

CANNON BEACH
COMPREHENSIVE PLAN
BACKGROUND REPORT

ADOPTED: MARCH 20, 1979

AMENDED: ORDINANCE 84-07
ORDINANCE 86-12
ORDINANCE 94-09
ORDINANCE 94-14
ORDINANCE 94-28
ORDINANCE 95-03
ORDINANCE 95-18
ORDINANCE 95-23
ORDINANCE 96-17
ORDINANCE 97-17
ORDINANCE 97-18
ORDINANCE 98-01
ORDINANCE 98-09
ORDINANCE 98-24
ORDINANCE 00-01
ORDINANCE 01-02

Current through November 2001/LS

Table of Contents

POPULATION, HOUSING & LAND-USE	2
Population, Age and Race	2
Households and Household Size	6
Housing Units	8
Housing Tenure	9
Housing Cost	11
Population Projections, Alternatives	13
Plan Population Projection	15
Land Use- Adequacy of the Urban Growth Boundary	16
 HOUSING 97	 18
 NATURAL RESOURCES	 28
Climate and Air Quality	29
Geology	30
Soils and Topography	32
Hydrology	33
Vegetation	35
Wildlife	36
Fish and Marine Life	38
Ecola Creek Estuary	39
 AIR & WATER QUALITY	 42
Water Quality	43
Air Quality	51
Solid Waste	52
 GEOLOGIC HAZARDS	 63
A Field Investigation of Geologic Hazards In Cannon Beach, Oregon	 64
Flood Plain Management Measures	90
Flood Insurance Program	93
Flooding History	97
 OPEN SPACE, SCENIC AND HISTORIC AREAS AND NATURAL RESOURCES	 104
Administrative Rule on Goal #5	106
Natural Resources Inventory	107
Open Space	108
Mineral/Aggregate	110
Energy Sources	110
Fish/Wildlife Habitat	110
Significant Natural Areas	113
Scenic Views	114
Watersheds, Groundwater Resources and Wetlands	119
Wilderness Areas	120

Cultural and Historic Resources	120
Scenic Waterway	121
Recreation Trails	121
PARKS AND RECREATION	123
City's Parks and Recreation Resources	124
Beach Access Inventory	133
ECONOMY	138
Economic Data	139
Employment	139
Income	140
Employment	141
Objectives	145
PUBLIC FACILITIES ELEMENT	147
Sanitary Sewer System	148
Water System	150
Storm Drainage	155
Capital Improvements	156
TRANSPORTATION	158
Street System, <i>General</i>	160
Alternative Highway 101/Hemlock Street	167
Cannon Beach Shuttle	171
Pedestrian and Bicycle	178
Parking	192
Demand Management	193
ENERGY CONSERVATION	200
APPENDICES	See Appendix Book
● POPULATION, HOUSING & LAND-USE (ORD 94-14)	
● COASTAL SHORELANDS (ORD 86-12)	
● DELINEATION OF ACTIVE DUNES AND CONDITIONALLY STABILIZED DUNES IN CANNON BEACH (94-09)	
● WETLANDS STUDY (ORD 94-28)	
● CANNON BEACH: AN INTEGRATED APPROACH TO SAND MANAGEMENT (ORD 98-01)	
● PRESIDENTIAL STREETS SAND MANAGEMENT UNIT (ORD 01-02)	

POPULATION, HOUSING AND LAND USE

POPULATION, HOUSING & LAND-USE

Population

The Portland State University population estimate for 1992 was 1270.

According to the Census, the city's population in 1990 was 1221. This represented a population growth of 2.9% from 1980. The 1990 population figure must be used with caution because the Census indicated that there were 24 persons of Hispanic origin in the community. Local knowledge indicates that this was an undercount.

The city population was 495 in 1960, 779 in 1970 and 1182 in 1980. The City's population grew by 55% between 1960 and 1970 (this included the annexation of Tolovana Park), and by 52.4% between 1970 and 1980.

Clatsop County experienced a growth rate of 2.5% between 1980 and 1990. Among the cities in Clatsop County, Cannon Beach's growth rate was the fourth highest after Hammond, Warrenton (Hammond and Warrenton have since been consolidated), and Gearhart. The population growth rate of Cannon Beach between 1980 and 1990 was similar to that for the County. This is a change from the previous two decades when Cannon Beach's population grew much more rapidly than that of the County.

Between 1970 and 1980, Cannon Beach had the highest growth rate among Clatsop County cities, with the County growing at an overall rate of 14.1%.

Cannon Beach's population as a percentage of the total Clatsop County population grew gradually between 1960 and 1980, but was constant between 1980 and 1990. In 1960, Cannon Beach's population was 1.8% of the total Clatsop County population; in 1970 it was 2.7%; in 1980 it was 3.7%; and in 1990 it was 3.7%.

Age

Table 1 illustrates the percentage of Cannon Beach and Clatsop County's population, by age group, in 1990. Cannon Beach had lower

percentages of persons aged 0-14 and 15-24 than the County as a whole. Conversely, the city had slightly higher percentages of persons aged 25-44, 45-64, and 65 and older. As a result of population changes between 1980 and 1990, the character of Cannon Beach's population, by age group, has become more like that of the County as a whole.

Among Clatsop County cities, Cannon Beach has the second highest percentage, after Seaside, of its population aged 50 and over and 65 and over. Cannon Beach also has the lowest percentage of population in the 0-4 age group and persons under the age of 18.

The most important demographic change in Cannon Beach between 1980 and 1990 was an almost 42% decrease in the population aged 15-24. The other age cohorts grew by between 10 and 17 percent.

Cannon Beach and Clatsop County's population, by age group, exhibited the following trends between 1980 and 1990:

- A 17% increase in the population aged 0-14. Clatsop County's population in this category increased by 4.9%.
- A 10% increase in the population aged 25-44. Clatsop County's population in this age category increased by 17%.
- A 16.8% increase in the population aged 45-64. Clatsop County's population in this age category increased by 1%.
- A 15% increase in the population aged 65+. Clatsop County's population in this age category increased by 13.7%.

Overall, the change in population, by age group, in Cannon Beach followed the same general trends exhibited by Clatsop County.

The major trends affecting various age categories in Oregon between 1970 and 1980 were:

- 1) A substantial decrease in the percentage of the population under the age of 15 as a result of a decline in fertility rates. However, there were opposing trends within the under 15 age group. While the school-age population (5-14) decreased, the number of preschool children increased. The increase in preschool age children is attributable to women of the "baby boom era" entering the reproductive years;
- 2) A very large increase in the 15-34 age group as the result of the aging of the baby boom generation;

- 3) A modest increase in the 45-64 age category due to the entry into this age group of person born during the Great Depression; and
- 4) A slow but steady increase in the 65 and older age group as the result of increased longevity.

The changes in Cannon Beach's age structure are reflective of some of these general demographic changes, but are divergent in some important ways.

The most important demographic change in Cannon Beach between 1970 and 1980 was the large influx of persons between the ages of 15-24 and 25-44. These age groups grew by 132% and 247%, respectively. The growth in these two age groups represented 96% of the total population growth in the City during the decade. Conversely, the City's population aged 45 or older decreased by 5%.

As a result of these trends, the City's median age decreased and is now only slightly higher than the County median age (33.0 vs 31.5).

The younger character of the City's population is also apparent when comparing Cannon Beach with other Clatsop County cities. In 1970, among Clatsop County cities, Cannon Beach had the smallest percentage of its population in the 25-44 age group and the second smallest percentage in the 15-24 age group. In 1980, it had the highest percentage in the 15-24 age group and second highest percentage in the 25-44 age group. Conversely, in 1970 Cannon Beach had the highest percentage in the 45-64 and 65 and over age groups. In 1980, it had the lowest percentage in the 45-64 age group, but still had the second highest percentage in the over 65 age group.

Cannon Beach's population, by age group, exhibited the following additional trends between 1970 and 1980:

- A 100% increase in the population aged 0-4. Clatsop County's population in this category increased by 25.1%.
- A 5% increase in the population aged 5-14. Clatsop County's population in this age category decreased by 10%.
- A 230% increase in the population aged 18-24. Clatsop County's population in this age category increased by 32%.
- A 10.6% decrease in the population aged 45-59. Clatsop County's population in this age category decreased by 14.2%.

- A 2% decline in the population aged 60 years and older. Clatsop County's population in this age category increased by 14%.

Cannon Beach's median age in 1980 was 33.0 years, with the median age for males being 32.8 and females being 33.3.

TABLE 1

POPULATION BY AGE GROUP, 1980, 1990

	1980					1990				
	0-14	15-24	25-44	45-64	65+	0-14	15-24	25-44	45-64	65+
Cannon Beach	165	234	361	214	213	193	136	397	250	245

TABLE 2

POPULATION BY AGE GROUP, 1970, 1980

	1970					1980				
	0-14	15-24	25-44	45-64	65+	0-14	15-24	25-44	45-64	65+
Cannon Beach	125	101	104	242	207	165	234	361	214	213

TABLE 3

PERCENTAGE OF TOTAL POPULATION
BY AGE GROUP, 1980, 1990

	1980					1990				
	0-14	15-24	25-44	45-64	65+	0-14	15-24	25-44	45-64	65+
Cannon Beach	13.9	19.7	30.4	18.0	17.9	15.8	11.1	32.5	20.5	20.1
Clatsop Co.	21.1	17.7	26.9	19.7	14.6	21.6	12.1	30.7	19.4	16.2

TABLE 4

PERCENTAGE OF TOTAL POPULATION
BY AGE GROUP, 1970, 1980

	1970					1980				
	0-14	15-24	25-44	45-64	65+	0-14	15-24	25-44	45-64	65+

Cannon Beach	16.0	13.0	13.4	31.1	26.6	13.9	19.7	30.4	18.0	17.9
Clatsop Co.	24.1	17.2	19.7	24.6	14.3	21.1	17.7	26.9	19.7	14.6
OREGON	27.2	17.5	23.0	21.4	10.8	22.4	17.6	29.8	18.7	11.5

TABLE 5
 PERCENTAGE CHANGE IN POPULATION
 BY AGE GROUP, 1980, 1990

	TOTAL	0-14	15-24	25-44	45-64	65+
Cannon Beach	2.9	17.0	-41.9	10.0	16.8	15
Clatsop Co.	2.5	4.9	-30.2	17.0	1.0	13.7

TABLE 6
 PERCENTAGE CHANGE IN POPULATION
 BY AGE GROUP, 1970, 1980

	TOTAL	0-14	15-24	25-44	45-64	65+
Cannon Beach	52.4	32.0	131.7	247.1	-11.6	2.9
Clatsop Co.	14.1	-0.2	17.4	56.0	- 9.0	16.4
OREGON	25.9	3.5	26.7	63.4	9.5	33.7

Race

In 1990, 4.5% of Cannon Beach's population was non-white (Black, American Indian, Eskimo & Aleut, Asian and Pacific Islander, and Other Race). Persons of Hispanic origin comprised 2% of the total population. (Based on local knowledge of the number of persons of Hispanic origin living in Cannon Beach, this represents an undercount.) In comparison, 3.5% of Clatsop County's population was non-white and 2.2% was of Hispanic origin.

In 1980, 1.7% of Cannon Beach's population was non-white. Persons of Hispanic origin comprised 0.8% of the total population. In comparison, 3.5% of Clatsop County's population was non-white and 1.4% was of Hispanic origin.

In 1970, 0.2% of Cannon Beach's population was non-white.

Households and Household Size

Cannon Beach had 550 households in 1990. This represented a 3.1% increase from the 533 household in 1980. During the same decade, the number of Clatsop County's households grew by 5.3%

In 1990, 33% of Cannon Beach's households were one person households, 52% consisted of two or three persons and 14% had four or more persons. For Clatsop County: 28% of the household contained one person, 50% contained two or three individuals and 22% contained four or more persons. Among Clatsop County cities, Cannon Beach had the second highest percentage of one person households, after Seaside, and the lowest percentage of households containing four or more persons.

Between 1980 and 1990, Cannon Beach experienced a decrease in the percentage of one person households, 38.2% to 33%, an increase in two and three person households, 50.8% to 52%, and an increase in households with four or more persons, from 10.9% to 14%.

In 1980, among Clatsop County cities, Cannon Beach had the highest percentage of one person households and the lowest percentage of households containing four or more persons.

In 1970, 32.4% of Cannon Beach's households were one person households, 55.2% consisted of two or three persons, and 12.4% had four or more persons.

Between 1970 and 1980, the percentage of one person households increased, while the percentage of 2 and 3 person households and four or more person households decreased.

The average household size in 1990 was 2.22. The average household size for owner occupied dwelling units was 2.24 and that for renter occupied units was 2.0. In 1980, the average household size was 2.23 and in 1970 it was 2.15.

In 1990, Clatsop County's average household size was 2.47, just slightly less than the 1980 size of 2.5. Among Clatsop County cities, Cannon Beach had the second smallest household size after Seaside. In 1980, Cannon Beach had the lowest average household size among Clatsop County cities.

Between 1970 and 1980, Clatsop County's average household size decreased from 2.7 persons to 2.5 persons.

Of Cannon Beach's 550 households in 1990, 117, or 21.2% contained children less than 18 years old. This was the lowest percentage among Clatsop County cities. The percentage of Clatsop County households containing children under the age of 18 was 32.2%.

Housing Units

The 1990 Census states that there were 1367 housing units in the city. The 1980 Census states that there were 1274 housing units in the city. There was a 7.2 % increase in the total number of housing units between 1980 and 1990. This is substantially less than the 44.6% increase in the housing stock between 1970 and 1980.

The growth in the housing stock, between 1980-90, was two and one-half times the growth in population. 7.2% vs 2.9%. Over the same period, the number of households increased by 3.1%. The difference in growth rates, between population/households and housing units, is attributable to the construction of housing held for occasional use (second homes).

Clatsop County's total number of housing units increased by 4.5% between 1980 and 1990.

The 1990 Census indicates that there were 546 occupied housing units in the City.

- The 1980 Census indicated that there were 533 occupied housing units.
- The growth in occupied housing units between 1980 and 1990 was 2.4%. This growth rate conforms closely to the 2.9% population growth rate and provides an indicator that the higher rate of growth in the housing stock, relative to population, during the past decade was due to the construction of dwellings held for occasional use.
- Between 1970-80, the growth rate of occupied housing units was 47%.

The majority of the dwelling units in Cannon Beach are single-family residential. The 1990 Census found that: 83.8% of the city's housing units were single family detached, single family attached or mobile homes; 5.7% of the housing stock were duplexes; and 9.6% of the housing units were located in structures containing 3 or more units. The comparable percentages for Clatsop County are: single-family 76%, duplexes, 5.5%, and structures containing three or more units, 17.3%. These percentages indicate that the city has a relatively low percentage of its housing stock in multi-family units.

- In 1980, 77% of the city's housing stock was single-family residential, 5% duplex units, and 17% in multi-family structures containing three or more units. (These figures may not be directly comparable to the 1990 figures because of changes in the way structures were classified. For example, in 1980, 218 housing units were classified as multi-family and in 1990, only 131. There were no

substantial demolitions of multi-family units within this period which could explain the sharp decrease in the number of multi-family units).

- For comparison, in 1980 68% of Clatsop County's total housing stock consisted of single-family residences.

The city has a small number of manufactured dwellings. In 1990, there were 23 housing units classified by the Census as mobile homes or trailers. This is 1.6% of the total housing stock and 4.2% of the occupied housing stock. For comparison, mobile homes are 7.3% of Clatsop County's total housing stock and 9.5% of the occupied housing stock. Among Clatsop County cities, Cannon Beach had the third highest percentage of its occupied dwelling units classified as mobile homes after Warrenton and Hammond.

- In 1980, 10 housing unit were classified as mobile homes. This represented 0.8% of the total housing stock; 1.5% of the occupied housing stock was classified as a mobile home. For comparison, mobile homes were 6.2% of Clatsop County's total housing stock and 7.1% of the occupied housing stock.

In comparison with Clatsop County, the city's housing stock is relatively new. Fifty-two percent of the housing stock is less than 30 years old, 26% is between 30 and 50 years, and 21.8% is older than 50 years. By comparison, the percentages for Clatsop County are as follows: less than 30 years, 43.3%; 30 to 50 years, 25.3%; and more than 50 years, 31.5%. In 1980, 48% of the city's housing stock was less than 30 years old and for the county it was 45%.

The total number of housing units increased from 881 to 1274 between 1970 and 1980, an increase of 44.6%. The increase in housing units was smaller than the increase in the number of households (44.6% vs. 47.2%). This indicates that some housing units that were second homes became available for use by full time residents during the decade.

The decade from 1970 to 1980 saw a sharp increase in the number of the City's housing units that consisted of two or more units in 1970, 93% of the City's housing stock was single-family residences and 6% were housing units consisting of two or more units. In 1980, 79% of the City's housing stock was single-family residence and 20% were housing units consisting of two or more units.

Housing Tenure

According to the 1990 Census, there were 339 owner occupied dwelling units, or 62% of Cannon Beach's total occupied dwelling units. This is slightly less than the Clatsop County's 63%. Among Clatsop County's cities, Cannon Beach had the fourth highest percentage of owner occupied dwellings after Gearhart, Warrenton and Hammond. The percentage of owner occupied housing units relative to total housing stock was 24.8%. Between 1980 and 1990, the number of owner occupied housing units increased from 291 to 339, or 48 dwelling units, a 16.5% increase.

- In 1980, 54.6% of Cannon Beach's occupied housing units were owner occupied. The percentage for Clatsop County was 66.8% and that for Oregon was 65.1%. Thus during the period 1980-90, while the percentage of owner occupied dwelling units was increasing in Cannon Beach it was decreasing in the County.
- In 1980, the percentage of owner occupied housing units relative to the total housing stock was 23%.

According to the 1990 Census, there were 207 renter occupied dwelling units, or 38% of Cannon Beach's total occupied dwelling units. This is slightly more than Clatsop County's 37%. Between 1980 and 1990, the number of renter occupied housing units decreased from 242 to 207, a 14.5% decrease. During the same period, the number of rental housing units in the county increased by 8.4%

The 1990 Census indicated that there were 821 vacant housing units in Cannon Beach. Because of the extremely low vacancy rates in the city, it is assumed that these 821 housing units represent housing held for occasional use, that is second homes.

- Dwellings held for occasional use represent 60% of the city's total housing stock.
- In 1980, there were 691 housing units held for occasional use in the city, or 54% of the housing stock. The growth in the percentage of the total housing stock that is held for occasional use indicates that a high percentage of the housing constructed during the past decades were second homes.

According to the 1990 Census, the growth in the number of housing units held for occasional use, 130, exceeded the total growth in all housing units, which only grew by 93. If it is assumed that all vacant units identified in the 1990 Census were held for occasional use, this indicates that dwelling units used for long-term rental purposes were converted to short-term rentals use during the past decade. This assumption is supported by the decrease in the number of renter occupied dwelling units.

The number of owner-occupied housing units increased from 270 in 1970 to 291 in 1980, a 7.7% growth rate. The number of renter occupied housing units increased from 92 to 242, a 163 percent growth rate. As a result of the large increase in the renter occupied housing units, the percentage of the city's housing units that are owner occupied decreased from 74.6% in 1970 to 54.6% in 1980.

For comparison, the percentage of occupied units that are owner occupied in Clatsop County decreased from 66.8% to 64.5% between 1970 and 1980.

Housing Cost

The cost of owner occupied housing in Cannon Beach, at least during the past two decades, has been substantially higher than that of the remainder of the county and that differential is increasing.

- In 1990, the median value of an owner occupied dwelling in Cannon Beach was \$95,300, for the county it was \$62,100. The median value of owner occupied housing in Cannon Beach was 153% of the county's.
- Between 1980 and 1990, the median value of an owner occupied dwelling increased by 49% in Cannon Beach and 23% in Clatsop County.
- In 1980, the median value of an owner occupied dwelling in Cannon Beach was \$63,800, for the county it was \$50,400. The median value of owner occupied housing in Cannon Beach was 123% of the county's.
- For the period August 1989 to August 1990, the average sales price of a house in Cannon Beach was \$110,000 (this figure did not include oceanfront houses). It is estimated that was 150-175% of the price of housing sales in the county generally. The average sales price for the lowest 25% of the houses sold during the above period was \$52,500.
- In February 1993, there were 47 dwellings for sale in Cannon Beach. The median sales price was \$160,000 and the average list price was \$210,00. Only five dwellings were listed under \$100,000; two one bedroom condominium units; a one bedroom single-family dwelling; and two manufactured dwellings.

Because of the large percentage of Cannon Beach's housing stock that is held for occasional use, the demand for housing and thus its price, is not set by the local economy but by the economy of Portland and Seattle. This situation puts local residents at a significant disadvantage. Not only is the median household and family incomes less in Cannon Beach than in these two metropolitan areas, but it is dramatically less than the incomes of persons in the market for second homes.

- The market area for second homes includes the Portland/Willamette area and the Seattle/Tacoma metro area. It also includes people from a

broad geographic area purchasing homes with the ultimate objective of retiring in Cannon Beach.

- Given the population and income growth projected for the Portland and Seattle metropolitan areas, it is assumed that there will be continued strong demand for second homes and thus a continued escalation in housing prices.
- The continued growth in the retirement aged population will add to the demand for housing because of the city's attractiveness to retirees.

The median gross rent in 1989, according to the Census, was \$398. The county's median gross rent was \$352. Among Clatsop County cities, the city had the third highest median rent after Hammond and Gearhart. Cannon Beach's median gross rent was about 13% higher than the county's. This differential is not substantially different from the 12% differential in 1980 Census.

A survey of local property management firms, undertaken in June of 1993, indicates that the city has a 0% vacancy rate. The market rental rates were: one bedroom, \$375-\$450; two bedroom \$500+; three bedroom, \$600-\$800.

In 1993, the city completed a study entitled "Housing Affordability Study: Cannon Beach Employers and Employees". A total of 152 employers and 303 employees were surveyed as to housing needs. The study was designed to identify the housing needs and affordability characteristics for individuals employed within the city. The following were the key findings of the survey:

- Forty percent (40%) of surveyed employers reported that their employees had trouble finding housing in Cannon Beach. Of the employers who stated that their employees had trouble obtaining housing in Cannon Beach, 75% stated that the housing was too expensive and 71% mentioned an inadequate supply of housing.
- Employees stated the following reasons for not residing in Cannon Beach: personal choice, 50%; housing too expensive, 39%; other reasons, 19%; an inadequate supply, 12%; and living space not the right size, 4%.
- Thirty-eight percent of the employees stated that they had trouble finding housing in Cannon Beach. The most commonly reported problems in obtaining housing were: too expensive, 73%; inadequate supply, 63%; other reasons, 25%; and living space not right size, 11%.
- Housing cost (including rent/mortgage, property taxes for owners, insurance for owners, and utilities for owners and for renters, if not included in the rent) were: for owners, the mean monthly cost was \$674

and the median cost was \$585; and for renters, the mean cost was \$464 and the median cost was \$450.

- Among owners, the percent of monthly income spent on housing was a mean of 21% and a median of 18%.

- For renters, the percentage of monthly income spent on housing was a mean of 32% and a median of 30%.

- Utilizing HUD Section 8 income limits for Clatsop County, October 1, 1992: 41% of all the respondents resided in households with an income of 80% or less of the median county income (lower income) and 24% resided in households that were at or below 50% of the median income limits (very low income). If the target group is survey respondents who live in Cannon Beach and those who do not live in the city but who mentioned cost, supply and/or size as a reason for not living in Cannon Beach, 45% were at or below 80% of median county income and 28% were at or below 50% of median county income. If the target group is survey respondents who were employees, that is they were not employers or did not live with employers, 48% lived in households with 80% or less of median county income and 28% lived in households with 50% or less of median county income.

Population Projections, Alternatives

A number of population projection methods were reviewed:

1. Method #1 Based on Oregon Department of Transportation, "Demographic and Economic Forecasts, 1990-2030, March 1993". This projection assumes that Cannon Beach's population, as a percentage of Clatsop County's projected population, will remain at 3.7% during the forecast period. In 1990, Cannon Beach's population was 3.7% of Clatsop County's population.
2. Method #2 Based on Bonneville Power Administration, County Employment, Population, and Household Projections, June 1991". This projection assumes that Cannon Beach's population, as a percentage of Clatsop County's projected population, will remain at 3.7% during the forecast period. In 1990, Cannon Beach's population was 3.7% of Clatsop County's population.
3. Method #3 Assumes an annual growth rate of 0.5%. This is a slightly higher growth rate than was experienced by the city between 1980 and 1990.

4. Method #4 Assumes an annual growth rate of 0.25%. This is similar to the growth rate experienced by the city between 1980 and 1990.
5. Method #5 Population projections used by the city's engineering firm, KCM, in preparing the sewer and water master plans.
6. Method #6 This projection is based on the average number of building permits issued for dwelling units during the last six years, 30 permits annually. The projection assumes 40% of the dwelling units are for permanent residents and that the household size will be 2.2 persons. The city's average household size in 1990 was 2.2.
7. Method #7 This projection is based on the average number of building permits issued for dwelling units during the last six years, 30 permits annually. The projection assumes 25% of the dwelling units are for permanent residents and that the household size for permanent residents will be 2.2 persons. The city's average household size in 1990 was 2.2.

ALTERNATIVE POPULATION PROJECTIONS

	1995	2000	2005	2010
1.	1366	1458	1521	1598
2.	1326	1395	1460	1532
3.	1291	1326	1361	1398
4.	1279	1294	1309	1324
5.	1359	1428	1501	1577
6.	1349	1481	1612	1744
7.	1320	1403	1486	1569

Range of Population Projections:

1995	1279 - 1366
2000	1294 - 1481
2005	1309 - 1612

Plan Population Projection

Population projection Method #7 was selected as providing the best estimate for future permanent population growth.

Projected Peak Service Population

Because of Cannon Beach's unique characteristics, the city's permanent population is not always an effective measurement, particularly as it relates to the provision of city services. In order to accurately assess the impact of population on city services, it is necessary to define all the components that constitute the city's population. In addition to permanent residents, this includes persons staying in the city's motel room, persons using dwellings held for occasional use (second homes) and persons visiting the community for the day. Table 7 illustrates these projected populations during a peak use periods.

TABLE 7

PROJECTED PEAK SERVICE POPULATION

YEAR	POPULATION				
	Permanent	Commercial	Temporary	Transient	Total
1993	1,310	2,668	2,664	4,545	11,187
1995	1,320	2,716	2,799	4,545	11,380
2000	1,403	2,954	3,138	4,695	12,190
2005	1,486	3,192	3,474	4,845	12,997
2010	1,569	3,430	3,813	5,025	13,837
Percentage Change 1993-2010	19.7%	28.5%	43%	10.5%	23.6%

Permanent Residents: The number of permanent residents is based on the city's population projection for full time residents.

Commercial Residents: The number of commercial residents was determined as follows: the total number of motel units, recreational vehicle sites and camp sites; assume a 100% occupancy rate; and 2.8 persons per room. Future growth was based on the following assumptions: no additional motel zoning, which is current existing city policy; build-out of existing motel property, to the maximum density, including redevelopment of existing motel property; a limited number of new motel units in existing commercial zones; and no change in the number of person per unit.

Temporary Residents: The number of temporary residents was determined as follows: the number of dwelling units held for occasional use (second homes); assume that 75% are occupied; and 4.0 persons per dwelling unit. Future growth was based on the following assumptions: an annual growth rate of 22.5 dwelling units; and no change in the occupancy rate or the number of persons per dwelling.

Transient Residents: The number of day visitors was determined by the number of on-street and off-street parking spaces available in the city's commercial zones. It was assumed that there are 3 persons per vehicle. Future growth was based on the assumption that there would be limited numbers of additional off-street parking associated with new commercial development. It was also assumed the persons per vehicle would not change.

Land Use- Adequacy of the Urban Growth Boundary to Accommodate Projected Residential Growth

The city reviewed its urban growth boundary to determine whether it contained sufficient buildable land to accommodate the projected level of residential growth.

The following methodology was used to establish land available for residential growth. The Clatsop County Assessor records were reviewed to determine vacant parcels of land. Most parcels in Cannon Beach have already been platted into lots. For unplatted parcels, the number of potential building sites was based on the parcel's topography and zoning or potential zoning. To determine vacant buildable land, vacant parcels were compared to the city's wetlands inventory. Each parcel which contained a wetland, regardless of size, was assigned one building site. It was assumed no other factors would limit the buildability of a parcel such that it could not

accommodate a dwelling unit. The following table illustrates the number of vacant buildable parcels within the existing urban growth boundary, by zone.

Vacant Buildable Land, By Zone

RL	81 lots
R1	118 lots
R2	152 lots
RAM	12 lots
number of lots within city limits	<u>446</u>
RVL	108 lots
OSR	87 lots
number of lots outside city limits	<u>195</u>
total number of lots available	<u>641</u>

The number of vacant buildable parcels within the urban growth boundary was compared to the number of lots needed to accommodate projected residential growth. The methodology for determining required number of buildable lots is illustrated in the following table.

Required Buildable Land

Population growth, 1990 -2010	289
Number of new households, assuming 2.2 persons per household	131
Projected number of permanent dwelling units	131
Projected number of second homes, assuming 22.5 units a year	394
Total number of dwelling unit	525

Within the urban growth boundary there are 641 buildable lots available to meet a need for 525 dwelling units. The existing urban growth boundary is adequate to provide for the city's growth needs to the year 2010.

HOUSING 97

HOUSING 97 - INTRODUCTION

The Oregon Housing and Community Services Department (OHCS) has prepared several documents to assist cities in the preparation of the housing element of their comprehensive plans. Included in these documents are recommendations on study components needed to fulfill periodic review requirements. Four main study components are recommended, a buildable residential lands analysis, an inventory of the status of the existing housing stock, housing market information, and an evaluation of zoning regulations affecting housing. The city's housing element utilizes this format.

BUILDABLE RESIDENTIAL LAND ANALYSIS

Buildable residential land - general

The purpose of the buildable residential lands analysis is to ensure that the city has made adequate provision for residentially zoned land to accommodate the projected growth of the community. The population, housing and land-use element of the comprehensive plan background report contains this analysis. The analysis concluded that the city's existing urban growth boundary contains an adequate amount of land to accommodate the city's growth needs to the year 2010.

Buildable residential land - housing type

The residential buildable land inventory can be refined by including an analysis of the adequacy of available land by the type of housing structure. The types of structures used for this analysis are single-family dwelling, manufactured dwelling, duplex and multi-family dwelling.

Single-family dwellings and manufactured dwellings are permitted outright in each of the city's residential zones. The city has an adequate supply of residentially zoned property, or property that is intended to be zoned for residential purposes in its urban growth boundary. Therefore, even if 100% of the future residential development in the community consisted of single-family dwellings and/or manufactured dwellings, there would be an adequate supply of lots available to accommodate such projected growth. (According to the 1990 Census, 83.8% of the city's housing stock consisted of single-family dwellings and manufactured dwellings.)

Duplexes are permitted outright in the city's R-2 residential zone, subject to a dispersion standard that prohibits the location of new duplex within 99 feet of an existing duplex or triplex. The number of R-2 lots available for new duplexes was determined as follows. The location of all duplexes and triplexes in the city's R-2 zone was mapped (Duplexes and Triplexes in the R-2 Zone, March 1995). The duplex siting standard was applied, in conjunction with the location of each existing duplex and triplex, to determine the number of lots on which a duplex could not be placed because of the location of an existing duplex or triplex. Application of the duplex siting criteria to the existing 38 duplexes, eliminated 269 of the city's 730 R-2 lots from the supply of lots available for the placement of a new duplex. Thus there are 451 R-2 lots on which a duplex can be sited. It was assumed that all existing lots are available for the siting of duplexes. This assumption was based on a review of duplex applications between 1991 and 1994. The review found that of the 17 applications, eight were for duplexes on vacant lots and nine were for the conversion of an existing single-family dwelling into a duplex. The location of the existing 38 duplexes eliminated 269 lots from the potential supply of R-2 lots available for the siting of additional duplexes. Thus, the

siting of each duplex reduced the available supply of lots for a future duplex by seven lots (269 - 38). Therefore, the remaining 451 lots can provide for the siting of 64 additional duplexes (451 - 7). In the four-year period between 1991-94, 17 duplexes were approved, eight were constructed between 1991-1993 and it is assumed that six of the eight duplexes approved in 1994 will be built. This is the equivalent of 3.5 duplexes a year. Assuming the construction of 3.5 duplexes per year, the 64 available R-2 lots provide a 18-year supply of sites available for duplex construction. In addition to the R-2 zone, duplexes are permitted as an outright use in the RAM zones. Duplexes sited in this zone are not subject to the duplex siting standard. There are 39 lots in the RAM zone. These 39 lots can accommodate another 11-year supply of duplexes. Taken together, the R-2 and RAM zones can provide for an adequate supply of duplexes. The above analysis is based on the construction of 3.5 duplexes a year. According to the 1990 Census, 5.7% of the city's housing stock was in duplex units. If this percentage (5.7%) is applied to the 525 dwelling units needed to meet future residential requirements, provision for only 30 duplexes will be needed for the period to the year 2010.

Multifamily dwellings are permitted outright in the city's R-3, Residential High Density zone and in the RM, Residential Motel zone. They are also permitted as a conditional use in the RAM, Residential Alternative/Manufactured Dwelling zone and the C-1, Limited Commercial zone. There are seven vacant parcels in the R-3 zone that can accommodate 57 multifamily dwelling units (individual parcels can accommodate between three units and 25 units). According to the city's residential buildable land analysis, 525 dwelling units will be needed by the year 2010. According to the 1990 Census, 9.6% of the city housing stock was in multifamily structures of three or more units. Applying this percentage of the housing stock that is multifamily housing (9.6%), to the anticipated 525 dwelling units, results in a need for land to accommodate 50 multifamily dwelling units. The present R-3 zone contains adequate vacant land to meet the need for multifamily dwellings. There is also vacant land in the RAM, C-1 and RM zone which may also provide for multifamily development.

EXISTING HOUSING STOCK

The population, housing and land-use section of the comprehensive plan background report contains information on the city's housing stock by both type of dwelling unit and the tenure of the dwelling unit.

A review of building permit applications for 1989 through 1995 (the period since the last census) indicates that 232 new dwelling units were added to the city's housing stock. This total consisted of 140 single-family dwellings, 8 manufactured dwellings, 16 duplexes (32 units), 46 multifamily units, and 6 units added to existing dwellings. These figures have been adjusted to take into account the housing demolitions during the period. The 232 new units represent a 17% increase in the number of housing units reported by the 1990 U.S. Census. This level of growth is an indicator of the vigorous nature of the housing market in Cannon Beach.

There are three traditional sources of information on the condition of a community's housing stock, the decennial census, assessor records, and a local "windshield survey." The purpose of information on the condition of the housing stock is to establish the extent to which safe and decent housing is being provided for the communities residents. The condition of the existing housing stock is not a major community issue, therefore only information from the census is included in this report.

The census provides information on the following housing characteristics, dwelling units lacking complete plumbing facilities, dwelling units which do not have adequate sewer or water facilities, dwelling units which lack kitchen facilities, and dwelling units which do not have a source of heat. All dwellings in the city are required to

be connected to the city's sewer and water system. There are very few units without kitchen facilities or a source of heat. According to the 1990 Census, less than one percent of the city's housing units lacked complete kitchen facilities and no occupied housing units lacked a source of heat.

The age of a structure is often used as an indicator of a dwelling's condition. The assumption is that older units are generally in worse physical condition than newer units. The benchmark often used in housing studies is structures that are at least fifty years old. According to the 1990 U.S. Census, Cannon Beach contains fewer dwelling units that are at least 50 years old than does Clatsop County as a whole, 21.8% versus 32%. In a city such as Cannon Beach, with a very small and desirable housing market, the age of structures is not a useful indicator for determining housing units that may be in need of rehabilitation. High real estate values ensure that over time these units will be rehabilitated through the private sector.

The number of households living in overcrowded conditions is used as an indicator of a tight housing market, as well identifying a population that may be in need of affordable housing because of a lack of financial resources. The definition used by the U.S. Census of a dwelling unit that is considered "overcrowded" is one where the ratio of the number of residents to the number of rooms, exclusive of baths, kitchens, laundry facility, etc., is greater than one-to-one. According to the 1990 U.S. Census, 2.5% of the city's housing stock was defined as begin overcrowded. For Clatsop County, 2% of the owner-occupied households and 5% of the renter occupied household were considered living in overcrowded conditions. It should be noted that "doubling up" in sleeping rooms is an effective means of reducing the cost of housing and cannot always be considered as a circumstance which identifies a "housing need." This is particularly true of a seasonal tourist-based economy, such as Cannon Beach.

HOUSING MARKET ANALYSIS

The nature of Cannon Beach's housing market differs significantly from that of most communities. Generally, the housing costs in an area are established by the regional economy and that economy's ability to support a range of housing prices. This is not the case in Cannon Beach. Cannon Beach's housing market is driven by the market for "second homes." Therefore, rather than the Clatsop County economy being the main variable in establishing the parameters of the housing market, it is the economy of the Portland and Seattle metropolitan area. This situation puts local residents at a significant disadvantage in the housing market. Not only are the median household and family incomes less in Cannon Beach than in these two metropolitan areas, but it is dramatically less than the incomes of persons in the market for second homes.

A survey of the sales price of single-family dwellings, detached and attached, was conducted for the period January 1, 1995 to March 10, 1996. During this 14.5 month period, there were 50 sales. The median sales price was \$165,000 and the average sales price was \$212, 048 (the average sales price for non-oceanfront dwellings was \$175,830). The average sales price of the dwellings in the lowest quartile was \$109, 917.

For comparison, the median sales price of residential dwelling units in the Portland metropolitan area in January 1996 was \$133,300.

A similar sales price survey was conducted in Cannon Beach for the period August 1989 to August 1990. At that time, the average sales price for non-oceanfront lots was \$110,000 and the sales price for the lowest quartile was \$52,500.

The average sales price of non-oceanfront single-family dwellings increased by 60% from the period 1989-90 to 1995-96. In the same period, the average sales price for dwellings in the lowest quartile more than doubled, increasing by 109%.

Comparable sales figures are not available for other communities in Clatsop County. However, according to the *Housing Needs Analysis for Clatsop County, November 1995*, the following were the average assessed values of detached single-family dwellings in April of 1995:

Astoria	\$77,662
Cannon Beach	\$210,297
Gearhart	\$176,336
Seaside	\$119,600
Warrenton	\$71,332
Rural Clatsop County	\$116,347
Clatsop County (entire)	\$117,536

The average assessed value of detached single-family dwellings in Cannon Beach is 79% higher than the county's average and is 19% percent higher than that of Gearhart, the community with the second highest assessed valuation.

The following summarizes the current rent structure in Cannon Beach. The information is based on a review of rental ads from the Cannon Beach Gazette for the period 6/95 to 2/96, discussions with property managers and current rental rates at multifamily dwellings.

One bedroom	\$325-\$465
Two bedroom	\$450-\$850
Three bedroom	\$550-\$850

In comparison, rental rates in Seaside in April of 1996 were \$325-\$425 for a one bedroom unit and \$450-\$700 for a two-bedroom unit.

Whereas the cost of owner-occupied housing, based on the 1994 average assessed value, is 43% higher in Cannon Beach than Seaside, the rental rates are not significantly different.

The rental rates for the Elk Creek Terrace Apartments, a low income housing project where rents are subsidized, in April 1996 were: one bedroom \$317, two bedroom \$385, and three bedroom \$446. In comparison, the rents at 147 E. Dawes, a non-subsidized apartment, were \$425 for a one bedroom unit and \$525 for a two-bedroom unit. Thus, the rents at Elk Creek Terrace are approximately 25% below market rates for one and two bedroom units.

Vacancy rates determine the number of available rental units, which in turn affect both the ease with which rental housing may be obtained and the cost of that housing. Traditionally, a housing market where the vacancy rate for

rental dwellings is less than 5% is considered a “tight” housing market. On a year-round basis, the city’s rental vacancy rate has consistently been less than 1.5%. No rental units are available during the summer months.

The vacancy rate for owner occupied dwellings is not a meaningful standard for assessing the city housing market because of the high proportion of the total housing stock which is held for occasional use (60% according to the 1990 census). However, the high sales price of single-family dwellings is indicative of the strength of the city’s housing market.

A key component of the description of any housing market is an assessment of the extent to which the market is providing housing that is affordable to the residents and workers of a given geographic area. Numerous methods are employed to define what constitutes “affordable housing” and the extent to which such housing is needed. The following summarizes data available for Cannon Beach on affordable housing.

In 1993, the city completed a study entitled "Housing Affordability Study: Cannon Beach Employers and Employees." A total of 152 employers and 303 employees were surveyed. The study was designed to identify the housing needs and affordability characteristics for individuals employed within the city. The following were the key findings of the survey:

- Forty percent (40%) of surveyed employers reported that their employees had trouble finding housing in Cannon Beach. Of the employers who stated that their employees had trouble obtaining housing in Cannon Beach, 75% stated that the housing was too expensive and 71% mentioned an inadequate supply of housing.
- Employees stated the following reasons for not residing in Cannon Beach: personal choice, 50%; housing too expensive, 39%; other reasons, 19%; an inadequate supply, 12%; and living space not the right size, 4%.
- Thirty-eight percent of the employees stated that they had trouble finding housing in Cannon Beach. The most commonly reported problems in obtaining housing were: too expensive, 73%; inadequate supply, 63%; other reasons, 25%; and living space not the right size, 11%.
- Housing cost (including rent/mortgage, property taxes for owners, insurance for owners, and utilities for owners and for renters, if not included in the rent) were: for owners, the mean monthly cost was \$674 and the median cost was \$585; and for renters, the mean cost was \$464 and the median cost was \$450.
- Among owners, the percent of monthly income spent on housing was a mean of 21% and a median of 18%.
- For renters, the percentage of monthly income spent on housing was a mean of 32% and a median of 30%.
- Utilizing HUD Section 8 income limits for Clatsop County, October 1, 1992: 41% of all the respondents resided in households with an income of 80% or less of the median county income (lower income) and 24% resided in households that were at or below 50% of the median income limits (very low income). For survey respondents who lived in Cannon Beach or who did not live in the city, but who

mentioned cost, supply and/or size as a reason for not living in Cannon Beach, 45% were at or below 80% of median county income and 28% were at or below 50% of median county income. For survey respondents who were employees, that is they were not employers or did not live with employers, 48% lived in households with 80% or less of median county income and 28% lived in households with 50% or less of median county income.

Based on the results of the "Housing Affordability Study: Cannon Beach Employers and Employees," it is estimated that approximately 94 renter households, in 1993, would have met the HUD standard for "low income", i.e., 50% of less of median family income, and would consider living in Cannon Beach.

A housing market analysis was undertaken by Shelter Resources in conjunction with the proposed Shorewood development. The conclusion of the February 7, 1995-report was that there was a demand for 134 dwelling units by households which could meet the income qualifications for the Rural Economic and Community Development Services 515 program (household income that is 60% or less of the county median income). The market area consisted of a five-mile radius from the center of Cannon Beach. Nineteen ninety-four (1994) household income information was used for the analysis.

A 1995 Clatsop County Housing Authority study, "Housing Needs Analysis for Clatsop County, Oregon" used households earning 80% or less of the county median income and paying more than 35% of household income as a measure of households with a housing need. According to the 1990 Census, there were 89 households meeting this criterion in 1989.

The CHAS report utilizes a simple formula, which correlate household income and housing costs, as a means of assessing how much household income is required in order for housing at various costs to be considered affordable. For owner-occupied units, this formula is based on the assumption that the monthly capital costs, taxes, insurance and utilities will total about 1% of the real property value of the dwelling unit. It is also assumed that a household will pay no more than 30% of its gross income on housing. Applying this formula to Cannon Beach's owner-occupied housing market illustrates the "affordability problem " for owner occupied dwellings. Using the 1% formula, an annual household income of \$66,000 is required to be able to afford the median valued \$165,000 house. Even if a household were able to obtain financing which permitted allocating 40% of income to housing, an income of \$49,500 would be required for the purchase of the median dwelling in Cannon Beach. The same analysis applied to the average sales price of a dwelling in the lowest quartile of the city's housing market (\$110,000) finds that at a household income of \$44,000 is required to finance such a dwelling if 30% of household income is allocated to housing and \$33,000 if 40% of household income is allocated to housing costs.

No recent income figures are available for Cannon Beach. However, for this analysis it is assumed that Cannon Beach's median family income and personal per capita income comparable to that of Clatsop County. According to the Department of Housing and Urban Development (HUD), the 1995 median family income for a family of four was \$34,500. Applying the "1% formula" to this income indicates that such a family could afford an \$86,200 home, if 30% of its income is allocated to housing. If 35% of its income is allocated to housing, the family could afford a \$100,625 home. The result of this analysis is only slightly different if one uses 1994 U.S. Department of Commerce personal per capita income of \$19,340 for Clatsop County. A family with two wage earners would have a family income of \$38,680. Applying the "1% formula" to this income indicates that such a family could afford a \$97,000 home, if 30% of its income is allocated to housing. If 35% of its income is allocated to housing, the

family could afford a \$112,817 home. These figures clearly demonstrate that a family earning the median income cannot even afford the housing in the lowest quartile of the city's housing market.

The recent rental housing survey found that a one bedroom unit rented in the range of \$325- \$465 and two bedroom units rented in the range of \$450-\$850. For the purpose of the following affordability analysis, the rental rates charged at the apartment located at 147 E. Dawes will be used as a representative example. Assuming that 30% of income is applied to housing costs, an annual income of \$17,000 is required to make the one bedroom unit affordable. If 35% of income is applied to housing costs, the required annual income is \$14,570. Assuming that 30% of income is applied to housing costs, an annual income of \$21,000 is required to make a two-bedroom unit affordable. If 35% of income is applied to housing costs, the required annual income is \$18,000. The following hourly wage rates are required to generate the income levels described above, assuming 2,000 hours of annual work: \$14,570 - \$7.30/hr.; \$17,000 - \$8.50/hr.; \$18,000 - \$9.00/hr.; and \$21,000 - \$10.50. The majority of the employment opportunities available in the city are in the service sector, positions such as cooks, waitpersons, receptionist, retail counter attendant, custodian, and maid. These jobs generally pay less than \$10.00/hr.; many of these jobs are part time in nature.

EVALUATION OF THE REGULATIONS AFFECTING HOUSING

The OHCS recommends that a city's land use regulations provide for a broad range of housing types in order to meet the Goal 10 objective of providing for the housing needs of the community. The types of housing that are recommended are: single-family detached, single-family attached manufactured dwelling on an individual lot, mobile home on an individual lot, condominiums, duplex, multifamily, accessory apartments, mobile home parks.

Single-family detached dwellings are permitted as an outright use in the city's RVL, RL, R-1, R-2, RAM, R-3 and RM zones. The residential buildable lands inventory demonstrates that the city's urban growth boundary can accommodate the anticipated level of residential growth.

Single-family attached dwellings are provided for through cluster development standards. Cluster development is permitted in any zone, upon approval by the Planning Commission, in conjunction with a proposed subdivision or planned development.

Pursuant to the requirements of ORS 197.307, the city permits manufactured dwellings on individual parcels as an outright use in all its residential zones, the RVL, RL, R-1, R-2, RAM, R-2, and RM zone.

The city has one residential zone, the RAM zone, which provides for a mobile home on an individual lot. A mobile home being a manufactured dwelling which does not meet the design standards specified by ORS 197.307.

A condominium is a form of land ownership not a housing type. (However, condominium ownership is generally associated with multi-family dwellings.) The city's zoning code does not regulate the form of land ownership, except that a duplex may not be a condominium. The purpose of this standard is to ensure that duplexes provide for rental housing.

Duplexes are permitted as an outright use in the R-2, RAM and R-3 zone. The buildable lands section demonstrates that there is adequate land in these zones to provide for the additional number of duplex units needed to the year 2010.

Multifamily structures are an outright use in the R-3 and RM zone. The buildable lands section demonstrates that there is adequate land in the R-3 zone to provide for the additional multifamily dwelling units needed to the year 2010. Multifamily structures are also permitted as a conditional use in the RAM and C-1 zone. Land in these zones may provide additional opportunities for multifamily housing.

The R-2 and RAM zones permit accessory dwellings as an outright use. In addition, accessory dwellings are permitted as a conditional use in the city's other residential zones, the RVL, RL and R-1 zone. The number of available parcels demonstrates that the city has made adequate provision for accessory dwellings

Mobile home parks are permitted as a conditional use in the city's MP zone. There are two parcels zoned MP.

In summary, the city's land-use regulations provide for the recommended range of housing types. Adequate land is zoned for each housing type, subject to clear and objective standards.

Government assisted housing can be considered another type of housing, one intended to meet the needs of persons with low incomes. Two government assisted housing projects have been initiated in the city during the past five years. The Elk Creek Terrace Apartments, containing 36 units, began occupancy in the winter of 1994. Shorewood, a 34-unit project, received city approval in the spring of 1996. Occupancy is anticipated to be the fall of 1997.

The 1990 Census found that the city contained 207 rental housing units in 1989. City building permit records indicate the city added approximately 90 rental housing units between 1989 and 1995. With the addition of the 34 units in the Shorewood development, the city's rental housing stock will be 331 units, of which 21% is government assisted. There are ten existing or approved government assisted housing developments in Clatsop County. These projects contain 332 units, of which 144 are limited to senior citizens. Cannon Beach has 70 existing or approved government housing units. This represents 37% of the total non-senior housing and 21% of all assisted housing units. Cannon Beach has approximately 4% of the county's population. These figures demonstrate that the city has made adequate provision for government assisted housing.

The OHCS recommends that a city's development codes provide not only for a range of housing types, but also for housing that meets the needs of groups of persons with special housing requirements. Individuals in these defined groups typically require some level of social service to lead reasonably normal lives. Groups with special housing needs include the frail elderly, persons recovering from drug/alcohol abuse, persons with developmental or physical disabilities, and victims of domestic violence. OHCS's objective with regard to housing for groups with special needs is that the local plan and development regulations do not limit these types of housing opportunities.

There are four general types of housing for the frail elderly: nursing homes, assisted living, adult foster homes and adult day care. The city's zoning code does not make provision for either nursing homes or assisted living facilities. Adult foster homes are permitted in all the city's residential zones under the definition of a residential home. Adult day care is permitted as an outright use in all the city's residential zones. There are no facilities serving the frail elderly in Cannon Beach.

All the other housing needs of defined groups, such as persons with developmental disabilities or persons recovering from drug or alcohol abuse, are defined as either a residential home or a residential facility. The city's zoning code permits residential homes and residential facilities as an outright use in all the city's residential zones. There are no residential homes or residential facilities in Cannon Beach.

HOUSING PROGRAM

In 1991, the Planning Commission completed a housing study whose objective was the preparation of an action plan for improving housing opportunities in the city. The study made a variety of recommendations on amendments to the city's zoning code. The city has implemented most of the recommendations. The following summarizes the actions the city has taken to implement the recommendations contained in the 1991 study.

- Reduced the minimum lot size for new duplexes to 5,000 square feet.
- Rezoned two parcels R-3, High Density Residential in order to create additional opportunities for multifamily housing. One of these parcels has been developed by the Cannon Beach Community Development Corporation for 36 units of government assisted housing, the Elk Creek Terrace Apartments.
- Changed the off-street parking requirement for multifamily dwellings so that the number of parking spaces required corresponds to the type of apartment, e.g., one bedroom or two bedroom, rather than requiring two parking spaces for each dwelling unit.
- Created a new type of multifamily housing, the limited triplex, which permits three dwelling units on a 5,000 square foot lot in the R-3 zone. This use is permitted outright.
- Permitted manufactured dwelling on individual parcels in all residential zones.
- Permitted accessory dwellings as an outright use in the R-2 and RAM zone and as a conditional use in the RVL, RL, and R-1 zone.

NATURAL RESOURCES ANALYSIS

NATURAL RESOURCES ANALYSIS

Introduction

The natural resource analysis is intended to be a physical inventory of the climate, topography, soils, geology, hydrology, wildlife and vegetation within the planning area. (Figure 1) In a separate section potential hazard areas will be inventoried and analyzed.

Climate and Air Quality

The Cannon Beach climate is moderate in its temperature range, with wet winters and comparatively dry summers. Average annual rainfall is 90 inches. Rainfall in the mountains to the east and south is considerably greater and it is 120 inches at the headwaters of Elk Creek. Approximately 80 percent of the total precipitation occurs during the 6-month period of October through March. (Figure 2)

Snow is not common, and seldom remains on the ground longer than a few days. The average frost-free season is about 270 days. Mean monthly temperatures at Seaside, the nearest meteorological station, range from 43°F in January to 60°F in August. Extremes of record are 12°F in December and January to 105°F in July.

During late fall and winter months the city is subjected to frequent, intense, flood-producing storms that usually sweep in from the southwest. Several inches of rain often fall in a 24-hour period. Such storm conditions may occur several times during the winter season in the Elk Creek basin. Also, any of these storms may be accompanied by high tides and strong winds.

During the summer and fall, winds tend to blow from the north or northwest, but prevail from the southwest and southeast during winter months. Occasional easterly winds create humidity conditions much below normal. Continuous wind velocities from 15 to 25 miles per hour are common, and gales occur during the winter season. Wind gusts in excess of 100 miles per hour have been experienced.

Air quality data for the Cannon Beach area are not presently available, but air quality generally is very good. No major sources of industrial pollution exist in Cannon Beach. Due to the absence of industrial sources and the common occurrence of steady winds, gaseous pollutants are estimated to occur at low concentrations and, compared to suspended particulates, are of limited concern.

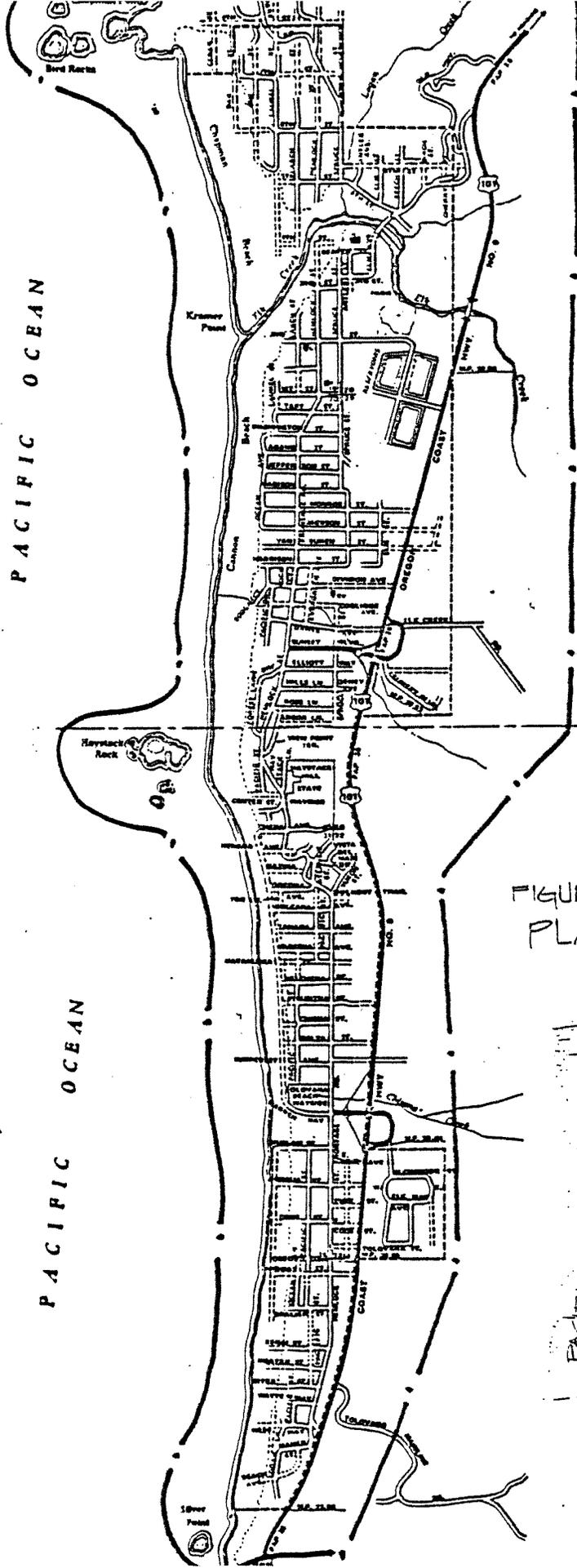
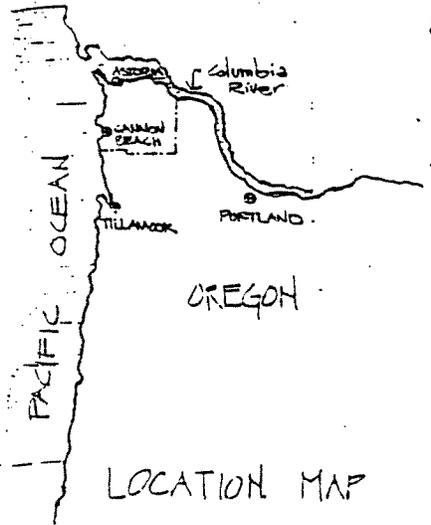
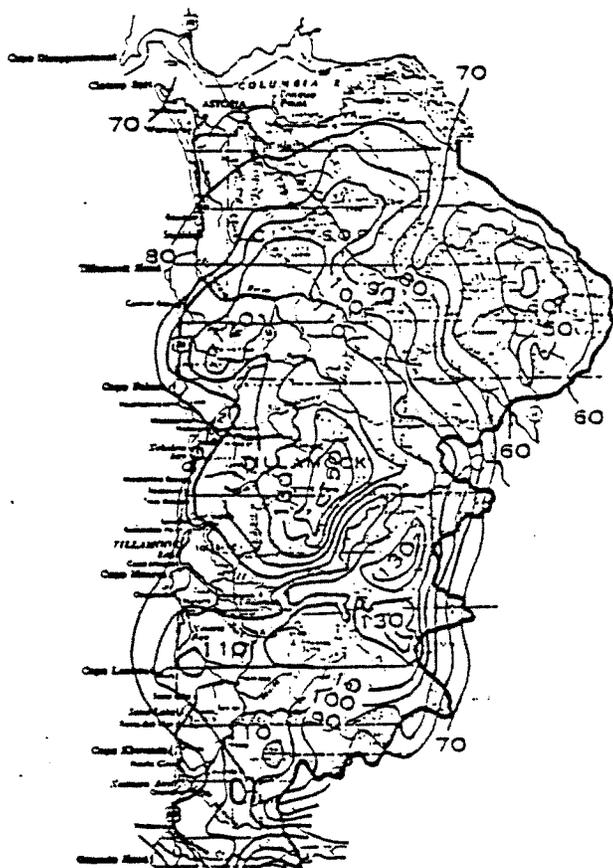


FIGURE 1
PLANNING AREA



AVERAGE ANNUAL PRECIPITATION



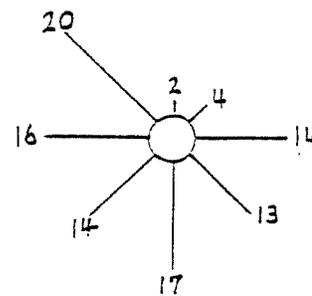
PRECIPITATION CHART ASTORIA AIRPORT

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1953		5.32	6.68	2.82	4.11	2.90	0.82	1.12	3.90	6.30	12.42	12.21	
1954	18.94	9.56	4.17	6.70	1.66	3.68	1.77	2.24	2.31	6.66	10.10	10.22	75
1955	5.94	6.23	6.64	6.04	1.62	2.73	3.62	0.10	3.37	12.24	10.66	10.37	83
1956	17.09	9.32	13.47	1.33	1.42	4.64	0.18	2.13	3.74	11.37	2.37	9.09	74
1957	4.78	6.90	9.73	3.94	2.42	3.30	1.68	1.34	0.42	3.43	7.66	11.77	80
1958	9.41	10.94	6.62	7.32	1.02	2.40	0.00	0.52	1.94	7.17	14.14	12.17	72
1959	13.24	8.04	7.88	6.40	3.49	3.72	0.91	0.92	3.36	6.46	11.40	8.36	74
1960	10.49	6.47	7.40	5.92	6.60	1.42	0.01	1.84	1.67	7.32	13.91	6.12	71
1961	9.02	21.88	10.49	5.47	2.90	1.10	0.50	1.20	1.92	6.14	7.28	6.14	80
1962	6.23	5.68	5.18	7.04	2.68	1.23	0.34	2.46	3.30	7.00	10.21	8.74	84
1963	4.78	6.44	6.12	5.70	1.91	1.40	1.32	1.20	2.20	3.38	13.14	9.12	83
1964	18.30	4.08	7.41	3.37	2.27	2.70	2.37	2.21	2.73	2.41	11.15	13.67	73
1965	10.34	6.77	0.92	3.47	2.74	0.72	0.46	1.97	0.31	3.97	11.42	11.78	83
1966	6.61	5.32	8.74	2.90	2.18	2.12	0.34	1.01	2.12	2.23	10.00	16.07	83
1967	16.22	6.02	8.28	5.22	1.37	1.14	0.22	0.17	3.07	11.08	5.94	9.04	86
1968	9.33	9.32	10.42	6.22	3.70	4.42	1.22	1.22	6.60	6.03	11.76	13.82	87
1969	12.02	5.62	3.14	3.24	3.92	1.42	0.50	0.88	6.32	5.77	11.69	11.69	82
1970	10.44	3.29	4.26	7.74	1.82	1.19	0.31	0.08	3.62	3.80	9.46	15.92	70
1971	10.44	6.67	9.66	4.07	2.30	2.97	1.32	1.14	4.82	6.34	9.08	13.22	79
1972	10.62	8.18	10.04	6.42	1.22	0.82	2.01	0.37	4.72	1.76	6.90	13.28	87
1973	3.72	2.60	3.71	2.28	3.18	4.20	0.02	3.46	4.12	3.32	16.72	15.72	85
1974	12.47	8.28	10.72	6.26	4.37	2.22	4.20	0.29	0.87	1.82	6.92	13.84	72
1975	13.22	8.02	3.66	3.80	2.41	1.97	0.22	2.62	0.04	12.36	12.28	13.66	80
1976	11.47	7.64	7.17	3.52	2.10	1.27	2.44	2.52	1.38	2.94	1.49	4.20	88
RECORD MEAN	11.62	7.77	7.42	4.92	2.62	2.34	1.14	1.44	2.82	6.44	10.01	11.62	70

AVERAGE TEMPERATURE ASTORIA AIRPORT

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
1953		43.2	46.4	47.7	52.8	55.2	60.4	61.1	59.4	54.2	49.4	43.0	
1954	46.2	45.2	42.8	46.2	52.2	56.2	57.7	59.7	58.6	52.6	48.6	43.6	50.4
1955	41.4	41.2	41.4	43.2	49.2	55.2	57.8	58.2	56.7	52.2	42.9	41.5	46.6
1956	41.8	38.4	42.8	46.2	53.8	55.2	60.4	59.6	57.2	50.2	46.2	42.6	49.7
1957	35.8	42.4	43.6	46.8	54.2	57.8	59.0	62.0	62.0	53.1	43.6	43.6	50.6
1958	49.8	49.2	49.2	46.2	55.0	60.8	62.4	62.0	58.9	55.1	46.4	47.6	53.1
1959	42.7	43.0	43.0	49.4	52.2	56.2	60.2	58.2	56.6	53.6	46.6	42.2	50.7
1960	46.2	42.2	46.4	49.2	51.0	56.2	59.2	57.2	57.2	52.2	46.6	43.2	50.2
1961	47.2	46.4	45.8	47.2	52.6	58.2	61.8	61.2	56.6	51.0	42.7	42.2	51.2
1962	46.2	43.2	43.2	46.2	50.2	56.8	58.2	60.2	59.6	53.6	46.6	46.6	50.6
1963	36.2	49.2	45.2	46.2	53.0	53.8	60.2	61.0	61.2	56.8	47.8	46.2	51.2
1964	43.2	42.2	46.2	46.4	49.2	53.2	59.2	59.2	57.4	53.6	46.6	46.6	50.6
1965	42.2	46.2	47.2	49.2	50.8	56.2	60.2	61.7	57.0	52.2	46.6	46.2	51.2
1966	42.2	42.6	43.7	49.0	50.2	56.2	59.2	59.2	51.7	47.6	45.9	46.7	50.7
1967	43.6	43.2	42.2	46.2	51.7	58.2	61.1	62.6	60.2	52.6	48.1	41.2	50.6
1968	42.0	47.2	46.7	46.2	52.2	58.2	61.2	60.2	57.6	50.6	47.1	39.7	50.6
1969	46.2	46.2	46.2	46.2	53.8	59.8	58.6	58.7	57.2	51.5	46.2	46.2	50.6
1970	41.6	46.2	46.7	45.2	51.6	56.6	59.2	60.2	56.0	51.0	47.1	46.6	50.1
1971	46.7	42.2	42.0	46.2	51.6	56.6	59.4	62.4	57.6	51.2	46.6	41.2	49.7
1972	46.0	43.2	47.8	46.6	54.7	58.2	62.2	63.4	57.6	52.2	47.2	38.6	51.6
1973	46.2	46.2	46.4	48.7	53.6	56.6	59.7	57.6	57.8	51.2	46.2	45.2	50.2
1974	38.8	42.2	46.7	46.0	50.2	56.2	58.2	62.1	60.9	51.7	46.2	45.6	50.7
1975	42.6	43.1	43.2	46.7	52.8	59.6	60.7	59.7	59.2	50.9	46.2	46.2	50.6
1976	46.2	43.4	43.7	48.7	52.4	59.8	61.4	61.7	60.6	53.2	46.0	43.2	51.2
RECORD MEAN	41.2	43.4	44.4	47.2	52.1	56.4	59.2	60.2	58.4	52.2	46.7	42.6	50.2
MEAN	43.4	40.4	41.8	45.0	50.0	53.8	60.4	61.7	60.6	53.2	46.2	46.2	50.6
MIN	35.4	36.8	36.4	39.4	44.2	49.2	52.2	52.2	49.0	44.1	39.8	37.4	42.1

WIND ROSE ASTORIA AIRPORT (24 Years of Data)



0 10 20 30 40 50 60 70 80 90
Scale of Wind Percentages

One or two days a year, depending upon the right climatic conditions, smoke and associated odors drift over the northern part of the city from the open-burning dump located northeast of town.

This practice of burning garbage was scheduled to be eliminated from the Cannon Beach disposal site in October, 1977, but is still being allowed under a permit extension from DEQ. The automobile is considered to be the major source of gaseous pollutants.

An unpleasant odor comes from the bird rocks located in the ocean west of Chapman Point. During the nesting season, on days with northwest winds, the smell of "rotten eggs" is readily apparent in downtown Cannon Beach.

The only available air pollution data pertinent to the area are for suspended particulate measurements taken in Astoria, 25 miles to the north. A significant source of that "pollutant" is the associated airborne salts from the Pacific Ocean. The background level of suspended particulates (the concentrations from natural sources only) is estimated at between 14 and 20 micrograins per cubic meter. This compares favorably with the primary Federal standard of no more than 75 micrograms per cubic meter.

Fireplaces and wood heaters also contribute to air pollution in Cannon Beach, although this is primarily particulate matter.

Geology

Two major basalt headlands, Cape Falcon and Tillamook Head, bracket the shorelands on which Cannon Beach is located. (See Figure 3) Cape Falcon to the south of Cannon Beach is a part of the headland complex that extends northward to Arch Cape and lies at the southern end of an extensive area of basalt. This is the mountainous terrain, southwest of the city, extending inland as far as the southern and eastern portions of the Elk Creek basin.

From Arch Cape north to Tillamook Head, the bedrock is almost continuously sedimentary. The lowland area is level where there is a marine terrace and irregular where ridges of the hills to the east project to the beach. The shore in front of the marine terrace is sand beach interrupted occasionally by small points of land (i.e. Humbug Point and Chapman Point), comprised of basalt and in some places, massive sand stone (i.e. Silver Point and Hug Point). North of Silver Point, Cannon Beach extends without interruption as far as Chapman Point. The beach segment north of Elk Creek to Chapman Point is sometimes referred to as Chapman Beach.

Besides the several small promontories of basalt along the beach, numerous basalt remnants in the form of rock knobs and sea stacks lie just off shore.

The most notable of these is Haystack Rock, located less than one mile south of the mouth of Elk Creek. That stack is principally fragmental basalt cut by numerous dikes. Near its base and in the satellite stack attached to the south side there is sedimentary rock intermixed with basalt, which suggests the rock is of submarine origin or of lava that poured into the sea.

Geological studies indicate that hard-ended or consolidated rock units ranging in age from one to 63 million years ago and unconsolidated units in age of one million or less years ago underlie the Elk Creek Basin and Cannon Beach areas. The consolidated units total over 20,000 feet in thickness and include basaltic lava flows, breccia and tuff, and marine siltstone, claystone and sandstone. Unconsolidated deposits include the marine terraces, flood plain alluvium and beach sand.

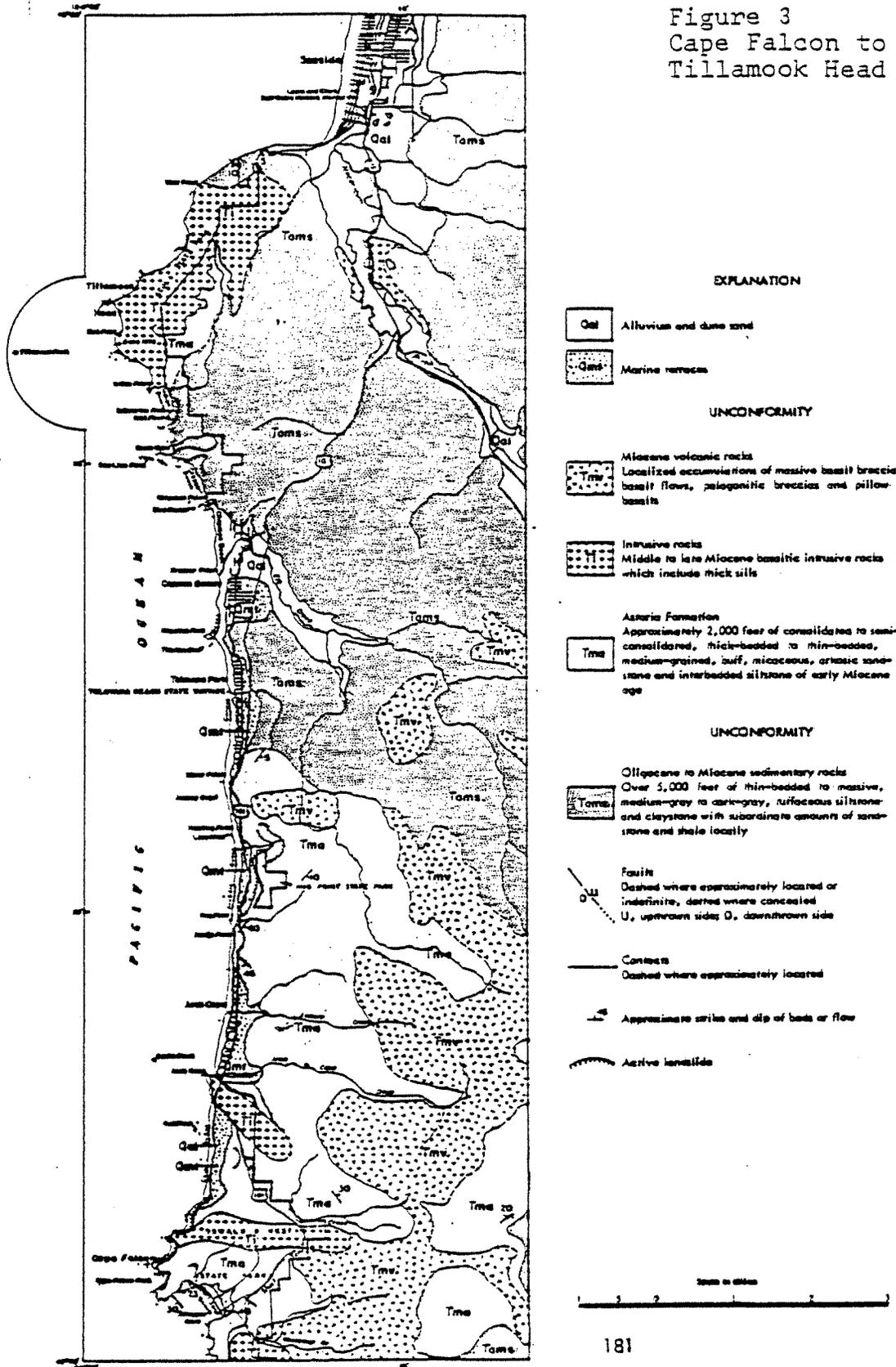
Elk Creek has removed much of the marine terrace at the northern end of the Cannon Beach area and formed an alluvial plain. The main business section of Cannon Beach is built on that plain. The plain also extends upstream from the Cannon Beach area as shown in Figure 3. The soil is largely dark brown silt loam, friable, and strongly acid. It is, or would be, well suited for agriculture but is limited by wetness and flooding in some areas. Soil borings in 1971 along the present city levee indicated soft deposits of peat and organic silt that overlay a dense fine sand.

Sedimentary rocks are the most widespread in the Elk Creek Basin (see Figure 3). They consist of thin-bedded to massive, tuffaceous siltstone and claystone with lesser amounts of sandstone and shale locally. The siltstone weathers to form thick residual soils.

Unstable zones of sedimentary rock masses exist along the coast between Tillamook Head and Cape Falcon. Where these zones are exposed to wave erosion there are sites of active and inactive landslides (see Figure 3). Slides have been particularly active within Ecola State Park and adjacent to Silver Point.

Landslides have helped shape the highly scenic indentations that lie between the points of land of the locality. The rocks that appear west of Chapman, Ecola and Silver Points, and Haystack Rock mark former positions of those promontories, and the points once extended seaward much farther than the exposed outermost rocks. As erosion continues the existing points will be destroyed, and their remnants will become additions of the reef as part of the very gradual but continuous change in the scene along the coast.

Figure 3
Cape Falcon to
Tillamook Head



Soils and Topography

Unconsolidated soil types located in the Cannon Beach area include the marine terrace, floodplain alluvium, beach sand, and the dense clays and silty clays on moderate to steep slopes.

Numerous soil types have been mapped within the Cannon Beach area (See detailed soils map and descriptions in appendix). The following soil types are dominant in the hilly, upland areas (slopes up to about 60%), (Figure 4) underlain by consolidated, marine sedimentary rocks: Chitwood silty clay loam (slopes up to 12%), Walluski silt loam (slopes up to 20%), Tolovana silt loam (slopes up to 30%), and Ecola silt loam (slopes up to 60%).

The marine terraces are comprised of soils in the Chitwood and Walluski Soil Series. Slopes on these soils average from zero (0) to twenty (20) percent. The main locations for these soil types are between Taft and Ross Avenues and east toward the Pacific Power and Light Substation and all of Tolovana Park.

Coquille silty clay loam (slopes up to 7%) is the dominant soil type found on the flood plain of Elk Creek, upon which the main business district of Cannon Beach is located. Soil borings made in 1971 along the present city levee indicate that dense, fine sand underlies soft peat, organic silt and the soil of the flood plain. There alluvial soils are located (Figure 4) north of First Street to Elk Creek and east up the Elk Creek Basin. A smaller area is located north of Elk Creek in association with Logan Creek.

Beach sand is found extending the entire length of Cannon Beach along the ocean shore and the dune complex located from Breakers Point to Chapman Point. The beach sand is an accumulation of unconsolidated material of basalt and sandstone, generally identified by the extreme high water line and the start of vegetation. The beach itself slopes gently seaward (3% or less) but is steeper locally where it grades into adjacent sand dunes shoreward such as at Breakers Point and elsewhere where dunes are nested against sea cliffs. Soils of the Westport series occur on stabilized portions of dunes in the area.

The Breakers Point dune is the major sand dune system located in Cannon Beach. It is located north from Elk Creek to Chapman Point and west of Laurel and Larch Streets to the vegetation line (see Figure 4). This dune system is made up of an active foredune, conditionally stable dunes and a stable dune consisting of approximately 26 acres. The stable dune is evidenced by the beginnings of a soil profile along with such plant species as scotch broom, salal, spruce, pine and ivy. The dominant vegetation found along the foredune is European beach-grass, while in the conditionally stable

dune areas, additional plants species capable of survival include, lupine, vetch, strawberry and beach sedge.

Additional information about the Breakers Point dune system specifically and dune systems in general may be found in Terrain Sensitivity of the Proposed 'Breakers Point' Condominium Site, Cannon Beach, Oregon, 1976, by Charles L. Rosenfeld and Plants of the Oregon Coastal Dunes, 1969, by Wiedemann, Dennis, and Smith.

The appendix contains a list of native vegetation plus plants that grow well in the Cannon Beach area. Both this list and the documents listed above may be used as reference sources for vegetation needed for soil stabilization, buffering, landscaping and other purposes. The list has been divided into two classes of plants: those that grow well on the ocean front or vicinity of the ocean] and those that are not salt tolerant.

Many residents of Cannon Beach grow fine vegetable gardens. Vegetables that are most easily grown here include the cabbage family, broccoli, cauliflower, lettuce, root crops of all types, peas, squash and beans. The climate of the area precludes some hot weather plants such as tomatoes and corn, although some gardeners use hybrid species or special techniques to successfully raise these crops. Acid soil is sometimes a problem for new gardens; this is normally corrected by adding lime, dolomite or wood ashes. The shallow depth of soil to clay is typically corrected by deep rototilling and the addition of organic material such as compost, peat, or other conditioners. The Cannon Beach Community Questionnaire indicated that more than 100 persons would be interested in participating in a community garden. Many others mentioned that they had their own vegetable garden on their property.

Hydrology

The City of Cannon Beach is traversed by Elk Creek in the northern part of the city. Logan Creek joins Elk Creek near its mouth and provides drainage for a major portion of the city north of Elk Creek. Numerous small intermittent streams traverse the city from Elk Creek south to Silver Point and provide a major portion of drainage for the city.

a. Surface Water

Elk Creek is formed by two main tributaries, the North and West Forks, which join about 2 1/2 river miles southeast from Cannon Beach and the ocean. Each of the tributaries is several miles long, flowing from elevations well above 1,000 feet msl. The streams descend quickly (about 200 to 400 feet per mile) to lower elevations so that along the

last few miles to the ocean, the water moves slowly over its flood plain where its gradient averages less than 25 feet per mile.

Elk Creek's flow is directly related to the watershed precipitation pattern: high flows occur during October through March and low flows occur during July through September. Because of the small drainage area and the steep stream gradient of tributaries, Elk Creek rises quickly following periods of intense precipitation.

Stream flow gages were recently installed (1975) for Elk Creek, one on each fork, just above their confluence. On the basis of the 110-inch annual precipitation for Elk Creek Basin and a single year (1975) discharge record, the Elk Creek mean annual runoff was 95,750 acre feet for 1975 (October 1974 to October 1975). Approximately 85 percent of the annual runoff occurs during the period of November through April. Only about 2 percent of the annual runoff occurs during the period of July through September. Recorded mean monthly flows for Elk Creek at the forks are shown in the following tabulations:

TABLE 1

MEAN MONTHLY FLOWS IN C.F.S., FOR ELK CREEK AT THE FORKS (1975)

OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
11.3	185.5	274	366	245	198.0	111.1	94.5	36.3	16.1	34.8	20.0

b. Ground Water

The occurrence, movement, quantity and quality of ground water are determined in larger part by the geology of the region it originates in and flows through. A continuing supply of ground water also requires a favorable climate to replace the water at an adequate rate. Most of the Elk Creek Basin is underlain by fine-grained marine sedimentary rocks and associated volcanic rocks of low porosity (capacity to store water) and permeability (capacity for water movement.) Consequently, ground water yields are generally low in Elk Creek Basin areas. Coastal dune areas and lowland areas such as the valley floor along Elk Creek store and deliver large quantities of water. Recharge occurs mainly in infiltration from rainfall.

The water table surface adjacent to Elk Creek and its lower reaches is 2 feet or less below the ground surface during the wet season. During the dry season, the water table drops several feet. A typical well in the Elk Creek area could be expected to yield 10 to 15 gallons per minute for each foot of drawdown. Existing well log data are located in the appendix.

c. Vegetation

According to Jerry F. Franklin and C. T. Dyrness, authors of Natural Vegetation of Oregon and Washington, the area comprised by northwestern Oregon and western Washington is the most densely forested region in the United States. Presently, 82 percent of that area is classed as forest land. The coniferous forest stands in the Elk Creek Basin are typically dense, tall and productive. Constituent tree species are Sitka spruce, western hemlock, western red cedar, Douglas fir, and Grant fir. Hardwood species occur on disturbed sites and also occupy the river-bottom lands. Major species there are red alder, big-leaf maple, black cotton-wood and Oregon ash. Under story species along the river include sword fern, various species of rushes and sedges, salmonberry and thimbleberry. Distinctive stands of pine and spruce, deformed by wind and salt spray, dot the beach-front areas.

Forest land dominates all of the area adjacent to the city. The majority of forest land is owned by the Crown Zellerbach Corporation. The Oregon Board of Forestry owns 160 acres of land along Elk Creek in the vicinity of the forks, while the City of Cannon Beach owns 60 acres along the south fork for its watershed.

The Oregon State Board of Forestry (OSBF) lands adjacent to the city are classified for commercial forest, recreation and wildlife uses. This site classification system along with appropriate maps are in the appendix.

Crown Zellerbach Corporation forest lands are site-class indexed the same as the OSBF lands and the classification system and maps are also in the appendix.

The particular community of wetland flora existing in the area between Elk Creek and the sewage lagoons is found only in small, isolated low areas along the streams on the Oregon and Washington coastline. The Elk Creek area supports several large Sitka spruce, Western hemlock, shrubby red alder and crabapple in the understory. Sedges, rushes and tussocks in the more low-lying portions, and grasses with some salal, salmonberry and twinberry make up the cover at ground level. (See Figure 5).

d. Wildlife

In the Cannon Beach area, the existence and management of vegetation is closely tied to the presence of wildlife, particularly those forms that have economic significance. How a road is constructed can determine the fate of a stream with regard to its population of salmon or trout. A clear cut has both detrimental and beneficial effects on wildlife habitat. A fire can be initially disastrous to all life forms, but the land given enough time re-establishes itself with flora and fauna.

The sparsely populated areas east of the city provide excellent habitat for many forms of wildlife: mammals and birds, reptiles and amphibians, microbes and marine organisms. The Oregon State Department of Fish and Wildlife is actively engaged in the management and protection of many forms of wildlife, while the Marine Region with the department is concerned with the management of commercial fish species and other marine organisms.

SITKA SPRUCE /
SHORE PINE - SCOTCH
BROOM - BEACH GRASS

PINE - SCOTCH BROOM - BEACH GRASS

2ND GROWTH ALDER -
SPRUCE - HEMLOCK -
SALAL ASSOCIATION

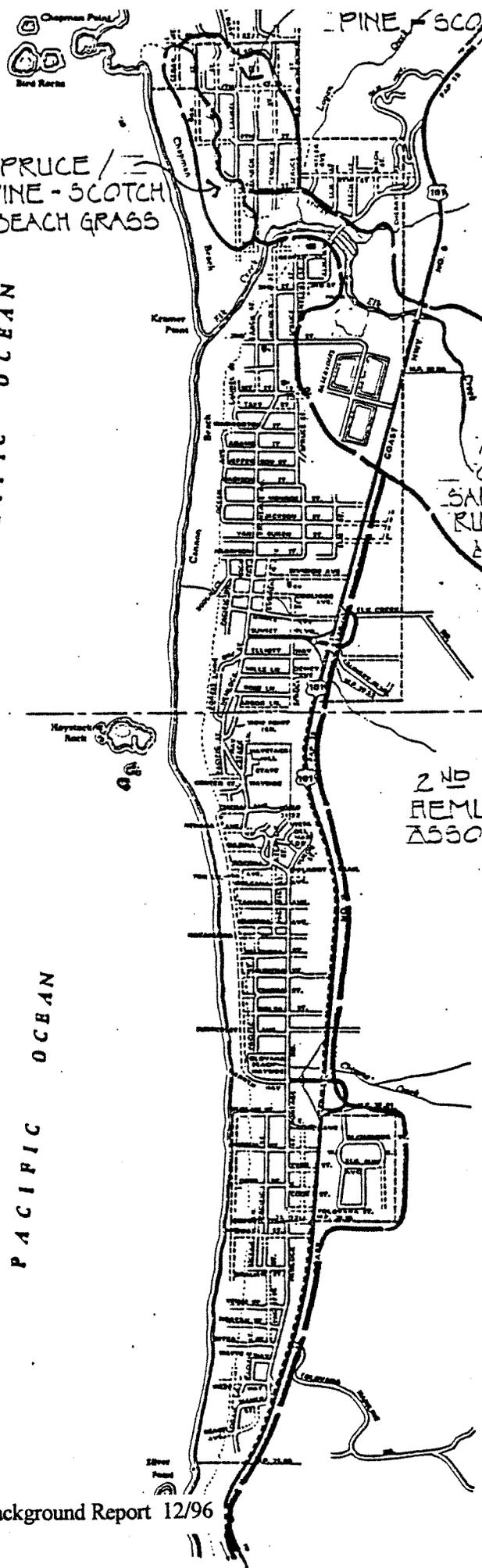
PACIFIC OCEAN

ALDER - SPRUCE
CRABAPPLE -
SALMONBERRY -
RUSH - SEDGE
ASSOCIATION

2ND GROWTH SPRUCE -
HEMLOCK - SALAL
ASSOCIATION

PACIFIC OCEAN

FIGURE 5
GENERALIZED
DOMINANT VEGETATION
ASSOCIATIONS



Some of the more common forms of wildlife found in and around the Cannon Beach area include:

Mammals

Roosevelt elk
Black-tailed deer
Black bear
Coyote
Wildcat
Muskrat
Mink
Rabbit
Raccoon
Weasel
Ground squirrel
Chipmunk
Beaver
Mole
Shrew
Meadow mouse
Otter
Opossum

Birds

Grouse
Quail
Morning dove
Pigeon
Grebe
Phalarope
Sandpipers
Seagulls
Cormorant
Murre
Killdeer
Tufted puffin
Ducks
Merganser
Geese
Pidgeions
Shovelers
Teal
Water ousels
Kingfisher
Great blue heron
Golden crowned ringlets
Woodpecker
Western fly catcher
Trails
Cowbirds
Golden pilated warbler
Goldfinch
Wrens
Swallows
Robins
Thrushes
Wren Tit, rush tit
Sparrows
Solitary vireo
Blackbirds

Game Fish

Steelhead trout
Silver salmon
Chinook salmon (ocean)
Cutthroat trout
Rainbow trout

Owls
Peregrine falcon
(rare & endangered)
Hawks
Crows
Ravens
Jays
Oregon junco
Rufous-sided towhee
Starlings
Finches
Hummingbirds

e. Fish and Marine Life

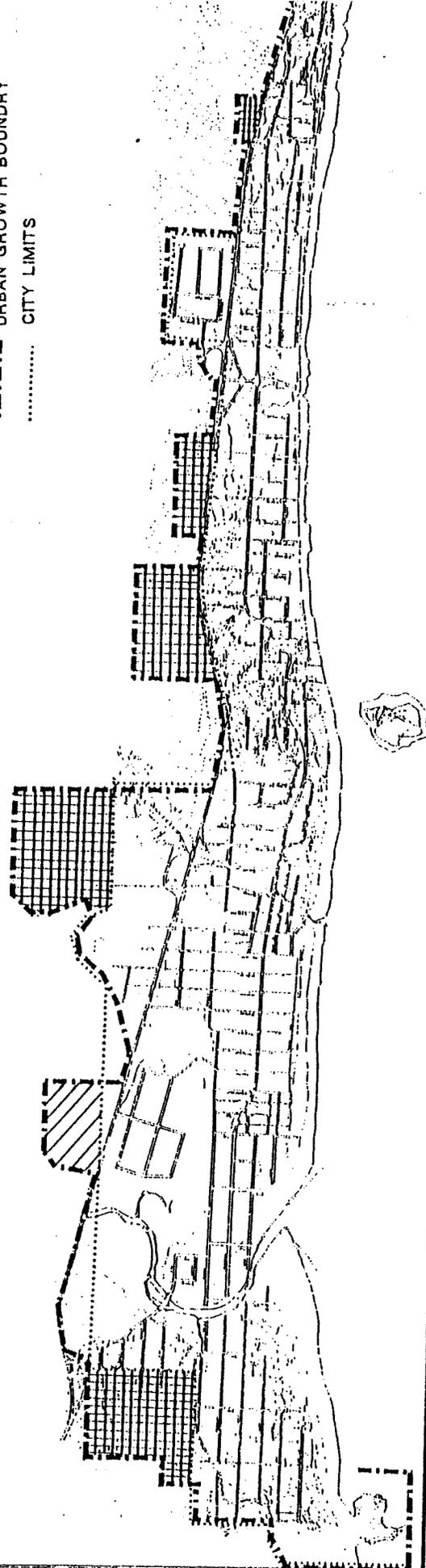
Coastal streams contain habitat for Pacific salmon, steelhead, and sea-run cutthroat trout. Ecola Creek receives runs from three main species of these anadromous salmonids, which include the Pacific coho salmon, sea-run cutthroat trout and steelhead. The Oregon Department of Fish and Wildlife has surveyed the coho population of Ecola Creek since 1981. The attached table entitled, Standard Coho Survey 1981-1994, graphically displays the results of this survey and provides comparison data for the upper portion of the Necanicum River. The number of fish surveyed over the fourteen year period ranged from one in 1992 and 1993 to 76 in 1985. The median number of fish surveyed was between 16 and 19. Of the seven years with the lowest fish counts, four have been in the 1990's. Fish have been surveyed in the creek from the last week in October to the second week in February. Fish have been surveyed in each week of this 21 week period. According to the Department of Fish and Wildlife, having a wide range of time in which fish move into the river allows a greater chance for sustaining the fish population. In February of 1995, the Oregon Fish and Wildlife Commission determined not to list the coastal coho as a threatened or endangered species; coastal coho were listed as a sensitive species. This decision will be reviewed in one year. At the federal level, the process for considering the listing of coastal coho as an endangered species has been initiated. The National Marine Fisheries Service has proposed listing the coastal coho as a threatened species (1995). Resident cutthroat and resident steelhead inhabit Ecola Creek in its upper reaches. Their numbers have not been estimated, but of the two species cutthroat trout are more abundant and widespread.

The Cannon Beach area contains no large estuaries or extensive breeding areas for marine animals. However, there are several headlands and points, rock promontories and seastacks along the coast that provide habitats for a wide variety of marine flora and fauna. Tillamook Head, Ecola Point, Chapman Point, Haystack Rock, Jockey Cap Rock and Hug Point provide intertidal habitats for

City of Cannon Beach



--- URBAN GROWTH BOUNDARY
..... CITY LIMITS



FOREST LAND SITE CLASS

GRID PATTERN SITE CLASS II
DIAGONAL LINES NONE

many saltwater organisms. A limited amount of surf fishing from the beach and points goes on during the summer.

Common species in the area are:

Sponge	Gumboot chiton
Nudibranch	Ribbon worm
Leather chiton	Sea lemon
Green anemone	Chiton
Leather star	Anemone
Lined chiton	Blood star
Tube worm	Finger limpet
Ochre star	Goose-neck barnacle
Bishop's hat limpet	Slender-rayed star
Acorn Barnacle	Leafy horn mouth
Six-rayed star	Pill bug
Black turban snail	Twenty-four-rayed star
Hermit crab	Keyhole limpet
Porcelain crab	Periwinkly snail
Red sea cucumber	Oregon cancer crab
Blue-top shell	White sea cucumber
Purple shore crab	Dire's whelk
Purple sea urchin	Kelp crab
Snails	Red sea urchin
Solitary ascidian	Colonial ascidian

Limited amounts of silver and chinook salmon and various species of bottom fish are caught off the coast of Cannon Beach.

Ecola Creek Estuary

According to the Estuarine Resources of the Oregon Coast, by the Oregon Coastal Conservation and Development Commission, 1974, Ecola Creek may qualify as a Type III or "Conservation" Estuary (areas to be designated for long-term uses of renewable resources and that do not require major alteration of the estuary, except for the purposes of restoration). But due to its minimal estuarine characteristics, Ecola Creek might also be considered a "drowned tidal creek".

many saltwater organisms. A limited amount of surf fishing from the beach and points goes on during the summer.

Common species in the area are:

Sponge	Gumboot chiton
Nudibranch	Ribbon worm
Leather chiton	Sea lemon
Green anemone	Chiton
Leather star	Anemone
Lined chiton	Blood star
Tube worm	Finger limpet
Ochre star	Goose-neck barnacle
Bishop's hat limpet	Slender-rayed star
Acorn Barnacle	Leafy horn mouth
Six-rayed star	Pill bug
Black turban snail	Twenty-four-rayed star
Hermit crab	Keyhole limpet
Porcelain crab	Periwinkly snail
Red sea cucumber	Oregon cancer crab
Blue-top shell	White sea cucumber
Purple shore crab	Dire's whelk
Purple sea urchin	Kelp crab
Snails	Red sea urchin
Solitary ascidian	Colonial ascidian

Limited amounts of silver and chinook salmon and various species of bottom fish are caught off the coast of Cannon Beach.

Ecola Creek Estuary

According to the Estuarine Resources of the Oregon Coast, by the Oregon Coastal Conservation and Development Commission, 1974, Ecola Creek may qualify as a Type III or "Conservation" Estuary (areas to be designated for long-term uses of renewable resources and that do not require major alteration of the estuary, except for the purposes of restoration). But due to its minimal estuarine characteristics, Ecola Creek might also be considered a "drowned tidal creek".

Tidal influence extends to just above the U.S. 101 bridge, a total distance of ½ of a mile. Ecola Creek is a well-mixed tidal creek having very low marine biological and moderate terrestrial biological value. Ecola Creek has no definable eel-grass beds or tidelands. According to the Cannon Beach Wetland Study, the Ecola Creek estuarine area consists of forested wetlands, estuarine emergent wetland and estuarine/shrub-scrub wetlands. The forested wetland vegetation is described as a "multi-layered canopy dominated by Sitka spruce, red alder, Hooker's willow, salmonberry, skunk cabbage, slough sedge and lady fern". The vegetation found in the estuarine emergent wetlands consists of Pacific silverleaf, Lyngbye's sedge and beachgrass. The vegetation in the estuarine shrub-scrub is similar to that of the emergent vegetation but the area is being invaded by Hooker's willow.

Ecola Creek has sediments of mixed sand, gravel and mud. These sediment types combined with low salinities limit Ecola Creek to small anadromous fish runs of coho and steelhead trout. But for its size Ecola Creek sustains a fairly large stable run of native searun cutthroat trout; and for this reason the Oregon Department of Fish and Wildlife recommends that Ecola Creek be left in its natural state of providing a "wild stock" anadromous fishery.

Ecola Creek is an important natural resource for Cannon Beach. It serves as a recreation area for swimmers, fishermen, hikers, canoeists and bird watchers. In a relatively short distance, it flows from a completely natural setting into a dense downtown area. (Information on the hydrology, tidal characteristics and wildlife are contained in the background data.) Ecola Creek has been identified by the Oregon Department of Fish and Wildlife as one of the most productive native searun cutthroat trout streams on the Oregon Coast. Numerous species of birds, small mammals and other animals inhabit the wetlands area east of U.S. Highway 101. This area is also noted as an important elk wintering habitat. Although there have been no recent sightings of rare and endangered species such as the bald eagle and peregrine falcon in the Ecola Creek area, these raptors have been known to inhabit Ecola Park area and feed on fish and waterfowl at the mouth of the creek.

As development of the City has occurred, Ecola Creek wetlands have been filled and diked. The City's downtown area sits on approximately 20 acres filled tidelands and wetlands. Of the approximately 100 acres of wetlands on the east side of U.S. Highway 101, about 5 acres have been filled. Approximately 16

acres west of U.S. Highway 101 remain in somewhat natural condition around the city park.

Although flooding has occurred recently (1967) and caused some damage, the City has raised the level of the dike and is in the process of adopting flood protection controls under the Federal Flood Insurance Administration Program. A proposal (in 1975) by the U.S. Army Corps of Engineers to extensively dike the area was rejected as being too costly. Clatsop County adopted an exception to the requirements of the Estuarine Resources Goal and the Coastal Shorelands Goal to permit the construction of a wetland treatment component to the city's wastewater treatment system, east of Highway 101. This system has been in operation, in conformance with the requirements of the city's NPDES Waste Discharge Permit, since 1984.

The ownership of the estuary and its shorelands is both public and private; uses such as the elementary school, Les Shirley Park, the wetlands area east of the dike and a small area of city property east of the Hemlock Street Bridge constitute the public property. Private holdings on the estuary consist of the Breakers Point development, homes situated along the mouth of the creek, a recreational vehicle park which incorporates a seasonal horse rental operation, and a conference center. East of U.S. Highway 101, the estuary is essentially undeveloped, with the exception of the wetlands treatment portion of the city's wastewater treatment facility

The U.S. Army Corps of Engineers has jurisdiction in the estuary under the "404" Wetlands Protection Program. The Oregon Division of State Lands regulates estuarine areas under provisions of the Fill and Removal Law. A schematic of the Ecola Creek estuary and the permit responsibilities of the various agencies is as follows:

Although the handbook mentioned here is useful in obtaining a general idea of the jurisdictions and concerns of the permit agencies, it is considered important by the agencies that any proposal must be examined on a site-specific, or case-by-case basis.

Portions of the Ecola Creek estuary, east of U.S. Highway 101, lies in unincorporated Clatsop County, within the city's urban growth boundary and within the city limits.

AIR & WATER QUALITY

AIR & WATER QUALITY

Water Quality

The Department of Environmental Quality is the state agency with the primary responsibility for managing water quality in the state. Generally, the focus of regulations is on managing pollution sources so that defined water quality standards are met. For surface waters, the source of pollution is defined as either a point source or a nonpoint source. Generally, pollutants originating from industrial and municipal waste sources are defined as point sources. Pollutants originating from dispersed activities associated with agriculture, forestry, and urban activities are defined as nonpoint sources.

Point Source Pollution

There is only one point source of pollution in the city, the city's wastewater treatment system. The city has consistently met the discharge requirements of its National Pollution Discharge Elimination Permit System (NPDES) permit. The city's NPDES permit was renewed in 1993 and is effective until June 30, 1998. The DEQ has begun review of the city's permit.

Nonpoint Source Pollution

There are three main regulatory programs to protect surface waters from nonpoint source pollution, the Coastal Nonpoint Pollution Control Program (CNPCP), Section 303(d) of the Clean Water Act, and the Environmental Protection Agency's (EPA) Phase II Regulations under Section 402 of the Clean Water Act.

Coastal Nonpoint Pollution Control Program

In 1990, the U.S. Congress adopted new water quality requirements for states that have federally approved coastal resource management programs. That requirement is generally referred to as the Coastal Nonpoint Pollution Control Program (CNPCP). In Oregon, the Department of Land Conservation and Development (DLCD) and the Department of Environmental Quality (DEQ) are responsible for the development of that program. The goal of the program is to protect coastal waters from nonpoint source pollution.

In January of 1998, the Environmental Protection Agency (EPA) informed the DLCD and DEQ that Oregon's plan of action to comply with the CNPCP had been conditionally approved. Consistent with EPA requirements, Oregon's program is organized by categories for agricultural activities, forest activities, urban areas, marinas and recreational boating, hydromodification, and wetland protection. In order to meet water quality objectives, Oregon's program relies on state agencies and local government to implement program elements referred to as management measure. Management measures are ways of doing things that will reduce nonpoint source pollution. Most of the management measures pertinent to Cannon Beach are defined as urban management measures.

There are also several measures in the hydromodification and wetlands protection components that are relevant to the city.

The management measures that are applicable to Cannon Beach have the following objectives:

- The protection of wetlands, streams and associated riparian areas;
- The promotion of the restoration of wetland and riparian areas;
- The reduction of sedimentation and erosion;
- Limiting the increase in post development storm water runoff rates and volumes; and;
- A reduction in the pollution of surface waters caused by chemicals and nutrient sources.

For the city to achieve these objectives, various approaches are required. Some objectives can be achieved through regulatory means, for example the protection of wetlands, streams and associated riparian areas. Other objectives require specific actions, such as wetland restoration. To achieve some objectives, such as limiting the pollution of surface waters by the application and disposal of lawn and garden care products, the city's role is primarily one of education.

The following is an analysis of the city's existing planning and regulatory framework in terms of the five objectives listed above.

Protection of Wetlands, Streams and Associated Riparian Areas

There are two types of wetlands within the city's urban growth boundary, estuarine wetlands and nonestuarine wetlands.

Estuarine wetlands are associated with Ecola Creek. The city's comprehensive plan contains an Ecola Creek Estuary Plan Policy section. The Ecola Creek Estuary Plan's stated purpose is to protect the natural resources of the creek area. Pursuant to this purpose, only uses with minimal impact on the estuary are permitted. The following are policies that are relevant to nonpoint source pollution control measures:

Ecola Creek Estuary Policy 3 Alterations to the shoreline or the creek which will alter the flow of the stream are not permitted.

Ecola Creek Estuary Policy 4 Riparian vegetation along Ecola Creek shall be protected, except where removal is permitted in conjunction with an approved use or activity.

Ecola Creek Estuary Policy 7 The management and improvement of Les Shirley Park shall be compatible with Ecola Creek environment. Natural vegetation shall be retained, particularly along Ecola and Logan Creeks

Ecola Creek Estuary Policy 15 Proper management of existing stream side vegetation is the preferred method of shoreline stabilization followed by the planting of vegetation. Where vegetative protection is inappropriate (because of high erosion rate, the use of the site, or other factors), structural means such as riprap or bulkheading may be considered, if consistent with the restrictions in the estuarine zone.

Downtown Policy 11 The City will prepare a management plan for the estuarine area located east of Spruce Street. The intent of this management plan shall be to preserve the integrity of the estuarine area while accommodating the storm water that it drains.

Uses and activities in the estuarine area are regulated by Estuarine zone standards in the zoning ordinance. The purpose of the Estuarine zone is to assure the protection of fish and wildlife habitats, maintain the biological productivity of the estuary, and provide low-intensity uses that do not require major alterations to the estuary. Consistent with these purposes, only a limited number of uses and activities are permitted in the estuary. The Estuarine zone contains standards that address specific management measures contained in the CNPCP:

- Bridge crossing and bridge crossing support structure standards require that the repair and placement of a bridge is conducted in a manner that minimizes the impact on the estuarine environment.
- Riparian vegetation is protected.
- The active restoration of fish and wildlife habitat and estuarine enhancements are permitted as conditional uses.

In summary, the city has management measures in place to protect estuarine wetlands from potential adverse effects of specific uses and activities as identified in the CNPCP.

The following comprehensive plan policies are applicable to the objective of protecting nonestuarine wetlands located within the city:

General Development Policy 14. To ensure that development is designed to preserve significant site features such as trees, streams and wetlands.

Northside Policy 1. The Northside area, the area north of Ecola Creek, shall remain primarily residential in character. Development should take place only in a manner that is compatible with sensitive lands, steep slopes, active foredunes, areas subject to flooding, wetlands and stream banks.

Northside Policy 8. Clustering of development may be considered in order to reduce the effect of geologic hazards, protect trees and wetland areas, and to retain larger areas of open space. Where cluster development is permitted, wetland areas shall not be used in determining the permitted density of the development (no density transfer from wetland to upland areas).

The wetland overlay zone implements the city's goal of protecting nonestuarine wetlands. The wetland overlay zone contains standards that address specific management measures contained in the CNPCP:

- Standards to protect wetlands and an adjacent buffer;
- Standards that minimize the amount of fill permitted;
- Standards that address construction practices in wetlands in order to minimize impact on wetlands, including contamination with construction waste or debris;
- Control of stormwater discharged into the wetland;

In summary, the city has management measures in place to protect nonestuarine wetlands from adverse effects of uses and activities as identified in the CNPCP.

The following comprehensive plan policies are applicable to the objective of stream and riparian area protection:

General Development Policy 14 To ensure that development is designed to preserve significant site features such as trees, streams and wetlands.

Northside Policy 1 The Northside area, the area north of Ecola Creek, shall remain primarily residential in character. Development should take place only in a manner that is compatible with sensitive lands, steep slopes, active foredunes, areas subject to flooding, wetlands and stream banks.

Northside Policy 4 Les Shirley Park shall be maintained and improved in a manner that is compatible with the Ecola Creek estuary and adjacent residential development. Riparian vegetation adjacent to Ecola Creek and Logan Creek shall be left in its natural condition.

Northside Policy 5. A fifteen foot buffer on either side of Logan Creek is established to protect riparian vegetation. In order to minimize impacts on riparian vegetation, uses and activities permitted within the buffer shall be limited.

The integrity of Ecola Creek is protected by the standards in the estuary zone. The stream corridor protection standards in the zoning ordinance provide protection for other streams in the city. The stream corridor protection section contains standards that address specific management measures contained in the CNPCP:

- A minimum ten foot buffer on either side of a stream, with only a limited number of activities permitted within the buffer;
- Standards that control the removal of riparian vegetation
- Priorities for stream bank protection, with management of existing stream-side vegetation being the highest priority;
- A standard which limits the placement of culverts and stream channelization; and
- Regulation of the discharge of storm water into streams.

In summary, the city has management measures in place to protect streams and adjacent riparian areas from adverse effects of uses and activities, as identified in the CNPCP.

Restoration of Wetland and Riparian Areas

The state of Oregon has embarked on a program to restore native anadromous fish populations by conserving and restoring the aquatic systems that support them. This program is referred to as the Oregon Plan. The Oregon Plan is based on a watershed planning approach. Watershed councils have been formed to provide a forum for interested parties and landowners to cooperate in the development of a plan of action for the improvement of aquatic habitat within that watershed. Elements of the planning process include an assessment of the condition of the watershed, an action plan and monitoring measures.

Cannon Beach is located within the Ecola Creek watershed. A watershed council was formed in 1997. As of the spring of 1998, initial assessment work is underway. The vast majority of land within the watershed is forest land located east of the city's urban growth boundary. However, the city contains the estuarine portion of the watershed. With the development of the city, this area has been subject to substantial alteration. A number of these altered areas may represent opportunities for estuarine restoration or enhancement. The city's comprehensive plan and zoning ordinance permit active restoration of fish habitat and estuarine enhancement measures.

In summary, the city has management measures in place that would permit the restoration of estuarine wetland and riparian areas.

Sedimentation and Erosion Control

The following comprehensive plan policies address sedimentation and erosion control

General Development Policy 4 The City shall control excavation, grading, and filling in order to: avoid landslides and other geologic hazards; protect adjacent property and structures; provide for appropriate drainage improvements; minimize the extent of vegetation removal; minimize erosion and sedimentation; and protect the aesthetic character of the City.

Air, Water and Land Quality Policy 3. The City will adopt and implement erosion and sedimentation control measures to protect water quality, fish and wildlife habitat, and its investment in the storm drainage system.

These policies are implemented by the grading, sedimentation and erosion control section of the zoning ordinance, as well as standards in the subdivision ordinance which require the preparation and implementation of grading plans and sedimentation and erosion control plans. These city provisions contain standards that address specific management measures contained in the CNPCP:

- Require preparation of an erosion and sediment control plan;
- Encourage minimum land disturbance;
- Controls grading; and
- Require that sediment be retained onsite during and after construction.

In summary, the city has management measures in place to meet the CNPCP' s objective of limiting the impact of sedimentation and erosion on the city's water bodies.

Storm Water Management

The CNPCP contains two types of management measures relevant to this objective, measures to limit the quantity of storm water generated by development and measures to affect the quality of storm water. Oregon's CNPCP proposes to develop recommendations for local government on the best management practices to achieve these objectives. When such recommendations become available, the city will consider, at least at the time of its next periodic review, the adoption of those recommended measures as part of its public facility improvement standards.

The city has implemented several stormwater management measures. Residential development in the city is limited to a maximum lot coverage of 50%. This standard meets the objective of limiting the increase in impervious surfaces. The city's tree removal requirements and land clearing standards limit land disturbance during construction.

Pollution prevention

Applicable pollution prevention management measures address the following issues: the improper disposal of household chemicals, the application of lawn and garden herbicides, and the discharge of oil into the storm drainage system. The CNPCP proposes the development of information and technical assistance for local governments to use in educating the public on these issues. The city will utilize this material when it becomes available.

The city has implemented a number of measures designed to reduce the types of pollution identified by the CNPCP. In conjunction with the DEQ, the city has held several one day household hazardous waste collection events. The city plans to schedule additional collections in the future. The city has an unwritten policy of not using herbicides in the maintenance of its parks and landscaped areas.

Section 303(d) of the Clean Water Act

As required by Section 303(d) of the Clean Water Act, the Oregon Department of Environmental Quality (DEQ) recently completed (1998) an inventory of the water quality of the streams in the state. The streams found not to meet water quality standards were designated "water quality limited streams." Ecola Creek and Logan Creek were not placed on the list of "water quality limited streams." This indicates that these two streams are not experiencing significant levels of water quality degradation. As a consequence of not being placed on the list of "water quality limited streams," the DEQ is not required to develop Total Maximum Daily Loads (TMDLs) for Ecola Creek or Logan Creek.

EPA Phase II Regulations

In 1987, the Clean Water Act was expanded to include the regulation of storm water discharge. The legislation required that certain stormwater discharges obtain a National Pollution Discharge Elimination System (NPDES) permit. The legislation also created a phased approach to regulating storm water discharges, beginning with large municipal and industrial sources (Phase I Regulations). On January 9, 1998, the Environmental Protection Agency (EPA) published its proposed Phase II regulations. The regulations are to become effective on March 1, 1999. These regulations will extend the scope of stormwater regulations by including smaller municipalities and covering construction sites of between one and five acres (Construction sites of five acres or more are already regulated by the DEQ under Phase I regulations). All municipal stormwater systems are "potentially designated" as subject to Phase II requirements. For cities located outside the state's major metropolitan areas, the DEQ is charged with evaluating these systems based on criteria developed to assess their impact on water quality. The DEQ must apply the criteria to cities serving a population of more than 10,000. It is not known whether the DEQ will apply the Phase II regulations to Cannon Beach. It is assumed that in the near term, the DEQ will focus on cities with a population of more than 10,000.

The city requires that construction on sites of between one and five acres prepare and implement erosion and sedimentation control plans. The DEQ has not determined how the proposed NPDES permit requirement for construction sites of between one and five acres will be integrated with existing local programs.

Groundwater

There is limited information available on the quality of groundwater located within Cannon Beach.

Between 1988 and 1990, the city investigated the feasibility of augmenting its municipal water supply through the development of a groundwater source. Groundwater was identified as a viable source of supply and test wells were drilled adjacent to Ecola Creek, east of the recreational vehicle park. The well tests determined that well field development could yield approximately 120 to 125 gallons per minute per field. However, water quality analysis found that the water was high in both iron and manganese. The iron levels were from eight to 20 parts per million and the manganese

levels were approximately two parts per million. In 1990, the drinking water limit for iron was .3 parts per million and for manganese it was 0.05 parts per million. Consequently, the use of the groundwater as a municipal water source would require treatment to remove the iron and manganese. The city determined that this option was no cost effective.

The city does not contain any sensitive groundwater areas that have been identified by the Department of Environmental Quality.

In order to identify potential sources of groundwater pollution, the DEQ's "Environmental Cleanup Site Information System" was reviewed. No Cannon Beach sites are identified on the list.

The DEQ's Leaking Underground Storage Tank (LUST) list includes two sites in Cannon Beach. The Cannon Beach Rural Fire Protection District downtown fire station and a residence located at 234 Noatak. The Cannon Beach Rural Fire Protection District has completed the removal and cleanup of its underground storage tank. However, the DEQ has not completed its paperwork in order to remove the site from its list. The site at 234 Noatak is a home heating oil tank.

There are three gasoline service stations in Cannon Beach, one of which is inoperative, Sage's. Gary's Cannon Beach Service Center and the Cannon Beach RV Resort have upgraded their storage tanks to meet current standards. Sage's will be required to decommission its two tanks by December 22, 1998. No contamination in conjunction with these sites has been identified.

Air Quality

In 1974, the Environmental Protection Agency (EPA) issued air quality regulations under the 1970 version of the Clean Air Act (P.L. 91-604) for the prevention of significant deterioration of air quality (PSD). These regulations established a scheme for protecting areas with air quality cleaner than the national ambient air quality standards (NAAQS). EPA's prevention of significant deterioration regulatory scheme was further modified by 1977 amendments to the Clean Air Act (P.L. 95-95).

Under existing EPA regulations, "clean areas" of the nation can be designated under one of three "classes". Specified numerical "ambient increments" of net air pollution increases are permitted under each class up to a level considered to be significant for that area. Class I increments permit only insignificant air quality deterioration; Class II increments permit moderate deterioration; Class III increments allow for the greatest amount of deterioration, but in no case beyond the national air quality standards.

Under the Federal regulations, all areas of the state are automatically classified as Class II areas, except for mandatory Class I areas and "non-attainment" areas. The area classification scheme is administered and enforced through a pre-construction and pre-modification permit program for specific types of stationary air pollution sources. No such air pollution sources could begin construction or modification unless EPA and DEQ have found that the source's emissions will not exceed the numerical "increments" for the applicable class, and that the source would use the best available air pollution control technology.

Under this classification scheme, Cannon Beach is a Class II area. According to DEQ's Handbook for Environmental Quality Elements of Oregon Local Comprehensive Plans, the Cannon Beach airshed has 100% of its Class II TSP and SO₂ "increments" still available to it. This implies that some air quality deterioration, through industrial development, could take place without exceeding national air quality standards. However, there is presently no industrial development in Cannon Beach, nor does this plan make provision for new industrial uses. Land use provisions in the comprehensive plan will not result in a "using up" of Class II PSD increments for the area. Thus it has been determined that Cannon Beach's comprehensive plan does not appear to conflict with Class II PSD air quality standards.

Using the method contained in DEQ's Handbook, a calculation was made to determine whether there is a violation of the carbon monoxide air quality standards.

Within the Cannon Beach area, only Highway 101 carries substantial amounts of traffic. The Department of Transportation's Traffic Volume Tables for 1977 indicates that 4300 vehicles per day use the highway at the north entrance to Cannon Beach. This is well below the volume of traffic necessary to generate an excess of carbon monoxide. Due to the capacity limitations of Highway 101, traffic volume in 1990 will also not result in excessive carbon monoxide levels, Thus it has been determined that the needs within the comprehensive plan area do not cause existing or future violations of 8-hour carbon monoxide standards. The winds in Cannon Beach, from the southwest in the winter and northwest in the summer, provide adequate ventilation for the pollutants that accumulate in the downtown area. Traffic figures are not available for the downtown area, although long time residents report that the "new highway" and the Spruce Street improvement have substantially reduced traffic congestion in the downtown area.

Solid Waste

The solid waste collection system for Cannon Beach is operated by a private collector who is franchised by the city. Disposal of solid waste is done at a nearby (to the city) open-burning dump owned and operated by the collector. As with jurisdictions using other Clatsop County disposal sites, Cannon Beach is working with the Clatsop County Solid Waste District to find a permanent sanitary landfill site. Present dump sites are operating under permit extensions from the State Department of Environmental Quality. Cannon Beach also funds and operates a recycling center for the collection of glass, tin, aluminum, paper and cardboard. It is apparent that the recycling center has had a major impact by reducing the amount of solid waste normally dumped at disposal sites now being used by the community. CTIC membership also has directed its staff members to prepare recommendations for a two-county cooperative effort to deal with solid waste disposal and recycling of reusable materials.

AIR QUALITY
SUMMARY OF ESTIMATED ANNUAL EMISSIONS
(TONS/YEAR) BY SOURCE CATEGORY
CLATSOP COUNTY

TOTAL PARTICULATES

SOURCE CATEGORY	TONS/YEAR

A. Fuel Combustion Sources:	
1. Residential Fuel Combustion	6
2. Commercial Fuel Combustion	41
3. Industrial Fuel Combustion	349
	407

B. Process Loss Sources:	
1. Chemical Industries	0
2. Food/Agriculture Industries	66
3. Metallurgical Industries	0
4. Mineral Products Industries	44
5. Petrochemical Industries	0
6. Wood Processing Industries	687
7. Other Industries	0
	799

C. Transportation Sources:	
1. Motor Vehicles	216
2. Off-Highway Fuel Use	6
	223

D. Solid Waste Sources:	
1. Incineration	0
2. Open Burning	33
3. Wigwam Waste Burners	0
	33

E. Miscellaneous Area Sources:	
1. Field Burning	0
2. Forest Fires	64
3. Slash Burning	66
4. Other	25
	156

TOTAL MISCELLANEOUS	156

SUMMARY BY SOURCE CLASS:

1.	AREA SOURCES	422
2.	POINT SOURCES	1,197
	TOTAL OF ALL SOURCES	<hr/> 1,620

SUMMARY OF ESTIMATED ANNUAL EMISSIONS
(TONS/YEAR BY SOURCE) CATEGORY
CLATSOP COUNTY

SULFUR OXIDES

SOURCE CATEGORY	TONS/YEAR

A. Fuel Combustion Sources:	
1. Residential Fuel Combustion	78
2. Commercial Fuel Combustion	395
3. Industrial Fuel Combustion	1,046
	1,519

B. Process Loss Sources:	
1. Chemical Industries	0
2. Food/Agriculture Industries	0
3. Metallurgical Industries	0
4. Mineral Products Industries	0
5. Petrochemical Industries	0
6. Wood Processing Industries	83
7. Other Industries	0
	83

C. Transportation Sources:	
1. Motor Vehicles	73
2. Off-Highway Fuel Use	7
	80

D. Solid Waste Sources:	
1. Incineration	0
2. Open Burning	2
3. Wigwam Waste Burners	0
	2

E. Miscellaneous Area Sources:	
1. Field Burning	0
2. Forest Fires	0
3. Slash Burning	0
4. Other	115
	115

SUMMARY BY SOURCE CLASS:

1.	AREA SOURCES	561
2.	POINT SOURCES	1,240

	TOTAL OF ALL SOURCES	<hr/>
	AS OF 06/15/78	1,801

SUMMARY OF ESTIMATED ANNUAL EMISSIONS
(TONS/YEAR BY SOURCE) CATEGORY
CLATSOP COUNTY

NITROGEN OXIDES

SOURCE CATEGORY	TONS/YEAR

A. Fuel Combustion Sources:	
1. Residential Fuel Combustion	52
2. Commercial Fuel Combustion	121
3. Industrial Fuel Combustion	803
	977

B. Process Loss Sources:	
1. Chemical Industries	0
2. Food/Agriculture Industries	0
3. Metallurgical Industries	0
4. Mineral Products Industries	0
5. Petrochemical Industries	0
6. Wood Processing Industries	0
7. Other Industries	0
	0

C. Transportation Sources:	
1. Motor Vehicles	1,958
2. Off-Highway Fuel Use	75
	2,034

D. Solid Waste Sources:	
1. Incineration	0
2. Open Burning	12
3. Wigwam Waste Burners	0
	12

E. Miscellaneous Area Sources:	
1. Field Burning	0
2. Forest Fires	14
3. Slash Burning	14
4. Other	225
	255

SUMMARY BY SOURCE CLASS:

1.	AREA SOURCES	2,481
2.	POINT SOURCES	797

TOTAL OF ALL SOURCES		<hr/>
AS OF 06/15/78		3,279

SUMMARY OF ESTIMATED ANNUAL EMISSIONS
(TONS/YEAR BY SOURCE) CATEGORY
CLATSOP COUNTY

CARBON MONOXIDE

SOURCE CATEGORY	TONS/YEAR

A. Fuel Combustion Sources:	
1. Residential Fuel Combustion	13
2. Commercial Fuel Combustion	9
3. Industrial Fuel Combustion	85
	108

B. Process Loss Sources:	
1. Chemical Industries	0
2. Food/Agriculture Industries	0
3. Metallurgical Industries	0
4. Mineral Products Industries	0
5. Petrochemical Industries	0
6. Wood Processing Industries	3,671
7. Other Industries	0
	3,671

C. Transportation Sources:	
1. Motor Vehicles	16,815
2. Off-Highway Fuel Use	714
	17,529

D. Solid Waste Sources:	
1. Incineration	0
2. Open Burning	176
3. Wigwam Waste Burners	1
	177

E. Miscellaneous Area Sources:	
1. Field Burning	0
2. Forest Fires	460
3. Slash Burning	475
4. Other	74
	1,011

SUMMARY BY SOURCE CLASS:

1.	AREA SOURCES	18,564
2.	POINT SOURCES	3,933

	TOTAL OF ALL SOURCES	<hr/>
	AS OF 06/15/78	22,497

SUMMARY OF ESTIMATED ANNUAL EMISSIONS
(TONS/YEAR BY SOURCE) CATEGORY
CLATSOP COUNTY

TOTAL ORGANICS

SOURCE CATEGORY	TONS/YEAR

A. Fuel Combustion Sources:	
1. Residential Fuel Combustion	3
2. Commercial Fuel Combustion	6
3. Industrial Fuel Combustion	56
	66
TOTAL FUEL COMBUSTION	

B. Process Loss Sources:	
1. Chemical Industries	0
2. Food/Agriculture Industries	1
3. Metallurgical Industries	0
4. Mineral Products Industries	0
5. Petrochemical Industries	0
6. Wood Processing Industries	1
7. Other Industries	0
	2
TOTAL PROCESS LOSS	

C. Transportation Sources:	
1. Motor Vehicles	2,245
2. Off-Highway Fuel Use	40
	2,286
TOTAL TRANSPORTATION	

D. Solid Waste Sources:	
1. Incineration	0
2. Open Burning	62
3. Wigwam Waste Burners	0
	62
TOTAL SOLID WASTE	

E. Miscellaneous Area Sources:	
1. Field Burning	0
2. Forest Fires	86
3. Slash Burning	89
4. Other	340
	516
TOTAL MISCELLANEOUS	

SUMMARY BY SOURCE CLASS:

- 1. AREA SOURCES 2,813
- 2. POINT SOURCES 121

TOTAL OF ALL SOURCES 2,934
AS OF 06/15/78

GEOLOGIC HAZARDS

A Field Investigation of Geologic Hazards
In Cannon Beach, Oregon

Prepared by
Martin E. Ross
Geologist
Cannon Beach, Oregon

June 3, 1977

A FIELD INVESTIGATION OF GEOLOGIC HAZARDS
IN CANNON BEACH, OREGON

PURPOSE AND SCOPE OF INVESTIGATION

This investigation was undertaken at the request of the Clatsop-Tillamook Intergovernmental Council (CTIC) as part of the development of a comprehensive land-use plan for the City of Cannon Beach. It was requested by CTIC that the following three areas of the city be mapped in detail (see Fig. 1): 1) the area within the city limits south of Sitka Street; 2) the area between the beach and Hemlock Street from Gulcana Avenue north to the marine terrace and the area south of Chena Avenue between Hemlock Street and U.S. Highway 101 as far south as an imaginary eastward extension of Gulcana Avenue; 3) the area bounded on the north by 9th Street (unimproved dirt road) and Crown Zellerbach property, on the south and west by the city limits and Ecola Park Road, and on the east by U.S. Highway 101. In this report three areas will be referred to respectively as the south end area, the curves area, and the north end area. Detailed mapping of major rock units and existing and potential geologic hazards (mainly land-slides) was done in the above three areas. Mapping extended beyond the limits of these areas locally to include related features (such as the landslide scarp just east of Hemlock Street in the curves area). At the request of CTIC, detailed mapping of ocean undercutting and landsliding along the beach frontage from the mouth of Elk Creek to the southern city limits was done. Within the remainder of the city, reconnaissance mapping was done to more accurately delineate contacts between the major stratigraphic units present. Soils (including beach and dune sands) were not mapped since they have been recently mapped (at a scale of 1" x 800'), for Cannon Beach by the U. S. Soil Conservation Service. The dune area of Breakers Point has already been studied in detail (Rosenfeld, 1976) with only the erosional effects of a single storm described herein.

METHODS OF INVESTIGATION

A total of five days of mapping was conducted intermittently between March 8 and April 24, 1977. Topographic base maps with a scale of 1 inch = 100 feet and a contour interval of 2 feet were used except for much of the north end area for which coverage at this scale was not available. For this area the 7 1/2 minute Tillamook Head Quadrangle was enlarged to a scale of 1 inch = 400

feet (with a contour interval of 50 feet) and used for mapping. Features could be less precisely plotted at this scale than on the larger scale maps (1 inch = 100 feet). Most of the roads north of the city limits had to be mapped since they were constructed after publication of the Tillamook Head Quadrangle in 1949. The field map was then enlarged to a scale of 1 inch = 100 feet (contour interval remained 50 feet) for illustrative purposes.

Mapping was done on foot by visual inspection and the pace-and-Brunton compass technique utilizing cultural and topographic features as landmarks in locating positions of geologic features. The stratigraphic terminology of Schlicker and others (1972) is used in this report. The actual contacts between adjacent stratigraphic units are rarely visible in the field due to soil and vegetation cover and modifying effects of erosion. As a result the exact location of contacts by surface investigation is impossible. In most instances, a change in topography (and perhaps soil type) occurs across a fairly narrow zone underlain by a hidden contact between contrasting rock types. The contacts shown on Sheets 1 through 8 (1 inch = 100 foot maps will be referred to as sheets in this report) are probably located within about 20 feet of their actual position on the ground. Their exact location would require more detailed study utilizing information from borings, test pits, trenches, geophysical investigations. The present mapping (Sheets 1 - 8) is substantially more precise and detailed than the available reconnaissance map (Schlicker and others, 1972) with a scale of approximately one inch a one mile. A contact shown on this earlier map may be plotted in excess of 200 feet of its actual position on the ground and still be within acceptable limits of error for mapping at that scale.

ROCK UNITS MAPPED

The five rock units mapped are: Oligocene to Miocene sedimentary rocks (Toms), the Miocene Astoria Formation (Tma), Miocene basaltic intrusive rocks (Ti), Pleistocene marine terrace deposits (Qmt), and Pleistocene to Holocene flood plain alluvium (sc).

Oligocene to Miocene Sedimentary Rocks (Toms)

In Cannon Beach, this unit consists of tan to yellow-brown, thin bedded to massive tuffaceous siltstone and claystone and lesser amounts of thin-bedded, light to dark gray shales and micaceous siltstones. These marine sedimentary rocks form the steeper upland areas in the central and northern portions of the Cannon Beach area

and are the oldest rocks exposed within the area (Fig. 1). The predominant residual soils developed on these rocks are Tolovana silt loam, Chitwood silty clay loam, Ecola silt loam, and Walluski silt loam (soils mapped by U.S. SCS). Some of the engineering characteristics of these soils are summarized in Table 1. These rocks and related soils are very susceptible to landsliding.

Astoria Formation (Tma)

The Silver Point member of the Astoria Formation occurs in the extreme south end of the town of Cannon Beach (Fig. 1). It consists of consolidated to some-consolidated, light to dark gray, thinly laminated to thin-bedded, micaceous mudstone, siltstone and occasional interbeds and lenses of sandstone and, more rarely, conglomerate. These marine sedimentary rocks are of Miocene age and unconformably overlie the older Oligocene to Miocene sedimentary rocks.

The Silver Point member is well-exposed in the sea cliffs just south of town below the viewpoint along U.S. 101. Walluski silt loam is the dominant soil type developed on the Astoria Formation in the south end area of town. The Astoria Formation and related soils are very susceptible to landsliding. The mudstone contains abundant montmorillonite (Niem, 1975), which is a clay mineral that swells markedly upon addition of water. The alternating swelling when wet and shrinking when dry contributes greatly to the instability of this rock by reducing its cohesiveness.

Basaltic Intrusive Rocks (Ti)

During the Miocene, the above described sedimentary rocks were intruded by magmas of basaltic composition. The resulting basaltic rocks occur within the study area as dikes and sills (Fig. 1). These intrusive rocks form a part of the vent system that fed the flows of Depoe Bay basalt capping the high peaks to the west and southwest of town (Snively and others, 1973). The basalt is dark gray to blue-black, fine to medium-grained, and massive to jointed. At the time of intrusion, the sedimentary rocks were apparently moist and poorly consolidated. As a result they were often deformed by the forceful intrusion of the basalt magmas. This deformation has locally contributed to the weakening of the rocks adjacent the intrusions.

Marine Terrace Deposits (Omt)

Nearly all of the Tolovana Park district and much of the residential area just south of the downtown business district are built on two marine terraces (Fig. 1). These terraces consist of flat-lying sediments deposited by the ocean upon wave-cut benches formed during the Pleistocene at times when sea level was higher (during interglacial periods). Their elevation above present sea level may also be due in part to contained uplift of the Coast Range during that time (Niem, 1975).

The terraces are composed of well-sorted, reddish to yellow-brown, iron-stained beach sands and yellow-brown, iron-stained basalt gravels in thin beds or lenses. Yellow, tan, or light to dark gray clay, layers of peat and carbonized tree limbs and twigs are also present. The deposits are unconsolidated and soft and easily eroded by ocean waves to produce over-steepened slopes susceptible to landsliding. U.S. Soil Conservation Service mapping shows Chitwood silty clay loam and lesser Waluski silt loam to be the predominant soils developed on the sediments of the marine terraces in Cannon Beach.

Flood Plain Alluvium (sc)

Alluvium consisting mostly of brown, silty clay forms the flood plain of Elk Creek upon which most of the downtown and north end residential area of Cannon Beach are built (Fig. 1). Over the years these materials have been, and continue to be, deposited by Elk Creek (and Logan Creek) during periods of overbank flooding. The Coquille silty clayloam is the main soil type occurring on the flood plain (see Table 1 for engineering properties).

GENERAL NATURE OF LANDSLIDING IN THE CANNON BEACH AREA

The principal features of a landslide are illustrated and defined in the appendix of this report. Landslides can be classified according to the approximate age of their most recent movement. The following categories presented by Schlicker and others (1972) are used in this report:

Active landslide - ground movement is continuous or periodic or has occurred within about the last 100 years.

Inactive landslide - shows no evidence of movement within about the past 100 years and is characterized by

erosion-modified headscarps and hummocky, poorly-drained topography.

Old landslide topography - large areas of irregular, hummocky ground having disrupted but well-established drainage and no well-defined headscarps. Landslide movements may have occurred from several hundred to several thousand years ago.

In addition to headscarps unmodified by erosion, evidence of active landsliding may include one or more of such features as tilted trees, sag ponds, cracks in ground or pavement, back-tilted (rotated) block and disturbed structures. The presence of dense vegetation cover on a headscarp does not necessarily indicate a less active slide because the rate of plant growth is very rapid in such a humid climate. A single headscarp may be bare and fresh looking at one point and totally covered by vegetation a short distance away.

All of the landslides that I mapped in the Cannon Beach area are active. On Sheets 1-8 two categories of active and slides have been distinguished on the basis of the physical appearance of the headscarps: 1) those with headscarps that are distinct> steep, lack vegetation, essentially unmodified by erosion and 2) those with headscarps covered to varying degrees with vegetation and only slightly modified by erosion, if at all (erosion tends to round off scarps, reduce their slopes, and shift them uphill away from their original positions), These two categories of headscarps were used to better depict the nature of the scarps and not necessarily to indicate differences in ages or degree of movement on the slides.

General Causes of Landslides in the Cannon Beach Area

The causes of any landslide should be considered in two categories: 1) long-term contributory causes operating over geologic time (thousands to millions of years) and/or causes related to ancient geologic events and processes not acting at the present time; 2) immediate causes which may trigger movement.

1. Long-term causes of landslides -

The Cannon Beach area is a good example of how long-term processes and ancient events have contributed to present day landsliding. During the Oligocene (26-38 million years ago) and early Miocene (Miocene ended 12 million years ago) much of western Oregon was covered by warm, shallow seas (Baldwin,

1976). Sediments derived from farther east were deposited as horizontal layers (beds) in these seas. Sediments continued to be deposited in subsiding shallow, marine embayments during the middle Miocene when much of western Oregon was uplifted above sea level (Niem, 1975). These sediments (sand, mud and gravel) were gradually consolidated to form the Tertiary sedimentary rocks of the Cannon Beach area. While the rocks were still very moist and only partially consolidated, they were intruded by dikes and sills of basalt magma that locally deformed and weakened the sedimentary rocks (Schlicker and others, 1961, Niem, 1975). This deformation has probably made these rocks more susceptible to landsliding (Schlicker and others, 1961). The thicker sills also add a great deal of weight onto the underlying, weak sedimentary rocks, making them more prone to landsliding as slopes are steepened by erosion or human activity. After the magma solidifies to form basalt, the rock continues to cool down from temperatures approaching 1000' C (1832.F). Shrinkage cracks called joints develop in the rock as it cools. Joints weaken the rock and contribute to present day rock fall from cliffs developed in basalt. Lava flows poured out onto the sea floor or onto dry land from vents (dikes and sills) that reached the ground surface. Erosional remnants of these flows remain as caps on many of nearby peaks of the Coast Range. Consolidation of the marine sedimentary rocks continued during and after this. Period of igneous activity. Among other processes, consolidation of sediments into sedimentary rocks involves either compaction, cementation, drying, or some combination of these. Deep burial of sediments beneath younger deposits in slowly subsiding basins enhances consolidation, especially if the rocks remain deeply buried for many millions of years. This did not occur in the case of the Tertiary sedimentary rocks of coastal Oregon. Uplift of the Coast Range began during the Miocene, but most of the uplift occurred during the Pliocene (2-12 million years ago) (Baldwin, 1976). This uplift caused westward tilting of the previously flat-lying marine sedimentary rocks. This westerly dip of these relatively weak rocks contributes significantly to ancient and present day landsliding, especially along the coastline where lateral support is continuously being removed by the sea.

Uplift of the Coast Range caused streams to erode steep-walled valleys into the underlying rocks, exposing the resulting unstable slopes to further erosion and landsliding. Sea-level fluctuation of as much as several hundred feet occurred during

the Pleistocene Ice Age, which occurred 11,000 to 3 million years ago (Baldwin, 1976). Stream downcutting accelerated when sea level was lowered by the storage of water on land in continental ice sheets, Coastal areas were flooded during interglacial periods when glacial melt waters poured into the oceans. Erosional attack of the shoreline increased as the sea level rose. This all contributed to sidespread landsliding resulting in the hummocky, irregular, ancient landslide topography developed in the marine sedimentary rocks. Once exposed, the prolonged and continued weathering of these rocks has further weakened them and has produced soils prone to landsliding, especially in hillside areas.

Since the end of the Pleistocene, sea level has risen to its present position causing flooding and erosional attack of the present coastline. This erosion has produced, and continues to produce, the prominent sea cliffs, headlands, arches and stacks. This shoreline erosion also is removing lateral support of the generally seaward dipping rock units, which contributes greatly to past and present landsliding.

The long-term effects of the humid climate of the north coast area act to both favor and retard mass wasting. The abundance of precipitation (over 80 inches annually) enhances the chemical and mechanical weathering of earth materials with a resultant reduction in their cohesiveness. The water table is at relatively shallow depth most of the time in such a humid climate. This reduces the cohesiveness of rocks and soils near or at the earth's surface. Such a climate doesn't however, allow a dense, natural vegetation to flourish. This vegetation uses much of the water that would otherwise enter the ground water body and add to the saturation and weakening of underlying rock and soil. Root systems also act to stabilize slopes by binding unconsolidated material and retarding surface runoff and erosion.

2. Immediate cause of landslides -

The immediate cause or causes of a landslide are usually more readily observable than the long-term contributory factors. Immediate causes include such things as the following: A period of heavy rainfall, erosion at the base of slopes by storm waves, earthquake shock waves, oversteepening of slopes by human or natural excavations, overloading of slopes by buildings or fill, removal of vegetation, and vibrations due

to traffic on roadways. The immediate cause may act suddenly to "trigger" a landslide or it may operate over a certain length of time before movement occurs. There is a common misconception that excessive moisture acts as lubrication in causing landslides.

The lubricating action of excess ground water is minimal in comparison to the buoyancy effect of pore-water pressure in tiny voids between component particles. This pressure (analogous to hydrostatic head) within void spaces suspends individual grains which reduces the internal friction of the rock mass. If enough cohesion is lost, the internal shear strength of the mass will be exceeded and rupture will occur at a weak point along the slope. Excess moisture also adds some weight to the material, which further reduces its stability. Landsliding along the Oregon Coast can apparently be correlated with increased precipitation and high winter waves occurring from late fall to early spring with December and January having the greatest slide frequency (Byrne, 1963).

GEOLOGIC HAZARDS WITHIN THE THREE SELECTED AREAS OF CANNON BEACH

South End Area

The bedrock units in the south end area are marine terrace deposits overlying the Silver Point member of the Astoria Formation (Fig. 1, Sheet 1). An east-west cross-section through this area is shown schematically in Figure 2. The most severe geologic hazard in this area is landsliding in both units instigated mainly by the removal of lateral support by wave erosion (especially during winter storms). The most southern house in the area (Section 1, Fig. 1 and Sheet 1) is endangered by a slide in the Silver Point mudstone on tile west side of the house (Fig. 3). The adjacent area to the south (below the viewpoint on U.S. 101) is a large slump block of the Astoria Formation. One tenth mile south of the viewpoint, a large landslide occurred in February, 1974. This slide caused U.S. 101 to drop 25 to 35 feet, destroyed several summer homes, and involved 1.25 square miles of surface area (Niem, 1975). The tendency of the montmorillonite-rich clays in the mudstone (Niem, 1975) to swell upon the addition of moisture, contributes to the weakening of this rock.

Landsliding to the north of Station 1 in the south end area (Fig. 1, Sheet 1) occurs in marine terrace deposits. Numerous houses and properties show evidence of displacements due to slumping, debris

slides and soil creep. The area west of Watts Way has a history of movement, which often has caused damage to sewer lines buried along the base of the slope (Gary Middaugh, personal communication).

1. Recommendations - South End Area -

A. A site-specific geologic investigation should be a prerequisite for the issuance of any building permit in the following portions of the south end area:

- (1) The area south of Maher Street underlain by the Astoria Formation.
- (2) Any property fronting on the beach.
- (3) Any property containing or adjacent to all or part of an active landslide.
- (4) Within the two small stream valleys (one to the north and one to the south of Maher Street) (Sheet 1). (Development within these two areas should not be allowed to interfere with the drainage systems or reduce the stability of the valley walls and therefore threaten properties at higher elevations).

B. The open ditch along the east side of Logan Lane extending approximately 200 feet south of West Way, should be lined with concrete and allowed to drain into the stream at the south end of Logan Lane or into the nearest city storm drain. This would reduce the infiltration of water along the ditch and help alleviate the slumping immediately to the west of Logan Lane.

The curves area

Bedrock consists of Oligocene to Miocene sedimentary rocks (Toms) within the hilly terrain of the curves area (Fig. 1 and Sheet 4). This material and related soils are very susceptible to landsliding as evidenced by the large slide in the road cut on U. S. 101 and the large, older slide scarp in the undeveloped land between U. S. 101 and Hemlock Street (Sheet 4). This entire upland area was mapped as landslide topography by Schlicker and others (1972). An abrupt change from landslide topography to the marine terrace to

the south does not occur. A gently sloping topographic transition zone was mapped (Sheets 3 and 4) consisting primarily of Tertiary sedimentary rocks (Toms non-landslide topography). Other than along the beach frontage, a sharp distinction between this transition zone and the marine terrace deposits (qmt) could not be made by surface field investigation. The contact between these two units was based mainly on the change from the gently sloping topography of the transition zone to the flatter marine terrace.

The most immediate problem in the curves area exists within the more intensely developed area between Hemlock Street and the beach. This area consists of hummocky landslide topography with wave erosion along the sea cliffs contributing greatly to slumping along the beach frontage. Slump debris is being removed by the ocean as fast as it accumulates at the base of the cliffs. Moisture and vibrations due to traffic along Hemlock Street also contribute to landslide movement in this area. Vertical displacements of up to about 3 feet have occurred in Hemlock Street at the most northern of the sharp curves (Gary Middaugh, personal communication). Slumping is endangering two houses in the vicinity of this curve. The empty house just south of the Bouvy residence is flanked on its east and west sides of headscarps (Station 2, Fig. 1 and Sheet 4). The slump on the west side has severely disturbed a concrete patio. The newer house farther south and just below the curve in Hemlock Street (Station 3, Fig. 1, and Sheet 4) has a slump headscarp with over 1 foot of displacement immediately adjacent the west side of the house (Fig. 4). A second scarp approaches the house from the north and has disturbed the remains of a concrete foundation of a building no longer present. A less obvious headscarp occurs farther to the west at the base of the slope below the house. A small sag pond occurs on the back-tilted (rotated) block associated with this headscarp (Sheet 4). Any excavation or construction on the slopes below these two houses will almost certainly aggravate the landslide problems they are presently experiencing.

1. Recommendations -The Curves Area -

- A. A site-specific geologic investigation should be a prerequisite for the issuance of any future building permit in the curves area and surrounding areas consisting of landslide topography developed in Tertiary sedimentary rocks (Toms on Sheets 3, 4, and 5, and Fig. 1).

Thorough site-specific investigations are especially critical within the large slide mass on either side of Hemlock Street (Sheet 4, Fig. 1). The slide area south of the Bouvy residence (Oswald West house) appears to be very unfavorable for future development and a very detailed site-specific investigation should be made in this area to determine if further development should be allowed.

- B. Cut and fill methods of leveling lots should be discouraged. Structures should be planned to preserve natural slopes as much as possible.
- C. Access roads and driveways should follow the slope contours whenever possible to reduce the need for grading.
- D. The removal of natural vegetation should be kept to a minimum since these plants are best suited to the existing climatic, slopes, and soil conditions and act to stabilize the natural slopes.
- E. Extensive landscaping with plants (including lawns) requiring extra watering should be avoided.
- F. No development should be allowed to block stream drainage ways in the area.
- G. All culverts should be checked before each rainy season and cleared of sediment and debris. The two culverts along Vista Del Mar Street just northwest of its junction with Yukon Street and the culverts at the base of Yukon Street (including the one crossing Hemlock Street) are nearly completely clogged and should be cleared. As development continues it will probably be necessary to upgrade the system of culverts and replace them with culverts at least as large as the new 18-inch culvert beneath U.S. 101 near the southeast corner of the curves area.
- H. The marshy area at the south central border of the curves area (Sheets 3 and 4) will become increasingly marshy and provisions should be made to handle present and future runoff before development is allowed.

The north end area

Oligocene to Miocene sedimentary rocks also form most of the bedrock in the north end area. These rocks have been intruded by a thick sill and numerous small dikes of basalt (Fig. 1, Sheets 7 and 8). This upland area appears as landslide topography on the reconnaissance map of Schlicker and others (2). The portion of the area north of Eighth Street has been platted and rights-of-way for some of the proposed streets have been cleared and occur now as dirt jeep trails. The sedimentary rocks (Toms) exposed along these trails show irregular, disrupted bedding patterns produced by ancient landsliding. Bedding adjacent to intrusions may have been distorted by the forceful injection of the basalt magma into the then poorly consolidated, moist sediments. Deformation of these rocks by sills in Ecola Park has weakened them and probably made them more slide prone (Schlicker and others, 1961). The thickly vegetated, natural slopes in the area appear to be relatively stable under the present circumstances. The slumps mapped are all adjacent roads or an abandoned quarry and are closely related to these features. Major landsliding is widespread in these rocks to the north in Ecola Park. This information is instructive when considering possible effects of future development in the area. The steepest, presently stable, natural slopes developed in the sedimentary rocks of the north end area approach 55% (28° 49'). The stability of natural slopes of this steepness is probably very tenuous considering the lack of steeper, stable slopes in the area.

The delicate equilibrium of such slopes could easily be disrupted by the construction of roads, houses, or other features involving excavations and the removal of natural vegetation. Evidence for this can be seen along Old U.S. 101 (Sheet 7) where several slumps have occurred below the road on slopes as flat as 30% (16° 42').

1. Recommendations - North End Area -

- A. Topographic map coverage at a scale of 1 inch = 100 feet (contour interval = 2 feet) should be obtained for the rest of the north end area as soon as possibly to provide the same level of control now available for the rest of Cannon Beach. This would enable a much more precise plotting of features and problem areas than is now possible and would greatly assist planning for possible future growth in this area. The same is true for other probable growth areas adjacent and within Cannon Beach

that are not now covered by topographic maps of this scale.

- B. A site-specific geologic investigation should be a prerequisite for the issuance of any building permit in the north end area.
- C. The steeper slopes in the north end area should be left in their present, essentially natural condition. A specific slope steepness, beyond which development should not be allowed, cannot be precisely established on the basis of present information. A more thorough investigation (including laboratory testing of soils and bedrock and completion of mapping at a scale of 1" = 100') is needed. Tentative partial guidelines, however, can be recommended at the present time. Slopes in excess of 35% (19° 18') in areas where bedrock consists of Tertiary sedimentary rocks (Toms) should be left in their natural condition. Development could be allowed on certain steeper slopes where the thick basalt sill occurs as bedrock near enough to the surface for footings to be anchored in solid, fresh basalt without extensive excavation (preferably no excavation) of soil. The remainder of the north end area (slopes less than 35%) should be zoned for low density residential development with the allowable units per acre dependent on slope steepness, and soil and bedrock characteristics. The establishment of specific limits (including the 35% limit suggested above) will have to await the more thorough investigation recommended above.
- D. Recommendations C through G, made earlier for the curves area, apply equally to the north end area.

Beach frontage area of Cannon Beach

Erosion along the beach frontage within the city limits of Cannon Beach was mapped as part of this investigation. The location of riprap and sea walls was plotted as was the general condition of the riprap (Sheets 1 through 8). Shoreline erosion was designated as "critical" along all of Chapman Beach and Cannon Beach by Schlicker and others (1972).

Most of the shoreline from Harrison Street north to First Street consists of wind-blown sand accumulated against a wave-cut cliff in

marine terrace deposits. This sand forms an effective buffer that protects the sea cliff from storm wave erosion and should be preserved. The storm of March 8, 1977 removed approximately 900 to 1000 cubic yards of sand, damaged riprap, and exposed a previously buried, wooden sea wall just north of the west end of 1st Street (Station 4, Fig. 1 and Sheet 6). The storm itself was not unusually severe but the storm surge added to a moderate high tide (+7.9 ft.) and a southerly diversion of the flow of Elk Creek focused at this location. Without the sand buffer, riprap and sea wall, substantial erosion of the sea cliff could have occurred. This same storm caused oversteepening and subsequent sand slumping along 400 feet of the southern end of Breakers Point on the north side of Elk Creek. Limited flooding also occurred up Elk Creek to the east of the Hemlock Street Bridge.

Over the past ten years or so, sand has been accumulating along the sea cliff north of Monroe Street at a more rapid rate than previously (Dennis Rittenback, personal communication). As a result, much of the sea cliff in this area is now buried by sand. Only the top few steps of a stairway to the beach remain exposed above the sand at the end of Adams Street. Sand tends to accumulate on Ocean Avenue and adjacent properties at scattered points, usually where foot traffic to the beach is heavy. This is especially true at the ends of streets such as, Adams and Monroe.

1. Recommendations - Beach Frontage Area -

- A. A site-specific geologic investigation should be a prerequisite for the issuance of building permits on any property having beach frontage.
- B. There is probably no completely adequate, economically feasible solution to the problem of sand accumulation in the Ocean Avenue area. The present practice of occasionally digging trenches across the beach and excavating along the base of the sand slopes adjacent to problem areas does little, if anything, to prevent sand encroachment and should be discontinued. This practice oversteepens sections of the seaward slopes of the dunes and exposes them to erosion by storm waves and, to a lesser extent, by high tides. The blowing of sand up onto the terrace could better be controlled by

maintaining adequate vegetation cover between the street and the sand buffer.

The effectiveness of vegetation (salal especially) is well-illustrated along this same sea cliff south of Monroe Street. Access trails to the beach at the ends of the east-west streets should be clearly marked with signs visible from both the beach and the street. This would reduce the number of people meandering through the dunes looking for access to the street or to the beach, and destroying vegetation in the process. The accumulation of sand along the terrace edge, although annoying, is a small price to pay for the protection from erosion the sand buffer provides the buried sea cliff.

The above report is respectfully submitted June 3, 1977 and represents the undersigned's opinions based on the investigation therein presented.

Martin E. Ross

Geologist
P.O. Box 20
Cannon Beach, Oregon

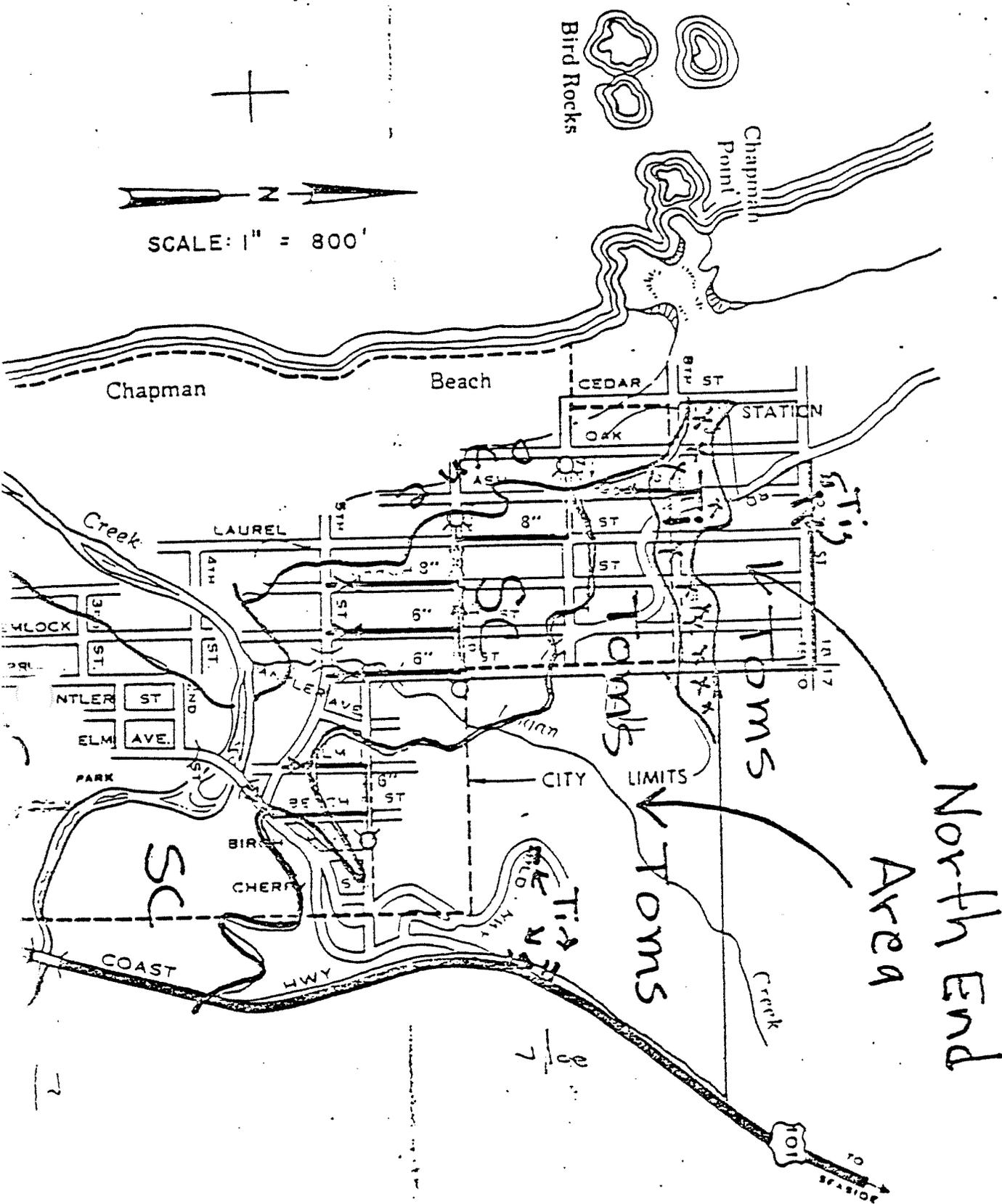


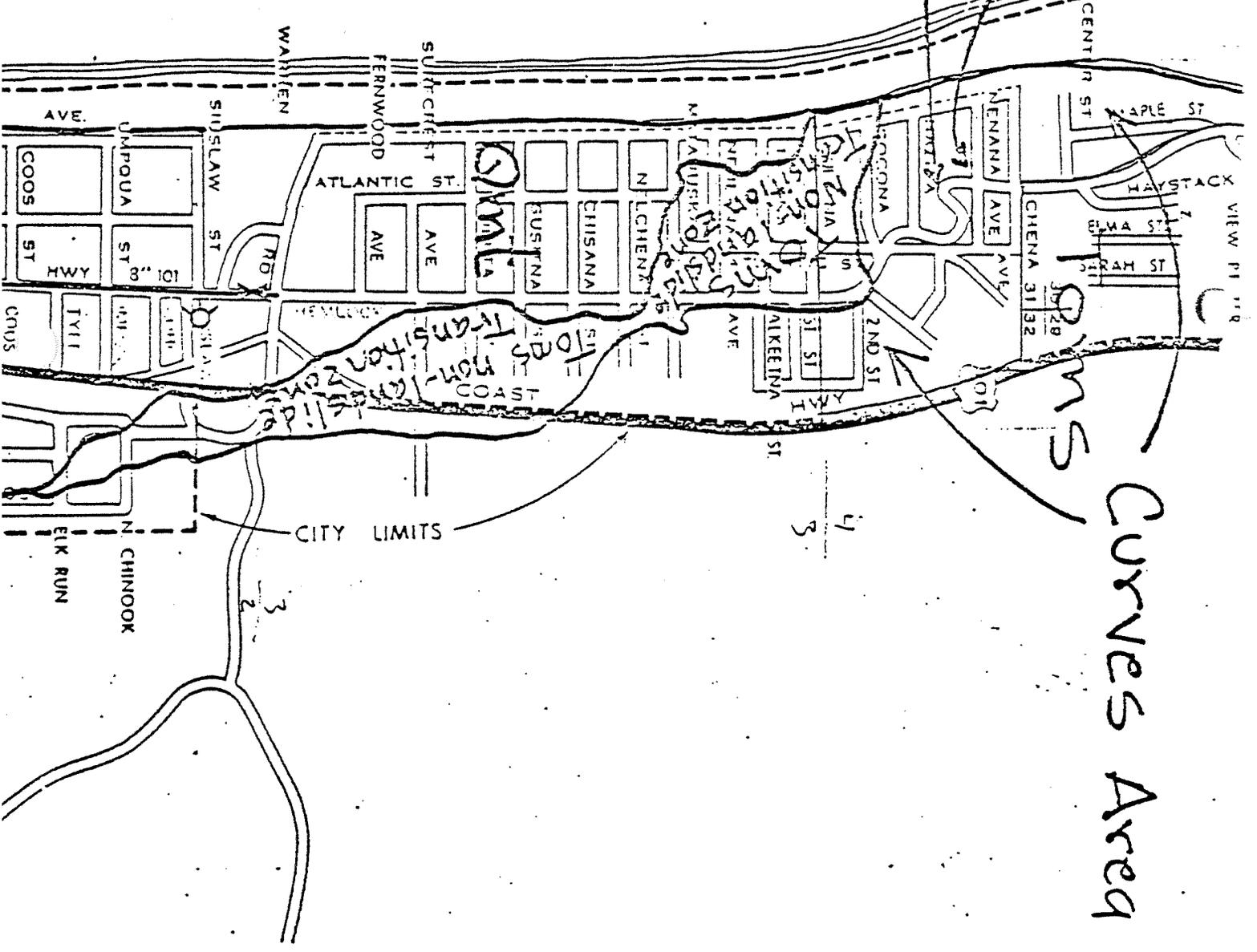
FIGURE 1
 CANNON BEACH, OREGON
GEOLOGIC SKETCH MAP
 by
 Martin Ross

PACIFIC

Haystack Rock



2
3



CURVES AREA

CITY LIMITS

LINE

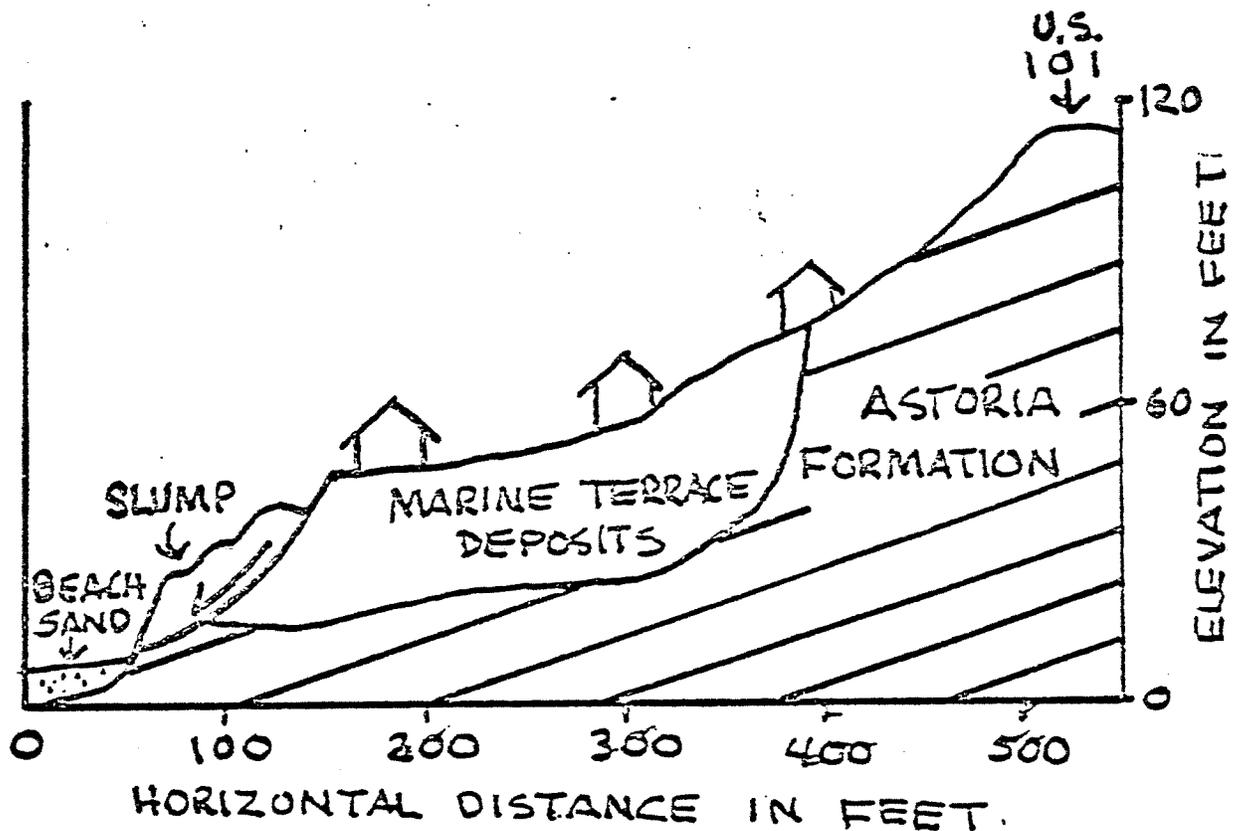


Figure 2. Diagrammatic east-west cross section through the south end area of Cannon Beach.

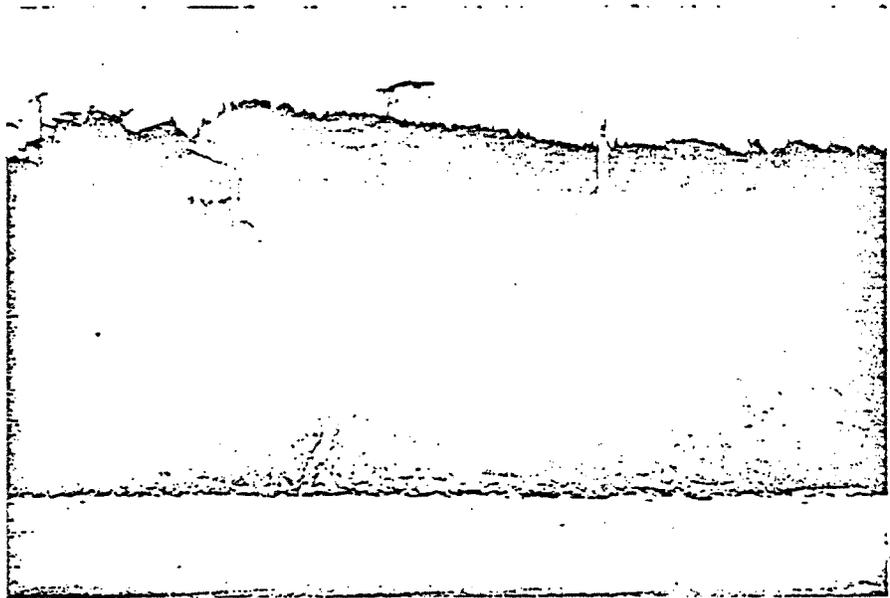


Figure 3. Slumping which endangers this most southern house in Cannon Beach is due mainly to the removal of lateral support by ocean waves at the base of slopes developed in the Astoria Formation.

A basalt sill forms the lower portion of the sea cliff in the right (southern) part of the photograph.

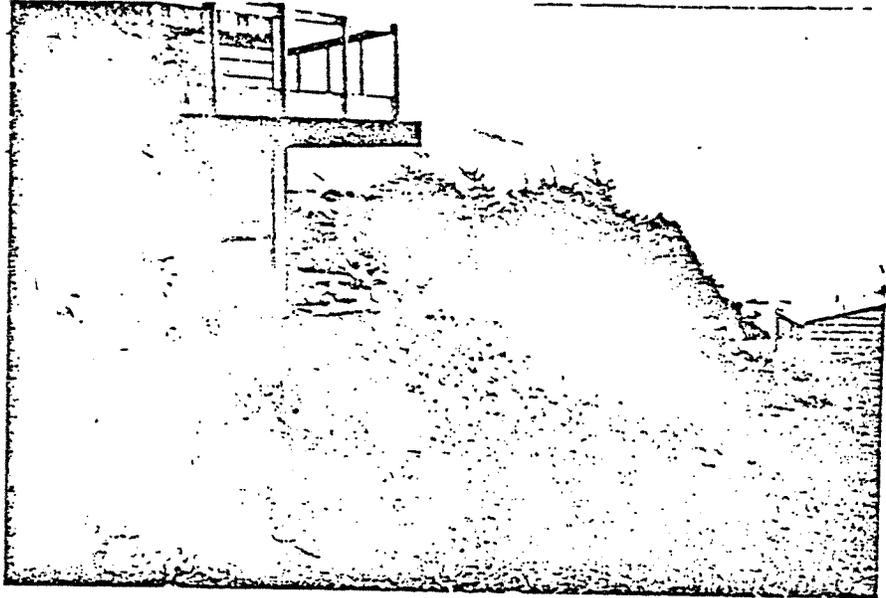


Figure 4. A slump developed immediately west of the foundation of a house located along Hemlock Street just north of Wazina Avenue. As much as $1\frac{1}{2}$ feet of displacement has occurred along this newly formed headscarp.

APPENDIX

LANDSLIDE TERMINOLOGY

The following definitions were adapted from Plate 1 of the Highway Research Board Landslide Committee report (1958) and Schlicker (1972):

Slump - a landslide in which a body of earth material slips downward and outward from a slope in a rotational manner along a curved surface of rupture (see Fig. 5).

Slip plane - surface of rupture along which movement occurs in a landslide; usually is concave upward in slumps.

Main scarp or headscarp - a steep surface on the undisturbed ground along the periphery of the slide caused by the downward movement of material away from the undisturbed ground; the projection of the main scarp beneath the disturbed material becomes the slip plane; in plan view generally forms an arc concave toward the slide mass.

Minor scarp - a lesser scarp in the disturbed material produced by differential movements with the sliding mass.

Crown - the undisturbed ground adjacent the highest parts of the main scarp.

Head - the upper parts of the slide material along the contact between the disturbed material and the main scarp.

Toe - the downhill margin of the disturbed material most distant from the highest portion of the main scarp.

Sag pond - ponded water typically accumulating in depressions at the head of a slide.

Debris slide - slow to rapid downslope movement of predominantly unconsolidated and incoherent earth and debris in which the moving mass does not show backward rotation.

Creep - particle-by-particle downslope movement of earth and rock (essentially a very slow debris slide).

Figure 5. Block diagram showing parts of a typical landslide of the slump type.
See previous page for definitions of features shown here.

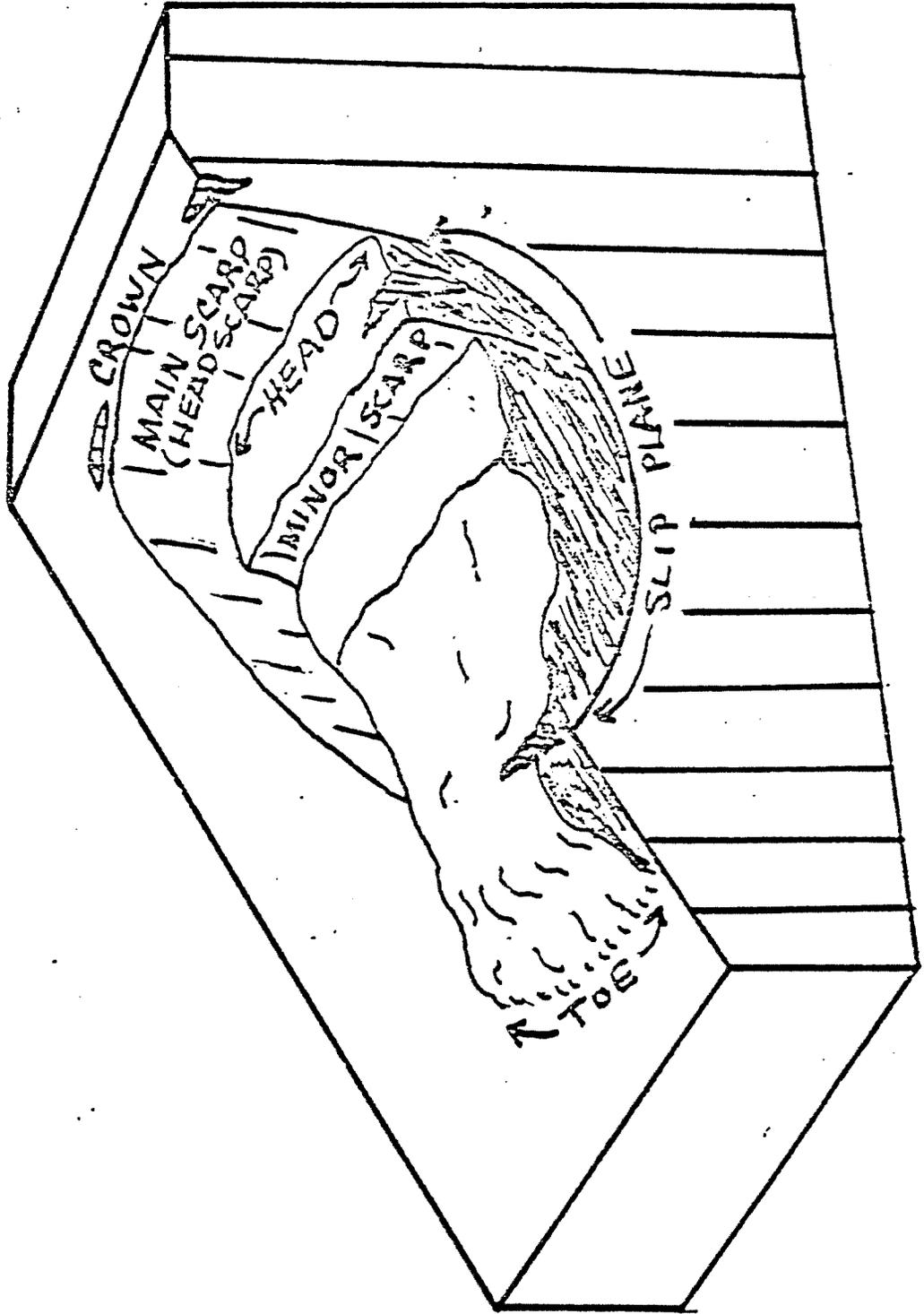


TABLE 1. Estimated properties of Cannon Beach area soils mentioned in text. ¹

Soil Series	High Water Depth (ft)	Table Months	Frequency of Flooding	Shrink-Swell Potential ²	Permeability Potential	Liquid Limit ³	Plasticity Index ⁴
Walluski	2.0-3.0	Nov-May	none	low-high	slow-moderate	20-60	nonplastic-15
Coquille	0-2.0	Oct-June	frequent	low-mod	slow-moderately rapid	30-55	5-35
Chitwood	1.5-2.0	Dec-April	none	low-mod	slow-moderately slow	50-65	10-25
Ecola	>6.0		none	low-mod	moderate	25-40	0-10
Tolovana	>6.0		none	low	moderate	40-50	5-10

USE LIMITATIONS

Slight-properties favorable for rated use, limitations easily overcome
 Moderate-rated use requires special planning, design, or maintenance
 Severe-requires major soil reclamation, special design, or intensive maintenance

Soil Series	Shallow Excavations	Dwellings Without Basements	Dwellings With Basements	Restrictive Features
Walluski	moderate	moderate	severe	low strength, slope, wet
Coquille	severe	severe	severe	wet, floods
Chitwood	severe	moderate	severe	wet, shrink-swell, clayey
Ecola	severe	severe	severe	slope, depth to bedrock
Tolovana	slight-severe	mod-severe	mod-severe	slope, low strength

¹Determined by U.S.D.A. Soil Conservation Service

²High ranking indicates a hazard to maintenance of structures built in, on or with this material

³Moisture content at which material changes from plastic to liquid state

⁴Numerical difference between the liquid limit and the plastic limit (range of moisture contents with which soil has plastic properties)

REFERENCES CITED

- Baldwin, E.M., 1976, Geology of Oregon: Kendall/Hunt Publishing Company, Dubuque, Iowa, 147 p.
- Highway Research Board Landslide Committee, 1958, Landslides and Engineering Practice: Special Report No. 29, National Academy of Sciences-National Research Council Publication 544, 232 p.
- Niem, A.R., 1975, Geology of Hug Point State Park, Northern Oregon Coast: The Ore Bin, Oregon Dpt. Geol. and Min. Ind., v. 37, no. 2, p. 17-36.
- North, W.B., and Byrne, J.V., 1965, Coastal Landslides of Northern Oregon: The Ore Bin, Oregon Dept. Geol. and Min. Ind., v. 27, no. 11, p. 217-241.
- Rosenfeld, C.L., 1976, Terrain Sensitivity of the Proposed 'Breakers Point' Condominium Site Cannon Beach, Oregon: report prepared for Clatsop-Tillamook Intergovernmental Council, 25 p.
- Schlicker, H.G., Corcoran, R.E., and Bowen, R.G., 1961, Geology of the Ecola State Park Landslide Area, Oregon: The Ore Bin, Oregon Dept. Geol. and Min. Ind., v. 23, no. 9, p. 85-90.
- Schlicker, H.G., Deacon, R.J., Beaulieu, J.D., and Olcott, G.W., 1972, Environmental Geology of the Coastal Region of Tillamook and Clatsop Counties, Oregon: Bulletin 74, Oregon Dept. Geol. and Min. Ind., 164 p.
- Snavely, P.D., MacLeod, N.S., Wagner, H.C., 1973, Miocenetholeiitic Basalts of Coastal Oregon and Washington and Their Relations to Coeval Basalts of the Columbia Plateau: Geolo. Soc. America Bull., v. 84, p. 387-424.

DOCUMENTATION

The City of Cannon Beach geologic hazards and beaches and dunes inventory is based on field investigations by Martin Ross, Geologist,¹ Charles Rosenfeld, Geomorphologist,² and with technical assistance from Leonard Palmer, Geologist.³ The data collected are available at the City Hall, and constitutes part of the Comprehensive Plan Background Data. A regional study that deals with the geologic hazards of the area is Bulletin 74, Environmental Geology of Clatsop and Tillamook Counties, 1972, Oregon Department of Geology and Mineral Industries, Herbert Schlicker, et al. In addition to these field investigations and reports, aerial photography and interviews with local citizens were utilized in compiling the data.

¹A Field Investigation of Geologic Hazards in Cannon Beach, Oregon, Martin E. Ross, Geologist, Cannon Beach, June, 1977.

²Terrain Sensitivity of the Proposed "Breaker's Point" Condominium Site, Cannon Beach, Oregon, Charles F. Rosenfelt, OSU, August, 1976.

³Draft Report by Leonard Palmer to the Clatsop-Tillamook Intergovernmental Council, June, 1977.

Table 1

Flood Plain Management Measures

"V" ZONES

(COASTAL -- INCLUDING ELEVATIONS)

- * New Construction, Substantial Improvements:
 - Must be elevated on pilings or columns, and securely anchored.
 - Lowest portion of structural members of lowest floor (excluding the piling or columns) must be elevated to or above the base ("100-year") flood.
 - Must require certification from engineer or architect that construction will withstand velocity waters.
 - Space below lowest floor must be free of obstructions and not used for human habitation.
- * New construction must be located landward of the reach of mean high tide.
- * The use of fill or structural support must be prohibited.
- * Mobile homes prohibited, except where parks or subdivisions already exist.
- * Man-made alteration of sand dunes that would increase potential flood damage is prohibited.
- * Community must obtain and record lowest habitable floor elevations for new construction, substantial improvements.

In non velocity areas, (numbered "A" zones) such as the downtown, structures are required to have their lowest floor (including basement) elevated to or above the 100-year flood level in order to qualify for low-cost insurance. Table 2 that follows summarizes the flood plain management measures that are required in the numbered "A" zones.

Table 2

FLOOD PLAIN MANAGEMENT MEASURES
NUMBERED "A" ZONES
(RIVERINE -- INCLUDING ELEVATIONS)

- * Residential: New construction, substantial improvements must have lowest floor (including basement) elevated to or above base ("100-year") flood.
- * Non-Residential: New construction, substantial improvements must have lowest floor (including basement) elevated or floodproofed to or above base ("100-year") flood.
- * Floodproofing Standard: Performance standard specifies that structure must be watertight with walls substantially impermeable to passage of water and having capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.
- * Where Floodproofing Utilized:
 - Community obtains from developer and records engineering or architectural certification that floodproofing meets performance standard, or;
 - Community administers its own detailed specifications that meet the standard.
- * Mobile Home Parks and Subdivisions: Stands or lots must be elevated on compacted fill or pilings so that lowest floor of mobile home will be at or above base ("100-year") flood level, when park or subdivision is:
 - New
 - Expansion to existing
 - Substantial improvement to existing
- * Same elevation requirement applies to placement of individual mobile home not in park of subdivision.
- * Where no floodway has been designated, no new construction, etc. can be permitted that would raise the elevation of the base ("100-year") flood more than 1 foot at any point in the community. This determination must consider the cumulative affect of other anticipated development.

Flood Insurance Program

The City of Cannon Beach is presently in the emergency flood insurance program. It is progressing toward the regular program. Outlined below are highlights of both programs as it affects Cannon Beach presently and in the future.

How The Flood Insurance Program Works

- A. Basic Requirements. Before any individual may purchase a flood insurance policy, the community that has land use authority over him must first establish eligibility. By establishing eligibility, the community agrees to adopt minimal land use, i.e., floodplain management, measures, designed to reduce or avoid future losses in flood hazard areas.
- B. In order that the land use requirement can be made of local government (and held up in court) there is a definite need for technical data on which localities can base their measures.
- C. Thus, the Program is based on technical maps, hydrological data, etc.
 1. 1968 Act literally required that HUD delineate every floodplain in U.S.
 2. HUD contracts for this work with the Corps of Engineers, U.S. Geological Survey, Soil Conservation Service, TVA, Bureau of Reclamation, private A & E firms.
 3. Major products are flood hazard maps, in two stages:
 - Flood Hazard Boundary Maps (FHBM)
 - Flood Insurance Rate Maps (FIRM)
 4. FHBM
 - preliminary, based on existing information
 - generally no original field work
 - shaded area is Hazard Zone A - keyed to water coverage in the base, or 100-year flood (this is a flood that has a 1% chance of occurrence in any given year, or a 26% chance of occurring average mortgage term).

- maps prepared under contract by Michael Baker, Jr., Inc. of Harrisburg, Pennsylvania; at times they will subcontract with other local firms.
- FHBM's available through state servicing companies
- lenders and federal agencies must use FHBM's, if FIRM not available, as basis for requiring flood insurance - lender cannot waive these maps.
- maps can be appealed, altered, etc., in a least 6 different ways
- maps now sent to community for review prior to publication.

5. FIRM

- This map is only one product of detailed hydrological and hydraulic study of community's watercourses performed on ground in community under extensive coordination procedures.
Study contains:
 - a. data on frequency of flooding
 - b. detailed water surface elevations keyed to 100-year flood
 - c. water surface profiles of the 10, 50, 100, and 500-year floods
 - d. proposed floodways
 - e. coastal high hazard area
- Study transmitted to community which then has 6 months to adopt land-use measures commensurate with those data.

D. Emergency and Regular Programs

- Emergency 1969 Amendment allowed a community to establish eligibility before all detailed studies are done, making insurance (subsidized) available to residents immediately. Insurance available in 1/2 amount that will be available in Regular Program. Community in Emergency Program until all maps, studies, etc., are completed.
- Regular Community in regular Program after all maps, studied, etc., are completed and appropriate land use measures adopted. Twice the insurance available.

E. Subsidized and Actuarial Insurance

- Subsidized

- Applies to all existing buildings, defined as having been constructed prior to issuance of detailed study.
- Subsidy is approximately 90% of the policy on an aggregated nation-wide basis. Is not a grant or loan.
- Actuarial
 - Risk rates; not subsidized. Rates vary with risk.
 - Apply to all new construction built after detailed maps and studies completed, and community in Regular Program.

F. All buildings are eligible for coverage, as defined in the policy.

G. Coverage

	<u>Emergency</u>	<u>Regular</u>
Single Family Residential Structure	\$ 35,000	\$ 70,000
Multi-Family & Non Residential	100,000	200,000
Residential Contents	10,000	20,000
Non-Residential Contents	100,000	200,000

H. Subsidized Rates

All Residential Structures	\$.25/100
Residential Contents	\$.35/100
Non-Residential Structures	\$.40/100
Non-Residential Contents	\$.75/100

I. Actuarial Rates - vary with risk.

Once the City becomes eligible for the regular program (January, 1978) citizens will be able to acquire flood insurance at actuarial rates. For example, a new residential structure assessed value \$30,000 with no basement, located in a "A1 - A7" zone, with a first floor elevation at the base (100-year) flood level would be insured at a rate of \$.12/100. In the emergency program this same house would be insured at the subsidized rate of \$.25/100. Elevation Rate Table I below provides a graphic illustration for actuarial rates - the lower the elevation the greater the cost of insurance.

ELEVATION RATE TABLE I
ONE TO FOUR FAMILY RESIDENTIAL STRUCTURE
ONE STORY

ELEVATION OF FIRST FLOOR ABOVE OR BELOW BASE FLOOD ELEVATION	NO BASEMENT ZONES			
	A1-A7	A8-A14	A15-A17	A18-A30
+ 5 OR MORE	.01	.01	.01	.01
+ 4	.01	.01	.01	.01
+ 3	.01	.01	.02	.04
+ 2	.01	.02	.05	.08
+ 1	.01	.07	.10	.15
0	.12	.16	.19	.23
- 1	.48	.31	.31	.34
- 2	1.59	.55	.47	.48
- 3	*	.93	.70	.64
- 4	*	1.48	1.00	.83
- 5	*	2.34	1.40	1.07
- 6	*	2.86	1.91	1.34
- 7	*	*	2.62	1.66
- 8	*	*	3.53	2.02
- 9	*	*	*	2.48
-10	*	*	*	3.03
-11 or lower	*	*	*	*
ZONE RATE	.35	.55	.73	.95
*Use \$25.00 Rate				

Flooding History

The greatest ocean flooding conditions in Oregon history occurred on January 3, 1939, when wind-driven waves caused extensive damage. On December 2 and 3, 1967, Cannon Beach was battered by unusually destructive storm waves. The waves were generated by the cumulative effect of prolonged 50-mph southwesterly winds and still-water levels exceeding 7 feet (MSL). Cannon Beach was hit by open coast storm waves of damaging magnitude on February 18, 1976. In the flood of December 2 and 3, 1967, water ponded to elevation 11.5 feet (MSL) (a depth of 2.5 feet above the street surface) at the intersection of 2nd and Hemlock Streets, the center of the town's business district. About 35 stores and business establishments, several public buildings, the conference complex, and three residential properties were flooded. Water and sanitary facilities were damaged, creating a health hazard. Similar, but less severe flooding has occurred three other times in the last 20 years. In the 3 years since the city built its temporary low levee north from Second Street, no serious flooding has occurred in Elk Creek. However, minor flooding of the protected area has occurred twice during those 3 years. In the winter of 1971, a freshet caused waters in Elk Creek to rise and flow around downstream end of the city's levee. In January 1972, a high tide aided by wind and wave buildup resulted in the overtopping of the levee in two locations; prompt sandbagging by local residents prevented failure of the levee and limited inundation in the landward side to undeveloped low areas.

Cannon Beach is also exposed to seismic sea waves (tsunami). On 27 March 1964, Cannon Beach was damaged by tsunami originating from the submarine earthquake that occurred off the south coast of Alaska. The surge of water was so great that it swept the 200-foot-long Elm Street Bridge 1/4 mile upstream. Motels along Elk Creek were badly damaged, and much of the business district was flooded. The two business blocks from 1st to 3rd Streets and from Hemlock to Spruce Streets were under water, as was the area east of U.S. Highway 101.

Federal and State flood protection measures and control works are nonexistent in the Elk Creek Basin. In 1970 the City constructed a low levee to protect a portion of the study area from ordinary tidal flooding, using materials excavated during sewage lagoon construction. That levee was hastily built to provide temporary protection until a more permanent solution to the flooding problem could be found. As built, the levee had a crest elevation of 10

feet (MSL). However, recent surveys indicate that the top elevation now is about 9.5 feet, which provides protection against floods with an average recurrence frequency of once in 2 years, with a freeboard of 0.5 foot. No other flood control works exist in the Elk Creek watershed.

The U.S. Army Corps of Engineers has studied the feasibility of constructing flood control levees along Elk Creek at Cannon Beach. Other than localized construction of rock, plank, or concrete bulkheads around private property, no open coast flood protection construction has been performed in Cannon Beach.

Additional flood information elevation data may be found in the Flood Insurance Study for the City of Cannon Beach, Oregon, January, 1977, by the U.S. Department of Housing and Urban Development, Federal Insurance Administration. This document will become the reference document for flooding and a supplement to the Comprehensive Plan.

Since Cannon Beach has participated in the National Flood Insurance Program and received ample technical data from which to discern flood prone areas, policies designed to minimize flood risks can be initiated.

The following proposed policies and guidelines shall be expanded upon in the Cannon Beach Comprehensive Plan and the Cannon Beach Zoning Ordinance.

- 1.) Where development within floodplains is allowed, the developer shall provide appropriate safeguards to insure public safety and protect individuals residing in the flood zone.
- 2.) All new construction and substantial improvements shall be constructed by methods and practices that minimize flood damage. (Floodproofing)
- 3.) Flood Zone regulations shall be based on the most current and reliable floodplain data and meet the minimum requirements established by the Federal Insurance Administration.
- 4.) Public hearings shall be held on all substantial developments proposed within a floodplain boundary.
- 5.) Development in areas subject to severe ocean flooding shall be prohibited.

- 6.) 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 one foot.

Ocean Wave Erosion and Landsliding

Erosion and landsliding have been the dominant geologic processes effecting the shoreline since the end of the Pleistocene era, approximately 11,000 years ago. As sea level rose to its present position, due to the melting away of the last great ice sheets, erosion of the shoreline greatly accelerated. Tillamook Rock, over a mile offshore from Tillamook Head, stands as dramatic evidence of the extent of eastward erosional retreat of the coastline. The City of Cannon Beach has contracted with a geologist to conduct a geologic hazards inventory of three areas: The north end, the "curves area" and the southern part of town adjacent to Silver Point. The detailed report is entitled: "A Field Investigation of Geologic Hazards in Cannon Beach, Oregon" by Martin A. Ross, Geologist, Cannon Beach, Oregon, June 3, 1977.

We cannot hope to halt this process, nor should we, since it is responsible for the incredible beauty of the coast line. The lure of living as close to this scenery as possible, has been, and will continue to be, strong. Evidence of landsliding has almost always been overlooked or ignored in the selection of home sites. As the density of homes along the coast increases, the number of dwellings and persons threatened by landsliding also increases. When not planned properly, development almost always adds to the problem of landsliding and often "triggers" movements, resulting in property damage and even loss of life. Planning cannot eliminate this possibility, but it can greatly reduce it.

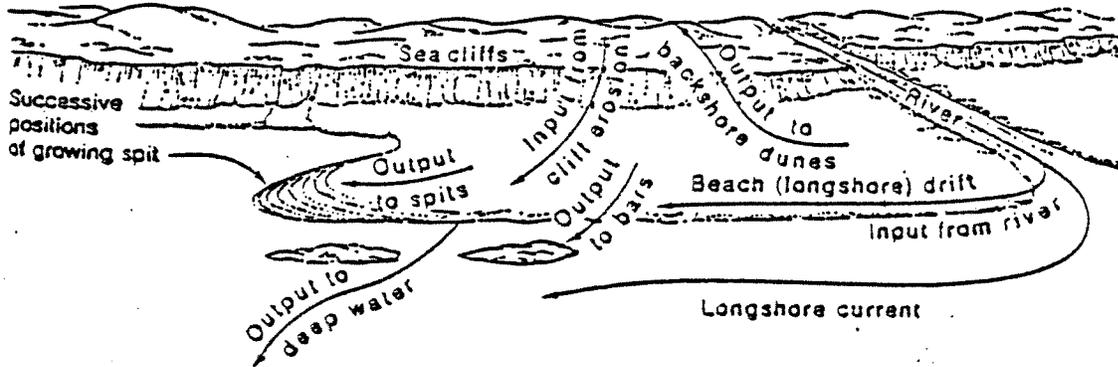
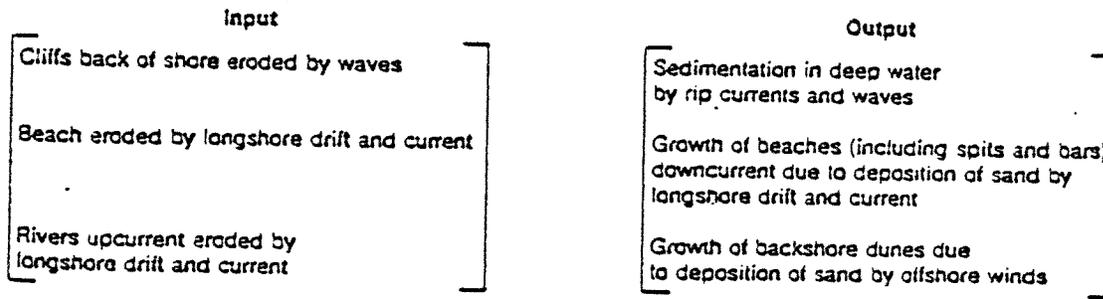
An important part of planning is the recognition of existing and potential geologic hazards in an area (Figure 9) such as Cannon Beach (see geologic report in appendix.) As the community of Cannon Beach continues to grow, it will expand increasingly farther into the more geologically hazardous upland areas within and adjoining the town. Fortunately, there is adequate time for planning and controlling this growth so that members of the community can enjoy this setting without needlessly risking loss of life or property.

Wind Erosion and Deposition

One of the most perplexing problems of construction in sand areas is the problem of aeolian erosion control, both during the construction and occupance phases. The sensitivity of the site to sand deflation (wind removal) is severe. Over 35% of the surface sand will pass a #200 (.003") sieve. This very fine sand requires a wind speed of only 6 mph for near surface transport (saltation) and higher velocities easily make it airborne.

Problems of sand transport are common to sand areas along the Oregon coast. The dune sheets north of Waldport and the Heceta Beach area north of Florence both contain excellent examples of new housing experiencing sand abrasion and dune drift problems. At Cannon Beach winter storms have removed beach sand and deposited it inland. (See Figure Hazards)

The beach budget is a complex balance between erosion and sedimentation in which such forms as spits and bars grow as beach cliffs and other sources supply sand. If input is out of balance with output, the beach will tend to grow or erode.



The removal of protective vegetation causes immediate wind erosion at Breakers Point. The most obvious example is the deflation occurring near the intersection of paths in the active foredune area. The cut and fill operations required for foundation and road construction would remove the vegetation, exposing large amounts of sand to deflation.

Wind erosion and deposition will continue to be a problem at Breakers Point and between Jackson Street and Kramers Point, for the foreseeable future as sand continues to accrete along the beach. The design of the units, especially on the foredunes, will actually increase the rate of sand transport. Further site specific information about Breakers Point may be found in Terrain Sensitivity of the Proposed "Breakers Point" Condominium Site Cannon Beach, Oregon, August, 1976 by Charles L. Rosenfeld, Oregon State University.

Flood Hazards

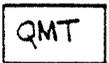
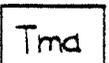
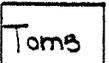
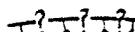
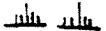
The Federal Insurance Administration, as authorized according to regulations published in the October 26, 1976 Federal Register, has conducted a flood insurance study for the City. The draft report was released in January, 1977, and is entitled Flood Insurance Study For The City of Cannon Beach, Oregon.

The study identifies two areas of Cannon Beach that are subject to flood hazards: 1.) The oceanfront, which is flooded when ocean waves coming with high tides, westerly winds and severe storms, and 2.) The elk Creek Basin, which is flooded when the runoff from the Elk Creek watershed is backed up by high tides. It is typical that both types of flooding occur at the same time. In addition, Tsunami (mistakenly referred to as tidal wave) flooding has caused damage in Cannon Beach. (Please refer to Figure 9)

Construction Requirements

The area of direct ocean flooding is referred to as a velocity zone, where special construction techniques are called for in order to avoid flood damage and thereby qualify property owners for low cost flood insurance. Flood plain management measures required in "V" zones are summarized in Table 1.

EXPLANATION

	Holocene to Pleistocene		Flood plain deposits; mostly silty clay.
	Pleistocene		Marine terrace deposits; yellow, tan, or light to dark gray clays and fine silt; unconsolidated sand and gravel; semi-consolidated yellow-brown, weathered, thinly-bedded sand and semi-consolidated, yellow-brown, weathered, thickly bedded gravel.
			UNCONFORMITY
Tertiary	Miocene		Basaltic intrusive rocks; occur as dikes, sills, and irregular pods.
	Miocene		Astoria Formation; consolidated to semi-consolidated, thinly-laminated to thin-bedded, light to dark gray, micaceous mudstone, with interbeds of siltstone and sandstone. All landslide topography.
	Oligocene to Miocene		Thin-bedded to massive, tan to yellow-brown tuffaceous siltstone and claystone; lesser amounts of thin to medium-bedded, light to dark gray shales and micaceous siltstones; landslide topography unless otherwise noted.
Active Hazard Areas			Active landslide with bare scarp.
			Active landslide with vegetation growing on recognizable scarp which is, at most, slightly modified by erosion.
			Possible active landslide.
			Slope being actively over-steepened by ocean wave undercutting (daily or periodically).
			Over-steepened slope <u>not</u> now being actively undercut by ocean waves.
			Intact riprap.
			Riprap reduced to rubble and scattered by ocean waves.
			Sea wall of wood, concrete, or rock and mortar.
			Fill, man-made.
			Marshy ground, high water table.
		Contact.	
		Strike and dip of beds, dikes, or sills.	
		Quarry.	
		Culvert	
		Sag pond.	

OPEN SPACE, SCENIC AND HISTORIC AREAS, AND NATURAL RESOURCES

Open Space, Scenic and Historic Areas and Natural Resources

GOAL #5 OPEN SPACE, SCENIC AND HISTORIC AREAS, AND NATURAL RESOURCES

The overall goal of Statewide Planning Goal #5, Open Space, Scenic and Historic Areas, and Natural Resources is: "To conserve open space and protect natural and scenic resources".

To achieve this goal, Cannon Beach is required to undertake an inventory of the following twelve types of resources:

- a. Land needed or desirable for open space;
- b. Mineral and aggregate resources;
- c. Energy sources;
- d. Fish and wildlife areas and habitats;
- e. Ecologically and scientifically significant natural areas, including desert areas;
- f. Outstanding scenic views and sites;
- g. Water areas, wetlands, watersheds and groundwater resources;
- h. Wilderness areas;
- I. Historic areas, sites, structures and objects;
- j. Cultural areas;
- k. Potential and approved Oregon Recreation Trails;
- l. Potential and approved federal wild and scenic waterways and state scenic waterways.

These resources are to be inventoried as to their location, quality and quantity.

Upon completion of the resource inventory, a determination is to be made if there are conflicting non-open space uses for these resources or resource areas. Areas or sites for which no conflicting use has been identified are to be protected. Where conflicting uses have been determined to exist, the economic, social, environmental and energy consequences of the conflicting uses on the resource shall be determined.

Based on the inventory and the analysis of conflicting uses, the City is to develop a program that will:

- 1) ensure open space;
- 2) protect scenic and historic areas and natural resources for future generations;

- 3) promote healthy and visually attractive environments in harmony with the natural landscape character.

Requirements of the Administrative Rule on Goal #5, OAR 660-16

An administrative rule clarifying the requirement of Statewide Planning Goal #5, Open Spaces, Scenic and Historic Areas, and Natural Resources was adopted by the Land Conservation and Development Commission in June of 1981. The administrative rule establishes a method to be used in applying Goal #5 to resource sites. This procedure addresses the following elements: what is and is not required to be included in the plan inventory; how to identify conflicting uses for resource sites and determine their impacts on those resource sites; and how to protect resource sites, depending on the degree to which conflicting uses are to be allowed or limited.

The following is an outline of the three-step procedure which the Administrative Rule establishes. The first step is data collection and an evaluation of the quality, quantity, and location of the resource sites identified. Based on the information collected, one of three decisions is made: (1) the resource is determined not to be important enough to warrant inclusion in the inventory; (2) or the available information is inadequate to determine the value of an identified resource (in this case, the City must include policy language in its Comprehensive Plan committing the City to the development of additional information on the resource sites' quality, quantity); (3) and the resource site is important enough to include in the inventory.

The second step is the identification of conflicting non-open space uses for a given resource or resource site. If no conflicting uses are identified, the resource must be protected. If conflicting uses are identified, an evaluation of the environmental, social, economic and energy consequences of allowing the conflicting use is required. The level of information that the City must provide concerning possible conflicting uses should be adequate to explain why the City chose to protect, or not to protect, a given resource.

Relationship of Goal #5 to the Estuarine Resources Goal #16, and the Coastal Shoreland Goal #17

Goal #5 lists fourteen types of resources that are subject to inventory and possible protection. A number of these resources are also addressed by the Estuarine Resources Goal and the Coastal Shoreland Goal. Generally, the resource protection requirements of the Estuarine Resources goal and the Coastal Shoreland Goal are more stringent than the requirements of the Open Space Goal.

Generally, when one of the fourteen Goal #5 resources is located in either an estuarine or coastal shoreland area, the appropriate resource inventory and protection requirements of the Estuarine Resources Goal or the Coastal Shorelands Goal are applied. Therefore, these resources are not covered by this element of the Comprehensive Plan. An exception to this methodology was taken for wetlands. All non-estuarine wetlands were analyzed under the Goal #5 process.

The following described the scope of the Goal #5 inventory for each of the identified resources:

- 1) Open Space - all land and water areas;
- 2) Mineral/Aggregate - all land and water areas;
- 3) Energy Sources - all land and water areas;
- 4) Fish/Wildlife Habitat - all land outside of the City's estuarine areas that is not a "significant habitat";
- 5) Ecologically Significant Natural Areas - all land areas;
- 6) Scientifically Significant Natural Areas - all land areas;
- 7) Outstanding Scenic Views - all land and water areas;
- 8) Watersheds - all land areas;
- 9) Groundwater resources - all land areas;
- 10) Wetlands - all land and water areas, except estuarine areas;
- 11) Historical/Archaeological Sites - all land areas;
- 12) Wilderness - all areas;
- 13) Oregon Recreation Trails - all land areas; and
- 14) Wild and Scenic Waterways - all land areas.

Methodology of the Open Space, Scenic and Historic Areas, and Natural Resources Inventory

The following procedure was used in undertaking the Cannon Beach Open Space Inventory and in the establishment of a program to protect identified open space sites resources:

- 1) Determination of the elements of each resource category to be inventoried. The completeness of each resource category to be verified with appropriate state agencies.
- 2) Selection of inventory sources.
- 3) Development of a resource list based on the inventory sources.
- 4) Determination of conflicting uses, if any, for the resource. Where conflicting uses were identified, an evaluation of the environmental, social, energy and economic impact of allowing these conflicting uses was undertaken.
- 5) Development of a program to achieve the objective of the Open Space Goal. This includes a determination of which resources to protect and the appropriate method of resource protection. Generally, where they were found to be adequate, existing state or federal programs and regulations were relied on to protect resources. Additional local protection was developed only for those resources for which existing regulation was found to be inadequate to meet the intent of the Goal.

Resource #1 Open Space

The Goal defines open space to "consist of lands used for agriculture or forest uses and any land area that would, if preserved and continued in its present use:

- a) Conserve and enhance natural or scenic resources;
- b) Protect air or streams or water supply;
- c) Promote conservation of soils, wetlands, beaches or tidal marshes;
- d) Conserve landscaped areas such as public or private golf course, that reduce air pollution and enhance the value of abutting or neighboring property;
- e) Enhance the value to the public of abutting or neighboring parks, forests, wildlife preserves, nature reservations or sanctuaries or other open space;
- f) Promote orderly urban development".

Using the above definition, three types of open space can be identified. The first is general open space. This category consists of forest lands, ocean beaches, and estuarine areas. The city has two types of land use regulations which seek to protect the open space values of forested areas in an urban setting.

First, forest management activities are permitted as conditional uses in only two zones within the urban growth boundary, the Residential Very Low Density Zone, RVL and the Open Space Recreation Zone, OSR. One of the standards for forest management in these zones is a limit on the overall amount of tree cover which can be removed. The purpose of the selective harvesting standard is provide a balance between permitting an economic use of the property until such time as the property is converted to urban use and the retention of the open space values that the forested area provides. Secondly, the City has adopted a tree removal ordinance to regulate the removal of trees in conjunction with urban development. The purpose of the ordinance is to permit the removal of trees necessary for the development and use of the property while retaining as much of the existing tree cover as possible. The open space values of the City's estuarine areas are protected through the comprehensive plan's Estuarine Resources element and the Zoning Ordinance's Estuarine and Open Space zones. The open space value of the ocean beaches are protected by the following measures: the state's declaration of the Pacific shore as a state recreation area (ORS 390.605 - 390.770) and the State Parks and Recreation Department's improvement permit process to ensure that improvements to the oceanshore are consistent with the maintenance of the public interest in the oceanshore; and the provisions of the city's Oceanfront Management Overlay Zone which prohibit development on the beach, active foredunes and conditionally stable foredunes that are subject to wave overtopping and ocean undercutting.

The second group of open space consists of site specific resources. This category includes parks, wildlife refuges and natural areas. The city contains nine parks. These are described in the parks and recreation element of the plan. The parks are protected from conflicting uses by virtue of their public ownership. Les Shirley Park, City Park, the Tolovana Wayside and South Park are subject to a Park zoning designation which protects the open space aspect of these parks from potentially conflicting uses. Haystack Hill Park is protected by an Open Space zoning classification. Ecola Creek Park is protected by an Estuarine Resources zoning classification. The open space values of Chapman Point are protected by an Open Space zoning designation. This designation prohibits any uses that interfere with Chapman Point's open space values. Haystack Rock is part of the Oregon Islands National Wildlife Refuge administered by the US Department of Fish and Wildlife. Discussion of Haystack Rock is contained in the significant natural features section.

The final category is open space which is provided in conjunction with a specific development, usually residential. This type of open space can serve a number of purposes: the protection of areas of steep slope, geologic hazard, or flooding hazard; the buffering of conflicting land uses; or the provision of areas for passive and active forms of recreation. The City has adopted Comprehensive Plan policies and Zoning Ordinance provisions that provide for cluster development and the retention of open space in residential developments.

Resource #2 Mineral/Aggregate

The Department of Geology and Mineral Industries list of removal permits was used as a source for identifying aggregate sites in Cannon Beach. None were identified. There are no streams in Cannon Beach for which a Division of State Lands permit for the removal of gravel has been issued. No mineral resources, such as coal, have been identified within the Cannon Beach urban growth boundary.

Resource #3 Energy Sources

There are no energy resource sites in Cannon Beach, e.g. hydroelectric sites, sites identified as having potential for wind farms, or areas with geothermal energy potential. However, Cannon Beach may have the potential for small individual wind energy systems. Wind monitoring tests (1982-83) conducted by the Oregon Department of Energy indicate the Mean Wind Speed at Fort Stevens State Park is 15.6 mph and 15.9 mph at Nehalem Bay State Park. It can be assumed that areas of Cannon Beach would have similar wind speed readings. A mean wind speed of 12 mph is usually used as a standard indicating that wind generation of electricity is feasible.

Resource #4 Fish/Wildlife Habitat

The "Fish and Wildlife Habitat Protection Plan for Clatsop County" prepared by the Oregon Department of Fish and Wildlife includes six wildlife habitat types: big game, upland game birds, water fowl, furbearers and hunted non-game wildlife, non-game wildlife and fish habitat.

The Department of Fish and Wildlife classifies big game range as either Major Big Game Range, Peripheral Big Game Range, or Excluded Range. (Big Game Range provides the habitat requirements for

Roosevelt Elk, Black trail deer, Black bear and cougar). Major Big Game Range is defined as that portion of the County which supports the majority of big game. In general, these lands are sparsely developed forest lands. They also provide the majority of big game recreational opportunity. Peripheral Big Game Range is generally defined as the valley bottoms of the County's major river valleys. These lands support substantial big games populations and serve as a wintering area for animals from major range areas in severe winters. Conflicts exist between big game and other uses, and these conflicts limit management options and recreational opportunities. The Peripheral Big Game Range areas were once of equal value with Major Big Game Range prior to their more intensive development. Excluded Range areas are developed areas, such as cities and urbanized portions of the County, that are only occasionally used by big game. The portion of Cannon Beach west of U.S. Highway 101 is classed as Excluded Range. The area east of Highway 101 is classified as Peripheral Range. The major conflicting use for the peripheral range area is residential development. Residential development will degrade or destroy big game habitat. Big game habitat will be displaced from these areas to other non-impacted areas. Loss in habitat may result in a decline in big game population with an affect on hunting activity.

Two types of habitat have been determined to be important for upland birds: mineral springs for band-tail pigeons and riparian vegetation along streams. There are no mineral springs in Cannon Beach. The study "Cannon Beach Wetlands" includes an inventory of all the streams located in the city's urban growth boundary. The streams are associated with the city's many small drainages and are characterized as either intermittent or of low flow. The largest stream, other than Ecola Creek, is Logan Creek. The conflicting use analysis of the streams and their associated uses is contained in the "Cannon Beach Wetland Study", which is an appendix of the background report. All the city's streams are subject to stream corridor protection standards incorporated into the Zoning Ordinance. The stream corridor standards require a ten foot buffer on either side of the stream, with a fifteen foot buffer required adjacent to Logan Creek. This buffer will protect riparian vegetation associated with the streams and this in turn will protect habitat valuable to upland birds, as well as other birds.

Two areas of Cannon Beach provide waterfowl habitat, Ecola Creek and the lagoons of the city's sewage treatment facility. Since 1987, a weekly bird census of the lagoon area has been taken. During the summer months, two species are present, wood ducks and

mallards. The wood ducks migrate in the middle of September. Five species of water fowl over winter at the lagoons: lesser scaups, buffleheads, shovelers, mallards, and coots. The primary waterfowl found in Ecola Creek are mergansers in the summer and buffleheads in the fall and winter. The waterfowl habitat associated with Ecola Creek is protected through the policies and standards that apply to Ecola Creek Estuary. The waterfowl habitat associated with the city's sewer lagoons is protected by virtue of the fact that the lagoons are required to operate the city's sewage system.

Non-game wildlife includes eagles, herons, ospreys , owls, and snowy plovers. There are no known Northern Bald Eagle, Great Blue Heron, Osprey or Northern Spotted Owl, or snowy plover nesting sites in Cannon Beach.

The habitat for furbearers and hunted non-game wildlife corresponds to that for big game species and upland birds.

Ecola Creek supports anadromous fish runs of coho salmon, steelhead and sea-run cutthroat. These are discussed in the Natural Resources, Fish and Marine Life element of the Background Report. There are a number of factors that can lead to a loss of fish habitat or the deterioration of habitat quality. The most significant of these are: low stream flows; elevated stream temperatures; stream sedimentation; and chemical or biological stream pollution. Stream quality, and thus its value as fish habitat is affected by adjacent land uses. The major adjacent land uses of Ecola Creek are residential and commercial. Residential and commercial uses can affect stream quality in a number of ways. The removal of riparian vegetation can result in elevated stream temperatures and increase the potential for stream bank erosion. Improper land clearing practices can result in stream sedimentation. The riparian vegetation along Ecola Creek is protected by standards contained in the city's Estuary zone. The land adjacent to the Ecola Creek estuary has been subdivided. Therefore, potential erosion and sedimentation which can result from land clearing operations associated with subdivisions development will not occur. Development of individual commercial sites is subject to the city's design review process. This process permits evaluation of land clearing activities on adjacent estuarine areas. The city's lot coverage requirements and tree removal standards limit the portions of residential sites which can be cleared, thus minimizing the potential impact of erosion and sedimentation. There are no major land uses along the estuary which have the potential to contribute to chemical or biological

pollution of the creek. Effluent from the city's sewage treatment plant is subject to tertiary treatment and must comply with the conditions of its discharge permit from the Department of Environmental Quality. The primary land use adjacent to Ecola Creek, outside of the urban growth boundary, is forestry. Potential impacts of forest operations on the stream include: sedimentation, elevated stream temperatures, and contamination with herbicides. The Oregon Forest Practices Act and Forest Practices Rules provide the regulatory framework for addressing these potential impacts.

Resource #5 &6 Significant Natural Areas

The report, Oregon Natural Areas, Clatsop County, prepared by the Oregon Natural Heritage Program for the Department of Land Conservation and Development listed Chapman Point as a potentially significant natural area. The site has been designated Open Space. The OS zone does not permit any uses. Therefore, the zoning designation protects the open space values associated with Chapman Point from conflicting uses.

Haystack Rock is part of the Oregon Islands Natural Wildlife Refuge administered by the U.S. Department of Fish and Wildlife. Haystack Rock and an area within a 300 yard radius of the base of the rock have been designated a Marine Garden by the Oregon Fish and Wildlife Commission, one of four such areas on the Oregon coast. Marine Gardens are areas that support diverse intertidal or subtidal communities and are adaptable to visitor use through specific management techniques, especially as focal points for formal and informal marine education. Regulations under the Marine Garden designation are administered by the Department of Fish and Wildlife.

The following is the description of Haystack Rock contained in the Territorial Sea Plan, prepared by the Oregon Ocean Policy Advisory Council. The state owns the intertidal lands in the Marine Garden. The US Fish and Wildlife Service owns Haystack Rock and adjacent rocks above Mean High Water. The state owns the adjacent beach. The key resources are: three seabird colonies with over 2,000 birds consisting of pelagic cormorant, western gull, pigeon guillemot, rhinoceros auklet, and tufted puffin; the tufted puffin nesting colony is the second largest in the state. The site is rated as having high intertidal habitat levels, but whose size is low. Seabird concentrations are rated high. Resource conflicts for both intertidal and bird life are rated very high. In terms of current

use, the site is rated very high for both visitation and accessibility. The identified impact concerns are overuse of the intertidal area and disturbance of nesting seabirds by climbing on the rocks. Uses include tidepooling, sight seeing, and shore angling. The city's Haystack Rock Awareness Program provides interpretive services during the summer months. In the section concerning future site management, the plan states that "future site management programs need to address trampling impacts to the intertidal area and disturbances to the seabird nesting colonies. Impacts can be partially alleviated through education. The Haystack Rock Awareness Program has done an excellent job of focusing public education to reduce impacts. This program should be continued and expanded. Educational efforts should target local hotels and school groups that use the area. There should be greater enforcement of the no climbing rules on Haystack Rock. It may be necessary to implement rotational closures of sections of the intertidal area to allow some recovery of the areas receiving the greatest use".

The city will participate, through the Haystack Rock Awareness Program, with the US Department of Fish and Wildlife and the Oregon Department of Fish and Wildlife in joint management actions to implement elements of the Territorial Sea Plan as it pertains to Haystack Rock and in particular to implement actions which will limit the impact of conflicting uses on the resources in the vicinity of Haystack Rock.

Other off-shore islands in the vicinity of Cannon Beach include Bird Rocks to the west of Chapman Point and Silver Point and Jockey Cap south of the city limits. These islands are also in the Oregon Islands Natural Wildlife Refuge. The islands support seabird colonies. The Territorial Sea Plan identifies Bird Rocks as a site needing additional assessment for protection.

Resource #7 Scenic Views

The Open Space, Parks and Recreation section of the 1979 Comprehensive Plan Background Report recognized the importance of scenic resources in defining the community. The report included an inventory of those city's visual resources which were defined as having a high scenic value. The categories of visual or scenic areas were based on the publication "Visual Resource Analysis of

the Oregon Coastal Zone" prepared by the Oregon Coast Conservation and Development Commission in October 1974. The following is a list of the resources identified:

<u>Area</u>	<u>Perspective (Direction of visual experience)</u>	<u>Potential Policy or Control</u>
Haystack Rock	Oceanward from beach level or Tolovana Hill/Hemlock View-point	Further protection of tidepools, restricting cars from the beach in front of the Rock, height limits along Hemlock
The beach and ocean appearance	All directions: Oceanward, toward the mountains, toward Tillamook Head	Guidelines for shore protection; restriction of cars; elimination of spot lights on the beach, lower height limits on beach front
Chapman Point & Dunes to the south	North from Elk Creek	Recognition of Chapman Point as a natural area; protection of fore dunes from development
Ocean Avenue	Oceanward, north and south	Improve beach steps; restricts drive-through traffic (as between Jackson and Van Buren); lower building height
Elk Creek Estuary	East and west from Hemlock St. bridge	Keep RVs in existing area, allow only day use of immediate shore lands. Provide bike/hiking trail

along City dike; control development of state wayside to insure compatibility with the creek

Elk Creek wetlands on both sides of U.S. 101

East of City park & dike

Maintain as a natural area and flood "sponge"

Downtown Cannon Beach

Both sides from 1st Street to Elk Creek Bridge

Enact design review to keep future construction compatible with existing character. Discourage "fast food" or garish activities

U.S. 101 Scenic Corridor

Silver Point to Cannon Beach Jct. including forest buffer on both sides of 50'

Limited access along highway, all uses set-back with no highway frontage. Tree buffer of 50' maintained throughout the distance

Gov. Oswald West House and Grounds

From the beach or immediately north

Designation as an historical area, possible future acquisition by the State, protection from incompatible structures or uses, preservation

Trees

Throughout the City

Protection by enactment of "Tree Ordinance"

During the past fifteen years the city has implemented many of the plan polices and zoning standards that were suggested. The following summarizes these actions.

Haystack Rock The Haystack Rock Awareness Program provides an educational and interpretive program focussing on the intertidal habitat surrounding Haystack Rock. The program's objective is to protect Haystack Rock's fragile ecosystem through education of the visiting public. Vehicular use of the beach has been restricted to emergency vehicles, the disabled, the launching of boats, and wood collection. The city chose not to establish special height restrictions on areas west of Hemlock Street as a means of maximizing the views of Haystack Rock.

Ocean beaches The city has established an oceanfront management overlay zone, within the Zoning Ordinance, which applies to uses and activities on the beach and adjacent upland areas. The zone restricts the uses that are permitted on the beach and this restriction on use has the effect of protecting the beach's scenic values. The overlay zone also contains standards for beachfront protective measures. The preferred method of shoreline protection is the protection of existing vegetation or the use of vegetative shoreline stabilization. These preferred methods of shoreline stabilization are intended to minimize the visual impact of beachfront protective structures on the beach and adjacent areas. As discussed in the Haystack Rock section, vehicular use of the beach has been greatly restricted. The city has established zoning ordinance standards to limit the impact of spot lights on the beach. The city has chosen not to establish a lower building height along the beach front.

Chapman Point and Dunes The scenic values of Chapman Point are protected by an Open Space land use designation. This designation does not permit any uses or activities on Chapman Point. The Oceanfront Management Overlay Zone includes standards which prohibit residential development on the active foredune and conditionally stable foredunes subject to wave overtopping and ocean undercutting. This standard protects foredunes from development and thus maintains their scenic qualities.

Ocean Avenue The city has implemented a program of improving beach access. To date no improvements have been made along Ocean Avenue. No changes to the traffic pattern on Ocean Avenue have

been implemented. The city has chosen not to establish a lower building height for lots along Ocean Avenue.

Ecola Creek Estuary The city has established comprehensive plan policies and zoning ordinance standards to regulate uses in the Ecola Creek estuary. These policies have the effect of treating the estuary as a "natural estuary" under the state's classification scheme. The policies and standards protect the estuary's scenic values. The "sponge area" has been designated Estuarine. A comprehensive plan policy limits the area for the pasturing of animals and additional animals are not permitted. The city has adopted a comprehensive plan policy regarding the development of a bike/hiking trail on a portion of the diked area. The area once intended to be a state wayside has been developed into Les Shirley Park, a city park. The design of this park considered the protection of the scenic values of the adjacent estuarine area.

Downtown Cannon Beach The city has established a design review process. All commercial building are subject to the design review process, including those in the downtown area. A number of the design review criteria address the impact of a development on scenic resources. The design review process has been effective in creating a downtown area with a distinct visual character which is compatible with the surrounding residential area. The city has established plan policies and zoning standards to prohibit formula food restaurants. The city also regulates outdoor merchandising as a means of maintaining the visual character of its commercial areas.

US 101 Scenic Corridor The city has adopted comprehensive plan policies which prohibit additional commercial development along Highway 101. The city has adopted comprehensive plan policies intended to preserve the scenic character of Highway 101 by opposing its widening to four lanes and the removal of trees contained within its right-of-way.

Oswald West House The Oswald West house was destroyed by fire in the early 1990's. The house has been reconstructed to conform to its original historic character. The site of the Oswald West house is listed on the Federal Register of Historic Places. Acquisition of the site has been found to be inappropriate. No additional regulations are required to "protect" the site of the Oswald West house from the impacts of adjacent residential uses.

Trees The city's zoning ordinance contains a chapter regulating the removal of trees. These regulations maintain the scenic character of Cannon Beach which is associated with its tree cover.

In 1994, the Oregon Department of Land Conservation and Development prepared a document titled "Exceptional Aesthetic Resources, Technical Report". The report provides an initial inventory of exceptional aesthetic resources along Oregon's ocean shoreline. The areas identified in the report are intended to be a starting point for local governments in their evaluation and designation of shoreland areas to be protected for their scenic values. The study divided the state's coastal shoreline into ten regions. Within each region "Recommended Landscapes with Exceptional Aesthetic Resources" were identified. For each such landscape there is a description of the exceptional values that are present, possible enhancement opportunities that will raise the landscape to its full potential and general development guidelines that are consistent with the natural values in that landscape. Cannon Beach is located in the region identified as the Nehalem Subregion. One landscape is identified in Cannon Beach; it is referred to as Haystack Rock and Wayside. The report describes this landscape as follows. "Haystack Rock - the cluster of rocks are prominent, basaltic remnants located in Cannon Beach. There is an opportunity to develop a highway pull-off at Haystack Rock Wayside which would open views to the rocks. Development of structures or rehabilitation of existing structures between the Wayside and the rock should be low profile so as not to conflict with existing and potential views. View management should include the addition of low vegetation to screen structures below the viewpoint and selective clearing to frame the beach and rock. Any signs should be located outside the view corridor." Haystack Rock is a scenic resource. However, the development of a wayside at Haystack Hill State Park as a means of creating "visual access" to Haystack Rock is not desirable. The Park has a plan/zoning ordinance designation of Open Space. This zone does not permit any park development, including trails. The park's aesthetic character, including views to Haystack Rock, is best preserved by maintaining the park in its undeveloped condition.

Resources #8, 9, & 10 Watersheds, Groundwater Resources and Wetlands

There are no lakes in Cannon Beach. The City's watershed is located outside its urban growth boundary. Wetlands are described and analyzed in the study titled "Cannon Beach Wetlands".

Resource #11 Wilderness Areas

There are no wilderness areas in Cannon Beach.

Resources #12 & #13 Cultural and Historic Resources

The following brief description of the "pre-history" of Cannon Beach is excerpted from an archaeological survey conducted by John Woodward in 1980 and contained in the report titled "Development & Evaluation of Wetlands/Marsh Water Treatment System, Facilities Plan Addendum No. 2." prepared by KCM in October of 1981.

"Although no recorded systematic archaeological research has been conducted in the immediate Cannon Beach area, excavations at the Palmrose (35CT47) and Par-Tee (35CT20) site in Seaside have revealed that complex maritime cultures existed on the northern Oregon Coast from at least 1000 B.C. (Phebus and Drucker 1979). Cannon Beach is located in the territory of the historically described Salishan-Tillamook Indians (Thwaites 1904, Swanton 1952, Sauter and Johnson 1974). Captain William Clark visited a village of five houses at the mouth of Ecola (Elk) Creek in January 1806 in what is now Cannon Beach: nearby, the inhabitants were butchering the remains of a beached whale (Thwaites 1904). Prehistoric shell midden remnants remain at nearby Tolovana Park and in Ecola State Park. During the historic period three major coastal trails converged on the coast near the mouth of Elk Creek (Dicken 1971)."

An archaeological survey was conducted in conjunction with planning for the siting of the city's marsh wastewater treatment facility. This survey identified a previously undocumented archaeological site south and east of the Ecola Creek bridge. The marsh wastewater treatment facility was designed to avoid the site. A further description of the site is contained in the report titled "Development & evaluation of Wetlands/Marsh Water Treatment System, Facilities Plan Addendum No. 2." prepared by KCM in October of 1981. No other archaeological sites have been identified. Excavation, filling, grading and other construction activities in or adjacent to an archaeological site are potential conflicting uses. The consequences of allowing such conflicting uses without proper review and regulation could be a loss of a significant cultural resource that could enhance the knowledge available concerning the culture of the indigenous people of the area.

Several state and federal laws and statues pertain to archaeological sites. Oregon Revised Statute (ORS) 97.740 prohibits tampering with Native Indian cairns and graves. ORS 273.705-742 governs the removal of archaeological, historical and valuable materials from state lands. The pertinent Federal laws are Pl 96-97, the Archaeological Resources protection Act of 1979 and PL 93-291, Historic and Archaeological Data Preservation Act. In order to protect archaeological sites, both presently identified and those that may be identified in the future, from conflicting uses the city will establish a review and notification process involving the State Historic Preservation Office. It will also include the application of the pertinent state and federal regulations.

There are no buildings listed on the National Register of Historic Places. There is one site listed on the National Register of Historic Places, that is the site of the Oswald West house. There are no additional buildings or sites listed on the State Inventory of Historic Sites.

The Oswald West, Coastal Retreat (1913) was entered in the National Register of Historic Places on February 26, 1992. The property consists of .88 acres and is located at 1981 Pacific Avenue. The designation was based on the site's association with Oswald West. Oswald West developed the site in 1913 during the time he served as Governor. Oswald West was responsible for the legislation which declared Oregon's beaches as a public highway. This legislation forms the basis for the public's recreation easement across the dry sand beaches of the state. The designation is also intended to recognize the historic significance of the site in the context of conservation and outdoor recreation in Oregon. The Oswald West house was destroyed by fire in the early 1990's. The house has been reconstructed to conform to its original historic character. The site and surrounding property are located in an R-1, Residential Moderate Density Zone. The uses permitted in this zone do not conflict with the designation of the site as a historic resource. Therefore, no additional standards are required to "protect" the site.

Resource #14 Scenic Waterway

There are no approved Federal Wild and Scenic Waterways or State Scenic Waterways in Cannon Beach.

Resource #15 Recreation Trails

There are three bicycle routes that pass through Cannon Beach. One of these, the Oregon Coast Bicycle Route, has been officially designated by the procedures established by ORS 390.950-390.981. The other two routes have not gone through the procedures established in Oregon Revised Statutes. The Oregon Coast Bicycle Route is part of the coastal bicycle touring route that extends from Mexico to Canada. The bicycle route exits from U.S. Highway 101 at the north entrance to Cannon Beach, proceeds through the city on Hemlock Street and reconnects with U.S. Highway 101 at the south entrance to the city. The Northwest Oregon Loop Bicycle Route connects the east and west coasts of the United States. The western terminus of the route is in Astoria. The route follows U.S. Highway 101 through Cannon Beach. The Northwest Oregon Loop Bicycle Route connects the Willamette Valley with the Oregon Coast. The portion through Clatsop County and Cannon Beach follows U.S. Highway 101. The Trans-American Bikeway connects the east and west coasts of the United States. The western terminus of the route is in Astoria. The route follows U.S. Highway 101 through Cannon Beach. Conflicts between bicycle and vehicular traffic can occur. The Highway Division has a program to widen street shoulders to reduce this conflict. Aside from bicycle rider safety, there are no appreciable environmental, social, economic or energy consequences.

The Oregon Coast Trail will eventually be a 370 mile hiking trail along the coast from the Columbia River to the California border. The northernmost 64 mile segment from the Columbia River to Barview was dedicated in 1975. The portion of the trail that passes through Cannon Beach follows Ecola Park Road to Fifth Street, then proceeds east on Fifth Street to Alternative U.S. 101. The trail leaves the street and starts along the beach at Whale Park. From there, it proceeds along the full length of Cannon Beach along the ocean beach. As a designated trail, there are no conflicting uses and the trail can be considered protected. The portion of the Oregon Coast Trail, in the City of Cannon Beach, between Ecola Park Road and Les Shirley Park has been designated as part of the Lewis and Clark National Historic Trail. Les Shirley Park is the terminus of that trail and an interpretive sign has been placed in the park to commemorate Lewis and Clark's visit to the area.

PARKS AND RECREATION

PARKS AND RECREATION

State-wide Planning Goal 8, Recreational Needs, provides the following goal statement: "to satisfy the recreational needs of the citizens of the state and visitors and, where appropriate, to provide for the siting of necessary recreational facilities including destination resorts."

The Goal continues by describing a recreation planning process where "the requirements for meeting such needs, now and in the future, shall be planned for by governmental agencies having responsibility for recreation areas, facilities and opportunities: (1) in coordination with private enterprise; (2) in appropriate proportions; and (3) is such quantity, quality and locations as is consistent with the availability of the resources to meet such requirements. State and federal agency recreation plans shall be coordinated with local and regional recreation needs and plans."

The city will use the conceptual framework contained in the Oregon Outdoor Recreation Plan 1988-1993 and the draft Oregon Outdoor Recreation Plan 1994-1999 (these plan's will be referred as SCORP) to undertake the analysis of recreation resources as required by Goal 8.

The city is a residential resort community and as such recreation plays a more fundamental role in the community than it does in most cities. The city's physical location on the Pacific Ocean, and the recreation opportunities that the ocean and its beaches provide, has been an integral part of the development of the city. The city's physical location makes it a destination for people seeking recreational activities and experiences. The three major components of the city's economy, tourism, construction and the second home/retirement home housing market, are all directly related to the recreation activities available in Cannon Beach and its environs. In planning for recreation facilities and activities, the city's objective is to find a balance between providing for the recreational needs of its visitors and maintaining the essential elements of its residential character. Planning for recreational facilities and activities must also balance the needs of visitors with those of permanent residents.

City's Parks and Recreation Resources

The discussion of the city's park and recreation resources consists of the following elements: (1). an inventory of the recreation facilities and activities; (2). an assessment of the existing recreation facilities and activities; and (3) identification of additional recreational facility needs.

The city contains nine parks, six in city ownership and three owned by the state, two of which are managed by the Oregon Parks and Recreation Division. The following is a summary of each park and its characteristics.

Les Shirley Park

Les Shirley Park is located north of Ecola Creek, south of 5th Street and west of the Old Oregon Coast Highway. The park has an area of 5.7 acres. The park has approximately 800 feet of frontage on Ecola Creek. In addition to estuarine wetlands associated with Ecola Creek, the park contains Logan Creek at its confluence with Ecola Creek. All of the park is located in the floodplain associated with Ecola Creek.

The park site has historic significance,. The Lewis and Clark Expedition visited the site in 1806. The park is the official terminus of the Lewis and Clark Trail and is recognized as such by the National Lewis and Clark Heritage Foundation and the Oregon Lewis and Clark Trail Committee.

The Les Shirley Park includes the following improvements: public restrooms; 28 parking spaces; picnic facilities, including tables and grills; open grassy areas available for a variety of play activities; public access to Ecola Creek and the ocean; and interpretive signs. The park provides unimproved angler access to Ecola Creek.

The park is one of the city's five main public access points to the ocean beach and Ecola Creek estuary. Each of these main public access points consists of three elements: parking, physical access improvements and appropriate signage. Les Shirley Park is the only fully developed public access point on the north side of Cannon Beach.

The park's interpretive signs provide information about the site's unique estuarine, riparian, and beach environments. A description

of the Lewis and Clark Expedition's visit to the site is also provided.

Ecola Creek Park

Ecola Creek Park is located on the southern bank on Ecola Creek, immediately east of the bridge crossing Ecola Creek. The park has an area of .7 acres. The park has approximately 250 feet of frontage on Ecola Creek. The park is located in the creek's flood plain. The park provides picnic tables and parking spaces. The site provides access to Ecola Creek for fishing and launching of non-motorized boats.

Whale Park

Whale Park is located in the northern portion of the downtown area, west of Third Street and north of Hemlock Street. The park has an area of 13,000 square feet. The park has 100 feet of frontage on Ecola Creek near its confluence with the Pacific Ocean. On its north, the park adjoins unimproved city property, of approximately 4.7 acres, which provides an additional 700 feet of frontage on Ecola Creek. Park improvements include covered seating areas and a wooden sculpture of a whale. Whale Park provides visual and physical access to the Pacific Ocean. The park is one of the city's five main public access points to the ocean beach and Ecola Creek estuary.

Elk Run Park

Elk Run Park is located in the southern portion of the downtown area, west of Spruce Street and south of First Street. The park has an area of 20,000 square feet and abuts the unimproved right-of-way of Taft Street, which provides an additional 10,000 square feet of area. The park contains a fresh water wetland that is classified, according to the National Wetland Inventory, as a palustrine, forested, seasonal wetland. The Cannon Beach Wetland Study describes the site as containing "a remnant of old growth Sitka spruce forest with depressions of pooled water, skunk cabbage, and a meandering stream channel. The wetland is small and isolated..."

The park's primary function is to provide a quiet picnicking/rest area in close proximity to the downtown area. The park contains the following improvements: 8 off-street parking spaces; picnic benches; and a viewing and seating platform.

City Park

City Park is located in the middle of the downtown area, east of Spruce Street and north of Second Street. The park has an area of approximately 3.5 acres. On its east, the park is adjacent to Ecola Creek and associated wetlands.

City Park is the city's community park. The park accommodates a variety of functions including: active recreational activities such as field games, court games, and skate boarding; play area for young children; picnicking; and summer concerts. The park contains the following improvements: a baseball diamond, soccer goals, two tennis courts, a skateboard park, basketball hoop, playground equipment, and a bandstand.

Madison Park

Madison Park is located in the Presidential Streets residential area, north of Madison Street and west of Spruce Street. The park has an area of approximately 8,000 square feet. The park contains several picnic tables in an open grassy area that is separated from the adjoining street by a landscaping berm.

Haystack Hill State Park

Haystack Hill Park, a state park, is located west of US Highway 101, south of Arbor Lane and North of Chena Street. The park has an area of 8.83 acres. The park is undeveloped. Portions of the park contain a dense stand of Sitka Spruce. The park provides sweeping views south to Cape Falcon. An informal network of trails has been established. The deed conveying the park to the state requires that the area remain in an unimproved condition.

Tolovana Wayside

The Tolovana State Wayside is located in the Tolovana area, west of S. Hemlock Street and north of Warren Way. The wayside has an area of 2.7 acres and is in the State Parks system. The park contains the following improvements: 100 parking spaces, picnic benches and a public restroom. The wayside is one of the city's five main public access points to the ocean beach.

South Cannon Park

South Park is located adjacent to the US Highway 101 right-of-way at the southern entrance to the city. The park area is .86 acres. The parcel is owned by the Oregon department of Transportation. The park contains picnic tables.

In addition to the parks described above, the city contains other recreational facilities. The Cannon Beach Grade School grounds provide: a play field, playground equipment and basketball courts. The school also has a gymnasium that can be used for community recreational and cultural activities. The Oregon Coast Trail, the Oregon Coast Bicycle Route and other bicycle paths are described in more detail in the Open Space element of the Background Report.

The city contains three private campgrounds (the RV Resort at Cannon Beach, Wright's For Camping, and Sea Ranch RV Park) which provide approximately 200 recreational vehicle and tent sites.

A number of organized recreational programs and activities occur in the city's parks. During the summer months, the City Park is the site of: a concerts in the park series sponsored by the Cannon Beach Arts Association; a summer youth recreation program sponsored by the city; and organized baseball and soccer league games.

The Tolovana Community Hall provides for a limited amount of indoor recreation in the form of exercise and activity classes provided by a variety of sponsors. The gymnasium at the Cannon Beach Grade School and a gymnasium at the Cannon Beach Conference Center provide indoor children play areas. There are a number of private commercial swimming pools; one of which is used for senior aquatic exercise classes.

Land within cities which is specifically designated and/or developed for recreation purposes is often classified as being one of four park types: neighborhood, community, district and regional. This classification is generally based on the activities that occur in the park, the principal user groups and the jurisdiction with management responsibility. Other parks, with more specialized functions, are defined as tot lots, mini-parks, sports fields, courts and pools. Parks under city jurisdiction are mainly intended to serve neighborhood and community needs within the city boundaries. Neighborhood parks are usually defined as those under 15 acres in size; community parks are usually 15 acres or more in

size. Neighborhood parks are those easily accessible to the community, offer high density activity or passive use, but with a limited range of facilities. Community parks are parks whose location provides for citizens of a community and immediate outlying areas, offers moderate density recreation use and/or cultural opportunities. Community parks have the potential for providing a greater diversity of recreational activities than do neighborhood parks. The city's larger parks, Les Shirley Park and City Park would generally be classified as neighborhood parks, but these parks do serve some community park functions. Whale Park, Elk Run Park, Madison Park, and Ecola Creek Park fall into the mini-park category. While the proposed playground equipment area of the Tolovana Wayside makes it a tot lot.

The city's parks also provide recreational activities for visitors to the city. The most common activities being: picnicking, use of playground equipment, and use of tennis courts and skateboard park.

In assessing how well the city's existing recreational facilities and programs provide for the recreation needs of the community, survey information on community based recreation contained in the draft SCORP is being used.

The Oregon Outdoor Recreation Plan 1994-1999 includes the results of a survey of community based recreation. The survey measured participation in 12 local outdoor community activities. The survey found that the following were the participation rates for common community based recreation activities: park walking/running (59%); picnicking (50%); unpaved trail walking and hiking (44%); nature and wildlife observation (39%); sports/games (38%); playground equipment use (35%); botanical/historical activities (35%); biking on pavement (33%); cultural events (29%); golf (25%); use of a swimming pool (23%); and rollerskate/skateboard use (8%).

The survey also measured participation in organized recreational programs. The most often listed programs in which survey respondents participated in were: community art, craft festivals and exhibits (48%); historical exhibits (44%); and outdoor concerts, music festivals (37%).

It is assumed that these survey results are reflective of the recreational activity participation rates of Cannon Beach residents. Thus the range of recreation facilities and activities available in the city can be evaluated in light of the types of recreation activities citizens are most likely to participate in.

Such an evaluation results in a general finding that the city's recreation facilities provide for its present community based recreation needs. This conclusion is based on the following comparison of city resources to identified activities. The ocean beaches provide an unparalleled setting for walking and running activities. All of the city parks provide some improvements for picnicking as does the Tolovana Wayside. The ocean beaches are an ideal locale for picnicking. The city's physical setting, adjacent to the Pacific Ocean and the Ecola Creek estuary, provide opportunities for nature and wildlife observation. The use of City Park for organized baseball and soccer games is constrained by its size and the variety of uses that occur in the park. Playground equipment is available at both the City Park and the Cannon Beach Grade School. These locations were found to be convenient to most of the community. However, a need for additional playground equipment in the southern portion of the city has been identified. In 1995, the city, in cooperation with the Oregon Parks and Recreation Division, will be installing playground equipment at the Tolovana Wayside. The city does not have an arboretum or other similar resource for the study and enjoyment of plants. However, given the city's rural location and proximity to thousands of acres of forest land, a need for such a facility has never been identified. The Cannon Beach Historical Society recently acquired a building and some adjacent land. The Society's long-range plans include a building expansion that will permit the development of historical displays open to the public. The Oregon Coast Bicycle Route passes through Cannon Beach. Over the years, a key element in the implementation of the city's bicycle master plan has been the development of dedicated bicycle lanes along the full length of Hemlock Street through Cannon Beach. This plan is nearing completion. In addition the bicycle master plan provides for the development of other bike routes. For a community of its size, the city supports a broad range of cultural events. The Cannon Beach Arts Association's cultural activities include a concert series in the park series and a lecture series. The Coaster Theater provides a setting for plays and concerts. Portland State University's Haystack Program provides a broad range of courses in the arts and the environment. As part of their courses, teachers and participants give community lectures, concerts and demonstrations. There are no golf courses located in Cannon Beach. However, there are four golf courses within 20 miles of the city. A public swimming pool is operated by the Sunset Empire Parks and Recreation district in Seaside, eight miles to the north. Portions of Cannon Beach are located in the Sunset Empire Parks and Recreation District. City Park contains a skateboard facility.

Among the most often listed organized community programs in which person's surveyed by SCORP participated, the city provides a variety of opportunities. The Coaster Theater, the Cannon Beach Arts Association, and the Portland State Haystack program provide a many art related exhibits and activities. The Cannon Beach Arts Association, with the city's support, sponsors a summer concerts in the park series.

The Parks and Community Services Committees, in its 1993 update of the Parks and Community Services Refinement Plan, also made a finding that the city's park system is generally adequate to respond to the city's recreation needs. The Refinement Plan identified three areas for potential park system improvement: (1). placing playground equipment at the Tolovana Wayside to serve residents in the Tolovana Park area; (2). development of a sports park to provide for baseball and soccer fields; (3). improvements that will facilitate park use by the disabled; and (4) extension of the bicycle path system.

The city's 1994 population estimate is 1,330. The city is estimating a population in the year 2010 of 1569 permanent residents. This modest population is not anticipated to create a demand for recreation activities that can not be accommodated by recreation facilities, either present or planned.

SCORP also identified a category of recreation activities defined as dispersed recreation activities. These activities are defined as ones which usually occur beyond the local community in which the person participating in the activity resides. SCORP notes that for these activities, the quality of the physical setting is often an integral part of the recreation experience.

Based on the SCORP survey results, the most popular dispersed recreation activities are: sightseeing (69%); swimming/wading at the ocean, a lake or river (59%); boat fishing (41%); tent camping (39%); and nature study/wildlife viewing (39%). It is the opportunity to participate in these dispersed recreation activities which forms the basis for a substantial portion of the city's tourist industry.

The Pacific Ocean and the ocean beaches are the city's dominant physical feature and are also the focus for dispersed recreational activity in the city. The Pacific Ocean and its beaches provide opportunities for three of the five most popular forms of dispersed

recreation activity: sightseeing, swimming and wading in the ocean; and nature study.

Providing convenient access to the ocean beaches is a key element of their recreational use. The fact that many of the city streets dead-end at the ocean has resulted in the creation of numerous beach access points. The city has approximately 3.5 miles of ocean frontage. There are 43 improved beach access sites, for an average of one beach access point each 425 feet of beach frontage. In the residential area of Midtown and Tolovana Park there is generally a beach access point every 200 feet. The longest stretch of beach without a beach access is located between an alley located in the vicinity of Dawes Avenue and the beach access stairs to Haystack Rock, a distance about one-third of a mile. There are 4 unimproved street ends (Sixth Street, Chena Street, Nenana Avenue, and Nazina Avenue) which could provide additional beach access.

The following description and condition of the beach access points was conducted in January of 1994:

Beach Access Inventory

<u>Location</u>	<u>Description</u>	<u>Condition</u>
1. Beach Ave.	Wood steps w/handrail; path to beach	Fair
2. West Way	Concrete steps w/metal railing. Wood landing and railing along paved area added (1993)	Very Good
3. Sitka	Railroad tie/gravel upper steps and wood stairs to short beach path	Good
4. Noatak	Upper wooded path; wood steps with several landings and built in benches; beach path (1991)	Excellent
5. Kenai	Wide right-of-way to concrete steps with handrail (1990)	Very Good
6. Braillier	Partial blacktop right-of-way vehicle access. Handrail added (1993)	Very Good
7. Midway	Wide gravel right-of-way to Concrete steps with handrails	Excellent
8. Orford	Natural trail with five foot rise	Fair

9.	Coos	Gravel right-of-way to short natural trail	Very Good
10.	Umpqua	Right-of-way extends to beach	Very Good
11.	Siuslaw	Right-of-way to man-made berm; natural trail over berm	Good
12.	Warren Way	Rocked access for vehicles	Very Good
13.	Tolovana Wayside	Wood steps w/railings, concrete landing (State maintained)	Very Good
14.	Delta	Wide right-of-way to beach partially graveled; concrete steps w/ handrails (1990)	Excellent
15.	Susitna	Wood steps w/concrete landing (1987)	Very Good
16.	Chisana	Right-of-way to beach, partially graveled; moderate to steep slope to beach	Fair to Poor
17.	Nelchena	Roadway paved to within 20 ft of berm; path over berm, concrete steps and handrails to beach (1990)	Good
18.	Matanuska	Paved right-of-way to within 20 ft. of grassy berm; 8 ft drop off on beach side w/erosion	Very Poor
19.	Nebesna	Roadway to berm; concrete steps with handrails (1990)	Very Good
20.	Tanana	Roadway to within 30 ft of beach; narrow, natural trail to sand	Good
21.	Gulcana	Wide right-of-way to beach (50 ft); short, moderate slope at beach; concrete outfall in middle of existing walkway; old bench	Fair to Poor

22.	Gogona	Older wooden steps with single railings, both sides; old platform bench	Good
23.	Center	Right-of-way shared with private driveway; upper stepped path (1993); older wood steps w/handrails and landings (1987)	Very Good
24.	Haystack Rock	Upper-wood steps w/ handrails and landing; gravel path; lower-wood/concrete steps with concrete landing (1990)	Excellent
25.	Dawes	15 ft public easement, sand path to beach	Excellent
26.	Ecola Ramp	Paved roadway to beach-vehicular access	Excellent
27.	Harrison	Paved road to old concrete steps	Good
28.	Van Buren	Old concrete steps with handrail on one side	Good
29.	Jackson	Natural trail but eroded	Very Poor
30.	Monroe	Sand path	Very Good
31.	Jefferson	Sand path	Very Good
32.	Adams	Wide opening thru dunes to beach	Very Good
33.	Washington	Open to beach	Very Good
34.	Laurel Alley(1)	15 foot right-of way to beach	Very Good
35.	Laurel Alley(2)	15 foot right-of-way to beach	Excellent

36.	First St	Moderately wide and level right-of-way to beach	Very Good
37.	Second St	Paved street to seawall; concrete steps with metal handrails, concrete landing	Very Good
38.	Whale Park	Wide, smooth, gravel path path to beach (1991)	Excellent
39.	Spruce St Street-end	Sandy access for pedestrians and vehicles	Very Good
40.	N. Hemlock	Sand path via Les Shirley Park	Excellent
41.	N. Larch	Paved street to short beach path	Excellent
42.	Fifth St.	Raised wooden walkway	Very Good
43.	Seventh	Winding sand path through dunes and grass	Good

The 1988 SCORP found that the North Coast region (Clatsop, Tillamook, Lincoln, and coastal Lane counties) is the most popular area of the state for dispersed recreation. The study estimated that about one quarter of the state's fishing, camping, food gathering and nature study, sightseeing and picnicking activities occur in the North Coast region. Among the state's eight regions, the North Coast region has the highest percentage participation in each of these activity categories. SCORP indicated that the following activities will experience the greatest increase in demand: sightseeing/picnicking, hiking/walking, and nature study/food gathering. These are all activities associated the ocean beaches and their environs. Given that over the next twenty years the Portland Metro area will experience a growth rate substantially greater than the state as a whole, Cannon Beach can anticipate an ever increasing number of visitors seeking recreation opportunities.

In the face of the anticipated growth in demand for dispersed recreation activities, the city recognizes the importance of maintaining the physical setting of the ocean beaches so that any deterioration in the quality of the recreational experience enjoyed

by both residents and visitors is minimized. The city has implemented a number of programs to maintain the quality of the recreation experience on the beach. During the 1980's, in conjunction with the Parks Division, motorized vehicular use of the beach was eliminated. Commercial uses on the beach are prohibited. The extent of spot lights on the beach are restricted. For the past ten years, the Haystack Rock Awareness Program has provided an educational and interpretive program focusing on the intertidal habitat surrounding Haystack Rock. The program is operated through the summer on low tide weekends and a few mid-week low tide mornings. The program's purpose is to protect Haystack Rock's fragile ecosystem through education of the visiting public.

The other physical feature of Cannon Beach which provides for dispersed recreation activity is Ecola Creek and its associated wetlands. The activities associated with the creek include wildlife viewing and nature study, fishing, and non-motorized boating. Several of the city's parks abut on Ecola Creek, Les Shirley Park and Ecola Creek Park, and some but not all of the above referenced activities occur within these parks. Given the fragile nature of the creek and its estuarine areas, managing the recreation activities to ensure that they do not result in the deterioration of the resource is an important city objective.

The areas surrounding Cannon Beach also provide for dispersed recreation activities for both residents and visitor. Ecola State Park, a 1,300 acre day use park just north of the city limits, provides a developed recreation area which has walking trail, picnic areas, and access to several ocean beaches. Forest lands owned by the State Department of Forestry and Cavenham Forest Industries have traditionally provided for recreational activities associated with forest land. These activities include: nature study and wildlife viewing, hunting and fishing, ORV use, and more recently "mountain bike" use. Several years ago Cavenham Forest Industries restricted access to its forest land by gating access roads. This has substantially curtailed the amount of forest land adjacent to Cannon Beach on which the above referenced recreation activities can occur.

ECONOMY

CLATSOP COUNTY ECONOMIC DATA

The following information is intended to provide a broad overview of Clatsop County's economy.

Clatsop County's economy has historically been a natural resources-based economy, reliant on forest products and seafood. During the past two decades there has been a significant loss of employment in these sectors and the visitor-related economy has become more significant. Although the forest products and seafood related industries have experienced declines in employment, they still represent core elements of the county's economy. According to the *1995 Overall Economic Development Program Report*, prepared by the Clatsop Economic Development Council, more than 35% of the wage and salary jobs in the county in 1994 were in the forest products, seafood industry and visitor related businesses.

Employment

According to information compiled by the Oregon Employment Department, between 1985 and 1995, Clatsop County's civilian labor force increased from 16,340 to 17,100, a 4.6% increase. This level of growth is comparable to the 4.2% increase in population for the same period. Total employment between 1985 and 1995 increased from 14,990 to 16,220, an 8.2% increase. The difference between the rate of growth in the civilian labor force and total employment is the result of a decreased rate of unemployment.

Between 1985 and 1995, Clatsop County's unemployment rate varied from 5.1% to 8.3%, with the high in 1985 and the low in 1995. The county's unemployment rate has generally been higher than that for Oregon as a whole.

Between 1985 and 1995, employment in the Clatsop County's manufacturing sector has decreased from 3,140 to 2,640 a 15.9% decline. Employment in the nonmanufacturing sectors has increased from 8,660 to 11,780, a 36% increase. In 1985 manufacturing represented 26.6% of the county's covered employment and in 1995 it represented 18.3%. The decline in the manufacturing sector is similar to that experienced by the national economy.

A 1996 report prepared by the Oregon Tourism Commission, *Economic Impacts of the Oregon Travel Industry*, provides information on the financial impact of the travel industry on Clatsop County in 1994. The report finds that in 1994 the travel industry generated 3,784 jobs. Oregon Employment Department figures for 1994 indicate that total employment in the county was 15,890. Thus, the travel industry comprised approximately 24% of the total county employment. The four largest tourist oriented employment sectors were eating and drinking establishments, tourist accommodations, retail sales, and recreation. The report found that the travel industry generated 41 million dollars of payroll. Oregon Employment Department figures for 1994 indicate that the total payroll for all covered employment was 298 million dollars. Thus, the travel industry represented approximately 14% of the county's total payroll. The fact that this percentage is significantly less than the percentage of total county employment reflects the low wage nature of the tourism industry.

Among the economic sectors of the county's economy particularly relevant to Cannon Beach, the following are changes in employment between 1985 and 1995: construction /mining an increase from 250 to 590, a 136% increase; trade from 2,940 to 4,260, a 44.9% increase; and services from 2,310 to 3,340, a 44.6% increase.

Clatsop County's economy has always been seasonal in nature because all its major sectors are subject to seasonal employment fluctuations. In 1994, employment during the peak employment month exceeded that of the lowest employment month by 13.6%. This is the same percentage as in 1984.

Many of the employment sectors pertinent to Cannon Beach's economy experience significant seasonal employment fluctuations. In 1994, for employment sectors, the peak employment month exceeded that of the lowest employment month as follows: construction, 13%, eating and drinking establishments 26%; other retail trade, 16%; services, 17%; and hotel/motel, 34%.

The following are the job openings for which the Employment Department had the most listings in Region 1 (Clatsop, Tillamook and Columbia County) during 1994: cannery worker, housekeeping cleaner, stores laborer, material handler, and waiter /waitresses. Many of the jobs in these categories are either seasonal or part-time. Wages for these types of jobs are low. The mean hourly wage offered for these five types of jobs was: waiter/waitress, \$4.82; housekeeping cleaner \$5.49; cannery worker, \$5.72; stores laborer, \$6.79; and material handler, \$6.94.

The Oregon Employment Department has prepared employment projections for the Clatsop/Tillamook/Columbia County region. Their estimate is that total nonfarm payroll employment will increase by 22.3 percent between 1995 and 2005. The fastest growing sectors are projected to be: services +45.1%; wholesale trade, +36.4%; finance/real estate, +30.6%; and retail trade, +28.4%. By occupational type, the projections are that much of the region's employment growth will be concentrated in the service, sales and clerical and administrative support categories. While the region's largest existing occupational group, which is production construction, operatives, maintenance workers and laborers, is projected to experience a net decline.

Income

In 1994, Clatsop County's per capita income was \$19,340, which ranked the county ninth among Oregon's 36 counties. That per capita income lagged \$2,356 behind that of the United States. The disparity between Clatsop County's per capita income and that of the United States has been increasing. In 1985, Clatsop County's per capita income was 9.7% less than that of the United States, in 1994 it was 12.2% less.

The following is the 1994 average annual pay in Clatsop County, by key sectors, all nonfarm employment, \$20,814; manufacturing - \$31,877; construction - \$22,517; trade - \$13,544; and services - \$16,049.

Transfer payments, which consist of income maintenance programs such as social security, disability, and retirement income, constitute a significant segment of the county's total income. In 1994 transfer payments represented 21% of the total county income, an increase from 18% in 1985. Transfer payments represented 17.4% of Oregon's income in 1994. The county's higher percentage of transfer payments reflects the higher percentage of the county's population which is 65 or older.

Economic Development Planning

The Clatsop County Economic Development Committee (CEDC) acts as the county's economic development organization. In 1994, the CEDC adopted a jobs development strategy. According to its *1996 Overall Economic Development Program Report*, this strategy:

“Called for business retention and development strategies focusing on firms that provide family-wage employment, are resilient to swings in the general economy, use locally-available renewable resources as raw materials, handle waste products in a responsible manner, employ locally-available skills, and capitalize on resources and attributes in which the county has a competitive advantage. CEDC identified several industries and markets matching this profile: film and video production; niche visitor marketing; value-added wood products processing; retirement community development; and nonspecific small businesses. Action plans were developed for each of these five sectors, focussing on existing businesses, recruitment or development of new businesses, and public investment.”

The *1995 Overall Economic Development Program Report* added the implementation of a terminal fisheries program to the CEDC's overall strategy.

The Northwest Oregon Economic Alliance (NOEA), comprising Clatsop, Columbia and Tillamook counties, is also involved in economic development planning and implementation. NOEA has developed a strategic plan which provides the basis for obtaining Regional Strategies Lottery funding. The plan's long-range objectives are to: increase the region's standards of living; increase the level of value-added business activity; increase the skill level and the competitiveness of the region's work force; expand the region's access to markets and information; and diversify the region's employment base. By statute, NOEA can only focus its funding on three key industries. The three industries that were selected are environmental services, forest products and tourism. Within these three sectors, the 1995-97 strategic plan seeks to increase employment in the environmental services industry, increase value-added export oriented business activity, and increase targeted off-season tourism.

CANNON BEACH ECONOMY

The three major sectors of Cannon Beach's economy are tourism, the second home industry and retirement.

Employment

According to the city's July 1996 business licence records, there were 1,063 persons employed in the city, 84% of which were employed in tourism associated sectors. There were 397 persons employed at tourist accommodations, 254 persons employed in retail trade establishments and 241 persons employed in restaurants. The remaining 159 persons were employed in other types of businesses.

In 1993, the city conducted a comprehensive survey of the housing needs of individuals employed within the city. This study, *Housing Affordability Study, Cannon Beach Employers and Employees*, found that 57% of the employees in the city also resided in Cannon Beach (the survey of business license holders did not include home occupations and both in and out of town contractors). For a community the size of Cannon Beach, this represents a high percentage of resident employees.

Information on the employment of Cannon Beach residents is available from the U.S. Census. Table I provides information on employment, by industry, for both 1980 and 1990. For comparative purposes, 1990 employment data for Clatsop County are also provided.

TABLE I

Industry for Employed Person Aged 16+
Percentage of Total Employment
1980 & 1990 US Censuses

	<u>Cannon Beach</u>		<u>Clatsop County</u>
	1990	1980	1990
Agriculture/forestry/fishing	3.7	3.2	5.0
Mining	0.0	comb. w/ag	0.0
Construction	8.0	8.4	6.2
Manufacturing	6.7	3.8	18.2
Transportation	0.0	1.9	4.2
Communications	1.0	2.9	1.6
Wholesale Trade	2.1	0.4	3.2
Retail Trade	37.4	31.9	22.6
FIRE	4.2	4.2	3.9
Business/Repair Service	0.3	2.3	2.0
Personal Services	5.9	13.5	15.7
Entertainment /Recreational Services	1.0	comb.w/ps	1.7
Professional & Related Services/	20.1	27.6	25.3
Educational Services			

The following are key findings from Table I:

- In 1990, the three sectors employing the most Cannon Beach residents were: retail trade, professional services, and construction, with retail trade comprising by far the largest employment sector.
- In 1990, Cannon Beach had a significantly higher percentage of its residents employed in the retail trade and construction than the county as a whole. Conversely, a significantly lower percentage of the city's residents were employed in the manufacturing, personal services, and professional services sectors than the county as whole.

- Between 1980 and 1990, the most significant changes were the increases in the percentage of residents employed in the retail trade sector and the decrease in the percentage of residents employed in the personal services and professional services sector.

Employment associated with the second home sector of the city's economy includes construction, personal services such as housecleaning, landscape maintenance and property management.

A comparison of several types of statistics indicates that the overall impact of the city's economy on the overall county economy is disproportionate to the city's population. In 1996, the population of Cannon Beach represented 4% of the total county population (1,395/34,600), while city employment represented 6% (1,065/17,770) of the total county employment. The 1996-97 assessed value of the city is 15.4% of the county's total assessed valuation (515,990,900/3,333,145,843).

Income

Detailed income figures for Cannon Beach are only available from the Census. The usefulness of the information contained in the 1990 Census is limited by the fact that it is eight years old. In 1989, the city's median household income was slightly higher than that of the county's, while the median family income was slightly lower. Among Clatsop County cities, Cannon Beach had the second highest, after Gearhart, median family and median household income. The number of households in Cannon Beach with incomes below the Federal poverty level was significantly lower than in the county and was the lowest among the county's cities.

Income derived from transfer payments can be used as a general indicator of the importance of the "retirement" sector of the local economy. Information on transfer payments received by Cannon Beach residents is not available. However, inferences can be made about the general level of income derived from transfer payment using data from Clatsop County. In 1994, transfer payments represented 21% of the county's total income. According to the 1990 Census, 20.1% of Cannon Beach's population was 65 and older, compared to 16.2% for the county. Because of Cannon Beach higher percentage of persons aged 65 and older, it is reasonable to assume that the percentage of the city's total income derived from transfer payments is greater than 21% of the total income of its residents.

Land Inventory

Table II summarizes the results of an inventory of vacant commercial land within the city undertaken in December of 1996.

TABLE II

Commercial Land
C-1
In acres

	Built	Vacant	Total
Downtown	12.54	.47	13.01
Midtown	8.34	.57	8.91
Tolovana Park	4.12	.80	4.92
TOTAL	25.0	1.84	26.84

Commercial Land
C-2
In acres

	Built	Vacant	Total
Midtown	6.51	0.0	6.51

Motel Land
RM
In acres

	Built	Vacant	Total
Total	21.05	.15	21.20

An analysis conducted by the city in 1994 found that the downtown C-1 area contained approximately 166,000 square feet of commercial space. Since that time approximately 7,000 square feet of additional commercial space has been added, for a total of 173,000 square feet of commercial space in the downtown area. The 1994 study also found that under the existing zoning standards for the downtown C-1 zone an additional 68,000 square feet of commercial space can be added through redevelopment. Thus, under present zoning requirements, the build-out of the downtown commercial area would contain 234,000 square feet.

A survey conducted in December 1996, found that there are approximately 39,000 square feet of commercial space in Midtown C-1 zone and 6,700 square feet of commercial space in Tolovana Park. Redevelopment of commercial land in these two areas could accommodate an additional 51,800 square feet of gross floor area.

The city's existing zoning permits the addition of 112,800 square feet of commercial space. This represents a 50% increase in the amount of commercial space. This is adequate to meet the city's

commercial growth requirements, while retaining the balance between commercial and residential development which the city seeks to achieve.

TABLE III
Tourist accommodations
November 1996

I.	Motel units, including bed and breakfast	937 units
II.	RV & camping sites	190 sites
II.	Short-term rentals	105 dwellings
IV.	TOTAL	1232 accommodations

In addition to the 1,232 existing tourist accommodations, it is estimated that the redevelopment of existing property in areas where motels are permitted as an outright use could result in an additional 271 motel units. In addition, the redevelopment of property which allows motels as a conditional use could result in an additional 94 motel units. There is also the potential, through redevelopment, to add to the number of RV sites.

City ordinances require that existing short term rental units be terminated in the year 2000. This will reduce the supply of tourist accommodations by 105 units. However, the city's existing zoning permits the addition of a minimum of 365 additional tourist accommodations. Thus, present zoning provision will permit an increase of 260 tourist accommodations. This represents an approximately 21% increase in the number of tourist accommodations. This increase is adequate to meet the city's growth requirements for tourist accommodations.

Economic Development Objectives

A review of general economic trends indicates that the three major sectors of the local economy will continue to grow. National and state projections indicate steady growth of the tourism industry over the next decade. The city's proximity to the rapidly growing Portland metropolitan area means that the growth in tourism related activities experienced by Cannon Beach can be expected to grow at a rate that is greater than that for the state as a whole. The city's second home market is primarily driven by the economies of the Portland and Seattle metropolitan area. In the near term, these economies will continue to be robust. In addition, the general demand for second homes will be enhanced by the demographics of the very large baby boom generation entering the age cohort of maximum earnings, generally from 45-55. Finally, the ongoing aging of the country's population means that there will be strong demand for attractive retirement locations such as Cannon Beach.

A review of economic trends indicates that there is a low probability that there will be major new economic development opportunities.

The city's primary economic development goal is to manage the tourism related aspects of the city in a manner that maintains the residential integrity of the community. The importance of this goal is

demonstrated by the fact that the city's daytime population during the summer months increases almost tenfold over that of the permanent population. The emphasis on maintaining the city's residential character is also important because attractive residential areas are what drives the retirement and second home sectors of the local economy. This goal is described by the following portion of the comprehensive plan's vision statement:

Cannon Beach will continue to plan for a balance between the residential and resort elements of the community. In achieving this balance, the emphasis will be placed on managing the resort aspects of Cannon Beach in a manner that is not disruptive to the residential character of the community.

The city relies on a number of strategies to achieve the balance between tourist development and the preservation of residential community with a strong sense of place that is described in the vision statement. These strategies include:

- Promotion of a compact commercial areas that are pedestrian oriented and are readily accessible from adjoining residential areas.
- Limiting future commercial growth, including that of motels, to existing areas designated for such uses.
- Prohibiting strip commercial development along U.S. Highway 101.
- Opposition to the development of a destination resort adjacent to the city.
- Using a design review process to create visually attractive commercial areas which reflect the city's coastal location.
- Prohibiting commercial uses which are detrimental to the character of the city's commercial areas.

The following two comprehensive plan policies summarize the city's economic development strategy:

The Economy Policy 2. The three major sectors of the city's economy are tourism, the second home industry and retirement. The city anticipates that these sectors will continue to constitute the majority of the city's economy. The city's efforts will be directed toward enhancing these economic sectors in a manner that results in the desired balance between the residential and resort elements of the community.

The Economy Policy 3. The vitality of all the major sectors of the City's economy is dependent in large part on the city's physical location, its natural amenities and the attractiveness of its residential and commercial areas. The presence of the visual and performing arts and opportunities for life long learning are also important to the health of the local economy. The City's economic development strategy will focus on the protection and enhancement of these factors. The objective is to strengthen the local economy in a manner that retains the community's small town character and benefits the entire community.

PUBLIC FACILITIES ELEMENT

SANITARY SEWER SYSTEM

The city's wastewater treatment facility consists of a four-cell aerated/facultative lagoon system and a two-cell wetlands treatment system which provides "natural" effluent polishing. From November 1 to April 30, after the influent has been processed in the aerated/facultative lagoon system, the effluent is released directly to Ecola Creek. Between May 1 and October 31, the effluent is pumped to the wetland cells for eventual discharge into Ecola Creek. (A more detailed discussion of the city's wastewater treatment system is contained in *Wastewater Treatment Supplement to Master Plan, January 1998*).

The wastewater treatment system was significantly upgraded in 1984; this upgrade included the construction of the two-cell wetland treatment element. Since these improvements, the city has consistently met the discharge requirements of its National Pollution Discharge Elimination Permit System (NPDES) permit. The NPDES permit was renewed in June of 1993 and is effective until June 30, 1998.

The report, *Wastewater Treatment Supplement to Master Plan, January 1998* (Report) includes an analysis of the city's wastewater treatment facility to the year 2015. The Report estimates that in the year 2015, the projected peak daily flow to the treatment facility would be 3.6 million gallons a day. The treatment facility (the lagoon, chlorine contact chamber and plant piping) has an overall hydraulic capacity of four million gallons a day. Based on this finding, the Report concluded that the overall capacity of the city's treatment system was adequate during the planning period. The Report also concluded that, through modifications in the operation of the system, it is likely the facility will be able to meet dilution requirements related to BOD and suspended solids during the planning period.

The Report identified a number of wastewater treatment system improvements. All these capital improvements are near term projects, to be implemented within the next three years. The two major improvements are upgrading the aerators and sludge removal and disposal. Upgrading the west aerators is scheduled for FY 98-99, at an estimated cost of \$150,000. Sludge removal and disposal are scheduled for FY 1999-2000. The Report estimated that sludge removal and disposal would cost \$300,000. The city will explore alternatives for sludge disposal including mechanical dewatering and hauling, liquid land disposal and composting as part of an overall organic waste handling program. The final cost of sludge disposal will depend on the disposal method selected. Depending on the outcome of the review of the city's NPDES permit, the city may be required to install a dechlorination facility, at an estimated cost of \$50,000 - \$130,000. If required this facility is scheduled for FY 2000-01. The required improvements to the wastewater treatment facility will be funded from sewer renewal and replacement fund.

The Report identified the following as issues that may be raised during the review of the city's NPDES permit: the level of BOD and suspended solids, chlorine and ammonia toxicity as they relate to salmonoids, dissolved oxygen concentrations as they relate to salmonoids, and the impact of the marsh treatment element on groundwater quality.

If more stringent water quality standards are implemented through the renewal of the city's NPDES permit, the city may be required to make capital improvements to the treatment system. Potential improvements include modifications to the chlorination facilities and to the marsh treatment area.

The Report also updates the "*City of Cannon Beach Waste Water Collection System Master Plan*" (Plan). The Plan was completed in May of 1991 and adopted by the city council in June of 1991. The Plan and Report include the following elements: an inventory of the existing collection system, including mapped locations of improvements; an assessment of wastewater collection system requirements; a hydraulic analysis of the collection system; and recommendations for system improvements.

The Report's major conclusion is that, with several exceptions, the existing collection system has adequate capacity to serve the growth that will result from a build out of the urban growth boundary.

The Report recommends both near term and long term improvements. Near term improvements are defined as those needed to meet existing system requirements and are to be implemented within the next three years. Long term improvements are defined as those required to meet projected growth within the urban growth boundary and are to be implemented during the next decade.

Near Term Projects

- 1). Upgrade the Matanuska pump station - estimated cost \$200,000.

Long Term Projects

- 1). Main Pump Station North Interceptor - Provide additional system capacity between the Ecola pump station and Main pump station - estimated cost \$173,000
- 2). Ecola Pump Station Trunk Main - Replace capacity deficient pipes within the trunk main north of Ecola Creek - estimated cost \$79,000.
- 3). Upgrade the Elkland pump station - estimated cost \$50,000.
- 4). Upgrade the Ecola pump station - estimated cost \$80,000.

The near term projects can be funded from the sewer system renewal and replacement fund.

The mapping of the city's waste water collection system is periodically updated to reflect system improvements and modifications.

The Plan utilized a twenty year planning horizon, from 1990 -2010. For this planning period, the Plan assumed an annual growth rate of 1%, for both the permanent population and the equivalent service population. The plan's analysis was also based on a "build-out" of the city's 1990 urban

growth boundary at the density permitted by the zoning designations in place at that time. In conformance with the plan's recommendations, these assumptions have been reviewed to determine their ongoing validity.

The Portland State Center for Population Research and Census estimates that the city's 1997 permanent population is 1,425. The Plan's population projection for 1997 was 1,400. This is less than a 2% variance from the population projection and therefore it is concluded that the city's permanent population growth since 1991 has been in conformance with the Plan's projection's. Since 1991, there have been two small additions to the urban growth boundary, with an area of approximately 23 acres. Development of these two parcels is likely to add only two dwelling units. Since 1991, there have been no significant changes in land use density standards or zone boundaries that would affect the "build-out" assumptions of the plan. The city reviewed the extent of its urban growth boundary in 1995 and determined not to expand the boundary. In summary, the Plan's assumptions about future city growth and the demands that growth will place on the collection system continue to be valid. Thus it is found that the Plan's basic conclusion, that the existing collection system generally has adequate capacity to serve the growth that will result from a build out of the urban growth boundary, continues to be valid.

The next comprehensive review of the urban growth boundary is not likely to occur before the year 2002. If the urban growth boundary is expanded at that time, the city's sewer system has the treatment capacity to accommodate a larger urban growth boundary area.

WATER SYSTEM

Historically, the city has obtained its water supply from three springs. These springs yield a maximum supply of between 800 and 1,000 gallons per minute (gpm). However, during the summer month the flow rate has dropped to as low as 300 gpm. When peak water usage occurred during these low flow periods, the city augmented the supply by pumping water from the West Fork of Ecola Creek into the source transmission line.

In addition to the 1.6 cubic feet per second (cfs) water right for the springs, the city possesses a 1.5 cfs (673 gpm.) water right on the West Fork of Ecola Creek.

In 1996, the city completed a slow sand filtration water treatment facility utilizing water from the West Fork of Ecola Creek. The facility has been designed, with later upgrades, to have the capability to treat all of the water from the springs and the entire 1.5 cfs of water from the West Fork

of Ecola Creek. It is estimated that the supply of water that the treatment facility can produce will meet the city's water supply needs beyond the year 2050.

Presently, the water filtration plant is operated only during the summer months, July through September, to supplement the water drawn from the springs. During these summer months the water from the springs is also processed through the water filtration plant, with the spring water representing approximately 75% of the volume. During the remainder of the year, the spring water is transmitted directly to the city's chlorination facility.

The basic document describing the city's water distribution system is titled "*City of Cannon Beach Water Distribution System Master Plan*"(Plan). The Plan was completed in May of 1991 and adopted by the city council in June of 1991. The Plan includes the following elements: an inventory of the existing water distribution system, including mapped locations of improvements; an assessment of projected water demands; a hydraulic analysis of the water system; and recommendations for water systems improvements.

The following are the major findings of the Plan:

- 1). The existing water distribution system operates effectively under average day, peak day and peak hour water demand periods.
- 2). The system is capable of providing acceptable fire flows and system pressures for a majority of the water distribution system service area.
- 3). The few areas experiencing less than normal system pressures and fire flows are small areas in the higher elevation portions of the system. These areas are on the extreme southern end of town (south of Maher Avenue), the Haystack Lane area, and the extreme northern end of town (north of Seventh Street). The conditions at these locations are not significantly severe to warrant specific water system improvements.
- 4). The fire flow capabilities of the water distribution system are very compatible with the existing land uses.
- 5). The change in peak day water demand through the 20-year planning period (1990 to 2110) is approximately 22 percent (1.06 to 1.29 million gallons per day, MGD). This percent increase is small relative to required fire flows. As such, fire flows become the driving force for system improvements, and it follows that improvements proposed for existing problem areas will be adequate to accommodate future population growth.
- 6). The existing reservoir storage is adequate to the year 2050, assuming a one percent average annual population growth rate, and allowances for peak day demand and fire flow requirements. Even under aggressive growth rates as high as 5 percent, reservoir storage would be adequate to the year 2000 to 2005.

The report includes the following recommended water system improvements; these improvements were recommended to enhance available fire flow:

Improvement No. 1

Description: Add 8-inch water line from Hemlock Street to Spruce Street along Second Street.

Rationale: Deficit fire flow; increase fire flow from 1,900 to 2,800 g.p.m..

Length: 270 feet

Cost: \$10,100

Improvement No. 2

Description: Add 8-inch water line from Fifth Street to between Fifth and Sixth Street along Beech Street.

Rationale: Deficit fire flow; increase fire flow from 1,400 to 1,800 g.p.m..

Length: 450 feet

Cost: \$16,900

Improvement No. 3

Description: Add fire hydrants to existing system

Rationale: Decrease hydrant spacing to 300 feet from 400 feet for better fire protection.

Location: 14 locations

Cost: \$54,600

A comparison of actual water use with the projections in the Plan indicates that water demand has been less than anticipated. For 1997, the Plan projected that the average day water demand would be .50MGD and the peak day water demand would be 1.15 MGD. The actual average day water demand for 1997 was .36MGD and the calculated peak day water demand was .80 MGD. This discrepancy between projected usage and actual usage appears to be the result of inaccurate 1990 water use data particularly since the Plan projected a 1% annual growth rate in water demand and the actual water use between 1991 and 1997 increased at an annual rate of 2%.

Assuming that water use continues to grow at 2% annually, in 2010, average daily water demand is projected to be .46MGD and the peak daily water demand is projected to be 1.04 MGD. These projections are substantially lower than those contained in the Plan. The Plan projected an average daily water demand of .58MGD and a peak daily water demand of 1.29 MGD for the year 2010.

The city has taken the following actions with regard to the listed water system improvements. Improvement No. 1 has been revised to extend the existing 6" water line in Second Street to the existing 12" water inch water line in Hemlock Street. The estimated cost of this project is \$4,000. The project has been scheduled for either FY 1997-98 or FY 1998-99. Improvement No.2 has been

deleted from the list of improvements because the existing fire flow availability of 1,400 gallons per minute is adequate for this zone. Improvement No. 3 has been incrementally implemented. Five fire hydrant installations remain to be completed. The installation of these hydrants is scheduled for FY 1999-2000 at a cost of \$3,000 per hydrant. These improvements will be funded from water system capital reserve funds.

The city has made the following water distribution system improvements, not listed in the plan, since 1991:

- 1). On Alternative Highway 101, between Antler Street and Beaver Street, replaced a two inch steel water line with an 8" PVC line.
- 2). Upgraded the upper reaches of the transmission line near the city springs
- 3). On S. Hemlock Street, between Matanuska Street and Fernwood Avenue, the replacement of transite pipe with PVC pipe.
- 4). Replacement of the pump station on Seventh and Ash.

The city has undertaken a study to ascertain the best method of providing improved domestic and fire protection water service to the north end area (between 7th and 9th Street and Oak and Spruce Street). Water service in this area is constrained by the area's elevation relative to that of the city's water reservoir. The alternative which has been selected is to construct a small storage tank and to upgrade the pump station serving the area. The upgraded pump station has been completed. Construction of the water tank is planned for FY 1999-2000, with funding from the water system replacement and renewal fund.

An additional water distribution system improvement that has been identified is the extension of approx. 800 feet of 8" water line from 2nd and Spruce Street to the city's recycling building. The estimated cost of the project is \$25,000. The project is scheduled for FY 1999-2000. The mapping of the city's water distribution system is periodically updated to reflect system improvements and modifications.

Clatsop County's Regional Problem Solving Program (RPS) includes the report "*Water Management Plan for Coastal Clatsop County.*" This report includes information on the environmental consequences of water supply practices of cities in Clatsop County, including Cannon Beach. The report states that based on instream water rights that were filed by the Oregon Department of Fish and Wildlife (ODFW) in the late 1980's, the West Fork of Ecola Creek is over-appropriated from April through November, where over-appropriated is defined as total water rights exceeding the actual amount of water in the stream at certain times. At this time, this over-appropriation has a limited impact on the city's ability to obtain water from the West Fork of Ecola Creek because the city's water right predates ODFW's instream water right. The report contains the results of a hydrologic analysis which was conducted to determine how frequently flow in certain streams in Clatsop County, including the West Fork of Ecola Creek, is insufficient to meet both the future demand for municipal water and the needs of aquatic life, as defined by ODFW's instream water

rights. The analysis concludes that in the year 2050 approximately 10% of the time flow in the West Fork of Ecola Creek will be less than the sum of the peak water demand and the instream flow requirements. The report notes that this conclusion probably overstates the percentage of time that stream flow will be insufficient because the analysis assumed that the full water demand will be met from the West Fork of Ecola Creek, when in fact a substantial amount of the city's water supply will still be obtained from the city springs. The report concludes by stating that "if it is accepted that ODFW's specified instream flows accurately represent the needs of fish and other aquatic life, then it appears that estimated future diversions of water for municipal supply will have an adverse effect on fish habitat. The most severe effects are felt on the Lewis and Clark River and the South Fork of the Necanicum River. The mainstem of the Necanicum River and the West Fork of Ecola Creek are less seriously affected."

The RPS makes a number of recommendations for actions to improve water supply management. Several of these recommended action items are applicable to Cannon Beach:

1. Reduce unaccounted-for water in all communities to 10 to 15% of production and maintain it at this level or better.
2. Implement water conservation measures.
3. Install flow and temperature gauges on all rivers and creeks subject to water diversions so that compliance with in stream requirements can be properly determined.
4. Refine minimum fish flow requirements. Current fish flows were calculated in the late 1960's and do not take account of meteorological variation. A more refined analysis is needed to set minimum flows for wet, typical, dry and very dry years.

A number of these recommendations are being implemented. The city estimates that its unaccounted-for water is already less than the target range. Installation of gauges on Ecola Creek has been budgeted for the FY 98-99.

The Plan utilized a twenty year planning horizon, from 1990 -2010. For this planning period, the Plan assumed an annual growth rate of 1%, for both the permanent population and the equivalent service population. The Plan's analysis was also based on a "build-out" of the city's 1990 urban growth boundary at the density permitted by the zoning designations in place at that time. In conformance with the Plan's recommendations, these assumptions have been reviewed to determine their ongoing validity.

The Portland State Center for Population Research and Census estimates that the city's 1997 permanent population is 1,425. The Plan's population projection for 1997 was 1,400. This is less than a 2% variance from the population projection and therefore it is concluded that the city's permanent population growth since 1991 has been in conformance with the Plan's projection's. Since 1991, there have been two small additions to the urban growth boundary, with an area of

approximately 23 acres. Development of these two parcels is likely to add only two dwelling units. Since 1991, there have been no significant changes in land use density standards or zone boundaries that would affect the “build-out” assumptions of the plan. The city reviewed the extent of its urban growth boundary in 1995 and determined not to expand the boundary. In summary, the Plan’s assumptions about future city growth and the demands that growth will place on the city’s water system continue to be valid.

The next comprehensive review of the urban growth boundary is not likely to occur before the year 2002. If the urban growth boundary is expanded as part of that review, the capacity of the city’s water supply and treatment system are such that the added water demands from an expanded urban growth boundary area can be accommodated.

STORM DRAINAGE

The basic document describing the city’s storm drainage system is titled “*City of Cannon Beach Storm Drainage System Master Plan*” (Plan). The Plan was completed in February of 1995 and adopted, with amendments, by the council on January 23, 1996. The report includes the following elements: an inventory of the existing drainage system, including mapped locations of improvements; the establishment of a the five year storm event as the design criteria, hydraulic analysis of the existing system; and recommendations for system improvements.

The following are the major findings of the Plan:

- 1). The existing storm drainage system has not experienced severe capacity problems from recent storm events.
- 2). Drainage problems in Cannon Beach have not endangered life, health or public safety.
- 3). Many of the problem areas in the city can be categorized as nuisance drainage from inefficient conveyances and resulting ponding of overland flows.
- 4). The city is drained by many small drainage areas or catchments which discharge to the ocean by separate independent outfalls.
- 5). Drainage improvements within the city’s system will not reduce flooding from tidal effects on Ecola Creek, nor will regulatory flood plain areas be reduced.
- 6). Based on an analysis of costs, level of protection and experience by other Oregon communities, a 5-year storm has been selected for pipe sizing.

The Plan recommends improvements in three categories, immediate need, future need, and possible future need. The projects include pipe replacement and new lines. Immediate need projects represent current existing system deficiencies or problem areas needing attention within five years. Future needs projects represent minor system deficiencies and near-term growth related improvements. These are expected to be constructed after the immediate need projects, however, a project may be determined to be an immediate need based on a demonstrated need. Possible future needs projects are those deemed less desirable due to relationship of the cost to the benefit obtained, or it addresses a long-range future need. Sixteen immediate need projects were identified, at a total cost of \$453,000. Sixteen future projects were identified, at a total cost of \$362,900. Seventeen possible future projects were identified, at a total cost of \$757,700.

A number of the immediate projects were completed in 1997. These projects were in the Coolidge, SGulcana and Tolovana drainage basins. Four improvement projects are scheduled for FY 98-99. These projects were identified as immediate need projects in the Plan.

In 1998, the city will initiate two additional storm drainage studies for areas that were not analyzed as part of the master plan. The areas to be studied are the downtown commercial core and the city's north side. It is anticipated that these studies will recommend storm drainage improvements for their respective areas. Upon study completion, the city council will determine the priority of such projects, relative to those that were identified in the Plan.

SUMMARY - CAPITAL IMPROVEMENTS

Near Term Projects

Sewer System

Capital Improvement	Time Frame	Project Cost
Waste water ponds, west aerators - upgrade	FY 98-99	\$150,000
Matanuska pump station - upgrade	FY 98-99	\$200,000
Waste water pond sludge disposal	FY 99-00	\$298,000
Waste water treatment system modifications - NPDES renewal	FY 00-01	Unknown

Water System

Capital Improvement	Time Frame	Project Cost
Northside water storage	FY 99-00	Unknown

Second Street/ Hemlock Street water line	FY 98-99	\$5,000
Water line extension to recycle building	FY 99-00	\$25,000
Installation of fire hydrants - 300 foot standard	FY 98-99	\$5,000

Storm Drainage System

Capital Improvement	Time Frame	Project Cost
Coos/Hemlock Street	FY 98-99	\$24,000
Ocean/Pacific	FY 98-99	\$2,000
Gulcana/Hemlock	FY 98-99	\$11,700
Hemlock/Nelchena	FY 98-99	\$14,800
Downtown Basin Improvements	To Be Determined	
Logan Creek Basin Improvements	To Be Determined	

Long Term Projects

Sewer System

Capital Improvement	Time Frame	Project Cost
Main Pump Station/ North Interceptor - upgrade	2000-2010	\$173,000
Trunk Main - North of Ecola Creek - upgrade	2000-2010	\$79,000
Elkland Pump Station - upgrade	2000-2010	\$50,000
Ecola Pump Station	2000-2010	\$80,000

Water System

Sunset Boulevard Pump Station - upgrade	2000-2010	\$30,000
---	-----------	----------

ORDINANCE 00-01

AN ORDINANCE AMENDING THE COMPREHENSIVE PLAN BACKGROUND REPORT
PUBLIC FACILITIES - SUMMARY CAPITAL IMPROVEMENTS

The City of Cannon Beach does ordain as follows:

Section 1. The table, Summary - Capital Improvements, contained in the Public Facilities element of the Comprehensive Plan Background Report is deleted in its entirety and replaced as follows:

SUMMARY - CAPITAL IMPROVEMENTS

Near Term Projects

Sewer System

Capital Improvement	Time Frame	Project Cost
Waste water treatment system modifications		
Dechlorination Facility	FY 00-01	\$50,000
Chlorine Gas Scrubber	FY 00-01	\$80,000
Main Pump Station/ North Interceptor - upgrade	FY 01-02	\$173,000
Trunk Main - North of Ecola Creek - upgrade	FY 01-02	\$79,000
Matanuska pump station & Force main	FY 01-02	\$586,000

Water System

Capital Improvement	Time Frame	Project Cost
Northside water storage	FY 00-01	\$150,000
Ecola Creek Gauging	FY 00-01	\$30,000
Master Plan Update projects	FY 01-02	Unknown

Ordinance 00-01

Storm Drainage System

Capital Improvement	Time Frame	Project Cost
Downtown Basin Improvements	FY 00-01 FY 01-02	To Be Determined To Be Determined
Logan Creek Basin Improvements	FY 00-01 FY 01-02	To Be Determined To Be Determined
Monroe Street	FY 00-01	To Be Determined
Laurel Street	FY 00-01	To Be Determined
Haystack Heights	FY 01/02	To Be Determined

Long Term Projects

Sewer System

Capital Improvement	Time Frame	Project Cost
Elkland Pump Station - upgrade	2000-2010	\$50,000
Ecola Pump Station	2000-2010	\$80,000

Water System

Sunset Boulevard Pump Station - upgrade	2000-2010	\$30,000
---	-----------	----------

THIS ORDINANCE shall become effective on February 10, 2000.

Ordinance 00-01

PASSED by the Common Council of the City of Cannon Beach this 11th day of January 2000, by the following vote:

YEAS: Councilors Kramer, Adamson, Swigart; Mayor Hood

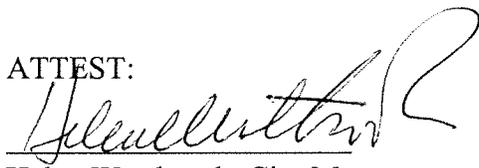
NAYS: None

ABSTAINED: Councilor Standridge

SUBMITTED to the Mayor this 11th day of January 2000, and APPROVED by the Mayor this 11th day of January 2000.


Laurel Hood, Mayor

ATTEST:


Helen Westbrook, City Manager

REVIEWED:

Bill Canessa, City Attorney

TRANSPORTATION

TRANSPORTATION ELEMENT

INTRODUCTION

Statewide Planning Goals and Guidelines, Goal 12, Transportation states that communities are to develop a plan which will "provide and encourage a safe, convenient and economic transportation system." The Transportation Goal states that such a plan shall:

"(1) consider all modes of transportation including mass transit, air water, pipeline, rail, highway, bicycle and pedestrian; (2) be based upon an inventory of local, regional and state transportation needs; (3) consider the differences in social consequences that would result from utilizing differing combinations of transportation modes; (4) avoid principal reliance upon any one mode of transportation; (5) minimize adverse social, economic, and environmental impacts and cost; (6) conserve energy; (7) meet the needs of the transportation disadvantaged by improving transportation services; (8) facilitate the flow of goods and services so as to strengthen the local and regional economy; and (9) conform with local and regional comprehensive land use plans. Each plan shall include a provision for transportation as a key facility."

The Land Conservation and Development Commission has adopted a Transportation Planning Rule (OAR 660-12-000 to 660-12-070) to provide guidance to local jurisdictions in the implementation of Goal 12. The Transportation Planning Rule (TPR) defines two phases of transportation planning: transportation system planning, whose purpose is to establish a coordinated network of transportation facilities which are adequate to serve state, regional and local transportation needs; and transportation project development which implements the transportation system plan by determining the precise location, alignment and preliminary design of specific improvements included in the transportation system plan. The focus of the TPR is on the elements of the transportation system and the plan for that system. As in Goal 12, the TPR seeks to reduce reliance on the automobile by through coordination of land use and transportation planning. The TPR requires that the plan be the result of coordination among affected levels of government and that such coordination is to occur throughout the development of the transportation planning and implementation process.

The Director of the Department of Land Conservation and Development is authorized to grant whole or partial exemptions from the requirements of the TPR or communities with populations of less than 2,500. Rather than request an exemption, the city has prepared a transportation element that tailors the principles of the TPR to the needs of a small community. The plan contains the following elements: streets, transit, bicycle and pedestrian improvements, parking and demand management.

STREETS

Street System, General

The configuration of the city's streets has largely been defined by the city's geographic location and the early platting of the community. The Pacific Ocean to the west and steep forested uplands to the east create a narrow linear strip of developable land. This developable land was platted into a grid style street pattern in the late nineteenth and early twentieth century. The result is a system of short residential blocks, generally measuring 300-450 feet in length and 200 feet in depth or 200 feet in length and 800 feet in depth. The residential blocks are connected to Hemlock Street, which provides a north-south arterial "spine" to the city's street system. In the late nineteen forties and early nineteen fifties, the Oregon Coast Highway (US 101) was relocated from Hemlock Street and a bypass was constructed to the east of the city. In the early 1970's, development began occurring on the east side of US Highway 101. Residential street patterns in this area reflect the post World War II suburban style, with curvilinear streets and cul-de-sacs.

The city's urban growth boundary contains approximately 20.5 miles of improved streets. The two main streets in the city are US Highway 101 and Alternative Highway 101/Hemlock Street which have lengths of 3.4 miles and 3.0 miles respectively. There are approximately 11.3 miles of residential streets and 2.2 miles of commercial streets. In addition, approximately .63 miles of Ecola Park Road are located within the city's urban growth boundary. Of the 11.3 miles of residential street, 52.2% are paved, 43.7% are graveled and 4% are partially paved and partially graveled.

Street System, Functional Classification

Streets are generally described by means of the functions they serve. A common functional system establishes five classifications: freeway, major arterial, minor arterial, collector and local. The functional system is based on the extent the street provides for traffic movement or access to adjoining property. At one end of the classification is a freeway, which carries no local access traffic. At the other end of the classification is a local cul-de-sac street which carries no through traffic.

Arterial streets are intended to expedite the movement of traffic to and from major trip generators and between communities. Arterials also collect and distribute traffic from freeways to collector streets, or directly to traffic generators. Compared to other street in the system, arterials carry high traffic volumes, have wide rights-of-way and the fewer access points. Major arterials are intended to provide a high degree of mobility and serve longer trips. Therefore, they are designed to provide for high operational speeds and levels of service. Since traffic movement, not access, is their principal function, access management is an essential element of preserving capacity. Minor arterials interconnect residential, shopping, employment and recreational activities at the community level. In comparison with major arterials, minor arterials accommodate trips of a shorter length and at a lower level of service.

US Highway 101 is the city's only major arterial. Alternative Highway 101/ Hemlock Street and Sunset Boulevard, between Hemlock Street and U.S. Highway 101, are the city's only minor arterial streets.

Collector streets collect and distribute traffic from arterial streets onto local streets, or directly to traffic destinations. Collector streets provide for both land access and movement within residential and commercial areas. Compared to arterial streets, collector streets have more frequent intersections, narrower right-of-way widths, more access points and on-street parking.

There are no collector streets in the city.

Local streets. Local streets provide property access. The traffic movement function on local streets is incidental and generally involves traveling to and from a collector or arterial street. Trip

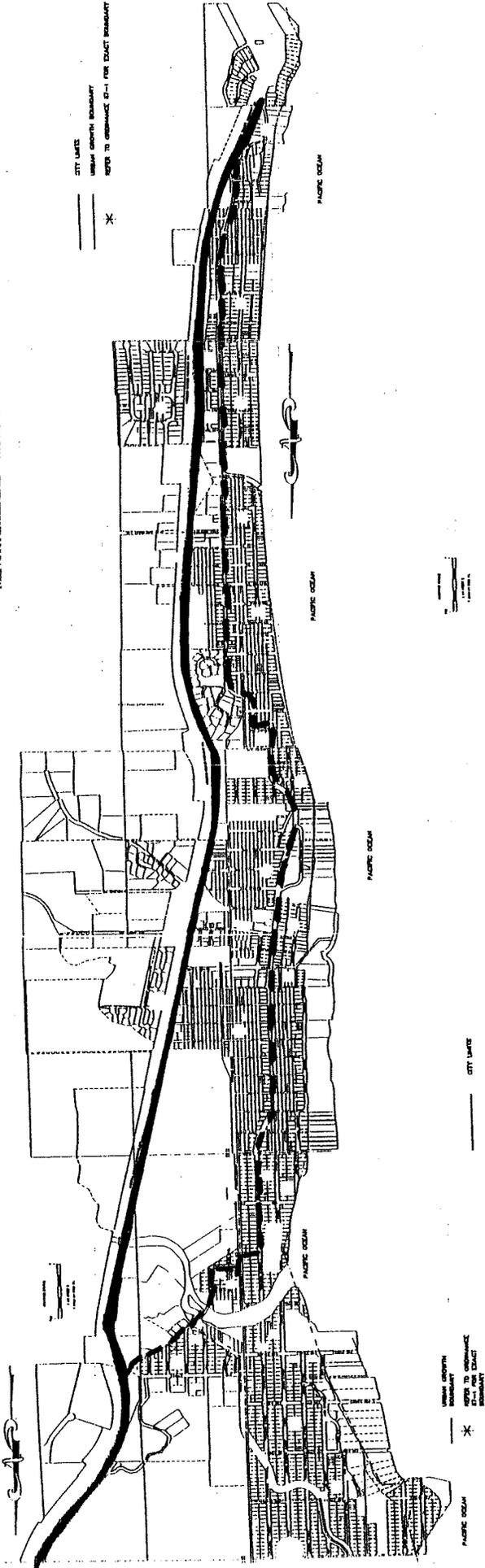
STREET SYSTEM

ARTERIAL STREETS

MAJOR ARTERIAL - U.S. HIGHWAY 101

MINOR ARTERIAL - ALTERNATIVE 101/HIEMLOCK STREET

City of Cannon Beach



STREET SYSTEM

lengths on local streets are short, traffic volumes are low and speeds are slow.

Approximately two-thirds of the city's streets, measured in miles, are local streets.

Traffic Control

The city contains no traffic signals. Traffic is controlled by stop signs at major street intersections.

Traffic Accidents

The Cannon Beach Police Department traffic accident records from 1991 through 1995 were reviewed to determine the location and nature of traffic accidents. A total of 110 traffic accidents was recorded. Thirty-one accidents occurred on Highway 101 (28%) and 79 accidents (72%) occurred on city streets. Thirteen of the accidents (12%) involved injuries, including one fatality. Of the injury accidents, five (38%) occurred on US Highway 101, including the one fatality. Streets in the city's three commercial areas experienced 62% of the accidents occurring on streets other than Highway 101, including four injury accidents. Two-thirds (66%) of the traffic accidents on streets other than US Highway 101 occurred on Alternative Highway 101/ Hemlock Street, including six of the eight injury accidents on streets other than US Highway 101. On streets other than US Highway 101, the following were the five locations with the highest number of accidents: 2nd & Spruce (8), Hemlock & Dawes (6), 1st & Hemlock (5), 2nd & Hemlock (4), and 3rd & Hemlock (4). Less than five accidents occurred on local residential streets.

U.S. Highway 101

The U.S. Highway 101 right-of-way is generally 200 feet wide. The roadway surface consists of two travel lanes and six foot wide shoulders on both sides of the road. ODOT 1995 traffic surveys indicate that the ADT on U.S. Highway 101 at the north entrance to Cannon Beach was 6,400 vehicles and the ADT south of the north entrance was 3,800 vehicles. In comparison, the ADT on U.S. Highway 101 at Broadway in Seaside was 13,000 vehicles.

The Oregon Coast Highway Corridor Master Plan projects that the ADT on Highway 101 at Cannon Beach will increase to 9,000 vehicles by the year 2015. This is a 273% increase in traffic from the 1991

level. It is noted that for the period 1991-95, ADT increased from 3,300 vehicles to 6,400 vehicles , or 57% of the total ADT increase which the plan projects to the year 2015. The plan notes that the difference in the ADT observed on the Seaside to Cannon Beach segment of U.S. Highway 101, compared to the Cannon Beach segment, can be attributed to the use of local Cannon Beach streets, i.e., Alternative Highway 101/Hemlock Street as an alternative north-south route through Cannon Beach.

The *Oregon Coast Highway Corridor Master Plan* was adopted by the Transportation Commission in 1995. The plan establishes a 20-year program for the management of transportation needs along the Oregon Coast Highway corridor. The major goals of the plan include harmonizing highway improvements with the scenic values of the corridor, creating a transportation system that supports the economy of the area, ensuring that corridor improvements are responsive to the character of individual coastal communities. The plan also defines an ongoing planning and implementation partnership between ODOT and the local jurisdictions along the highway corridor.

The plan includes general corridor-wide policies, which address issues such as road capacity, intercity passenger service, and access management, and specific plan activities such as safety improvements, scenic overlooks and vegetation management for views. Plan activities are organized by county and within each county specific sections are identified. The description of each highway section includes the objectives to be achieved, existing conditions and recommended improvements.

Clatsop County has been divided into five segments. The Cannon Beach urban growth boundary is located in the southernmost of these segments. With regard to the overall objective of the plan, the Highway 101/Highway 26 intersection (Cannon Beach Junction) is used as a dividing point. North of the Cannon Beach junction, the emphasis of the plan is on accommodating through traffic, while serving the needs of the adjacent communities. South of the Cannon Beach junction, the preservation of the natural and scenic resources of the corridor is the primary objective. The plan provides the following needs statement for the section of US Highway 101 south of the Cannon Beach junction:

"From Cannon Beach south, no significant capacity or geometric constraints have been identified. Traffic (ADT) is forecast to increase by an even greater percentage in this southern portion of the county than in the northern portion, but existing volumes are relatively low. Consequently, the

increases can be accommodated while reasonable levels of service are maintained. This section of the corridor is characterized by mature vegetation, scenic resources, and Hug Point and Oswald West State Parks. Consequently, the focus of the strategies in these zones is on the preservation of natural resources, with minimal improvements to the highway itself."

It is noted that although the above needs statement includes the finding that no significant geometric constraints have been identified on the section of U.S. Highway 101 from the U.S. Highway 26 junction to the Tillamook County line, the plan also identifies safety improvements to the north entrance to Cannon Beach as one of the key implementation tasks.

The following are activities identified in the plan which impact the city:

- Develop access management plans
- Create bicycle and pedestrian strategies
- Transit service improvements
- Safety improvements at the north entrance to Cannon Beach
- Preserve and enhance the viewpoint north of Cannon Beach with techniques including vegetation management.
- Natural corridor preservation between Cannon Beach and Neahkahnie Mountain.
- Maintain the existing Highway 101 cross section in this area. Improve the merging lanes and add pedestrian and bicycle amenities to the Sunset Boulevard interchange
- Identify locations for the protection of significant vegetation, including preservation of existing stands of large trees
- Manage vegetation to screen development and open ocean views.

The following paragraphs describe how the corridor plan activities outlined above have been addressed by the city.

Access management. The city's support for the Department of Transportation's efforts to control access along Highway 101 is reflected in the following comprehensive plan policies:

Transportation Policy 4. The City recognizes that the Highway 101 corridor has significant scenic attributes. These attributes include: two travel lanes; a forested corridor that creates a sense of enclosure and continuity; the lack of adjacent commercial development; and a limited number of access points onto the highway. The City will cooperate with the Oregon Department of Transportation in protecting these elements of the Highway 101 corridor through Cannon Beach.

Transportation Policy 7. Access to Hemlock Street and U.S. 101 shall be limited. Whenever possible, traffic from developments shall enter these roads from central access streets, rather than individual driveways.

City policies also support the objective of limiting access onto Highway 101 by restricting commercial development along the highway, thus avoiding the type of strip-commercial development which has resulted in significant access management problems in other coastal communities along Highway 101.

General Development Policy 13. In order to maintain the scenic character of U.S. Highway 101, commercial uses along the highway shall be limited to existing commercial zones (C-1). Future public uses along the highway shall be consistent with the maintenance of the scenic character of U.S. 101.

Midtown Policy 10. Proposals that would result in a commercial strip along U.S. Highway 101 will not be considered

Bicycle and pedestrian improvements Bicycle and pedestrian improvements are discussed in the bicycle and pedestrian section.

Transit service Transit service is discussed in the transit section

North entrance The city's comprehensive plan recognizes the need for safety improvements at the north entrance.

Transportation Policy 2. A safer and more efficient north entrance to the City will be developed. The preferred long-term design solution is a northbound underpass/overpass, which the city will actively pursue for inclusion on the Oregon Department of Transportation's Statewide Transportation Improvement Program (STIP). Until the underpass/overpass is completed, the city will cooperate with the Oregon Department of Transportation in making interim improvements.

Over the years, there have been ongoing discussions between the city and ODOT on measures that could be taken to enhance the safety of the north entrance. In the winter of 1996, the city and ODOT agreed on the following strategy. The long-term solution is the construction of an underpass for exiting northbound traffic. In the near-term the following improvements will be made: construction of a deceleration lane for southbound traffic exiting from U.S. Highway 101; improving the sight-line for north bound traffic entering U.S. Highway 101 by reducing the extent of the hillside on the east side of the Highway 101 right-of-way; installation of improved warning signalization; and reconfiguration of the north entrance.

Natural corridor preservation. The concept of maintaining the existing Highway 101 cross section and preserving vegetation along the highway corridor has been incorporated into the city's plan. The following comprehensive plan policies are intended to implement this objective of the corridor plan.

Transportation Policy 4. The City recognizes that the Highway 101 corridor has significant scenic attributes. These attributes include: two travel lanes; a forested corridor that creates a sense of enclosure and continuity; the lack of adjacent commercial development; and a limited number of access pints onto the highway. The City will cooperate with the Oregon Department of Transportation in protecting these elements of the Highway 101 corridor through Cannon Beach.

Transportation Policy 5. The City supports maintaining the existing Highway 101 cross-section within the City's urban growth boundary. The City also recognizes the need to make safety improvements to the highway such as

improved vehicular safety at the north entrance to the City and improved merging lanes at the Sunset Boulevard interchange. The City is opposed to highway widening that would result in the creation of a passing lane or four lane cross section within the urban growth boundary.

Recreation and Open Space Policy 9. A tree corridor along U.S. Highway 101 shall be maintained. The corridor shall incorporate both the U.S. Highway 101 right-of-way and adjacent private property.

Future improvements. City policy supports the objective of maintaining the existing highway cross-section, but making improvements to the Sunset Boulevard interchange.

Transportation Policy 5. The City supports maintaining the existing Highway 101 cross-section within the City's urban growth boundary. The City also recognizes the need to make safety improvements to the highway such as improved vehicular safety at the north entrance to the City and improved merging lanes at the Sunset Boulevard interchange. The City is opposed to highway widening that would result in the creation of a passing lane or four lane cross section within the urban growth boundary.

Alternative Highway 101/Hemlock Street

Alternative Highway 101/Hemlock Street is the only city street which provides for through traffic from the north end of the city to the south end of the city. It links the city's residential areas to one another and to the three main commercial areas. It also serves as the primary access for business within the commercial areas. These characteristics mean that the street can be extremely congested during peak visitor periods - the summer months, holidays and weekends. Traffic congestion is most pronounced in the downtown area.

The right-of-way width varies from 40 feet to 60 feet. In addition to two travel lanes, there are sidewalks and bicycle lanes on portions of the street.

The Oregon Department of Transportation transferred Alternative Highway 101/Hemlock Street to the city in 1994.

Traffic surveys conducted by ODOT in the summer of August of 1994 indicate that Hemlock Street north of Sunset Boulevard had a daily

traffic flow of approximately 10,000 vehicles. The *Oregon Coast Highway Corridor Master Plan* projects a substantial increase in traffic using U.S. Highway 101. It can be assumed that a portion of this increased traffic will utilize Alternative Highway 101/Hemlock Street as an alternative north/south route.

The downtown portion of Hemlock Street is presently congested during peak visitor periods. This results in a low level of service on a 6-8 block section of Hemlock Street. The projected increase in traffic utilizing the U.S. Highway 101 corridor will increase traffic congestion over the next twenty years. This in turn will further reduce the level of service. It is also anticipated that the number of days experiencing a low level of vehicular traffic will increase. Increased congestion in the Midtown commercial area of Hemlock Street will also occur.

The anticipated reduction in the level of service for vehicles on Alternative Highway 101/Hemlock Street is acceptable. There are two reasons for this conclusion. First, a primary design objective of the city's commercial areas is to create a strong pedestrian orientation. Slow moving vehicular traffic minimizes potential conflicts with pedestrian use. Second, the width of the Hemlock Street right-of-way precludes major improvements to increase vehicular capacity. As a result, no major improvements to Alternative Highway 101/Hemlock Street are anticipated (potential bicycle and pedestrian improvements are discussed in the bicycle and pedestrian section).

Sunset Boulevard

Sunset Boulevard, between U.S. Highway 101 and Hemlock Street, provides a connection between U.S. Highway 101, major arterial street and Hemlock Street, a minor arterial street, and as such it is considered a minor arterial street. This portion of Sunset Boulevard has a right-of-way width of 60 feet. The right-of-way has been improved with a sidewalk, bicycle lane and vehicular travel lane in each direction. No other improvements to this portion of Sunset Boulevard are feasible or desirable.

Local Streets

Residential streets have right-of-way widths of between 30 and 50 feet. The level of street improvement varies greatly. During the past decade, the major issues have been whether local streets

should be paved and ensuring that there is an adequate unobstructed travel surface for emergency vehicle movements. Until 1994, the city operated a joint venture street paving program whereby the city would share, on a 50/50 basis, the cost of street paving with affected property owners. The present (1996) city policy regarding street paving is that any such project must first be approved by the council and if it is approved the affected property owners must pay the full cost. Emergency vehicle access has been enhanced by placed no parking signs on one side of numerous residential streets.

It is the city's intent that local streets function at very low traffic volumes and traffic speeds and that they provide for shared space for vehicles, pedestrians and bicyclists. These objectives are supported by the nature of the city's local street pattern, i.e., short blocks, narrow improved roadway surfaces, and a rustic roadway surface, which provides for the retention of trees and landscaping, and a speed limit of 15 m.p.h.

TRANSIT

Cannon Beach Shuttle

The city initiated a shuttle service in 1990. The shuttle follows a fixed route, primarily along Hemlock Street, from Les Shirley Park, in the northern portion of the city, to Maher Street near the south city limits. The route also extends east of Highway 101 to provide service to the RV Resort at Cannon Beach and the Elk Creek Terrace Apartments. The driver has the authority to vary from the route at a passenger's request. The service of the shuttle is continuous, beginning at 9:00 a.m. and ending at 6:00 p.m., seven days a week. The shuttle service uses a 12-passenger van which is handicapped accessible. The 1995-96 budget for operating the system is \$50,000. Revenues are derived from business license fees, room tax funds parking management fees and grant funds. The city has also received funding through the Special Transportation Fund administered by the Oregon Department of Transportation.

The following table provides information on the ridership of the shuttle.

Ridership - Cannon Beach Shuttle			
	1993	1994	1995
January	544	886	839
February	1,054	1,028	889
March	1,166	1,158	1,243
April	1,281	1,439	1,357
May	1,494	1,409	1,736
June	1,559	1,188	1,689
July	1,869	1,940	2,261
August	2,333	2,157	2,799
September	1,432	1,490	1,579
October	1,299	1,316	1,226

Ridership - Cannon Beach Shuttle			
November	1,039	882	952
December	656	661	1,004
TOTAL	15,726	15,554	17,574

Shuttle ridership has increased by 10% between 1993 and 1995.

The monthly ridership patterns reflect the impact of the city's tourism industry. Almost 50% of the ridership occurs during the four main tourist season months, June-September. It is estimated that local residents represent about 50 percent of the ridership in the winter months and about 25% during the summer months.

During 1995, seniors comprised between 6% and 13.5% of the monthly ridership.

The per-ride cost of the shuttle service is approximately \$2.50, which according to the Comprehensive Transit Plan prepared by the Sunset Empire Transportation District, is at the low-end of the range for small rural fixed route carriers.

The operation of the shuttle is a component on the city's parking management plan for the downtown area. Use of the shuttle, particularly during the congested summer months, reduces the demand for parking spaces and traffic congestion in the downtown area by permitting visitors access to the city's commercial areas without the use of their vehicles.

During the summer of 1991, the Chamber of Commerce initiated a program to reduce employee parking in the downtown area. Employees were encouraged to use designated parking areas outside of the downtown area and ride the shuttle to their place of employment. The program was discontinued because of very low use.

Intercity Bus Service

The Sunset Empire Transportation District, under contract with Special Mobility Services, Inc., operates a fixed route bus service between Astoria and Cannon Beach. The route serves the cities of Astoria, Warrenton, Seaside and Cannon Beach. The bus provides two

round trips a day to Cannon Beach. The Cannon Beach Shuttle schedule is coordinated to link with the intercity bus service.

The deregulation of the bus industry in the early 1980's has lead to a steady decline in the intercity bus service available in Clatsop County. In the spring of 1995, all regularly scheduled bus service to points outside Clatsop County was discontinued. As of early 1996, there is one trip a day service between Astoria and Portland.

The lack of regular bus service to Clatsop County means that special charter services provide the only avenue means for persons without automobiles to visit the county and its tourist destinations.

Taxi service

Taxi service is available in the city. In 1995, a one way fare from Cannon Beach to Seaside **was** between \$13 and \$16.

Special transportation services

A number of social service agencies in Clatsop County provide transportation services for their clients. The population served consists of the elderly, the disabled and the poor. Transportation is provided both within Clatsop County and to the Portland metropolitan area. Transportation to the Portland metropolitan area is provided primarily for medical related matters. The agencies which provide transportation are: State of Oregon Adult and Family Service, Oregon Senior and Disabled Services Division, the Volunteer Services Division of the Oregon Department of Human Resources, Coast Rehabilitation Services, Clatsop County Educational Service District, and the Columbia-Pacific Head Start program.

The Sunset Empire Transportation District began limited dial-a-ride service in February of 1996. The service is intended primarily for the elderly, disabled or transportation disadvantaged.

Fred Meyer provides a van service, with a capacity of ten persons, from Cannon Beach to its store in Warrenton once a week. Scheduling is coordinated through the Seaside Community Center.

The Cannon Beach Shuttle is available for use by nonprofit organizations. The Shuttle has been used on a regular basis to provide transportation between Cannon Beach and the Seaside Youth Center.

Planning for public transportation

The Sunset Empire Transportation District was formed in 1993 by the Clatsop County Commissioners for the purpose of developing a public transportation system to serve the needs of the residents and visitors. Except for the city of Gearhart, all land within the county is included in the district.

The Sunset Empire Transportation District has adopted a plan document titled *Comprehensive Transit Plan, September 1995*.

The plan contains four objectives which relate to public transportation in Cannon Beach.

- 1). Maintain and expand the existing fixed route transit system serving the county.
- 2). Develop a coordinated demand responsive dial-a-ride transit system to meet the transportation requirements of senior citizens and those with special mobility needs.
- 3). Develop an adequate and stable local funding base through a property tax assessment.
- 4). Establish a link between Clatsop County and the Portland metropolitan area.

In May of 1996, Clatsop County residents approved a tax base for the Sunset Empire Transportation District.

The Oregon Department of Transportation has completed a corridor planning program for US Highway 101 from Astoria to the California border. The results of the planning program are contained in *The Oregon Coast Highway Corridor Master Plan, 1995*. Its purpose is to develop a 20-year plan for the management of future transportation needs in the Coast Highway Corridor. The plan includes corridor-wide policies for intercity passenger service and intermodal improvements.

The current status of public transportation along the 101 corridor from Astoria to Brookings is poor. There is no direct bus service in either direction; travelers wishing to visit various points along the Coast must take inland routes and transfer to another route. Some areas, such as Clatsop County, have no bus link to the Portland metropolitan area.

The following are corridor-wide policies which are pertinent to intercity passenger services and intermodal improvements.

1). Commercial intercity bus service, provided primarily by private enterprise, should be available to a city with a population of 2,500 or more or a group of cities on the coast with a combined population of more than 2,500 and located within five miles of one another. Service should be available to other, similar cities or groups of cities. Service should allow the round trip to be made within a day.

2). Major population centers (market areas more than 50,000 in population) in the corridor more than 70 miles from Portland should have at least three round trip transit connections to Portland available per day. These cities are Astoria, Newport/Lincoln City, and North Bend/Coos Bay.

3). Passenger transit service should link coastal cities with the nearest major city in the Willamette Valley with at least one trip per day.

4). As a result of the above activities, passenger service should be available for the entire length of the Coast Highway Corridor, with at least one daily stop in each direction in each community or combination of communities.

5). Local public transit service and elderly/disadvantaged services should regularly interconnect with intercity transit services.

6). Commercial air service connecting to service in Portland and other hubs should be available in major coastal cities of Astoria, Newport, and North Bend/Coos Bay. This service may substitute for surface intercity service described above if operating assistance per passenger is more economical than assistance to surface modes.

7). Intercity passenger transit terminals should provide open access to all intercity carriers.

8). Direct connections should be available between intercity bus and air service in the corridor.

The plan states that "the purpose of providing these levels of service is to meet the mobility needs of citizens. The effects of

these service levels on vehicular demand in the corridor will be measurable but modest in comparison with overall forecast volumes. The service would provide a base on which additional services can be provided in response to future demand."

The policies in the plan describe a level of bus service that far exceeds that presently available in the County. Unless there are direct public subsidies, or bus transportation is reregulated, the probability of attaining the level of transit service described in the plan is extremely low.

PEDESTRIAN AND BICYCLE

Introduction

The *Oregon Bicycle and Pedestrian Plan (1995)*, Oregon Department of Transportation Highway Division (OBPP) provides an appropriate framework for the development of the bicycle and pedestrian element of the city's transportation plan. The goal of the OBPP and the city's transportation plan is to support and encourage increased levels of bicycling and walking. This goal supports the Land Conservation and Development's Transportation Planning Rule objective of designing a transportation system which is less reliant on the automobile.

For persons without an automobile, walking and bicycling are the main modes of transportation.

Relationship between land use planning and bicycle and pedestrian use

The *Oregon Bicycle and Pedestrian Plan* makes the following observation concerning the relationship between land use and walking and bicycle use:

"The link between land use and bicycling and walking is paramount. Most walking trips are usually very short (less than one-half mile), and most bicycle trips are fairly short (less than three miles). Long distances between destinations

act as deterrents to walking and bicycling, as do destination points designed to be accessed by automobile only. Land use patterns that are created with automobiles as the intended transportation mode encourage automobile use, which in turn perpetuates land use patterns that do not encourage pedestrian and bicycle use."

The plan identifies a number of land use characteristics which support walking and bicycle use. These are:

Greater residential densities which allow more residents to live closer to each other and to their neighboring destinations such as stores and schools.

Mixed-use zoning which locates services in close proximity to residential areas.

A system of interconnected streets which provides a variety of direct routes to destinations with and limits out-of-direction travel. This is especially critical for pedestrians and cyclists because they are less willing to travel out of direction. A grid pattern of streets with short blocks generally provides the optimum level of connectivity

Site planning standards for commercial uses which result in buildings being closer to and oriented toward sidewalks rather than parking lots.

The plan also identifies a number of street design features which can be impediments to walking and bicycle use. These are:

Multi-lane roadways are difficult to cross on foot.

Intersections built for the movement of motor vehicles can be difficult for pedestrians and bicyclists to cross.

Multiple access drives create conflicts for pedestrians and bicyclists at every crossing.

The majority of Cannon Beach consists of fairly dense residential areas that are defined by a grid street system that is made up of short blocks. These land use characteristics conform to those identified in the OBPP as facilitating walking and bicycle use. In commercial areas, the city has established design review criteria that promote commercial buildings which have a pedestrian orientation. Hemlock Street is a two-lane street which was

designed prior to World War II. As a result, it does not have street design features, such as wide roadways and intersections designed exclusively for automobile turning movements, that make pedestrian and bicycle use difficult.

Bicycle and pedestrian facility standards

The *Oregon Bicycle and Pedestrian Plan's* basic finding on appropriate bicycle and pedestrian facilities is that with the exception of limited access freeways and expressways, bikeways and walkways should be provided on all arterial and major collector streets. This finding is based on the fact that arterial and collector streets form the backbone of a city's street system. A failure to adequately accommodate nonmotorized travel on these major thoroughfares will result in a fragmented bicycle and pedestrian system which will not permit the maximization of non-motorized means of transportation.

In urban areas, the plan identifies three types of on-road bikeway designs: a shared roadway, a wide outside travel lane and a bike lane. A bike lane is the preferred means of providing for bicycles on arterial and major collector streets. On a shared roadway, bicyclists and motorists share the same travel lane. Shared roadways are suitable in urban areas on streets with low speeds (25mph or less) or low traffic volumes (3,000 ADT). Thus, a shared roadway is the appropriate bikeway design for local and minor collector streets. A wide outside travel lane can be provided where a bike lane is warranted but cannot be provided due to physical constraints. To be effective, the wide outside travel lane must be at least 14 feet, but not greater than 16 feet. Bike lanes are one-way facilities that carry bicycle traffic in the same direction as the adjacent motor-vehicle traffic. The preferred width of a bike lane is 6 feet. However, where physical constraints exist, narrower bike lanes are acceptable. On roadways with open shoulders the minimum bike lane width is four feet. On roadways with a curb, the minimum width is five feet.

The OBPP defines a multipurpose path as a bicycle improvement that is separate from city streets. Multipurpose paths are typically two-way facilities that are used by both pedestrians and bicyclists. The OBPP recommends that the primary focus of multipurpose paths be recreational use. For multipurpose paths to function effectively, they must connect into the city's street system in a safe and convenient manner.

The OBPP states that the appropriate facilities for pedestrians on arterial and major collectors are sidewalks on both sides of the street, unless there are physical limitations and use characteristics that render a sidewalk unsuitable on one side of the street. The plan also finds that sidewalks should be provided on both sides of local streets. Pedestrian walkways must also be designed to meet the requirements of the Americans with Disabilities Act (ADA).

The plan finds that minor roadway improvements and an ongoing street maintenance program can improve the safety and convenience of bicycle facilities. Identified roadway improvements include providing properly designed drainage grates, improving sight distances at curves by removing vegetation, and fixing minor irregularities in the roadway. Important elements of an ongoing roadway maintenance program include routine sweeping and surface repairs and the maintenance of standardized signs, stripes and legends.

Bicycle and pedestrian use in Cannon Beach

The only information available on pedestrian and bicycle use in Cannon Beach comes from the 1990 Census. The Census includes data on the mode of transportation to work by workers 16 years of age and older. The data indicates that 24% of the city's workers, who work outside the home, got to work by walking. This is a very high percentage; the statewide percentage is 8.5%. The Census data also indicates that 3.4% of the workers go to work on a bicycle. This rate of bicycle use is also three times higher than the statewide average of 1.1%. The high rates of pedestrian and bicycle use are a direct result of the city's small size and the resultant proximity of housing and employment. According to the 1990 Census, 44% of workers aged 16 and over traveled less than five minutes to their place of employment and 72% traveled less than ten minutes to work. By comparison, 11% of Astoria workers traveled five minutes or less to work and 37% traveled less than ten minutes to work. Among Seaside workers, 16% traveled five minutes or less to work and 54% traveled less than 10 minutes.

There is no information available on other forms of bicycle use and walking. However, studies indicate that journey to work trips account for at most one quarter of all bicycle and walking trips. Among city residents, it can be assumed that the same city characteristics which promote the use of bicycles and walking to

work also results in a higher than average number of trips for errands and pleasure.

Recreational activities are a major element of the city's attraction for tourists. Probably the most important recreational activity is walking on the city's beaches. Shopping is another major tourist activity. The city has developed compact commercial areas that are pedestrian oriented. This has resulted in a high level of pedestrian use in the city's commercial areas.

Facility inventory, bicycle

The city contains two arterial streets, US Highway 101 and Alternative Highway 101/Hemlock Street. Sunset Boulevard, between Hemlock Street and US Highway 101, also functions as an arterial street.

Old Cannon Beach Road/Alternative Highway 101/ Hemlock Street

Old Cannon Beach Road/Alternative Highway 101/ Hemlock Street is the designated Oregon Coast Bicycle Route. The following are bicycle facilities on Old Cannon Beach Road/Alternative Highway 101/Hemlock Street.

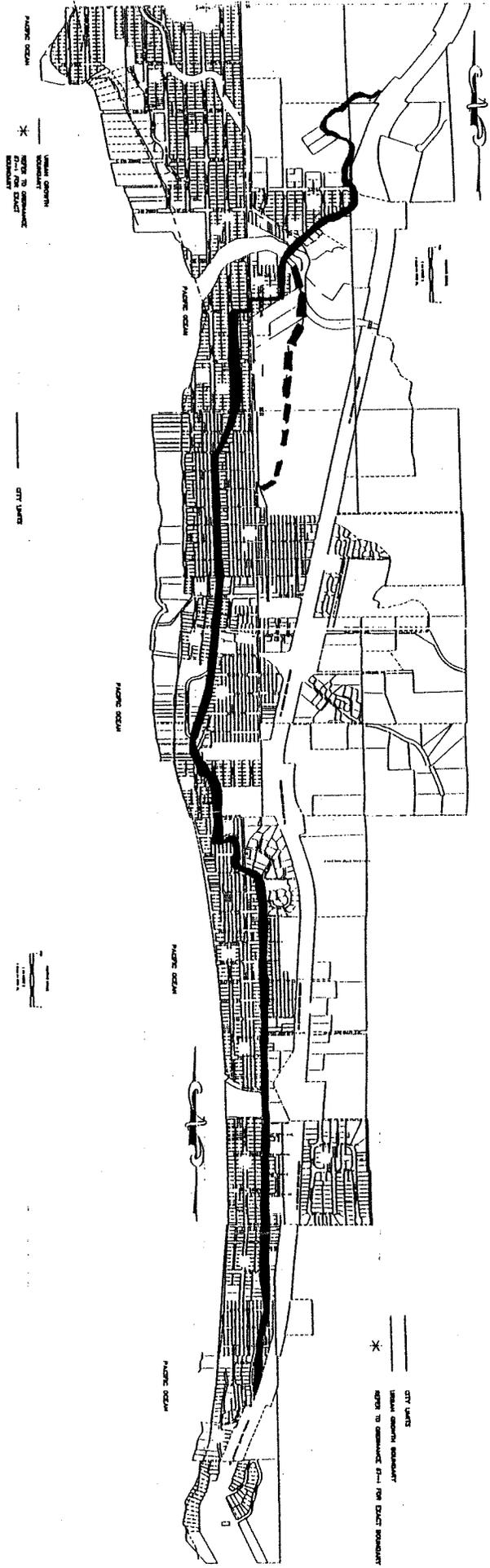
- Section 1. From US Highway 101 to Third and Elm, a distance of .5 miles, there are no improvements for bicycle use. However, Old Cannon Beach Road and Alternative Highway 101 have adequate right-of-way width to make provision for bicycle use.
- Section 2. From Third and Elm (the downtown area) to First Street, a distance of .3 miles, there are no improvements for bicycle use and the right-of-way width is inadequate to make any improvements.
- Section 3. From First Street to Gower Street, a distance of .5 miles, there are bicycle lanes on both sides of the street. On the west side of Hemlock Street, there is a four-foot wide bicycle lane adjacent to a curb. On the east side of Hemlock Street, there is a four foot wide lane adjacent to an open shoulder.

- Section 4. From Gower Street to Sunset Boulevard, a distance of .1 miles, there is a 3-foot wide bicycle lane on the west side of Hemlock Street, On the east side of Hemlock Street, there is an improved shoulder which can be used by bicycles.
- Section 5. From Sunset Boulevard to Hills Lane a distance of .1 miles, there is a five-foot wide bike lane adjacent to an open shoulder on both sides of the street.
- Section 6. From Hills Lane to Haystack Lane, a distance of .2 miles, there is a five-foot wide bike lane adjacent to an open shoulder on the west side of the street. There are no improvements for bicycles on the east side of Hemlock.
- Section 7. From Haystack Lane to Chena Street, a distance of .1 miles, both sides of Hemlock Street have a five foot wide bike lane adjacent to an open shoulder.
- Section 8. From Chena Street to Gogona Street, a distance of .2 miles, there is a five-foot wide bicycle lane, adjacent to an open shoulder, on the west side of Hemlock Street. There is no bike lane on the east side of the street. Topography creates a constraint on the ability to provide a bike lane on the east side of Hemlock Street.
- Section 9. From Gogona Street to Chisana Street a distance of .3 miles, there is a five-foot wide bike lane adjacent to an open shoulder on the west side of Hemlock Street. There is no bike lane on the east side of Hemlock Street. However, there is adequate right-of-way width to make provision for a bicycle lane.
- Section 10. From Chisana Street to US Highway 101, a distance of 1.2 miles, there is a five-foot bike lane adjacent to an open shoulder on both sides of Hemlock Street.

BICYCLE ROUTES

City of Cannon Beach

OREGON COAST BICYCLE ROUTE
POTENTIAL MULTI-PURPOSE PATH



Bicycles Routes

BICYCLE ROUTES

US Highway 101

The three miles of US Highway 101, from the north entrance to the city to the south entrance to the city, has a paved shoulder that is approximately six feet in width on both sides of the highway.

Sunset Boulevard

There are bicycle lanes on both sides of Sunset Boulevard between Hemlock Street and Spruce Street. The lane on the south side of the street is five feet in width adjacent to a curb; the lane on the north side of the street is between 4.1 and 4.6 feet in width adjacent to a curb. East of Spruce Street, in the Sunset interchange area, there is a four to five foot wide bike lane, with open shoulders, on both sides of the street.

Bike racks

There are four bicycle rack locations downtown: on Hemlock Street, by Ecola Square; Whale Park; City Park; and the Chamber of Commerce. Use of these bicycle racks, even during the summer months is light.

One commercial use in the midtown area has a bicycle rack.

Potential bicycle facility improvements

Old Cannon Beach Road/Alternative Highway 101/ Hemlock Street

Since 1979, when the city's first comprehensive plan was adopted, the city's objective has been to improve, where feasible, both sides of Alternative Highway 101/ Hemlock Street for bicycle use. As indicated by the bicycle facility inventory, there are still a number of sections of a bicycle route through Cannon Beach which require improvement. The following are the recommended improvements, by section.

Section 1: Provide a safe bicycle exit from U.S. Highway 101, onto Old Cannon Beach Road. This improvement is to be undertaken in conjunction with the construction of the north entrance deceleration lane. Provide a five-foot wide bicycle lane, with an open shoulder, on the west side of Old Cannon Beach Road and Alternative Highway 101.

Section 2: The existing right-of-way width and on-street parking prevent the development of bicycle improvements in this section.

Section 3: No additional improvements are required.

Section 4: In conjunction with drainage improvements and the realignment of the Hemlock Street centerline, provide bicycle lanes on both sides of the street.

Section 5: Provide a five-foot wide bicycle lane, with an open shoulder, on the east side of Hemlock Street.

Section 6: Topography constrains the ability to provide a bicycle lane on the east side of Hemlock Street. Investigate the possibility, through a modest street realignment of providing a wide outside lane in this section.

Section 7: No additional improvements are required.

Section 8: Topography constrains the ability to provide a bicycle lane on the east side of Hemlock Street. Investigate the possibility, through a modest street realignment of providing a wide outside lane in this section.

Section 9: In conjunction with drainage improvements on the east side of Hemlock Street, provide a five-foot wide bike lane with an open shoulder.

Section 10: No additional improvements are required.

Because south is the preferred direction of travel on the Oregon Coast Bicycle Route, the first priority for improvements is the creation of a continuous bike route on the west side of Old Cannon Beach Road/Alternative Highway 101/Hemlock Street. Meeting this objective requires completion of the improvements for Section 1.

US Highway 101

The bikeway design criteria in the *Oregon Bicycle and Pedestrian Plan* establish that a shoulder bikeway is an appropriate bikeway design for rural arterials such as US Highway 101. For arterials with a traffic volume like US Highway 101, a shoulder width of 6 feet is recommended. US Highway 101 through Cannon Beach has shoulders that are generally six feet wide on both sides of the

highway. Therefore, no bikeway improvements are anticipated on Highway 101 proper. The Coast Highway Corridor Master Plan has identified the need for improvements to the merging lanes at the Sunset Boulevard interchange. Improvements are to be designed to enhance bicycle use. The timing of this project has not been established.

Sunset Boulevard

Improvements to Sunset Boulevard would be associated with improvements to the merging lanes at the Sunset Boulevard interchange of US Highway 101.

Local Streets

All other city streets are classified as local streets. The bikeway design criteria in the Oregon Bicycle and Pedestrian Plan establish a shared roadway as the appropriate bicycle improvement on local streets. No bikeway improvements on local streets are proposed.

Multipurpose paths

An on-going city objective has been the development of a multipurpose path that would provide an alternative route through the congested downtown area. The route would begin at the Ecola Creek bridge and then proceed south along the dike on the south side of Ecola Creek from Ecola Creek park through to the dike's connection with Second Street, at City Park. South of Second Street, the route would follow the exterior of the sewer ponds, traverse the "IMPACT" property and connect onto Spruce Street in the vicinity of Adams or Jefferson Street. From there the route would be a shared roadway on Spruce Street to Sunset Boulevard, including a section of Spruce Street between Gower Street and Dawes Avenue which is improved for only bicycle and pedestrian use.

Facility inventory, pedestrian facilities

Sidewalks are located almost exclusively in two of the city's three commercial areas, downtown and midtown. In the core downtown area, which is generally defined as the commercial area from Third Street south to Taft Street and from Spruce Street west to the beach, there are approximately 4,300 lineal feet of sidewalks.

Approximately 51% of the lineal street frontage in the core commercial area has been developed with sidewalks. There are an additional 1,050 lineal feet of sidewalks in the downtown commercial area, primarily on the north side of Alternative Highway 101. Almost the entire Midtown commercial/motel area is served by sidewalks, a total of 4,010 lineal feet. There are only approximately 100 lineal feet of sidewalk in the Tolovana Park commercial area.

Outside of commercial areas, there are only four street sections with sidewalks: the west side of Hemlock Street from Taft to Harrison Street (2,090 lineal feet); the south side of Fifth Street from Alternative Highway 101 to Larch Street (1,230 lineal feet); the north side for Fifth Street between Larch Street and Ash Street (550 lineal feet); and the north side of Washington Street between Spruce Street and Laurel Street (200 lineal feet).

The ocean beach provides an incomparable pedestrian path which runs the entire length of the city. The ocean beach is connected to the city's street system by numerous street ends, which are generally located 200 - 450 feet apart.

Potential walkway improvements

The *Oregon Bicycle and Pedestrian Plan* states that the appropriate pedestrian facility on arterial, collector, and local streets is a sidewalk on both sides of the street, unless there are physical limitations and use characteristics that render a sidewalk unsuitable on one side of the street.

Alternative Highway 101/Hemlock Street and Sunset Boulevard from Hemlock Street to US Highway 101 are the city's arterial streets. There is a sidewalk on the north and west side of Alternative Highway 101/Hemlock Street from Beaver Street to Sunset Boulevard, a distance of 1.1 miles. In addition, there is a sidewalk on the south and east side of Alternative Highway 101/Hemlock Street from Antler Street to Taft Street (this area corresponds to the downtown commercial area). There is a sidewalk on both sides of Hemlock Street between Gower Street and Sunset Boulevard (this area corresponds to the midtown commercial area). There is a sidewalk on both sides of Sunset Boulevard between Hemlock Street and US Highway 101.

The city council adopted a sidewalk policy in 1993. This policy describes where future sidewalk improvements should occur. The policy anticipates no additional sidewalk improvements along Alternative Highway 101/Hemlock Street. This policy is based on the council's finding that the core commercial areas of downtown and midtown are served by sidewalks on both sides of the street and that the sidewalk on the west side of Hemlock Street, between Taft Street and Gower Street is adequate to provide a pedestrian link between the downtown and midtown commercial area. This finding recognized that the ocean beach parallels Hemlock Street and provides an alternative pedestrian path between downtown and midtown. The policy also states that there will be no sidewalks in residential areas, i.e., on local streets. This policy is based on the council's desire, consistent with the city's vision statement, to maintain a rustic streetscape. The council finding was that sidewalks established an unwanted urban character on the city's residential streets. Because of the city's grid street pattern and short blocks, traffic on residential streets is extremely low. Therefore, a shared roadway for both pedestrians and vehicles does not pose a safety risk. Nor will a shared roadway for pedestrian use discourage walking as is demonstrated by the high percentage of city residents who walk to work.

At one time, US Highway 101 defined the eastern edge of the city. However, over the past twenty years development has occurred on the east side of US Highway 101. Providing pedestrian linkages between the east and west side of the highway is a means of establishing better connectivity among city areas. The logical location for these connections is at the Sunset Boulevard interchange and Tolovana Park interchange of US Highway 101. The city has been working with the Oregon Department of Transportation on a project to construct a sidewalk on the south side of the Sunset interchange, connecting Sunset Boulevard with Elk Creek Road. Construction of a sidewalk at the Tolovana interchange, connecting W. Chinook Street to Hemlock Street, should be located on the east and north side of the interchange road. Impediments to construction are: a narrow roadway shoulder, topography and drainage.

Americans with Disabilities Act

The Americans with Disabilities Act of 1990 (ADA) contains requirements which are within the scope of the transportation element. Specifically, there are ADA requirements which address

the physical accessibility of facilities. The ADA requires that services and activities are accessible to and useable by persons with disabilities.

In 1995, the city retained Environmental Access Inc. to prepare an ADA compliance review. This document was completed in May of 1995. The report contains what is referred to as a self evaluation and a transition plan. The self evaluation includes a physical survey of all city owned and leased facilities for compliance with ADA Accessibility Guidelines and/or Oregon Uniform Building Code. For each facility the evaluation identified areas that were not in compliance and made recommendations for changes that would bring the facility into compliance. The transition plan consists of the recommended changes identified in the self evaluation. The transition plan also identifies a time frame-frame for needed modifications.

The following are the main findings of the self evaluation, relevant to the transportation element, and the elements of the transition plan intended to address the identified deficiencies.

The curb ramps on the city's sidewalks generally do not comply with either the ADA Accessibility Guidelines or Chapter 31 of the Oregon Uniform Building Code. Almost all the curb ramps do not have detectable warnings. Most of the curb ramps have an abrupt transition where the curb ramp meets the street. The transition plan calls for the development of a curb ramp installation and maintenance program. The intent of the program is to provide accessible routes, such as public sidewalks, with curb ramps which provide access to: buildings and facilities where government programs and services are located, to public transportation, to places of public accommodation, and to places of employment. The following priorities are established: a). access to city facilities, including parks and restrooms; b). access along Hemlock Street; and c). access to businesses and other public accommodations.

A number of deficiencies were identified in association with public buildings, including public restrooms, public parking lots and city parks. These are:

- a. The design of handicapped accessible parking spaces;
- b. The adequacy of the accessible route for the parking space to the building entrance;

- c. Inadequate signage to identify accessible entrances to buildings; and
- d. In parks, accessible routes are not provided which connect parking, restrooms, picnic tables and other amenities.

PARKING

There are 915 parking spaces, other than those associated with a motel, in the downtown commercial area. These spaces are broken down as follows: city parking lots - 223 spaces, private off-street parking lots - 316 spaces, and on-street parking - 376 spaces. Sixty-five percent of the parking spaces are located either on a city street or in a city parking lot. There are 345 parking spaces, other than those associated with a motel, in the midtown commercial area. These spaces are broken down as follows: city parking lots - 60 spaces, private off-street parking lots - 185 spaces, and 50 on-street parking spaces. There are 190 parking spaces in the Tolovana Park commercial area. These 190 spaces are broken down as follows: 100 spaces at the Tolovana Wayside, 72 spaces in private off-street parking lots, and 18 on-street parking spaces.

Parking, especially in the downtown area, has been the subject of intense community debate for the past twelve to fifteen years. Parking is an issue because of high demand during peak tourist use periods, particularly summer weekends and holidays. The city's goal has been to balance the provision of parking for peak use periods with other objectives for its commercial areas. These other objectives include maintaining small, compact commercial areas that are pedestrian oriented and creating commercial areas that are not dominated by off-street parking.

The comprehensive plan contains the following policy regarding the city's role in the provision of parking in the downtown area:

No new land acquisition, by the City, is anticipated for parking purposes.

Since 1989, an annual parking and traffic management plan has been prepared and adopted by the city council. These plans have identified specific actions, concerning parking and traffic related issues, to be taken in the coming year. The plans generally address the following areas: loading zones, on-street parking and improvements, time limited parking, the operation of the Shuttle, and personnel. Examples of issues that have been discussed, but not necessarily implemented are: methods of encouraging employees to park outside of the core downtown area, creation of overflow parking in outlying areas, implementation of time limited parking

on city streets, and residential parking permits for residential streets adjacent to commercial areas.

The city will continue to use the annual parking and traffic management plan as the means for identifying and resolving parking related issues.

DEMAND MANAGEMENT

Traditionally, transportation planning has focused on translating projected population growth into travel volume forecasts and then designing a road network to accommodate those traffic volumes at a desired level-of-service. In this approach, future transportation requirements are met by providing an increased supply of streets and highways. One of the stated purposes of the Transportation Planning Rule is to reduce the reliance on the automobile. This purpose is to be achieved by reducing the need to make automobile trips and to promote the use of alternative modes of transportation such as transit, bicycle and pedestrian. In this approach, the demand for additional streets and highways is reduced. This approach to meeting future transportation requirements is referred to as demand management.

Demand management seeks to provide better integration of land use and transportation planning. In the simplest terms, land uses and land use patterns generate traffic which in turn creates the demand for transportation facilities. The objective is to create a transportation efficient land use pattern, one which minimizes the number and length of vehicular trips generated.

The city's comprehensive plan and implementing ordinances were reviewed to determine if they are fostering a "transportation efficient" land use pattern. Specifically, policies and standards were reviewed to determine whether they: (1) supported a reduction in the demand for vehicular use and the vehicle miles driven; and (2) create a land use pattern which promotes pedestrian and bicycle use.

The following land use characteristics have been identified as having the effect of reducing the demand for automobile use: 1). a compact urban form; 2). the proximity of residential and

commercial development; 3). compact commercial areas; 4). mixed use development; and 5). the proximity of housing and work.

Compact urban form.

A compact urban form promotes the reduction in demand for vehicular trips by providing a variety of land uses in close proximity to one another. The proximity of land uses makes it more attractive to use alternative modes of travel, such as walking or bicycling. Vehicular trips are also shortened

Cannon Beach is a small town. The area's physical features have defined the form of Cannon Beach. The Pacific Ocean to the west and steep forested uplands to the east, give the city a narrow linear form. However, unlike many other coastal communities, the extent of the city's north-south development is limited by Silver Point to the south and Ecola State Park to the north. A compact city with distinct edges is an element of the city's vision statement:

"The fundamental principle of the plan is to foster a community with a strong sense of place which provides its residents the quality of life that they desire. The protection and enhancement of the following unique community characteristics form the basis for achieving this principle: ... a city that is physically small in size and has well-defined edges as the result of its location adjacent to the ocean and forest land."

"The element's of the town's physical form which the plan will foster are: a compact development pattern where various land uses are readily accessible to residents and visitors."

The city's goal of a compact urban form is implemented through an urban growth boundary whose size corresponds closely to the projections for residential and commercial growth. Limiting the size of the urban growth boundary has the effect of encouraging in-fill development. In-fill development reinforces a compact community.

Through its urban growth management agreement with Clatsop County, the city has zoned land within in the urban growth boundary, but outside the city limits, for very low density residential development. Upon annexation, land is rezoned to a substantially higher density. This density incentive has limited development in

the urban growth boundary until such time as the property is annexed into the city.

The city's zoning code provides for relatively high residential densities. Most of the city is zoned either R-1 or R-2. These zones permit single-family residential development on 5,000 square foot lots, or a net density of 8.7 dwelling units per acre. The zoning ordinance also permits accessory dwellings (small duplex units), either outright or conditionally, in all residential zones. Duplexes are permitted in the city's R-2 and R-3 zone on 5,000 square foot lots; this is a density of 17 dwelling units per acre. This density of residential development means that a given area can provide for more growth, thus reducing the need to expand the urban growth boundary.

Proximity of residential and commercial development

Commercial development that is convenient to residential areas reduces the demand for vehicular trips by making it more attractive to use alternative modes such as walking or bicycling; when a vehicle is used, the trip is shortened.

The city's commercial development is located in three nodes, downtown, midtown and Tolovana Park. These areas are located roughly in the northern, central and southern portions of the city. Thus even though the city has a linear form, all areas of the city are located within a mile of basic commercial services such as a grocery store.

The population of the city limits the types of commercial services available. Residents must go to larger cities, such as Seaside and Astoria/Warrenton, for many goods and services. However, the city's tourist industry has created a commercial base which is disproportionate to the population of the city. As a result, city residents have access to a much broader variety of goods and services than most cities of 1,350.

Compact commercial areas

Compact commercial areas reduce the demand for vehicular trips by promoting pedestrian use within the commercial area.

The city has fostered the development of compact commercial areas that are pedestrian oriented rather than automobile oriented. The

importance to the community of compact commercial areas is reflected in the following element of the comprehensive plan's vision statement

"The elements of the town's physical form which the plan will foster are: ...compact commercial areas that are pedestrian oriented and are readily accessible from adjoining residential areas"

The Comprehensive Plan contains a policy with the same objective.

Downtown Policy 2 states "the City's objective is to support development in the downtown area that will result in a compact town-center where a wide variety of uses occur, including housing, businesses, motels and civic uses, including parks."

The objective of a compact pedestrian oriented commercial areas is implemented by a number of design review criteria which are applied to new commercial development and substantial improvements to existing commercial development.

Site design evaluation criteria Where appropriate, the design includes a parking and circulation system that encourages pedestrian rather than vehicular orientation, including a separate service area for delivery of goods.

Architectural design evaluation criteria. The design sufficiently addresses the relationship of the structure(s) to the sidewalk and to pedestrian activities so as to foster human interaction.

Landscape design evaluation criteria. Where it is desirable to do so, the design provides amenities for the public

Mixed use development

Mixed use development can reduce the demand for vehicular trips by promoting pedestrian use through the proximity of a variety of complimentary land uses.

The importance to the community of mixed use development is reflected in the following element of the comprehensive plan's vision statement

The element's of the town's physical form which the plan will foster are . . . mixed land uses which promote the livability of the town.

The objective of creating mixed use areas is reflected in the following comprehensive plan policies:

Downtown Policy 8 states that the city will encourage the provision of permanent housing in Downtown by providing zoning incentives for mixed use structures which incorporate housing,

Housing Policy 16 states that the city will encourage and support the development of housing units in conjunction with commercial uses in order to provide additional housing, to provide for a diversity of uses in the city's commercial areas and to provide security to commercial areas.

Proximity of housing to work

Vehicular trips to and from work are a major source of traffic generation. A Home occupation is a means of eliminating the commute to work. The city's Zoning Ordinance contains reasonable standards for home occupations. As a result, there are 53 licensed home occupations in the city.

The city's comprehensive plan contains policies which seek to encourage housing that is available at a range of costs. The provision of affordable housing in the city means that there are more opportunities for employees in the city's service sector to live in Cannon Beach, thus reducing intercity vehicle trips.

Housing Policy 7 states that the City recognizes that there needs to be a balance between employment and housing in the Cannon Beach area and that the City cannot rely solely on other communities to provide needed affordable housing.

OTHER TRANSPORTATION FACILITIES

Air

Clatsop County has had only intermittent air service, from the Port of Astoria airport located in Warrenton, during the past decade.

Most recently, Horizon Air began scheduled passenger service between the Astoria Regional Airport and Portland International Airport in 1994. All air service was discontinued in the summer of 1995.

The Astoria Regional Airport also provides for general aviation.

The Seaside Airport is a small general aviation airport.

Rail

There is no rail service to Cannon Beach.

Pipelines

Cannon Beach is served by a Northwest Natural Gas pipeline.

...

ENERGY CONSERVATION

ENERGY CONSERVATION

The City of Cannon Beach promotes energy conservation through several means:

1. Funding support of the community recycling center (\$1000 per year) in conjunction with the Portland Recycling Team.
2. Land use controls that provide for efficient land use and public facilities extensions, including a realistic urban growth boundary, small lot size requirements where feasible, and maintenance of a compact commercial center.
3. Use of energy efficient sewer and water systems, including a stabilization lagoon-type sewage treatment system, high level water reservoir, and use of gravity wherever possible for moving water or wastewater.
4. Promotion of bike use and walking through the construction of bike paths and sidewalks, and the establishment of parking lots in central locations to encourage people to park in one place and walk rather than drive from place to place.

The City is currently investigating the feasibility of powering the sewer pump stations and aerating the waste lagoons with wind energy conversion systems (windmills); a grant application is currently being prepared for submission to the State Department of Energy to fund a feasibility study and pilot project. The aim would be to study both the mechanical and electrical energy possibilities of conserving the power now used to pump wastewater, one of the major uses of energy by the City.

The City encourages the use of solar energy in home construction through its zoning ordinance, which protects solar access of adjacent structures, and through the enforcement of the uniform building code. Although the climate of Cannon Beach is cloudy and wet much of the year (70 hours of sunshine per month in January, 240 hours in July), the mild temperatures and radiation that comes through the cloud cover makes solar space heating and water heating quite feasible. One solar home owner in Cannon Beach claims 60-75% heating needs in a passive solar heating system. Several solar structures have been constructed in town, including a motel complex. Most solar heated structures use wood as a backup source.

The abundance of wood in the area makes it an extremely feasible source of alternative energy.

In conjunction with Mr. R.H. Walkup of the Crown Zellerbach Corporation, it has been determined that a community firewood lot of approximately 300 acres can provide the City with enough cord wood to heat all of the permanent structure on a sustained yield basis. At the present time, most firewood is logging debris culled from clearcut forests. 1979 prices of a cord range from \$50-\$60, depending on the species and availability. It was determined that an efficient, managed woodlot close to the City could significantly reduce this cost.

In order to pursue this idea, a feasibility study could be done to investigate: 1) the use of State Forestry Department lands just east of the City (approximately 750 acres), 2) the possibility of providing grants or loans for the installation of safe, efficient wood heaters, particularly to low income persons, and 3) the use of mechanized harvesting and splitting equipment to reduce the cost per cord.

The breakdown of home heating types in Cannon Beach is as follows:

HOME HEATING METHODS - 1977

<u>Type</u>	<u>Number</u>	<u>Percent</u>
Propane	21	4
Oil	120	23
Electricity	294	57
Wood	76	15
Solar	2	-
Don't Know/No Response	5	1
Totals	519	100

Natural gas is not available in Cannon Beach at the present time, although Northwest Natural Gas Company has discussed the possibility of bringing a line from Seaside in the future. Pacific Power and Light provides electrical power from a substation on Ecola Creek Road. The substation and corridor is reported to be sufficient for the foreseeable future.

The other major use of energy in the City is for motorized transportation. Since the community is a resort, it has little

power to control use of visitors. However, the City encourages bike and pedestrian modes wherever possible. The police department has recently purchased a Volkswagen Rabbit for use as a patrol car. It is projected that as energy costs rise, use will grow at a rate below that of population growth. The gas shortages of 1979 have already caused a measurable reduction in tourist traffic. The city has adopted the energy conservation provisions of the Uniform Building Code for new structure, and interest in alternative forms of energy is high among the populace of Cannon Beach.