(Draft) Section 3
BACKGROUND

LEGAL AUTHORITY AND SCOPE

Chapter 86.26 of the Revised Code of Washington (RCW) requires that counties requesting financial and government participation for flood control assistance provide a flood hazard management plan (FHMP), approved by the Department of Ecology (Ecology), in consultation with the Department of Fish and Wildlife. RCW 86.26.105 states that an FHMP must be completed and adopted within 3 years of the award of a Flood Control Assistance Account Program (FCAAP) flood control maintenance grant. This program is discussed in detail below. In the past, Grays Harbor County has been awarded FCAAP monies to address localized drainage issues and to develop smaller-scale flood hazard management plans for several areas including the North Beach. More recently, the County has received funding for countywide flood hazard management planning. This Plan follows two similar plans: one completed in 1995 for the Grayland area and one completed in 1997 for the South Beach area, both located in the southwestern coastal area of the County. Eventually, with additional funding, a Countywide FHMP will be completed.

As fully detailed in Chapter 173-145 of the Washington Administrative Code (WAC), the FHMP must include several key elements. Broadly, these elements are as follows:

- Determination of the need for flood control work.
- Watershed descriptions, including the identification of specific problem areas, historical and potential flood damage, the documentation of applicable regulations, and goals for the planning area.
- Alternative flood control work.
- Identification of potential impacts of instream flood control measures to instream uses and resources.

- Definitions for the coverage area of the comprehensive plan.
- Conclusions and proposed solution(s).

The FHMP is also an element of Grays Harbor County's plan to meet the intent of the 1990 Growth Management Act (GMA). Under the GMA, all counties with a population of at least 50,000 people and a population increase of more than 17 percent in the last 10 years must adopt a countywide comprehensive plan. Although Grays Harbor County does not fall into this category, it has chosen to initiate planning to achieve the intent of the GMA.

Sponsorship of Local Government

This FHMP was developed in accordance with Ecology's *Comprehensive Planning for Flood Hazard Management (CPFHM)* approach for an FHMP. In that document, the following steps are outlined for successful completion of a plan.

1. Establish the citizen and agency participation process.
2. Set flood hazard management short- and long-term goals and objectives.
3. Inventory and analyze physical conditions.
4. Determine the need for flood hazard management measures.
5. Identify alternative flood hazard management measures.
6. Hold public alternative evaluation workshop(s).
7. Develop flood hazard management strategies.
8. Complete draft Comprehensive Flood Hazard Management Plan and State Environmental Policy Act (SEPA) documentation.
9. Submit the final Comprehensive Flood Hazard Management Plan to Ecology.
10. Hold a public hearing and pass the "intent to adopt" resolution.
11. Notify Ecology that the final plan is adopted.

PROJECT BACKGROUND

In 1990, Grays Harbor County initiated a process to prepare a comprehensive utilities plan for water supply, sewers and drainage. As part of this process, the County conducted a series of public meetings in April 1991. The meetings were held not long after the serious floods of late 1990, and discussions of drainage and flooding issues dominated the meetings. In response, the County has placed increased emphasis on addressing localized drainage problems.

The two areas previously affected, Grayland and South Beach, are located in the south coastal area of the County. The North Beach Study is a continuation of the systematic review of coastal flooding and drainage problems. The Study Area is the coastal strip lying between Conner Creek on the south and Copalis Beach on the north (see Figure 3-1). This 4-mile long area has been extensively developed for beach resorts. Small commercial areas exist at Ocean City and Copalis Beach. Nearly all of the resorts and the residences in this area are situated within one-half mile of the ocean. State Highway 109 crosses the full length of the Study Area. Several drainage problem areas occur along the highway, where very gentle slope and/or low-lying areas result in ponded water conditions. These conditions may persist for weeks at a time during the rainy season.

Conner Creek is a large stream that runs parallel to and a short distance west of Highway 109. The majority of its 13 square mile drainage is located east of the Study Area. At the Highway 109 crossing, this creek turns northward and flows parallel to the ocean shoreline a distance of 4 miles, emptying into the ocean at Copalis Beach. Since the early portion of this century, the creek outlet has migrated north approximately 3 miles. The dynamics of the migration of the stream channel have been traced in a recent study *entitled Conner Creek Stabilization Project – Feasibility Study* (Pacific International Engineering, 1997; referred to here as the Feasibility Study). The Feasibility Study proposed a new creek outlet and a hardened structure located a short distance north of Ocean City. The County attempted to move forward with the project. However, due to potential environmental inpacts and the resulting permitting difficulties, this project has not been pursued by the County.

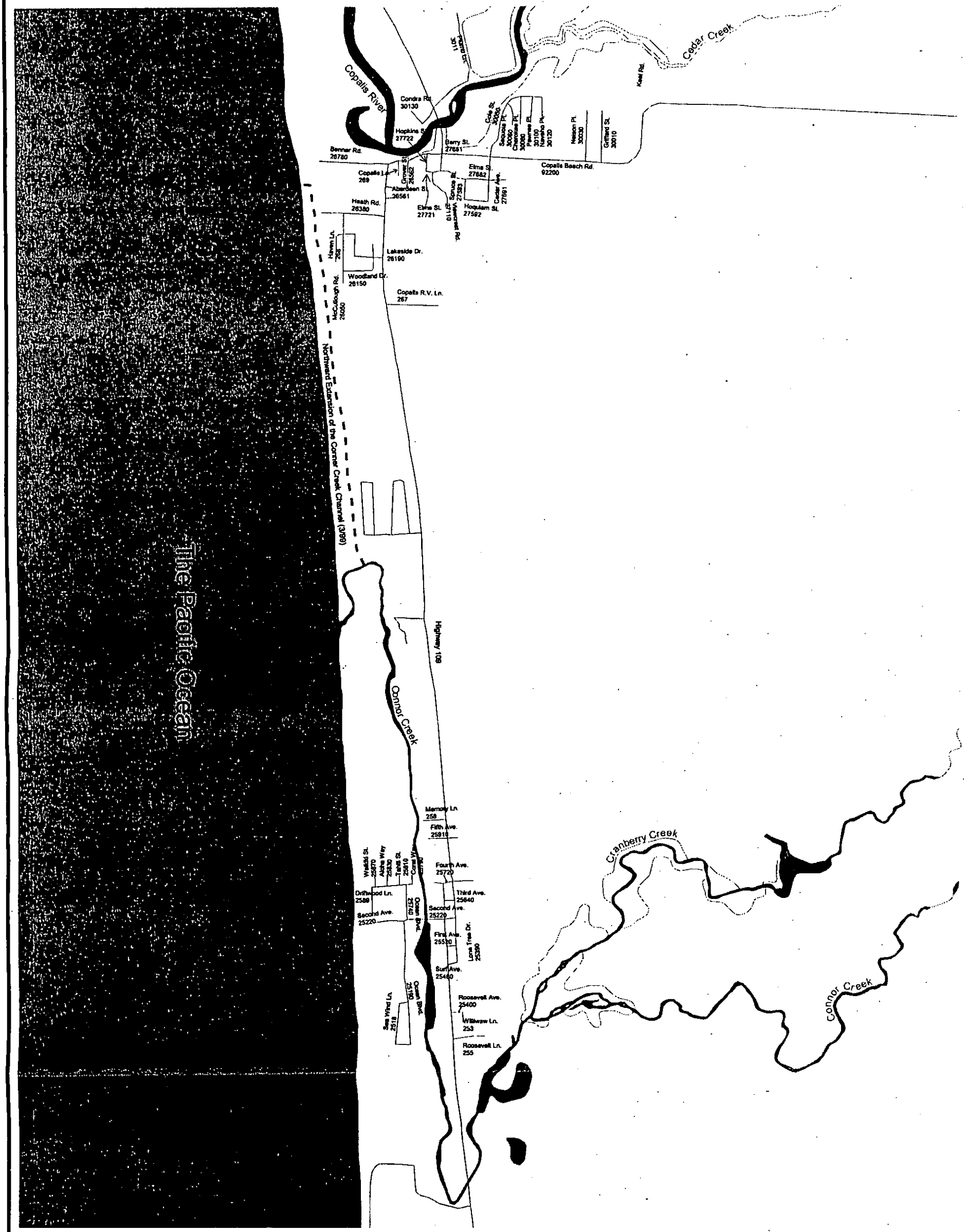


Figure 3-1 Study Area

As recently as the mid-1980s, the outlet was located near Seaview Estates about one mile north of Ocean City. However, the outlet has migrated north relatively rapidly over the past decade. This past year it has reached the Griffiths-Priday State Park, in the vicinity of the Copalis River, which also flows in a northerly direction in this area. It is interesting to note that as of the spring of this year (1999), the northerly rate of migration of the stream outlet had closely followed the prediction in the Feasibility Study.

As the creek channel has migrated north, it has cut off direct beach access from adjoining properties. A number of bridges have been constructed over the years to re-establish access. A total of eight bridges, three of them foot bridges and the rest accommodating automobiles, have been constructed along the one-mile segment of stream between Ocean City and Seaview Estates.

Need for Plan

Rapid development and severe flooding in portions of the Pacific Northwest have caused flood hazard management to become a priority for Washington's state and local governments. Citizens and public officials are increasingly aware of the interrelationship of comprehensive planning, stormwater management, resource preservation, and flood damage protection. Within this context, it is also acknowledged that floods are natural events, and often it is human activities that must be managed to minimize the watershed impacts that make flooding a serious hazard.

The State of Washington has made grant funds available to help communities and local governments comply with state statutes calling for watershed-based flood protection activities. To qualify for these funds, an FHMP must be developed to ensure that an overall watershed approach to flood hazard management is being taken. Because activities throughout the watershed can directly and indirectly impact localized flood control projects, a complete understanding of the drainage basin, including its soil types, land uses, and hydrology are imperative. Poor management in one part of the watershed can adversely affect drainage and result in flooding in another part.

This FHMP addresses the watershed contributing to the North Beach area and evaluates the potential for flooding and its impacts. It proposes possible structural and alternative management solutions to reduce flood hazards.

The general goals of this plan are to identify existing flooding and drainage problems in the Study Area and to develop cost-effective solutions. Specifically, the goals of this FHMP are as follows:

- Improve the protection of public health and safety from flooding threats in the North Beach Study Area.
- Provide practical, cost-effective solutions that will result in measurable reductions in flooding frequency, duration, and frequently flooded area damages.
- Improve County regulations and programs to control flooding impacts to future growth.

This plan has several objectives. The first is to analyze the flood levels along the lower portion of Conner Creek, below Highway 109. In particular, the restriction to creek flow posed by the existing bridges is analyzed. However, no attempt is made to propose measures to stabilize the stream outlet to the ocean. This was the subject of a previous study (discussed later in this section) which met with serious objections by reviewing agencies. Second, this report analyzes a number of local drainage problems identified by the County and by residents at a public meeting held in February, 1999. Potential solutions to these drainage problems are developed. To the extent that Conner Creek may serve as an outlet for one or more of these potential projects, the two objectives are closely related.

Principles of Comprehensive Flood Hazard Management

Flood hazard management is an important planning tool because it encompasses not only the designated floodplain, but environmental and economic issues and land uses beyond the floodplain.

This FHMP recognized or worked to meet the following fundamental principles, which are elaborated upon in Appendix D:

- It is often more cost-effective and beneficial to accommodate a waterway's dynamic nature.
- The causes of flood damage must be identified and understood early in the planning process.
- Public and agency participation are an important part of the FHMP process.
- Issues of construction, maintenance, funding, and public approval should be thoroughly examined during the alternative selection process.
- Modifications to and preservation of natural hydrologic processes can help meet other resource protection goals.
- FHMPs can be a vehicle to improve interdepartmental coordination.
- Comprehensive planning solutions should be included in the FHMP.

Flood Control Assistance Account Program

The Flood Control Assistance Account Program (FCAAP) provides matching reimbursable grants for county and local jurisdictions' planning and maintenance efforts to reduce flood hazards and damages.

Administered by Ecology's shoreland and coastal zone management program, FCAAP promotes a watershed approach to minimizing flood hazards. To be eligible for funding, jurisdictions must participate in the National Flood Insurance Program. The maximum amount of initial emergency funds available per county is $500,000 per biennium, subject to availability. Grants for up to 50 percent of eligible maintenance and construction costs and up to 80 percent of emergency flood repair costs are also provided, subject to availability.

PLANNING PROCESS

As detailed in Ecology's *Comprehensive Planning for Flood Hazard Management*, public and agency participation is critical to a flood hazard management plan's success. For the North Beach Study Area, there are a number of factors in support of public participation. They are as follows:

1. Proposed measures will affect many local property owners, and their support will be needed.

2. WAC 173-145-070 calls for the review of all FCAAP projects by associated state agencies and affected parties. Therefore, appropriate public agencies, such as the State Department of Fisheries and Wildlife, the Department of Natural Resources, affected Native American tribes, and other public entities should be involved throughout the process for plan formulation and comments.

3. The plan must ultimately be adopted by the local government; therefore, it is important to build support among the local constituency.

4. The planning process offers an opportunity for educating the public on the issues, opportunities, and public responsibilities of flood hazard management.

Public and Agency Participation

Initial scoping for this project relied, in part, on problems identified in *the1992 Grays Harbor County Comprehensive Utilities Plan* in which a series of public meetings were held. This was supplemented with a public meeting held early in the preparation of this plan.

In keeping with Ecology's guidance for flood hazard management planning, the County worked actively to involve members of the North Beach community in identifying flooding problems and advising on potential solutions. A public meeting was held to gather input for development of the draft FHMP. The meeting was publicized in the local newspaper.

On February 4, 1999, the meeting was held in the North Beach Area at the Lions Club Hall to inform the local residents of the start of the Flood Hazard Reduction Study and to seek out local

information on existing drainage problems. A total of 18 residents attended the 1:00 p.m. meeting. A representative from the Washington Department of Transportation's Aberdeen Office also attended. The general context of the study and its goals were presented by the County Deputy Director for Community Development, Lee Hansmann. Members from the Consulting Firm conducting the study, CH2M HILL then discussed the study in more detail. At the conclusion of the presentation, the audience was asked to comment on the study and any drainage problems that should be addressed. The following comments were received form a total of 8 individuals:

- Persistent, shallow flooding occurs around the Silver Maple Resort, about one-half mile south of the jog in Highway 109 at Ocean City. Nearby Roosevelt Avenue floods to nearly a foot deep at times. The adjacent highway drainage system does not appear to carry away the runoff.
- Rod's Resort, located one mile south of Copalis Beach, suffers from persistent shallow flooding. It was stated that past activities on adjacent land have blocked the natural flow of water, causing property flooding.
- The Haven-by-the-Sea Neighborhood, south of Heath Road, experiences very slow drainage of runoff from larger storms. It was suggested that a collapsed storm pipe which formerly conveyed the water north to Heath Road is a source of this problem.
- The intersection near Johnson's Mercantile in Copalis Beach is a low-lying spot which periodically floods when the adjacent Copalis River is high. In 1996, the water rose high enough to enter the store.
- One long-time resident commented that the water level in Conner Creek, at the highway crossing one mile south of Ocean City, has risen considerably since his childhood. It was speculated that this might be due to the northward movement of the creek's outlet, which produced a progressively shallower stream slope.
- Within Ocean City, near Leisure Time Resort, Sixth Street used to have a ditch that drained toward Conner Creek; this should be checked into to see if drainage could be improved.
- One block east of the highway in Ocean City, near Ocean City Storage, there are several ditches that appear to drain to no outlet.

A number of these drainage problems are investigated in this study. Development within the Study Area is concentrated in a generally narrow strip on either side of Highway 109. Most of the drainage problems occur along or near the highway.

A meeting was held with the WSDOT Regional Office in Aberdeen to review recommendations for several projects proposed within WSDOT right-of-way. Finally, at the conclusion of this process, the Grays Harbor County Commissioners will hold a public hearing prior to plan adoption.

DESCRIPTION AND CHARACTERISTICS OF PLANNING AREA

Planning Area Boundaries

North Beach is an unincorporated community located in the west central portion of Grays Harbor County along SR 109. It includes the coastal area north of Grays Harbor and south of the Copalis River. Figure 3-1 shows the general study planning area boundaries.

Topography

The Study Area is characterized by flat, low-lying areas supporting many localized depressions, and wetlands. The elevation ranges from sea level to approximately 40 feet. The higher elevations represent ridges of older sand dunes lying east of SR 109. The Study Area is bisected by Conner Creek, which receives the runoff from all but its northern portion.

Soils Characterization

Throughout Grays Harbor County, sands, sandstone, and glacial runoff constituents make up the parent material of the lowland soils, while the mountainous regions are underlain by sandstone and basalt. The marshy portions of the Study Area are likely composed of silt, peat, and clay parent material. Soils information is summarized from the County SCS soil survey.

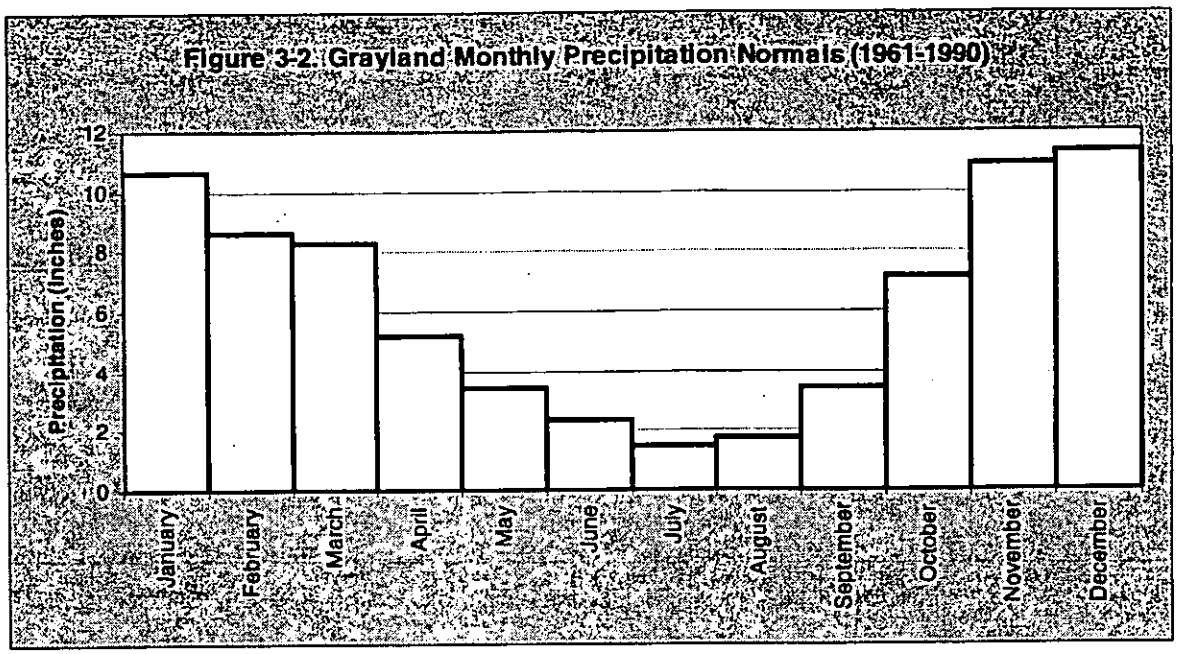
About half of the Study Area is characterized as Yaquina Soils. These are stabilized sand dunes, which have moderate permeability but develop a seasonally high water table that comes within 2 feet of the ground surface. Just inland of this soil are the Wishkah Soils. These were formed as glacial outwash plains and are poorly drained, with a seasonally high water table typically 2-4

feet below ground surface. In the southern portion of the Study Area , Westport Soils are found. These sandy soils drain reasonably well and do not experience shallow water table conditions of the Wishkah and Yaquina soils.

Climate

As a coastal community along the Pacific Ocean, North Beach is influenced by the prevailing wind direction, the surface temperature of the Pacific Ocean, the Coast and Cascade Ranges, and the position and intensity of the large high- and low-pressure centers over the ocean. The air is generally moist, and the fluctuation in annual temperature is moderate. Summers in North Beach are relatively cool and dry, and the winters are mild, wet and cloudy.

Figure 3-2 shows the monthly average precipitation in Grayland, located 18 miles south of Ocean City, along the coast. Annual average precipitation is listed by the National Oceanic and Atmospheric Administration as 75 inches, with 80 percent occurring between October and March. The month of December typically has the maximum average precipitation, but localized flooding is a problem throughout the fall and winter. The water table in the flat lowland areas near SR 109, where most of the development is centered, is relatively high in the winter months (refer to the Soils Section above). Infiltration and runoff of surface water cannot readily occur; therefore, the frequent winter rainfalls produce localized pools of standing water and result in peak flows throughout the existing drainage system.



Hydrology and Watershed Characteristics

North Beach has diverse surface water features. The Pacific Ocean borders the community on the west and provides a number of recreational activities such as clamming and sightseeing. Small lakes, wetlands, and drainage channels cover the low-lying interior. Two sizable streams lie within the study area: Copalis River and Conner Creek.

Extreme tide levels (converted to 1988 NAVD elevation datum) along the coast of the Study Area are reported by the Federal Emergency Management Agency (FEMA) as follows:

- **10-year high tide:** 11.1 feet above mean sea level
- **50-year high tide:** 12.7 feet above mean sea level
- **100-year high tide:** 13.5 feet above mean sea level
- **500-year high tide:** 14.0 feet above mean sea level

Storm-driven waves can cause wave run-up as high as 24 feet. However, this extreme would only be experienced along the sand dunes directly facing the ocean. Extreme tides levels for 1999 range from –5.9 feet (low tide) to +10.2 feet (high tide) above sea level.

The presence of significant floodplains and wetlands throughout the North Beach Study Area is indicative of the area's propensity toward regional flooding. Flooding occurs mainly during the winter months, when high tides and winter storm winds combine with the heavy seasonal rainfall to create coastal flooding. The 1986 FEMA *Flood Insurance Study for Grays Harbor County, Washington (Unincorporated Areas)* documents the extent of the 100- and 500-year floodplains in Grays Harbor County. Figure 3-3 shows the floodplain boundaries for the Study Area. These limits were established in accordance with FEMA's national standards for flood hazard management purposes (the 100-year event) and additional risk indicators (the 500-year event). In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year boundary is shown. Occasionally, small areas within the floodplain boundaries may lie above the flood elevations. These locations were not shown in Figure 3-3.

Because of Grays Harbor County's coastal location, the potential for tsunami hazards was also discussed in the FEMA flood insurance study. The analysis was based on the report *Type 16 Flood Insurance Study: Tsunami Predictions for the West Coast of the Continental United States* (U.S. Army Corps of Engineers, 1978). The report concluded that the elevation of tsunami-caused flooding at the 100-year recurrence level is lower than that caused by winter storms. Tsunamis are not considered to be a significant hazard for the North Beach community, which is afforded a reasonable level of protection by the coastal dunes.

Encroachment on floodplains, whether by structures or fill material, reduces flood-carrying capacity, increases flood heights and velocities and increases flood hazards in areas outside of the encroachment. Floodplain boundaries can be an important management tool in balancing the economic gain from floodplain development against the resulting increase in flood hazard. As discussed later in this chapter, development in the FEMA-mapped floodplain in the County is governed by special permitting requirements that limit filling and provide other safeguards.

Conner Creek

As mentioned earlier, Conner Creek flows south to north through the length of the North Beach Study Area. The creek drains a 13 square mile area lying predominantly east of the Study Area. Very little development has taken place in the watershed upstream of its crossing of Highway 109. The area is largely forested and has large amounts of low-lying land which is covered with water for much or all of the year. For many decades, the mouth of the creek has tended to migrate both north and south, responding to sand deposition along the beaches and the forces of periodic high flows and strong ocean storms. Over the past 10 years, the channel has lengthened a distance of over two miles, as the mouth of the creek has extended north to the vicinity of the Copalis River.

Peak flows for Conner Creek were estimated based upon regional regression equations (Appendix A). At the mouth of the stream the flows (in cubic feet per second [cfs]) are estimated as shown below:

- **2-Year: 610 cfs**
- **10-year: 940 cfs**
- **100-year 1,340 cfs**

The water surface elevation for Conner Creek was modeled for these three standard flood levels. The model was run under high, but not extreme tide conditions. The reasoning was that the flood events modeled on the creek are rather rare events in themselves. The chances of a flood event coinciding with an extreme high tide would be doubly rare. Therefore a high tide level of 9.5 (12.0 MLLW) was used as the boundary condition for the mouth of Conner Creek. This level is exceeded a total of 8 times in 1999, when the highest daily tide is 9.9 feet. (12.4 MLLW). It appears to be a reasonable estimate for a higher tide condition when a standard flood such as the 2-, 10- or 100-year event would occur.

As shown in Figure 3-4, the channel bottom varies in elevation from 3 to 6 feet, except for one location near Rod's Resort. At this location, the channel bottom rises to an elevation of 9 feet and appears to control the stream elevation for a distance of about one mile upstream. This represents only a single, measured cross-section along a 2-mile stretch of the creek. Cross-sections upstream and downstream should be taken to better define the channel in this area.

Figure 3-4 shows that the Highway 109 bridge over Conner Creek would be under nearly 2 feet of water during a 100-year flood and under a half foot of water during a 10-year flood. The bridge has not been submerged in recent years (personal communication with Ernie Shumate, WSDOT Engineer, Aberdeen, Washington).

No other bridges would be submerged during high flows. However the approaches to several of the bridges would become submerged during the two-year event (Leisure Time Resort I bridge) and the 10- year event (Private Drive and the Ocean Mist Resort bridges). Refer to Appendix A for more information.

The head loss (or drop in water surface elevation) through most of the bridges is minimal (less than 0.05 feet). The one exception is the Leisure Time Resort II Bridge, which shows a head loss between the upstream and the downstream sides of the bridge of about one-third of a foot during the 100-year flood event. This bridge has wide girders which extend well below the bottom of the road surface. The relatively large cross-sectional area exposed to higher stream flows by these girders is likely causing some backwater upstream of this bridge. Overall, the existing bridges do not appear to significantly impede the flow of Conner Creek.

Figure 3-4 indicates that during the 2-year event the creek elevation through the Ocean City area will be 13 to 15 feet. During the 100-year event the creek elevation increases to 15 to 18 feet. At this latter level some flooding in the Ocean City area would occur. This is generally consistent with the FEMA Flood Insurance Map for the area (Figure 3-3).

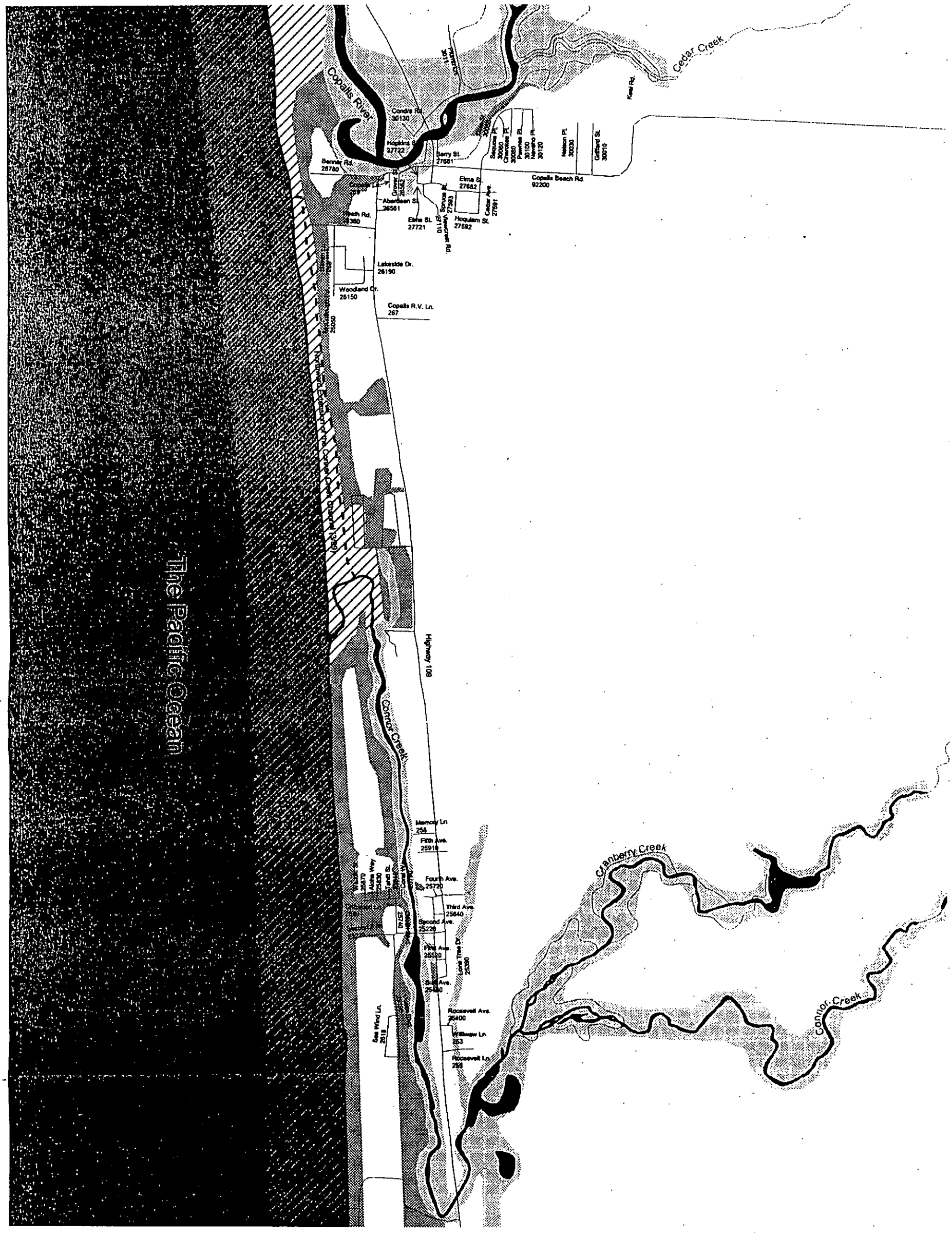
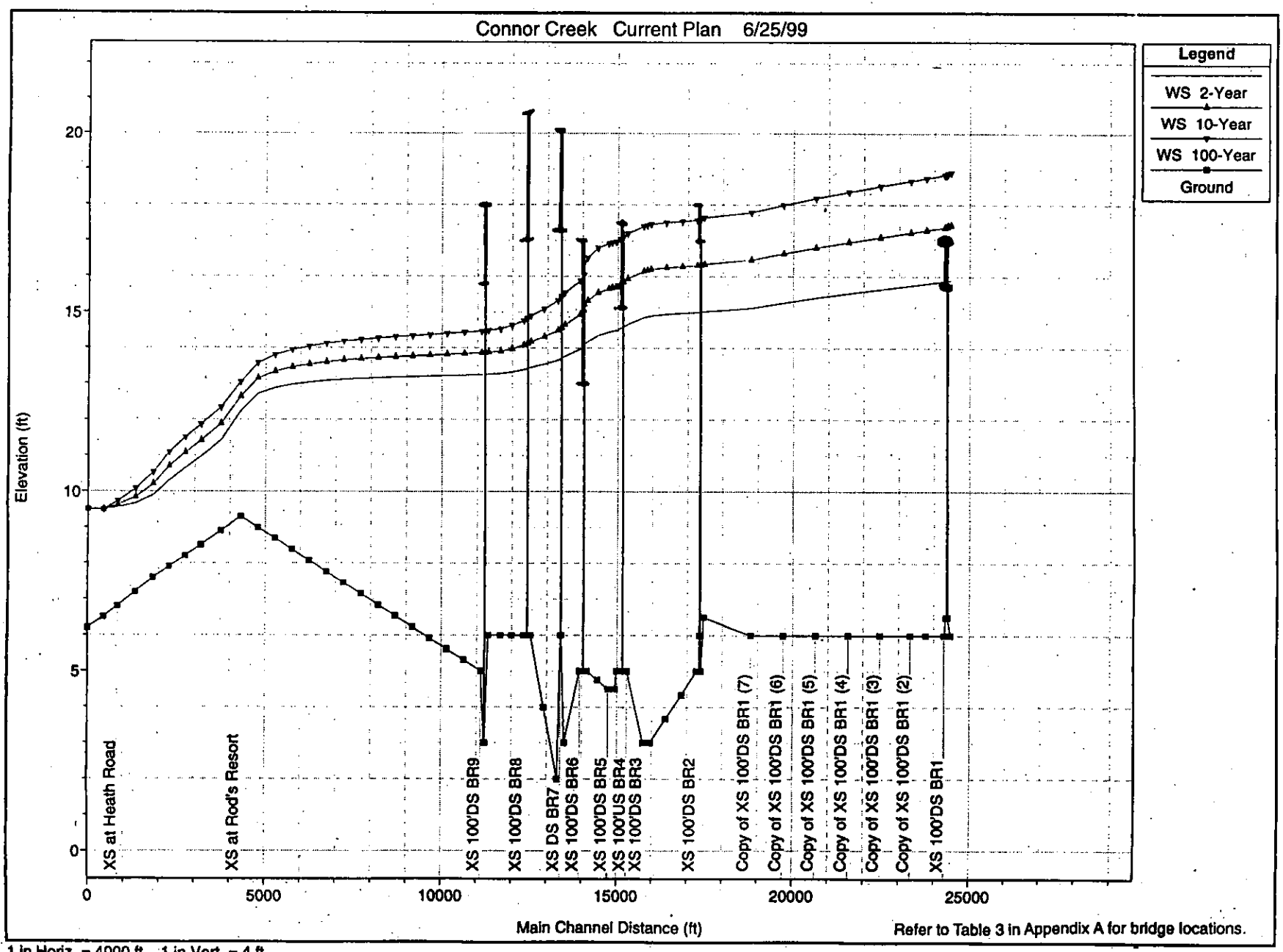


Figure 3-3 Flood prone areas from FEMA Flood Insurance Map for Grays Harbor County



1 in Horiz. = 4000 ft 1 in Vert. = 4 ft

FIGURE 3-4

Water Surface Profiles for the Lower Portion of Conner Creek

Copalis River

The Copalis River serves as the northern boundary of the North Beach Study Area. It drains a 39 square mile area northeast of the Study Area. Its watershed is low-elevation, mostly a few hundred feet with a high point of 650 feet. It is mostly forested with a few farms. The Flood Insurance Study for Grays Harbor County gives a 10-year flood figure of 2,350 cfs and a 100-year flood figure of 4,010 cfs. No detailed flood investigation was performed on the river in that study nor in this one. Within the Study Area, the river is less than one mile from the ocean and is tidally influenced.

BIOLOGICAL RESOURCES

Vegetation

The vegetation within the North Beach area is generally a function of the land use; a mix of rural development, undeveloped, and uncultivated land. There are no agricultural uses of land within the study area beyond the small homeowner gardens that are characteristic of rural development. The only vegetation of significance in terms of this FHMP relate to wildlife habitat and are addressed in the Wetland Resources and Wildlife sections below.

Fisheries Resources

Because changes in existing hydrologic patterns in a watershed can directly impact fish and aquatic wildlife, the FHMP must take their habitats and sustainability into account. Species that are listed as endangered, threatened, sensitive, or candidate by the Washington State Department of Fish and Wildlife (WDFW) must be identified and considered in any improvement projects that would impact their viability. Additionally, if a species priority habitat (e.g., the breeding habitat of a particular unlisted fish) is identified within a proposed improvement area, special steps must be taken before habitat changes are implemented (if they are allowed at all).

Region 6 of the WDFW was contacted by the consultants to determine fish usage in the study area watershed. The Copalis River and the associated wetlands and drainage channels support coho, chum, and chinook salmon, cutthroat, steelhead, stickleback, and Olympic mudminnow, which is a Washington state candidate sensitive species. Before implementing any structural

improvement projects, it is recommended that the Regional Office of the Washington Department of Fish and Wildlife be contacted to check the status of affected waterways. During any work in drainage channels or ditches, a biologist should be present. Fish-bearing waterways should be temporarily blocked off, and any fish present electro-shocked and temporarily removed in order to avoid impacts to fisheries resources.

Wetland Resources

The low-lying areas of North Beach support a number of wetlands (identified by the presence of standing water during the growing season, hydric soils and hydrophytic vegetation). These wetlands, shown in Figure 3-5, can provide significant natural stormwater storage and attenuation of stormwater runoff peaks. Because wetlands are a habitat for many species of wildlife and perform many useful water quantity and quality functions, regulations exist to prevent changes in their natural characteristics. This means that draining, filling, or otherwise dramatically altering their hydrology is generally not permitted.

Wetlands having any of the following criteria are described by WDFW as priority areas:

- Comparatively high wildlife density or species diversity
- Important wildlife breeding habitat or seasonal ranges
- Limited availability
- High vulnerability to habitat alteration

Although there are many productive wetlands throughout the North Beach study area, none are known to be ranked as priority wetlands. The WDFW has emphasized that for the proposed improvement projects in North Beach, drainage systems should not drain wetlands, as many of the wetlands associated with the Copalis River and Connor Creek are salmon-bearing resources. Additionally, no ditch cleaning or dredge spoils should be side-cast into any wetlands.

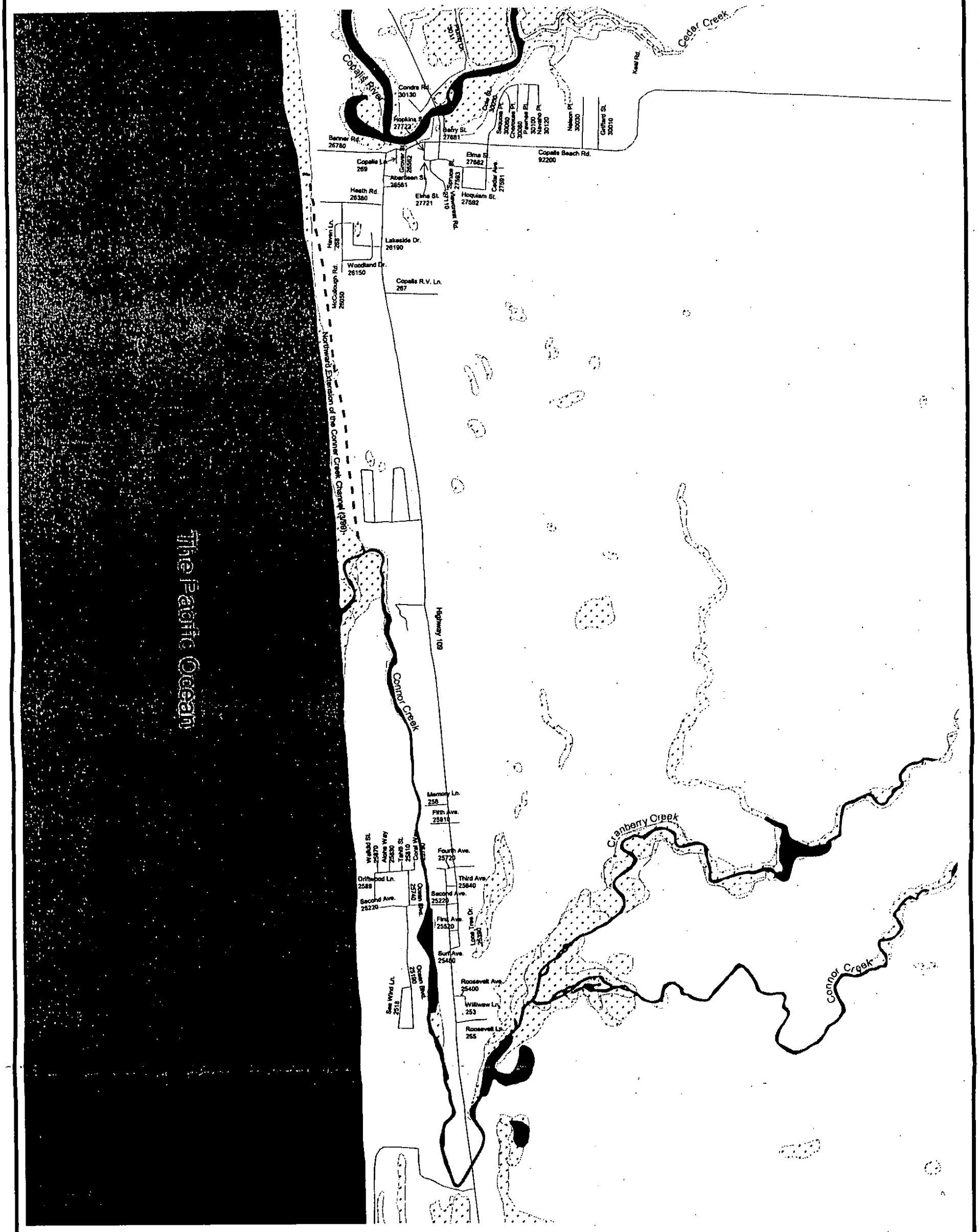


Figure 3-5 Wetland Areas

Wildlife

Peregrine falcons, a WDFW-listed species, have been identified along the dunes west of SR 109. Similarly, the spruce forests in the area have been identified as a potential habitat of the Marbled Murrelet, a listed bird species. If improvements to drainage have a potential to disturb these birds during feeding or migration, an Endangered Species Act Section 7 consultation will be required. There are also a number of shorebirds that use the beaches on the western portion of the study area, particularly during the migration period. In general, before major drainage improvements are undertaken, a consultation with the Regional Office of the WDWF is recommended.

According to the USDA/SCS Soil Survey for the area, the following broad categories for habitat exist in Grays Harbor County. Based on the land use and soil types in North Beach, these are probable habitats for the study area.

- **Habitat for Openland Wildlife** - meadows and areas that are overgrown with grasses, weeds and/or shrubs. These areas produce grains, seeds, grasses, legumes, and wild herbaceous plants that attract wildlife (California quail, pheasant, meadowlark, robin, field sparrow, crow, killdeer, and rabbit).

- **Habitat for Woodland Wildlife** - regions of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. These areas attract pigeon, ruffed grouse, woodpeckers, mountain beaver, squirrels, black-tailed deer, and black bear.

- **Habitat for Wetland Wildlife** - open, marshy, or swampy shallow water with typical wetland vegetation (hydrophytic sedges, rushes, grasses, and shrubs). Some of the wildlife attracted to these regions includes ducks, geese, herons, shore birds, kingfisher, muskrat, mink, and beaver.

CURRENT AND PROJECTED POPULATION

The current population estimation for the North Beach FHMP study area was provided by the Grays Harbor Regional Planning Commission, using 1990 U.S. Census Bureau census tract

information. Because the census tracts are delineated differently than the study area's boundaries, the following figures are approximations.

- Population: 515
- Housing Units: 486

Like many portions of Grays Harbor County, the North Beach area is influenced by the tourist industry seeking Pacific Ocean beach access and activities. The area also relies partially on the timber industry. Population projections are difficult to make because these influences are highly variable from year to year. Because no population predictions exist specifically for the North Beach area, several different local predictors for the entire county of Grays Harbor were examined. Within the same county, unincorporated and incorporated areas tend to have different growth rates because of the availability of land, the economic draw, and other factors. For this reason, only those growth rates for unincorporated areas within Grays Harbor County were considered. Three sources for population projections were found to suggest reasonable rates of growth. They are as follows:

- Washington State Office of Financial Management (OFM) 1990-1994 Census Data
- *Grays Harbor County Capital Facilities Plan* (CH2M HILL, 1994) - Projections based on historical population in Grays Harbor County, OFM population projections for Grays Harbor County and surrounding counties, Washington State Superintendent of Public Instruction enrollment forecasts for school districts within the County, Grays Harbor Regional Planning Council population information, and Port of Grays Harbor estimates of industrial development.
- *Utilities Comprehensive Plan: Grays Harbor County* (Parametrix, 1991) - Projections based on data from the U.S. Census Bureau and Grays Harbor County Regional Planning Commission.

After compiling the statistics, general population growth rates of 1.5 percent to reach 1997 populations, 1.3 percent to the year 2001 and 1.1 percent for the for the remainder of the 15-year period were selected. These rates assume medium growth in the North Beach area. High and

low rates should also be considered (with the former being approximately 5 percent higher than the medium rate, and the low rate assumed to be zero). For the purposes of this FHMP, a medium rate has been selected.

Using the data described above, the future population at the end of the 2001-2015 planning period is estimated to be roughly 700. This would equate to approximately 660 housing units (based on the ratio of population to housing units at the time of the study).

LAND USE

Current Land Use

Land use in the North Beach area is characterized by scattered residential development, which increases in density in Ocean City and Copalis Beach. Several pockets of denser residential development also occur in subdivisions, such as Seaview. A number of commercial developments, including several tourist resorts, are located along SR 109, and Griffiths-Priday State Park is located at the junction of SR 109 and Copalis Beach Road. The balance of the area is undeveloped, with large tracts of open space east of SR 109 and open dune areas to the west.

Future Land Use

The North Beach planning area falls under the countywide zoning code for Grays Harbor County (Title 38 of the County Code). The majority of the area is zoned as R3, Resort/Residential, with some small areas allowing commercial development. Based on the assumed growth rate, it can be estimated that there will be a slight increase in the urban land use. The new Quinault Indian Casino, which is currently being constructed near Hogan's Corner, will contribute to some increased development in the study area. It is likely that the increased urbanization will encroach only slightly on the undeveloped portion of the study area. Although impacts from future growth are not predicted to be dramatic, planning efforts and recommendations in this FHMP will also address new development.

REGULATORY OVERVIEW

Federal, state and local regulations directly affect flood hazard management and improvements to local drainage systems. These regulations are in place to ensure that all development, changes in land use, and utility improvements give proper consideration and planning to potential impacts to human safety and convenience and natural resources. The regulations pertaining to stormwater runoff collection and conveyance can be grouped into the following four major categories:

- Land Use Management
- Resource Management
- Environmental Protection
- Flood Hazard Management

The laws under each of these categories and their implementation mechanism are summarized in Table 3-1. More detailed explanations of the regulations, their rationale, and the responsibilities of the jurisdictions can be found in Appendix B.

Table 3-1
Regulations Pertaining to Flood Hazard Management

Law	Brief Summary	Implementation
Land Use Management		
Comprehensive Plan/Growth Management Act (State)	Gives long-range direction and guidance for systematic growth and development. Countywide planning required.	NA
Zoning Ordinance (County)	Regulates land uses and densities. Implements growth management policies of the Comprehensive Plan.	By County, through zoning codes
Uniform Building Code (County adopts by ordinance)	Provides jurisdictions with an adoptable set of building regulations.	Building officials
Subdivision Ordinance (County)	Sets procedures for land division. Includes drainage plans and drainage system standards.	By County
Washington State Shoreline Management Act (SMA) (State)	Establishes priority of shoreline uses to preserve natural resources. Regulates development in shoreline area.	By State and local, through WAC 173-14, 16, 17, 18, 19, 20 and 22
Shoreline Master Program (County and Local)	Mandated by the SMA as the principal planning tool to protect shoreline resources.	By County and local through WAC 173
Resource Management		
Hydraulic Code (State)	Preserves fish and wildlife by requiring a permit for any work using, diverting, or changing the flow or bed of any waters of the State.	By State (DFW) through WAC 220-110 and Hydraulic Permit Approval
Section 404–Clean Water Act (Federal)	Maintains the biological integrity of the nation's waters (including wetlands and adjacent tributaries) through actions such as the regulation of dredge/ fill materials.	By Federal (COE) through 40 CFR
Section 401–Clean Water Act (Federal)	Federal permit prerequisite certification process for discharge into a waterbody. Important in the construction phase of flood hazard protection measures.	By Federal through 40 CFR, also State through WAC 173-201
Section 10–Rivers and Harbors Act (Federal)	Prohibits unauthorized obstruction or alteration of navigable US waters.	By Federal (COE) through 33 CFR 320-330

Table 3-1
Regulations Pertaining to Flood Hazard Management

Law	Brief Summary	Implementation
Environmental Management		
National Environmental Policy Act (Federal)	Requires Federal agencies to consider environmental impacts of projects requiring agency permits.	By Federal and CEQ through 40 CFR 1500-1508
Washington State Environmental Policy Act (State)	Requires agencies to determine (and make information available to the public about) the environmental impact of actions for which they issue permits. For significant adverse impacts, agencies mandated to require mitigation.	By State (Dept. of Ecology) through WAC 197-11 and WAC 400-04-902
Executive Order 11990 (Federal) and Executive Order 90-40 (State)	Mandate that agencies exercise to the extent permissible, their powers to require mitigation, and condition, deny or appeal permits, for all adverse impacts to wetlands.	All levels
Executive Order 11988 (Federal)	Mandates that agencies exercise to the extent permissible, the avoidance of adverse impacts from their activities in floodplains.	All levels
Flood Hazard Management		
National Flood Insurance Program (Federal)	Makes affordable flood insurance available to communities that have adopted approved floodplain management regulations.	By State and County/ local through zoning and floodplain restrictions
State Floodplain Management (State)	Adopts the NFIP minimum standards, and also prohibits new or substantially improved residential development in any designated floodway.	State (Dept. of Ecology) and Local through WAC Ch. 173-158, zoning and floodplain restrictions
Floodplain Management Ordinance (Local)	Requires development permits to restrict dangerous uses due to water or erosion hazards	By County through zoning code

Notes:
DFW = Washington State Department of Fish and Wildlife.
COE = Army Corp of Engineers.
CEQ = Council on Environmental Quality.
Ecology = Washington State Department of Ecology.
WAC = Washington Administrative Code.
CFR = Code of Federal Regulations.