The location of accessory structures and on-site sewage disposal systems will be determined in each case based on site-specific information provided by a Geologic Hazard Report, prepared in accordance with subsection (6).
 - (B) Any accessory structure higher than three feet as measured from existing grade will be subject to the variance procedure and criteria set forth in Article 8 of the Tillamook County Land Use Ordinance.
 - (C) Accessory structures for on-site subsurface sewage disposal systems may not be located oceanward of the primary structure on the subject property unless the following provisions are met:
 - (i) The primary structure on the subject property is an authorized residential, commercial, or industrial structure in existence as of October 28, 1992;
 - (ii) The accessory structure is required for repair of an existing disposal system, and there is no viable alternative system or location landward of the primary structure; and
 - (iii) The owner of the subject property submits an affidavit to the Department acknowledging that the property owner has been informed a beachfront protective structure will not be authorized to protect the disposal system against erosion, and that the owner has sole responsibility for maintaining the

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disposal system and for notifying any purchaser of this condition prior to sale of the property.

(g) Beach Access:

(A) Non-structural, low-impact pedestrian footpaths to the beach, not to exceed four-feet in width, shall be permitted in all dune areas, except where restricted in Foredune Management Areas.

(B) Boardwalks and other structural pathways are subject to the requirements of 7(b) above.

(C) Off-road recreational vehicle use in dune areas shall be permitted in Sand Lake Recreational Area. Motor vehicles registered to operate on public highways and roads shall be allowed to travel on beaches where posted by the Oregon Parks and Recreation Department (ORS 390.678). Operation of motor vehicles at other beach locations will require a permit from the Oregon Parks and Recreation Department.

(D) In Foredune Management Areas, where heavy use of public easements or rights of way destabilizes dune areas on adjoining private property, signs may be placed at landward beach entrance points to encourage the use of alternative public access points. Signs shall be subject to review by the Foredune Management Authority, Tillamook County, and the Oregon Parks and Recreation Department.

(h) Land Grading Practices: No excavations for residential and commercial site development shall be done earlier than thirty (30) days prior to the start of construction. Following the completion of major construction, excavated areas shall be stabilized. At a minimum, the site shall be stabilized within nine (9) months of construction completion.

(8) OCEANFRONT SETBACKS: As used in this section, “vegetation line” means the ocean shore state recreation area boundary as described in ORS 390.770 or the line of established upland shore vegetation, whichever is farther inland. In areas subject to the provisions of this section, all development, except for activities listed as exempt in subsection (5)(b), shall be set back from the vegetation line the greater of:

(a) A distance specified in a required Geologic Hazard Report if it is more restrictive than the Oceanfront Setback Line; or

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- (b) A distance established through calculation of an Oceanfront Setback Line (OSL) as follows:
- (A) On a lot or parcel where there are existing buildings located within 300 feet of the boundaries of the subject lot or parcel on both the north and the south, the OSL is a line drawn between the nearest building to the north and the nearest building to the south. The line shall be drawn between the most oceanward points of the two building footprints closest to the vegetation line.
 - (B) On a lot or parcel where there are buildings within 300 feet of the boundaries of the subject lot or parcel on one side only (north or south), the OSL is the average distance from the vegetation line of all such buildings. The measurement for calculating the average shall be made from the most oceanward point of the building footprints closest to the vegetation line.
 - (C) On a lot or parcel where there are no buildings within 300 feet north or south of the boundaries of the subject lot or parcel, the OSL is the average distance from the vegetation line of the nearest two buildings. The measurement for calculating the average shall be made from the most oceanward point of the building footprints closest to the vegetation line.
 - (D) For purposes of calculating the OSL, “building” means a lawfully established, permanent residential, commercial, public, or industrial structure within 500 feet of the vegetation line and located on a lot or parcel that abuts the vegetation line. It does not include detached accessory structures.
 - (E) For purposes of calculating the OSL, “closest point of a building” means the point on an exterior wall of a building that is closest to the vegetation line. It does not include decks, second story decks, other structural improvements above finished grade, unroofed porches or landings, walkways, or building projections such as cornices, eaves, canopies, sunshades, gutters, or chimney chases.
- (c) In no case may any structure or other development be permitted west of the statutory vegetation line or line of actual vegetation, whichever is more

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landward, except as authorized by the Oregon Department of Parks and Recreation in accordance with OAR Chapter 736, division 20.

- (e) On lots or parcels created prior to the effective date of this section, where the application of the minimum oceanfront setback, together with any other required yards and/or setbacks, results in a building footprint area of less than 1,500 square feet, the required yard setback opposite the oceanfront may be reduced as follows:
 - (A) The required yard setback opposite the oceanfront may be reduced by an amount necessary to provide a building footprint of not more than 1,500 square feet, or to a minimum of 10 feet, whichever is less.
 - (B) If the reduction in setback permitted in subsection (A) results in a permissible building footprint of less than 1,500 square feet, the oceanfront setback may be reduced by an amount necessary to provide a building footprint of not more than 1,500 square feet.
 - (f) Notwithstanding the above provisions, the Planning Director shall require a greater setback from the ocean where there is evidence of significant coastal, environmental, or geologic hazards as determined by a Geologic Hazard Report submitted pursuant to Section 3.530(6) or other information available to the Department. In making this determination, the Geologic Hazard Report and the Director shall consider evidence of recent and future beach erosion and whether the proposed development has been designed to adequately minimize and mitigate for any adverse environmental effects to the fullest extent required by law.
- (9) FOREDUNE BREACHING: When permitted, foredune breaching and restoration shall be conducted in a manner consistent with sound principles of conservation. Such breaching may be permitted only:
- (a) To replenish sand supply in interdune areas;
 - (b) On a temporary basis in an emergency, such as for fire control, hazard removal or clean up, draining farmlands, or alleviating flood hazards; or
 - (c) For other purposes only upon adoption of an exception to Statewide Planning Goal 18.

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- (10) GROUNDWATER REQUIREMENTS: Applications for development which will utilize groundwater resources shall provide a hydrologic analysis which demonstrates that groundwater withdrawal will not:
- (a) Lead to the loss of stabilizing vegetation;
 - (b) Lead to a deterioration of water quality; and
 - (c) Result in the intrusion of salt water into water supplies.
- (11) REMEDIAL SAND GRADING: As used in this section “remedial sand grading” means the removal of accumulated sand which poses an immediate threat of damage or is preventing access to a structure. Remedial sand grading does not alter the crest of the foredune. Before remedial sand grading activities can occur, an approved Remedial Sand Grading Permit from Tillamook County is required. Application, review, and decisions for Remedial Sand Grading Permits shall be a Type I procedure in accordance with Article 10.
- (a) Remedial sand grading can be conducted on an individual lot or parcel on an as-needed basis and may be permitted in all areas subject to the BD Overlay Zone with or without a foredune management plan. Remedial sand removal may include:
 - (A) Clearing of sand which poses an immediate threat of inundation to houses, commercial or industrial buildings, beach access points, or infrastructure such as streets and utility lines, or which is preventing access to a structure;
 - (B) Excavation necessary for the purpose of placing a beachfront protective structure;
 - (C) Minor reshaping of the forward portion of the foredune necessary to provide an even slope for planting stabilizing vegetation.
 - (b) All remedial sand grading shall be conducted in compliance with the following standards:
 - (A) Rear yard (Rear yard is the yard seaward of the structure): Sand may be removed to the level of the top sill of the foundation up to 40 feet from the building, provided the foredune crest is not altered. From the 20-foot line, where applicable, all grading shall slope upward to the crest of the dune at a ratio of 2:1 (horizontal: vertical).

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- (B) Side yards: Sand may be removed to the level of the top sill of the foundation within 10 feet of the building. From the 10-foot line, sand grading shall slope upward at a ratio of 2:1.
- (C) Front yard: All sand that is landward of the building may be removed down to the sill level of the foundation, provided removal does not create slopes of more than 2:1 with adjacent properties. Grading may not lower the front yard below the level of adjacent streets or roads except to clear sidewalks or driveways.
- (D) All remedial grading shall be done in a manner that does not lower the existing height of the foredune and does not significantly damage existing vegetation. Any removal which exceeds standards shall be promptly restored.
- (E) Permittees shall notify the Tillamook County Department of Community Development at least 48-hours prior to conducting authorized remedial grading to allow onsite inspection by the county and to provide for flagging by the county, if needed.
- (F) All graded sand that is moved up and over the foredune seaward of the building shall be moved and placed in a manner that does not reduce the height of the foredune, uses one pathway (no more than 12 feet in width), and that minimizes disturbance to vegetation and the beach.
- (G) All graded sand shall remain in the beach-foredune system.

(12) FOREDUNE GRADING: Foredune grading may be performed only as authorized in a foredune management plan adopted and acknowledged in conformance with Statewide Planning Goal 18. As used in this section “foredune grading” means grading that lowers the height of the foredune for view restoration and/or maintenance, or other purposes, and does not include remedial grading authorized by subsection (11) of this section.

- (a) Foredune grading shall require a Foredune Grading Permit. Application, review, decisions, and appeals for Foredune Grading Permits shall be a Type II procedure in accordance with Article 10.
- (b) A decision to approve a Foredune Grading Permit shall require findings of compliance with the following requirements:
 - (A) The proposed foredune grading will be performed on a continuous portion of the foredune of not less than 500 feet in length;
 - (B) The application for the Foredune Grading Permit includes the written

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consent of all owners of property within the continuous portion of the foredune to be graded;

- (C) The application for the Foredune Grading Permit shall include elevation profiles of existing and proposed foredune conditions prepared by a registered surveyor; and
- (D) The proposed foredune grading will conform to all the requirements and specifications of the applicable foredune management plan, including requirements for height and width of the graded foredune, stabilization measures, redistribution of graded sand, and maintenance and monitoring.

- (c) Upon completion of foredune grading under an approved Foredune Grading Permit, final foredune elevations and conditions shall be surveyed by a registered surveyor, showing compliance with permit conditions, and submitted to the Tillamook County Department of Community Development.

(13) REQUIREMENTS FOR BEACHFRONT PROTECTIVE STRUCTURES:

- (a) A Dune Area Development Permit is required for beachfront protective structures not subject to regulation by the Oregon Parks and Recreation Department under OAR Chapter 736, division 20.
- (b) In all cases, beachfront protective structures shall be permitted only where development existed on January 1, 1977, or where an exception to Goal 18, Implementation Requirement 2 or 5 has been adopted in the County’s comprehensive plan.
- (b) For the purposes of this subsection, "development" means houses, commercial and industrial buildings, and vacant subdivision lots which are physically improved through construction of streets and provision of utilities to the lot.
- (c) All beachfront protective structures shall be subject to the following requirements:
 - (A) Visual impacts shall be minimized;
 - (B) Access to and along the beach shall be maintained;
 - (C) Negative impacts on adjacent property shall be minimized;

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- (D) Long-term or recurring costs to the public shall be avoided.
 - (E) Structures shall be designed to minimize adverse impacts on water currents, erosion, and accretion patterns;
 - (F) Land-use management practices and non-structural solutions to problems of erosion and flooding shall be preferred to structural solutions; structural solutions shall only be utilized when it is determined that land-use management and non-structural solutions are not adequate; and
 - (G) All applicable requirements of the Flood Hazard Overlay Ordinance as described in TCLUO Section 3.510 shall be followed.
- (d) In addition to the applicable requirements set forth in subsection 6, Geologic Hazard Reports for beachfront protective structures shall, to the extent applicable and based on best available information, include the following information, analyses, and recommendations:
- (A) Project Need: Analysis of the types of hazards affecting the property; estimated rate of erosion based on visual observations, aerial photo analysis, published reports, such as DOGAMI hazard risk zone studies, and DOGAMI beach monitoring data; description of the type of property, improvements, or structures that are threatened, and description of the nature of the threat.
 - (B) Evaluation of Alternatives: Include a description of the preferred erosion mitigation technique, any practices that have been attempted previously, as well as an evaluation of the following options:
 - (i) Hazard avoidance options (siting or relocation);
 - (ii) Non-structural stabilization methods (e.g., foredune enhancement, beach nourishment, vegetation plantings, cobble berms);
 - (iii) Structural stabilization (e.g., riprap, seawalls); and
 - (iv) Bio-engineered structures (e.g., clay burritos and vegetated terraces); and

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(v) Site modifications for the control of erosion such as vegetation management, drainage controls, slope regrading, and building reinforcements.

(C) Analysis of Impacts from Preferred Alternative, including:

(i) Potential for flank scour and toe scour;

(ii) Shoreline alignment impacts to adjoining properties and non-armored neighbors, including impacts to properties not eligible for shoreline protective structures; potential for the preferred alternative to cause rip embayments or prolong existing embayment patterns;

(iii) Reduction in sand supply caused by preferred alternative;

(iv) Quantify narrowing or loss of beach area;

(v) Impacts from expected maintenance of the project over the lifetime of the structure. Include history of maintenance of similar projects nearby, analysis of local sea level rise, and trends in littoral sand movement. Describe the expected maintenance methods that could occur;

(vi) Impacts to existing public beach access routes, and provisions to keep access route in a useable condition; and

(vii) Impacts to sites of geologic interest, such as fossil beds or ancient forest remnants.

(14) CERTIFICATION OF COMPLIANCE: Permitted development shall comply with the recommendations in the required Geologic Hazard Report. Certification of compliance shall be provided as follows:

(a) Plan Review Compliance: Building, construction or other development plans shall be accompanied by a written statement from a certified engineering geologist or licensed geotechnical engineer stating that the plans comply with the recommendations contained in the Geologic Hazard Report for the approved Dune Area Development Permit.

(b) Inspection Compliance: Upon the completion of any development activity for which the Geologic Hazard Report recommends an inspection or observation by

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a certified engineering geologist or licensed geotechnical engineer, the certified engineering geologist or licensed geotechnical engineer shall provide a written statement indicating that the development activity has been completed in accordance with the applicable Geologic Hazard Report recommendations.

- (c) Final Compliance: No development requiring a Geologic Hazard Report shall receive final approval (e.g., certificate of occupancy, final inspection, etc.) until the department receives:
 - (A) A written statement by a certified engineering geologist or licensed geotechnical engineer indicating that all performance, mitigation, and monitoring measures specified in the report have been satisfied, including confirmation of foredune restoration and implementation of temporary and permanent vegetation stabilization measures;
 - (B) If mitigation measures incorporate engineering solutions designed by a licensed professional engineer, a written statement of compliance by the design engineer.
 - (C) A written statement by the qualified licensed geoprofessional indicating that all erosion control measure requirements were met.

- (15) RESTORATION AND REPLACEMENT OF EXISTING STRUCTURES:
 - (a) Notwithstanding any other provisions of this ordinance, application of the provisions of this section to an existing use or structure shall not have the effect of rendering such use or structure nonconforming as defined in Article 7.
 - (b) Replacement, repair or restoration of a lawfully established building or structure subject to this section that is damaged or destroyed by fire, other casualty or natural disaster shall be permitted, subject to all other applicable provisions of this ordinance, and subject to the following limitations:
 - (A) Replacement authorized by this subsection is limited to a building or structure not larger than the damaged/destroyed building.
 - (B) Structures replaced pursuant to this subsection shall be located no further seaward than the damaged structure being replaced.
 - (C) Replacement or restoration authorized by this subsection shall commence within one year of the occurrence of the fire or other casualty

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which necessitates such replacement or restoration.

- (D) Where the cost of restoration or replacement authorized by this subsection equals or exceeds 80 percent of the market value of the structure before the damage occurred, such restoration or replacement shall also comply with subsections (7) and (8) of this section.
- (c) A building permit application for replacement, repair, or restoration of a structure under the provisions of this subsection shall be accompanied by a Geologic Hazard Report prepared by a qualified licensed geoprofessional that conforms to the standards set forth in subsection (6) and subsection (13) if applicable. All recommendations contained in the report shall be complied with in accordance with subsection (14).
- (d) A building permit application for replacement, repair, or restoration authorized by this subsection shall be processed and authorized as Type I review pursuant to Section 10.020.

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SECTION 4.130: DEVELOPMENT REQUIREMENTS FOR GEOLOGIC HAZARD AREAS

Sections

4.130(1)	Purpose
4.130(2)	Applicability
4.130(3)	Geologic Hazard Assessment Review
4.130(4)	Geologic Hazard Report Standards
4.130(5)	Decisions of Geologic Hazard Assessment Reviews
4.130(6)	Development Standards for Uses Subject to Review

4.130(1) Purpose

The purpose of these Development Requirements for Geologic Hazard Areas is to protect people, lands and development in areas that have been identified as being subject to geologic hazards.

The provisions and requirements of this section are intended to provide for identification and assessment of risk from geologic hazards, and to establish standards that limit overall risk to the community from identified hazards to a level acceptable to the community. Development in identified hazard areas is subject to increased levels of risk, and these risks must be acknowledged and accepted by present and future property owners who proceed with development in these areas

4.130(2) Applicability

The following areas are considered potentially geologically hazardous and are therefore subject to the requirements of Section 4.130:

- a) All lands partially or completely within categories of “high” and “moderate” susceptibility to shallow landslides as mapped in Oregon Department of Geology and Mineral Industries (DOGAMI) Open File Report O-20-13, Landslide hazard and risk study of Tillamook County, Oregon;
- b) All lands partially or completely within categories of “high” and “moderate” susceptibility to deep landslides as mapped in DOGAMI Open File Report O-20- 13, Landslide hazard and risk study of Tillamook County, Oregon;
- c) All lands partially or completely within a “debris flow fan” as mapped in DOGAMI Open File Report O-20-13, Landslide hazard and risk study of Tillamook County, Oregon;

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- d) All lands partially or completely within a rapidly moving landslide as mapped in DOGAMI IMS-22, GIS Overview Map of Potential Rapidly Moving Landslide Hazards in Western Oregon, 2002.
- e) All lands along the oceanfront. An oceanfront lot is a lot or parcel that abuts the ocean shore state recreation area (as defined in OAR 736-021-0010) or a lot or parcel where there is no portion of a buildable lot between it and the ocean shore state recreation area. Lots or parcels that are fronted by roads, parks, beach accesses, or other minimal improvements are also considered oceanfront.
- f) Lots or parcels where the average existing slopes are equal to or greater than 19 percent within or adjacent to hazard risk zones described in 4.130(2)(a) through (d) for any lot or parcel less than or equal to 20,000 square feet or lots or parcels where the average existing slopes are equal to or greater than 29 percent within or adjacent to hazard risk zones described in 4.130(2)(a) through (d) for any lot or parcel greater than 20,000 square feet.
 - 1. For the purpose of this section, slopes are determined by:
 - Lots or parcels less than 20,000 square feet where the average existing slopes are equal to or greater than 19% measured from the highest to lowest point of the property.
 - The average existing slope of the building footprint or area to be disturbed measured from the highest to lowest point within the footprint or area to be disturbed is 29 percent or greater for properties 20,000 square feet or larger.
- g) Any other documented geologic hazard area on file, at the time of inquiry, in the office of the Tillamook County Community Development Department. A “documented geologic hazard area” means an area of land that is shown by reasonable written evidence to contain geological characteristics or conditions which are hazardous or potentially hazardous for the improvement thereof.

The publications referenced above are not intended to be used as a site-specific analysis tool. The County will use these publications to identify when a Geologic Hazard Assessment Review is needed on a property prior to development.

4.130(3) Geologic Hazard Assessment Review

- a) Except for activities identified in Subsection 4.130(3)(b) as exempt, any new development or substantial improvement (as defined in Article 11) in an area subject to the provisions of this section shall require a Geologic Hazard Assessment Review.
- b) The following development activities are exempt from the requirement for a Geologic Hazard Assessment Review:

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1. Maintenance, repair, or alterations to existing structures that do not alter the building footprint or foundation and do not constitute substantial improvement as defined in Article 11.
 2. Exploratory excavations under the direction of a certified engineering geologist or registered geotechnical engineer;
 3. Construction of structures for which a building permit is not required;
 4. An excavation which is less than two feet in depth, or which involves less than twenty-five cubic yards of volume;
 5. Fill that is less than two feet in depth or that involves less than twenty-five cubic yards of volume;
 6. Yard area vegetation maintenance and other vegetation removal on slopes less than 20%;
 7. Removal of trees smaller than 8 inches dbh (diameter breast height);
 8. Removal of trees larger than 8 inches dbh (diameter breast height) provided the canopy area of the trees that are removed in any one-year period is less than 25% of the lot or parcel area;
 9. Forest operations subject to regulation under ORS 527 (the Oregon Forest Practices Act);
 10. Maintenance and reconstruction of public and private roads, streets, parking lots, driveways, and utility lines, provided the work does not extend outside the existing right-of-way boundary;
 11. Maintenance and repair of utility lines, and the installation of individual utility service connections;
 12. Emergency response activities intended to reduce or eliminate an immediate danger to life, property, or flood or fire hazard; and
 13. Beachfront protective structures subject only to regulation by the Oregon Parks and Recreation Department under OAR Chapter 736, division 20.
- c) Application, review, decisions, and appeals for a Geologic Hazard Assessment Review shall be a Type I procedure in accordance with Article 10. Applications for a Geologic Hazard Assessment Review may be made prior to or concurrently with any other type of application required for the proposed use or activity. Except for exempt activities listed under Section 4.130(3)(b), Geologic Hazard Assessment Review shall be completed prior to any ground disturbance.
- d) All applications for Geologic Hazard Assessment Review shall be accompanied by a Geologic Hazard Report prepared by a qualified licensed geoprofessional (as defined in Article 11) that meets the content requirements of Section 4.130(4), at the applicant/property owner's expense.

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- e) For development activities that are subject both to this section and Section 3.530: Beach and Dune Overlay Zone, one complete Geologic Hazard Report can be submitted for meeting the requirements of this section and Section 3.530. The report shall include requirements for both sections as applicable.

4.130(4) Geologic Hazard Report Standards

- a) For the purposes of Section 4.130, a Geologic Hazard Report refers to engineering geologic reports, geotechnical reports, and geotechnical engineering reports.
- b) .Geologic Hazard Reports required pursuant to this section shall be prepared consistent with standard geologic practices employing generally accepted scientific and engineering principles, and shall at a minimum contain the applicable provisions outlined in the Oregon State Board of Geologist Examiners publication "Guidelines for the Preparation of Engineering Geologic Reports," 2nd Edition, 5/30/2014 or other published best practice guidelines for engineering geologic or geotechnical engineering reports, consistent with current scientific and engineering principles. Reports shall reference the published guidelines upon which they are based.
- c) For oceanfront property (lots or parcels abutting the ocean shore), Geologic Hazard Reports shall also address all the requirements of Section 3.530 (6)(f) to the extent applicable and based on best available information.
- d) Geologic Hazard Reports required by this section shall include the following from the preparer(s) of the report:
 - a. A statement that all the applicable content requirements of subsection 4.130(4) have been addressed or are not applicable to the review. An explanation shall be accompanied with any requirement identified as not applicable;
 - b. A description of the qualifications of the professional(s) that prepared the report. If multiple licensed professionals contributed to the report, each professional shall individually sign and stamp their own work products; and
 - c. A statement by the preparer(s) that they have the appropriate qualifications to have completed the report and all its contents.
- e) All Geologic Hazard Reports are valid for purposes of meeting the requirements of Section 4.130 for a period of five (5) years from the date of preparation. Such reports are valid only for the development plan addressed in the report. Tillamook County assumes no responsibility for the quality or accuracy of such reports. Within that five-year period, the Planning Director can require at their discretion an addendum by a qualified licensed geoprofessional certifying that site conditions have not changed from the original report. If site conditions have changed, a new Geologic Hazard Report shall be required.

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4.130(5) Decisions of Geological Assessment Reviews

A decision on a Geologic Hazard Assessment Review shall be based on findings of compliance with the following standards:

- a) The Geologic Hazard Report shall meet the content standards set forth in Section 4.130(4).
- b) In approving a Geologic Hazard Assessment Review, the decision maker may impose any conditions which are necessary to ensure compliance with the provisions of this section or with any other applicable provisions of the Tillamook County Land Use Ordinance.
- c) The development plans for the application conform, or can be made to conform, with all the recommendations and specifications contained in the Geologic Hazard Report.
- d) In the event the decision maker determines that additional review of the Geologic Hazard Report by a qualified licensed geoprofessional is necessary to determine compliance with this section, Tillamook County may retain the services of such a professional for this purpose. The applicant shall be responsible for all costs associated with the additional review. The results of that evaluation shall be considered in the decision of the Geologic Hazard Assessment Review.

4.130(6) Development Standards for Uses Subject to Review

In addition to the conditions, requirements and limitations imposed by a required Geologic Hazard Report, all uses subject to a Geologic Hazard Assessment Review shall conform to the following requirements:

- a) Hazard Disclosure Statement: All applications for new development or substantial improvements subject to Geologic Hazard Assessment Review shall provide a Hazard Disclosure Statement recorded with the Tillamook County Clerk’s Office and signed by the property owner that acknowledges:
 1. The property is subject to potential natural hazards and that development thereon is subject to risk of damage from such hazards;
 2. The property owner has commissioned a Geologic Hazard Report for the subject property, a copy of which is on file with Tillamook County Department of Community Development, and that the property owner has reviewed the Geologic Hazard Report and has thus been informed and is aware of the type and extent of hazards present and the risks associated with development on the subject property;
 3. The property owner accepts and assumes all risks of damage from natural hazards associated with the development of the subject property.

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4. The property owners shall refrain from interfering with mitigation measures or improvements on the site and shall maintain them.
- f) Mitigation measures: Mitigation measures required to make the site suitable for the proposed development, including their design and construction specifications, shall be included in the Geologic Hazard Report and followed.
- b) Safest site requirement: All new structures shall be limited to the recommendations contained in the Geologic Hazard Report; and
 1. Property owners should consider use of construction techniques that will render new buildings readily moveable in the event they need to be relocated; and
 2. Properties shall possess access of sufficient width and grade to permit new buildings to be relocated or dismantled and removed from the site.
- c) Minimum Oceanfront Setbacks: For oceanfront lots or parcels, , the building footprint of all new development or substantial improvement subject to a Geologic Hazard Assessment Review shall also comply with the requirements of Section 3.530(8) Oceanfront Setbacks.
- d) Erosion Control Measures: All uses subject to a Geologic Hazard Assessment Review shall address the following erosion control measure requirements, designed by a qualified licensed geoprofessional:
 1. Stripping of vegetation, grading, or other soil disturbance shall be done in a manner which will minimize soil erosion, stabilize the soil as quickly as practicable, and expose the smallest practical area at any one-time during construction;
 2. Development plans shall minimize cut or fill operations so as to prevent off-site impacts;
 3. Temporary vegetation and/or mulching shall be used to protect exposed critical areas during development;
 4. Permanent plantings and any required structural erosion control and drainage measures shall be installed as soon as practical;
 5. Provisions shall be made to effectively accommodate increased runoff caused by altered soil and surface conditions during and after development. The rate of surface water runoff shall be structurally retarded where necessary;
 6. Provisions shall be made to prevent surface water from damaging the cut face of excavations or the sloping surface of fills by installation of temporary or permanent drainage across or above such areas, or by other suitable stabilization measures such as mulching, seeding, planting, or armoring with rolled erosion control products, stone, or other similar methods;
 7. All drainage provisions shall be designed to adequately carry existing and

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potential surface runoff from the twenty-year frequency storm to suitable drainageways such as storm drains, natural watercourses, or drainage swales. In no case shall runoff be directed in such a way that it significantly decreases the stability of known landslides or areas identified as unstable slopes prone to earth movement, either by erosion or increase of groundwater pressure;

8. Where drainage swales are used to divert surface waters, they shall be vegetated or protected as necessary to prevent offsite erosion and sediment transport;
 9. Erosion and sediment control devices shall be required where necessary to prevent polluting discharges from occurring. Control devices and measures which may be required include, but are not limited to:
 - i. Energy absorbing devices to reduce runoff water velocity;
 - ii. Sedimentation controls such as sediment or debris basins. Any trapped materials shall be removed to an approved disposal site on an approved schedule;
 - iii. Dispersal of water runoff from developed areas over large undisturbed areas.
 10. Disposed spoil material or stockpiled topsoil shall be prevented from eroding into streams or drainageways by applying mulch or other protective covering; or by location at a sufficient distance from streams or drainageways; or by other sediment reduction measures; and
 11. Such non-erosion pollution associated with construction such as pesticides, fertilizers, petrochemicals, solid wastes, construction chemicals, or wastewaters shall be prevented from leaving the construction site through proper handling, disposal, site monitoring and clean-up activities.
- e) Certification of compliance: Permitted development shall comply with the recommendations in the required Geologic Hazard Report. Certification of compliance shall be provided as follows:
- a. Plan Review Compliance: Building, construction or other development plans shall be accompanied by a written statement from a certified engineering geologist or licensed geotechnical engineer stating that the plans comply with the recommendations contained in the Geologic Hazard Report for the Geologic Hazard Assessment Review.
 - b. Inspection Compliance: Upon the completion of any development activity for which the Geologic Hazard Report recommends an inspection or observation by a certified engineering geologist or licensed geotechnical engineer, the certified engineering geologist or licensed geotechnical engineer shall provide a written statement indicating that the development activity has been completed in

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accordance with the applicable Geologic Hazard Report recommendations.

- c. Final Compliance: No development requiring a Geologic Hazard Report shall receive final approval (e.g., certificate of occupancy, final inspection, etc.) until the department receives:
 - i. A written statement from a certified engineering geologist or licensed geotechnical engineer indicating that all performance, mitigation, and monitoring measures specified in the Geologic Hazard Report have been satisfied;
 - ii. If mitigation measures incorporate engineering solutions designed by a licensed professional engineer, a written statement of compliance by the design engineer;
 - iii. A written statement by the qualified licensed geoprofessional indicating that all erosion control measure requirements were met.
- f) Restoration and replacement of existing structures:
 - a. Notwithstanding any other provisions of this ordinance, application of the provisions of this section to an existing use or structure shall not have the effect of rendering such use or structure nonconforming as defined in Article 7.
 - b. Replacement, repair or restoration of a lawfully established building or structure subject to this section that is damaged or destroyed by fire, other casualty or natural disaster shall be permitted, subject to all other applicable provisions of this ordinance, and subject to the following limitations:
 - i. Replacement authorized by this subsection is limited to a building or structure not larger than the damaged/destroyed building.
 - ii. Structures replaced pursuant to this subsection along the oceanfront shall be located no further seaward than the damaged structure being replaced.
 - iii. Replacement or restoration authorized by this subsection shall commence within one year of the occurrence of the fire or other casualty which necessitates such replacement or restoration.
 - c. A building permit application for replacement, repair, or restoration of a structure under the provisions of this subsection shall be accompanied by a Geologic Hazard Report prepared by a qualified licensed geoprofessional that adheres to the Geologic Hazard Report Standards outlined in Section 4.130(4). All recommendations contained in the report shall be followed.
 - d. A building permit application for replacement, repair, or restoration authorized by this subsection shall be processed and authorized as Type I review pursuant to Section 10.020.

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Definitions Contained in Article 11

Geoprofessional: refers to a Registered Geologist (RG), Certified Engineering Geologist (CEG), and Geotechnical Engineer (GE). Geoprofessionals are obligated to work within their area of expertise.

- Registered Geologists (RG) provide geologic maps and documents, can identify relative hazards, and are licensed by the Oregon State Board of Geologist Examiners (OSBGE). RGs cannot imply or provide recommendations for the siting, design, modification, or construction of structures and cannot practice engineering geology. RGs are defined in ORS 675.505 and ORS 672.525.
- Certified Engineering Geologists (CEG) provide engineering geologic reports and geotechnical reports that include hazard mitigation design. They are licensed by the Oregon State Board of Geologist Examiners (OSBGE). They apply geologic data, principles and interpretation to naturally occurring materials so that geologic factors affecting planning, design, construction and maintenance of civil engineering works are properly recognized and utilized. They can conduct geologic work to provide recommendations for the siting, design, modification, or construction of a structure. CEGs are defined in ORS 672.505 and ORS 672.525.
- A Geotechnical Engineer (GE) is a Professional Engineer (PE) with the specific training, expertise, and experience to qualify as a Geotechnical Engineer (GE). GEs can provide geotechnical engineering reports and are licensed by the Oregon Board of Examiners for Engineering and Land Surveying (OSBEELS). A GE can investigate and evaluate physical and engineering properties of earth materials, and design mitigation measures to reduce risk from natural hazards. As defined in Oregon Statute, Professional Engineers can only perform services in the areas of their competence. ORS 672.005, OAR 820-020.

Oceanfront Lot: A lot or parcel that abuts the ocean shore state recreation area (as defined in OAR 736-021-0010) or a lot or parcel where there is no portion of a buildable lot between it and the ocean shore state recreation area.

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HAZARDS

(Goal 7)

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HAZARDS

(Goal 7)

1. OVERVIEW

The demand for land in Tillamook County is increasing rapidly and problems related to developing these lands are mounting. Because of the tractable ground already in use, new developments are being directed toward areas that were previously passed over. Unfortunately, many of the new areas are subject to some type of natural hazard such as landsliding, flooding, erosion, ground instability, or other geologic condition, unknown to the citizen who plans to occupy this ground.

The purpose of addressing hazards then, is not meant to restrict properties from development, but rather to institute policies concerning potential problems, so that they can be considered before financial losses and possible injury may be avoided by the application of the policies formulated in the Comprehensive Plan.

Goal 7, Areas Subject to Natural Disasters and Hazards, reads:

“To protect life and property from natural disasters and hazards, developments subject to damage or that could result in loss of life shall not be planned nor located in known areas of natural disasters and hazards without appropriate safeguards. Plans shall be based on an inventory of known areas of natural disaster and hazard.”

Hazards listed include: ocean and stream flooding, groundwater, erosion and deposition, landslides, earthquakes, weak foundation soils, and other unique local hazards.

1.1 State Planning Requirements

a. Planning guidelines specify that:

1. Developments should be keyed to the degree of hazard present;
2. Plans for flood areas should prefer uses that do not require structural protection;
3. Low density and open space uses should be preferred in floodplains, and especially in floodways;
4. Land conservation and development actions should not exceed resource carrying capacities; and,
5. Planning for known areas of natural hazards and disasters should include an evaluation of the beneficial impact on natural resources and the environment from letting such events naturally re-occur.

b. Implementation guidelines specify:

1. Cities and counties not already enrolled should qualify for inclusion in the National Flood Insurance Program;
2. Density of development should be limited by degree of natural hazard

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present;

3. The potential impacts of both regulatory programs and engineering projects should be considered; and,
4. The possible creation of new natural hazards by proposed developments should be considered, evaluated, and provided for.

c. Definitions for planning purposes are:

ACTIVE LANDSLIDE: These are areas where ground movement is continuous or periodic or areas in which historic (within about 100 years) movement has taken place. The areas indicated include debris and rockfalls on the headlands, shallow slump failures along terraces fronting the ocean and bays, and areas of local slump in upland areas.

BASALT: A dark, fine-grained volcanic rock composed primarily of calcic plagioclase and pyroxene, occurs in flows, dikes, and sills.

DEBRIS SLIDE: Rapid downslope movement of unconsolidated earth and debris which has no planar slide plane and which is characterized by a hummocky topography.

EARTHFLOW: The downslope movement of unconsolidated earth or fragmented rock debris in a manner which resembles the flow of a highly viscous fluid.

LANDSLIDE: In this report, the term LANDSLIDE is restricted to downslope movement of a rapid nature.

MANTLE CREEP: Mantle creep (also soil creep) is the slow movement of earth material downslope over prolonged periods of time.

It generally is restricted to moderate slopes varying between approximately 10 percent and 25 percent, but also occurs in association with active and historic landslides on steeper slopes. Mantle creep is similar to landsliding in most respects except for a much slower rate of movement. It may involve soil, weathered bedrock, or both. Diagnostic features are the same as those for landslides, but are much more subtle in their development, owing to the lesser rates of movement. Irregularities of slope, drainage, soil distribution, and vegetative cover are the main criteria for recognition.

MASS WASTING: Downslope movement of earth material under the influence of gravity without the aid of running water.

MUDFLOW: Downslope movement of a wet, viscous mud and rock mixture.

ROCKFALL: The free fall of a newly detached segment of bedrock from a cliff or steep slope.

ROCKSLIDE: Perceptible downslope movement of rocky material down moderate to steep slopes.

SEDIMENTARY ROCKS: Rocks formed by the deposition of individual grains from a transporting medium, as opposed to igneous and metamorphic rocks.

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SLUMP: The downward movement of unconsolidated material in response to gravity characterized by backward rotation of the moving material and by movement along a curved basal slip plane.

SOIL CREEP: Slow particle-by-particle downslope movement of unconsolidated material with no well-defined basal slip plane and no backward rotation of the slide mass.

TERRACE DEPOSIT: A bench topped by marine sediments or alluvium. Represents the eroded remnant of a former beach or floodplain before uplift or lowering of sea level.

1.2 Information Base

Data for identifying potential hazard areas were drawn from the following state publications. The maps following are illustrative of these data.

- a. Oregon Department of Geology and Mineral Industries. “Environmental Geology of Inland Tillamook and Clatsop Counties, Oregon”. Portland, Oregon. 1972. 65 pp.
- b. Oregon Department of Geology and Mineral Industries. “Environmental Geology of the Coastal Region of Tillamook and Clatsop Counties, Oregon”. Portland, Oregon. 1972. 164 pp.
- c. Oregon Department of Geology and Mineral Industries. “Geologic Hazards Inventory of the Oregon Coastal Zone”. Portland, Oregon. 94 pp.
- d. Oregon State Soil and Water Conservation Commission. “Streambank Erosion in Oregon”. Salem, Oregon. 151 pp.

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Additional information sources for the Natural Hazards element are the following:

Information Source	Description	Author/ Agency	Date
Appraisal of Chronic Hazard Alleviation Techniques, with Special Reference to the Oregon Coast	Hazards management. Describes geomorphic, oceanic and human factors affecting shoreline stability, then discusses approaches for identifying and evaluating hazard avoidance technique options. Contains brief section relating the above to the specific context of the Oregon Coast.	Report to DLCD, from Oregon Coastal Zone Management Association, prepared by Shoreland Solutions	December 1994
Inventory of Critical and Essential Facilities Vulnerable to Earthquake or Tsunami Hazards on the Oregon Coast	Quantification of risk faced by facilities (such as hospitals, fire stations, communications centers, etc.) in Tillamook County, in the event of earthquake or tsunami. Database file (included on disk) lists these facilities, their location, data used in assessing risk, the risk determination, and other data.	Oregon Dept. of Geology and Mineral Industries (DOGAMI)	January 1995
A Unified National Program for Floodplain Management	Broad scale policy direction pamphlet (43 pages) describing floodplain management in theory, the history of floodplain management, a discussion of the Unified National Program and its implementation, including goals for the next 30 years.	Federal Interagency Floodplain Management Task Force	1994
Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials	Identifies types of flood hazards, describes regulatory approaches for addressing specific types of flood hazards, provides examples of innovative community programs, and provides a bibliography of more-detailed information sources. Arranged by type of flood hazard.	Prepared by The Association of State Floodplain Managers, for The Federal Emergency Management Agency	1985
Managing Floodplain Development in Approximate Zone A Areas – A Guide for Obtaining and Developing Base (100-Year) Flood Elevations	Includes computer program (diskette) for computing water surface elevations in open channels.	Federal Emergency Management Agency (FEMA-265)	July 1995

Also included is a chart prepared by RNKR Associates of Corvallis illustrating potential relationships between land uses and geologic hazards. Additional charts are also available from the firm covering more detailed aspects of potential county response to development problems caused by geologic hazards.

Although the groundwater resource and groundwater quality are covered to some degree in the Goal 5, Goal 6 and Goal 18 elements of this plan, they are also included in this element because of their fundamental relationship to the geology of the County.

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IRLAND TILLAMOOK COUNTY

MASS MOVEMENT

(downslope movement of earth material)

FALL

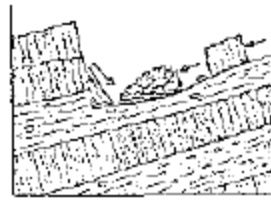
(rapid vertical descent)



Rockfall

SLIDE

(few shear planes)



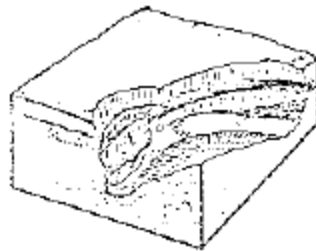
Rockslide

FLOW

(innumerable shear planes)

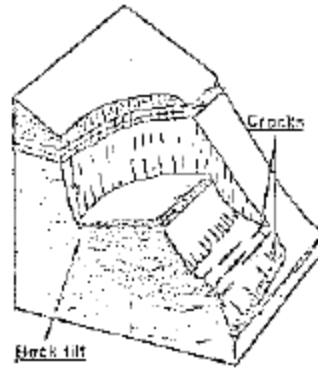


Creep



Soil Fall

(Streambank erosion)



Slump

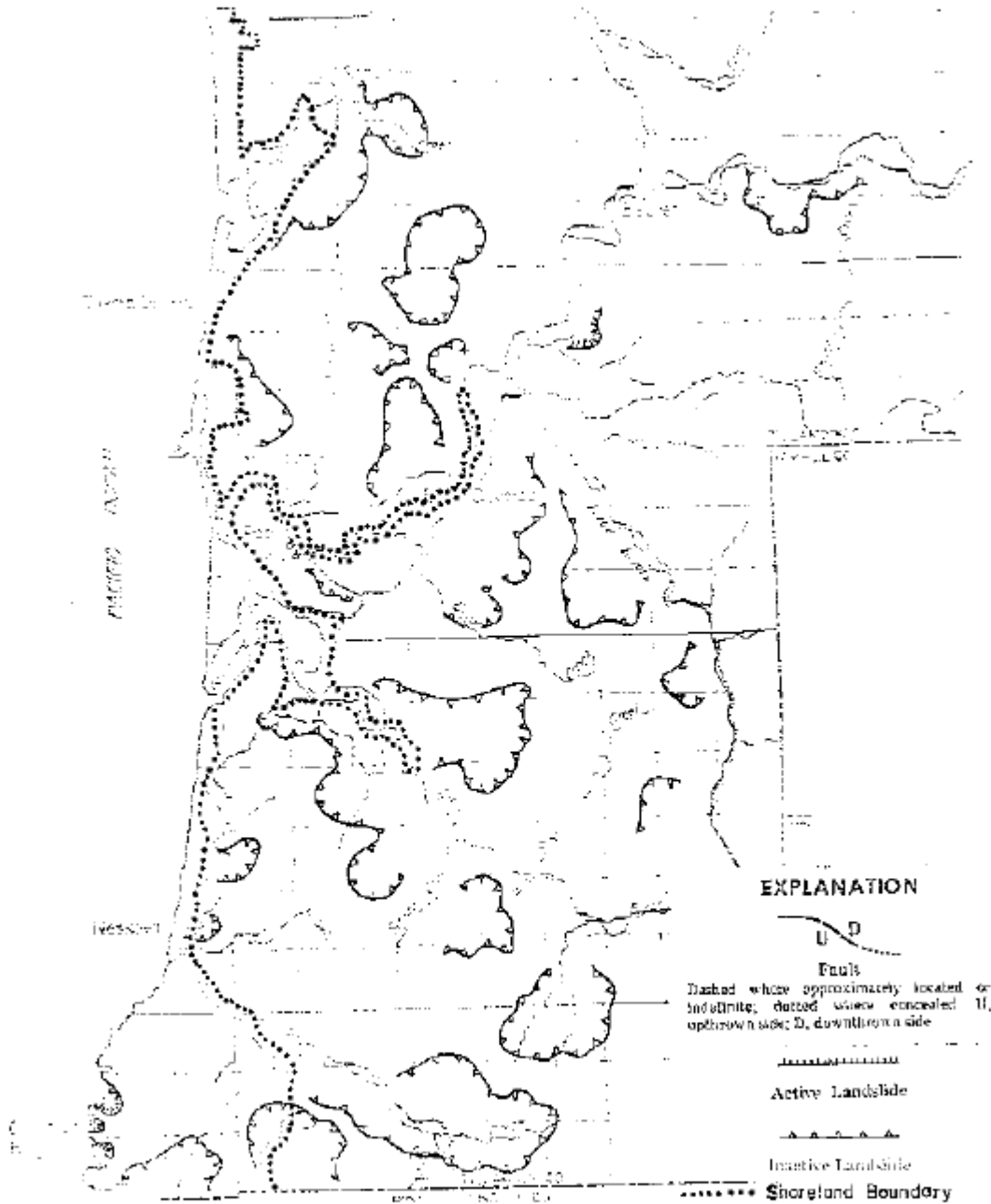


Earthflow



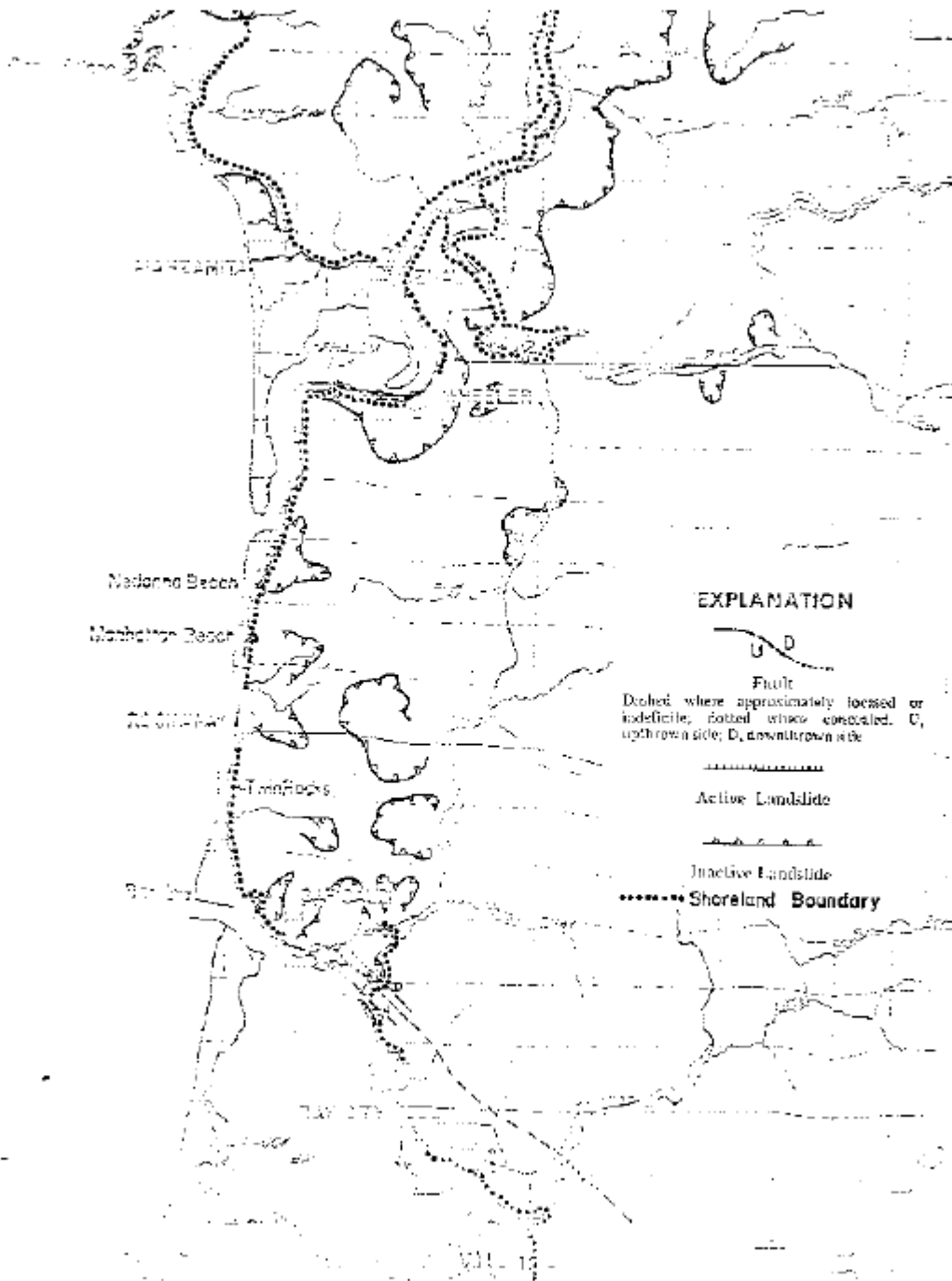
Mudflow

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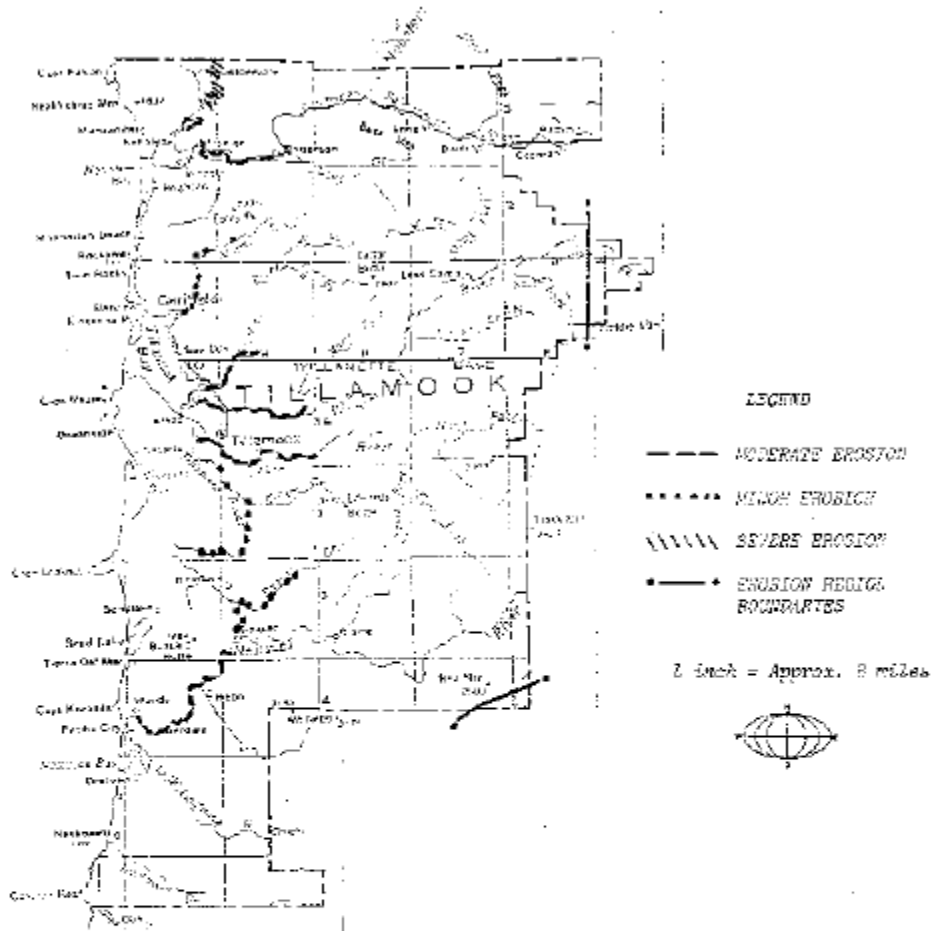


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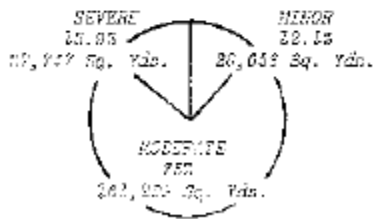
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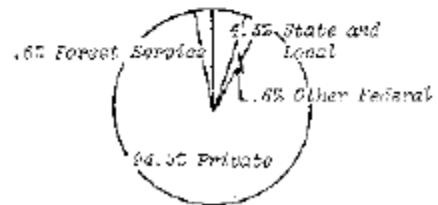
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Severity of Erosion

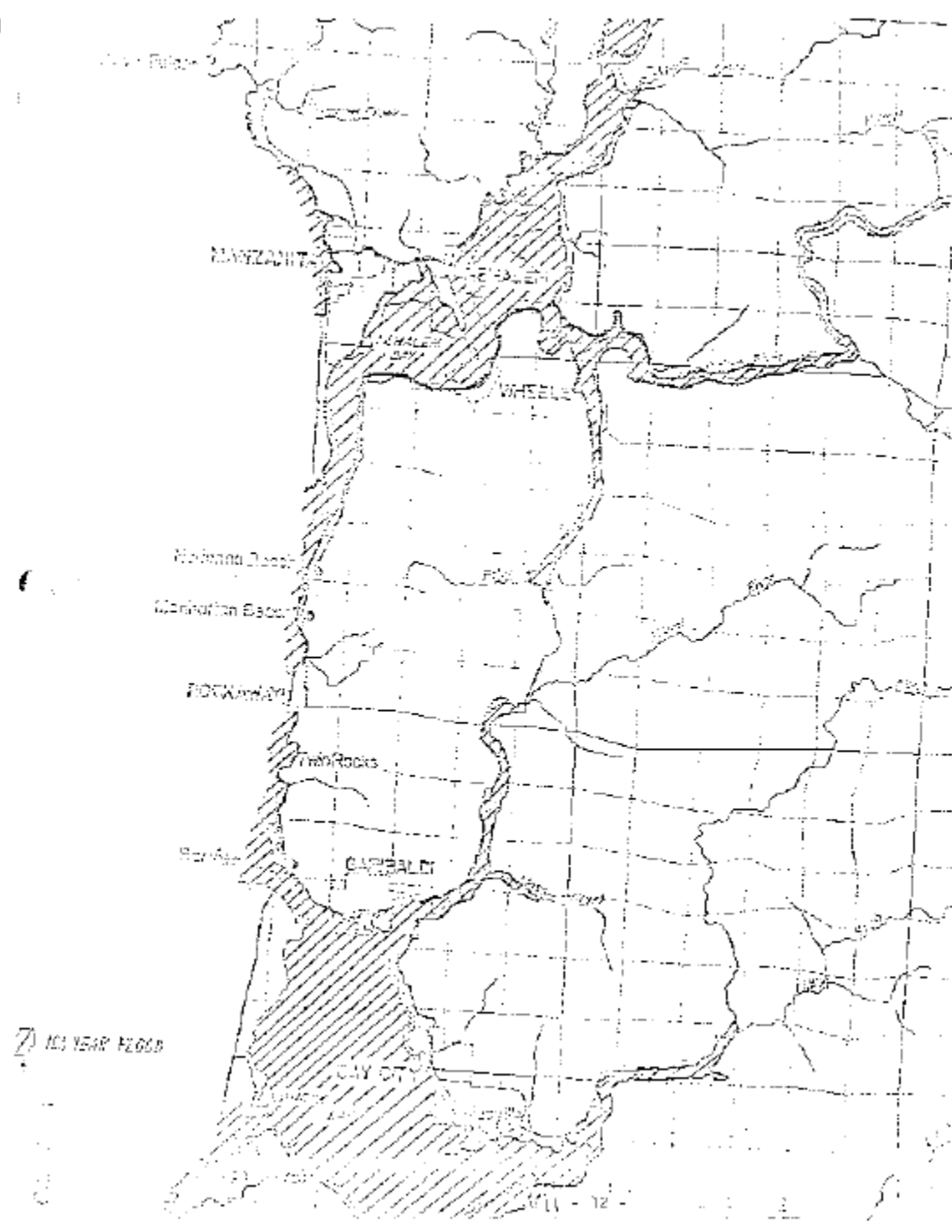


Ownership of Lands Affected

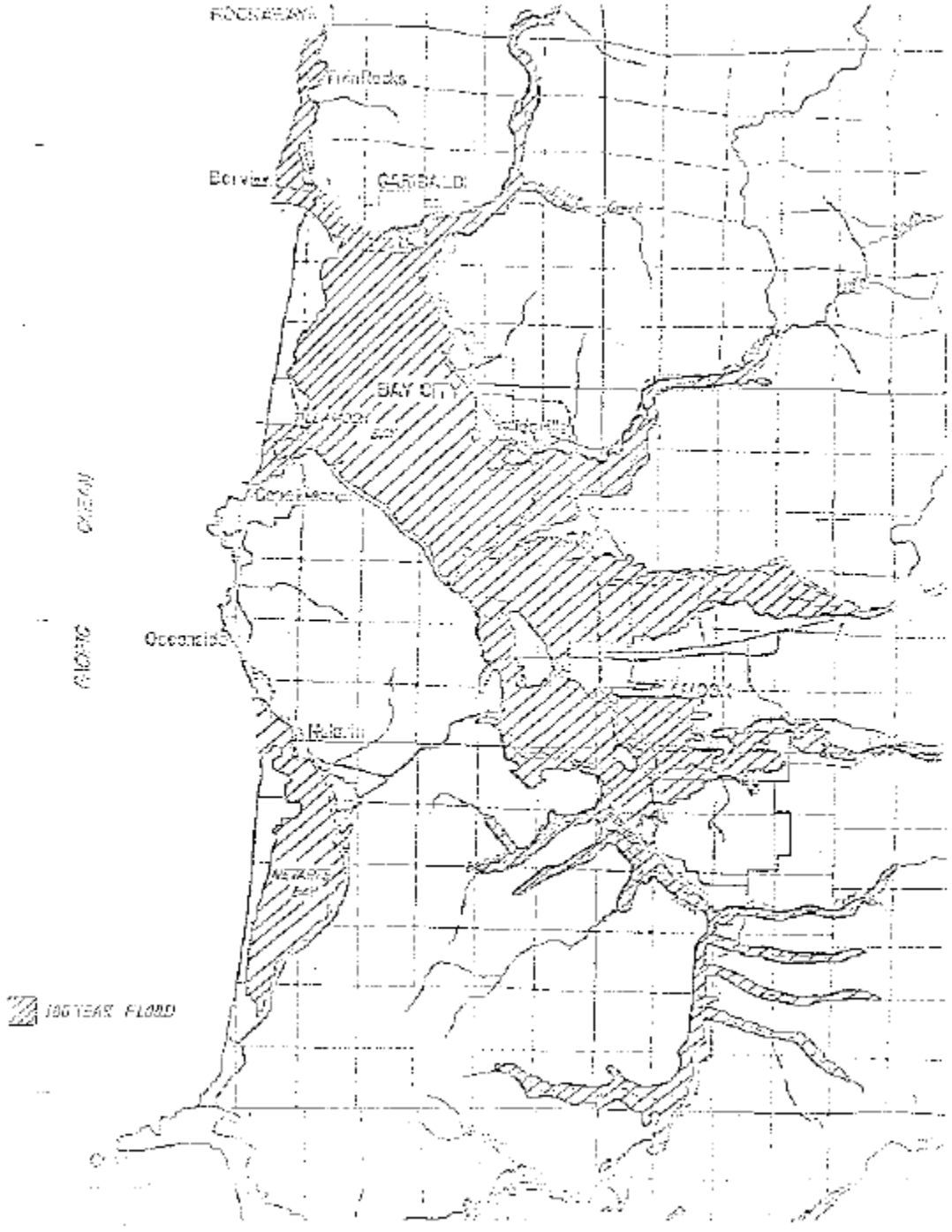


SOURCE: S.W.C. "Sediment Erosion in Oregon", 1973, p. 14, 90 and Plate 27.
 FIG. 31 -

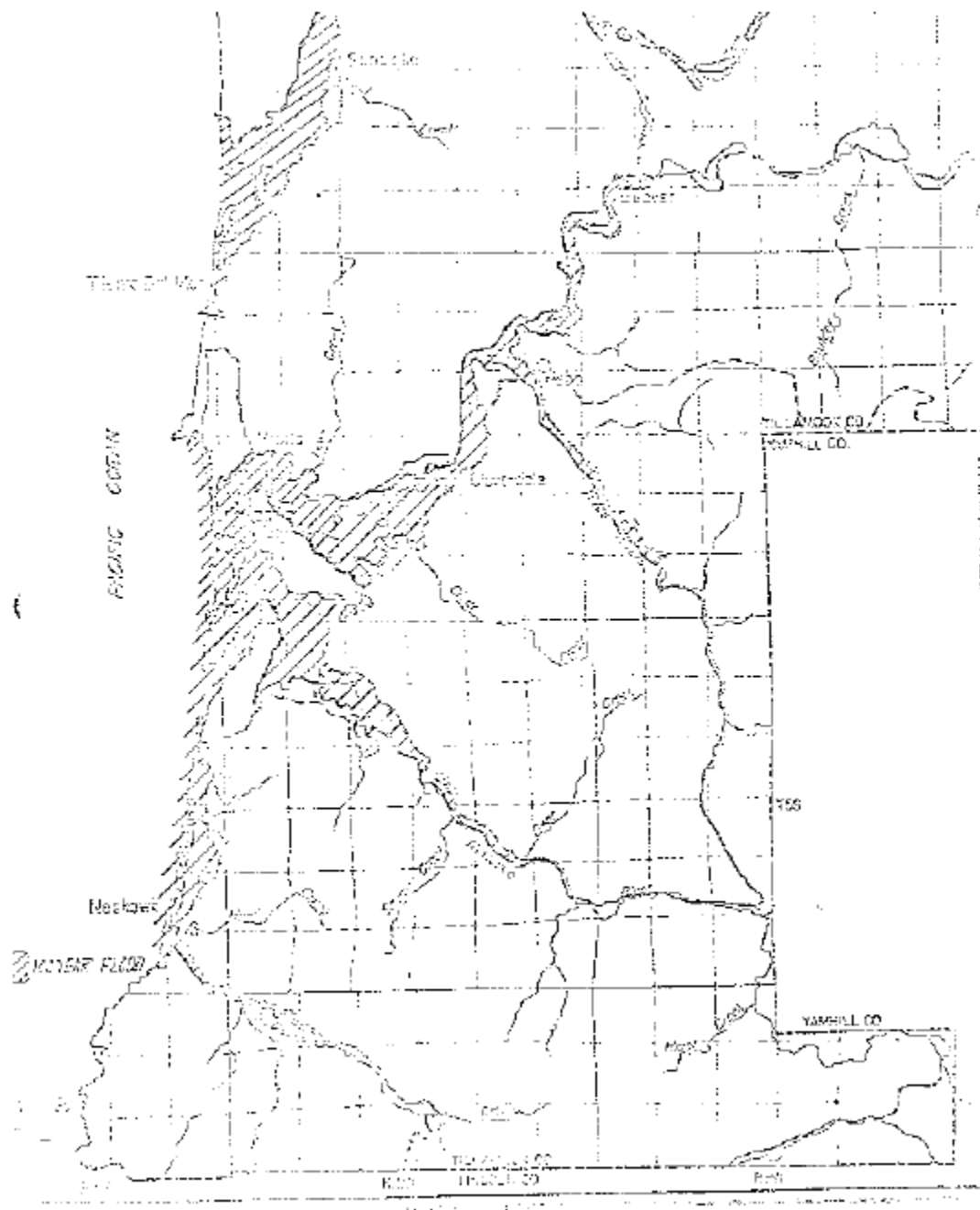
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TABLE 1
TILLAMOOK COUNTY

River/Stream	Eroded Length (Miles)	Total Erosion in County (Square Yards)	Erosion In Region Per Mile of Eroded Length (Square Yards)	Severity By Region
Beaver Creek	.4	1,462	3,655	Minor
East Beaver Creek	1.1	1,584	1,742	Minor
Bible Creek	.4	704	1,760	Minor
Boulder Creek	.3	468	1,560	Minor
Clear Creek	.2	820	4,100	Moderate
Edwards Creek	1.2	1,404	1,170	Minor
Fawcett Creek	1.4	3,801	2,715	Minor
Kilchis River	1.6	25,669	16,039	Moderate
Little South Fork Kilchis River	.3	1,056	3,520	Minor
Miami River	1.3	4,744	3,880	Minor
Moon Creek	.2	584	2,920	Minor
Nehalem River**	3.2	22,205	6,939	Moderate
	<u>1.4</u>	<u>38,846</u>	27,747	Severe
	4.6	61,051		
Big Nestucca River	5.7	49,801	8,719	Moderate
Little Nestucca River	.3	468	1,560	Minor
South Fork Trask River	1.0	3,520	3,520	Minor
Trask River	3.6	24,552	6,823	Moderate
Wilson River	<u>3.5</u>	<u>26,664</u>	7,618	Moderate
Total	27.1	215,041		

** This stream falls within two or more erosion regions.

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LAND USE VS. GEOLOGIC HAZARD

GEOLOGIC HAZARD	LAND USE								
	High Density Housing	Low Density Housing	Heavy Foundation Loads	Roads and Streets	Drainfield Disposal	Landfill	Basements	Underground Fuel Storage	Underground Utilities
Landslide	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
Steep Slope	⊕	⊕	⊕	⊕	⊕	⊕	○	○	⊕
Rock Fall	⊕	⊕	NA	⊕	NA	NA	NA	NA	NA
High Water Table	⊕	⊕	○	⊕	○	⊕	⊕	⊕	○
Ponding	⊕	⊕	○	○	⊕	⊕	⊕	⊕	○
Weak Foundation Soil	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
Heavy Clay Soil	⊕	⊕	⊕	⊕	⊕	⊕	○	○	○
Erosion	⊕	○	○	⊕	○	⊕	NA	○	○
Near Surface Bedrock	⊕	⊕	○	○	⊕	○	⊕	⊕	⊕
Pollution	⊕	⊕	NA	NA	⊕	⊕	NA	○	○
Eventual Slope Failure	⊕	○	⊕	⊕	⊕	⊕	○	NA	○
Marine Erosion	⊕	⊕	⊕	⊕	⊕	⊕	NA	NA	○
Flooding	⊕	⊕	○	⊕	⊕	⊕	⊕	⊕	⊕

HIGH POTENTIAL FOR PROBLEMS ⊕
 MODERATE POTENTIAL FOR PROBLEMS ⊕
 LOW POTENTIAL FOR PROBLEMS ○
 NOT APPLICABLE NA

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2. FINDINGS AND POLICIES

2.1 Landslides & Weak Bearing Soils

The following findings are sourced from Open-File Report O-20-13, Landslide hazard and risk study of Tillamook County, Oregon by Nancy C. Calhoun, William J. Burns, and Jon J. Franczyk, Oregon Department of Geology and Mineral Industries (DOGAMI).

Tillamook County has experienced many landslides in the last 150 years. DOGAMI OFR O-20-13 mapped existing landslide deposits (landslide inventory), modeled deep and shallow landslide susceptibility to demonstrate where landslides may occur in the future, and assessed landslide risk through an exposure analysis. The study area is ~325 square miles (841 square kilometers), spans the length of the county, and includes numerous incorporated and unincorporated communities and transportation corridors. Results from DOGAMI's mapping and risk assessment indicate the following:

- There are 4,091 mapped landslides, and 605 located historic landslide points, covering 13% of the total study area.
- Of the 4,091 identified landslides, ~650 are shallow, while ~2,470 are deep seated landslides. The other 971 landslides are mostly debris flow fans (957) and rock fall talus.
- Almost 5,000 people live in the shallow landslide high susceptibility zone and approximately 1,650 live in the deep landslide high susceptibility zone.
- More than 1,700 residents live on existing debris flow fans; and more than 1,500 residents live on deep-seated landslides. Debris flows can be a life-threatening hazard, due to the rapid and destructive nature of their movement.
- Buildings with a value of approximately \$207 million are located on existing deep landslides.

This report indicates that the study area experiences moderate to high landslide hazard, which tends to be concentrated in several discrete communities and along certain key road corridors, notably along U.S. Highway 101. The primary landslide hazard in the study area is exposure of existing structures and roadways to deep landslides and debris flow fans. Substantive risk reduction activities for this type of landslide hazard include controlling the input of water onto slopes within the moderate and deep landslide susceptibility zones and on existing deep landslides and avoiding adding material (weight) to the tops of susceptible slopes or, conversely, removing material from the bottoms of slopes (by excavation or grading).

Damages and losses due to landslides can be high. In the past 20 years, on average there have been approximately 30 landslides per year. The range of losses from landslides in a typical year is expected to be ~\$2.5M to \$4M (using the range in estimates from \$89,300 to \$144,000 per landslide). Stormy, wet, or otherwise extreme landslide years, such as the 1996 winter, can cause hundreds of landslides and millions of dollars' worth of damage.

Tillamook County is characterized by a diverse array of landforms and geomorphology, including resistant coastal headlands, active and inactive sand dunes, estuaries, deltas, river valleys, marine terraces, coastal foothills and very steep highlands. Tillamook County has high average annual precipitation as well as high 24-hour-duration precipitation related to storm events. Both factors are extremely important in triggering landslides, especially when combined with the local geology and geomorphology. The area also has a relatively moderate to high seismic hazard potential. Both high precipitation and large earthquakes are primary triggers for new landslides and the reactivation of existing landslides. Human activities may also trigger landslides.

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Additional Findings:

- Massive land failure is caused primarily by the high winter rainfall which saturates the weathered and soft sedimentary rocks underlying much of Tillamook County.
- One of the major causes of slope failure along the coast is wave erosion on the headlands and terraces. Sea stacks adjacent to the larger headlands testify to the former position of the coastline and to the erosive force of the sea.
- Many areas along the coast from Tillamook Head to Cascade Head exhibit active landslide movement.
- Active slides can be generated by acts of man which alter the balance of nature.
- Excavations, cuts, fills, and drainage modifications may decrease the stability of an area and initiate sliding. Water introduced into the subsurface by drainfields, septic tanks, and improper handling of runoff may also initiate slides.

Policies

- a. Development shall not be allowed in areas of active sliding.
- b. Zoning regulations should incorporate the grading requirements as stipulated under Chapter 70 of the Uniform Building Code.
- c. Standards of the Uniform Building Code and the density and nature of developments should be keyed to slide potential.
- d. All excavations, fills and drainage changes, and vegetation removal programs in areas of mass movement topography shall be engineered to minimize the possibility of sliding.
- e. Any development on the headlands shall consider the degree of safety which exists in terms of ground stability and the rate of beachfront erosion.
- f. Where strata slope toward cuts, slides are easily initiated, and excavation in areas with such unfavorable bedrock conditions should be properly excavated.
- g. Projects involving modifications of established drainage patterns should be evaluated in terms of the effect these changes would have on drainage and slope stability.
- h. Projects which include plans for modifying the topography of sloping areas should be evaluated in terms of the effect these changes would have on drainage and slope stability.
- i. Projects or long-range plans involving urbanization of given areas should be evaluated in terms of the long-range influence the proposed land use would have on land stability; drainage is particularly critical.
- j. Closely spaced drainfields and septic tanks should be restricted from moderate to steeply sloping areas because of the potential for sliding.
- k. Proposed development in close proximity to active or inactive landslides shall require site investigation.
- l. Proper engineering investigations should precede all medium to large construction in

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regions of possible compressible soils. Engineering solutions include excavation and backfilling with more suitable material, preloading, and the use of piling, or spread footings, depending upon the nature of the specific structure being considered and the degree of severity of the hazard.

2.2 Earthquakes

Findings

- a. In general, earthquake activity is important to the area only insofar as it may trigger mass wasting in previously unstable areas. Earthquake activity is just one of many factors which may initiate sliding, and it should be regarded as a hazard of secondary importance (Bulletin 74, p. 107).
- b. A few faults have been indicated on the geologic maps for the Tillamook area, but no attempt was made to conduct detailed mapping of rock structure (Bulletin 74, p. 107).
- c. Most of the Oregon Coast is categorized as a zone of minor potential damage for which quakes of Mercalli Intensity V-VI may occur. Moderate quakes (Intensity VIII) are accompanied by general alarm, the cracking of walls, and the falling of plaster in a wide variety of structures. Minor quakes (Intensity V-VI) are associated with swaying trees and the overturning of loose objects (Geologic Hazards Inventory of the Oregon Coast, p. 41).
- d. On November 16, 1957 an earthquake of Intensity VI (Modified Mercalli Scale) occurred near Beaver (12 miles south of Tillamook) and was felt over a total area of 4,500 square miles. As far away as Salem, household furnishings shifted location and some objects were broken.

Policies

Care shall be taken when reviewing development proposals to insure that development does not take place on faults which are highly susceptible to earthquakes.

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2.3 Erosion

Findings

- a. Erosion is the loss of land by stream, ocean, wind, or other hydraulic action and includes streambank erosion, channel scour, and gullyng (Geologic Hazards Inventory of the Oregon Coastal Zone, p. 15).
- b. Causes of erosion include rapid precipitation, lack of vegetation, steep to moderate and sometimes gentle slopes, low infiltration rates, and erodibility of bedrock or soil. Because land use can affect slope, vegetative cover, infiltration rate, and degree of consolidation, it is a primary factor in gullyng in areas of development (Geologic Hazards Inventory of the Oregon Coast, p. 15).
- c. The impacts of erosion may include the undercutting of structures of all sizes, the interruption of linear developments such as highways, railroads, and pipelines, the loss of topsoil in forestry and agricultural areas, increased sediment load, degradation of water quality, and the destruction of spawning grounds (Geologic Hazards Inventory of the Oregon coast, p. 15).
- d. Slopes in excess of 15% are highly susceptible to erosion.

Policies

- a. Prevention or remedial action shall include any or all of the following:
 1. Maintenance of existing vegetation in critical areas;
 2. Rapid revegetation of exposed areas following construction;
 3. The stabilization of shorelines and stream banks with vegetation and/or riprap;
 4. Maintenance of riparian buffer strips;
 5. Structural accommodation of increased runoff in areas of development;
 6. Seasonal restriction of construction in critical areas;
 7. Set-back requirements for construction or structures near slope edge, stream banks, etc.; and,
 8. Any other measures deemed appropriate to deal with site specific problems.

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2.4 Flooding

Findings

- a. Flooding of streams in Tillamook is an annual winter occurrence and some streams may overflow their banks several times a year. This condition is due to various combinations of heavy rainfall, steep topography, low bedrock permeability, extensive flood plains, log jams, gravel- and silt-clogged rivers and bays, high tides, and strong westerly winds from storms at sea (Bulletin 74, p. 91).
- b. Stream flooding is most likely to occur during December and January, although a combination of stream and tidal flooding can also be expected throughout the November-February period. Coastal streams respond quickly to rapid runoff from higher elevations experiencing heavy rainfall or melting snow, or combination of both (Bulletin 74, p. 91).
- c. Preliminary investigation reveals that clogging of the lower streams and the bays by silt is not the primary cause of flooding in the floodplain areas. The effect of the high ocean tides driven farther ashore by gale winds is far greater. Consequently, any advantage in getting stream flood waters to sea as quickly as possible by dredging would depend on the simultaneous occurrence of flooding conditions and ebb and slack tides. Such an occurrence would be purely coincidental and could not be depended upon. Commonly the high ocean flood tides would combine with the stream flooding to overflow the deepened channelways regardless of dredging (Bulletin 74, p. 91).
- d. In general, precipitation ranges from 80 to 110 inches with up to 150 inches in the headwaters of the Kilchis to 89 inches at Tillamook (Bulletin 74, p. 91).
- e. Flooding by streams constitutes one of the major hazards to Tillamook County with damage to developments through the effects of moving water, standing water, erosion, and siltation. Commercial establishments, homes, and other structures can experience considerable structural damage and transportation by highways and roads can be severed or impeded.
- f. The major problem associated with flooding in the Nehalem River basin is streambank erosion. The terraces are composed of unconsolidated sand and silt, and the main channel follows a sinuous course through the terraced valley. Lateral erosion is characterized mainly by slump and may be a potential threat to highways where abrupt turns in the river are situated very near the roads (Bulletin 79, p. 41).

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- g. The major hazard throughout much of the Wilson River drainage basin is flash flooding. In its lower reaches, Deadman Creek, Negro Jack Creek, Smith Creek, Slide Creek, and Fern Creek exhibit potential for flash flooding. Because of the primary governing factors, which include steep slope, impermeability, and heavy rainfall, are beyond human control; prevention of flash floods is not possible. During the floods of 1972 and 1977 torrents from side channels swept over the Wilson river Highway in dozens of places causing major damage at several localities (Bulletin 79, p. 43).
- h. Mudflows are an additional hazard, especially in the lower reaches. The actual channel of the river is scoured in bedrock throughout its entirety and lateral migration under natural conditions is minimal. However, bank erosion in areas of fill constitutes a hazard. In addition, floodwaters laden with logs can inflict considerable damage on man-made structures extending into the river (Bulletin 79, p. 43).
- i. In terms of flooding, the major hazards along the Trask River are landslide damming in the upper reaches and flash flooding of the side channels in the upper and lower reaches. In the valley bottom, terrace levels are fairly high and bedrock is near or at the surface. Danger of appreciable streambank erosion in the main channel is minimal. Streambank erosion of some of the tributaries and parts of the upper main channel, however, is significant.

Flash flooding due to steep slopes, impermeable bedrock, and intense winter rains is a hazard along many of the short streams in the lower Trask drainage including Cedar Creek, Panther Creek, Burton Creek, and others. In 1972, considerable upstream flash flood damage was done to the main road one mile south of Trask House, where a short unnamed stream washed out the road (Bulletin 79, p. 43).
- j. The upper Nestucca river basin is characterized by gentle relief, more vegetative cover, and longer side channels than the more hazardous parts of either the Wilson or the Trask Rivers. The dangers of flash flooding are correspondingly diminished. Terraces are relatively high west of Blaine, and the stream channel is scoured out of bedrock east of Blaine. Stream-bank erosion, although still a hazard, is not extreme. No stream-flow data are available for the study area (Bulletin 79, p. 44).

Policies

- a. Tillamook County’s flood control regulations as stipulated under the “F-H” Flood Hazard Zone shall apply to all areas designated as flood areas on the County’s Flood Insurance Rate Maps.
- b. The County shall continue cooperation with other local governmental units to seek out and implement solutions to flooding problems in the Lower Wilson River area.
- c. Roads crossing channels subject to flash flooding shall be founded on culverts of adequate size to accommodate maximum runoff.
- d. Permanent structures shall not be placed in channels subject to flash flooding.
- e. Where development within floodplains is allowed, the developer shall provide appropriate safeguards to insure public safety and protect individuals residing in the flood zone.
- f. All new construction and substantial improvements shall be constructed by methods and practices that minimize flood damage (floodproofing).

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- g. Flood zone regulations shall be based on the most current and reliable flood plain data and meet the minimum requirements established by the Federal Insurance Administration.
- h. Development within the regulatory flood way shall meet minimum Federal requirements.
- i. Protective measures shall be taken to insure that the cumulative effect of a proposed development or fill, when combined with all other development or previous placement of fill, will not increase the water surface elevation above a specified level.

2.5 Tsunamis (Seismic Waves)

Description of the Hazard:

The Oregon coast is well known for its spectacular scenery and natural resources. However, because the coast lies at the interface between land and the Pacific Ocean, it also is a zone of great instability and vulnerability. Over time, we have gained a greater awareness of our coast’s geologic hazards and its risks to people and property.

Coastal Oregon is not only vulnerable to chronic coastal hazards such as coastal erosion from winter storms and sea level rise, but it is also subject to the potentially catastrophic effects of a Cascadia earthquake event and related tsunami. These types of powerful and devastating earthquakes of magnitude 9+ are generated at the Cascadia Subduction Zone where the eastward-moving Juan de Fuca tectonic plate dives under the westward- moving North American plate just off the Oregon coast.

These large earthquakes will occur under the ocean just offshore of our coast and will produce extremely destructive tsunamis that can strike the coast as soon as 15 minutes after the earthquake, leaving devastation in their path. It is likely that in most Oregon coast communities, including Tillamook County, the only warning of an approaching tsunami will be the earthquake itself.

The geologic record shows that the largest of these large Cascadia Subduction Zone earthquakes and accompanying tsunamis occur about every 500 years, plus or minus 200 years. The last such earthquake and tsunami occurred over 300 years ago, on the evening of January 26th, 1700. This means that we are in the time window where a destructive Cascadia earthquake and tsunami could occur and the probability of that occurrence will continue to increase over time. This time the stakes are much higher as the great earthquake and catastrophic tsunami could occur when tens of thousands of Oregonians and visitors are enjoying coastal beaches and towns. To address this increasing risk and substantially increase resilience within our community, Tillamook County is proactively addressing tsunami preparedness and mitigation within its land use program. Land use planning that addresses tsunami risk is an essential tool to help increase resilience to a potentially catastrophic tsunami event within Tillamook County.

Tsunami Hazard Maps:

The Department of Geology and Mineral Industries (DOGAMI) has developed Tsunami Inundation Maps (TIMs) which provide the essential information for defining tsunami risk along the Oregon coast. Tillamook County has adopted the TIM’s applicable to its coastal unincorporated areas as a part of its comprehensive plan hazard inventory. These maps are also referenced within this natural hazards element of the comprehensive plan and are the basis for establishing the boundaries of Tillamook County’s Tsunami Hazard Overlay Zone. The TIMs are referenced in the tsunami related plan policies and within the overlay zone for purposes of differentiating between areas of higher versus lower risk.

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Tsunami Related Policies:

Tillamook County has adopted a set of comprehensive plan policies related to tsunami preparedness and recovery that are included within this and other applicable sections of the comprehensive plan. These policies have been developed to address the resilience goals of the County. They are designed to support the County’s resilience efforts within the comprehensive plan and implementing codes.

Zoning:

Tsunami Hazard Overlay Zone (THO): Tillamook County has adopted an overlay zone which utilizes the applicable DOGAMI Tsunami Inundation Maps (TIMs). The overlay zone includes all areas identified as subject to inundation by the largest (XXL) local source tsunami event which ensures that life safety and evacuation route planning and development are adequately addressed. Other land use resilience strategies and requirements included within the overlay zone, which are not life safety or evacuation related, are applied within a subset of the overlay to smaller inundation scenario areas. These measures are included within the overlay zone provisions and reflect the community’s risk tolerance and application of mitigation measures. The overlay zone boundary has been adopted as an amendment to the official zoning map for Tillamook County.

Tsunami Evacuation Facilities Improvement Plan Maps: The County, as part of its land use program for tsunami preparedness, is in process of completing a comprehensive Tsunami Evacuation Facilities Improvement Plan in coordination with affected communities and stakeholders. The Tsunami Evacuation Facilities Improvement Plan identifies designated evacuation routes, assembly areas and other components of the local evacuation system. The plan is a key component of the County’s efforts to reduce risk to life safety by planning for a comprehensive evacuation system and developing the detailed information necessary to establish land use requirements to implement evacuation measures and improvements.

General Policies

To protect life, minimize damage and facilitate rapid recovery from a local source Cascadia Subduction Zone earthquake and tsunami, the County will:

1. Support tsunami preparedness and related resilience efforts.
2. Take reasonable measures to protect life and property to the fullest extent feasible, from the impact of a local source Cascadia tsunami.
3. Use the Oregon Department of Geology and Mineral Industries (DOGAMI) Tsunami Inundation Maps applicable to the County to develop tsunami hazard resiliency measures.
4. Adopt a Tsunami Hazard Overlay Zone for identified tsunami hazard areas to implement land use measures addressing tsunami risk.
5. Enact design or performance implementing code components in identified tsunami hazard areas.

Evacuation Policies

To facilitate the orderly and expedient evacuation of residents and visitors in a tsunami event, the County will:

1. Develop a Tsunami Evacuation Facilities Improvement Plan that identifies current and projected evacuation needs, designates routes and assembly areas, establishes system standards, and identifies needed improvements to the local evacuation system.
2. Identify and secure the use of appropriate land above a tsunami inundation zone for evacuation, assembly, and emergency response.
3. Ensure zoning allows for adequate storage and shelter facilities.
4. Allow for needed evacuation route improvements, including improvements to route demarcation (way finding in all weather and lighting conditions) and vegetation management, for new development and substantial redevelopment in tsunami hazard areas.
5. Work with neighboring jurisdictions to identify inter-jurisdictional evacuation routes and assembly areas where necessary.

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6. Allow for the development of vertical evacuation structures in areas where reaching high ground is impractical.
7. Evaluate multi-use paths and transportation policies for tsunami evacuation route planning.
8. Encourage suitable structures to incorporate vertical evacuation capacity in areas where evacuation to high ground is impractical.
9. Install signs to clearly mark evacuation routes and implement other way finding technologies (e.g. painting on pavement, power poles and other prominent features) to ensure that routes can be easily followed day or night and in all weather conditions.
10. Prepare informational materials related to tsunami evacuation routes and make them easily available to the public.

Policies Related to Reducing Development Risk in High Tsunami Risk Areas

The County will:

1. Prohibit comprehensive plan or zone map amendments that would result in increased residential densities or more intensive uses in tsunami hazard areas unless adequate mitigation is implemented. Mitigation measures should focus on life safety and tsunami resistant structure design and construction.
2. Encourage open space, public and private recreation and other minimally developed uses within the tsunami inundation zone area.
3. Prohibit the development of those essential facilities and special occupancy structures within the **LARGE (L)** tsunami inundation area, unless a “Use Exception” has been granted.
4. Protect and enhance existing dune features and coastal vegetation to promote natural buffers and reduce erosion.

Hazard Mitigation Planning

The County will:

1. Address tsunami hazards and associated resilience strategies within the community’s FEMA approved hazard mitigation plan.
2. Incorporate and adopt relevant sections of the hazard mitigation plan by reference into the comprehensive plan.

Tsunami Awareness Education and Outreach

The County will:

1. Encourage and support tsunami education and outreach, training, and practice.
2. Implement a comprehensive and ongoing tsunami preparedness community education and outreach program.
3. Collaborate with local, state and federal planners and emergency managers for the purpose of developing a culture of preparedness supporting evacuation route planning and other land use measures that minimize risk and maximize resilience from tsunami events.

Debris Management

The County will:

1. Identify and work to secure the use of suitable areas within the Tsunami Inundation Zone for short and long-term, post-disaster debris storage, sorting and management.
2. Work with other public and private entities to establish mutual aid agreements for post-disaster debris removal and otherwise plan for needed heavy equipment in areas which may become isolated due to earthquake and tsunami damage.

Hazardous Materials

The County will:

1. Limit or prohibit new hazardous facilities within tsunami inundation zones. Where limiting or prohibiting

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such facilities is not practical, require adequate mitigation measures consistent with state and federal requirements.

Goal 11: Public Facility and Services

The County will:

1. Consider and address tsunami risks and evacuation routes and signage when planning, developing, improving, or replacing public facilities and services.

Goal 12: Transportation

The County will:

1. Develop multi-use paths that both enhance community livability and serve as tsunami evacuation routes.
2. Coordinate evacuation route and signage planning in conjunction with existing or proposed transportation system plan pedestrian and bicycle route planning efforts.
3. Locate new transportation facilities outside the tsunami inundation zones where feasible.
4. Where feasible design and construct new transportation facilities to withstand a Cascadia event earthquake and be resistant to the associated tsunami.

Goal 14: Urbanization

The County will:

1. Limit the allowable uses on property in the tsunami hazard area vacated as the result of a community growth boundary expansion to relocate existing development. Such limitations shall include permitting only low risk uses, or requiring uses which implement adequate protection or mitigation measures for seismic and tsunami hazards.
2. Plan for the location or relocation of critical facilities outside of tsunami hazard area when conducting the land needs analysis.

Map Amendments

- a. *DOGAMI Tsunami Inundation Map (TIM): Communities should adopt the map, or maps in the DOGAMI Tsunami Inundation Map (TIM) Series applicable to their jurisdiction as a part of the comprehensive plan inventory, as they provide the essential information for defining tsunami risk. The TIMs include five inundation scenario areas including small, medium, large, extra-large, and extra extra-large tsunami events. The TIMs will typically be referenced in the natural hazards element of the comprehensive plan, and will also be used as the basis for establishing the boundaries of a Tsunami Hazard Overlay zone. The TIMs may also be referenced in plan policies and/or the overlay zone for purposes of differentiating between areas of higher versus lower risk.*
- b. *Tsunami Hazard Overlay Zone Map (THO): The overlay zone map(s) should be developed using the applicable DOGAMI Tsunami Inundation Maps or TIMs. In developing the overlay map it is recommended that the overlay area include all five inundation scenarios identified on the TIMs (S, M, L, XL, and XXL) which would ensure that life/safety and evacuation route planning and development are adequately addressed. Other land use resilience strategies and requirements included within the overlay zone, which are not life safety or evacuation related, may be applied within a subset of the overlay to smaller inundation scenario areas subject to the community's risk tolerance and application of mitigation measures. The map(s) should be adopted in the form of an amendment to the official zoning map for the community.*
- c. *Tsunami Evacuation Facilities Improvement Plan Maps: The Tsunami Evacuation Facilities Improvement Plan will typically include a map or maps that identify designated evacuation routes, assembly areas and other components of the local evacuation system. This map would be included in the adoption of the overall Tsunami Evacuation Facilities Improvement Plan. The Tsunami Evacuation Facilities Improvement Plan should, in turn, be incorporated into the community's comprehensive plan or transportation system plan, as appropriate.*

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2.6 Groundwater

Findings

- a. Groundwater pollution is technically not a geologic hazard in that the main cause of the problem lies in the activities of man rather than acts of nature. Because an understanding of geologic conditions is fundamental to the prevention or treatment of groundwater pollution, however, it is included here (Geologic Hazards Inventory of the Oregon Coastal Zone, p. 29).
- b. The study area is characterized by heavy winter rains, dry summers, impermeable bedrock, variable vegetative cover, and gentle to steep slopes. Relatively little water is retained by the ground. Total runoff amounts to approximately three-fourths of the annual precipitation and it is concentrated in the winter months (Bulletin 79, p. 52).
- c. Bedrock consists of “tight” volcanic and sedimentary rocks in the Nestucca, Trask, and Wilson River drainages and in the lower Nehalem Basin. Bedrock in the upper Nehalem Basin consists of impermeable clay siltstone and minor sandstone (Bulletin 79, p. 52).
- d. The lack of consolidation and the flat topography expression of the terrace deposits in the upper Nehalem River Basin apparently favor the storage of groundwater and the overall well production there is significantly higher than in the valleys to the south (Bulletin 79, p. 52).
- e. In the upland areas water wells are basically restricted to valley and canyon bottoms. Because stream flow is so low in the dry summer months and runoff is so abrupt following winter storms, it can be inferred that infiltration on the mountain slopes is minimal and water potential away from the major valleys is very low. Almost all producing wells are drilled in sedimentary rock (Bulletin 79, p. 52).
- f. Static water level is 50 feet or less in most wells of the Nehalem River Valley and it is 30 feet or less in most of the wells of Tillamook County. Total depth of producing wells is generally less than 200 feet. Water production is erratic even within small areas (Bulletin 79, p. 52).
- g. Most of the producing wells yield approximately 10 gallons per minute in inland Tillamook County. However, the Tillamook Valley is underlain by extensive alluvial sand and gravel layers which locally can produce large volumes from high-yield wells. The total potential sustained yield of the area has not been determined, but it undoubtedly is much greater than is presently produced. Individual large-diameter wells in Tillamook Valley can produce more than 1000 gallons per minute (Bulletin 74, p. 133).

Policies

- a. Measures shall be recognized that assure the protection of recharge areas of groundwater aquifers that have immediate or future potential use.
- b. Future planning for the uplands shall consider the restrictions inherent in the low groundwater potential of the area.
- c. Buoyant structures such as basements, buried gas tanks, and swimming pools shall not be permitted in areas of high groundwater table.

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BEACHES AND DUNES ELEMENT

(Goal 18)

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BEACHES AND DUNES ELEMENT

(GOAL 18)

1. IDENTIFICATION OF BEACH AND DUNE AREAS

1.1 Introduction

Tillamook County has 111 miles of shoreline. Of this total, 61 miles consist of small beaches, alternating with headlands and steep terrace scarps, and 50 miles are shores along bays. This diversity of coastal features provides the individual with an opportunity to enjoy a variety of recreational experiences in addition to space for housing and commercial activities. It is this mix of uses that make coastal communities unique.

It is not surprising that this area's values and diversified uses are sought after, often resulting in conflicting uses, such as off-road vehicles activity adjacent to residential development.

Additionally, the beach and dune systems are quite sensitive to human activities as well as the natural forces of wind, rain, and ocean waves.

When planning for these diverse land uses, it becomes imperative that the County make an effort to provide a wide spectrum of uses while maintaining the physical integrity of the beach and dune areas.

1.2 Inventory

Beaches and dunes are classified as a variety of different forms. The following list of definitions from the Statewide Planning Goals provides one system of classification.

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BEACH: Gently sloping areas of loose material (e.g. sand, gravel, and cobble) that extend landward from the low-water line to a point where there is a definite change in the material type or landform, or to the line of vegetation.

DEFLATION PLAIN: The broad interdune area which is wind scoured to the level of the summer water table.

DUNE: A hill or ridge of sand built up by the wind along sandy coasts.

DUNE, ACTIVE: A dune that migrates, grows, and diminishes from the face of wind and supply of sand. Active dunes include all open sand dunes, active hummocks, and active foredunes.

DUNE, CONDITIONALLY STABLE: A dune presently in a stable condition, but vulnerable to becoming active due to fragile vegetative cover.

DUNE, OLDER STABILIZED: A dune that is stable from wind erosion, and that may include diverse forest cover. They include older foredunes.

DUNE, PARABOLIC: A dune which is parabolic in shape and is oriented with the convex side away from the wind.

DUNE, RECENTLY STABILIZED: A dune with sufficient vegetation to be stabilized from wind erosion, but with little, if any, development of soil or cohesion of the sand under the vegetation. Recently stabilized dunes include conditionally stable foredunes, conditionally stable dunes, dune complexes, and younger stabilized dunes.

DUNE, YOUNGER STABILIZED: A wind stable dune with weakly developed soils and vegetation.

DUNE COMPLEX: Various patterns of small dunes with partially stabilized intervening areas.

FOREDUNE, ACTIVE: An unstable barrier ridge of sand paralleling the beach and subject to wind erosion, water erosion, and growth from new sand deposits. Active foredunes may include areas with beach grass, and occur in sand spits and at river mouths as well as elsewhere.

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FOREDUNE, CONDITIONALLY STABLE: An active foredune that has become conditionally stable with regard to wind erosion.

FOREDUNE, OLDER: A conditionally stable foredune that has become wind stabilized by diverse vegetation and soil development.

HUMMOCK, ACTIVE: Partially vegetated (usually with beach grass), circular, and elevated mounds of sand which are actively growing in size.

INTERDUNE AREA: Low-lying areas between higher landforms which are generally under water during part of the year.

All beach and dune areas categorized in the table below and as identified in Open File Report O-20-04, Temporal and Spatial Changes in Coastal Morphology, Tillamook County, Oregon by the Oregon Department of Geology and Mineral Industries (DOGAMI) are subject to the provisions of this section. Beach and dune landforms are identified and mapped in this DOGAMI report. The following table provides a crosswalk between the categories mapped in O-20-04 and the categories subject to the provisions of this Section 3.530 and the Beaches and Dunes Element of the Tillamook County Comprehensive Plan.

Table 1

DOGAMI Classification	Inventory	Goal 18, DLCD Classification	Mapping Code
Beach		Beach	B
Active Foredune		Foredune, Active	FDA
Active Dune Hummocks		Hummocks, Active	H
Recently Stabilized Foredune		Foredune, Conditionally Stable	FD
Dune Complex		Dune Complex	DC
Younger Stabilized Dunes		Dune, Younger Stabilized	DS
Older Stabilized Dunes		Dune, Older Stabilized	ODS
Open Dune Sand		Dune, Active/Dune, Parabolic	OS
Open Dune Sand Conditionally Stable		Dune, Conditionally Stable	OSC
Active Inland Dune		Dune, Active	AID

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Wet Interdune	Interdune	W
Wet Deflation Plain	Deflation Plain	WDP

Table 2
Major Impacts in Management Beaches and Dunes, Oregon
(11x17)

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2. MANAGEMENT OF IDENTIFIED BEACH AND DUNE AREAS

2.1 Introduction

The beach and dune forms identified in Section 1.2 have different suitabilities for human use and alteration. Hazards associated with some of these areas may be significant enough to justify prohibiting development that have any value. In areas prone to less severe hazards, developments of value are reasonable if they are built according to standards that reasonably assure their safety and the safety of surrounding areas. This section evaluates the suitabilities of the dune forms for the uses commonly considered in the planning process and provides guidelines for regulating uses in these areas.

This element of the comprehensive plan will focus on hazards in evaluating use suitabilities. The need to protect areas of critical environmental concern, areas having scenic, scientific, or biological importance, and significant wildlife habitat was assessed in the Goal 17 element for the beach and dune areas within the shorelands boundary, and in the Goal 5 element for other dune areas. (Please note that all beaches and most dune areas are included in the shoreland boundary.)

A number of hazards are associated with beach and dune areas. They include erosion, flooding, groundwater drawdown or pollution, and sliding. One or more hazards may be present in any given beach or dune area.

Erosion of the beach and dunes behind it can be caused by water movement or the wind. Waves and river or stream currents will easily erode sand from a beach or dune area. In areas where such losses are severe or areas where

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losses are not replaced, it is inadvisable to place structures or facilities of value. Wind will also transport sand where a thick vegetative cover is not present. The dangers of sudden destruction are not present but longer term hazards of inundation are.

Flooding is particularly hazardous in beach and dune areas because of the basic instability of these land-forms. In addition, storm driven waves are powerful as they carry logs and other debris that act as battering rams.

Dune aquifers, because of their very porous nature are susceptible to over-withdrawal and pollution. Because dune sand is not a good filter, pollutants can travel long distances and foul dune aquifers. Some areas such as interdune areas are particularly susceptible because water tables are near the surface. Over-withdrawal of water can also foul a dune aquifer by causing saltwater to intrude. Finally, over-withdrawal of groundwater can kill off stabilizing surface vegetation and ultimately lead to dune erosion.

Sliding may be a hazard where dune slopes exceed 30 degrees, the angle of repose for unconsolidated sand. Development of steeper slopes stabilized only by surface vegetation can trigger sliding if adequate stabilization of the sand substrate is not retained.

2.2 Beach and Dune Use Capabilities

The following discussion of beach and dune use capabilities is based on the analysis provided by the USDA Soil Conservation Service in *Beaches and Dunes of the Oregon Coast*. Table 2, reproduced from that publication, summarizes the tolerances that the various mapped beach and dune forms have for various uses.

2.2a Beach

Beaches are very hazardous environments subject to strong ocean waves and their erosive forces. The beach profile varies considerably throughout the course of a year, undergoing erosion, sometimes sudden, during the winter months and gradual build-up during the summer. The beach acts as the primary dissipater of storm wave energy as the summer sand build-up is redistributed by winter storm waves into off-shore bars.

The harsh beach environment is unsuitable for any type of structure or facility. Elevating structures on fill or by other means does not provide

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for their safety because they are still located in the area of greatest storm wave attack and erosion of adjacent beach areas will undermine their footings.

The beach is very tolerant of all forms of recreation because little or no vegetation and waves and wind will easily re-sculpt disturbed areas. However, off-road vehicle use should be limited in critical Snowy Plover habitat (See Goal 17 element).

2.2b Active Foredune (FDA)

Active foredunes are growing barrier ridges of sand located immediately above the high tide line and paralleling the beach. They typically have 15% of their surface in open sand patches in the summer and 40% in open sand in the winter. Because of their incomplete surface cover, they are prone to wind erosion. Hazards present in active foredune areas include wind erosion, wave erosion, flooding, and sand inundation.

Table 2 indicates that active foredunes have no tolerance for any type of development. However active foredunes have been developed in Tillamook County with some success where they have become stabilized with dune vegetation over time. In fact, many of the foredune areas identified as active foredunes in the SCS study have become conditionally stable in the years since that study was done. Wave and wind erosion and sand deposition have caused problems in a number of these areas. In the Nedonna, Pacific City, and Neskowin areas, severe wave erosion necessitated the placement of riprap. In the Pacific City area, sand inundates several houses along Sunset Drive every year.

Certain management practices are necessary in order to minimize the hazards of developing on active foredunes. They are as follows:

- 1) Vegetate open sand areas and protect existing vegetation;
- 2) Minimize dune alteration and disturbance of vegetation, temporarily protect disturbed areas and revegetate as soon as possible;
- 3) Locate structures and facilities as far from the beach as

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possible; and,

- 4) Elevate structures, preferably on piling, to protect against wave damage and to allow for sand build-up.

Active foredunes have little tolerance for forms of recreation other than pedestrian recreation because of the fragile nature of the vegetation present. Off-road vehicle use is a particularly destructive form of recreation on these dune forms. Where possible, access across active foredunes should be limited to elevated walkways.

Active foredunes have no tolerance for sand mining.

2.2c Active Dune Hummocks (H)

Active dune hummocks are those hummocks which are actively growing or deflating from wind erosion or deposition. They have no tolerance for development, off-road vehicles, or sand mining. Wind erosion is a hazard associated with this dune form. Wet hummocks that are associated with active dune hummocks present additional hazards of high water tables and quicksand.

A portion of Bayocean Spit is the only area of Tillamook County where this dune type is mapped.

2.2d Recently Stabilized Foredunes (FD)

These are foredunes that have sufficient vegetative cover to retard wind erosion. They are typically larger than active foredunes and have a more diverse vegetative cover. Recently stabilized foredunes may, however, be no more resistant to wave erosion than active foredunes. They are prone to activation if the vegetative cover is removed. Conditionally stable foredunes can be susceptible to wave overtopping as well. Sand transport and dune growth is not as pronounced as with active foredunes but still can cause sand build-up problems around structures.

The Soil Conservation Service indicates that recently stabilized foredunes have a low tolerance for low levels of urban development and no tolerance for deep excavations.

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The tolerance of recently stabilized dunes for recreation activities and sand mining is similar to that for active foredunes.

2.2e Open Dune Sand (OS)

Open dune sand, essentially devoid of vegetation, has no tolerance for development. Wind drifted sand is a severe hazard that can readily inundate structures. Advancing open dune sand can also pose hazards to adjacent areas as it covers farmland, forestland, roads, structures, and everything else in its path. This dune form does have a high tolerance for all forms of recreation and sand mining.

2.2f Open Dune Sand Conditionally Stable (OSC)

This dune form includes active open dune sand areas that have been planted to European beachgrass and secondary plants, conditionally stable foredunes that have been flattened by earth moving equipment, and some drained deflation plains.

As with recently stabilized foredunes, this dune form is vulnerable to becoming reactivated when the vegetative cover is removed. Some of these areas are subject to flooding although this typically is hydrostatic flooding rather than velocity flooding. High groundwater may also be a problem in some of these areas.

The Soil Conservation Service identifies this dune form as having a low tolerance for low levels of urban development. It is a less hazardous formation than recently stabilized foredunes and it has some tolerance for deep excavations.

Conditionally stable open sand areas have no tolerance for recreation other than pedestrian forms. It also has no tolerance for sand mining.

2.2g Younger Stabilized Dunes (DS)

These dunes are surface stabilized with vegetation including native, grasses, European beachgrass, shrubs, and trees.

They are distinguished from older stabilized dunes by having less developed soil and cementation. Younger stabilized dunes have a moderate to high suitability for urban development. Use of these areas

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must proceed with caution, however, because removal of large areas of vegetation exposing the poorly cemented sand below can result in wind erosion and sliding. For this reason, logging, sand mining, ORV use, and deep excavation should not occur indiscriminately.

2.2h Older Stabilized Dunes (ODS)

Older stabilized dunes have high levels of tolerance for urban development. They are well stabilized by vegetation as with younger stabilized dunes but they have a higher level of soil cementation. Because of this, they can better tolerate deep excavation but may be unsuitable for on-site sewage disposal. These dunes have a moderate or high level of tolerance for all forms of recreation and for sand mining.

2.2i Wet Deflation Plain (WDP)

Wet deflation plains have almost no tolerance for development because of high water tables. Some specific areas within mapped deflation may be suitable for low levels of urban development. These areas are intolerant of sand mining and ORV use.

Wet deflation plains in Tillamook County are confined to the Nehalem Spit, Barview County Park, Bayocean Spit, and Nestucca Spit. These are recreation areas where development is slight.

Goal 18 implementation requirement 2 applies to deflation plains that are subject to ocean flooding. Tillamook county is not taking an exception to this requirement in any area because all mapped wet deflation plains are in state or county parks.

2.2j Wet Interdune (W)

Wet interdunes are diverse sand forms varying from wet open dune sand forms to wet areas in recent and older stabilized dunes. Many wet interdunes are old deflation plains.

Wet interdunes have tolerances similar to those for wet deflation plains. They can tolerate low levels of urban development in certain areas. Development in these areas creates difficulties for construction, drainage, and on-site sewage disposal. Potential groundwater pollution hazards are considered in Section 4.

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2.2k Dune Complex (DC)

Areas mapped as dune complex include other dune types occurring together including open sand conditionally stable, active open dune sand, wet interdunes, and stabilized areas. Use suitabilities for this dune form are similar to those for open dune sand. Where conditionally stable open sand is present, there is a higher level of tolerance of development but a lower tolerance for sand mining or recreation.

2.3 Beach and Dune Management Requirements and Findings

Goal 18 includes several requirements for managing uses and activities in beach and dune areas. This section discusses implementation requirements 1, 2, 3, and 6. Implementation requirement 5 is discussed in Section 4.

2.3a Implementation Requirement 1

2.3a.1 Implementation Requirement 1 states that:

Local governments and state and federal agencies shall base decisions on plans, ordinances, and land use actions in beach and dune areas, other than older stabilized dunes, on specific findings that shall include at least:

- (a) The type of use proposed and the adverse effects it might have on the site and adjacent areas;
- (b) Temporary and permanent stabilization programs and the planned maintenance of new and existing vegetation;
- (c) Methods for protecting the surrounding area from any adverse effects of the development; and,
- (d) Hazards to life, public and private property, and the natural environment which may be caused by the proposed use.

2.3a.2 As Table 2 shows, the adverse effects of developing or otherwise using dune areas varies with the beach and dune

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types. For example, some areas such as beaches, foredunes, and open sand areas have little or no tolerance for development whereas younger and older stabilized dunes have moderate to high levels of tolerance. For other uses, however, tolerances can be completely different. Beaches have a high tolerance for ORV use whereas younger stabilized dunes have low tolerance.

2.3a.3 Agricultural Uses

In general, Tillamook County is not including beach and dune areas in agricultural zones, F-1 and SFW-20. The only exception is in the Sandlake area, where some areas of Yaquina and Netarts soils are included in these zones. These soil types correspond to younger stabilized dunes and wet interdunes, both of which can tolerate grazing and other agricultural practices. Pasturelands are well established in these areas. Therefore there are no adverse effects or hazards to life, public and private property, and the natural environment anticipated to result from agricultural practices in dune areas in Tillamook County. Customary farm practices are adequate for maintaining vegetation and for protecting surrounding areas. (Please note that this pertains only to farm practices and not to other uses allowed in the farm zone. These are included in Section 2.3a.5 below.)

2.3a.4 Forest Practices

A number of different dune areas have been included in forest zones. Most of these areas are located north of Sand Lake and a part of the Siuslaw National Forest. Tillamook County is relying on the Forest Practices Act to govern forest operations in these areas. (Please note that other uses allowed in the

Forest and SFW-20 zones are included in Section 2.3a.5 below.)

2.3a.5 Sand Mining

Beaches, younger and older stabilized dunes, open dune, and

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wet interdunes have some tolerance for sand mining. Other dune types have no tolerance for this activity. Sand mining should not occur on any foredunes because it may create a breach or other weakening of the dune. A site investigation is necessary prior to approval of sand mining in all beach and dune areas in order to assess the adverse effects and hazards that may result from development and to determine appropriate methods for protecting the surrounding area from any adverse effects of the development.

2.3a.6 Urban and Rural Development

This section includes all construction of dwellings, buildings, and other structures.

Younger and older stabilized dunes are the most suitable dune forms for urban and rural development. Residential, commercial, and industrial development can easily occur in these areas without creating any adverse effects or hazards on the site or in surrounding areas. Potential hazards, aside from the potential groundwater pollution hazards discussed in Section 4, are wind erosion and deposition due to removal of surface stabilizing vegetation and sliding due to vegetation removal or excavation on slopes greater than 30 degrees, the angle of repose for unconsolidated sand. Development on slopes less steep than 30 degrees will not create adverse effects on the site or in adjacent areas and will not pose hazards to life, public and private property, and the natural environment providing that there is stabilization of disturbed areas with vegetation. Site investigations are necessary prior to approval of development on steeper slopes in order to assess the adverse effects and hazards that may result from development and to determine appropriate methods for protecting the development and the surrounding area.

Areas mapped as conditionally stable open dune sand are rated as having a low tolerance for low levels of urban development. The main hazards present in this dune type are wind erosion, sand deposition, and flooding. (Groundwater pollution hazards are discussed in Section 4.) Only where vegetation is removed and not restored would there be adverse effects and hazards from wind erosion and sand deposition.

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The method of protecting the surrounding area from these adverse effects is to minimize vegetation removal and to provide temporary and permanent stabilization of disturbed areas. Almost all conditionally stable dune areas in Tillamook County are subject to flooding, but almost none are exposed to velocity flooding (waves). Flood damages in these areas are water damage, but not the structural damage that is a threat in velocity flooding areas. Methods of protecting the area from the hazards of flooding include flood proofing or elevating structures.

Active foredunes and conditionally stable foredunes have little to no tolerance for urban development. Portions of all of such dune areas are described by FIRM flood hazard maps as being located in either a V zone (velocity zone) or an AO zone (area of shallow flooding). Such dune areas can also be described as subject to ocean undercutting or wave overtopping.

Many of the active foredune and conditionally stable foredune areas in the County were developed before the hazardous nature of such areas was realized. The County is providing for continued residential development on these dune forms only where the area is irrevocably committed to development. The four developing foredune areas that the County is taking an exception to Goal 18 to permit continued residential development and commercial and industrial buildings include the following communities: Cape Meares, Tierra del Mar, Pacific City, and Neskowin. Section 5 of this element contains the findings justifying this exception for selected tax lots in each community.

For residential infill within the boundaries of the communities of Cape Meares, Tierra del Mar, Pacific City, and Neskowin, a site investigation report which addresses the ocean erosion rates at the site will be required prior to residential development proposed in areas identified as an AO, B, or C flood hazard zone. The County is adopting findings that residential infill in the AO, B, and C flood zones in these areas will conform to the remaining criteria in Implementation Requirement 1 (Section 2.3a.6 of this element).

Site investigation reports are necessary prior to the approval of

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development in all beachfront areas identified by the FIRM flood hazard maps as a velocity (V) zone or for development in the remaining active and conditionally stable foredune areas in the County, in order to assess the adverse impacts and hazards that may result from the development and to determine methods for protecting the development and surrounding area from such proposed development.

Certain management practices are necessary in order to minimize the hazards of developing on foredunes. They are:

- 1) Vegetate open sand areas and protect existing vegetation;
- 2) Minimize dune alteration and disturbance of vegetation, temporarily protect disturbed areas and revegetate as soon as possible;
- 3) Locate structures and facilities as far from the beach as possible; and,
- 4) Elevate structures, preferably on piling, to protect against wave damage and to allow for sand build-up.

Little or no development is appropriate on beaches because of the magnitude of hazards present there. These include velocity flooding, wave and wind erosion, and sand deposition. Beaches have been included in development zones only because they are part of front and abutting ownerships that include non-beach upland areas that are developable. The beach portion of these ownerships, however, must not be developed unless there is some overriding public need. Examples of this include the Cape Kiwanda boat ramp, necessary for dory access to the ocean, and the sewage outfall for the Netarts Oceanside Sanitary District. In such cases, a site investigation is necessary prior to approval of development in order to assess the adverse effects and hazards that may result from development and to determine appropriate methods of protection.

Open dune sand has no tolerance for development because of the wind erosion and deposition hazards present. This dune

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form has been included in development zones only where it is incidental to other dune types. Some development on the margins of areas mapped as open dune sand may be possible providing that the sand surface can be stabilized and that dunes are not moving towards the area. A site investigation is necessary prior to approval of development in order to assess the adverse effects and hazards that may result from development and to determine appropriate methods of protection.

Wet deflation plains and wet interdunes can tolerate low levels of development in very limited instances. Hazards may include ocean flooding, ponding, and groundwater contamination (included in Section 4). Very little of these dune types have been included in development zones. Where these areas are subject to ocean flooding, development is permitted only if the areas are irrevocably committed to development (See Section 2.3b). In all cases, a site investigation is necessary in order to assess the adverse effects and hazards that may result from development and to determine appropriate methods for protecting the surrounding area from any adverse effects of the development.

Dune complexes, because of their varied nature can not be assessed in a general manner. Site investigations are necessary prior to development in order to assess the adverse effects and hazards that may result from development and to determine appropriate methods for protecting the surrounding area from any adverse effects of the development. Very little of this dune type is included in County development zones.

2.3a.7 Findings - Conformance to Goal 18 Implementation Requirement 1 for Residential Infill of Goal 18 Exception Areas

For residential infill within the boundaries of the Goal 18 exception areas defined for the communities of Cape Meares, Tierra del Mar, Pacific City, or Neskowin, the County is adopting the following findings that continued residential infill will conform to the criteria in Implementation Requirement 1. These findings apply only to residential development, other than multi-family dwellings, proposed in an AO, B, or C flood hazard zone.

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Dune landforms present at the communities of Cape Meares, Tierra del Mar, Pacific City, and Neskowin are for the most part conditionally stable foredunes, susceptible to varying degrees of ocean flooding, ocean undercutting, or wave over-topping. Prior to development in a coastal high hazard area (V zone) in one of these areas, a site investigation will be required prior to construction. The site investigation report requirement is implemented through Section 3.530: Beach and Dune Overlay zone of the Tillamook County Land Use Ordinance.

- “(1) The type of use proposed and the adverse effects it might have on the site and adjacent areas.”
- (a) The type of proposed use is single-family residential buildings (including mobile homes) and duplexes, as provided for in the County zoning designations of Rural Residential (RR), and Low to High Density Residential (R1, R2, R3).

Past and future development in these areas is anticipated to be characterized by single-family residential structures.

- (b) Sensitive environmental resources such as rare or endangered species or endangered species or unique habitat:

The affected areas do not constitute an important or critical wildlife habitat. Bayocean peninsula and Nestucca Spit, which are adjacent to the communities of Cape Meares and Pacific City, do have unique wildlife habitats such as nesting areas for snowy plover. These areas are protected by a Goal 17 significant shoreland habitat designation in the Comprehensive Plan.

- (c) Dune Vegetation: The foredunes and interdune systems present in the four community areas are primarily conditionally stable dunes mixed with older stabilized foredunes. Impacts on dune vegetation will be minimized through the requirements of Section 3.085, Beach and Dune Overlay zone, of the Land Use Ordinance. Land grading proposals in dune areas must demonstrate that the removal of dune vegetation is limited to what is necessary for the placement of structures and public utilities. Also, plans for temporary and permanent dune

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stabilization, and the planned maintenance of restabilized areas, must be submitted by the developer for dune areas disturbed during building site preparation.

- (d) Wind Erosion and Sand Deposition: Section 3.085 of the Land Use Ordinance requires that vegetation removal shall be limited to what is necessary to place buildings or to install utilities and that following construction, all excavated areas are stabilized. These requirements will minimize wind erosion and sand deposition onto adjoining properties. The location of new oceanfront buildings, landward of the crest of the active foredune, will also minimize sand inundation of buildings in active foredune areas (Section 3.085 (4) (a) (1) (b)). Findings to allow the removal of sand which periodically builds up against houses on foredune lots in Tierra del Mar, Pacific City, and Neskowin are provided in section 5.6 of this element.
- (e) Coastal Erosion and Shoreline Protection Measures: There is the potential for coastal erosion of all beachfront property in the County. Only in Pacific City and Tierra del Mar have landowners utilized riprap to impede erosion in the past. Presently these areas are not identified in the Comprehensive Plan as experiencing significant erosion hazards.

Where new oceanfront development is proposed in a velocity (V) flood hazard zone, a site investigation report will be required. At a minimum, all new oceanfront residential development will be setback in line with existing dwellings, unless the site investigation report provides evidence that a more conservation building setback line is necessary. Where new oceanfront residential development is proposed in an AO, B, or C flood hazard zone and there is evidence of recent active ocean erosion, a site investigation report will be required which will specifically address beach and dune erosion rates. Evidence of active beach or foredune dune erosion can include information provided by the following: (1) permits for shoreline protection measures that have been issued in the area within the last five years and (2) results of field investigations by County officials or staff of the State Parks and Recreation Division and Division of State Lands.

In all cases, where shoreline protective structures are

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requested, they will be designed and sited to minimize impacts to adjacent properties, as required by Section 3.085 of the Land Use Ordinance.

- (f) Groundwater Resources: Most of the dune areas in the County where there is existing development or which are planned for development are serviced with public water supplies, not by individual wells. These include the Tierra del Mar area, the Pacific City area, and the Neskowin area. Residential infill in these areas will have less significant impacts on groundwater resources than in an undeveloped dune area.

Most of these built and committed dune areas are likewise served by public sanitary sewers. Areas not served by public sewers include Tierra del Mar and Neskowin. The formation of a Neskowin sewer district is anticipated within the next five years. The quality of groundwater in these areas will be protected consistent with known limitations of subsurface sewage disposal according to County sanitation and DEQ requirements.

- (g) Historical or Archaeological Sites: There are no national, state, or county identified historical or archaeological sites in these areas.
- (h) Air and Water Quality: Residential development permitted by County zoning designations in dune areas will have no adverse effect on air or water quality.

“(2) Temporary and permanent stabilization programs and planned maintenance of new and existing vegetation.”

- (a) This requirement is implemented through Section 3.530 of the Land Use Ordinance. The ordinance requires that plans for temporary and permanent stabilization programs, and the planned maintenance of restabilized areas, are provided by the developer and that the site is stabilized within nine months of the termination of major construction activities.

“(3) Methods of protecting the surrounding area from any

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adverse effects of the development; and “

Providing residential infill in each of the four oceanfront communities mentioned above will have less significant impacts to surrounding areas than new residential development in an undeveloped oceanfront area. Through the requirements of the specific zone in which the development is located and standards for development in beach and dune areas, the Land Use Ordinance will ensure that methods will be employed to protect development on the property as well as development on adjoining properties. For example, the Land Use Ordinance provides review standards for shoreline protective structures, construction requirements, and building designs in active dune and flood hazard areas, building height requirements, minimum lot size, and building setbacks.

“(4) Hazards to life, public and private property, and natural environment which may be caused by the proposed use.”

Providing residential infill on vacant lots in built and committed dune areas will present less significant hazards to life, property, or the natural environment compared to new residential development in a non-built and committed oceanfront dune area. As provided in Findings 1 (b) through (h), the adverse effects of continued residential infill in these areas have or will be addressed through requirements of the Land Use Ordinance.

2.3b Implementation Requirement 2

Implementation Requirement 2 states that:

Local governments and state and federal agencies shall prohibit residential developments and commercial and industrial buildings on beaches, active foredunes, on other foredunes which are conditionally stable and that are subject to ocean undercutting or wave overtopping, and on interdune areas (deflation plains) that are subject to ocean flooding. Other development in these areas shall be permitted only if the findings required in (Implementation Requirement 1) are presented and it is demonstrated that the proposed development:

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- (a) Is adequately protected from any geologic hazards, wind erosion, undercutting, ocean flooding, and storm waves; or is of minimal value; and
- (b) Is designed to minimize adverse environmental effects.

Tillamook County is continuing to allow development in foredune areas which are irrevocably committed to development. An exception to this Goal requirement is included in Section 5. In all other foredune areas and interdune areas subject to ocean flooding, this goal requirement is being met.

2.3c Implementation Requirement 3

Implementation Requirement 3 states that:

Local governments and state and federal agencies shall regulate actions in beach and dune areas to minimize the resulting erosion. Such actions include, but are not limited to, the destruction of desirable vegetation (including inadvertent destruction by moisture loss or root damage), the exposure of stable and conditionally stable areas to erosion, and construction of shore structures which modify current or wave patterns leading to beach erosion.

Section 2.3a reviewed the problems of vegetation destruction and the exposure of stable and conditionally stable areas to erosion. Policies below address those problems. Section 3 addresses the problem of erosion caused by shore structures and Section 4 addresses the problem of destruction of vegetation by moisture loss.

2.3d Implementation Requirement 4

Implementation Requirement 4 requires that foredunes shall be breached only to replenish sand supply in interdune areas, or on a temporary basis in an emergency (e.g., fire control, cleaning up oil spills, draining farm lands, and alleviating flood hazards), only if the breaching and restoration after breaching is consistent with sound principles of conservation.

Tillamook County is taking an exception to this requirement in order to allow removal of sand from houses located on foredunes that are

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being inundated. This exception is contained in Section 5. Otherwise the county is adopting policies and implementing ordinances that are consistent with this goal requirement.

2.4 Policies

- 2.4a All decisions on land use actions in beach and dune areas other than older stabilized dunes shall be based on the following specific findings unless they have been made in the comprehensive plan:
- (a) The type of use proposed and the adverse effects it might have on the site and adjacent areas;
 - (b) The temporary and permanent stabilization programs and the planned maintenance of new and existing vegetation;
 - (c) Methods for protecting the surrounding area from any adverse effects of the development; and,
 - (d) Hazards to life, public and private property, and the natural environment which may be caused by the proposed use.
- 2.4b Development in beach and dune areas shall comply with the requirements of the Flood Hazard Overlay zone.
- 2.4c Grading and vegetation removal shall be the minimum necessary to accommodate the development proposed. Removal should not occur more than 30 days prior to the start of construction. Open sand areas shall be temporarily stabilized during construction and all new and pre-existing open sand areas shall be permanently stabilized with appropriate vegetation.
- 2.4d Excavated, filled, or graded slopes shall not exceed 30 degrees unless adequate structural support is provided. Clearing of these slopes shall be minimized and temporary and permanent stabilization measures shall be applied to safeguard the slope from erosion and slumping.
- 2.4e Cluster development in dune areas is strongly encouraged. Development shall occur on the most stable portion of the site.
- 2.4f Residential, commercial, and industrial buildings shall be prohibited on

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beaches, active foredunes, on other foredunes which are conditionally stable and that are subject to ocean undercutting or wave overtopping, and on interdune areas (deflation plains) that are subject to ocean flooding except on lots where such development is specifically authorized by Section 5. Ocean flooding includes areas of velocity flooding and associated shallow marine flooding mapped by the Federal Emergency Management Agency (FEMA). Other development in these areas shall be permitted only if the findings required in policy 2.4a are presented and it is determined that the proposed development:

- (a) Is adequately protected from any geologic hazards, wind erosion, undercutting, ocean flooding and storm waves; or is of minimal value; and,
- (b) Is designed to minimize adverse environmental effects.

2.4g Foredunes shall be breached only on a temporary basis in an emergency (e.g., fire control, cleaning up oil spills, draining farm lands, and alleviating flood hazards), and only if the breaching is consistent with sound principles of conservation. Policy 2.4a shall apply.

2.4h Because of the sensitive nature of active and conditionally stable dunes, vehicular traffic and recurring pedestrian and equestrian traffic should be limited to improved roads and trails.

2.4i Tillamook County shall continue to participate in the joint management program for off-road vehicle use and associated activities in the Sand Lake area.

3. FOREDUNE MANAGEMENT

3.1 Introduction and Inventory

Foredunes are an inherently unstable landform, subject to the hazards of wind deposition and erosion, and ocean flooding and erosion. They function not only as an effective natural storm wave defense system for shoreline development, but they also serve as a reservoir of sand for rebuilding the beach during severe ocean storms. Three characteristics of a foredune contribute to their ability to withstand ocean flooding: bulk, height, and shape.

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The greater the bulk of a foredune, the more resistance the dune has to ocean flooding and erosion. The greater the height of the dune, the greater its ability to withstand wave overtopping or breaching that could flood back dune areas. A smooth, low, sloping foreslope will direct ocean waves up the foredune, dissipating wave energy.

Since storm resistance increases with dune height, large areas of a foredune that have been lowered by grading, either in preparation for development, or to provide for easy beach access, or to provide an ocean view, can increase the potential for ocean flooding and erosion damage to shoreline development. For this reason, Goal 18 prohibits new residential development and commercial and industrial building in active foredunes and other foredune which are conditionally stable and that are subject to ocean undercutting or wave overtopping.

Although undeveloped foredunes in the County remain protected by Goal 18, many active foredune and conditionally stable foredune areas were platted for residential subdivisions before the unsuitability of such areas for development was realized. In the Necarney City, Nedonna, Tierra del Mar, Pacific City and Neskowin areas sand periodically inundates houses on foredune lots. The County is providing for sand removal under emergency conditions in the Tierra del Mar, Pacific City, and Neskowin areas.

Necarney City is within the city of Manzanita urban growth boundary area, however their Comprehensive Plan does not provide for foredune grading. Nedonna is within the City of Rockaway Beach urban growth boundary and a Foredune Management Plan pursuant to Goal 18 implementation requirement 7, is included in the City's Comprehensive Plan to allow foredune grading.

The Nedonna Beach Foredune Management Plan consists of three parts: a Technical Report analyzes the factors affecting the stability of the dunes in the area, a Grading Plan which specifies how and when grading may occur in Nedonna Beach, and a Management Plan which recommends how other alterations should be regulated to enhance the stability of the foredune. While this foredune study focused on the Nedonna/Rockaway Beach shoreline, many of the management recommendations, standards for foredune grading, and general information on coastal processes can be applied to the Tierra del Mar, Pacific City, and Neskowin foredune areas, when the County develops Foredune Management Plans for these areas.

3.2 Management Requirements

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Implementation Requirement 7 states “Grading or sand movement necessary to maintain views or to prevent sand inundation may be allowed for structures in foredune areas only if the area is committed to development and only as part of an overall plan for managing foredune grading”.

3.3 Policies

3.3a A foredune grading plan in areas subject to Goal 18 Implementation Requirement 7 shall include the following elements based on consideration of factors affecting the stability of the shoreline: (1) sources of sand, (2) ocean flooding, (3) patterns of accretion and erosion (including wind erosion), and (4) effects of beachfront protective structures and jetties. The plan shall:

- (a) Cover an entire beach and foredune area subject to an accretion problem, including adjacent areas potentially affected by changes in flooding, erosion, or accretion as a result of dune grading;
- (b) Specify minimum dune height and width requirements to be maintained for protection from flooding and erosion. The minimum height for flood protection is Flood-Elevation;
- (c) Identify and set priorities for low and narrow dune areas which need to be built up;
- (d) Prescribe standards for redistribution of sand and temporary and permanent stabilization measures including the timing of these activities; and,
- (e) Prohibit removal of sand from the beach-foredune system.

3.3b Sand on foredune areas subject to an exception to Goal 18 Implementation Requirement 6 shall be removed only if necessary as part of an approved plan for development or to remove sand which is inundating existing structures.

Removal shall be the minimum necessary to accomplish the purpose and shall be stabilized according to sound standards of conservation.

3.3c Tillamook County strongly urges that the Department of Land

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Conservation and Development initiate studies of dune management for view maintenance in the communities of Pacific City, Tierra del Mar, and Neskowin.

4. COASTAL EROSION

4.1 Inventory

Erosion is the primary geologic hazard in beach and dune areas. Rates of erosion in these areas can be very rapid because of the unconsolidated nature of the sand land forms. One vivid example of such erosion in Tillamook County was the destruction of the resort town of Bayocean on the Bayocean Spit. From 1940 to 1960, coastal erosion occurred at an average rate of 50 feet per year eventually resulting in the breaching of the spit in 1952. The following discussion and policies consider the land management issues related to coastal erosion. Erosion of coastal land forms other than beaches and dunes is included in this section because of the related nature of the hazards involved. The Beaches and Dunes Handbook for the Oregon Coast was the source for this discussion except where noted otherwise.

Map 7 summarizes coastal erosion, storm wave damage, and landslide hazards along the Clatsop, Tillamook, and Lincoln County coasts. This map also shows the number of structures which have been damaged or destroyed. Maps 8, 9, and 10 show hazards for the Tillamook County coastline in more detail.

Tillamook County's coastline is composed of a set of beach reaches located between major coastal headlands which include Cape Falcon, Cape Meares, Cape Lookout, and Cascade Head. (See figure 1). Sand moves north or south along the different beach reaches depending on the season. In the summer, when prevailing winds and waves are from the northwest, beach sand gradually moves southward. In the winter, sand moves northward in response to the wind and waves which come from the southwest. Figure 2 shows the direction of summer and winter winds and coastal currents. There is no net movement of sand when averaged over several years.

Sand is lost from these beach reaches primarily by wind transport into dune areas and by offshore water transport into deeper water and submarine canyons. New sand is carried to these beaches primarily by sea cliff erosion. The gains and losses of beach sands on most Oregon beach reaches are small.

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Erosion of the beach and adjacent dunes occurs on a yearly cycle. Winter storm waves erode the beach and deposit sand in offshore bars. The beach profile steepens as a result. In the summer, gentler waves redistribute the sand in the offshore bars back onto the beach and form a wide berm and a gentle beach profile. Thus the beach is a dynamic protector of adjacent upland areas from wave erosion. If summer beach build-up does not equalize winter losses over the period of several years, there is a net erosion of the beach. Maps 8, 9, and 10 show where this has occurred over the past 40 years.

Maps 8 through 10 show general erosion trends along portions of the Tillamook Coast. Although a particular area is shown as stable or prograding on these maps, it does not mean that the areas are not subject to severe winter storms which can threaten homes and other structures. For example, the Nedonna area which is shown as prograding on Map 8 was subject to heavy erosion in 1953 (Stembridge, p. 67) and in the winter of 1971-1972 (Schlicker, p. 115). Riprap was placed along the beach in the northern portion of the Nedonna Beach subdivision to protect homes from further erosion. The Cape Kiwanda area which is shown in Map 7 to be erosion stable, suffered severe erosion during the winter of 1977-1978. Large portions of the foredune were lost and riprap was placed to protect homes. The Nestucca Spit was breached by the 23 foot high breakers.

In any coastal area there are localized embayments of erosion that are the result of rip currents. These embayments may extend through the beach and provide a corridor for wave attack on the adjacent foredunes or other landforms. Rip currents were an important factor in the erosion of the Nestucca Spit. Tillamook County's flood insurance rate maps show major areas where low beach and dune permits storm waves to pass beyond foredunes to subject the dunes behind them to wave erosion. This is especially prevalent in the Neskowin area and is shown on Map 11.

Foredunes are the second line of defense against wave attack in most beach areas. They serve as a direct barrier to flooding as well as a dynamic buffer which supplies sand to eroding beaches. They are inherently unstable landforms subject to erosion (Clark, p. 336).

Ocean erosion also impacts landforms other than foredunes. Map 8 shows that the Neahkahnie area, a coastal terrace, is slowly retrograding. Map 9 shows that the Short Beach and Oceanside area, a mountain scarp, coastal terrace, and older stabilized dune is slowly retrograding as well. Cascade Head is also slowly retrograding as is shown on Map 10.

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4.2 Management Considerations

The primary means of guarding residences or other structures from damage due to coastal erosion is to locate them back from any eroding coastline. Structures should not be located on foredunes, but if development must occur on the foredune, as in committed areas, then structures should be located as far back as possible on the foredune. On coastal bluffs it is also important to minimize added weight near the edge of the bluff and to properly drain the site to minimize seepage into the ground.

In cases of severe erosion, it may be necessary to use some means of structural shoreline stabilization such as a revetment or seawall. These structures, when properly designed, can withstand the force of ocean waves and protect the shoreline behind them. They do however have impacts which are exacerbated if they are improperly designed. These include visual impacts and impacts on erosion in the surrounding area.

The visual impact depends on the size and type of structure. Revetments, especially riprap revetments, have the least potential for visual disruption because they may be covered by summer sand build-up. The impacts of various structural shoreline stabilization methods on the beach and surrounding shoreline areas is listed in Table 4.

TABLE 4

EFFECTS ON COASTAL PROCESSES AND ADJACENT PROPERTIES

STRUCTURE	ANTICIPATED EFFECT
Bulkheads	Protect eroding shorelines that may have been supplying material to downdrift areas, which may then experience accelerated erosion. The fronting beach may experience increased erosion due to wave reflections.
Revetments	Protect eroding shorelines that may have been supplying material to downdrift areas, which may then experience accelerated erosion.
Breakwaters	Diminished wave energy behind such structures induces deposition. If the amount of sediment accumulation is significant, the downdrift shore may experience accelerated erosion.

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Groins	Impede longshore transport and induce sedimentation. The downdrift shoreline may experience accelerated erosion due to lack of material supply. (See note below)
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Source: Low Cost Shore Protection, p. 77

NOTE: In Oregon where there is no net littoral drift, there would probably be no net erosion but the disruption of winter drift would probably accelerate erosion of downdrift areas in the winter. There would be net erosion however where groins are not perpendicular to the beach. See Komar’s discussion on jetties in the Beaches and Dunes Handbook of the Oregon Coast.

There are particular concerns with structural stabilization of sea cliffs since they are the principal source of new sand for beaches.

Sand mining of beaches and dunes can also affect shoreline erosion. Along most of the Oregon coast, the sources and natural losses of beach sands are quantitatively small. For this reason, removal of beach sand by sand and gravel companies or others may have a major impact on the beach, this unnatural loss being a major factor in the total budget of sediments. Komar concludes that the annual removal of 12,000 cubic meters of sand annually from 1965-1971 contributed to the dramatic erosion of the Siletz Spit. The impact that sand mining has depends on the quantity of sand removed and the total available sand supply on the beach reach where it is being removed.

Beach logs can play an important role in retarding beach erosion because they act as buffers which absorb some of the force of storm waves. (Lindberg, p. 5) (Komar, p. 50). They also act as sand traps which assist in the formation of new foredunes and in the restoration of existing storm damaged foredunes. The removal of beach logs will reduce the protective function that they provide and may subject adjacent coastal areas to significant increases in erosion and flooding hazards.

The Oregon Department of Transportation regulates the removal of beach logs west of the zone line. Such removal is prohibited unless it can be shown to be a public benefit. Among their management objectives for log removal is the protection of shorelines subject to erosion. They do not regulate firewood or souvenir wood removal.

4.3 Management Requirements

Goal 18 Implementation Requirement 1, discussed in Subsection 2.3 of this element requires an evaluation of all uses in beach and dune areas other

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than older stabilized dunes. The impacts of most uses were discussed in that subsection. The impacts of sandmining in beaches was briefly discussed in Section 2.3 but was elaborated on in this section because of the impacts on coastal erosion. Policies below and implementing measures are designed to comply with this requirement.

Goal 18 Implementation Requirement 3, discussed in Subsection 2.3 of this element, requires that:

Local governments shall regulate actions in beach and dune areas to minimize the resulting erosion. Such actions include construction of shore structures which modify current or wave patterns leading to beach erosion.

The discussion in Subsection 3.1 evaluated the anticipated impacts of shore structures on erosion. Policies below and implementing measures adopted pursuant to them are designed to minimize erosion caused by shore structures.

Goal 18 Implementation Requirement 5 regarding beachfront protective structures reads as follows:

Permits for beachfront protective structures shall be issued under ORS 390.605 - 390.770, only where development existed on January 1, 1977. Local comprehensive plans shall identify areas where development existed on January 1, 1977. For the purposes of this requirement and implementation requirement 7 “development” means houses, commercial and industrial buildings, and vacant subdivision lots which are physically improved through the construction of streets and provision of utilities to the lot and includes areas where an exception to (2) above has been approved.

Policies below and implementing measures adopted pursuant to them are designed to comply with this goal requirement.

4.4 Policies

4.4a The removal of sand from beaches shall be permitted only where a geological investigation establishes that a historic surplus exists at the site and that it can be removed without impairing the natural functions of the beach and dune system, water circulation, and littoral drift. Compliance with ORS 390.275 is also required.

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- 4.4b Tillamook County supports the efforts of the Oregon Department of Transportation to regulate the removal of logs west of the zone line particularly in areas where logs play an important role in protecting adjacent upland areas from erosion. Tillamook County discourages the removal of logs east of the zone line where they help stabilize dune areas.
- 4.4c Beachfront protective structures (sea walls, bulkheads, riprap, and other revetments) are permitted only where development existed on January 1, 1977 or where buildings are authorized by Section 5.

For the purposes of this requirement, “development” refers to the definition of development in Implementation Requirement 5 above.

Tillamook County has 61 miles of shoreline along the Pacific Ocean. Four beachfront communities in the County, (i.e. Cape Meares, Tierra del Mar, Pacific City, and Neskowin) totaling 11 miles of ocean shoreline, have approved exceptions to Goal 18 Implementation Requirement 2 to allow continued residential development. The findings for justifying these exceptions, and the foredune lots where permits for beachfront protective structures can be issued, are contained in Section 5 of this element.

An inventory of beach and dune areas within the remaining 50 miles of shoreline was prepared to identify where development existed on January 1, 1977. The inventory was based on Tillamook County building permit records and the 1973 through 1978 Oregon State Highway Ocean Shores aerial photos of Tillamook County. Structures built as of January 1, 1977, are identified on the 1978 Oregon State Highway Ocean Shores aeriels. These 1978 ODOT aeriels are

adopted as part of the Goal 18 element of the Comprehensive Plan to meet Goal 18 Implementation Requirement 5.

The results of the inventory can be briefly summarized according to ownership (public or private) of the shoreline in Tillamook county. All ocean shoreline in public ownership was determined to be undeveloped for purposes of Goal 18 implementation requirement 5 except for an area within Cape Lookout State Park, where riprap has been placed to protect the day use area. The remaining areas on the ODOT aeriels are scattered pockets of developed ocean shoreline in

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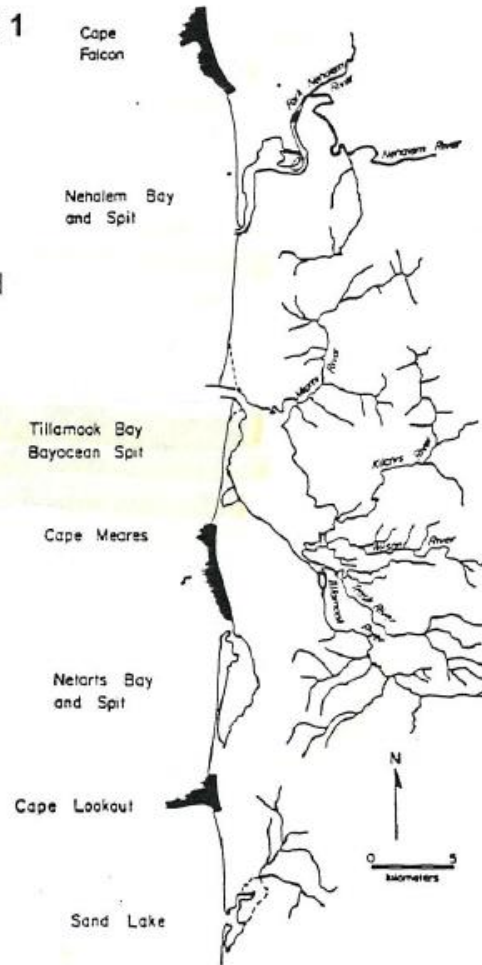
private ownership.

- 4.4d The shoreline stabilization policies in Section 7.5 of the Goal 16 element shall apply to beachfront protective structures.
- 4.4e Policy 2.4a shall apply to beachfront protective structures.
- 4.4f Shoreline protection measures shall not restrict existing public access.
- 4.4g In selecting sites for the disposal of dredged spoils, sites that allow for the nourishment of eroding beaches shall be preferred.

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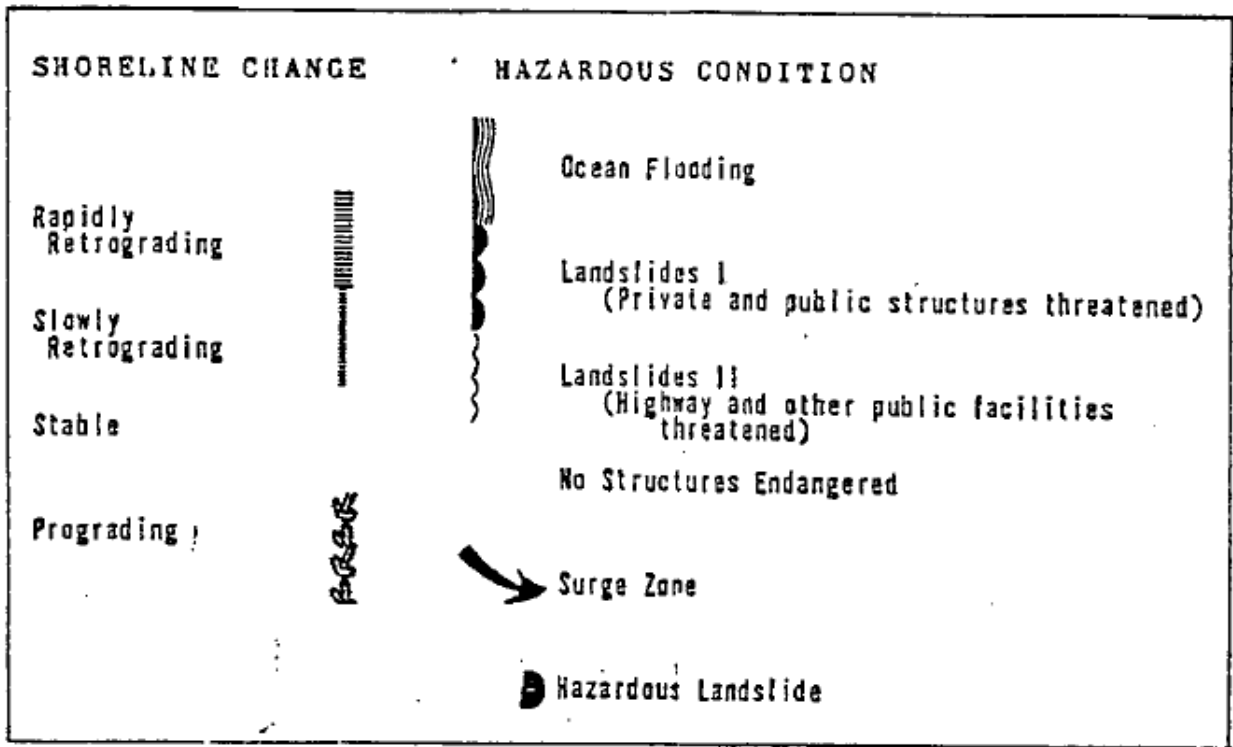
FIGURE 1

Figure 1. A portion of the north Oregon coast illustrating how it consists of a series of pocket beaches separated by pronounced rocky headlands.
Source: Komar



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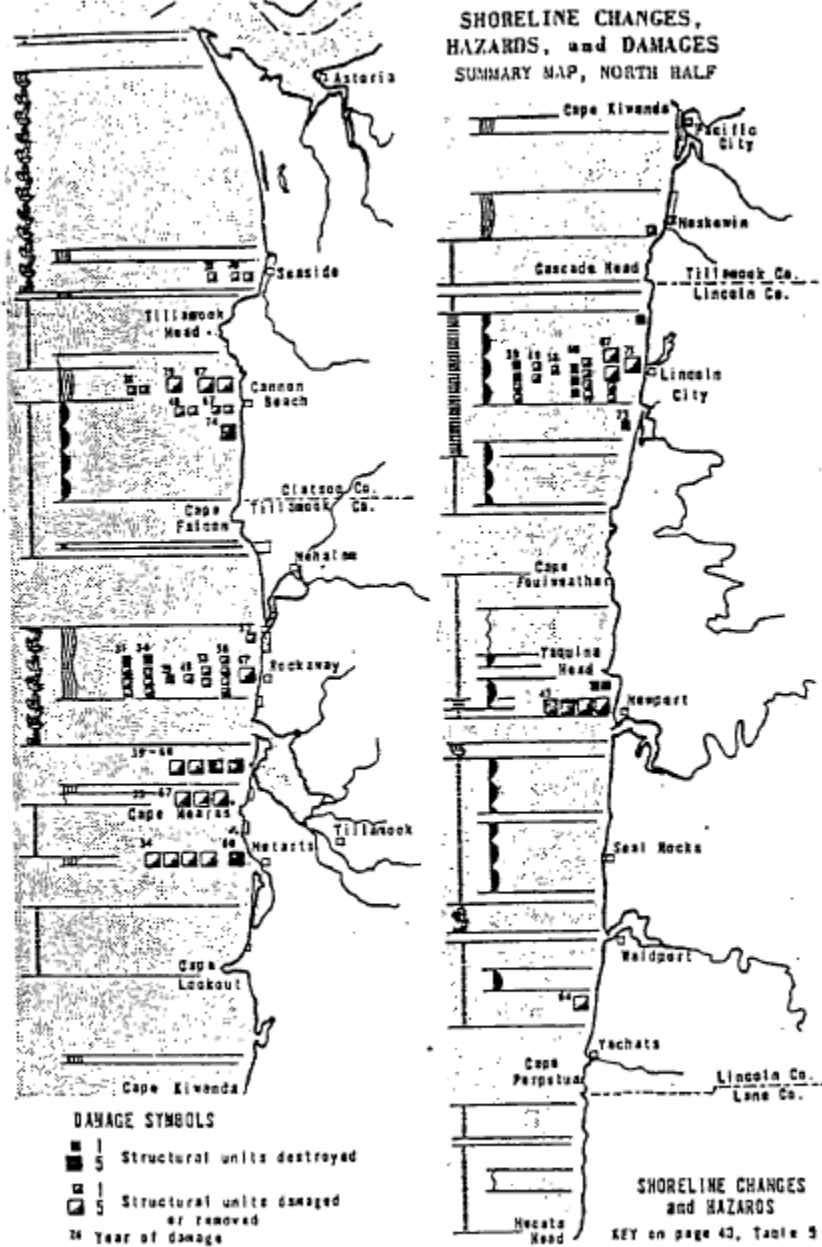
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MAP 7

SHORELINE CHANGES, HAZARDS, AND DAMAGES

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MAP 7



source: Stembridge

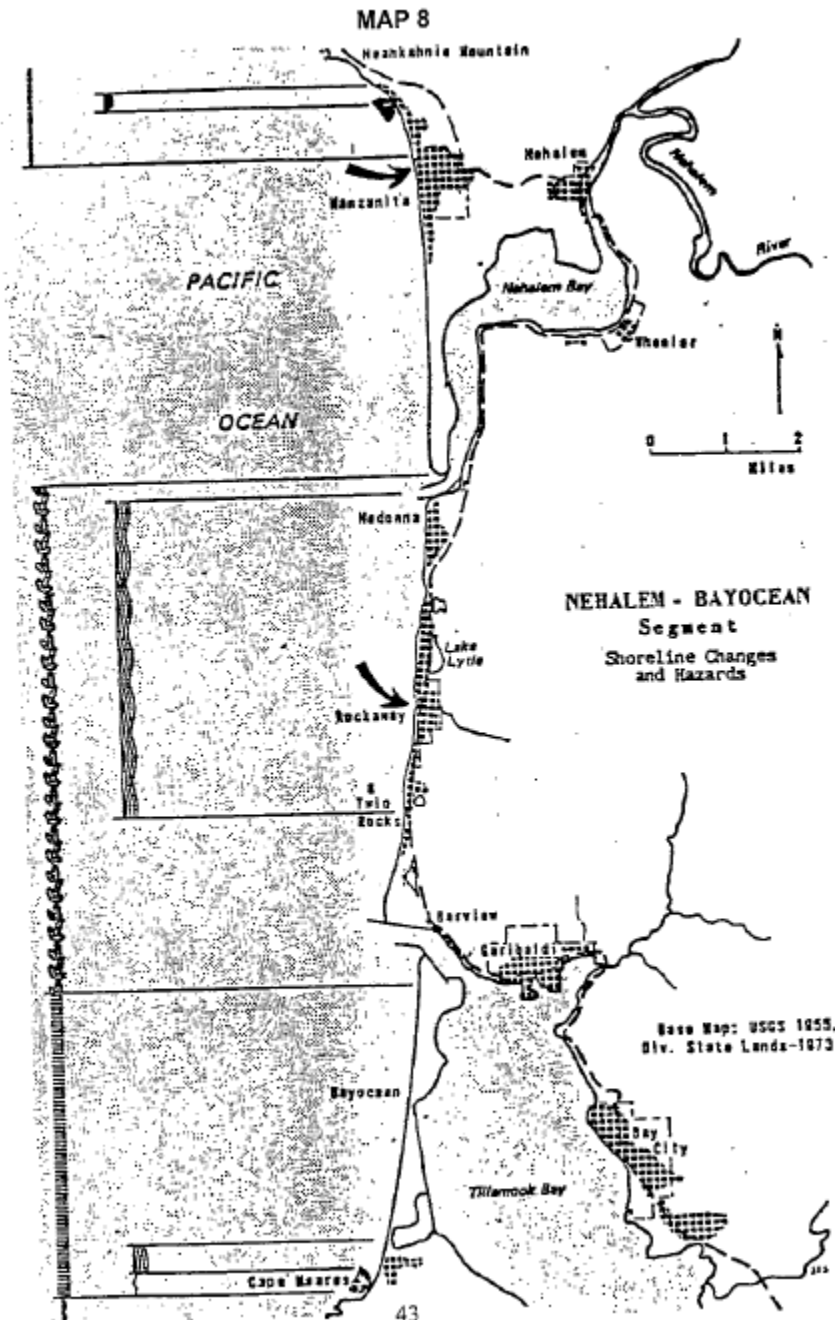
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MAP 8

NEHALEM - BAYOCEAN

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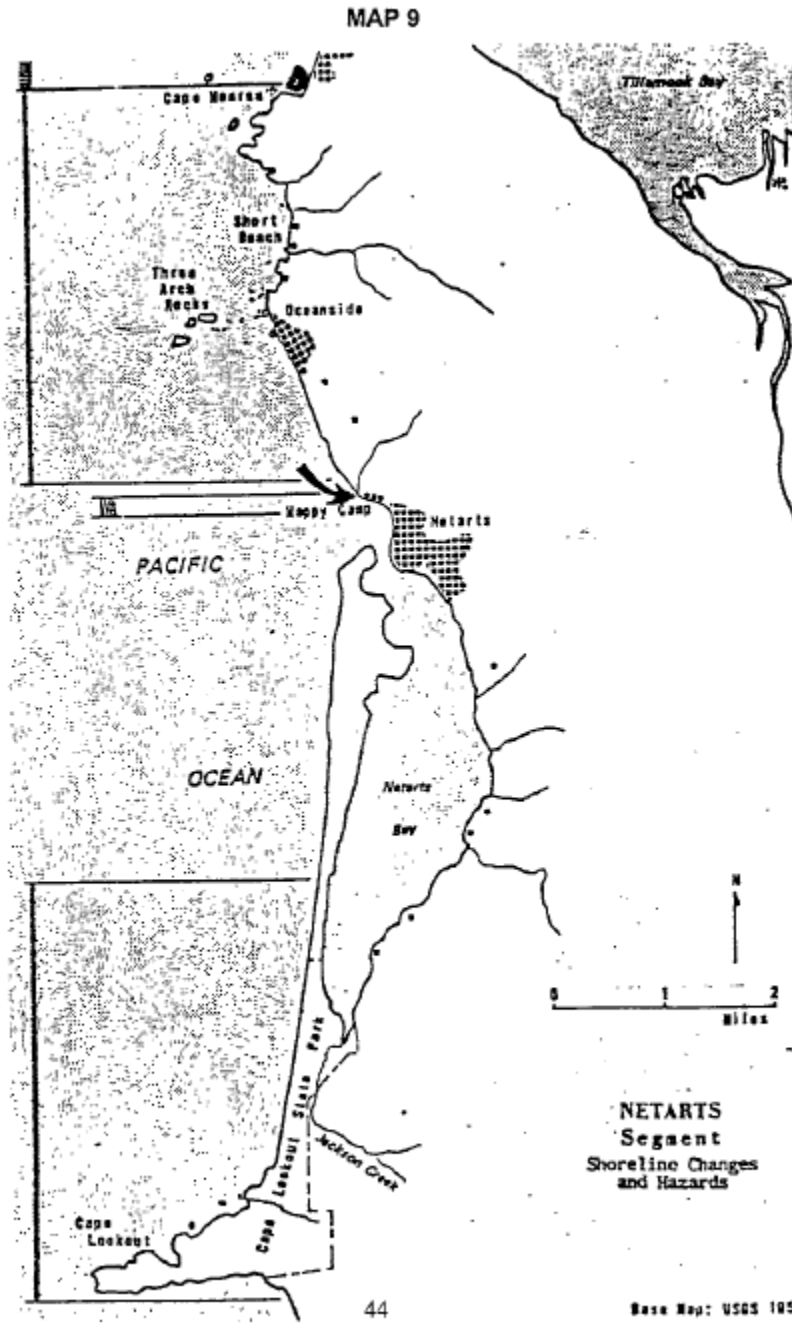


source: Stembridge

MAP 9

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NETARTS



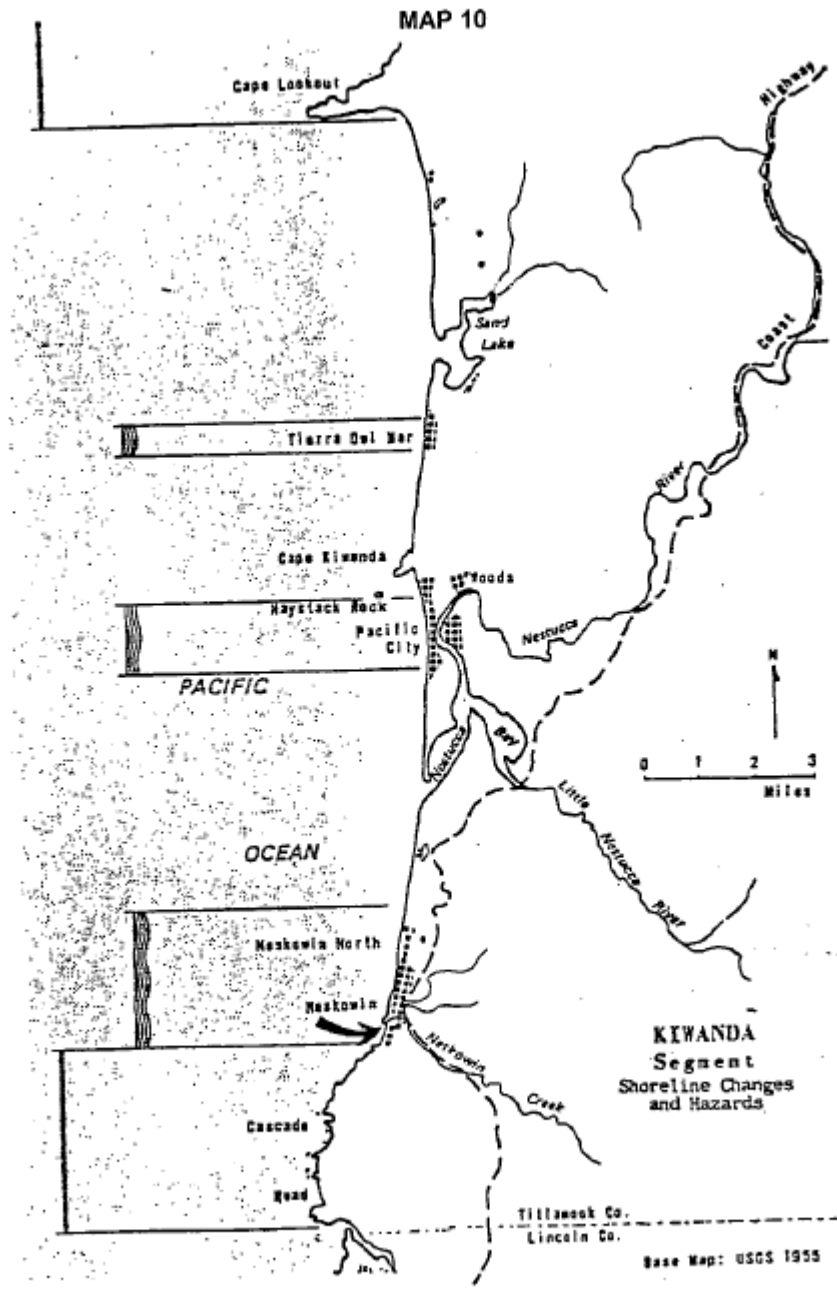
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MAP 10

KIWANDA

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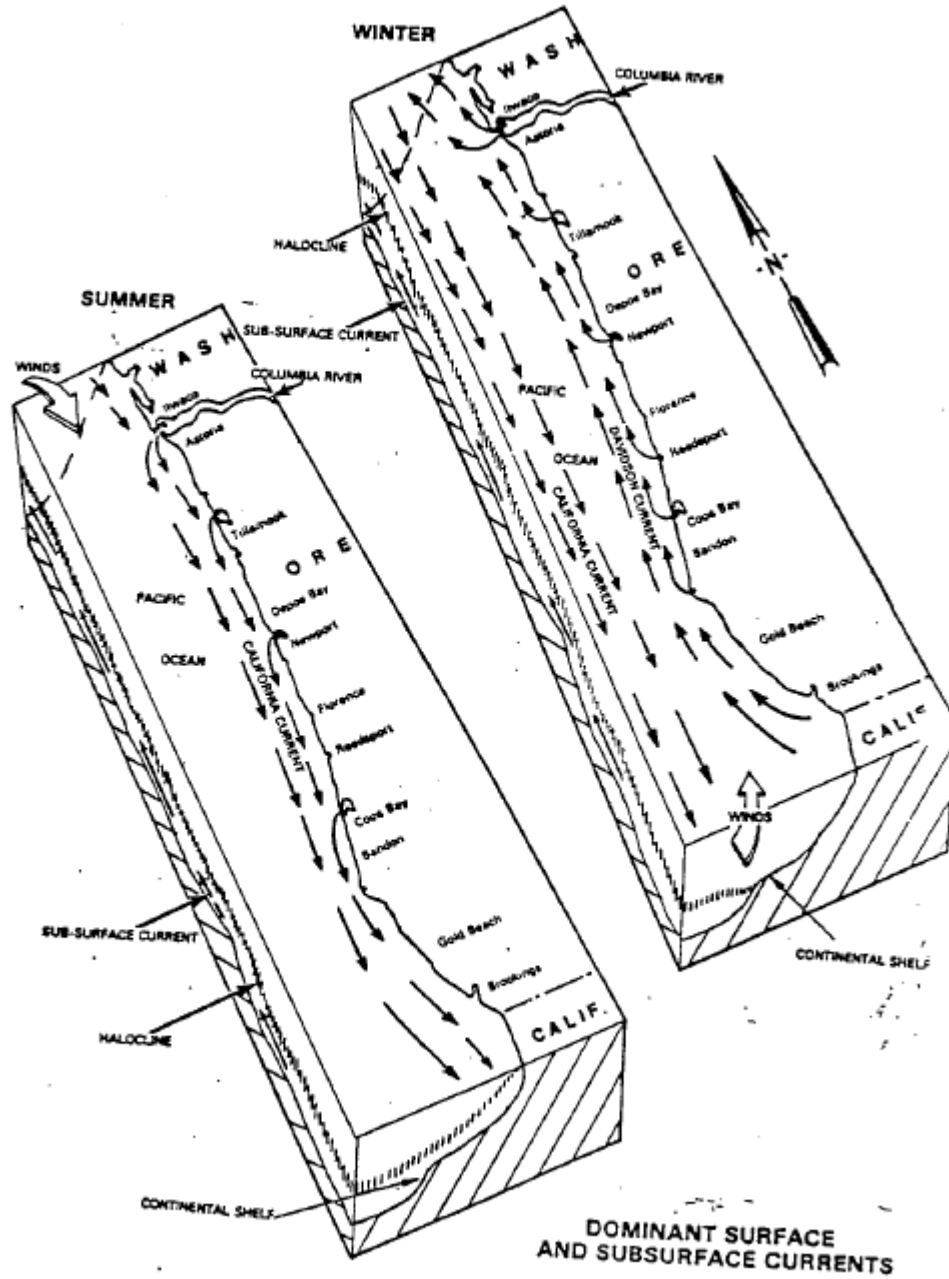
source: Stemberge

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FIGURE 2

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FIGURE 2



Source: USDA Soil Conservation Service

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FLOOD HAZARD OVERLAY ZONE MAP

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5. GROUNDWATER RESOURCES

5.1 Introduction and Inventory

Not much is known about dune aquifers in Tillamook County, but what is known indicates that coastal dunes harbor some of the better groundwater supplies in the county. According to DOGMI Bulletin 74, dune sand on Nehalem Spit, Kincheloe Point, Netarts Spit, and in areas west of Sand Lake and west and south of Pacific City probably contain sufficient water for local water supply. According to this same source, groundwater will not accumulate in significant quantities in the dune area north of Manzanita and north of Sand Lake towards Cape Lookout because impermeable bedrock is present above mean sea level beneath these areas.

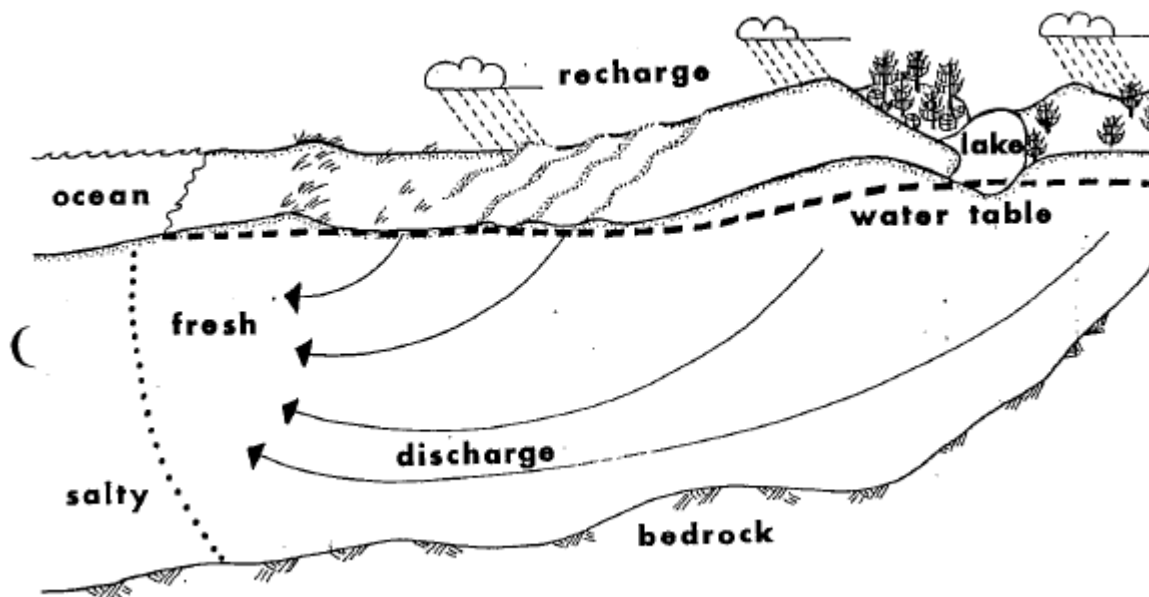
The following discussion extracted from the Beaches and Dunes Handbook of the Oregon Coast summarizes the hydrology of dune groundwater. “Groundwater exists as a large coherent body of water (or aquifer) which underlies dune sands. The boundaries of the groundwater are formed by underlying bedrock and relatively impervious terrace deposits, bedrock margins exposed at the surface (i.e. the basal western slopes of the Coast range), and the ocean to the west, (see figure 2). Impermeable silt and clay lenses are found within the deeper parts of the sand deposits which often-times restrict the vertical movement of water.”

“The top surface of the zone of groundwater is the water table. The general shape of the water table is a subdued replica of the land surface. It is farthest from the surface under the larger oblique-ridge dunes and closest at topographic lows. Most surface water (lakes, streams, and marshes) is a surface expression of this water table, occurring where the land surface dips to intersect the water table. Locally, “perched” water tables may exist. These are created by discontinuous bodies of impermeable materials located beneath the land surface but higher than the main water table. This impermeable layer catches and holds the water reaching it from above. On the western margin of the aquifer, the water position of the freshwater/saltwater is not clearly understood, but it most commonly appears to extend somewhat seaward of the beach.”

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“The water table reflects a seasonal variation, being higher in the winter recharge months and lower in the summer. Recharge of dune aquifers occurs primarily from infiltrating precipitation. It is estimated that fully 75 to 80 percent of the 50 to 70 inches of annual precipitation received on the Oregon coast reaches the groundwater. The remainder is lost through surface runoff in streams, evaporation, and plant use. Most of the groundwater eventually seeps directly into the ocean under the beach. Locally, lesser amounts enter lakes and streams especially during recharge months. Throughout the year, the interaction between the lakes, streams, and the water table appears to be one of mutual dependence. During the summer months the water table may be lowered from three to ten feet, at which time it appears that lakes may discharge water back to the water table.”

FIGURE 3



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Schematic illustration of groundwater interactions common to coastal beach and dune areas indicates the cycle of discharge and recharge and the confines of groundwater between bedrock and the surface (source: U.S.G.S. unpublished materials).

5.2 Management Consideration

Several hazards are associated with dune groundwater. The problems that ponding and high water tables create for development were mentioned in Section 2. The following discussion explores the problems of groundwater pollution and drawdown.

5.2a Groundwater Pollution

Sand dune aquifers are very porous and experience very high infiltration rates. Because of this, all sand dune areas downstream or in close proximity to sources of pollution may become polluted. Those areas of particular concern include all deflation plains and their fringes, areas near lakes, streams and marshes, and near beach sites.

Although bacterial travel a maximum distance of only 100 feet through dune aquifers, sand is ineffective in filtering chemical contaminants. Chemicals such as those present in household detergents can make groundwater unfit to drink. Viruses, too, appear to be unfilterable by sand.

Nitrate nitrogen may also be a harmful contaminant present in some areas. Sources of this pollutant include septic tank emissions and agricultural fertilizers.

Residential development using septic tanks or other on-site sewage disposal which discharges into the sand represents the primary threat to groundwater quality in Tillamook County. In other areas where industrial facilities including waste lagoons are situated in dune areas, industrial waste may also present a significant threat. No such development exists or is planned for in Tillamook County.

Residential pollution presents the greatest problem when on-site sewage disposal occurs in areas where the water table is near the surface. The hazard can be managed by placing areas where

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groundwater pollution is the greatest threat, and where there are no sewers, in resource or low density development zones.

An additional tool for managing groundwater pollution is the regulation of the placement of on-site sewage disposal systems. This is presently done by the County according to the rules established by the Oregon Department of Environmental Quality.

5.2b Drawdown and Saltwater Intrusion

Removal of substantial quantities of water from a dune aquifer can lead to a local or regional lowering of the water table. This can in turn have several adverse consequences including lowering the level of the water table below the depth of wells, reduction of lake levels, draining of wetlands, loss of vegetation, saltwater intrusion, and intrusion of water of poor quality from underlying bedrock. Saltwater intrusion is a particular concern on sand spits and the thinner beach and dune strips which do not receive a large amount of infiltration and recharge of the aquifer. Over pumping of water in these areas can lead to intrusion of saltwater into the aquifer causing temporary or permanent pollution of the resource.

The primary ways of managing this hazard include limiting densities of individual wells and by limiting the placement of public wells to areas where there is sufficient groundwater recharge to offset the amount of water withdrawn.

5.3 Management Requirements

5.3a Implementation Requirement 4

Implementation Requirement 4 states that:

Local, state, and federal plans, implementing actions, and permit reviews shall protect the groundwater from drawdown which would lead to loss of stabilizing vegetation, loss of water quality, or intrusion of salt water into water supplies.

Building permits for single family dwellings are exempt from this requirement if appropriate findings are provided in the comprehensive plan or at the time of subdivision approval.

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This requirement among other things, reiterates Implementation Requirement 3 to limit the destruction of desirable vegetation resulting from moisture loss. This requirement is being satisfied by limiting densities in areas unserved by public water, by prohibiting the drainage of deflation plains, and by requiring compliance with Implementation Requirement 4 for all permits issued by the Department of Water Resources.

Most of the dune areas where there is existing development or which are planned for development are serviced with public water supplies, not by individual wells. These include the Manzanita/Necarney City area, the Nedonna/Rockaway Beach/Twin Rocks/Barview area, the Oceanside/Netarts area, the Tierra del Mar area, the Pacific City area, and the Neskowin area. Only a limited area on the northwest of Sand Lake is proposed for low density rural development and is not serviced by a public water system. Approximately 140 acres of this area is within the Planned Development Overlay zone which requires approval. In the remainder of the area, the minimum lot size of two acres will limit the total development to 42 homes on an outright basis although in many areas, topography and wet soils will limit development even upon special approval, but only if it is determined that water supplies are adequate. The upland area of Whelen Island which encompasses approximately 69 acres is also subject to planned development requirements. According to DOGMI bulletin 74, these Sand Lake areas probably have enough groundwater to develop a local water supply.

Groundwater in Oregon is public property. The Oregon Department of Water Resources regulates the pumping of groundwater except for stock watering purposes, watering any lawn or non-commercial garden not exceeding one-half acre, and single or group domestic uses up to 15,000 gallons per day.

The Department of Water Resources has existing statutory authorization to apply this implementation requirement. ORS 535.505 authorizes the Department to protect public health and welfare by regulating groundwater withdrawal to include drawdown considerations. In addition, ORS 197.180 requires all state agencies to apply the Statewide Planning Goals to all actions that they take.

The Department of Water Resources is also better able to apply this

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implementation requirement because its staff has more expertise and experience than the Tillamook County Planning Department in these matters.

Groundwater withdrawals that are unregulated by the Department of Water Resources will be reviewed by Tillamook County in the course of reviewing subdivisions, planned developments, and partitions of lots smaller than two acres in the Rural Residential Zone.

Review of the effects of draining or filling of deflation plains will be accomplished in the course of reviewing development permits, building permits, major partitions, subdivisions, and planned developments.

5.3b Implementation Requirement 1

On-site sewage disposal in dune areas has the potential adverse effect and hazard of groundwater pollution. The methods of protecting dune aquifers from this hazard include limiting the density of unsewered development and requiring compliance with DEQ regulations for on-site sewage disposal.

Most of the dune areas where high density development will occur are within urban growth boundaries and are or will be served with public sewers. The exceptions include the Tierra del Mar and Neskowin areas which are irrevocably committed to this development. The Sand Lake area includes the most extensive dune area zoned for residential development. This is primarily older stabilized duneland within the Planned Development or Coast Resort Overlay zones which require an evaluation of appropriate densities and sewage disposal. In addition, the Rural Residential Zone, which applies to all unsewered residentially zoned properties, limits development densities to one unit per two acres unless it is demonstrated that the quality of groundwater will not be impaired.

5.4 Policies

- 5.4a The programs and rules of the Department of Water Resources regarding groundwater appropriations and withdrawals shall be carried out in such a manner as to protect the groundwater from drawdown which would lead to loss of stabilizing vegetation, loss of

“EXHIBIT F”

water quality, or intrusion of salt water into water supplies.

Building permits for single-family dwellings are exempt from this requirement if appropriate findings are submitted at the time of subdivision review.

- 5.4b The programs and rules of the Department of Environmental Quality regarding subsurface sewage disposal shall be carried out in such a manner as to protect groundwater from contamination.
- 5.4c Tillamook County will plan and zone dune areas not serviced by a public water system consistent with the known limitations of dune groundwater supply.
- 5.4d Tillamook County will plan and zone dune areas not serviced by a public sewer system consistent with known limitations for subsurface sewage disposal. Exceptions to this policy include the communities of Tierra de Mar and Neskowin where development and lotting patterns commit unsewered dune areas to dense development.
- 5.4e Reviews of subdivision, planned developments, and the creation of lots smaller than two acres in the Rural Residential Zone shall be carried out in a manner that will protect dune groundwater from drawdown which would lead to loss of stabilizing vegetation, loss of water quality, or intrusion of salt water into water supplies.
- 5.4f All development shall comply with the programs and rules of the Department of Environmental Quality and the Department of Water Resources.
- 5.4g The filling or draining of deflation plains is only permissible if it will not lead to loss of stabilizing vegetation, loss of water quality, or intrusion of salt water into water supplies.

6. EXCEPTIONS, BUILT AND COMMITTED AREAS

6.1 Exception to Goal 18 Implementation Requirement 2

Goal 18 Implementation Requirement number 2 specifically states:

“Local governments and state and federal agencies shall prohibit residential

“EXHIBIT F”

developments and commercial and industrial buildings on beaches, active foredunes, on other foredunes which are conditionally stable and that are subject to ocean undercutting or wave overtopping, and on interdune areas (deflation plains) that are subject to ocean flooding.

Two basic considerations must be taken into account in evaluating this requirement. First, the County finds that land availability for beachfront development is limited to six areas; those being Necarney City, Nedonna, Cape Meares, Tierra de Mar, Pacific City, and Neskowin. All these areas have realized levels of development that exceed 50 percent of their platted areas. Necarney City is within the city of Manzanita Urban Growth Boundary and an exception for continued development of the area has been included in the City’s acknowledged plan. Nedonna is within the City of Rockaway Urban Growth Boundary and an exception for continued development of the area has been included in the City’s plan.

Second, consideration is given to the fact that of the County’s 61 miles of coastline, approximately 11 miles can realize development. The remainder is primarily in public ownership and reserved for public recreational and resource conservation uses.

Based on these general observations, Tillamook County finds it necessary to take exception to the Beaches and Dunes Goal as allowed under Statewide Goal No.2 (Land Use Planning) for four developing areas, Cape Meares, Tierra del Mar, Pacific City, and Neskowin, and as required under the exceptions process has developed findings to substantiate its action. The findings for taking these exceptions primarily focus on the scarcity of buildable beachfront properties, lack of alternate locations, the level of development, economic value, and compatibility. Additionally, those properties that are included in the exceptions process are required to meet standards regarding building design, setbacks, and soil stabilization techniques to insure a reasonable level of safety against such hazards as ocean flooding.

6.1a Cape Meares

Tillamook County takes exception to the State of Oregon’s Beaches and Dunes Goal (#18) for those properties that are considered not to be active or conditionally stable dunes but are susceptible to potential ocean floodings (map 12 and 12a). The concerned lots include Township 1 South, Range 10 West, Section 7BD (Tax lots 2100-4100, 200, 400-500); Township 1 South, Range 10 West, Section 7AC (Tax lots 3500, 1900-2500, 3000-3200, 1300,

“EXHIBIT F”

1500-1800); Township 1 South, Range 10 West, Section 7CA (Tax lots 1600-2000, 3300-3900, 4300-4500) and all infill lots landward of the tax lots identified above.

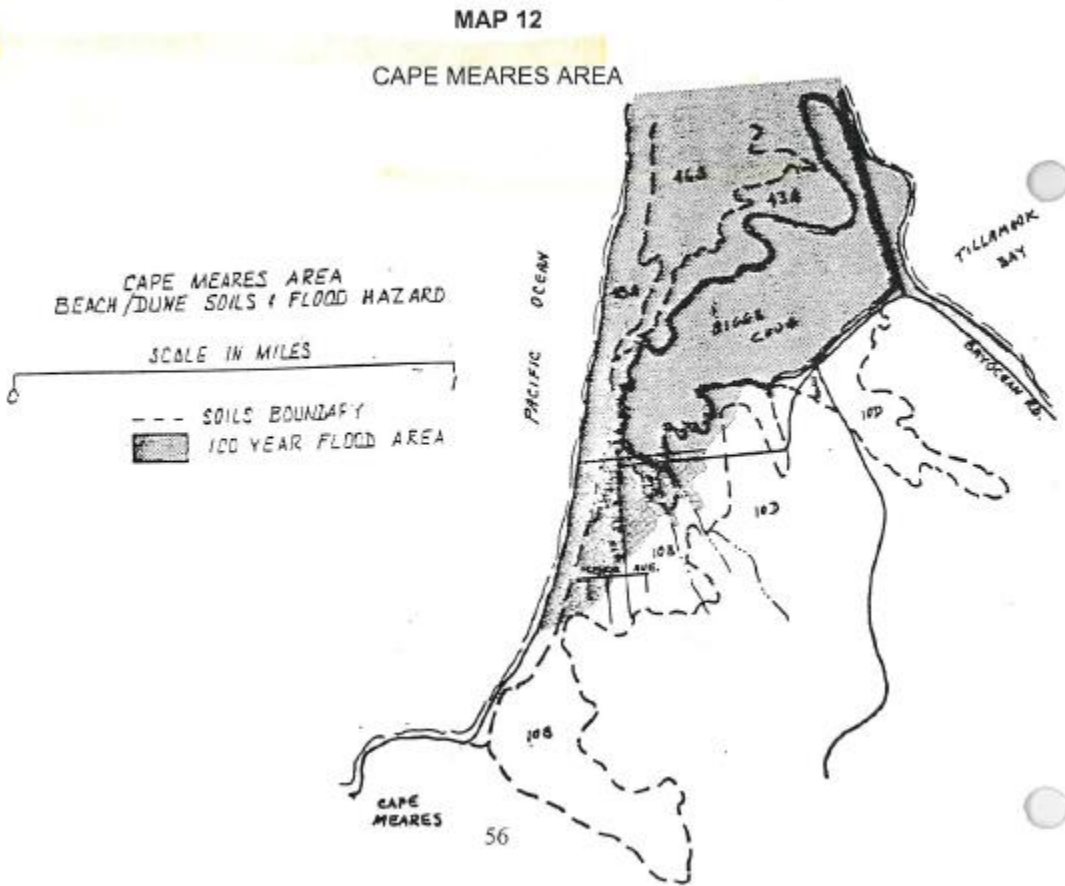
The County’s findings for the exception are as follows:

- a. The area within the flood hazard zone was originally platted in the 1920's and presently consists of 57 platted lots that have the potential of being inundated by ocean flooding. (“The Flood Insurance Study for Tillamook County” dated September 28, 2018, with an accompanying Flood Insurance Rate Maps (FIRMs)). Thirty of those lots have already realized development. The lots are located on stabilized dunes with varying soil depths from one to several feet.
- b. Water is provided by the Cape Meares Water District and septic tanks accommodate effluent. There is electricity and telephone service available with asphalt and graveled roads providing access to the concerned lots.
- c. Ocean Beach Avenue provides public access and parking adjacent to the beach; however, parking is poorly designated.
- d. Property in Cape Meares in which this exception is being taken is presently selling for between \$12,000 and \$16,000 per site. This value is substantially lower than what the sale value of beach properties is elsewhere in the County. However, it does provide persons of medium income an opportunity to purchase beach properties that they could not otherwise afford.
- e. Beach erosion is the primary threat with measures to impede this process possibly becoming necessary in the near future. Ocean flooding on those areas included in the exception, will have to meet all County flood criteria measures.
- f. The area regarded in this exception does not appear to constitute an important or critical wildlife habitat. However, Bayocean peninsula which is adjacent to the developed area does have wildlife habitats such as nesting areas for the snowy plover.
- g. The compatibility of the area would be maintained since development would continue to be single family residential.

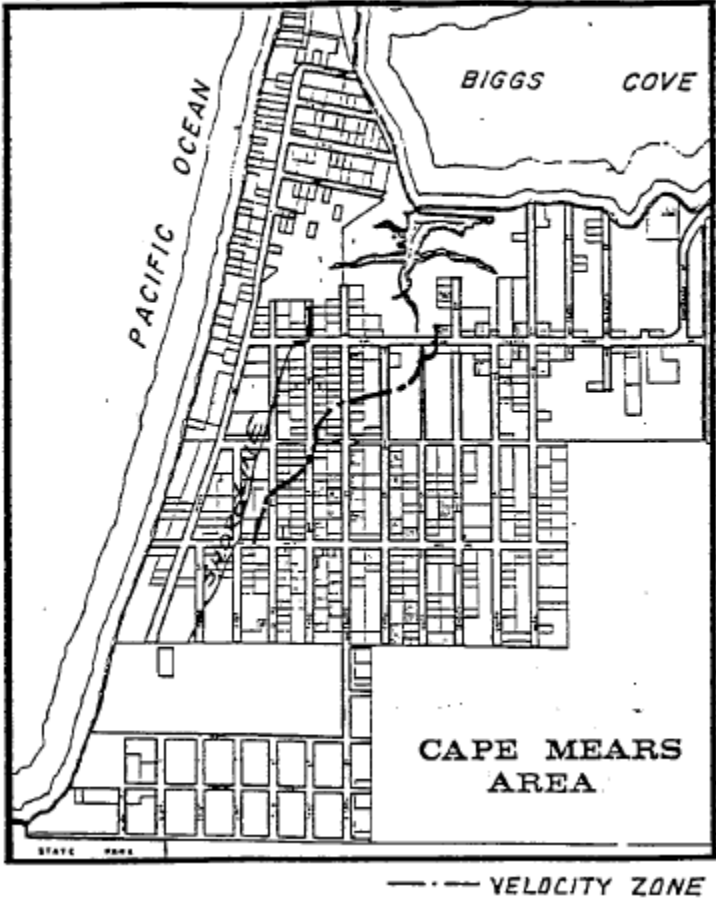
“EXHIBIT F”

MAP 12 CAPE MEARES AREA

“EXHIBIT F”



“EXHIBIT F”



“EXHIBIT F”

6.1b Tierra del Mar

Tillamook County takes exception to the State of Oregon’s Beaches and Dunes Goal (18) for those properties in the Tierra del Mar area that are considered to be conditionally stable foredunes. The beach front lots in question consist of Section 6BC, Township 4 South, Range 10 East, (Tax lots 100, 2700,4600-4700, 6900-7200, 10500-10700, and 13200-13600). Section 6CB, Township 4 South, Range 10 West (Tax lots 2200, 2201, 2100,4700,7000-7300, 9700-9900, 12400-12600, and 14400-14600) and Section 1DD, Township 4 South, Range 11 West, (Tax lots 600-900, 1700-2000, 2600-2900, 3200,3600-4100, and 3300) and all infill lots landward of the tax lots identified above.

The County’s findings for exception of the Tierra del Mar area are as follows:

- a. Tierra del Mar was an area that was platted in the 1950's. It presently consists of 49 platted beachfront lots of which 27 have realized residential development (See Map 13a). The zoning is a combination of R-R (Recreational Residential) and R-3 (High Density Residential) which are primarily oriented towards single family residences.
- b. Portions of this area (map 13) are subject to ocean flooding to water depths of one foot in the 100-year base flood, while other portions would be subject to the 500-year flood potential, i.e., .05% chance of occurrence in any one year. There are an additional 266 interior lots of which 150 have been developed.
- c. A majority of the lots have received sanitarian approvals. However, several lots due to their small size (2,560 sq. ft.) cannot accommodate a septic tank and drainfield. It is estimated that 20% of the lots fall into this category and are unacceptable for septic tank placement.
- d. All lots are or have availability to electricity, telephone, and water services. The roads however, are marginal in regard to County standards and in some instances are in a state of disrepair.

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- e. The cost of property is similar to those beach lots that are available in other areas of the County.
- f. As is the case with many of the beach front properties along the Tillamook County coast, there does exist the potential for beach erosion. Tierra del Mar is no exception since the development has occurred on conditionally stable foredunes and interdunes. To date little or no measures have been taken to prevent beach erosion since it has not been a factor as of yet.
- g. There are presently 12 access points (road rights-of-way) to the beach.
- h. Because of the present level of development any habitat values that do exist unfortunately are minimal.
- i. Future development would be similar to what already exists, that being single family residential.

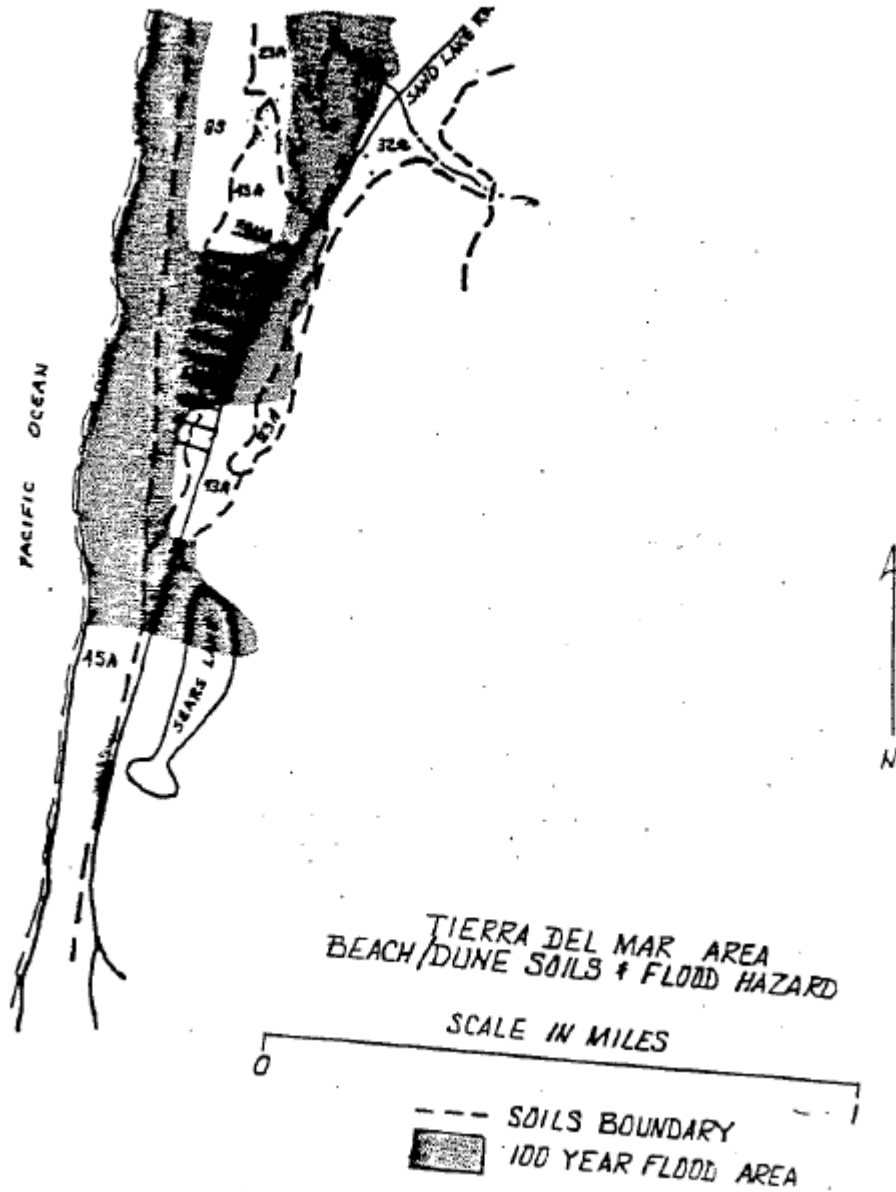
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MAP 13

TIERRA DEL MAR AREA
BEACH/DUNE SOILS & FLOOD HAZARD

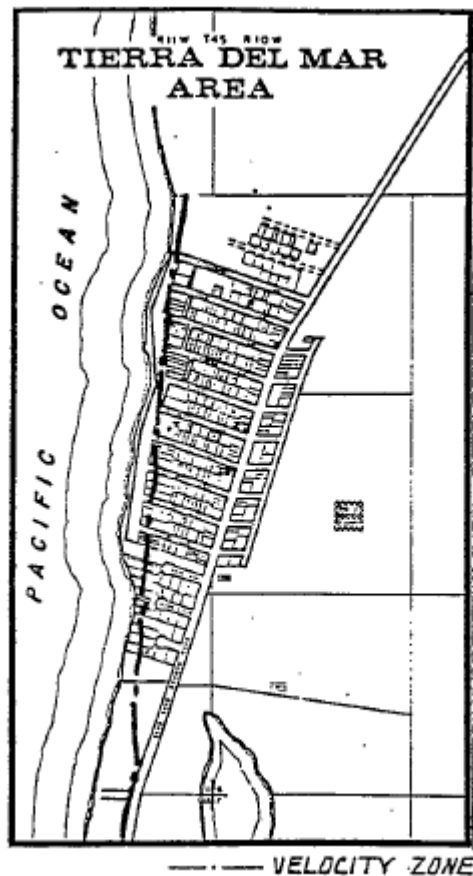
“EXHIBIT F”

MAP 13



Map 13a
Velocity Zone

“EXHIBIT F”



6.1c Pacific City

Tillamook County takes an exception to the State of Oregon’s Beaches and Dunes Goal (18), Implementation Requirement 2, for those properties that are considered (Map 14 and 14a) to be conditionally stable and are in some areas subject to oceans wave overtopping.

The exceptions are for beachfront properties of 4 South, 11, 24AA, (Tax lots 2000-3100, 4 South 11, 24AD (Tax lots 100-500), 4 South, 11, 24DA (Tax lots 2100-2600, 5800-7300), 4 South, 11, 24DD (Tax lots 3200-3700, 8000-9300), 4 South, 11, 25AA (Tax lots 400, 600,1200-2700), and 4 South, 11, 25AD (Tax lots 100-2700) and all infill lots landward of the tax lots identified above.

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The County’s findings for the exception for the Pacific City area are as follows:

- a. Approximately 50 percent of the Pacific City land area, as described in the Urban Service Boundary, is either foredune or part of an interdune system. (See Map 5). The dune systems for the most part are conditionally stable and are to varying degrees susceptible to ocean flooding.

Several subdivisions occupy this area which constitute a total of 106 buildable lots. Of those 65 have realized development with single family residential dwellings being the primary use.

- b. The Pacific City Sanitary District is responsible for providing sewerage service to this area with the potential to accommodate future growth within the Urban Service Boundary.
- c. A majority of the roads are paved with others made with a crushed rock base and gravel. There are several access points to the beach provided by street rights-of-ways besides a County parking lot and dory launching area at Cape Kiwanda and a public boat launching ramp on the Nestucca River.
- d. Other public facilities available are water, electricity, phone service, and fire protection.
- e. Undeveloped residential beach lots in the Pacific City area range in selling price between \$20,000 and \$25,000 with those on the west side of Sand Lake Highway selling for \$15,000 to \$20,000. Commercially zoned vacant properties adjacent to Sand Lake Highway are selling for \$30,000 to \$50,000.
- f. The long term environmental impacts of development in this area have to a certain degree been realized. Beachfront properties in Cape Kiwanda have utilized riprap to impede erosion of the conditionally stable foredunes, an economic cost that has been borne by the property owners. However, the preventative measures to stop erosion will not alleviate ocean and river flooding of the 100-year base flood.

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To minimize the hazards associated with these risks require that protective measures be employed such as shoreline protection, site investigation, and building designs that meet flood standards.

- g. The compatibility of future development in the exception area would be in keeping with other elements of the Comprehensive Plan.
- h. Because of the level of development that has already taken place, wildlife habitats are not an issue in the area of the exception. However, caution will have to be exercised with future conflicts that may arise with high density development adjacent to the Nestucca Sand Spit.

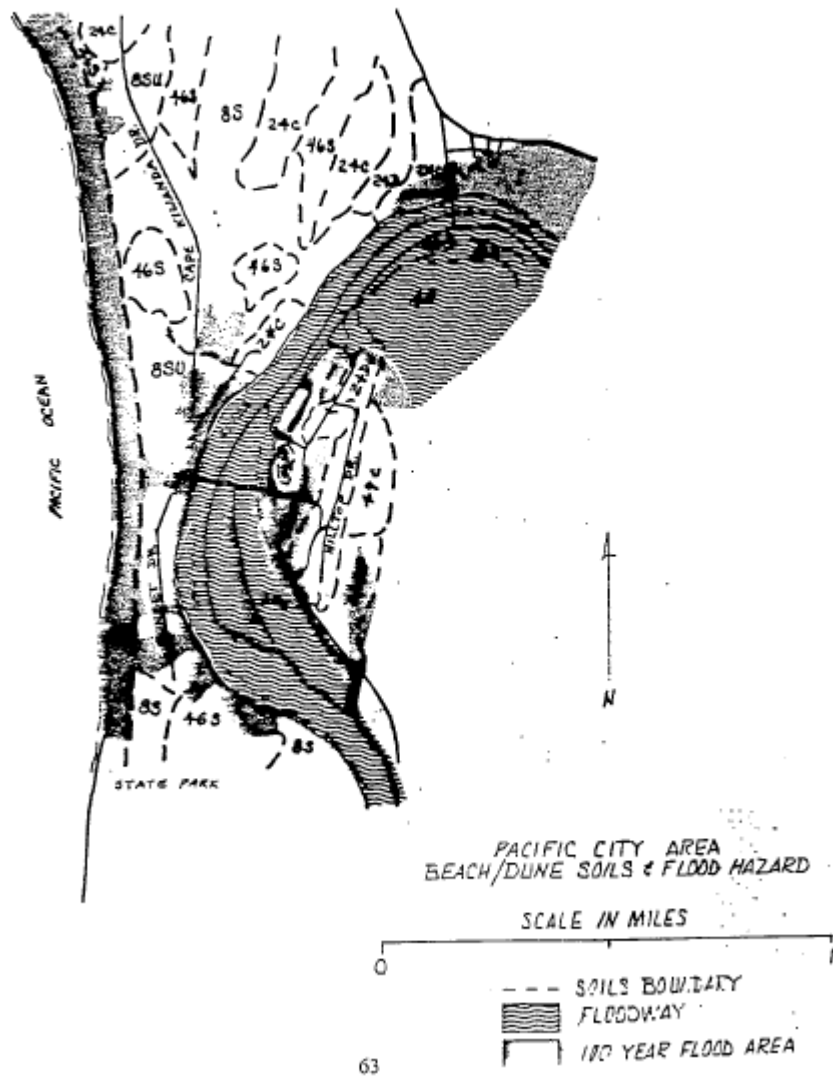
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MAP 14

PACIFIC CITY AREA

MAP 14

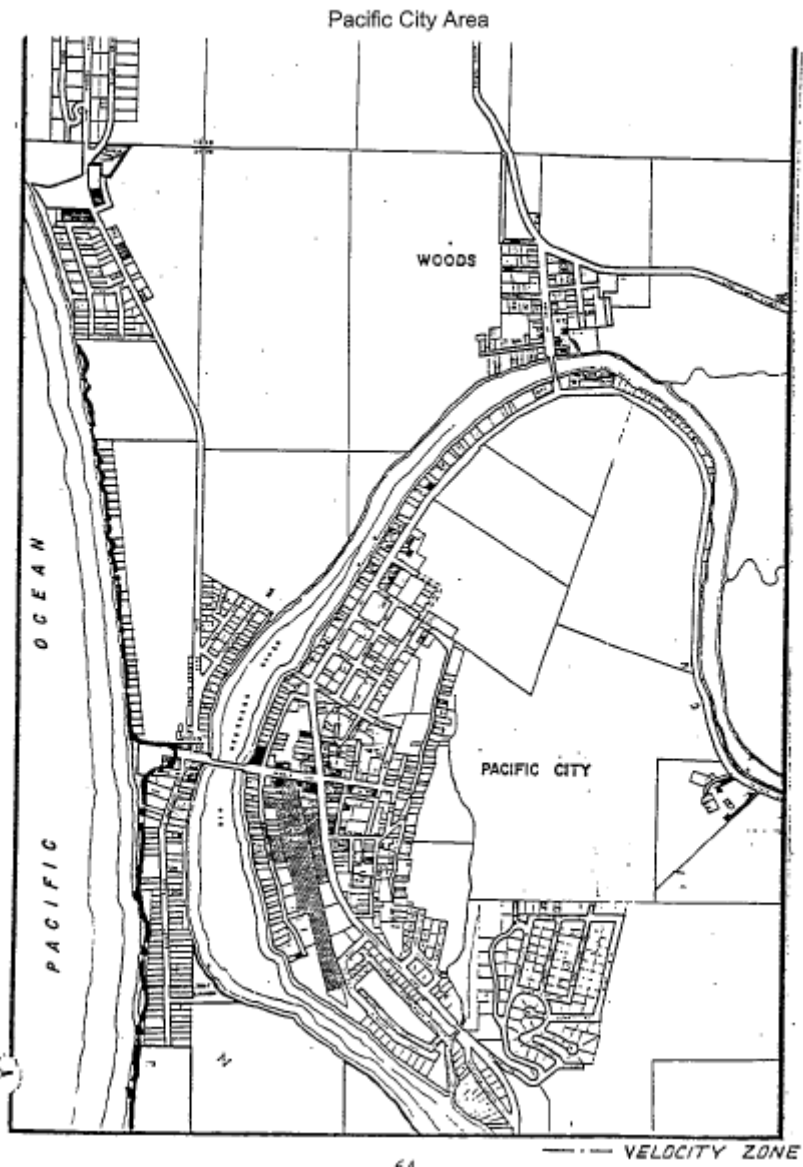
PACIFIC CITY AREA



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Pacific City Area

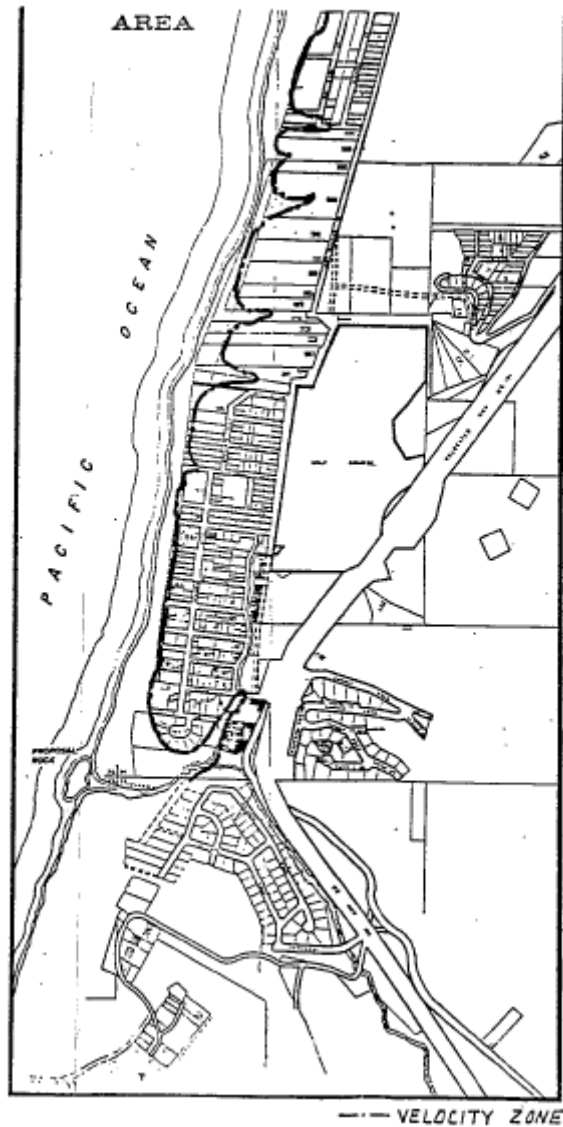
Velocity Zone



“EXHIBIT F”

Pacific City Area

Velocity Zone



“EXHIBIT F”

NESKOWIN AREA

BEACH/DUNE SOILS & FLOOD HAZARD

“EXHIBIT F”

Tillamook County takes exception to the State of Oregon’s Beaches and Dunes Goal 18 for those properties in the Neskowin area that are considered to be conditionally stable foredunes or subject to ocean flooding. Those lots consist of Township 5 South, Range 11 West, Section 24BD (Tax lots 1100-2500); Township 5 South, Range 11 West, Section 24CA (Tax lots 100-1800); Township 5 south, Range 11 West, Section 24CD (Tax lots 100-1800); Township 5 South, Range 11 West, Section 25BC (Tax lots 600, 800-1700); Township 5 South, Range 11 West, Section 25CB (Tax lots 92401-92412, 2900-3000, 80101-80324, 8800-9400, 11500-11700); Township 5 South, Range 11 West, Section 25CC (Tax lots 2100-2300, 90001-90008, 4600-4900, 6500-7400); Township 5 South, Range 11 West, Section 36BB (Tax lots 3000-3800); Township 5 South, Range 11 West, Section 36BC (Tax lots 1600-2000) and all infill lots landward of the tax lots identified above.

The County’s findings for the exception for the Neskowin area are as follows:

- a. All subdividing took place in the Neskowin area prior to 1970. Of the total 126 lots within the exception area, 58 have yet to realize development.
- b. The foredunes and interdune systems are primarily conditionally stable mixed with older foredunes. These areas would be subject, based on the Flood Insurance Rate Map, to ocean flooding having a one percent chance of being equaled to or exceeded in any given year. (See Map 4)
- c. All subdivision lots within the area under exception have roads that meet County standards; additionally, electrical power lines are placed underground in much of the area, with water service, although questionable as to quality, and available septic tanks and drainage systems accommodate effluent.
- d. Neskowin is a community that appears to be very desirable for single family residence with beach front lots selling on the average for approximately \$40,000. The exception would not jeopardize those values due to the fact that any future development will have to conform to the Comprehensive Plan.
- e. Beach access points (public roads) are primarily concentrated

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in the mid-portion of the Neskowin area. Additionally, there is a public parking lot that can accommodate approximately 30 vehicles.

- f. The formation of the Neskowin water and sewer districts should improve the quality of water service and provide adequate measures to handle any future sanitation problems.
- g. Wildlife habitat would be minimally affected by additional development, since the area has not been identified by any jurisdiction, agency, or group to be of wildlife habitat value.

6.2 Exception to Goal 18 Implementation Requirement 6

6.2a Tillamook County is taking exception to Goal 18 Implementation Requirement 6 in order to allow remedial grading activities which periodically builds up against houses on oceanfront lots.

6.2b Reasons Justify Why The State Policy Embodied In The Applicable Goals Should Not Apply:

Implementation Requirement 6 of Goal 18 should not apply because sand build-up that is not removed will damage structures or make them inaccessible. Damage will be caused by the weight of the sand or by the water that it traps. Inaccessibility will be caused by sand build-up on driveways and around doors and windows.

6.2c Areas Which Do Not Require a New Exception Cannot Reasonably Accommodate the Use:

This is an exception to Goal requirements for an activity, not a use. There are no alternatives to removing sand build-up. Either the sand is allowed to accumulate, damaging structures, limiting access to them and in some cases, forcing the abandonment, or sand is periodically removed.

6.3d The Long Term Environmental, Economic, Social, And Energy Consequences Resulting From The Use At The Proposed Site With Measures Designed To Reduce Adverse Impacts Are Not Significantly More Located In Areas Requiring a Goal Exception Other Than The

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Proposed Site.

This is an exception of a Goal requirement regulating activities not uses. The County is taking the minimum exception necessary. Removal of sand is limited to the minimum necessary in order to alleviate the problem. This is not an exception to allow removal of sand in order to maintain views of the ocean. Stabilization of any bare sand areas exposed in the process will be required.

- 6.2e The Proposed Uses Are Compatible With Other Adjacent Uses Or Will Be So Rendered Through Measures Designed To Reduce Adverse Impacts.

This activity is compatible with these foredune areas because they are built or irrevocably committed to residential development. It is a regular maintenance activity necessary to keep residential structures in good shape. Standards will limit the minimal adverse impacts that are associated with this activity.