

# Water Management and Conservation Plan

## City of Cannon Beach



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## Appendices

### A. Letters to Affected Local Governments

# 1. Municipal Water Supplier Plan Elements

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*This section satisfies the requirements of OAR 690-086-0125.*

This rule requires a list of affected local government to whom the plan was made available, and a proposed date for submittal of an updated plan.

## 1.1 Introduction

The City of Cannon Beach (City or Cannon Beach) is located in Clatsop County on the Northern Oregon Coast, approximately 80 miles northwest of Portland. Cannon Beach has approximately 1,800 water meter connections and provides drinking water to about 1,730 persons. All of the City's customers are located within the City's Urban Growth Boundary (UGB). The City operates the water system under the Public Water System Identification number of 41-00164. Tourism is a major driver for the local economy given the proximity of this popular coastal destination to the Portland metro area.

The purpose of this Water Management and Conservation Plan (WMCP) is to describe the City's current and future water management and conservation policies and programs that help ensure sustainable water use. This Plan also discusses the City's future water needs.

## 1.2 Plan Requirement

This WMCP is the City's second WMCP. The Oregon Water Resources Department (OWRD) issued a final order on April 1, 2013 approving the City's WMCP. The final order included a condition requiring Cannon Beach to submit an updated WMCP no later than October 1, 2020; this WMCP satisfies this condition.

## 1.3 Plan Organization

This WMCP fulfills the requirements of the Oregon Administrative Rules (OAR) adopted by the Water Resources Commission in December 2018 (OAR Chapter 690, Division 86). It describes water management, water conservation, and curtailment programs to guide the wise use and stewardship of Cannon Beach's water supply.

The WMCP is organized into the following sections, each addressing specific sections of OAR Chapter 690, Division 86. Section 2 is a self-evaluation of Cannon Beach's water supply, water use, water rights and water systems. The information developed for Section 2 is the foundation for the sections that follow. Section 3 discusses the City's current water management and conservation measures and presents Cannon Beach's benchmarks for future efforts. Section 4 describes the City's water curtailment history, assesses the City's abilities to address water shortages, and provides blueprints for action when curtailment of supply is necessary. Section 5 draws information from Sections 2 and 3 to present the City's future water needs and how Cannon Beach intends to utilize its water resources to meet future demand.

Section	Requirement
Section 1 – Municipal Water Supplier Plan Elements	OAR 690-086-0125
Section 2 – Municipal Water Suppliers Descriptions	OAR 690-086-0140
Section 3 – Municipal Water Conservation Element	OAR 690-086-0150
Section 4 – Municipal Water Curtailment Element	OAR 690-086-0160
Section 5 – Municipal Water Supply Element	OAR 690-086-0170

## 1.4 Affected Local Governments

### ***OAR 690-086-0125(5)***

The following governmental agencies may be affected by this WMCP:

- Clatsop County
- City of Cannon Beach

Thirty days before submitting this WMCP to OWRD, Cannon Beach made the draft WMCP available for review by the affected local governments listed above along with a request for comments relating to consistency with the local government’s comprehensive land use plan. The letters requesting comments are found in Appendix A; no comments were received.

## 1.5 Plan Update Schedule

### ***OAR 690-086-1025(6)***

The City anticipates submitting an update of this plan within 10 years of OWRD’s final order approving the plan. As required by OAR Chapter 690, Division 86, a progress report will be submitted within 5 years of the final order.

## 1.6 Time Extension

### ***OAR 690-086-0125(7)***

Cannon Beach is not requesting an extension of time to implement metering or a benchmark established in a previously approved plan.

## 2. Municipal Water Supplier Description

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*This section satisfies the requirements of OAR 690-086-0140.*

*This rule requires descriptions of the water supplier's water sources, service area and population, water rights, and adequacy and reliability of the existing water supply. The rule also requires descriptions of the water supplier's customers and their water use, the water system, interconnections with other water suppliers, and quantification of water loss.*

### 2.1 Terminology

The following terminology is used in this WMCP.

Demand (or system demand) refers to the quantity of water delivered to the City's distribution system from the City's Main reservoir. The City's Main reservoir is fed directly by the City's Water Treatment Plant (WTP). Demand includes apparent losses and real losses described below.

Consumption is equal to metered water use and unmetered, authorized water uses (e.g., system flushing).

Water loss equals the difference of demand minus consumption. Water loss is a result of apparent and real losses. Apparent losses include unauthorized consumption and meter inaccuracies, among other loss types, and real losses include leakage or in-system reservoir over-flow.

Generally, demand and consumption in municipal water systems are expressed in units of million gallons per day (mgd), but also may be expressed in cubic feet per second (cfs) or gallons per minute (gpm). One mgd is equivalent to 1.55 cfs or 694 gpm. For annual or monthly values, a quantity of water is typically reported in million gallons (MG). Water use per person (per capita use) is expressed in gallons per capita per day (gpcd).

The following terms are used to describe specific values of system demands:

- Average day demand (ADD) equals the total annual demand divided by 365 days.
- Maximum day demand (MDD) equals the highest system demand, measured in gallons per minute observed during a calendar year, multiplied by 1,440 (60 minutes x 24 hours). It is also called peak day demand.
- Monthly demand equals the total volume of demand in a month divided by the number of days in the month.
- Peaking factors are the ratio of one demand value to another. The most common and important peaking factors for WMCPs are the ratio of MDD to ADD.

## 2.2 Water Sources

### **OAR 690-086-0140(1)**

The City relies on Main, Haskell, and Howell springs and Ecola Creek, formerly known as Elk Creek, to meet system demands. The springs serve as the City's primary sources of supply, with Main spring consistently used and Haskell and Howell springs supplementing supply from Main spring as needed. The springs' flow rates are weather dependent, with flows diminishing during the summer months, when demands are the greatest. Ecola Creek serves to supplement these springs when the springs alone cannot fully meet system demands. These sources are shown in Exhibit 2-1. As required in the rule, the City is required to describe additional sources of water including storage and regulation facilities. The City has neither storage nor regulation facilities, only in-line distribution system reservoirs as described in Section 2.10.

## 2.3 Interconnections with Other Systems

### **OAR 690-086-0140(7)**

The City does not have any interconnections with other systems.

## 2.4 Intergovernmental Agreements

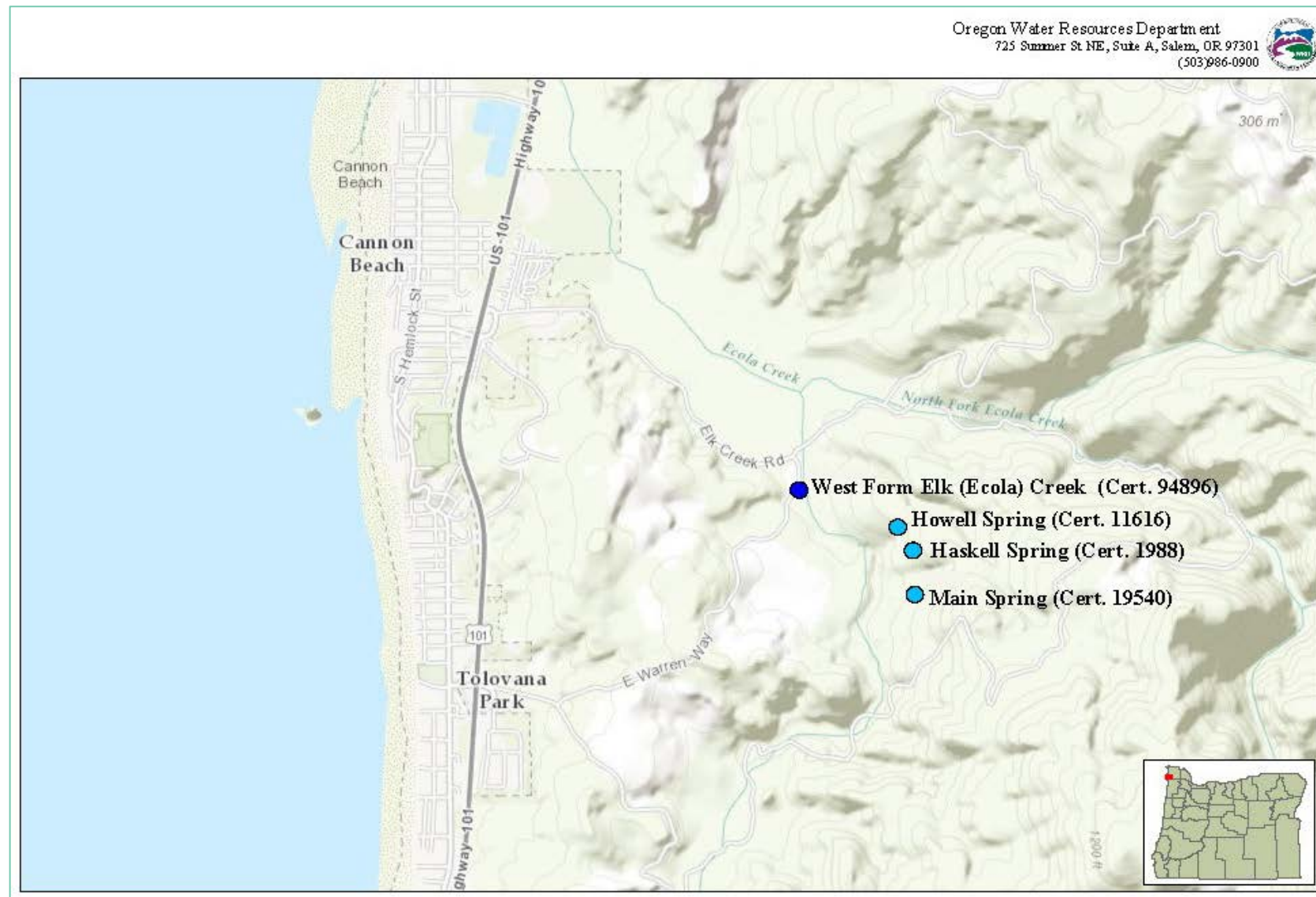
The City does not have any exchange agreements, intergovernmental cooperation agreements, or water supply or delivery contracts.

## 2.5 Current Service Area Description and Population

The City's service area includes the entire area within the City's municipal boundary and includes two parcels immediately outside this boundary, one of which is a residential property and the other is Ecola State Park to the north of the city. The service area is presented in Exhibit 2-2. The residential population within Cannon Beach's Urban Growth Boundary (UGB) was 1,652 in 2020 according to population estimates published in 2020 by the Portland State University (PSU) Population Research Center. Two known residences are located outside of the City's service area (and city limits), but within the UGB, therefore the population associated with these two residences were included within PSU's 2020 population estimate. To correct for this over counting of service area population, Cannon Beach reduced PSU's estimate by 5 persons (assuming 2.5 persons per residence). In total, Cannon Beach's service area population is estimated to be 1,647 ( $1,652 - 5 = 1,647$ ) as of 2020.

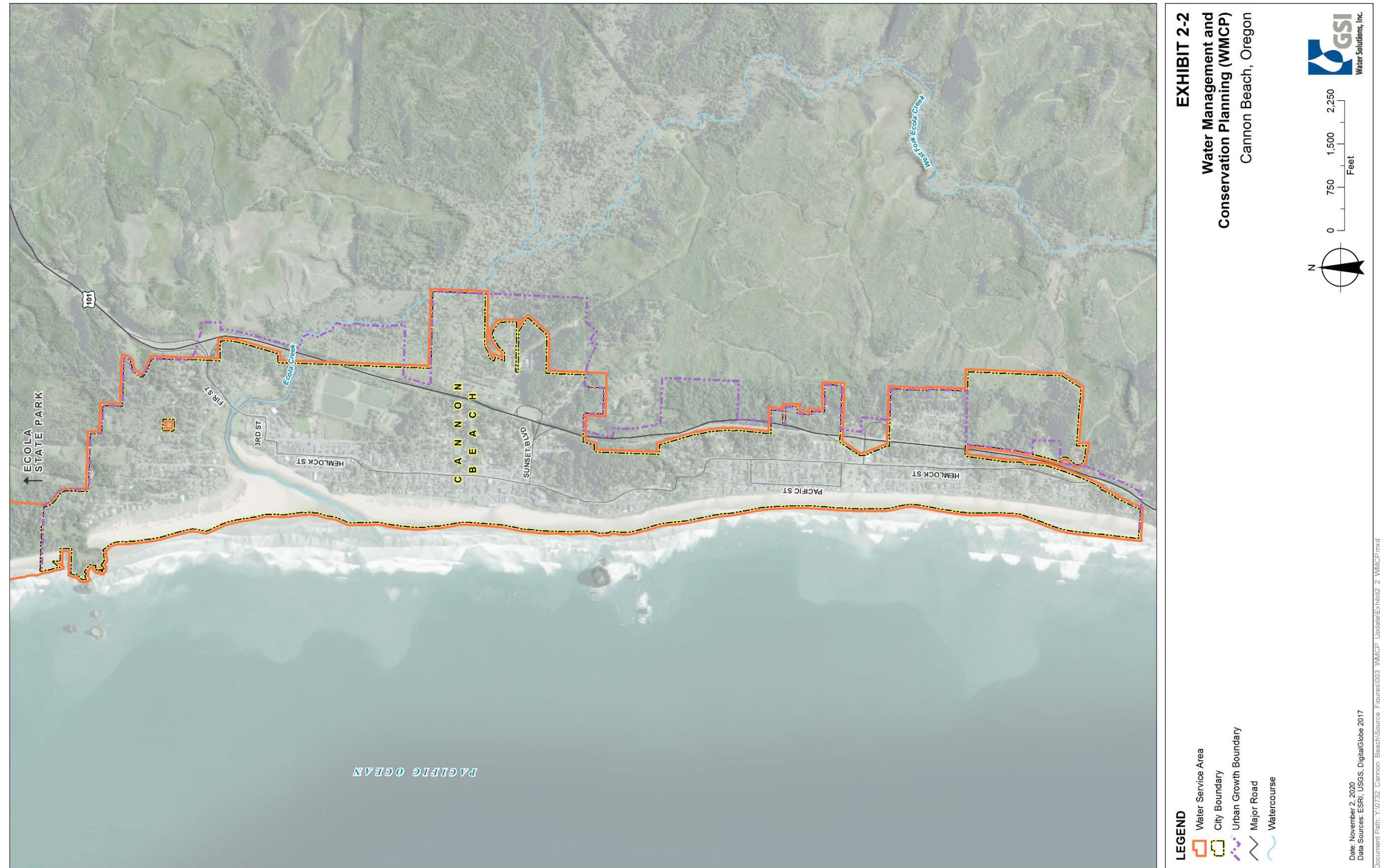


Exhibit 2-1. Water Sources of Cannon Beach



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Exhibit 2-2. Service Area





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## 2.6 Demand

### OAR 690-086-0140(4)

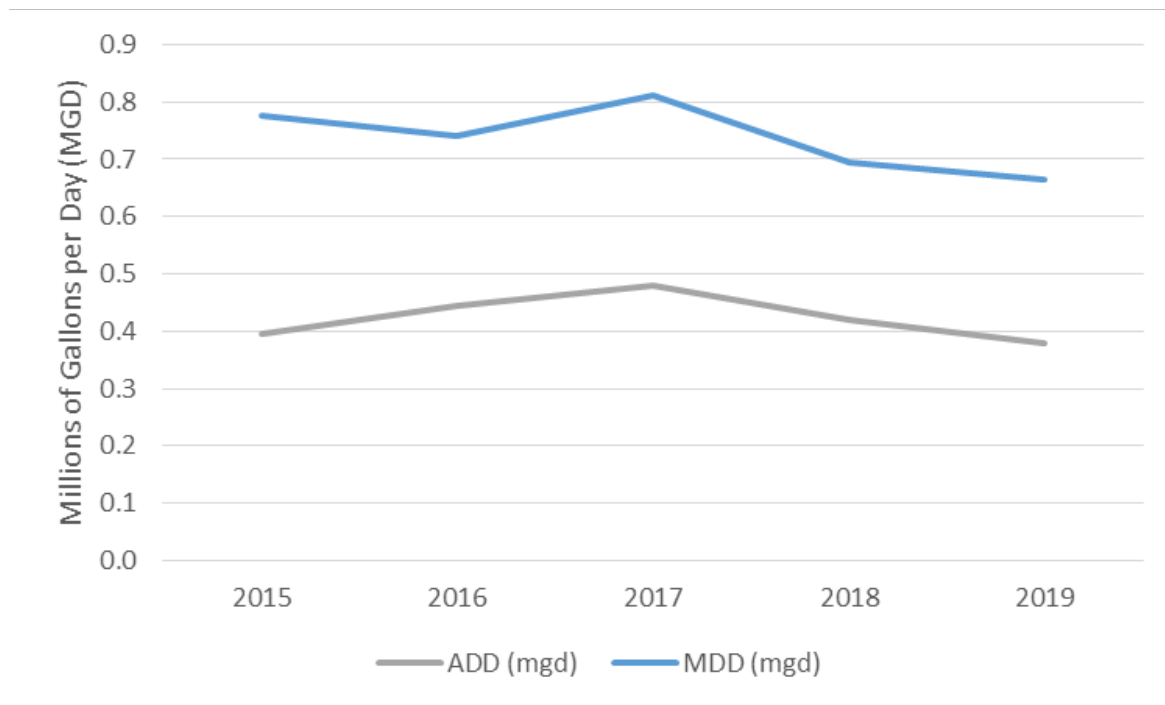
Exhibit 2-3 presents demands from 2015 through 2019 as annual use and average and maximum day use. Also shown are annual peaking factors and the months in which MDD and MMD occurred.

**Exhibit 2-3. 5-Year Historical Water Demand**

	<b>Demand (MG)</b>	<b>ADD (mgd)</b>	<b>MDD (mgd)</b>	<b>Peaking Factor</b>	<b>MDD Month of Occurrence</b>	<b>MMD Month of Occurrence</b>
<b>2015</b>	144.28	0.40	0.78	1.96	July	August
<b>2016</b>	161.89	0.44	0.74	1.67	July	August
<b>2017</b>	175.58	0.48	0.81	1.69	July	August
<b>2018</b>	153.38	0.42	0.69	1.65	July	July
<b>2019</b>	138.69	0.38	0.67	1.75	July	July
<b>Average</b>	154.77	0.42	0.74	1.74	-	-

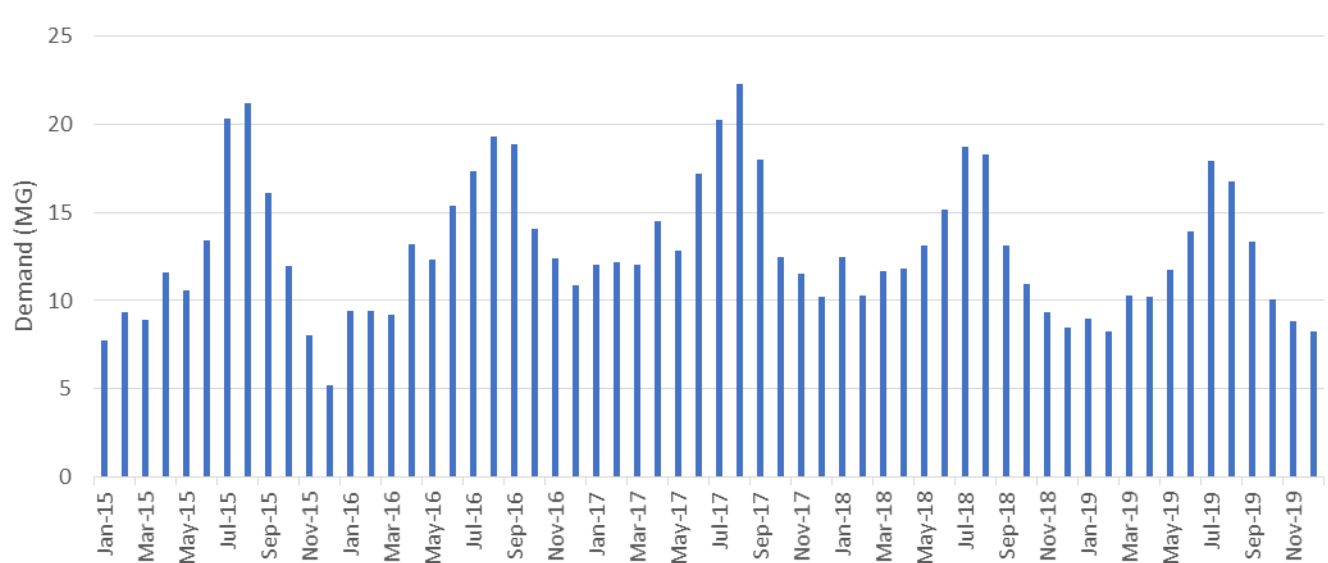
Over this five-year period, demand initially increased from 2015 to 2017, then decreased in 2018 and 2019 to a volume slightly below the volume recorded for 2015. ADD followed this similar trend and averaged 0.4 mgd. The greatest MDD during the five year period occurred in 2017, measuring 0.81 mgd. The peaking factors ranged from 1.65 to 1.96 and averaged 1.74. These peaking factors are similar to other coastal communities. For example, the City of Florence observed a peaking factor of 1.8 as shown in its recently published WMCP (2020) and the City of Nehalem had a peaking factor of 2.0 per its 2012 WMCP. Exhibit 2-4 depicts ADD and MDD from 2015 to 2019.

**Exhibit 2-4. ADD and MDD, 2015-2019**



Demand is greatest in the summer months as shown in the last two columns of Exhibit 2-3. MDD occurred in July in every year of the past five years and the MMD occurred in either July or August during this period. Exhibit 2-5 shows monthly demand from 2015 to 2019, further highlighting the seasonal nature of Cannon Beach's demand. Higher demand in the summer months is due to outdoor use of water, particularly water used for irrigation, increased tourism, and an influx of seasonal residents.

**Exhibit 2-5. Monthly Demands, 2015-2019**



## 2.7 Customer Characteristics and Use Patterns

### OAR 690-086-0140(6)

Customer characteristics impact water usage. Understanding these characteristics is helpful when analyzing historical and current customer consumption, forecasting future consumption patterns, and establishing conservation measures to reduce inefficient use of water.

#### 2.7.1 Customer Classes

For billing purposes, Cannon Beach categorizes its customer accounts into three class types. These classes are Residential, Commercial, and Government. Residential customers include single-family residences and multiplexes served by the City. The Government class include City facilities only, for example City-owned administrative buildings and parks, and the Commercial class includes businesses, such as hotels, restaurants, industries, retail, and institutions, such as schools and churches. As of mid-2020, the City had a total of 1,785 customer accounts. Of these, the Residential class made up over 88 percent of all accounts. Exhibit 2-6 provides the numbers of accounts per customer class and percentage of the total accounts.

**Exhibit 2-6. Numbers of Customers by Customer Class, 2020**

	<b>Count</b>	<b>Total (%)</b>
Residential	1,578	88.4%
Commercial	174	9.7%
Government	33	1.8%
<b>Total</b>	<b>1,785</b>	<b>100.0%</b>

#### 2.7.2 Customer Consumption

Customer consumption is shown in Exhibit 2-7 by customer class from 2004 to 2019. Consumption remained relatively stable for all classes, however the Government class showed temporary consumption spikes in 2004 and 2010. In 2004, the City emptied its South reservoir for maintenance and refilled the reservoir following the completion of the maintenance project and allowed the reservoir to overflow for three weeks to clear out any potential debris from the project. The 2004 spike in consumption was due to the refilling and planned overflows of this reservoir. The City has not been able to identify the cause of the spike in consumption in 2010.

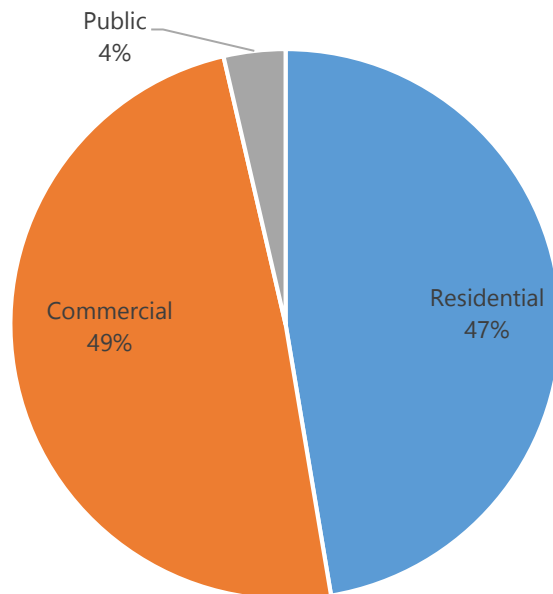
**Exhibit 2-7. Customer Consumption, 2004-2019**

	<b>Residential (MG)</b>	<b>Commercial (MG)</b>	<b>Government (MG)</b>	<b>Total (MG)</b>
2004	57.9	59.0	12.8	129.7
2005	62.2	58.9	4.8	125.9
2006	63.6	58.2	4.8	126.6
2007	64.3	59.0	4.6	127.9
2008	61.9	58.4	2.9	123.1
2009	60.6	58.6	4.2	123.4
2010	59.8	53.4	6.5	119.7
2011	59.8	51.9	4.1	115.8
2012	61.4	51.6	4.2	117.3
2013	61.0	52.8	3.9	117.7
2014	60.7	52.8	4.9	118.3
2015	63.1	55.3	4.3	122.7
2016	59.7	53.8	4.0	117.5
2017	58.9	57.5	4.2	120.6
2018	57.4	61.3	4.3	123.1
2019	57.5	59.5	4.4	121.5
<b>5-Yr. Ave. (2015-19)</b>	<b>59.2</b>	<b>57.5</b>	<b>4.2</b>	<b>121.1</b>

Consumption for the Residential and Commercial classes have remained roughly equivalent over the 16-year period as can be seen in Exhibit 2-7. Consumption by customer class as a percent of total customer consumption for 2019 is displayed in Exhibit 2-8, also showing nearly equal consumption of the Residential and Commercial classes.

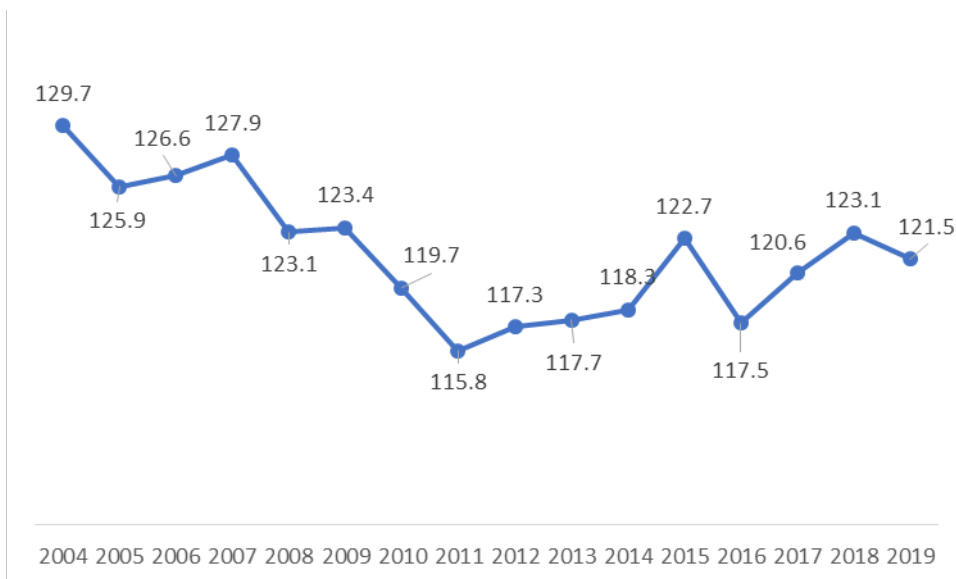


**Exhibit 2-8. Customer Classes Usage as Percent of Total Use, 2019**



Total annual consumption is shown in Exhibit 2-9. Total consumption trended downward over this 16-year period, with an annual average of 126.6 MG from 2004 through 2008 compared to 121.1 MG from 2015 through 2019. The City attributes this decrease to conservation measures implemented by the City and the tightening of federal water efficiency standards for water-using fixtures over this period.

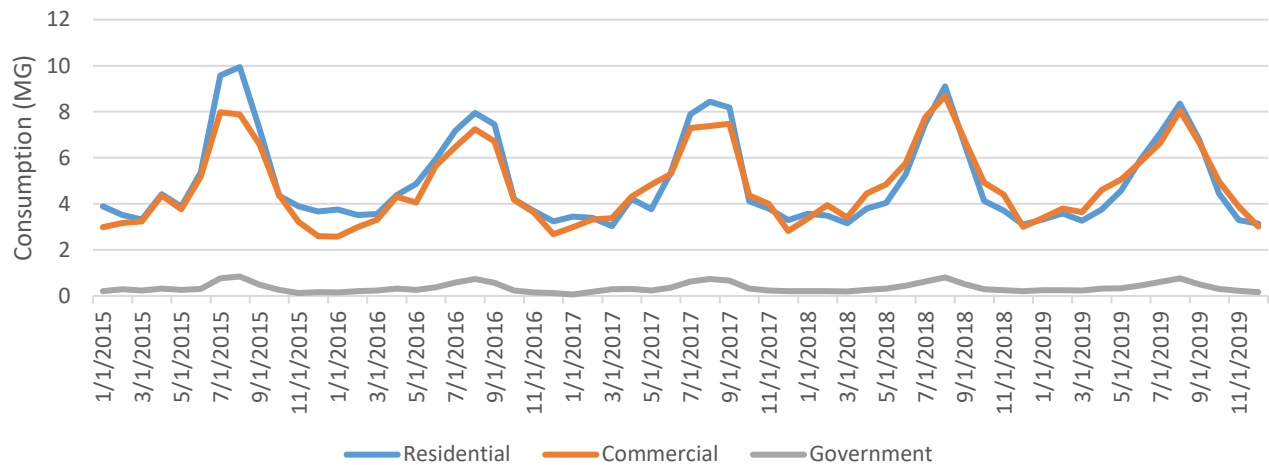
**Exhibit 2-9. Annual Customer Consumption (MG)**



As part of the analysis of customer consumption, monthly consumption by customer class was graphed from 2014 through 2019. The results are shown in Exhibit 2-10. Monthly consumption for the

Residential class shows a seasonal consumption trend, with consumption peaking during the summer season. Residential class peaking typically is a result of outdoor water use and in particular, outdoor irrigation. Seasonal residents also contribute to greater summer consumption than winter consumption as well. The Commercial class also shows this same peaking pattern. The City attributes Commercial consumption summer peaks to increased demands from the large influx of tourists during this time. The Government class shows summer season peaks due to the use of water to irrigate city parks and the use of public restrooms by the public.

**Exhibit 2-10. Monthly Customer Consumption by Class, 2015-2019**



## 2.7.3 Largest Customers

Exhibit 2-11 presents the annual consumption of the top 10 water users in 2019. Eight of the ten users on this list are temporary and long-term stay hotels and motels. The top user is categorized as Residential because it is a collection of condominiums for which the City aggregates water use. The Government user is the City, which uses water for park irrigation and all City facilities, such as municipal buildings and facilities (e.g. restrooms).

**Exhibit 2-11. Top 10 Water Users, 2019**

	<b>Annual Usage (MG)</b>	<b>Percent of Total Annual Consumption for All City Customers</b>
Residential	4.9	4.0%
Commercial	3.4	2.8%
Commercial	2.9	2.4%
Commercial	2.7	2.2%
Commercial	2.6	2.2%
Commercial	2.4	2.0%
Commercial	1.9	1.5%
Commercial	1.8	1.5%
Commercial	1.8	1.5%
Government	1.5	1.2%
<b>Total</b>	<b>25.9</b>	<b>21.3%</b>

## 2.8 Water Loss

### OAR 690-086-0140(9)

Exhibit 2-12 lists annual total demand, authorized metered and unmetered consumption, and water losses estimates for the years 2015 through 2019. Unmetered authorized consumption is based on estimates for water use by the fire department for training exercises, at the City's wastewater treatment plant for wet-well cleaning, and by contractors to fill tanker trucks. The City is not aware of unauthorized consumption occurring in its system.

Cannon Beach's estimated water loss percentage for 2019 is 12.2 percent, representing substantial annual decreases from a high of 31.2 percent in 2017. The City attributes the decreases in water loss observed since 2017 to major water loss reduction initiatives. These initiatives include a system-wide leak detection and repair program, a system-wide meter replacement program, and replacement of two of the City's four master meters. The City completed these initiatives in the spring of 2019. Section 3 of this WMCP describes these initiatives.

The City's water loss is comprised of real and apparent losses. The City is aware of real water losses in the form of leaks on the customers' sides of meters, distribution system leaks, and infrequent reservoir overflows at the City's South reservoir. These infrequent reservoir overflows are not metered and are not currently incorporated into the City's authorized unmetered consumption estimates due to the difficulty in estimating these losses. Apparent losses are components of the City's water loss estimates as well, such as meter reading and billing errors.

**Exhibit 2-12. Water Audit, 2015-2019**

	<b>Demand (MG)</b>	<b>Consumption (MG)</b>	<b>Authorized, Unmetered Uses (MG)</b>	<b>Water Loss (MG)</b>	<b>Water Loss (%)</b>
<b>2015</b>	144.3	122.7	0.20	21.4	14.8%
<b>2016</b>	161.9	117.5	0.20	44.3	27.3%
<b>2017</b>	175.6	120.6	0.20	54.8	31.2%
<b>2018</b>	153.4	123.1	0.41	29.9	19.5%
<b>2019</b>	138.7	121.5	0.25	16.9	12.2%
<b>5-Yr. Average</b>	<b>154.8</b>	<b>121.1</b>	<b>0.2</b>	<b>33.5</b>	<b>21.6%</b>

## 2.9 Water Rights

**OAR 690-086-0140(5)**

### 2.9.1 Summary of Water Rights

Cannon Beach holds four water right certificates. Certificate 1988 authorizes use of up to 1.0 cfs year-round for domestic use from a small unnamed tributary stream of South Fork Elk Creek. Elk Creek is now known as Ecola Creek and the City refers to this source as Haskell springs. Certificate 11616 authorizes diversions of up to 0.60 cfs year-round for municipal use from the source that the City calls Howell springs, which is listed as an unnamed spring on this water right. Certificate 19540 authorizes use of up to 1.0 cfs year-round for municipal use from an unnamed spring listed as a tributary of Elk (Ecola) Creek, which the City refers to as Main spring. The City also holds Certificate 94806 that authorizes up to 1.5 cfs year-round for municipal use from West Fork Elk (Ecola) Creek. Combined, these sources authorize a total of 4.1 cfs (2.7 mgd). Cannon Beach relies on these water rights to meet system demands. Exhibit 2-13 provides details about the City's rights and also includes annual, average monthly, and average daily information.

Exhibit 2-13. Water Rights Table

Source Type	Application	Permit	Certificate	Priority Date	Source (Common) Name	Entity name on water right	Type of Beneficial Use	Authorized Rate/Max. Diversion Rate To Date (cfs)**	Annual Demand* (MG)					Average Monthly Demand (MG)					Average Daily Demand (MG)				
									2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Surface water	S-5202	S-3135	1988	10/16/1916	Small stream, trib. of S. Fork Elk Crk. (Haskell spring)	Elk Creek Water and Light Co., City of Cannon Beach	Domestic	1.00/1.00	195.7	204.3	224.8	155.9	267.1	16.3	17.0	18.7	13.0	22.3	0.5	0.6	0.6	0.4	0.7
	S-14958	S-10936	11616	5/25/1933	Unnamed spring (Howell spring)		Municipal	0.60/0.60															
	S-16524	S-12321	19540	8/20/1936	Unnamed spring, trib. Of Elk Crk. (Main spring)	Cannon Beach Water Co., City of Cannon Beach	Municipal	1.00/1.00															
Surface water	S-55694	S-41717	94806	4/15/1977	West Fork Elk Creek	City of Cannon Beach	Municipal	1.50/1.50	47.7	44.4	66.8	68.7	69.5	4.0	3.7	5.6	5.7	5.8	0.1	0.1	0.2	0.2	0.2

\*For the purposes of this table, the use information is measured by source before entering the WTP clearwell. The Main spring flows continuously past the measurement point and then is returned to the source if not needed for meeting demand.

\*\*The City’s water rights do not have annual quantity restrictions.

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### 2.9.2 Aquatic Resource Concerns

OAR 690-086-140(5) requires municipal water suppliers to identify the following for each of its water sources: 1) any listing of the source as water quality limited (and the water quality parameters for which the source was listed); 2) any streamflow-dependent species listed by a state or federal agency as sensitive threatened or endangered that are present in the source; and 3) any designation of the source as being in a critical groundwater area.

Cannon Beach holds water rights for surface water. Therefore, this rule applies. The City's groundwater sources are not located within an OWRD designated Critical Groundwater Area or Groundwater Limited Area.

The Oregon Department of Environmental Quality's (DEQ) publishes the Integrated Report Assessment Database, which identifies surface water bodies that are water quality limited and associated water quality limiting parameters. The information described below for Ecola Creek was drawn from DEQ's 2012 Integrated Report, otherwise known as DEQ's "303d list" which can be found on DEQ's web page at <https://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx>.

Ecola Creek is on the DEQ's 303(d) list of water quality limited streams for two parameters within the stream reach between river miles 0 and 2.3. The parameters include chlorine (year round) and iron (year round). The City's authorized diversion point on the creek falls within this reach.

Ecola Creek may support several fish species that are listed as threatened, endangered, or sensitive under state and federal laws. The listed fish species that may be present in Ecola Creek are summarized in Exhibit 2-14.

**Exhibit 2-14. Federal and State Listed Fish Species in the Coast Range**

Common Name	Federal Listing Status	State Listing Status
Summer steelhead	Not Listed	Sensitive
Spring Chinook salmon	Not Listed	Sensitive
Oregon Coast Coho salmon	Threatened	Sensitive
Chum salmon	Not Listed	Sensitive-Critical
Bull trout	Threatened	Not Listed
Umpqua chub	Not Listed	Sensitive-Critical
Pacific lamprey	Not Listed	Sensitive
Western Brook lamprey	Not Listed	Sensitive
Western River lamprey	Not Listed	Sensitive
White sturgeon	Not Listed	Sensitive
Green sturgeon	Not Listed	Sensitive

Sources:

- Status of ESA Listings & Critical Habitat Designations for West Coast Salmon & Steelhead, NOAA Fisheries, [https://archive.fisheries.noaa.gov/wcr/publications/gis\\_maps/maps/salmon\\_steelhead/critical\\_habitat/wcr\\_salmonid\\_c\\_h\\_esa\\_july2016.pdf](https://archive.fisheries.noaa.gov/wcr/publications/gis_maps/maps/salmon_steelhead/critical_habitat/wcr_salmonid_c_h_esa_july2016.pdf)
- Oregon Department of Fish and Wildlife, Sensitive Species List (2019), [https://www.dfw.state.or.us/wildlife/diversity/species/docs/Sensitive\\_Species\\_List.pdf](https://www.dfw.state.or.us/wildlife/diversity/species/docs/Sensitive_Species_List.pdf)

### 2.9.3 Assessment of Water Supply

#### **OAR 690-086-0140(3)**

The City's four sources of supply (Certificates 11616, 19540, 94806, and 94806) have been adequate and reliable in meeting the City's system demands historically. The combined authorized rate of appropriation from all four of the City's water rights is 4.1 cfs (2.7 mgd).

The City's favored water source to meet demands is Main spring. Certificate 19540 authorizes diversions of up to 1 cfs (0.64 mgd) from this source. Compared to the five year average ADD of 0.65 cfs (0.42 mgd), the Main spring is adequate to meet demand for large portions of the year. However, the City experiences summer season demand peaks that exceed ADD. The highest MDD over the previous five year period was 1.25 cfs (0.81 mgd) in July 2017 and averaged 1.1 cfs (0.74 mgd) over the five year period. These rates exceed the authorized rate of diversion of the Main spring of 1.0 cfs (0.6 mgd). The City has been able to meet MDD with a combination of supply from Haskell (1.0 cfs) and Howell (0.6 cfs) springs in addition to the Main spring, for a combined authorized rate of diversion of 2.6 cfs (1.7 mgd).

Seasonal variations in the springs' flows can limit the City's ability to fully meet demand solely using these springs' sources. During these infrequent events that limit use of the springs, the City diverts water under Certificate 94804 from Ecola Creek (1.5 cfs) to help meet demand. The City has found streamflow to be adequate to meet the City's demands during these events. The lowest recorded streamflow during active streamflow monitoring from water years 1974/75 through 1985/86 was 3.7 cfs (2.4 mgd) as measured at a stream gage near the City's point of diversion.<sup>1</sup> For comparison, the City's

<sup>1</sup> Historical flow measurements were reviewed for Ecola Creek stream gage station identification number 14299140. The gage was actively monitored by OWRD from 10/1/1974 through 9/30/1986 when monitoring was discontinued.



highest MDD over the previous five year period was 0.81 mgd as shown in Exhibit 2-3. The City relies on Ecola Creek as a supplemental source to the springs due to the costs associated with treating this source. (Water from the springs is not treated in the City's WTP.) In summary, the City's water supplies (with a mix of springs and Ecola Creek) are adequate to meet the City's average and maximum day demands.

Moreover, all four of the City's certificated water rights are senior to all other rights associated with the authorized sources and therefore are not subject to regulation further confirming the reliability of the rights.

## 2.10 System Description

### **OAR 690-086-0140(8)**

The City's water system is comprised of transmission and distribution system, a WTP, and system appurtenances. These are shown in Exhibit 2-15 and described below.

The City's supply primarily comes from three springs, called Main, Haskell, and Howell springs which are all tributary to Ecola Creek. The City uses the Ecola Creek source to supplemental supply as needed. Ecola Creek is infrequently used typically during the summer months when spring flow is significantly diminished and demand is high.

Water from the three springs is gravity-fed to the City's WTP via one transmission line. Spring water enters the City's clearwell in the WTP, blends with finished surface water, and is routed to the City's Main reservoir. Main spring water is constantly conveyed to the WTP; spring water in excess of system demands is routed back to Ecola Creek. Meter vault 3 in the WTP houses the meter used to measure water coming from the springs.

Water diverted from Ecola Creek is conveyed via a transmission line that is separate from the springs' transmission line to the WTP. Meter vault 2 located in the WTP houses the master meter that measures diversions from Ecola Creek. The City's WTP is operated only when surface water from Ecola Creek is utilized to meet system demands. The WTP uses a slow sand filtration system installed in 1995 and has a treatment capacity of 1.0 mgd (700 gpm or 1.5 cfs). Treatment includes biological and physical filtering as well as chlorination. Following treatment, finished water blends with spring water in the clearwell prior to conveyance to the City's distribution system.

The City has three above-ground, inline reservoirs with a storage capacity of 2.63 MG. The City named these reservoirs the North tank (0.03 MG), the Main reservoir (1.0 MG), and the South tank (1.6 MG). Finished water from the WTP passes through the Main reservoir prior to entering the City's distribution system. The City's master meter measuring demand is located immediately downstream of the City's Main reservoir.

The City's distribution system is gravity fed except in two areas where the City operates two booster pumps to serve 51 customer accounts located at higher elevations. The City has approximately 23 miles of distribution mainline piping and approximately 7 miles of service line piping.

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### Exhibit 2-15. Water System Schematic



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## 3. Water Conservation Element

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*This section addresses the requirements of OAR 690-086-0150(1) – (6). This rule requires a description of specific required conservation measures and benchmarks, and additional conservation measures implemented by Cannon Beach.*

### 3.1 Progress Report

#### **OAR 690-086-0150(1)**

This is Cannon Beach's second WMCP, therefore this rule applies. The City submitted a progress report to OWRD in 2018 describing the City's progress on meeting the conservation benchmarks presented in its 2010 WMCP. Exhibit 3-1 provides an update on the City's progress toward meeting these 2010 benchmarks.

### 3.2 Use and Reporting Program

#### **OAR 690-086-0150(2)**

The water measurement and reporting program of the City complies with the measurement and reporting standards in OAR Chapter 690, Division 85. Cannon Beach measures the water diverted from its sources using transit time ultrasonic flow meters. Water diverted from Ecola Creek is metered at the point of diversion and spring water diversions are measured at the City's WTP.

The City submits monthly water use measurements to OWRD on an annual basis. Reporting is for the previous water year (October 1 to September 30). Their water use records can be found at [http://apps.wrd.state.or.us/apps/wr/wateruse\\_report/](http://apps.wrd.state.or.us/apps/wr/wateruse_report/)

### Exhibit 3-1. Progress on 2010 Conservation Benchmarks

Conservation Measures	2010 Benchmarks	2010 Benchmark Status in 2020
Annual water audit	The City will begin a program to track, by estimation, non-revenue, non-metered, water usage starting in June 2006 and factor this number into all subsequent auditing reports for year 2006 and beyond.	The City began including estimates for many non-revenue and non-metered authorized uses in its annual water audits. The City continues to explore opportunities to estimate dead-end line and hydrant flushing and has included a benchmark to begin incorporating the volumes from these uses as part of future water audits.
	The City will annually review water usage at city facilities to identify conservation opportunities.	The City monitors for leaks at these facilities on an on-going basis using meter technology that automatically flags the accounts of these facilities when leaks are identified. City staff are alerted and inspect and repair, if necessary, discovered leaks. The City has been evaluating an opportunity to install irrigation system rain sensors at City parks, which could reduce water used for irrigation.
	Fire hydrant meters will be used to account for all uses except fire protection. The Fire Department will provide estimated water use information.	The Fire Department provides the City with estimates of water use during training events and these volumes are incorporated into the City's annual water audit. Planned unmetered fire hydrant uses by the City, for example associated with dead-end lines and hydrant maintenance, contribute minimally to overall consumption. These uses are not currently captured in the water audit, but the City has committed to capturing these volumes as explained in Section 3.3.
Install meters on all water service connections	The City will continue to meter all water service connections.	All City customers continue to be metered and all new service connections are metered prior to service.
Meter testing and maintenance program	The City will perform accuracy testing of production meters beginning in year 2006, and every two years thereafter.	To address meter accuracy concerns, the City replaced four of its five master (production) meters since 2008. Of these four meters, one was tested since installation and the City's oldest master meter, the fifth of the five meters, was tested in 2012. Though the City has not met yet its goal of bi-annual accuracy testing, the City is committed to meeting this bi-annual testing regime as explained in Section 3.3.

Conservation Measures	2010 Benchmarks	2010 Benchmark Status in 2020
	Meters 2-inches and smaller will be replaced with “state-of-the-art” Automated Meter Reading (AMR) systems utilizing leak detection functions.	The City completed an aggressive meter replacement program in 2017 that replaced all meters 2-inches and smaller with meters with Automatic Meter Reading technology; these new meters utilize leak detection functions.
	Meters 3-inch and larger will be tested on a five year schedule.	The City recently completed an aggressive meter replacement program in 2017 in which all customer meters’ 3-inches and larger were replaced with compound meters. Meters five years and older have not been tested yet, however the City is committed to testing these large meters every five years as explained in Section 3.3.
	Upon testing, all meters will be brought into manufacturer’s accuracy specifications or will be replaced. Meters nearing or surpassing the 20-year length of service are scheduled for replacement.	This is an on-going effort, as described above. However, the City recently completed an aggressive meter replacement program in which all customer meters were replaced as of 2017. Upon installation, these meters met manufacturer’s accuracy specifications.
Rate structure	The City’s rate structure includes a fee for water use equal to or less than 400 cubic feet per month; any use above 400 cubic feet is charged a volume rate in 100 cubic feet increments.	The City’s rate structure continues to be based, in part, in the quantity of water used.
System leakage	The City is budgeting for comprehensive leak detection services for fiscal year 2007 and every five years thereafter. Results will be used to prioritize and repair high priority leaks.	The City budgeted and performed system-wide leak detection via an outside company specializing in leak detection in 2018 and again in 2019. These two rounds of testing, followed by line repair, resulted in a reduction of water loss due to line leaks of approximately 160 gpm (0.23 mgd).
	The City will routinely check fire hydrants (for leaks) after each use.	Fire hydrants are inspected for leaks when the City’s Public Works staff perform hydrant maintenance activities.
	The City will perform a minimum of 2 hour per month systematic routine spot checks for leakage.	The City performs routine spot checks throughout the system regularly, equating to two hours per month. In addition, most of the City’s meters have leak detection functions and can alert the City and customers to potential leaks.

Conservation Measures	2010 Benchmarks	2010 Benchmark Status in 2020
Public education	The City will continue free leak detection tests for residential customers who suspect a leak if the leak is outdoors and offer free brochures with conservation information and a free conservation kit when applicable. Brochures include tips on water saving irrigation techniques and methods to reduce consumption indoors.	The City provides basic technical assistance to customers who suspect leaks, including often a personal visit by City staff to these customers. City staff make suggestion on ways that customers can detect either indoor or outdoor leaks. Free conservation brochures and kits are offered to these residents and are available at City Hall. Leak detection tablets for toilets are included in each conservation kit.
	Distribute water conservation brochures and conservation kits at community events such as the Public Works Week open house, and provide brochures at City Hall. Brochures include tips on water saving irrigation techniques and methods to reduce consumption indoors.	The City continues to distribute conservation brochures and kits at the Public Works Week open house and provides brochures at City Hall to customers.
	Provide information on City conservation programs with links to other water conservation sites on the City's website.	The City has a website, which includes an explanation of the purpose of conservation, information from the City about leak detection, and links to other water conservation sites. <a href="https://www.ci.cannon-beach.or.us/publicworks/page/water-conservation-tips">https://www.ci.cannon-beach.or.us/publicworks/page/water-conservation-tips</a> .



## 3.3 Required Conservation Measures

### **OAR 690-086-0150(4)(a-f)**

OAR 690-086-0150(4) requires that all water suppliers establish five-year benchmarks for implementing the following water management and conservation measures:

1. Annual water audit
2. System-wide metering
3. Meter testing and maintenance
4. Unit-based billing
5. Water loss analysis
6. Public education

During the next five years, Cannon Beach plans to initiate, continue, or expand the following conservation measures that are required of all municipal water suppliers when a condition of a water use permit, permit extension, or another order or rule requires a WMCP. The benchmarks that Cannon Beach has selected are presented below and in Exhibit 3-2 at the end of Section 3.

#### **3.3.1 Annual Water Audit**

OWRD defines a water audit as an analysis of the water system that includes a thorough accounting of all water entering and leaving the system. The results of the City's historical water audits for the years 2015 through 2019 are presented in Section 2.8. The City employs a systematic and documented methodology for estimating several un-metered authorized uses, and an analysis of the City's own water use. The City's authorized un-metered estimates include uses for fire department training exercises, wet-well cleaning at the wastewater treatment plant (WWTP), and filling of private water tank trucks for contractor use. (Uses at City facilities, including public parks and restrooms and buildings owned by the City, such as City Hall, are metered and included within the "Government" category described in Section 2.) The City is not aware of any unauthorized uses.

During development of the City's 2019 water audit, the City discovered that it currently does not track water use associated with "dead end line" flushing. Though this use represents a small fraction of overall consumption, the City will begin to estimate and incorporate this use in its annual water audit.

As part of the rule, water providers must perform an analysis of its own water use to identify alternatives to increase efficiency. As part of the development of this WMCP, the City considered its own uses of water and potential areas for increases in efficiency. First, the City is considering an opportunity to install irrigation system rain sensors at City parks as a means to prevent irrigation during or immediately following precipitation events. If the City deems this opportunity to be feasible (i.e. cost-effective and compatible with existing irrigation systems), the City will install rain sensors at its parks in the next three years. Second, the City intends on installing fixtures in public restrooms that are more water efficient than the current fixtures during restrooms remodeling projects.

**Five-Year Benchmark** – Cannon Beach will continue to perform annual water audits and will begin to include volumes associated with "dead end line" flushing, in addition to continuing to include other unmetered and authorized uses currently incorporated within the audit. The City will investigate an

opportunity to install irrigation system rain sensors at City parks and install these at one or more parks over the next three years where installations are feasible and cost-effective. The City will upgrade to more water efficient fixtures in public restrooms when these restrooms are remodeled.

### 3.3.2 System-wide Metering

All existing water service connections are metered and meters are installed on all new service connections.

*Five-Year Benchmark* – The City will continue to require installation of meters on all water service connections.

### 3.3.3 Meter Testing and Maintenance

Cannon Beach has an active meter testing and maintenance program. From 2011 to 2017, the City replaced all customers' meters with meters fitted with Automatic Meter Reading (AMR) technology. During this meter replacement project, the City replaced meters' three inches and larger with compound meters that are better able to measure both small and large volumes of consumption. As meters age, they tend to undercount water volumes, and with the replacement of the old meters, the accuracy of the measured volumes of water used by the City's customers improved. As a result of the City's meter replacement program, the City observed a reduction in water loss from 2017 through 2019, as shown in the City's water audits.

The City's customer meter testing and replacement program is designed to ensure these meters are accurate. Like most cities, Cannon Beach's small (less than three inch) meter replacement program occurs once every 20 years, therefore, given the age of these meters (installation from 2011 through 2017), the City will not begin to replace these meters until the early-2030s. Cannon Beach's large customer meter replacement program entails testing and recalibrating, repairing, or replacing meters three inches in size and greater once every five years to ensure these meters continue to accurately measure water consumption.

As part of the City's on-going meter accuracy program, the City tests and recalibrates, repairs, or replaces its five master meters periodically. Testing and recalibration is performed by a contractor. The City's master meter located at the City's diversion point on Ecola Creek was replaced in the summer of 2016 and has not been tested since installation. The two master meters located within the WTP measuring production volumes from the City's sources (one meter each for Ecola Creek and the combined springs volumes) were replaced in the spring of 2017 and have not been tested since installation. The "effluent" meter measuring water leaving the WTP was replaced in approximately 2008 and was tested and recalibrated in the winter of 2015. The City's "demand" meter located immediately downstream of the City's reservoir was tested and recalibrated in 2012. The City is committed to ensuring the accuracy of these master meters and will begin testing these meters at least once every five years starting in 2021 and recalibrate, repair, or replace these meters as necessary.

The City's ongoing retrofit of meters with Advanced Meter Infrastructure (AMI), which will enable the City to more quickly identify failed meters than its current AMR system. Meters fitted with AMI provide nearly instantaneous consumption therefore failed meters can be identified quickly. This retrofit program is detailed in Section 3.3.7.

**Five-Year Benchmark** – Starting in 2021, Cannon Beach will test each of its master meters at least once every five years starting in 2020 and test customers’ meters three inches and larger every five years. Meters out of manufacturers’ specifications will be recalibrated, repaired, or replaced.

### 3.3.4 Water Rate Structure

Cannon Beach’s rate structure is based, in part, on the quantity of water metered at each service connection. In addition to the City’s basic water charge, the City charges \$24.20 for the first 400 cubic feet and \$6.05 per hundred cubic feet consumed thereafter per billing cycle for the 2020/2021 fiscal year. The City reads customers’ meters and bills customers monthly. This beneficial practice provides customers feedback on water consumption quickly and enables customers to adjust consumption practices accordingly.

**Five-Year Benchmark:** The City will continue to bill customers based, in part, on the volume of water consumed.

### 3.3.5 Water Loss Analysis

This rule requires that a municipal water provider must compare their water loss estimates as calculated through their annual water audit to an established water loss threshold of 10 percent. If water loss exceeds this 10 percent threshold, the provider must provide a description and analysis in the provider’s WMCP identifying potential factors for the loss and selected actions for remedy within two years of the approval of a WMCP. The City’s water audit revealed water loss in 2019 was 12.2 percent, therefore this rule applies to the City.

The rule further states that if the provider’s actions do not result in the reduction of water losses to 10 percent or less within five years of approval of the WMCP, the water supplier shall develop and implement a regularly scheduled and systematic program to detect and repair leaks in the transmission and distribution system using methods and technology appropriate to the size and capabilities of the provider or a line replacement program detailing the size and length of pipe to be replaced each year; or, develop and implement a water loss control program consistent with American Water Works Association’s standards.

The City has engaged in an aggressive, multi-year campaign to reduce its water losses. This campaign included replacement of all customers’ meters as discussed in Section 3.4.3, a system-wide distribution system line leak detection and repair and replacement program, and leak detection assistance for customers. As a result, the City’s water loss estimates have decline substantially the since 2017.

The City conducted periodic distribution system line leak detection followed up by line leak repairs or replacement of leaking lines. Three full system leak inspections were performed in 2007, 2017, and 2019 by an outside contractor. Following these three inspections, the City promptly prioritized and repaired many of the identified leaks or replaced segments of lines where leaks were found.<sup>2</sup> The leak repair or line replacement projects borne out of the City’s 2007 leak detection effort did not result in an observable improvement in water loss estimates, according to the City’s 2010 WMCP. However, the City

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<sup>2</sup> The City has found that it is not cost-effective to repair every leak detected--small leaks that insignificantly contribute to water loss are not repaired.

attributes decreases in water losses for the years 2018 and 2019 primarily to the City's 2017 and 2019 leak repair projects.

The City's latest round of distribution system leak detection and associated line repairs were completed in the spring of 2019. These repair, combined with on-going implementation of other measures<sup>3</sup>, the City anticipates that its 2020 water audit will show losses below 2019 levels (12.2 percent).

However, if water losses continue to exceed 10 percent two years following issuance of a final order by OWRD approving this WMCP, the City will meet the rule requirements by providing OWRD a description and analysis identifying potential factors for the loss and select actions for remedy.

**Five-Year Benchmark:** The City will assess the impacts of its water line leak repair program and other on-going measures on water loss over the next two years. If water loss continues to exceed 10 percent, the City will provide OWRD a description and analysis identifying potential factors for the loss and select actions for remedy.

### 3.3.6 Public Education

This rule requires Cannon Beach to establish a public education program to encourage efficient indoor and outdoor water use that includes regular communication of the supplier's water conservation activities and schedule to customers.

The City's education program includes providing brochures on the topic of water conservation at City Hall and includes a water conservation web page on its website that provides information about water-wise indoor and outdoor water use. The City's water utility billing webpage also describes how customers can check for leaks, common leak locations, and provides examples of potential volumes of water wasted due to leaking fixtures. In addition to continuing these measures, the City will also expand its public education efforts in three ways, as described below.

1. As the City installs AMI metering technology across the system in 2020 and 2021 as described in Section 3.3.7, the City will perform a service area-wide outreach campaign to educate customers about the capabilities and benefits of AMI technology. As part of this campaign, the City will incorporate information about the importance of efficient use of water and ways that customers can reduce outdoor and indoor demand and use the EyeOnWater app to educate themselves on their water use.
2. If the City changes water rates in the next fiscal year as currently anticipated, Cannon Beach will engage in a campaign to educate its customers about the effects of these changes. Like the AMI outreach campaign, the water rates outreach campaign also will include information about water conservation and methods to reduce inefficient use of water.
3. The City intends to include a water conservation message on written materials associated with the City's backflow device testing reminder letters.

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<sup>3</sup> Other measures include the City's ongoing conservation measures in addition to its campaign to sign customers up for the City's EyeOnWater app, as described in Section 3.4.7, which can help customers identify leaks at their site which receives water service (i.e. residence, business, etc.) nearly instantaneously.

**Five-Year Benchmark:** The City will continue to provide water conservation brochures at City Hall and will keep its water conservation and utility billing webpage up-to-date to reflect the needs of its customers. In addition, the City will include water conservation messaging in upcoming outreach campaigns associated with the rollout of its AMI meter technology and potential future rate increases and will begin to include conservation messaging on written communication with customers about backflow testing requirements.

### 3.3.7 Additional Conservation Measures

#### ***OAR 690-086-0150 (3) and (6)***

OAR 690-086-0150(6) requires municipal water suppliers that either: (a) serve a population greater than 1,000 and propose to expand or initiate diversion of water under an extended permit for which resource issues have been identified, or (b) serve a population greater than 7,500, to provide a description of the specific activities, along with a five-year schedule to implement several additional conservation measures. The City serves less than 7,500 persons and the City is not proposing to expand the diversion of water under an existing permit, therefore, this rule does not apply.

Though the City is not required to identify additional conservation measures, the City describes three measures that are part of its conservation program that are in addition to measures previously discussed. These measures include a meter retrofit program, leak checks for customers conducted by the City, and the provision of dye tabs to customers to detect toilet leaks.

In 2019, the City piloted a program to retrofit 70 customers' meters with AMI technology. Following the pilot program, the City was awarded a loan through the Oregon Health State Authority to install AMI technologies on all customers' meters. The City anticipates retrofitting all customers' meters by July 2021. Of the many benefits of AMI technology, AMI provides hourly reads of consumption by utility billing water account, which allows for the identification of potential leaks, meter failures, and unusual consumption at customers' locations. With hourly information, the City can observe use at unusual times, such as ongoing use at night, to identify leaks. The City can also identify little or no consumption at times during which use is expected, such as early evenings, suggesting the need to test or replace a potentially failing meter. This consumption information is available to customers as well for those who have meters fitted with AMI technology through the use of a free application (app) called EyeOnWater. Once installed on a customer's electronic device (phone, computer, etc.), a customer can self-identify possible leaks, alert the City to a potential meters' failure, and observe unintentional increases in water use related to inefficient water use practices.

Another practice employed by the City that helps reduce water loss is performing leak checks. When the City's utility bill system flags accounts with unusually high water consumption, the City adds these flagged accounts to a leak list. The City will either call or visit customers on this list to discuss the possibility of a leak on the customers' side of the meter or failing meter. If a leak is suspected, and not a meter incorrectly registering use, the City suggests ways these customers can detect and fix leaks. The City intends to continue this practice in the future as a service to its customers.

Leaks on the customers' sides of meters may be too small to warrant investigation by the City, so the City offers customers dye tabs at City Hall for customers to use to detect toilet leaks and instructions to repair leaks in an available brochure and other means.

**Exhibit 3-2. 2020 Conservation Benchmarks**

Conservation Measures	2020 Benchmarks
Annual water audit	Cannon Beach will continue to perform annual water audits and will begin to include volumes associated with “dead end line” flushing, in addition to continuing to include other unmetered and authorized uses currently incorporated within the audit.
	The City will investigate an opportunity to install irrigation system rain sensors at City parks and install these at one or more parks over the next three years where installations are feasible and cost-effective.
	The City will upgrade to more water efficient fixtures in public restrooms when these restrooms are remodeled.
System-wide metering	The City will continue to require installation of meters on all water service connections.
Meter testing and maintenance program	Starting in 2021, Cannon Beach will test each of its master meters at least once every five years and test customers’ meters three inches and larger every five years. Meters out of manufacturers’ specifications will be recalibrated, repaired, or replaced.
	Starting in 2021, Cannon Beach will test customers’ meters three inches and larger every five years. Meters out of manufacturers’ specifications will be recalibrated, repaired, or replaced.
Rate structure	The City will continue to bill customers based, in part, on the volume of water consumed.
Water loss analysis	The City will assess the impacts of its water line leak repair program and other on-going measures on water loss over the next two years. If water loss continues to exceed 10 percent, the City will provide OWRD a description and analysis identifying potential factors for the loss and select actions for remedy.
Public education	The City will continue to provide water conservation brochures at City Hall and will keep its water conservation and utility billing webpage up-to-date to reflect the needs of its customers.
	The City will include water conservation messaging in upcoming outreach campaigns associated with the roll-out of its AMI meter technology and potential future rate increases
	The City will begin to include conservation messaging on written communication with customers about backflow testing requirements.

## 4. Water Curtailment Element

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*This section satisfies the requirements of OAR 690-086-0160. This rule requires a description of past supply deficiencies and current capacity limitation. It also requires inclusion of stages of alert and the associated triggers and curtailment actions for each stage.*

### 4.1 Introduction

Curtailment planning is the development of proactive measures to reduce demand during supply shortages as the result of unanticipated events outside of the control of Cannon Beach, such as prolonged drought or partial or full system failure. Cannon Beach developed this curtailment plan by reflecting on the most likely scenarios that may reduce the City's ability to meet system demands and cause water shortages. These scenarios include shortages due to weather conditions, mechanical or structural infrastructure failure, contamination, or any combination thereof. Cannon Beach's planned responses to these types of events are described in Section 4.4.

### 4.2 Assessment of Supply Delivery

#### **OAR 690-086-0160(1)**

In Section 2, the City described its supply as adequate and reliable. The City's infrastructure is capable of delivering this water supply to its customers. The City's current maximum production capacity is 1,150 gallons per minute (1.66 mgd) according to the City's 2017 WMP, taking into account the production capacity of the WTP of up to 500 gpm and the estimated yield capacities of the springs at a combined rate of 650 gpm. In comparison, the recent historical maximum daily demand peaked at 0.81 mgd (in 2017), representing approximately 50 percent of maximum system capacity.

While the City has been capable of comfortably meeting system demands historically, the City evaluated its capacity to continue to deliver supply to its customers if one or more of the three events identified by the City occur. While the City has not experienced any supply deficiencies over the last ten years, drought-like conditions significantly reduced flows at the springs twice in this time period, however the City was able to rely on Ecola Creek for its main source of supply during these events. Stream gage measurements at Ecola Creek in the 1970s and 1980s showed that the Creek's minimum summer flow rates exceed the rate of historical maximum City demands, as discussed in Section 2.

The City is capable of meeting demand during drought-like conditions, but does not rule out the possibility that unusually low flows in Ecola Creek may inhibit the City's ability to meet demand. Moreover, if source contamination should occur in Ecola Creek simultaneous to drought-like conditions or if production capacity is reduced or ceases due to a major mechanical or structural infrastructure failure, the City must rely on water stored in the City's distribution system reservoirs temporarily to make up a deficit and meet demand. The City typically keeps its reservoirs nearly full, allowing for approximately four to five days of storage based on historical annual ADD.<sup>4</sup> Using stored water to meet

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<sup>4</sup> The City's distribution system reservoirs are capable of storing up to 2.63 MG.



peak summer demands shortens the duration in which the City can meet system demands. One consequence of reducing storage volumes is that the City may be at risk for meeting other crisis water demands (e.g., a significant fire requiring large quantities of water). Moreover, a complete supply shortage that lasts longer than the supply stored in the City's reservoirs may require the City to search for additional sources of supply to meet minimum public and health and safety needs. An additional source of supply may be obtained from water trucked into the City from outside sources. If the City is not able to meet system demands due to these (or other) unforeseen scenarios, anticipates not being able to meet demands, or must rely solely on stored water to meet demands, the City will implement this water curtailment plan.

## 4.3 Curtailment Stages and Initiating Conditions

### *OAR 690-086-0160(2) and (3)*

This curtailment plan provides strategies to water management staff that will create a reduction in daily demand for water. These strategies include implementing voluntary and mandatory water conservation measures applicable to the City's customers and the City. These strategies are described under four curtailment stages. Exhibit 4-1 presents these four stages, as well as the initiating conditions (i.e., triggers). One or more of the initiating conditions must be met for the associated stage to be enacted. At each stage, restrictions imposed at the previous level(s) remain in force unless otherwise noted. The curtailment stages are listed in Exhibit 4-1 in order of increasing severity.

#### **Exhibit 4-1. Curtailment Stages of Alert and Initiating Conditions**

<b>Curtailment Stages</b>	<b>Initiating Conditions<sup>1</sup></b>
<b>Stage 1: Early Warning</b>	<ul style="list-style-type: none"> <li>100 percent of demand is met, but without excess supply available</li> <li>Drought conditions are anticipated, potentially preventing the City from meeting 100 percent of demand</li> <li>Expectation of potential supply deficiencies (e.g. planned major infrastructure repair)</li> </ul>
<b>Stage 2: Supply Shortage</b>	<ul style="list-style-type: none"> <li>The City is experiencing a supply deficiency and reservoir storage falls to 90 percent of capacity (2.4 MG).</li> </ul>
<b>Stage 3: Severe Shortage</b>	<ul style="list-style-type: none"> <li>The City is experiencing a supply deficiency and reservoir storage falls to 85 percent of capacity (2.2 MG).</li> </ul>
<b>Stage 4: Critical Shortage</b>	<ul style="list-style-type: none"> <li>The City is experiencing a supply deficiency and reservoir storage falls to 75 percent of capacity (2.0 MG).</li> </ul>

<sup>1</sup>A supply deficiency occurs when the City's sources of supply do not fully meet demand.

Documenting the City's response to every type of curtailment event is not feasible given the myriad of scenarios and wide differences in potential severity of those scenarios, therefore this curtailment plan is designed to allow for modifications to the City's responses. Therefore, the City could initiate and implement these steps either progressively or directly implement a later stage. For example, supply contamination may require the City to enact Stage 4 and bypass earlier stages. At any stage, additional restrictions can be imposed beyond those described herein if they are deemed necessary or restrictions



can be removed or modified as needed by the City. Moreover, the initiating conditions may be changed to reflect the water shortage event at hand.

The decision to implement curtailment will consider the knowledge and judgment of staff members familiar with the water system. When the need to implement curtailment arises, the Water Operations Supervisor, Water Maintenance Supervisor, Utilities Division Manager and on duty water operations staff (the Water Utilities Management team) will meet to assess the situation. This team may evaluate the extent of system damage or contamination, duration of infrastructure repairs, fire hazards, dry weather forecasts, water source flow rates, and other factors. If the Water Utilities Management team determines that a potential water shortage may exist or does exist, the team will consult with the Public Works Director, who will determine a course of action under advisement of the team.

The team will consider the following guidelines when implementing the City's curtailment plan:

- Maximize public health and safety
- Meet Safe Drinking Water Act standards
- Minimize disruption to the public
- Protect and enhance the public's trust in the City
- Be consistent in phasing in curtailment measures as water shortage continues
- Apply measures in a fair and equitable manner in the best interest of the public
- Maximize coordination of responses with other departments within the City
- Minimize impact on the environment
- Limit liability

#### **4.3.1 Stage 1 - Early Warning for a Potential Water Supply Shortage**

The Stage 1 warning is reached when available supply is just meeting the daily demand, when there is expectation of a potential supply deficiency, or when 100% capacity is met but stream flow levels are dropping and there are predictions of unusually long-term hot weather. Stage 1 curtailment measures are voluntary.

- Reduce or eliminate City non-essential uses of water:
  - Hydrant and water-line flushing,
  - water usage in conjunction with new water main installation,
  - street sweeping, and
  - City Parks and Recreation Department shall irrigate at maximum efficiency.
- Limit fire department training exercises to those that do not use water.
- Request that customers voluntarily:

- reduce or eliminate nonessential water use (see Stage 2 for definition of “non-essential”) and
- limit outdoor watering to the early morning or late evening.

#### **4.3.2 Stage 2 - Water Supply Shortage**

A Stage 2 water shortage is reached when available supply is not meeting daily demand and reservoir storage falls to 90% capacity (2.4 MG). The Public Works Director will initiate the following mandatory restrictions:

- Limit Parks & Recreation Department nonessential water use, and irrigate only in off-peak hours.
- Use of City-supplied water to clean, fill or maintain levels in decorative streams, ponds or fountains unless it has a recirculating water system.
- Use of City-supplied water to fill swimming, wading or other pools with a capacity in excess of 100 gallons. Water may be added to swimming pools to replace volume lost due to evaporation and normal loss due to usage.
- Limit hydrant use and water use due to water main installation to emergencies only.
- Limit fire department training exercises to those that do not use water.
- Limit all non-essential outdoor water use to the hours between 8:00 pm and 8:00 am. The following practices are deemed nonessential:
  - Watering or irrigating of lawns, grass or turf except for:
    - New installations after June 1
    - Athletic fields frequently used for organized play
    - Park and recreation areas of a particular significance and value to the community as approved by the City Manager.
  - Use of City-supplied water to wash sidewalks, streets, driveways, walkways, parking lots, or other impervious surfaces except where necessary for public health or safety.
  - Use of City-supplied water to wash vehicles (including boats and watercraft) except at facilities equipped with water recirculation equipment or where necessary for public health or safety (e.g., garbage trucks or food transport) or as required bylaw.

#### **4.3.3 Stage 3 - Severe Water Supply Shortage**

A Stage 3 water shortage is reached when available supply is not meeting daily demand and reservoir storage falls to 85% capacity (2.2 MG). The Public Works Director will initiate the following mandatory restrictions in addition to those enacted in Stage 2:

- Continuation of Stage 2 restrictions, unless modified below.
- Use of City-supplied water to wash down sidewalks, streets, driveways, walkways, parking lots or other impervious surfaced areas except where necessary for public health or safety.
- Use of City-supplied water to wash vehicles (including boats and watercraft) except at facilities equipped with water recirculation equipment. Washing of vehicles for public health and safety

purposes (e.g., garbage trucks or food transport) is allowed as required by law.

- Use of City-supplied water to fill or refill swimming, wading or other pools with a capacity in excess of 100 gallons.

#### **4.3.4 Stage 4 - Critical Water Shortage**

A Stage 4 water shortage is reached when available supply is not meeting daily demand and reservoir storage falls to 75% capacity (2.0 MG) or lower. Because a water shortage of this severity threatens the ability of the City to deliver essential water supplies to its customers and provide adequate water storage and pressure for fire suppression, Stage 4 restrictions are mandatory.

The Public Works Director will initiate the following curtailment restrictions in addition to those enacted in Stage 3.

- All outdoor nonessential water use shall be prohibited except where necessary for public health or safety.
- Customers who receive water service from the City but who are located outside the City limits may have their water service disconnected temporarily.
- The Fire Department shall modify operations as necessary to maintain stored water levels and system water pressure for as long as possible. Public Works shall work closely with the Fire Department to alert them of areas where there may be low pressures and/or supply.
- In the event that a service level or other area of the city is without water, potable water shall be made available at appropriate locations within the city limits. Water shall be trucked to these sites and dispensed free of charge to City water customers.

The City may implement its Emergency Management Plan in response a critical water shortage. This Plan provides additional details regarding the logistics of response and should be considered a companion document to this curtailment plan.

## **4.4 Authority and Enforcement**

Cannon Beach's City Manager may declare a state of emergency and will authorize the Public Works Director to implement this curtailment plan. The Public Works Director has the authority to decrease or increase the curtailment stages or terminate curtailment activities and enforce curtailment requirements. The Water Emergency shall be in effect until such time as the Public Works Director notifies the City Manager when, in his/her opinion, the water shortage is over and an emergency situation no longer exists and this information is communicated to its customers.

## **4.5 Notifications of Curtailment**

Cannon Beach has several communication channels to relay important information about a supply shortage. Information would include the voluntary or mandatory measures associated with the stages of alert and the status of the City's supply shortage. These communication channels include, but are not limited to, the local news media, the City's website, water utility bills, direct mailers, and signs. The City may perform direct outreach to large customers and neighborhood associations. In addition to these

outlets, the City will make conservation information available to its customers by providing written materials at the Post Office, Chamber of Commerce, Public Library, Utility Billing and other City offices. Notices and other forms of communication may include a description of the current water situation, the reason for the requested conservation measures, and, during stage 1, a warning that mandatory restrictions will be implemented if voluntary measures are not sufficient to achieve water use reduction goals.

On an ongoing basis during curtailment, the Public Works Director will notify the City Manager and City Council of the shortage, and submit a report of what measures are being implemented.

## **4.6 Drought Declaration**

If a declaration of a severe drought in Clatsop County is declared by the Governor per ORS 536.720, the Oregon Water Resources Commission may order political subdivisions within any drainage basin or subbasin to implement a water conservation or curtailment plan or both, approved under ORS 536.780. The conservation and curtailment elements of this WMCP meet these requirements. If the City falls within a severe drought area declared by the Governor, such as Clatsop County, the City will consider whether curtailment measures are needed to meet system demands. Regardless of whether curtailment is needed, the City will continue to encourage customers to conserve water.

## 5. Municipal Water Supply Element

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*This section satisfies the requirements of OAR 690-086-0170.*

*This rule requires descriptions of the providers current and future service area and population projections, demand projections for 10 and 20 years, and the schedule for when the provider expects to fully exercise their water rights. The rule also requires comparison of the provider's projected water needs and the available sources of supply, an analysis of alternative sources of water, and a description of required mitigation actions.*

### 5.1 Delineation of Service Area

#### **OAR 690-086-0170(1)**

Cannon Beach's current service area is described in Section 2 and delineated in Exhibit 2-2. Within the 20-year planning period, Cannon Beach projects a low rate of growth (see next section for population projections) and this growth is expected to be absorbed within the existing service area in the forms of infill (development of vacant parcels) and redevelopment (the conversion of existing uses into new uses) within the current service area. Because forecasted growth will occur as infill and redevelopment within the existing service area, the City does not anticipate that its service area will expand beyond its current configuration during the planning period.

The City is aware of one possible development that would be located outside of the City's current service area. The City owns a 58 acre parcel called South Wind located in the southeast corner of the city (within City limits), but outside of the UGB. It is the largest undeveloped parcel outside of the City's current service area. The City has considered developing South Wind primarily to house essential or critical services capable of providing emergency response in the event of a tsunami or other natural disasters. If this parcel was developed, the City would provide water service area into this area, thereby expand its service area, however the City only is in the pre-planning project stage for this project and has no plans to develop the site at this time.

### 5.2 Population Projections

#### **OAR 690-086-0170(1)**

The forecasted population within the City's UGB in 2030 and 2040 is presented in Exhibit 5-1. These forecasted populations for the City's UGB were published by Portland State University's Population Research Center (PRC) in 2020. These populations were adjusted by the City to remove two residences known by the City to be outside of the City's service area, but inside the UGB. The estimated population of these two residences is 5 persons (assuming 2.5 persons per residence). Based on this adjustment of PSU's population forecasts, Cannon Beach's service area population is projected to increase from 1,647 in 2020 to 1,709 by 2040.

### Exhibit 5-1. Projected Population, 2030 and 2040

Year	Population <sup>1</sup>
<b>2020</b>	1,647
<b>2030</b>	1,693
<b>2040</b>	1,709

<sup>1</sup> Estimates published by PSU reduced by 5 persons to account for two residences outside of the City's service area, but within the UGB.

## 5.3 Demand Forecast

### OAR 690-086-0170(3)

The demand forecast for this WMCP was performed by multiplying the City's forecasted population in 2030 and 2040 by an MDD per capita factor. The City set the MDD per capita factor at 475.1 gpcd, which is the highest per capita MDD, observed from 2015 through 2019. This MDD occurred in 2017 as shown in Figure 5-2.<sup>5</sup>

### Exhibit 5-2. Per Capita MDD, 2015 - 2019

	Population Estimate <sup>1</sup>	MDD <sup>2</sup> (mgd)	MDD Per Capita (mgd)
<b>2015</b>	1,705	0.78	457.5
<b>2016</b>	1,710	0.74	432.7
<b>2017</b>	1,705	<b>0.81</b>	<b>475.1</b>
<b>2018</b>	1,710	0.69	403.5
<b>2019</b>	1,730	0.67	387.3

<sup>1</sup> Per annual estimates published by PSU.

<sup>2</sup> Data from Figure 2-3.

The use of the highest MDD from this period in the demand forecast calculation provides a conservative estimate of future demand, though greater MDDs have been observed by the City in the past based on a review of data from the City's 2010 WMCP.<sup>6</sup> The results of the City's demand forecast is presented in Exhibit 5-3 and shows MDD of 0.80 mgd (1.24 cfs) by 2030 and 0.81 mgd (1.25 cfs) by 2040.

<sup>5</sup> Population estimated by PSU show a greater population in 2019 than 2020 for Cannon Beach. PSU adjusted the 2020 estimates downward to reflect new information.

<sup>6</sup> The City's 2010 WMCP identified the highest MDD observed between 2000 and 2005 measured 0.98 mgd in 2004, which is approximately 589 gpcd. The combination of conservation measures implemented by the City along with changes in federal efficiency standards for water using fixtures since the mid-2000s are primarily the causes of a lower MDD per capita value of 475 gpcd in 2017 compared to 15 years ago.

**Exhibit 5-3. Demand Forecast, 2030 and 2040**

Year	Population	MDD (mgd)	MDD (cfs)
2030	1,693	0.80	1.24
2040	1,709	0.81	1.25

## 5.4 Schedule to Exercise Permits and Comparison of Projected Need to Available Sources

### ***OAR 690-086-0170(2) and (4)***

As shown in the previous section, the City projects that its maximum day demand will reach 1.25 cfs by 2040. Currently, the City's sources of supply includes three springs and Ecola Creek. Surface water Certificate 1988 authorizes diversion of up to 1.0 cfs from Haskell spring, Certificate 11616 authorizes diversion of up to 0.6 cfs from Howell spring, Certificate 19540 authorizes diversion of up to 1.0 cfs from Main spring, and Certificate 94806 authorizes diversion of up to 1.5 cfs from Ecola Creek. Combined, these certificates authorize the City to divert up to 4.1 cfs year around. The City will meet its forecasted system demand of 1.25 cfs using these four sources of supply through the 20-year planning period. The City does not hold any water right permits.

## 5.5 Alternative Sources

### ***OAR 690-086-170(5)***

OAR 690-086-0170(5) requires an analysis of alternative sources of water if any expansion or initial diversion of water allocated under existing permits is necessary to meet the City's demand forecast and redundancy needs. The City does not hold any permits. Consequently, this rule does not apply.

## 5.6 Quantification of Maximum Rate and Monthly Volume

### ***OAR 690-086-0170(6)***

OAR 690-086-0170(6) requires a quantification of the maximum rate of withdrawal and maximum monthly use if any expansion or initial diversion of water allocated under an existing permit is necessary to meet demands in the 20-year planning horizon. The City does not hold any permits. Consequently, this rule does not apply.

## 5.7 Mitigation Actions under State and Federal Law

### ***OAR 690-086-0170(7)***

Under OAR 690-086-0170(7), if mitigation is required for expansion or initial diversion of water under an existing permit, the water supplier is to describe mitigation actions it is taking to comply with legal requirements of the Endangered Species Act, Clean Water Act, and other applicable state or federal environmental regulation. The City does not hold any permits. Consequently, this rule does not apply.

## 5.8 New Water Rights

### ***OAR 690-086-0170(8)***

Under OAR 690-086-0170(8), an analysis of alternative sources of additional water is required if acquisition of new water rights will be necessary within the next 20 years to meet the projected water demands. The City does not intend to acquire new water rights within the next 20 years. Consequently, this rule does not apply.



## Appendix A. Letters to Affected Local Governments

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July 28, 2020

Jeff Adams  
Community Development Director  
City of Cannon Beach  
163 E Gower St  
PO Box 368  
Cannon Beach, OR 97110

Subject: Water Management and Conservation Plan for the City of Cannon Beach

Dear Mr. Adams:

The City of Cannon Beach has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department (OWRD). Your review is requested.

Under these rules, a water supplier is required to make its draft plan available for review by each affected local government and seek comments relating to consistency with the local governments' comprehensive land use plans. Please find enclosed an electronic copy of Cannon Beach's Draft WMCP.

Please provide comments to me by no later than August 31, 2020. If the plan is consistent with your agency's Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comment to me at the address on this letterhead or e-mail them to me directly at: [asussman@gsiws.com](mailto:asussman@gsiws.com).

If you have any questions, please feel free to contact me. My telephone number is 541-257-9001. Thank you for your interest.

Sincerely,

A handwritten signature in black ink, appearing to read "Adam Sussman", written over a horizontal line.

Adam Sussman  
Principal Water Resources Consultant

Enclosure



July 28, 2020

Gail Henrikson, Director  
Land Use Planning Division  
Community Development Department  
Clatsop County  
800 Exchange St, Room 100  
Astoria, OR 97103

Subject: Water Management and Conservation Plan for the City of Cannon Beach

Dear Ms. Henrikson:

The City of Cannon Beach has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department (OWRD). Your review is requested.

Under these rules, a water supplier is required to make its draft plan available for review by each affected local government and seek comments relating to consistency with the local governments' comprehensive land use plans. Please find enclosed an electronic copy of Cannon Beach's Draft WMCP.

Please provide comments to me by no later than August 31, 2020. If the plan is consistent with your agency's Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comment to me at the address on this letterhead or e-mail them to me directly at: [asussman@gsiws.com](mailto:asussman@gsiws.com).

If you have any questions, please feel free to contact me. My telephone number is 541-257-9001. Thank you for your interest.

Sincerely,

A handwritten signature in black ink, appearing to read "Adam Sussman", written over a horizontal line.

Adam Sussman  
Principal Water Resources Consultant

Enclosure