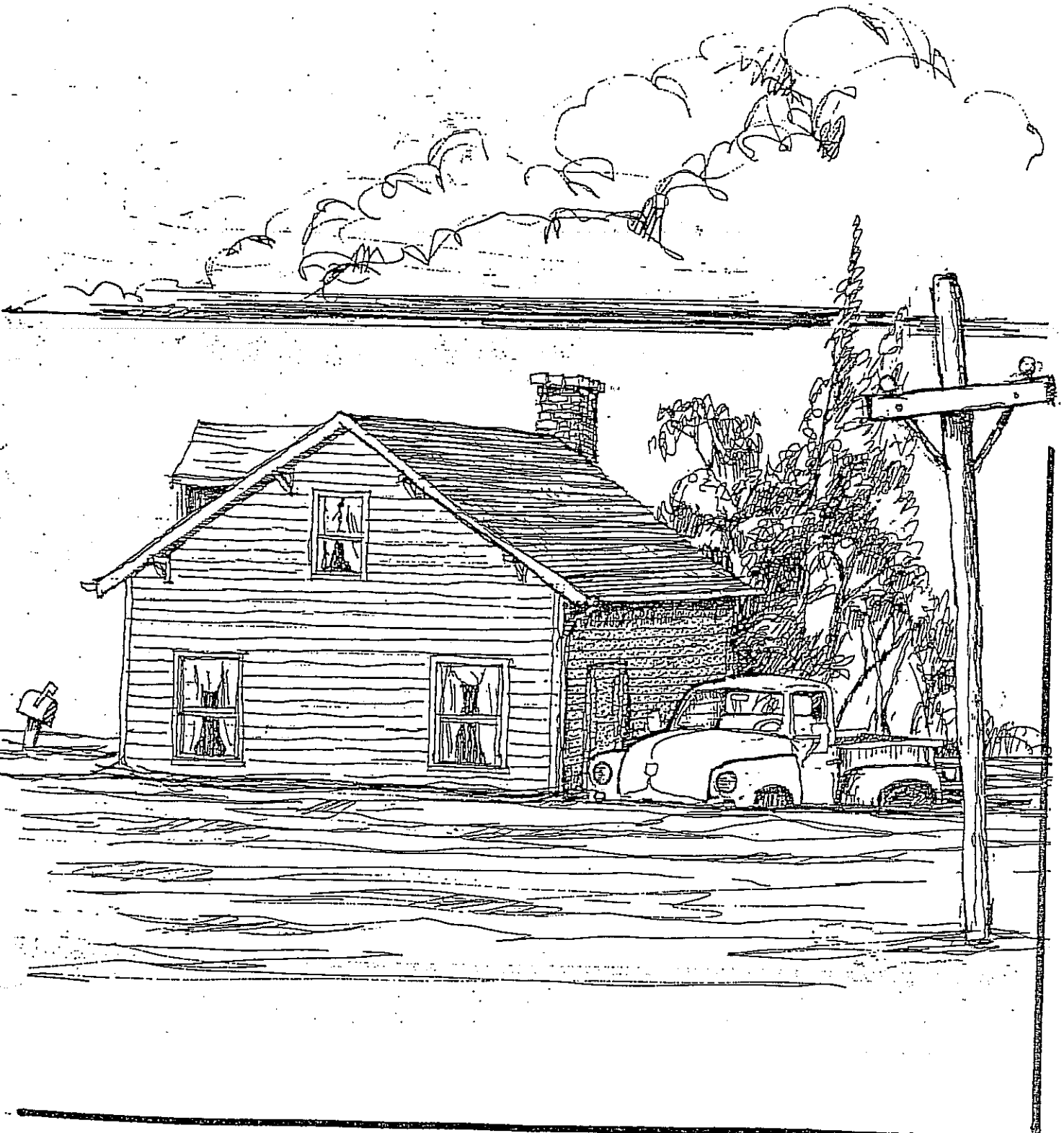


Goal 7

Goal 7: Access to Quality Education	
Indicator 7.1: Proportion of children and youth achieving minimum proficiency in reading and mathematics	Target: 80%
Indicator 7.2: Proportion of children and youth achieving minimum proficiency in science	Target: 75%
Indicator 7.3: Proportion of children and youth achieving minimum proficiency in social studies	Target: 70%
Indicator 7.4: Proportion of children and youth achieving minimum proficiency in arts	Target: 65%
Indicator 7.5: Proportion of children and youth achieving minimum proficiency in physical education	Target: 60%
Indicator 7.6: Proportion of children and youth achieving minimum proficiency in health and safety	Target: 55%
Indicator 7.7: Proportion of children and youth achieving minimum proficiency in life skills	Target: 50%
Indicator 7.8: Proportion of children and youth achieving minimum proficiency in environmental education	Target: 45%
Indicator 7.9: Proportion of children and youth achieving minimum proficiency in digital literacy	Target: 40%
Indicator 7.10: Proportion of children and youth achieving minimum proficiency in financial literacy	Target: 35%

CLATSOP COUNTY
GOAL 7
COUNTY-WIDE ELEMENT

**AREAS SUBJECT to NATURAL
DISASTERS and HAZARDS**



COUNTY-WIDE ELEMENT

GOAL 7

Areas Subject to Natural Disasters and Hazards

Adopted July 3, 1980 by Clatsop County Board of Commissioners
Amended by Ordinance 03-08

Introduction

In considering the suitability of various land for development, physical characteristics that are hazardous or limiting must be analyzed. Safeguards need to be taken in these areas to minimize the loss of life and property and avoid expensive and burdensome corrective measures.

The following natural hazards are of concern in Clatsop County:

1. Stream and Normal Ocean Flooding, Tsunamis,
2. Mass Movement and Earthquakes,
3. High Groundwater and Compressible Soils, and
4. Erosion and Deposition.

Stream and Normal Ocean Flooding, Tsunamis

Basic Findings

Clatsop County experiences flooding from three different sources: stream flooding, ocean flooding and tsunamis. Flooding is most severe in the low lying coastal and estuaries of the County such as the Necanicum Estuary where high river flows from storms can combine with ocean flooding from high tides. High tides hold back the high river flows and greatly aggravate lowland flooding along streams. Ocean flooding also affects diked areas of the County bordering the Columbia, Lewis and Clark, and Youngs River when high tides and river flows close the tide gates, temporarily flooding the diked tidelands.

Stream flooding in the upland areas of the County is much less severe than in the low flat coastal and estuary areas. The extent of flooding in the upland areas is most times limited by the narrowness of the stream valleys.

As part of the participation in the National Flood Insurance Program, Clatsop County has adopted a floodplain ordinance setting forth regulations for development in floodways and floodplains in relation to the degree of hazard present. No structures for human habitation are allowed in floodways. In other flood areas, structures must be floodproofed or elevated 1 foot above the 100 year flood. The flood elevations determined in coastal areas took coastal flooding and tsunamis into consideration.

Clatsop County recognizes the development limitations of floodplains, with their best use being for agriculture, forestry, and open space where the number of structures subject to damage is minimized. Most of the diked tideland and areas of the County with broad floodplains have been placed in Exclusive Farm Use (EFU) zones. Where subdivisions do occur in floodplains, developers are encouraged to cluster homes outside of the floodplain area, leaving the floodplain in open space.

Goal 7 - Natural Hazards

Goal

To protect life and property from natural disasters and hazards.

Flood Hazard Policies

1. Clatsop County recognizes the value of an integrated flood hazard management program in order to protect life and property and shall continue participation in the Federal Flood Insurance Program.
2. Through an integrated flood hazard management program, the county will implement and administer appropriate land use planning techniques and construction standards.
3. The County will develop and maintain educational efforts regarding the public benefit derived from an integrated flood hazard management program.
4. The County shall limit land uses in the floodplain to those uses identified by the adopted floodplain regulations as suitable.
5. The County shall strive to make flood hazard information, including that related to tsunamis, available to the public to insure that owners and potential buyers of flood prone land are aware of the hazard.
6. To provide continued flood protection, the County encourages the maintenance and repair of existing flood control structures. The construction of new dikes, for the purpose of establishing future development in floodplain areas, shall be discouraged.
7. Agriculture, forestry, open space and recreation shall be the preferred uses of flood prone areas.
8. The County shall prohibit the placement of hospitals, public schools, nursing homes, and other similar public uses within areas subject to flooding.
9. Subdivisions occurring within floodplain areas shall be encouraged to cluster land uses outside of the floodplain area leaving the floodplain in open space.
10. For specified areas, the County will consider the adoption of regulations requiring the preparation and implementation of a drainage plan as part of its review and approval of conditional use permits and development permits.

Mass Movement

Basic Findings

Extensive areas of Clatsop County are subject to mass movement, the majority of which is in the mountainous interior of the County used exclusively for forestry. However, throughout the County there are areas with mass movement potential which have the possibility of more varied use, such as rural areas along the Columbia River and along the southwest coast. Structures and facilities are subject to severe damage or complete destruction over time from moving masses of earth.

The southwest coast is the area of the County with the most severe mass movement hazards. The area has a history of major landslide activity including the Silver Point and Ecola landslides. A detailed geologic report by Martin Ross found the entire southwest coast retreating landward at varying rates caused by ocean wave undercutting and related landsliding. The recommendations from this study form the basis for the hazard policies the County has adopted as part of the Southwest Coastal Community Plan.

Care needs to be taken in approving development in areas of mass movement hazards. Excavations, cuts, fills and drainage modifications may decrease the stability of an area and initiate sliding. The County has the opportunity to minimize hazards by controlling the design of developments. Some methods include discouraging cut and fill construction practices, retaining stabilizing vegetation, and requiring roads to follow slope contours.

The best sources of information for mass movement hazards in areas of the County other than the southwest coast is the detailed soils mapping by the Soil Conservation Service (SCS). The SCS has prepared an inventory of the slopes at which different soil types in the County become hazardous (Table 1). When development is to occur on hazardous soils and slopes, the County will require a preliminary site investigation for evidence of hazards. If evidence of hazards is found, the County will require a detailed site investigation which includes possible solutions to address the hazard.

Most of the Oregon coast is categorized as a zone of minor potential earthquake damage for which quakes of Mercalli intensity V-VI may occur. The major hazard of earthquakes is that in regions of moderate to steep slopes and saturated ground conditions such as large areas of Clatsop County, earthquake vibrations could initiate significant slope failure.

Table 1.
Soils Hazardous in Relations to Mass Movement

<u>Soils</u>	<u>Mapping Symbol</u>	<u>Slopes at Which Becomes Hazardous</u>
Astoria silt loam	2E, F, G	20%
Hembra silt loam	12H	60%
Kilchis silt loam	27	60%
Klickitat stony loam	20G, H	50-60%
Svensen loam	37E, F, G	20%
Terrace escarpment	28E	
Tolovana silt loam	38E, F, G, H, F-1	20%
Winema silty clay (33 silt loam)	34E, F, G,	20%
Ecola silt loam (13 silt loam)	13E, F, G, H	20%

General Mass Movement Policies

1. The County shall recognize the development limitations imposed by areas of mass movement potential.
2. Mass movement hazards do not necessitate disapproval of development, but higher development standards can be expected in order to minimize problems.
3. Clustering of development on stable or less steep portions of sites is encouraged in order to maintain steeper or unstable slopes in their natural conditions.
4. Closely spaced septic tanks and drainfields should be restricted from moderately to steeply sloping areas because of the potential for sliding.
5. Projects which include plans for modifying the topography of sloping areas or established drainage patterns shall be evaluated in terms of the effect these changes would have on slope stability.
6. The presence of faults in an area shall constitute additional reason for restricting development in areas of landslide topography.
7. The County Planning Department should inform potential builders and developers of the presence of fault lines and may require a site investigation in appropriate situations (such as the construction of a school, hospital or large residential development).

Development Policies for Areas of Mass Movement

1. Structures should be planned to preserve natural slopes. Cut and fill construction methods shall be discouraged.

2. Access roads and driveways shall follow slope contours to reduce the need for grading and filling, reduce erosion, and prevent the rapid discharge of runoff into natural drainageways.
3. Loss of ground cover for moderately to steeply sloping lands may cause land slippage and erosion problems by increasing runoff velocity. Development on moderate to steep slopes should generally leave the natural topography of the site intact. Existing vegetation, particularly trees, should be retained on the site.
4. The County shall require a preliminary slope stability investigation in the following hazard areas:
 - a. Where detailed soils map exist, in hazardous soils areas listed in Table 2;
 - b. Where no detailed soil maps exist, all areas which have slopes in excess of 25%.

Where the preliminary slope stability investigation indicates mass movement hazards on the site, a detailed site investigation report shall be prepared. The detailed report shall indicate the severity of the hazard and any recommended techniques that could be used to alleviate the hazard before structures, roads, and septic tanks are allowed in non-commercial forest lands.

High Groundwater and Compressible Soils

Basic Findings

In the alluvial lowland areas near streams and rivers and in the interdune areas of the Clatsop Plains, the groundwater table is at or near the ground surface much of the year. Problems associated with high groundwater include hydrostatic pressure causing buoyancy of underground tanks or fracturing of basement floors and walls and health hazards from improperly working septic systems. Much of the problem of building in areas of high groundwater has been addressed by the present DEQ rules which prohibit the issuance of septic tank permits when the groundwater level is within 5-1/2 feet of the ground surface.

Most of the soils with high groundwater levels also experience problems due to the compressible properties of the soils. Construction on compressible soils can result in differential settling of development such as homes, roads, railroads, airport runways and pipelines.

Engineering solutions include excavation and backfilling with a 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.

Policies for Areas with High Groundwater and/or Compressible Soils

1. The County shall recognize the development limitations of lands with high groundwater and compressible soils during its planning process.
2. It is recommended that in all areas identified as having a high groundwater level, DEQ conduct a winter water check before issuing any septic tank permits.
3. Prior to the approval of a subdivision in areas of compressible soils, the County shall require a site investigation prepared by a soils engineer, geologic engineer or other expert. The report shall indicate what techniques can be used to address the hazards on the property.
4. Prior to the issuance of a building permit in an area of compressible soils the building official may require that special provisions be made in the foundation design and construction to safeguard against damage. The building official may require a site investigation and report to provide this design and construction criteria.
5. The County shall update its compressible soils and high water table maps as detailed soils information becomes available.

Table 2.

Compressible Soils and Soils that Exhibit High Groundwater Levels in Clatsop County

<u>Soil</u>	<u>Detailed Soils Map Symbol</u>	<u>Compressible</u>	<u>High Groundwater</u>
Peat	21A	X	X
Braillier muck	3A	X	X
Clatsop silty clay loam	5A	X	X
Coquille silty clay loam	7A	X	X
Warrenton loamy fine sand	23A	X	X

Erosion and Deposition

Erosion hazards in Clatsop County can be divided into streambank erosion, wind erosion, and wave erosion.

Wind and wave erosion hazards are addressed in the Beaches and Dunes section of the Clatsop Plains Community Plan and the Hazards section of the Southwest Coastal Community Plan.

Streambank Erosion and Deposition

Basic Findings

Areas of most active streambank erosion are recognized by steep slopes, little vegetative cover, and position on the outside of stream and river

channels. In addition to the loss of land, stream erosion is responsible for deterioration of water quality, destruction of fish spawning grounds and silt deposition which results in the clogging of the streams and estuaries.

Streambank erosion is a special hazard in dikes areas. Much of the problem may be due to wave action caused by tug and other boat traffic.

Both direct and indirect measures need to be taken if streambank erosion and deposition are to be controlled. Direct actions include streambank planting and installation of riprap, groins or baffles. Indirect methods of control are an attempt to get at the causes of erosion and are often the most difficult. Control of logging activity to reduce the amount of sediment and debris in the water is a major concern.

Streams and rivers in Clatsop County with erosion hazards have been identified by the Department of Geology and Mineral Industries as part of their two environmental geology reports and through the 208 Program conducted by the DEQ. Erosion rates are not known for the various rivers and streams in the County, which makes it difficult to prescribe safe setbacks for improvements. However, floodways of various widths exist along the streams and rivers within which no permanent structures are allowed. In addition, building setbacks along water lines will be prescribed for the multiple purpose of preventing erosion, maintaining wildlife habitat and providing a natural filter for runoff.

Policies for Streambank Erosion and Deposition

1. The outside faces of dikes shall be stabilized to prevent erosion as part of the regular maintenance of existing dikes.
2. A buffer of riparian vegetation along streams and rivers should be encouraged in order to protect and stabilize the banks.
3. Property owners shall be notified of areas of streambank erosion so they can take this information into account when placing structures.
4. The DEQ's best management practices for agricultural areas shall be supported to reduce erosion and sedimentation of streams.
5. Appropriate agencies should work to obtain speed limits and enforcement of these speed limits for boats in areas where dikes are affected by wave erosion.
6. The Forest Practices Act shall be strictly enforced to reduce sedimentation of streams.
7. Problems from natural erosion or the creation of situations where erosion would be increased due to actions on or adjacent to the river banks shall be avoided by carefully reviewing state and federal permits for shoreline stabilization to minimize impacts on adjacent land.

CLATSOP COUNTY COMPREHENSIVE PLAN

Background Report

NATURAL HAZARDS

Goal 7

Adopted July 23, 1980 by
Clatsop County Board of Commissioners

Revision: January, 1991
Amended by Ordinance 03-08

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	2
FLOOD HAZARDS	3
Stream and Ocean Flooding	3
Tsunami	3
Flood Damage and Prevention	4
 BIBLIOGRAPHY	 14

INDEX TO TABLES

TABLE 1. Recent History of Flooding in Clatsop County.	6
TABLE 2. Soils Hazardous in Relation to Mass Movement.	9

INDEX TO MAP

MAP 1. Generalized Floodplain Map.	5
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This inventory has been prepared to identify those areas in Clatsop County susceptible to natural hazards--information which is important to take into consideration when planning for future land use. These areas pose risks for the construction of buildings, utilities and roads, and for the safety of persons living in these areas. The degree of risk varies over areas. In one area the presence of a particularly critical hazard may override all other planning considerations. In other areas appropriate safeguards can be taken and the land still used for various residential, commercial or industrial uses.

This information will be used by the Citizen Advisory Committee when preparing their community plans, as well as being available to county planners, Planning Commissioners, and elected officials for consideration in all land use actions. In this way the detrimental effects of natural hazards can be reduced by accounting for them and taking appropriate safeguards.

The following natural hazards have been identified in Clatsop County:

1. Stream and Normal Ocean Flooding, Tsunamis,
2. Mass Movement and Earthquakes,
3. Wind Erosion,
4. High Groundwater,
5. Compressible Soils,
6. Stream bank Erosion and Deposition.

FLOOD HAZARDS

Clatsop County may experiences flooding from three different sources: stream flooding, ocean flooding and tsunamis.

Stream and Normal Ocean Flooding

Stream flooding in the upland areas of the County is much less severe than in the low, flat coastal and estuary areas. The extent of flooding in the upland areas is most times limited by the narrowness of the stream valleys, an exception being the broader floodplains in the Elsie-Jewell area. Some of the rivers have built up terraces along their banks, which constricts many of the floods to the channel. The major hazard associated with upland flooding is stream bank erosion.

The most extensive flooding occurs in the low lying coastal and estuary areas. Coastal streams respond quickly to the rapid runoff caused by the steep topography and low bedrock permeability of the uplands. Flooding is the greatest when

stream flooding occurs in conjunction with ocean flooding from high tides and winter storms. Storms that produce the storm surges also bring heavy rains. High tides hold back the high river flows and greatly aggravate lowland flooding along streams.

Ocean flooding also affects diked areas bordering the Columbia River and Youngs Bay when high tides and river flows close the tide gates. While tide gates are closed, storm runoff accumulates and floods the flat, low lying floodplain areas. This flooding is temporary, however, as the water drains through the tide gates on the next low tide.

Tsunami

The other type of coastal flooding hazard is the tsunami. Tsunami is the term applied to waves generated at sea by earthquakes. There are two types of tsunami events, near shore tsunamis and distant tsunamis. Tsunamis have the potential to be by far the most destructive flooding event. The inundation of low lying coastal areas can result in the loss of both property and lives. A near shore tsunamis will be generated by a Cascadia Subduction Zone earthquake (See the Earthquakes section). Scientists estimate that such an earthquake will generate a tsunami with wave run up heights of 16 to 30 feet above the prevailing seas. The first tsunami crest will arrive within 15 - 30 minutes after the earthquake is felt. Multiple waves will occur, with later crests having the potential to be higher than the initial event. After the earthquake and tsunami event, a significant amount of beach erosion can occur as beaches seek to reestablish equilibrium with the new lower elevations of the coastline.

In 1996, the Oregon Department of Geology and Mineral Industries (DOGAMI), pursuant to ORS 455.446 and 455.447, prepared maps showing the tsunami inundation zone for the Oregon coast based on a magnitude 8.8 Subduction zone earthquake. The base map for this mapping is the USGS 7.5 minute maps which are at a scale of 1:24,000. Pursuant to the Oregon Revised Statutes referenced above, the mapped inundation zone identifies areas where the construction of certain types of essential facilities and special occupancy structures is restricted.

In 1998, DOGAMI completed tsunami hazard mapping for the Seaside-Gearhart area. The study area extended from north of the Highlands Road to an area in the vicinity of the Johnson rock quarry south of Peterson Point. The study identified areas of moderate, high and extreme risk associated with a major Cascadia Subduction Zone earthquake.

Tsunamis from earthquakes located at transoceanic sites (e.g., Alaska, Japan, Chile) are termed distant tsunamis. Researchers have found the wave height of distant tsunamis to be directly

related to the magnitude of the earthquake with which it is associated. The most recent significant distant tsunami in Clatsop County was the 1964 Good Friday tsunami caused by a submarine earthquake that occurred off the south coast of Alaska. The tsunami caused considerable damage to the cities of Warrenton, Seaside, and Cannon Beach. Warrenton suffered \$20,000 damage, particularly to docks and log rafts in the mill area. Seaside was struck by a wall of water estimated to be more than 10 feet high, which flowed up the Necanicum River, doing \$40,000 damage as far inland as the golf course. The surge of water in Cannon Beach was so great it swept the 200-foot long Elk Creek highway bridge 1/4 mile upstream. Motels along Elk Creek were badly damaged and much of the business district was flooded.

The Federal government has established a warning system that notifies local emergency preparedness personnel in the event of a far shore tsunami. Generally, 4 to 15 hours of notice can be given.

Flood Damage and Protection

Flood damage is greatest in areas of fast flowing currents. The force of these currents can cause damage by smashing floating objects against stationary structures, by scouring out channels under or around structures, eroding away foundations and washing out roads and bridges.

Although not an immediate threat to life, flooding in areas outside of rapidly moving water can cause loss to buildings, equipment, and facilities from water and mud damage. A danger to safety is contamination of well and drinking water supplies.

The federal flood insurance program differentiates between the two types of flood areas mentioned above by the terms "floodway" and "area of special flood hazard". The floodway is the flood channel that carries the fast moving floodwater. Areas of special flood hazard are areas of rising floodwaters without rapid flow.

Clatsop County has participated in the National Flood Insurance Program since 1974. A floodplain ordinance and final maps establishing elevations, boundaries of floodways and special flood hazard areas was adopted June 21, 1978. Regulations for floodplains and floodways were adopted in relation to the degree of hazard. No structures for human habitation are allowed in floodways. In other flood areas, structures must be flood proofed or elevated above the level of a flood, which has a 1%, or greater chance of happening in any one year (100 year flood). The flood elevations determined in coastal areas took coastal flooding and tsunamis into consideration.

In addition, Clatsop County, in its planning process, has taken

Ordinance 03-08 Comprehensive Plan Text Amendments

flood hazards into consideration when determining land use designations. Most of the diked tideland and areas of the County with broad floodplains have been placed in Exclusive Farm Use (EFU) zones. The EFUs zones protect agricultural uses which ~~is~~ are compatible with flood areas while limiting the number of residential and commercial structures

The Department of Environmental Quality has rules whereby a sanitarian can deny approval for an on-site treatment system based on excessive saturation, if frequent flooding occurs, or based on high groundwater if the water table rises from below. These rules are intended to ensure that on-site treatment systems function without creating a health hazard or water pollution.

BACKGROUND REPORT
NATURAL HAZARDS
FLOOD HAZARD RELATED MATERIAL

FLOOD HAZARDS

Clatsop County may experiences flooding from three different sources: stream flooding, ocean flooding and tsunamis.

Stream and Normal Ocean Flooding

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The Department of Environmental Quality has rules whereby a sanitarian can deny approval for an on-site treatment system based on excessive saturation, if frequent flooding occurs, or based on high groundwater if the water table rises from below. These rules are intended to ensure that on-site treatment systems function without creating a health hazard or water pollution.

Table 1. Flooding in Clatsop County: 1953 - 1977

Date	Description	Damage (thousands of dollars)
Memorial Day, 1953	Vanport Flood	N/A
February, 1960	Freak Wave	N/A
January, 1964	River Flooding; Astoria - 4.32" of rain in 24 hours	N/A
March, 1964	Tsunami Heavy damage to homes and bridge washout in Cannon Beach. Heavy damage to homes in 6 block area of north Seaside and washouts of 12 th Street, Railroad, and Hwy. 101 bridges.	City of Warrenton 20 City of Seaside 20 private property in Seaside 235 TOTAL for County 1,000
December, 1964 January 1965	Flooding of the Columbia and Nehalem Rivers Damages on Columbia River (Oregon side from Willamette River to mouth of Columbia River)	TOTAL 1,181 Businesses 275 Flood fight & Rehab. 370 Physical Damage 536 Emergency Relief 41 TOTAL 328
December, 1966	Damages on Nehalem River (including Tillamook County)	N/A
December, 1967	Flooding on Necanicum River. Seaside, 3.35" of rain in 48 hours High winds and freak wave (damage and overtopping of dikes on Lewis & Clark River, Youngs River, Brownsmead, Knappa, Blind Slough and Gnat Creek. Cannon Beach was declared a special disaster area.)	Cannon Beach 125 Seaside 7 County- mainly agricultural damages 200
December, 1970	Flooding on Neawanna Creek. Seaside, 3.65 A of rain in 48 hours. Crown Camp, 5.6 A of rain in 48 hours with 20-32" of snow in hills.	N/A
January, 1971	High storm tides and heavy rains (100 mph winds reported at Cannon Beach). Seaside - 1.53" of rain in 24 hours with 15-26" snowmelt in hills.	Cannon Beach 75 County- mainly agricultural damages 216.5
December, 1972	High storm tide (+12 feet). Overtopping of dikes caused flooding in Alderbrook (Astoria) and in Brownsmead causing dike and tidegate washout.	N/A
January, 1974	High storm tides and river flooding (tide 2-3 feet above normal). Flooding on the Nehalem River.	Brownsmead damages 13 TOTAL 203.3

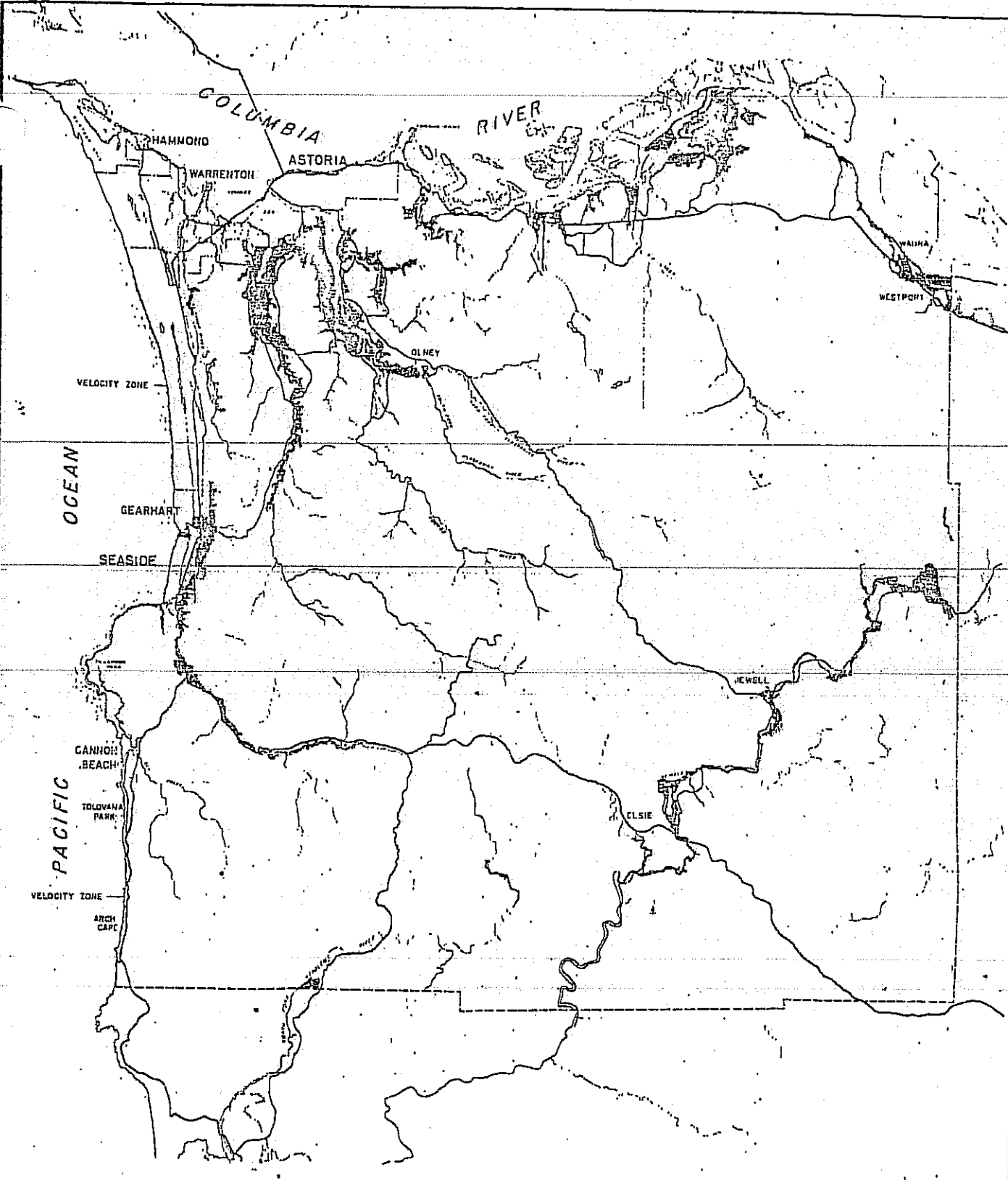
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Date	Description	Damage (thousands of dollars) (estimated total county damages)
	State of Oregon declared disaster area.	
December, 1975	Stream flooding. Clatsop Airport - 8.99" of rain in 6 days. Floodgate washout on Skipanon River.	N/A
February, 1976	Storm tides (sea swells were reported as 12-18 feet).	Arch Cape and Cannon Beach 75
December, 1977	High tide and river flooding. Astoria - 3.28" of rain in 24 hours. Overtopping of dikes on Youngs River, Lewis & Clark River, Brownsmead and Svensen Island. Tidegate and road washout occurred on Lewis & Clark Road. Extremely hazardous surf conditions on all beaches.	Damages 80

Sources: The Daily Astorian, U.S. Dept. of Agriculture, Soil Conservation Service, U.S. Army Corps of Engineers, and the National Weather Service.

Since 1979, the most severe flooding event occurred in February of 1996. A damage survey report prepared for the Federal Emergency Management Agency by Clatsop County estimated that the damage to public facilities, roads and individual property was approximately 2.65 million. Actual damage probably exceeded this figure. Flood damage was heaviest in rural Clatsop County, especially in the Nehalem River Valley, where the river crested 14 feet above flood stage. A log jam destroyed a bridge on the Lower Nehalem River, leaving the neighborhood of Sha-Ne-Mah without any road access. A section of Highway 202 was damaged resulting in an O-DOT road modification project with an estimated cost of one million dollars. The Columbia River flooded diked lands in the Brownsmead, Burnside and Svensen island area. The railroad access to western Clatsop County was closed by a landslide at Aldrich Point. (By 1999, the slide had not been removed). Emergency personnel evacuated residents around the county, with between 200 and 300 residents being evacuated in the Nehalem River Valley. National Guard troops distributed sandbags in Westport, Wauana, Seaside and at the Tongue Point Job Corps Center in Astoria.

Although the majority of property owners located in flood hazard areas do not have flood insurance, claims filed under the Federal Flood Insurance Program can provide some information on the extent of flood damage and where it is located. Since 1977, 29 property loss claims have been filed with FEMA; only one of these claims is considered to be a repetitive loss claim. Of the 29 claims, 14 were filed in the early part of 1996 and are assumed to have been associated with the February 1996 flood. Although the effect of the 1996 flood was significant, the information on claims filed under the Federal Flood Insurance Program indicate that flooding has not been a major problem in the county over the last two decades.

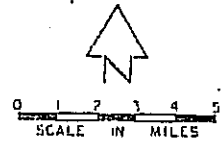


CLATSOP COUNTY

UNINCORPORATED AREAS

GENERALIZED FLOOD PLAIN MAP

■ AREAS INUNDATED BY 100 YEAR FLOOD



MAP REDUCED FROM U.S. DEPT. OF HOUSING AND URBAN DEVELOPMENT
FLOOD INSURANCE RATE MAPS FOR CLATSOP COUNTY, 1978

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