US Army Corps of Engineers ®
Portland District

DRAFT ENVIRONMENTAL ASSESSMENT

COAST FORK WILLAMETTE RIVER, OREGON SURPLUS WATER LETTER REPORT

Cottage Grove reservoir

The environmental review, consultation, and other actions required in accordance with applicable Federal laws for this project is being, or has been, carried-out by the U.S. Army Corps of Engineers, Portland District, under its assumption of responsibility pursuant to 33 C.F.R. Part 230.

5 May 2014

Executive Summary

This draft Environmental Assessment (EA) has been prepared by the U.S. Army Corps of Engineers, Portland District (Corps) and is available for public review in compliance with the applicable laws and regulations, including the National Environmental Policy Act (NEPA). The purpose of this draft EA is to consider the environmental impacts of supplying the City of Creswell (City), Oregon with 437 acre-feet of surplus water from the Coast Fork Willamette River to meet its municipal and industrial water needs. The City would withdraw water between June and September for the purpose of meeting increased water needs during the summer season.

Currently, the City obtains water from groundwater wells and natural flows in the Coast Fork Willamette River. Approximately 61 percent of the City's total water rights are sourced from natural flows in the Coast Fork Willamette River (2,243 gallons per minute [gpm]) and the remaining 39 percent (1,418 gpm) is supplied via groundwater. In total, the City's existing water rights provide 3,661 gpm for domestic purposes (see Table 1). However, while the City has water rights to meet current needs, the volume of water regularly available between groundwater and surface water sources is substantially less than the City's needs.

The Coast Fork Willamette River, is partially fed through the release of water from the Corps' Dorena and Cottage Grove reservoirs. In effect, the proposed action would result in a difference of 2 cfs less water in the river downstream from the City during the summer months. There would be *no* operational change in how the dams are managed or operated because the precision of the spillway gates does not allow for the release of exactly 1.8 cfs additional water.

The Corps has determined that surplus water is available for municipal and industrial water use, and a surplus water agreement between the City and the Corps would provide the City with a cost-effective source of water to meet their immediate needs. The agreement would be valid for 5 years, with a one-time-only option to extend the agreement for an additional 5 years (for a total of 10 years). The City would be authorized to withdraw water from the river downstream of the dams using existing infrastructure and no construction or ground-disturbing activities would occur. The total cost charged to the City for the use of stored surplus water would amount to $56,782 annually (almost $130 per acre-foot for), amounting to a total cost for surplus water of $283,910 over 5 years.

At the end of the public comment period, the Corps will consider all comments received or post marked by the expiration date of this public notice and make a determination of significance of impacts resulting from the proposed action.

TABLE OF CONTENTS

1. Introduction 1
1.1. Authority and Funding 1
1.2. Project History and Background 2
1.3. Action Area 2
2. Purpose and Need 4
3. Proposed Action and Alternatives 6
3.1. No Action Alternative 6
3.2. Proposed Action - Purchase Surplus Water from Corps 6
3.3. Alternatives Considered but Dismissed from Further Evaluation 6
3.3.1. New Surface Water Right 6
3.3.2. New Groundwater Right 7
3.3.3. Purchase Water from Another Municipal Entity 7
3.3.4. Water Conservation 7
3.4. Comparison of Alternatives 8
4. Affected Environment and Environmental Consequences 9
4.1. Water Resources 10
4.1.1. Willamette Valley Project 10
4.1.2. Hydrology and Hydraulics 10
4.2. Riparian Habitats and Vegetation 12
4.2.1. Environmental Consequences 13
4.3. Wetlands and Aquatic Habitats 13
4.3.1. Environmental Consequences 14
4.4. Water Quality 14
4.4.1. Environmental Consequences 15
4.5. Fish and Wildlife 15
4.5.1. Threatened and Endangered Species 17
4.5.2. Environmental Consequences 19
4.6. Air Quality and Noise Pollution 20
4.6.1. Environmental Consequences 20
4.7. Cultural Resources 21

4.7.1. Environmental Consequences 22
4.8. Recreation 22
4.8.1. Environmental Consequences 22
4.9. Socio-Economics 23
4.9.1. Environmental Consequences 23
4.10. Hydropower 24
4.10.1. Environmental Consequences 24
4.11. Irrigation 24
4.11.1. Environmental Consequences 25
4.12. Navigation 25
4.12.1. Environmental Consequences 25
4.13. Municipal and Industrial Water Supply and Demand 26
4.13.1. Environmental Consequences 26
4.14. Climate Change 27
4.14.1. Environmental Consequences 27
5. Cumulative Effects 28
5.1. Past Actions 28
5.2. Present Actions 29
5.3. Reasonably Foreseeable Future Actions 29
5.4. Cumulative Effects Summary 30
6. Status of Environmental Compliance 37
6.1. National Environmental Policy Act (NEPA) of 1969 37
6.2. Endangered Species Act (ESA) of 1973 37
6.3. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, 6 November 2000 37
6.4. Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976 38
6.5. National Historic Preservation Act 38
6.6. Other Laws and Executive Orders 39
7. Coordination and Distribution 40
8. References and Literature Cited 42

LIST OF FIGURES

Figure 1: Coast Fork Willamette River Watershed, Hydrologic Unit Code: 17090002 3

LIST OF TABLES

Table 1: City of Creswell Water Supply 4
Table 2: Conversion of Units and Volume Needed 5
Table 3: Comparison of alternatives 8
Table 4: Species of concern (not ESA-listed) in Coast Fork Willamette River watershed 16
Table 5: NMFS ESA-listed Species 18
Table 6: USFWS ESA-listed Species 19
Table 7: Stored water currently contracted for irrigation using Dorena or Cottage Grove reservoirs 25
Table 8: Cumulative effects to resources 31

LIST OF APPENDICES

Appendix A: City of Creswell's request letter

ABBREVIATIONS AND ACRONYMS

BiOp	Biological Opinion
°C	degrees Celsius
Cfs	cubic feet per second
City	City of Creswell, Oregon
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
DEQ	Oregon Department of Environmental Quality
DLCD	Oregon Department of Lands and Conservation Development
DO	dissolved oxygen
EA	Environmental Assessment
ER	Engineering Regulation
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EWEB	Eugene Water and Electric Board
Gpm	gallons per minute
Gpd	gallons per day
HUC	Hydrologic Unit Code
M&I	Municipal and Industrial (water)
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service, a division of the National Oceanic and Atmospheric Administration
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OAR	Oregon Administrative Rule
ODFW	Oregon Department of Fish and Wildlife
ORS	Oregon Revised Statutes
OWRD	Oregon Water Resources Department
pH	potential hydrogen
Reclamation	U.S. Bureau of Reclamation
RM	river mile
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1. INTRODUCTION

The U.S. Army Corps of Engineers (Corps), Portland District is proposing to supply the City of Creswell (City), Oregon with surplus water for municipal and industrial (M&I) use from Corps reservoirs in the Coast Fork Willamette sub-basin. This Environmental Assessment (EA) evaluates the environmental impacts of this proposal. This document has been prepared by the U.S. Army Corps of Engineers, Portland District (Corps) in compliance with the National Environmental Policy Act (NEPA).

In a letter dated 30 July 2013, the City requested withdrawing an addition 437 acre-feet of water annually from the Coast Fork Willamette River to support its growing M&I water supply needs (see Appendix A). In response to this request, the Corps completed a letter report to determine if there is a sufficient quantity of water in the Coast Fork Willamette River sub-basin, specifically in the Corps-owned and operated Dorena and Cottage Grove reservoirs, to support the City's request. The results of study were summarized in the April 2014 *Coast Fork Willamette River, Oregon Surplus Water Letter Report* (Corps 2014). As described in the report, the Corps determined there are sufficient quantities of surplus water in the reservoirs, and further, that the most efficient means to meet the City's immediate needs is to use stored water from the Dorena and Cottage Grove conservation pools.

Following the analysis of environmental effects, and in full consideration of any issues or comments identified by the public, State and Federal agencies and Tribes, the Corps will determine whether or not to issue a Surplus Water Agreement with the City.

1.1. Authority and Funding

The Corps is authorized to sell surplus water for M&I purposes, as granted to the U.S. Army Corps of Engineers by Section 6 of the Flood Control Act of 1944 (Public Law 78-534), as amended. Under this authority, the Secretary of the Army is authorized to make agreements to sell surplus water to states, municipalities, private concerns, or individuals, at such prices and on such terms as deemed reasonable. Engineering Regulation (ER) 1105-2-100, paragraph E-57(b)(2) classifies surplus water as:

> *1) water stored in a Department of the Army reservoir which is not required because the authorized need for the water never developed or the need is reduced by changes which have occurred since authorization or construction or 2) water that would be more beneficially used as municipal and industrial water than for the authorized purpose and which, when withdrawn, would not significantly affect authorized purposes over some specified time period.*

The Corps' authorization, construction, and management of the Dorena and Cottage Grove reservoirs is governed in part by the Flood Control Acts of 1938 [Public Law 75-761], 1950 [Public Law 81-5196], and 1960 [Public Law 86-645]. These Acts established and authorized a basin-wide flood control and multi-purpose water development and management plan for the Columbia River Basin, which encompasses the Willamette Basin (inclusive of the Coast Fork Willamette River). The Flood Control Act of 1938 specifically authorized the construction of the Cottage Grove and Dorena dams, among others.

The Flood Control Acts of 1950 and 1960 reauthorized earlier dams and expanded the authorization to construct additional dams to complete what is now referred to as the Willamette Valley Project, a collective system of 13 dams and reservoirs throughout the Willamette Basin. The Willamette Valley Project, as described in House Document 531, dated

October 1, 1948, was authorized for the primary purpose of controlling floods and drainage issues in the Willamette Valley during the flood season; after the flood season, the dams were authorized to release water for secondary purposes, including the storage and release of water to support navigation, hydropower generation, irrigation, water supply, recreation, and fish and wildlife habitat throughout the basin. The Water Resource Development Act of 1990 added environmental protection as a primary purpose at all Corps water resource projects.

Authority for the Corps to provide storage space in Federally owned reservoirs for M&I water supply originated in the Water Supply Act of 1958 (Title III of Public Law 85-500), as amended. The City's request for surplus water for M&I needs and the Corps' authority to enter into an agreement for surplus water for M&I use is consistent with these acts and plans.

1.2. Project History and Background

When the Willamette Valley Project was originally authorized, storage space in the conservation pools was not specifically allocated to each of the authorized purposes, i.e. irrigation, municipal and industrial, recreation, fish and wildlife. Instead, the conservation pools in each reservoir are allocated for joint-use for all the authorized purposes.

The Corps and the Oregon Water Resources Department (OWRD) initiated a feasibility study in May 1996 to analyze current water uses in the basin to project water needs for select authorized purposes. In March 1999, steelhead and spring Chinook salmon in the upper Willamette Basin were listed as threatened under the Endangered Species Act (ESA). It was anticipated that recommendations in the resulting biological opinion (BiOp) would include the use of stored water in the Willamette Valley Project dams to meet minimum flow requirements in the mainstem and tributaries. The Corps and OWRD agreed to suspend the feasibility study pending resolution of the ESA consultation and issuance of a BiOp.

The *Endangered Species Act Section 7(a)(2) Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Willamette River Basin Flood Control Project* (NMFS BiOp) and *Endangered Species Act Section 7 Consultation Biological Opinion on the Continued Operation and Maintenance of the Willamette River Basin Project and Effects to Oregon Chub, Bull Trout, and Bull Trout Critical Habitat Designated Under the Endangered Species Act* (USFWS BiOp), cumulatively referred to as Willamette BiOps, were issued in July 2008 and included flow requirements for fish (NMFS 2008, USFWS 2008). In addition, the BiOps included a requirement to further study the most beneficial flow requirements for ESA-listed salmonids.

Despite the on-going investigations into flow requirements for ESA-listed salmonids throughout the Willamette Basin, the Corps and OWRD re-initiated the 1996 feasibility study with a substantially reduced scope to complete the analysis of surplus water and, if appropriate, issue a surplus water supply agreement with the City of Creswell. The Corps summarized the results of the reduced study in a surplus water letter report (Corps 2014).

1.3. Action Area

The extent of analysis in this EA includes the City of Creswell in Lane County, Oregon, and the Coast Fork Willamette River watershed in the southern-most portion of the Willamette River valley (see Figure 1). The U.S. Geological Survey (USGS) uses a hierarchical system of hydrologic unit codes (HUC) to categorize and delineate regions, sub-regions, basins, sub-basins, watersheds and sub-watersheds, each with a unique identifier from 2-12 digits. The 4th HUC (watershed) for the Coast Fork Willamette River is 17090002.

The Coast Fork sub-basin is approximately 669 square miles and includes the Coast Fork Willamette River and the Row River and numerous tributaries above the confluence with the Middle Fork Willamette River south of Eugene and Springfield, Oregon. The Coast Fork Willamette River is one of two major rivers which converge to form the Willamette River in Eugene, Oregon. The Coast Fork Willamette River begins in the Coast Range in south western Lane County and flows north toward the City of Cottage Grove. The river is dammed at river mile (RM) 29.7 to form the Cottage Grove Reservoir. The Row River begins in the Cascade Mountains in southeastern Lane County and flows north where it is dammed at RM 7.7 to form Dorena reservoir, approximately 6 miles east of Cottage Grove, Oregon. The City of Creswell is downstream of Cottage Grove and lies at RM 13 on the Coast Fork Willamette River, upstream of its confluence with the Willamette River in Eugene, Oregon.

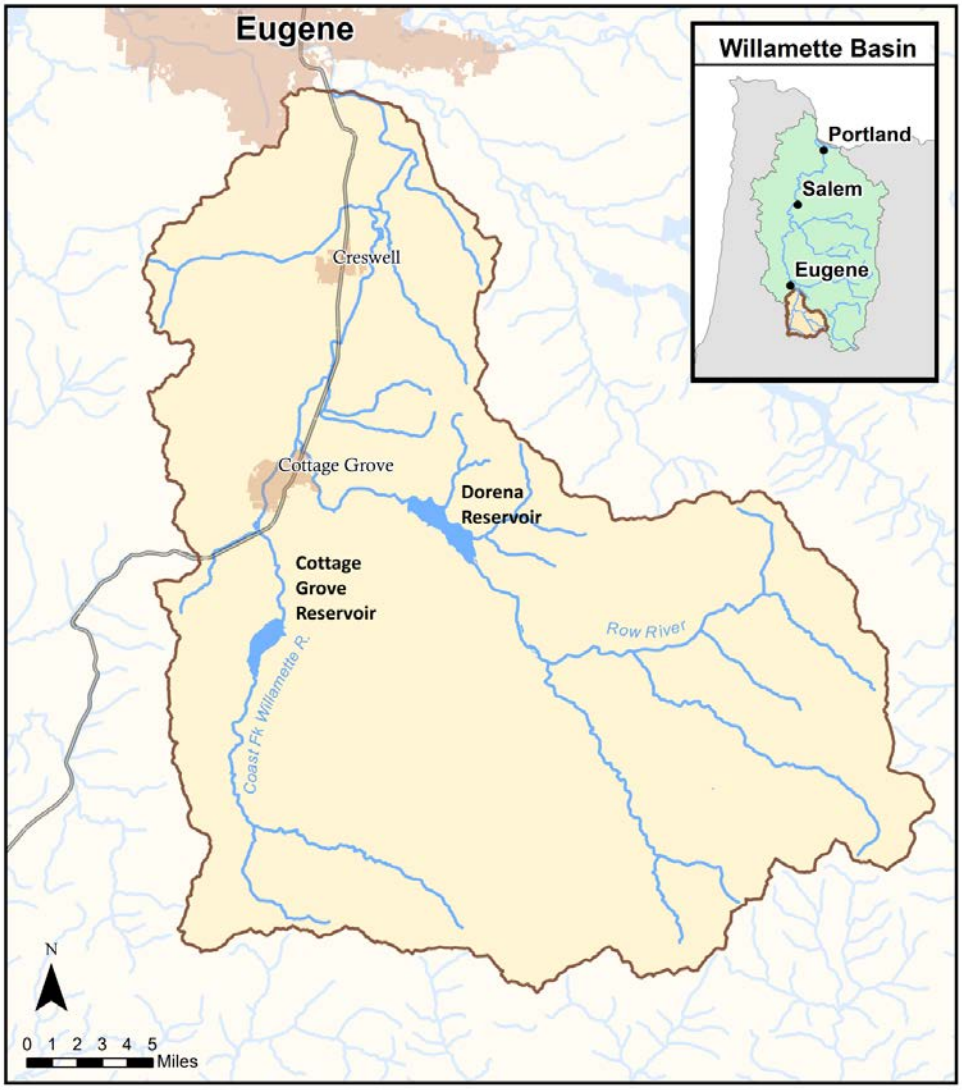

Figure 1: Coast Fork Willamette River Watershed, Hydrologic Unit Code: 17090002

According to the U.S. Census Bureau's 2010 census, the Cities of Cottage Grove and Creswell have populations of approximately 9,686 and 5,031 persons, respectively. The City of Creswell's current population of approximately 5,000 is projected to be 9,758 in 2025 and 11,727 in the year 2032 (Lane County Coordinated Population Forecast, June 2009).

2. Purpose and Need

The purpose of the proposed action, described in greater detail below, is to supply an additional 437 acre-feet of surplus water to the City of Creswell from the Dorena and Cottage Grove reservoirs to meet the City's increasing M&I needs. The City needs alternate sources of water to augment their existing water supply and meet expected future demands.

Currently, the City obtains water from groundwater wells and natural flows in the Coast Fork Willamette River. Approximately 61 percent of the City's total water rights are sourced from natural flows in the Coast Fork Willamette River (2,243 gallons per minute [gpm]) and the remaining 39 percent (1,418 gpm) is supplied via groundwater. In total, the City's existing water rights provide 3,661 gpm for domestic purposes (see Table 1). However, while the City has water rights to meet current needs, the volume of water regularly available between groundwater and surface water sources is substantially less than the City's needs.

The use of some groundwater wells is regularly restricted due to the shallow nature of the wells, their proximity to surface water sources, the potential for contamination, poor well construction, and low yield. In addition, some well fields are not usable for potable water due to public health concerns regarding the consumption of water with high levels of arsenic contamination. As a result, only 375 gpm (or 26 percent) of the total groundwater authorized for use is regularly available. Similarly, while surface water rights provide for 2,243 gpm, only 897 gpm (or 40 percent) are regularly available on an annual basis due to reduced flows during low-water years. As a result, the volume of water which is regularly available between groundwater and surface water is only 1,272 gpm (or 35 percent) on an annual basis.

Table 1: City of Creswell Water Supply

Source	Water Right (gpm)	Available (gpm)	Dependable (gpm)
Groundwater (22 wells)	1,418	375	375
Surface water: Coast Fork Willamette River	2,243	2,243	897
Total	3,661	2,618	1,272

The City conducted an analysis of the water system in April 2012 and projected an increased demand over the next 20 years (Southwood 2012). Based on population growth estimates, the City has projected that it will need 3,850 gpm by 2032 due to the expected increase in domestic water use. In the nearer future, however, the City projected an immediate need for 2,082 gpm in 2015. Between the water immediately available (1,272 gpm) and the projected need for 2015 (2,082 gpm), there is a shortage of 810 gpm. The City has identified that it requires an additional 810 gpm of water during the summer months when water use is most limited to meet current and future demand.

The additional 810 gpm equates to approximately 3.6 acre-feet of water per day (see Table 2 for the conversion of units). There are 122 days between June and September, resulting in a total needed volume of approximately 437 acre-feet of water (3.6 acre-feet * 122 days = 437 acre-feet). This equates to releasing an additional 1.81 cfs per day from the Dorena and Cottage Grove reservoirs between June and September to meet current and future M&I needs.

Table 2: Conversion of Units and Volume Needed

Gallons per Minute (gpm)	***Gallons per Day (gpd)***
$1\ gpm = 1{,}440\ gpd$ $Where\ 810 * 1{,}440 = \mathbf{1,166,400\ gdp}$	
Gallons per Day (gpd)	***Acre-feet per day (acre-feet)***
$1\ gdp = 0.0000031\ acre\ feet$ $Where\ 1{,}166{,}400 * 0.0000031\ = \mathbf{3.6\ acre\ feet}$	
Acre-feet per day (acre-feet)	***Cubic Feet per Second (cfs)***
$1\ acre - foot = 0.5\ cfs$ $Where\ 3.6 * 0.5\ = \mathbf{1.8\ cfs}$	

In addition to the reduced water that is regularly available, the City could experience a shortfall in surface water supplies due to the "junior" status of water rights.[1] Oregon's water laws are based on the principle of prior appropriation, wherein the oldest water right on a stream has priority in low-water years regardless of the needs of junior water rights. The City has a 1989 water right for 3 cfs (346.5gpm) annually from the Coast Fork Willamette River which could be curtailed if older, downstream water rights (totaling 2,040 cfs) are not met during periods of low flow. If this were to occur, the City could experience a substantial reduction in the amount of water that is available for domestic purposes.

These combined reductions in water availability create a deficit in the overall water supply which necessitates the City seeking additional water rights. The Oregon Revised Statute (ORS) §537.110 states that all waters in the State of Oregon are in public ownership and new appropriations for water rights are granted by the OWRD. Surface waters are limited throughout the Willamette Basin during the summer months when surface flows are insufficient to meet existing water rights and in-stream uses. The OWRD's analysis of water availability shows that no water is available for new natural flow water rights from the Coast Fork Willamette River from February through November of each year (Water Availability Report System). For this reason, the OWRD Water Resource Commission has determined the Willamette Valley Project reservoirs are the preferred source of water to meet the needs of growing communities and industries in the Willamette Basin (Oregon Administrative Rule [OAR] 690-502).[2]

In order to supply 437 acre-feet of surplus water from the Dorena and Cottage Grove reservoirs to the City for M&I use, the City would enter into an agreement with the Corps, per the Flood Control Act of 1944.

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[1] The City's water rights could be curtailed during low flow periods to provide water for domestic purposes and to meet senior water rights. Domestic water use includes water use for human consumption, household purposes, and domestic animal consumption ancillary to residential use but does not include irrigation, commercial or industrial uses. As a result, the City could be subject to curtailment and have limited access to its water rights during low-water years.

[2] Specific language and rules governing the Coast Fork watershed are found in OAR 690-520-0070.

3. PROPOSED ACTION AND ALTERNATIVES

As required under NEPA, the Corps identified all reasonable alternatives to supply the City with additional water and evaluated the effects of implementing those alternatives. However, the Corps dismissed alternatives that were either not feasible or those which did not meet the purpose and need described above in Chapter 2.

3.1. No Action Alternative

The No Action Alternative would not change the City's access to water for M&I use nor would it provide access to stored water in the Coast Fork watershed. Under the No Action Alternative, the City would maintain their existing water rights from groundwater wells and surface flows from the Coast Fork Willamette River. However, the Corps would not provide surplus water from the Dorena and Cottage Grove reservoirs to support growing needs for domestic and industrial water use. As a result, the City would not be authorized to withdraw additional water from the river to support M&I needs.

The Coast Fork watershed would remain a water-limited system under the No Action Alternative, and use of groundwater and surface water would be restricted during periods of low flow, particularly during the summer when overall water resources are limited.

3.2. Proposed Action - Purchase Surplus Water from Corps

Under this alternative, the City would withdraw 437 acre-feet of surplus water from the Coast Fork Willamette River, which is partially fed through the release of water from the Corps' Dorena and Cottage Grove reservoirs. The City would withdraw water between June and September for the purpose of meeting increased water needs during the summer season.

A surplus water agreement between the City and the Corps would provide the City with a cost-effective source of water to meet their immediate needs. The agreement would be valid for 5 years, with a one-time-only option to extend the agreement for an additional 5 years. The City would withdraw water from the river downstream of the dams using the City's existing infrastructure, and no construction or ground-disturbing activities would occur. The total cost charged to the City for the use of stored surplus water would amount to $56,782 annually (almost $130 per acre-foot for). Over the 5-year agreement period between the Corps the City, the total cost for surplus water amounts to $283,910.

It should be noted that the Corps would *not* release additional surplus water from the reservoirs, but rather, the City would withdraw the requested 437 acre-feet from the Coast Fork Willamette River between June and September. In effect, there would be 2 cfs less water in the river downstream from the City during the summer months. There would be *no* operational change in how the dams are managed or operated because the precision of the spillway gates does not allow for the release of exactly 1.8 cfs.

3.3. Alternatives Considered but Dismissed from Further Evaluation

3.3.1. New Surface Water Right

One alternative that was considered to meet the City's increased need was to obtain a new surface water right for natural flow in the Coast Fork Willamette River. However, a new surface water right is not available due to a lack of available surface water. The water availability analysis showed that surface waters from the Coast Fork Willamette River are not

available between February and November, and the OWRD's administrative rules prohibit the issuance of water rights for municipal uses where surface waters are limited. Further, the use of surface water for municipal use in the Coast Fork watershed is only authorized between 1 December and 30 April, preventing OWRD from issuing new permits for year-round use.

Therefore, obtaining a new natural flow water right is not a viable alternative to meet the City's needs and this alternative was eliminated from further consideration and evaluation.

3.3.2. New Groundwater Right

Another alternative meeting the purpose and need is for the City to obtain a new groundwater right. However, some local groundwater sources have naturally high levels of iron, manganese, and arsenic (Southwood 2004; SWMWP, 2008), which pose public health concerns. In addition, the issuance of new water rights for the use of groundwater has many of the same limitations as the issuance of new surface water rights, as described above. The OWRD's administrative rules presume that groundwater within a ¼ mile of a stream or surface water source is hydraulically connected with that surface water, and as such, groundwater is given the same classification (and use restrictions) as the surface water source. Additionally, the OWRD has determined that groundwater withdrawals within one mile of a surface water source can interfere with the availability of surface waters. As a result, OWRD typically applies the surface water restrictions to groundwater. In the Coast Fork watershed, surface water (and therefore groundwater) is not available for new uses between February and November.

For these reasons, a new groundwater right is not available and therefore is not a viable alternative to meet the City's need for additional water. As such, this alternative was eliminated from further consideration and evaluation.

3.3.3. Purchase Water from Another Municipal Entity

Another alternative to meet the City's need for additional water supply would be the purchase of water from another municipal water supplier. The Eugene Water and Electric Board (EWEB) is the only municipal water supplier within close proximity to the City of Creswell that has sufficient water supply and treatment infrastructure to provide water to other users. However, this alternative is expected to be cost prohibitive for the City.

For example, the projected cost of the pipeline from EWEB to the City of Veneta (approximately 10.5 miles west of Eugene) is estimated to cost almost $10 million, with construction of the pipeline costing an estimated $952,400 per mile. In addition to the construction costs associated with establishing a pipeline between the cities, the current (2013) cost of purchasing water is approximately $1.24 per thousand gallons, or approximately $404 per acre-foot annually. Assuming the same cost per mile between Eugene and the City of Creswell (5 miles), constructing a pipeline between the cities could cost upwards of $4.7 million, in addition to the added costs of purchasing the water which would total approximately $177,000 annually.

Due to the prohibitively expensive costs associated with purchasing water from another municipality, this alternative is economically infeasible and was therefore dismissed from further consideration and evaluation.

3.3.4. Water Conservation

The City of Creswell could institute conservation measures sufficient to eliminate its need for additional water supply beyond what can be supplied by its existing water rights. As a point of

comparison, a 2010 study of conservation measures conducted for the City of Corvallis found that implementing a suite of conservation measures to maximize water savings would yield a conservation savings of approximately 4 percent of the average demand and would require a budget of over $5 million (GSI Water Solutions 2010). Even if the City of Creswell were to implement conservation measures and reap a 5 percent savings during the summer months, they would still have insufficient water supply to meet these needs. Five percent of 2,082 gpm is 104 gpm, which equates to a conservative demand of 1,978 gpm. Given the volume of reliable water supply is 1,272 gpm, the City would still be over 700 gpm short of meeting the current needs.

For this reason, and because this alternative would be prohibitively expensive, implementing water conservation measures alone would not meet the purpose and need of the City, and this alternative was dismissed from further evaluation.

3.4. Comparison of Alternatives

The following section described how the alternatives were compared to ensure they met three primary criteria. For starters, the alternative proposed as the Preferred Alternative needed to meet the City's need for additional water supply to support M&I uses. In addition, the action needed to be compliant with all local, state, and federal policies and laws. And because costs can be limiting factors for small (and even large) municipalities, the economic viability of all the alternatives were compared to identify which alternatives were within reason of the City's financial resources. Table 3 shows a matrix of which alternatives met the criteria, and those which did not.

Table 3: Comparison of alternatives

Alternatives Under Consideration and Those Dismissed from Further Consideration	*Meets the City's purpose and need*	*Compliant with Local and State policy*	*Economically feasible*
No Action Alternative	No	Yes	Yes
Purchase Surplus Water from Corps	Yes	Yes	Yes
New Surface Water Right	Yes	No	Yes
New Groundwater Right	Yes	No	Yes
Purchase from Another Entity	Yes	Yes	No
Water Conservation	No	Yes	No

After comparing the alternatives against the City's need for additional water supply, compliance with local, state and federal policies and plans, and economic viability, only one alternative met all three criteria: the use of surplus water from the Corps' Dorena and Cottage Grove Reservoirs. For this reason, the Corps proposes this alternative as the Proposed Action.

4. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The sections below describe the human and natural resources that could be affected as a result of supplying surplus water to the City from the Dorena and Cottage Grove reservoirs. It should be noted that the Corps' analysis of surplus water availability, the relationship between conservation storage and yield, dam safety considerations, and all potential impacts to the management, operations and maintenance of the Dorena and Cottage Grove dams and reservoirs, as well as the Willamette Valley Project is summarized in the *Coast Fork Willamette River, Oregon Surplus Water Letter Report* (Corps 2014).

The Corps' construction of the Dorena and Cottage Grove dams in the 1940s initiated fundamental changes to the Coast Fork Willamette River watershed, including the elimination of fish passage between the lower river and upstream tributaries and spawning habitats, altered stream flows affecting downstream water quality, and the quantity and quality of in-stream and riparian habitats. Subsequent channelization to the Coast Fork Willamette River occurred in the 1950s, during which levees were constructed to safeguard against flooding, and culverts were installed to drain fields for agriculture, both of which disconnected the river from its natural floodplain. In spite of these changes, the resource descriptions provided below serve as the baseline condition (current condition, not pre-dam condition) against which the potential effects of the project alternatives are evaluated.

Furthermore, Section 102(B) of NEPA, as amended, instructs federal agencies to evaluate the relevant resources pertinent to the decision-making process. For this reason, only those resources which could influence selection of the proposed action or which may be affected by the proposed action were evaluated. Other resources, including geography, topography, geology, soils, etc. were considered but not carried forward for detailed analysis because the resources would not be impacted through the implementation of the proposed action. The following resources are evaluated for potential effects:

1. Water Resources, including the Willamette Valley Project, and Hydrology and Hydraulics
2. Riparian Habitats and Vegetation
3. Wetlands and Aquatic Habitats
4. Water Quality
5. Fish and Wildlife, including Threatened and Endangered Species
6. Air Quality and Noise Pollution
7. Cultural Resources
8. Recreation
9. Socio-Economic
10. Hydropower
11. Irrigation
12. Navigation
13. Municipal and Industrial Water Supply and Demand
14. Climate Change

This chapter also describes the expected impacts, with respect to the overall context and intensity the proposed action would have on each of the above listed resources in the Coast Fork Willamette River watershed. Two alternatives are evaluated in detail: the No Action Alternative and the Proposed Action.

This chapter evaluates two categories of effects: (1) direct effects, which occur at the same time and in the same place as the action; and (2) indirect effects, which occur later or at a location

away from the action. Cumulative effects, which are additive and include those effects which occur in the past, present, and reasonably foreseeable future, are discussed in Chapter 0.

4.1. Water Resources

4.1.1. Willamette Valley Project

The dams and reservoirs of the Willamette Valley Project (WVP) are located on five major tributaries: the Willamette River (inclusive of the Coast Fork Willamette River and Hills Creek); the McKenzie River; the North Santiam River; the South Santiam River; and the Long Tom River. The WVP is operated as a system to meet mainsteam Willamette River flow targets at Albany and Salem. The Corps has a high degree of operational flexibility among the 13 projects in determining how to meet the authorized purposes at each project and for the system as a whole. Even though water may be withdrawn directly downstream of a specific project, it is necessary to coordinate releases across the WVP to meet minimum flow requirements at Albany and Salem. Annual weather patterns in the Pacific Northwest and runoff characteristics of the Willamette Basin allow the system to be operated to balance the range of authorized purposes and downstream use.

The well-defined limits of the flood season (November through January) and the planned use of stored water after the flood season allows for the impoundment of spring runoff beginning in February. Between November and January, the reservoirs are used strictly for flood storage, and no stored water is available for other purposes. Once the reservoirs are filled to their maximum pool elevations at end of April, stored water is then retained through the summer months (May through September) for recreational purposes and released to maintain minimum flows for downstream purposes (fish and wildlife, irrigation, and water quality, etc.). Following Labor Day, water is released from the reservoirs to lower the reservoir to the minimum pool to accommodate storage for the winter flood season.

Storage space in the WVP reservoirs was not allocated to each of the authorized purposes when the projects were first authorized. Together, the Dorena and Cottage Grove reservoirs provide 93,457 acre-feet of storage space. Of this, only 688 acre-feet is currently contracted for irrigation purposes, equating to approximately 0.7% of the total conservation storage space in the Coast Fork Willamette River reservoirs.

4.1.1.1. Environmental Consequences

The WVP is operated as a system to regulate downstream flows at Albany and Salem. If the rate or timing of water released from one dam is changed, one or more dams in the system must also be adjusted to accommodate these changes and still maintain downstream minimum and maximum flows. Because there would be no operational changes to the Dorena and/or Cottage Grove dams during the winter flood season or the summer conservation season, the WVP would experience no direct or indirect changes under either the No Action Alternative or the Proposed Action.

4.1.2. Hydrology and Hydraulics

The hydrology of the Coast Fork Willamette River is an important component of protecting water quality and aesthetic value, as well as providing recreation opportunities, fish and wildlife habitat, and M&I use of surface and ground waters. The climate of the Coast Fork Willamette subbasin is a temperate marine west-coast type, characterized by wet winters and dry summers. More than half of the annual precipitation normally falls in the five-month

period of November through March, with July and August as the driest months. The total Coast Fork Willamette watershed is 669 square miles, with Dorena tributary basins at 265 square miles and Cottage Grove tributary basins at 104 square miles; the combined drainage area of the two projects is just over half the total area of Coast Fork watershed.

The Corps' dams and reservoirs in the Coast Fork watershed regulate peak flows for flood control and store water for seasonal discharge to support authorized downstream purposes. According to a watershed assessment conducted by the Coast Fork Willamette Watershed Council (CFWWC), there was a 37 percent reduction in peak flows after the dams became operational in the late 1940s and early 1950s (CFWWC 2005). Stored water is released from the reservoirs between May and September to support downstream uses, including irrigation, navigation, flows for fish and wildlife, and water quality maintenance.

The USGS stream gage (#14157500) near Goshen, Oregon (downstream from Creswell) monitors flows on the Coast Fork Willamette River for the entire watershed and serves as the control point for regulation of the Dorena and Cottage Grove dams. The mean annual peak flow, reported by the Goshen gage, is approximately 13,110 cfs, with peak flows approaching 33,400 cfs. Minimum flows are used at both dams whenever possible during flood events to keep flows at Goshen at no more than 12,100 cfs. The maximum evacuation rates (outflows) at Cottage Grove and Dorena are 3000 cfs and 5000 cfs, respectively, and high flows at Goshen are predominantly from local inflows (streams and tributaries downstream of both Cottage Grove and Dorena dams). Mean summer low flows in the Coast Fork Willamette River are 414 cfs (CFWWC 2005), where minimum outflows from Cottage Grove vary from 75 cfs between February and June to 50 cfs the remainder of the year. Minimum outflows from Dorena are 190 cfs between February and June and 100 cfs all other times.

The accuracy of the surface water discharges is dependent upon the accuracy of the streamflow gage regulating flows. In the case of the Goshen gage, it is estimated that flows are accurate to within 5-10 percent. As a result, a 5-10 percent error during the summer minimum flows (414 cfs) corresponds to approximately 20-40 cfs. The requested 2 cfs is well within the error margins of the spillway gates and minimum flow targets at Goshen. As a result, the discharge of water from the Dorena and Cottage Grove dams to meet minimum flows is sufficient to compensate for immeasurable variations in spillway gate heights.

During the Corps' surplus letter report study, 73 years of hydrologic and hydraulic data were modeled to identify if and when downstream flow targets were met versus the proportion of years when targets were not met. The results of this modeling showed that minimum downstream flow targets at Albany and Salem were met 95 percent of the years between June and September, and flow targets were not met only during deficit water years.[3] Dorena is able to capture and store all of its inflow during the spring conservation period to meet its summer pool elevation. Consequently, Dorena can meet its proportion of downstream flow targets. Cottage Grove is unable to fill its reservoir during deficit years and all incoming flows are passed downstream to meet (as much as possible) its proportion of the minimum downstream

[3] The Corps classifies water years as Deficit, Insufficient, Adequate, or Abundant depending on the volume of water stored within the WVP during the spring conservation season. The classification is based on the total storage volume across the WVP for each day between May 10th and May 20th, where the maximum storage volume available is 1.59 million acre-feet. If the volume is less than 0.9 million acre-feet, the year is designated as a Deficit water year. Insufficient water years have between 0.9 and 1.19 million acre-feet of stored water between May 10th and 20th; Adequate water years have between 1.20 and 1.48 million acre-feet; and Abundant years have more than 1.48 million acre-feet.

flow targets. When Cottage Grove cannot meet its flow targets, releases at Dorena Dam compensates (when possible) to meet downstream flow targets.

4.1.2.1. Environmental Consequences

Under the No Action Alternative, no water would be withdrawn from the river and as a result, there would be no direct or indirect changes to the hydrology or hydraulics of the Coast Fork Willamette River or its watershed. Flows would remain consistent with current peak and minimum flows, which are regulated in part by releases from the Corps' Dorena and Cottage Grove dams.

Under the Proposed Action, the City would withdraw an additional 2 cfs from the Coast Fork Willamette River, and in effect, there would be 2 cfs less water in the river downstream from the City. For the purpose of evaluating the most extreme impacts to in-stream flow downstream from the dams, it is assumed that no water is returned to the system after the City's use (assume 100 percent consumption). However, as described above, this amount of water is within the error margins of the stream gage at Goshen. As a result, the volume and the rate at which this volume is withdrawn from the river is immeasurable, even at low flows. Moreover, the Corps' hydraulic modeling results showed that the City's withdrawal of 2 cfs of water from the Coast Fork Willamette River did not change the number of days when minimum flow targets were not met. As a result of these factors, implementing the Proposed Action would result in no direct or indirect effects to the hydrology or hydraulics of the Coast Fork Willamette River or its watershed.

4.2. Riparian Habitats and Vegetation

Riparian plant species common throughout the watershed include Oregon ash, big-leaf and vine maples, various species of willows, dogwood, and an assortment of sedges, rushes, and grasses (CFWWC 2005). Some evergreen trees, in particular Douglas fir and western hemlock, can be found above ordinary high water. Riparian zones and a diverse assemblage of vegetation provides a multitude of benefits to fish and wildlife, including the contribution of large wood which creates cover and escape refugia from predators. Leaf litter and other allochthonous inputs support primary production, which in turn supports a prey base and the overall food chain.[4] Riparian vegetation can also improve water quality by reducing erosion and stabilizing streambanks, and canopy cover over or adjacent to the stream or river can moderate temperatures, providing thermal refugia for species adapted to cold-water systems.

Following construction of the dams and regulation of the Coast Fork Willamette River, there have been substantial changes to the vegetative structure of riparian zones across the watershed. Channelization has disconnected the river from the floodplain, and adjacent land uses (logging, agriculture, urbanization, etc.) have decreased the extent of the riparian zone supporting wetlands and aquatic habitats. The removal of trees and vegetation along the streambank has led to increased temperatures, increased erosion and sediment inputs, and substantially reduced the input of large wood and other materials important for maintaining ecological functions. Invasive species have also degraded the quality of riparian habitats, where non-native species outcompete with natives, and the overall biodiversity of vegetation is reduced. Together, these impacts have substantially reduced the overall habitat quality and quantity along the river's riparian zones.

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[4] Allochthonous sources of nutrients come from outside the aquatic system (such as plant and soil material) and are a critical source of nutrient recycling throughout the ecosystem.

4.2.1. Environmental Consequences

There would be no changes to riparian areas or vegetation along the Coast Fork Willamette River or its watershed if the No Action Alternative were implemented. No water would be withdrawn from the river and as a result, there would be no changes in the flow downstream from the City's water supply infrastructure. As described above, flows would remain consistent with the current peaks and minimums, to which the resources are adapted to normal seasonal variation. The structure and function of these areas would not change in response to the No Action Alternative.

Under the Proposed Action, the City would withdraw an additional 2 cfs from the Coast Fork Willamette River during the summer, low flow months. The direct effect of this action would immeasurably reduce downstream flows by 2 cfs. As noted above, the mean summer low flows in the Coast Fork are 414 cfs, and 2 cfs is less than approximately 0.5 percent of this amount. This loss of water from the downstream flow would have negligible impacts on the structure or function of riparian areas and any streamside vegetation, as they are adapted to fluctuating stages of the river given normal seasonal variation.

4.3. Wetlands and Aquatic Habitats

Wetlands provide several important ecological functions that benefit fish and wildlife, water quality, and recharge groundwater wells. In addition to providing shelter and foraging habitat, wetlands also provide habitat for species that are specifically adapted to seasonally or permanently saturated soils. Wetlands also buffer the effects of storms by attenuating the effects of flooding and filtering storm runoff to allow sediments (and pollution) to settle out from the runoff.

According to the CFWWC's watershed assessment, there are three main types of wetlands found throughout the watershed: lacustrine, riverine, and palustrine (2005). Lacustrine wetlands include lakes, reservoirs and ponds, and riverine wetlands are contained within the stream channel. The palustrine wetlands found throughout the watershed include wet prairies and marshes; vernal pools; emergent, forested, and scrub-shrub wetlands. There is a mosaic of seasonal and permanent wetlands, and the depth to which water saturates the soil varies from sub-surface to standing water depending on its source: precipitation, groundwater discharge, overland flow and/or season flooding.

Grazing and invasive plant species have substantially changed the composition of vegetation from native wetlands, especially where non-native plants are adapted to disturbed soils. In addition, altered hydrologic regimes from dam and levee construction, disconnection from the floodplain, and armoring of streambanks has had detrimental impacts on the distribution and abundance of wetlands across the region. Historically, it is estimated that wetlands covered approximately 49.7 square miles, or approximately 36 percent of the area (CFWWC 2005). No local wetland inventories have been conducted for the watershed, but the National Wetlands Inventory (NWI) integrates digital data and other resources to collate regional information and develop a preliminary inventory of wetland type and distribution across a landscape.[5] In the Coast Fork watershed, the NWI registers a total of over 350 forested, scrub-shrub, and emergent wetlands covering approximately 2,100 acres (3.3 square miles) (CFWWC 2005). Most of these wetlands are in lower portions of the watershed, near the mainstem and the major tributaries.

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[5] http://www.fws.gov/wetlands/NWI/index.html

4.3.1. Environmental Consequences

Similar to the discussion for riparian areas, there would be no changes to wetland or aquatic habitats along the Coast Fork Willamette River or its watershed if the No Action Alternative were implemented. Because no water would be withdrawn from the river, there would be no changes in the flow downstream from the City's water supply infrastructure. Any wetlands and aquatic habitats associated with the river are similarly adapted to seasonal flow variations, and these seasonal fluctuations would not change from the current conditions. As a result, there would be no direct or indirect effects to the structure and function of these areas in response to the No Action Alternative.

The direct effects from implementing the Proposed Action would also be wholly discountable to wetlands and aquatic habitats. Because the requested amount of water is within 1 percent of mean monthly flows during the summer months, wetland areas and aquatic habitats could experience a slight decrease in flows downstream from the City, but this decrease is within the range of what is normally experienced by these habitats.

4.4. Water Quality

The Oregon Department of Environmental Quality (DEQ) is required to regularly assess water quality and report to the U.S. Environmental Protection Agency (EPA) on the condition of the State's waters. As required in CWA Section 303(d), DEQ identifies those waters which do not meet water quality standards for beneficial uses.[6] Where data is available, DEQ also identifies specific water quality limitations and impairments for the state's waters. The summary report is commonly referred to as the 303(d) list and is used to identify where regulations are needed to improve water quality to better meet state and national standards.

Fish and other aquatic species experience some degree of stress or death at dissolved oxygen (DO) levels below 8 to 10 milligrams per liter (mg/l) (CFWWC 2005). As temperatures increase, DO concentrations decrease, creating environments that are stressful and at times lethal for fish and aquatic organisms. Fish adapted to cold-water systems (cutthroat and bull trout, for example) are sensitive to even minor increases in temperatures, especially when spawning. Measurements of potential hydrogen (pH) reflect the relative acidity and alkalinity, which can be influenced by human activities, the amount of primary production (photosynthesis), and local geologic conditions. Most aquatic organisms can tolerate a range of pH from 6.5 to 8.5; beyond these levels, an area can be too acidic or too alkaline. In addition, high levels of dissolved and suspended sediments and turbidity can be detrimental to fish and aquatic organisms by impairing visibility and smothering local habitats.

Increased concentrations of nutrients (phosphorous and nitrogen) and pesticides can limit plant growth and at high levels be toxic to plants and animals. High levels of nutrients can also trigger algae blooms, which can lead to lower DO concentrations. Fecal coliform concentrations and heavy metals (arsenic, mercury, etc.) can directly affect human health and some species of fish and aquatic wildlife. The bioaccumulation of mercury in fish is widely recognized as an environmental problem, increasing health risks to humans. Fish consumption advisories have been issued by the Oregon Health Authority for the Willamette River, including the Dorena and Cottage Grove reservoirs, advising consumers of the possible health risks associated with

[6] Beneficial uses include domestic and industrial water supply; irrigation and livestock watering; fishing, boating, and water contact recreation; fish and aquatic life, wildlife, and hunting; aesthetic qualities; and hydropower, commercial navigation, and transportation.

consuming fish from the Willamette Basin (Jones 2005). Dorena Reservoir has also had algae advisories for the past few years, affecting water based recreation on the reservoir.

The Coast Fork Willamette River is on the 303(d)-list as being water quality limited for alkalinity, aquatic weeds (algae), DO, iron, manganese, mercury, pH (only during the summer), phosphorous, and temperature. Furthermore, total maximum daily loads (TMDLs) have been established per DEQ to address year-round water quality concerns in the river, but which specifically address aquatic weeds, DO, mercury, pH, phosphorus, and temperature. A TMDL was established in 2006 to address mercury contamination, but this parameter remains a concern in the Cottage Grove and Dorena reservoirs. Dorena reservoir is also on the 303(d) list for aquatic weeds. The Row River is listed for alkalinity, biological criteria, and temperature, though the latter is the only one with an approved TMDL.

As discussed, both Cottage Grove and Dorena Dams are used to support downstream flow augmentation during the low flow period of the year. This augmentation was originally intended to support navigation but subsequently is used support the authorized purposes of fish and wildlife and pollution abatement to improve water quality conditions.

4.4.1. Environmental Consequences

If no water is withdrawn from the Coast Fork Willamette River under the No Action Alternative, water quality conditions would not further degrade. As described earlier, natural flows would remain consistent with the current peaks and minimums. Furthermore, existing regulations which limit source pollution and educational programs implemented to reduce non-point source pollution are expected to continue into the future. As a result of these actions, water quality trends are not expected to change under the No Action Alternative.

Under the Proposed Action, there are no direct and indirect effects to water quality expected because the change in flow in the Coast Fork Willamette River would be approximately 0.5 percent of the mean summer low flow of 414 cfs. This amount is immeasurable and less than the accuracy of the USGS stream gages. The change in flow would be within normal seasonal variations. Temperatures, DO concentrations, nutrients and bacteria will not measurably increase or decrease in response to the withdrawal of surplus water. As a result, there will be no change to water quality as a result of implementing the Proposed Action.

4.5. Fish and Wildlife

The Coast Fork Willamette River watershed supports a rich diversity of mammals, birds, reptiles, amphibians and invertebrates closely associated with the multitude of habitat types found throughout the watershed. It is estimated there are approximately 18 species of native amphibians, 15 reptile species, 154 bird species, and 69 mammal species present in the Willamette Basin (Hulse *et al*., 2002). Construction of the WVP and anthropogenic use of the Willamette Basin has fundamentally changed natural vegetation communities, which in turn has created opportunities for some wildlife species and fragmenting and/or degraded habitat for others. Increased development of the floodplain from agricultural and urban development has restricted wildlife distribution and use of habitats to the remaining natural areas, such as those adjacent to rivers and major tributaries and the WVP reservoirs.

With more than 2,400 acres, the Dorena dam and reservoir provide habitat for a wide variety of fish and wildlife common to the region. Both the Dorena and Cottage Grove reservoirs are designated stops along the Big River Loop of the Willamette Valley Birding Trail, where a suite of native bird species can be observed, including osprey, purple martin, willow flycatchers, yellow-breasted chats. There are multiple bald eagle nesting territories near the Dorena and

Cottage Grove reservoirs, and eagles frequently forage in the reservoirs in the winters months and early spring during nest initiation (Corps 2000).

Non-native species are common throughout the watershed, and many species often out-compete native species for habitat or prey resources, these species include nutria, bullfrogs, eastern gray squirrels, house sparrows, European starlings. Other non-native species support recreational hunting, namely wild turkeys and ring-necked pheasants; and native big game mammals, upland game birds and waterfowl.

Aside from federally-listed ESA species (discussed below), there are a number of state and federal species of concern, including mammals, birds, amphibians, reptiles, invertebrates and plants. Table 4 lists species of concern in the Coast Fork Willamette River watershed.

Table 4: Species of concern (not ESA-listed) in Coast Fork Willamette River watershed

Guild	Species	
Mammals	California wolverine [1]	*Gulo gulo luteus*
	Townsend's (Pacific western) big-eared bat	*Corynorynus townsendii*
	Long-legged myotis	*Myotis volans*
	Long-eared myotis	*Myotis evotis*
	Fringed myotis	*Myotis thysanodes*
	Red tree vole	*Arborimus longicaudus*
Birds	Yellow-billed Cuckoo [2]	*Coccyzus americanus*
	Harlequin duck	*Histrionicus histrionicus*
	Olive-sided flycatcher	*Contopus cooperi*
	Purple martin	*Progne subis*
	Oregon vesper sparrow	*Pooecetes gramineus affinis*
	Yellow-breasted chat	*Icteria virens*
	Lewis's woodpecker	*Melanerpes lewis*
	Northern goshawk	*Accipiter gentiles*
	Western burrowing owl [3]	*Athene cunicularia hypugaea*
	Acorn woodpecker	*Melanerpes formicivorus*
Reptiles	Northwestern pond turtle	*Clemmys marmorata marmorata*
Amphibians	Foothill yellow-legged frog	*Rana boylii*
	Red-legged frog	*Rana aurora aurora*
Plants/Trees	Whitebark pine	*Pinus albicaulis*
	Wayside aster	*Aster vialis*
	White-topped aster	*Aster curtus*
	Shaggy horkelia	*Horkelia congesta* ssp. *Congesta*
	Howell's montia	*Montia howellii*
	Tall bugbane	*Cimicifuga elata*

[1] Current breeding status for wolverine in the Willamette Basin is uncertain.
[2] The USFWS proposed to list the cuckoo as threatened under the ESA on 3 October 2013.
[3] Burrowing owls are considered extirpated from the Willamette Basin.

Sources: Corps 2000; NPCC 2004(a) and (b); Oregon Natural Heritage Information Center (ORNHIC) 2004.

The Corps also works with the Oregon Department of Fish and Wildlife (ODFW) to support resident game and non-game fisheries in the Coast Fork Willamette River. A number of native

and non-native fish species are present in the Coast sub-basin, including spring Chinook salmon, rainbow trout, cutthroat trout, bull trout, mountain whitefish, large-scale sucker, sculpins, longnose dace, leopard dace, Northern pike minnow, Oregon chub, peamouth chub, redside shiner, speckled dace, three-spine stickleback, sand roller, Pacific lamprey, Western brook lamprey, river lamprey, common carp, largemouth bass, and smallmouth bass (Hulse et al 2002, CFWWC 2005).

The Corps' dams divide the sub-basin into upper and lower portions, thereby reducing the transport and delivery of large wood and substrate to downstream reaches. Changes in the abundance and distribution of gravels and large wood (particularly in large jams) have reduced suitable spawning areas and limited areas for adult cutthroat trout and juvenile rearing habitat for spring Chinook salmon. Relative to the lower Coast Fork sub-basin, the upper sub-basin above the dams have aquatic habitat that is closer to the historical baseline, with the highest proportion of functioning riparian areas, the largest amounts of large wood in the river and tributary channels, and the highest quality spawning areas (NPCC 2004a).

4.5.1. Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 *et seq*.), as amended, provides for the conservation and recovery of endangered and threatened species and the ecosystems upon which they depend. The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) share joint jurisdiction for the administration of ESA-listed species. Under Section 7 of the ESA, federal agencies are required to evaluate the effects of actions they fund, permit, or authorize and consult with the USFWS and/or NMFS to ensure Federal actions will not jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as specific geographic locations critical to the existence of a threatened or endangered species.

4.5.1.1. National Marine Fisheries Service (NMFS) Species[7]

Among the species under NMFS jurisdiction in the Willamette Basin, there are no ESA-listed anadromous fish species currently spawning in the action area. Both the Dorena and Cottage Grove dams block upstream passage and therefore limit distribution in and above the reservoirs. However, spring Chinook salmon may be present in the Coast Fork Willamette River for rearing and migration purposes. Nevertheless, because habitat quality is poor, spawning is restricted to adjacent watersheds to the east (the Middle Fork Willamette River watershed). Both summer and winter steelhead spawn and rear in the Coast Fork watershed, but these populations are not considered native to the watershed.

Historically, only winter steelhead were native to the Willamette Valley; Willamette Falls created a seasonal barrier that was only passable during the winter months when flows were high. Since that time, the ODFW stocked the Coast Fork Willamette River with winter and summer steelhead from the Marion Forks hatchery through its Salmon and Trout Enhancement Program to supplement salmonid runs and enhance recreational fishing opportunities. Currently, NMFS does not provide any protection under the ESA to steelhead populations upstream of the Calapooia River (near Albany, Oregon). For this reason, while winter or summer steelhead may be present in the action area, they are not afforded the same protections as the distinct population segments that are ESA-listed as threatened and

[7] NMFS species list: http://www.nmfs.noaa.gov/gis/data/critical.htm#nw
Critical habitat list: http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm

endangered in the lower portions of the Willamette Basin.[8] As a result, Table 5 lists the ESA-listed species which were evaluated for potential effects resulting from implementing the proposed action.

Table 5: NMFS ESA-listed Species

Species	Status	Critical Habitat	Federal Register (FR) Citation
Chinook salmon (*Oncorhynchus tshawytscha)*	Threatened	Designated, none in action area	FR 64 14308 FR 2005-09-02

In 1999, NMFS listed the Lower Columbia River spring Chinook (which includes Upper Willamette River populations) as *threatened* with extinction under the ESA. Critical habitat for Chinook was formally designated in 2005, but none was identified in the Coast Fork Willamette River watershed, including the Row River, Mosby Creek and the Upper and Lower Coast Fork Willamette Rivers. While these watersheds are eligible for designation based on the necessary and required habitat characteristics for spawning, migration and/or rearing, NMFS determined that the economic benefits of excluding these areas outweighed the benefits of designation.

In the lower Coast Fork watershed, the productivity, capacity, and diversity of cutthroat trout, bull trout, and spring Chinook salmon populations are limited by habitat connectivity and modifications; lack of large woody debris; poor water quality; and the partial or complete barrier to upstream fish passage (NPCC 2004a). In response to these changes, the minimum in-stream flows described in the NMFS 2008 BiOp are comparable with flows recommended for upstream passage, spawning, incubation, and rearing of salmonids (NMFS 2008a; Corps 1982 and 2000). The release of warm water from Cottage Grove and Dorena reservoirs appreciably reduces the quality of habitat for salmonid production (Corps 2000). Compared to historical conditions, water temperatures below the dams are generally cooler in the summer and warmer in the fall and winter, which affects the upstream distribution of spring Chinook salmon adults, alters the timing of spawning, and affects egg incubation (NPCC 2004a). Temperatures in excess of 26°C have been measured downstream of the dams, and warm water species are much more abundant than salmonids, indicating an unfavorable temperature regime for native species (Thompson et al. 1966, Corps 2000).

4.5.1.2. U.S. Fish and Wildlife Service (USFWS) Species[9]

Among the ESA-listed and candidate species under USFWS jurisdiction in the action area, there are several species that were not evaluated in this assessment because their habitat is not present in the action area and therefore it is highly unlikely that individuals of the species would be present in the action area. In addition, species for which implementation of the proposed action would have negligible and/or discountable effects to either individuals or their habitats were not evaluated. These species include: gray wolf (*Canis lupus*), Canada lynx (*Lynx Canadensis*), fisher (*Martes pennanti*), marbled murrelet (*Brachyramphus marmoratus*), Northern spotted owl (*Strix occidentalis caurina*), streaked horned lark (*Eremophila alpestris*

[8] A distinct population segment is defined as a population of a particular species that is discrete from other populations of the same species, and which is also important to the long-term viability of the species as a whole.

[9] USFWS species list: http://www.fws.gov/oregonfwo/Species/Lists/Documents/County/LANE%20COUNTY.pdf

strigata), Oregon spotted frog (*Rana pretiosa*), Fender's blue butterfly (*Icaricia icarioides fenderi*), and the Oregon silverspot butterfly (*Speyeria zerene hippolyta*).

Similarly, there are three ESA-listed plant species that were not evaluated in this assessment because the potential effects from implementing the proposed action would be negligible and discountable to any populations present in the action area. These include Bradshaw's lomatium *(Lomatium bradshawii),* Willamette daisy *(Erigeron decumbens* var. *decumbens)* and Kincaid's lupine *(Lupinus sulphureus* var. *kincaidii).*

Table 6 lists the remaining ESA-listed species which were evaluated for potential effects resulting from implementing the proposed action.

Table 6: USFWS ESA-listed Species

Species	Status	Critical	Federal Register (FR) Citation
Oregon chub (*Oregonichthys crameri*)	Threatened*	Designated	
Bull trout (*Salvelinus confluentus*)	Threatened	Proposed	FR 63 31647

*On February 4, 2013, the USFWS announced a proposal to remove the Oregon chub, and its critical habitat, from the list of Endangered and Threatened Species.[10]

Oregon chub are endemic to the Willamette River, with historical populations in the Coast Fork Willamette River downstream from both Dorena and Cottage Grove dams. Oregon chub were listed as *endangered* under the ESA in 1993 and are under the jurisdiction of the USFWS. The USFWS changed to classification from endangered to threatened on April 23, 2010 and on February 4, 2013, USFWS proposed to remove the Oregon chub, and its critical habitat, from the endangered and threatened species list. Current populations are limited to naturally-occurring and reintroduced populations in the Santiam, Middle Fork, and Coast Fork Willamette Rivers. Surveys conducted in the mid-2000's found small populations (approximately 100 individuals) of chub in three locations in the Coast Fork watershed near the cities of Eugene, Creswell and Cottage Grove. Oregon chub have also lost habitat as backwater and off-channel areas have disappeared as a result of changes in the frequency and magnitude of seasonal flows (NPCC 2004a). Furthermore, the overall loss of channel complexity, reduced extent and lateral connection of the floodplain, the presence of non-native predators, further degrades quality habitats for native fish.

The Columbia River population of bull trout (including the Willamette River basin) was listed as *threatened* under the ESA in 1998. The Willamette River Recovery Unit encompasses an area of approximately 19,312 square miles and includes the Upper Willamette River area (including the Coast Fork watershed) and the Clackamas River. Currently, bull trout are only found in the upper portion of the Willamette basin, in the McKenzie and Middle Fork Willamette River basins and historically were found in the Santiam and Clackamas Rivers. There are no populations of bull trout in the Coast Fork Willamette River watershed, and there is no designated critical habitat in the Coast Fork watershed.

4.5.2. Environmental Consequences

Under the No Action Alternative, there would be no direct or indirect effects to the area's fish or wildlife, including threatened and endangered species and their habitats. There would be no changes associated with flows in the Coast Fork Willamette River, and therefore there would be no changes to habitats associated with the river as a result of this action. The

[10] https://www.fws.gov/oregonfwo/Species/Data/OregonChub/

habitats which support the area's fish and wildlife, while degraded, would remain intact and functioning in their current state. While habitats are expected to be further restricted and degrade over time due to current land use practices and existing stressors, the No Action Alternative would neither induce nor prevent these natural changes from happening. There are minimum flow requirements for fish and wildlife, per the NMFS and USFWS 2008 BiOps, and these flows would not change as a result of the No Action Alternative.

Similarly, the Proposed Action would have no direct or indirect effects to fish and wildlife in the Coast Fork watershed, including threatened and endangered species and their habitats. The overall quality and quantity of water downstream from the City would not alter or change the physical, chemical, or biological conditions of the river or the watershed, resulting in no impacts to fish and wildlife habitat. The City's withdrawal and use of 2 cfs for M&I purposes would have immeasurable impacts on existing conditions in the watershed. Like the No Action Alternative, any water withdrawn from the rivers would still be subjected to the minimum flow requirements associated with the NMFS and USFWS 2008 BiOps, and as a result, implementing the proposed action would not result in adverse impacts to the watershed's fish and wildlife.

4.6. Air Quality and Noise Pollution

Lane County is not monitored by the Oregon DEQ for air quality. Instead, a local air protection agency, the Lane Regional Air Protection Agency (LRAPA) monitors air quality for Lane County using standards developed by the EPA. While the City of Creswell is not specifically monitored for air quality, it is geographically close to the Eugene/Springfield metropolitan area. For this reason, air quality in Creswell is assumed to be consistent with that in the Eugene/Springfield metropolitan area. The area in the Eugene/Springfield urban growth boundary is designated by the EPA and Oregon DEQ regulations as a non-attainment area for Particulate Matter 10 and is classified as *moderate* for air quality (LRAPA 2010). Air quality in the area is within federal air quality standards found on the DEQ website at http://www.deq.state.or.us/aqi/index.aspx.

The LRAPA and the EPA's Air Quality Index (AQI) data shows that air quality has generally improved over the past twenty years. The AQI uses local monitoring data to assess possible health impacts associated with poor air quality. Data from 2010 showed that particulates, ozone and carbon monoxide levels were at record lows since the 1970's and 1980's, and motor vehicle exhaust has decreased by up to 50% following educational programs implemented in the early 2000s to reduce emissions and improve fuel efficiency (LRAPA 2010). As a result, air quality for Lane County is (on average) good and is considered to have little or no risk to human health.

Sources of noise in the Coast Fork Willamette River watershed are limited to traffic along major arterials, which are not considered impactful. Sensitive sites for noise and air quality are schools and hospitals.

4.6.1. Environmental Consequences

Under the No Action Alternative, there will be no effect on air quality or noise pollution and current trends are expected continue. Currently, the primary air quality and noise concerns are the result of everyday practices and processes commonplace in rural and larger metropolitan areas: traffic, industry, wood or other incidental burning, forestry, or agricultural activities (LRAPA 2010). Under the No Action Alternative, current living practices in the area are expected to mimic current conditions and the practices and processes representing the primary air quality and noise pollution concerns would not change and as a result, there would be no changes to air quality, noise pollution or subsequent risks to human health.

If the Proposed Action were implemented, current regulatory mechanisms would continue to limit air and noise pollution and changes to air quality would not be measurable against the existing background concentrations. As a result, there would be no direct or indirect changes to air quality or noise thresholds resulting from the City's withdrawal of 2 cfs from the Coast Fork Willamette River and any consequential changes to land use practices.

4.7. Cultural Resources

At the time of Euro-American contact, the Upper Willamette Valley was populated by Native American peoples who spoke languages belonging to the Kalapuyan language family. At least 13 distinct "bands" or "tribes" were present that roughly correspond with the major tributary subbasins of the Willamette River. The Winefelly band occupied the lower Coast and Middle Forks area (Heritage Research Associates [HRA] 2012).

The Kalapuyan bands used a variety of fish, wildlife, and vegetable resources in riverine, lowland and upland habitats. Because Willamette Falls restricted anadromous fish access to the Upper Willamette River Basin to Chinook and steelhead, the Kalapuyan bands were not as reliant on salmon as other Northwestern native populations. Kalapuyan settlement and subsistence patterns were closely tied to two primary seasonal patterns (wet winters and dry summers) each year. The rainy seasons were spent at permanent winter villages that consisted of multifamily winter dwellings composed of bark or plank houses excavated into the ground and subsistence activities included hunting, fishing and use of stored vegetable resources. Dry seasons were spent in temporary camps near concentrations of specific resources such as camas shoots and bulbs, which were collected in large quantities and roasted in large subterranean rock ovens and dried for winter use or trade. Hunting and fishing occurred year-round, and vegetable resources were reliant on seasonal availability. The practice of burning prairies improved the habitat for camas and other vegetable resources and also provided forage for game animals (HRA 2012).

Archaeological research has been conducted at several sites in the Upper Willamette Valley during the past decades. Artifacts such as large fluted and stemmed projectile points, as well as other stone tools have been found in multiple locations by both amateur and professional archaeologists, but have not been dated. The oldest known sites along the Long Tom River have been radiocarbon dated to between 9660 and 9130 years before present (BP) (HRA 2012). Other Early Archaic Period materials such as roasted camas bulbs and charcoal have been dated to 7750-6525 BP; Middle Archaic Period (6000-2000 BP) artifacts include broad-necked projectile points, milling stone technology and features such as camas ovens, pit houses, and burial sites, and the Late Archaic Period (2000-200 BP) is evidenced by the introduction of small, narrow-necked projectile points, which are believed to reflect a change from atlatl and dart technology to bow and arrow use. By about 5000 BP, there was an increase in plant processing using rock ovens. The intensification of processing and storage of food resources has been interpreted as a possible catalyst that led to a substantial increase in population, greater social complexity, and increased sedentism (O'Neill et al. 2004).

Historic settlement in the study area, as indicated by numerous donation land claims, began in the 1840s. In 1847, Richard Robinson became the Coast Fork subbasin's southernmost settler when he staked his claim just north of present day Cottage Grove (CFWWC 2005). Further settlement in the Coast Fork valley was spurred by emigration along the nearby Oregon Trail and Applegate Trail. For much of the late 1800s and early 1900s, the subbasin's floodplain area was used for a variety of agricultural purposes including fruit and nut orchards, hay production, hops, alfalfa, vegetable crops, as well as livestock grazing. Gold was discovered in the Bohemia Mountains above Cottage Grove in 1858 resulting in a substantial increase in

settlement in Cottage Grove (Cottage Grove Historical Society 2012). In 1872, the Southern Pacific Railroad line connecting Southern Oregon to Portland was completed, spurring population growth for the region.

4.7.1. Environmental Consequences

Under the No Action Alternative, there would be no potential for direct or indirect effects to cultural or historic resources, and for this reason, the No Action Alternative would result in a *no potential to cause effects* on properties on or eligible to the National Register of Historic Places (NRHP).

Similarly under the Proposed Action, thre would be no potential for direct or indirect effects to cultural or historic resources. The City's withdrawal of water from the Coast Fork Willamette River would utilize existing infrastructure and no new construction or ground disturbing activities would occur as a direct result of the action. For this reason, the Proposed Action would result in a *no potential to cause effects* on properties on or eligible to the National Register of Historic Places (NRHP).

4.8. Recreation

The Dorena and Cottage Grove reservoirs support a high level of recreation during the summer months when the conservation pools are full or nearly full. Cottage Grove Lake is popular for water-skiing and fishing and ranks 73rd out of all water bodies in the state for recreational boating, according to the Oregon State Marine Board. It is also popular for lakeside camping and day use associated with waterborne recreation. The Corps operates three day-use parks and two campgrounds at Cottage Grove Lake: Pine Meadows and Primitive Campgrounds are popular destinations on summer weekends. Cottage Grove Lake has boat access available to low pool and the Corps' facilities are used to capacity during the summer months. All of the beaches at the lake are most usable within the upper three feet of the maximum conservation pool elevation. However, some facilities, such as Wilson Creek Park swimming beach, are sensitive to small amounts of drawdown and use may decline at lower reservoir elevations.

Dorena Lake offers a a similar variety of recreation activities and ranks 58th in the state for boating use. Dorena Lake is a popular boating lake with higher percentage of sailboats and sailboards and a smaller percentage of water skiers than Cottage Grove. Schwarz Campground, operated by the Corps, is located immediately downstream of the dam. The Corps also operates two day use parks along Dorena Reservoir. Baker Bay Park, operated by Lane County, includes a day-use area, boat ramp, marina, and campground. The paved Row River Trail, operated by the U.S. Bureau of Land Management, follows Dorena Lake's north shore and can be used for biking, hiking, and horseback riding. Baker Bay and Schwarz campgrounds are highly used during the summer recreation season. However, the camping opportunities are not as closely related to waterborne recreation as at Cottage Grove. Dorena is less sensitive to minor drawdowns of the reservoir than Cottage Grove because of its steeper shoreline and drawdowns of a few feet do not substantially reduce the surface area available for boating and recreation.

4.8.1. Environmental Consequences

Recreational opportunities in the Coast Fork Willamette River watershed (inclusive of the Dorena and Cottage Grove reservoirs) would not change as a result of implementing the No Action Alternative. There would be no changes from existing conditions of the pool elevations at either reservoir. Additionally, there would be changes to the downstream flows and

consequently no impacts recreational opportunities (camping, boating, kayaking, swimming, etc.) that currently exist on the river downstream from the projects or at the reservoirs and lakeside campgrounds.

The Corps determined there would be no discernible changes to the pool elevations of the Dorena or Cottage Grove reservoirs, no changes to the rate and/or volume of drawdown, and no measurable changes to the downstream flow if the Proposed Action were implemented (Corps 2014). The withdrawal of 2 cfs from the Coast Fork Willamette River during the summer months is a discountable volume of water relative to the average summer flows (414 cfs). For these reasons, the Proposed Action would have no direct effects to recreational opportunities within the watershed, or across the entire WVP.

4.9. Socio-Economics

Several different social parameters are key drivers to economic and environmental effects related to water availability and related infrastructure in the City of Creswell. Population size depends primarily on employment opportunities and resource management initiatives affecting city residents. Population changes in response to changing economic opportunities depend on several factors, including alternative employment opportunities, age structure, quality of life/attachment to the area, and family characteristics, all of which will depend on adequate water supply.

According to the U.S. Census Bureau, the City has a total area of 1.72 square miles, of which 1.7 square miles is land and .02 square miles is water. There were 5,031 people in 1,906 households residing in the City, creating a population density of 1,190 inhabitants per square mile. As of the 2010 Census data, 2,441 residents in the City were part of the labor force, wherein 95% (2,318 people) were employed outside city limits, leaving only 123 residents living, as well as working, within city limits. Of the employees within city limits (792 people, 669 coming from outside the city), the majority of the jobs were in Retail Trade (19.2%), Health Care and Social Assistance (16.2%), and Lodging and Food Service Industry (13.8%), with over 80% of the labor force within the city making less than $3,333 per month.

Home ownership in the City is relatively high; approximately 71% of the households owned a home, in comparison to 62.5% for the rest of the state of Oregon. Housing in multi-unit structures between 2008 and 2012 was only 12.5% for the city, as opposed to 23.2% for the rest of the state. Although the median household income for city residents ($40,731) was less than the rest of the state ($50,036), the percentage of people below the poverty rate within the city was 11.6% vs. 15.5% for the state of Oregon.

4.9.1. Environmental Consequences

The City would not be able to meet current and future demands if the No Action Alternative were implemented. If the City does not withdraw an additional 2 cfs of water from the Coast Fork Willamette River for M&I purposes, future planning and growth would be restricted by the amount of water available to support residents, businesses and industry. Assuming future population growth follows recent trends, the City could experience an influx of upwards of 5,000 residents and the population could double by 2025. In these circumstances, the No Action Alternative would not be able to support this expansion, thereby having detrimental impacts to economic growth.

The current regulatory framework ensures future development or changes in land use are compliant with the applicable laws and implemented conservation measures intended to minimize direct and indirect impacts to socio-economic resources. Land use and planning

actions for the City are provided by the Lane Council of Governments (LCOG), an independent public agency established to coordinate public services across Lane County which facilitates the inclusion of both local and regional perspectives into comprehensive plans. If the Proposed Action were implemented, the City would have the resources (water supply) to support current need and meet future demand as it aligns with comprehensive land use plans. The Proposed Action would provide greater flexibility to the City in meeting future planning efforts during the summer months, when water is most limited. Regional job growth is expected to follow existing patterns, resulting in increased retail, health care, lodging and food services.

4.10. Hydropower

Cottage Grove does not have a hydropower plant for power generation. A private hydropower project is under construction at Dorena Dam: Dorena Hydro, LLC. This company expects to bring the plant online in the spring of 2014. However, it should be noted that hydropower generation at Dorena will only utilize the Corps' determined discharges from the reservoir to support power generation and no additional discharges from Dorena will be made to support power generation. Dorena Hydro LLC does not have authority or right to request an increase or decrease in flows from the federal project. Rather, the Corps will continue to release flows to meet authorized downstream purposes and flow targets at Albany and Salem.

4.10.1. Environmental Consequences

As discussed in Section 4.1.1.1, the WVP is operated as a system for downstream flood control. Power generation is an authorized purpose for those dams with hydropower infrastructure (Hills Creek, Lookout Point, Cougar, Green Peter, Foster, Detroit, Big Cliff, and Dexter dams). Because there would be no operational changes to the Dorena and/or Cottage Grove dams during the winter flood season or the summer conservation season, the WVP would experience no direct or indirect changes under either the No Action Alternative or the Proposed Action. Similarly, no changes to non-federal hydropower facilities are expected to occur from either the No Action or the Proposed Action. The volume of water in the river downstream from the City would not measurably change, and therefore any hydropower projects downstream from the City would not be impacted measurably. As a result, there would be no effect to hydropower generation across the Willamette Basin under both the No Action Alternative and the Proposed Action.

4.11. Irrigation

When the reservoirs were authorized and constructed, it was expected that widespread agriculture would expand throughout the Willamette Valley and the need for irrigation water would necessarily increase. Water-rights certificates issued by the OWRD to the U.S. Bureau of Reclamation (Reclamation) authorize storage in the Willamette Valley Project reservoirs for irrigation and supplemental irrigation. However, the extensive need for irrigation never developed throughout the valley as expected and only 72,000 acre-feet is currently contracted for agricultural uses throughout the Willamette Valley.

The Corps works with Reclamation to market stored water from the WVP, inclusive of the Dorena and Cottage Grove reservoirs, for the purpose of supporting irrigation needs. Reclamation currently administers 8 irrigation contracts for stored water in the Coast Fork Willamette River watershed, totaling 688 acre-feet. Table 7 identifies the number and quantity of stored water contracts supplied in part or entirely from the Coast Fork reservoirs. Dorena and Cottage Grove reservoirs are also used to supply 36,993 acre-feet to 76 mainstem Willamette River irrigation contracts (which are beyond the scope of this assessment).

Table 7: Stored water currently contracted for irrigation using Dorena or Cottage Grove reservoirs

Reservoir Providing Water	Number of Contractors	Total Acre-feet Contracted	Total Acres Served
Dorena and Cottage Grove, combined	6	581	233
Dorena, only	1	51	20
Cottage Grove, only	1	56	45
Sub-total on the Coast Fork	**8**	**688**	**298**

4.11.1. Environmental Consequences

Existing water rights for irrigation would not change under the No Action Alternative, and all irrigation contracts would continue to be met by existing flows. The current and forecasted need for stored water to support irrigation is low. Furthermore, it is not necessary for the Corps to alter dam operations (such as increasing flows) for the purpose of accommodating contract requirements.

As discussed in the above resources, the withdrawal of 2 cfs from the river would have immeasurable impacts to downstream flows. As a result, all existing irrigation contracts would continue to be supported by the existing flows if the Proposed Action were implemented and the City entered into an agreement with the Corps to withdraw an additional 2 cfs from the Coast Fork Willamette River for M&I purposes. In addition, the Corps' *Surplus Letter Report* determined the City's request for 437 acre-feet of water could be supported by surplus water (Corps 2014). As noted in Section 1.1, the Corps defines surplus water as stored water which is not needed to meet other authorized purposes, and which would be beneficially used for M&I purposes and which would not substantially affect other authorized purposes.

4.12. Navigation

House Document 531 outlined flow objectives for downstream control points at Albany and Salem, as well as minimum releases from the WVP between June and October to meet these objectives. The Congressionally authorized flow objectives during the summer (conservation) season were originally developed to maintain a specified navigation depth on the mainstem Willamette River. While the federal navigation channel is not maintained upstream of Portland, Oregon, the flows originally authorized for the Corps' navigation mission satisfy minimum flow requirements for fish and wildlife and water quality objectives, as listed in the NMFS and USFWS 2008 BiOps.

As described in Section 4.1.1.1 above, minimum releases from Dorena Dam are 190 cfs between February and June, and 100 cfs between July and November. The minimum releases from Cottage Grove are 75 cfs between February and June, and 50 cfs between July and November.

4.12.1. Environmental Consequences

There would be no changes to minimum flows in the Coast Fork Willamette River, and therefore no effects to downstream navigation under the No Action Alternative or the Proposed Action. The Corps would still meet downstream flow targets at Albany and Salem under both alternatives during moderate flow years.

There is no need to alter operations at the Dorena or Cottage Grove dams to accommodate the City's withdrawal of 437 acre-feet between June and September. The volume of water

requested by the City is inconsequential to the average flow during the summer low-flow period and because the hydrology of the Coast Fork Willamette River would not change under the Proposed Action, as described in Section 4.1.2.1, there would be no impacts to navigation if the Proposed Action were implemented.

4.13. Municipal and Industrial Water Supply and Demand

The City of Creswell is the only entity using natural flows from the Coast Fork Willamette River to support municipal water supply needs. To date, there are no agreements for using stored water from any of the WVP reservoirs for M&I water supply, but there is strong interest among water suppliers and users in the Willamette Basin.

Supply sources and projected water demands for the City's municipal and industrial uses are described in the City's 2004 Water System Master Plan, the 2008 Southern Willamette Valley Municipal Water Providers report, the City's 2012 Water System Analysis, and the City's 2013 Community Water Profile (Southwood 2004, SWMWP 2008, Southwood 2012, and LCOG 2013 respectively). The 2008 SWMWP report, which was funded by OWRD as part of its Water Supply and Conservation Initiative, described the City's 2007 population as 4,650 and its water demand for the four-month period of June-September as approximately 127 million gallons, equivalent to 390 acre-feet.

As described earlier, Lane County projected the City's current population of approximately 5,000 to increase to 9,758 in 2025 and 11,727 in the year 2032 (Lane County 2009). Based on recent per capita use figures, the City's (instantaneous) water demand in the near future (2015) could exceed 2,082 gallons per minute (gpm), which equates to approximately 3 million gallons per day or 9.3 acre-feet per day (Analysis 2012 and Profile 2013). Between June and September, 10 acre-feet per day equates to almost 1,134 acre-feet.

4.13.1. Environmental Consequences

The OWRD's administrative rules generally prohibit issuance of a new year-round municipal water right from natural surface and groundwater flows. Furthermore, these rules "classify" (allow use of) surface water within the Coast Fork watershed for municipal use only from December 1 through April 30 of each year. As a result, all new M&I water supply demand(s) are required to seek an alternate or supplemental source of water and the OWRD has determined a preference for the use of stored water in WVP reservoirs to meet new water supply demands.

Under the No Action Alternative, the demand for M&I water would continue to increase. In this scenario, if the City were not authorized to withdraw additional water from the Coast Fork Willamette River, it could not meet existing M&I water supply needs. The State of Oregon has the authority to grant a preference for human consumption (cooking, drinking, sanitation, etc.) and livestock watering during Governor-declared droughts. This authority could result in modified operations during dry years to ensure adequate storage is maintained through summer, low flow season to meet the municipal demand. As a result, existing water supply sources would be continually stressed, which could have detrimental impacts on future population growth and socio-economic conditions in the region.

Providing 437 acre-feet of storage specifically for the City's M&I water supply needs as part of the Proposed Action would meet the City's demand for M&I water without measurably impacting natural flows in the Coast Fork Willamette River. As noted above, there would be no changes to the availability of water to meet existing water rights and downstream uses.

4.14. Climate Change

Climate is governed by incoming solar radiation and the associated greenhouse effects which influence short-term, seasonal, and long-term weather patterns. Greenhouse gases include (in the order of importance to the greenhouse effect): water vapor, carbon dioxide, methane, nitrous oxide and ozone. Anthropogenic activities, such as the burning of fossil fuels and the clearing of forests, adds additional greenhouse gases to the atmosphere and create a natural sink for carbon dioxide, intensifying natural greenhouse effects, and ultimately causing changes to global, regional, and local climates.

Executive Order 13514 and subsequent guidance from the Council on Environmental Quality (CEQ 2011a and 2011b) led to development of Corps policy and planning documents: the *Climate Change Adaptation Policy Statement* and the *Climate Change Adaptation Plan and Report* (Corps 2011, 2012, and 2013, respectively). The policy states, "mainstreaming climate change adaptation means that it will be considered at every step in the project lifecycle for all [Corps] projects, both existing and planned . . . to reduce vulnerabilities and to enhance the resilience of our water resource infrastructure." In its *2013 Climate Change Adaptation Plan*, the Corps identified four categories of climate change effects which have the potential to impact its national mission and operations (Corps 2013). These four categories include:

1. increasing air temperatures,
2. changing precipitation,
3. increases in extreme events, and
4. sea level change and associated tides, waves, and surges

4.14.1. Environmental Consequences

Climate change is widely recognized as a critical issue with potentially wide-ranging effects on water resources, fish and wildlife species and their habitats, and other natural resources. It has also been suggested that the effects of climate change will exacerbate temperatures; the timing and magnitude of stream flow; habitat loss, isolation and degradation; invasive species; and drought. According to the U.S. Global Change Research Program (USGRP), the average regional air temperatures have increased by an average of 1.5°F over the last century (up to 4°F in some areas), with warming trends expected to continue into the next century (2009). Precipitation trends during the next century are less certain than those for temperature, but increased precipitation is likely to occur during October through March and less during summer, with more winter precipitation falling as rain rather than snow (ISAB 2007, USGCRP 2009).

The effects of climate change in the Action Area could lead to a change in the timing of precipitation, the extent of snowpack, and rain-on-snow events, all of which culminate in changes to the timing and magnitude of stream flows and water temperatures during the spring and summer months (ISAB 2007, USGCRP 2009). These changes will not be spatially homogeneous across the Willamette Basin, but could influence stream flows during the summer low-flow period. Low-lying areas, which contribute little to total stream flow, are likely to be more affected by changing hydrologic conditions at higher elevations. Regardless, because the scope of this assessment is limited to the Coast Fork watershed for a maximum period of 5 years (per the City's agreement with the Corps), the potential direct and indirect effects of climate change under both the No Action Alternative and Proposed Action would be immeasurable.

5. CUMULATIVE EFFECTS

This section analyzes the potential cumulative impacts that may occur following implementation of the Proposed Action when considered with other past, present, and reasonably foreseeable actions. Cumulative effects are defined as, "the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 C.F.R. § 1508.7). Cumulative impacts can result from individually minor actions, but which can collectively have a measurable impact over a period of time in a specific geographic area.

The geographic boundaries and cumulative effects vary for each resource, but the boundary for this analysis has been limited to the Coast Fork Willamette River watershed, the Action Area as described in Section 1.3. Analogous to the resources evaluated in Chapter 4, only those resources which could reflect a measurable, cumulative impact in the Coast Fork Willamette River watershed were evaluated in this analysis. Resources excluded from analysis include: geography and geology, topography, soils, and sediment quality. Furthermore, this analysis uses the same measurable threshold(s) to assess the social and environmental impacts for both the No Action Alternative and the Proposed Action. In general, effects of a particular action or group of actions would be considered to have a measurable cumulative impact if one of the following conditions are met:

- Effects of several actions occur in a common location;
- Effects are not localized and contribute to effects of an action in a different location;
- Effects on a particular resource are similar in nature or affect the same specific resource element; and
- Effects are long-term or permanent.[11]

It should be noted that this EA used a framework for assessing cumulative effects, and relied upon assumptions and uncertainties because specific data on the environmental effects of other past, present, and reasonably foreseeable actions is often incomplete or unavailable. As a result, the potential impacts on resources are expressed in qualitative terms or as a relative change from current conditions.

5.1. Past Actions

The Council on Environmental Quality (CEQ) issued a memorandum on June 24, 2005 regarding analysis of past actions. This memorandum states, "…agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." Thus, this section characterizes the existing conditions of the affected resources and discusses how the direct and indirect effects from implementing the Proposed Action may contribute to impacts from present and reasonably foreseeable future actions.

The existing conditions in the Coast Fork Willamette River watershed include the past construction and current operation and maintenance of the Dorena and Cottage Grove dams

[11] By definition, short-term impacts tend to dissipate over time and cease to contribute to the cumulative effects as the effects subside or become inconsequential.

and reservoirs. The construction fundamentally changed the character of the watershed, moderating flood flows during the winter by strategically storing and releasing water to minimize flooding. In addition to flood control, the dams and reservoirs function maintain downstream flows throughout the summer via the strategic release of water to supplement downstream inflows. Given the year-round maintenance of downstream flows, the OWRD and the Reclamation have issued a number of water rights and irrigation contracts over time to meet authorized purposes and downstream uses.

5.2. Present Actions

- Operation and maintenance of the Dorena and Cottage Grove dams and reservoirs;
- Water contracts for irrigation and existing water rights;
- Operation and maintenance of the new hydropower facility at Dorena Dam;
- The Nature Conservancy funded restoration at Pudding Creek near the confluence of Middle Fork Willamette River
- Maintenance of approximately 100 miles of power line between the Alvey sub-station and Fairview, Oregon.

5.3. Reasonably Foreseeable Future Actions

While present and ongoing activities could continue for many years into the future, and which could contribute to cumulative impacts, it is speculative to consider actions beyond what is reasonably foreseeable. The reasonably foreseeable nature of future actions promotes a forward-looking perspective, and the temporal boundary for this analysis has been established for 10 years. This timeframe captures the effects of future actions within the timeframe relevant to the 5-year surplus water agreement, with a possible 5-year extension period (total of 10 years).

- Continued operation and maintenance of the Dorena and Cottage Grove dams and reservoirs;
- Issuance of new water rights and/or irrigation contracts, in agreement with the OWRD's policies and regulations, the Corps, and Reclamation;
- Full allocation of the WVP for all authorized purposes;
- Growth and development in the City of Creswell.

The Corps intends to continue operating and maintaining the Dorena and Cottage Grove reservoirs into the future and it is assumed that Reclamation and the OWRD will continue to issue new irrigation contracts and water rights when and where it is authorized.

The Proposed Action is a separate activity that is fully independent from the proposed full-scale allocation of the stored water in the WVP. The proposed full-scale allocation is a reasonably foreseeable future action, but it is currently unknown when the Corps (and project sponsors) will initiate a feasibility study to evaluate the alternatives and potential effects of this action on the authorized purposes. In addition, the evaluation of potential effects on relevant resources from the proposed full-scale allocation is speculative in nature and cannot be adequately accounted for or described in this analysis. Per NEPA requirements, any future allocations will undergo an independent analysis to evaluate all potential effects, and that analysis will be made publicly available during the decision-making process.

Local population growth and urban development is expected to occur over time and additional water supply would support this growth and development. However, local and state land use restrictions and planning guidelines offer a multitude of conservation measures to protect vital natural resources and prevent the functional loss of these resources. The Oregon Department of Land Conservation and Development (DLCD) maintains a program dedicated to land use planning for the state, and has described 19 statewide planning goals, policies, and guidelines which are achieved through comprehensive local planning (DLCD 2010). Specific to the resources evaluated in this EA, Goal 5 of the statewide planning goals and guidelines intends "to protect natural resources and conserve scenic and historic areas and open spaces", which includes riparian areas (inclusive of water, riparian areas, and fish habitat), wetlands, wildlife habitat, natural areas, and several other natural resources (DLCD 2010).

These future projects would necessarily need to work with federal, state and local resource agencies to adhere to conservation measures and permitting requirements.

5.4. Cumulative Effects Summary

The cumulative effects analysis considered the effects of implementing the Proposed Action against the No Action alternative in association with past, present, and reasonably foreseeable future actions by the Corps and other parties.

A summary of the cumulative effects to relevant resources that may occur in the Action Area are provided in Table 8.

Table 8: Cumulative effects to resources

	No Action Alternative	Proposed Action
Water Resources	When combined with the past, present, and reasonably foreseeable future actions, the No Action Alternative would have no impact on water resources in the Coast Fork Willamette River watershed. Minimum and maximum flows would continue to be regulated by strategic release of water from the Dorena and Cottage Grove dams and reservoirs, and these releases would not change in response to the actions detailed above.	Water resources would not measurably change from current conditions in the Action Area by implementing the Proposed Action. In addition, the operation of the Dorena and Cottage Grove dams would not change in support of the Proposed Action. As a result, the cumulative effects of present and reasonably foreseeable future actions would not affect the hydraulics or hydrology of the Coast Fork watershed. Minimum and maximum flows would continue to be regulated by strategic release of water from the Dorena and Cottage Grove dams and reservoirs, and these releases would not change in response to the present and future actions detailed above.
Riparian Habitats and Vegetation	Past, present and reasonably foreseeable future actions would not result in cumulatively measurable impacts on riparian habitats and vegetation in the Action Area under the No Action Alternative. Invasive species would continue to stress native species but would be controlled to the extent practicable. Present and future actions would continue stressing riparian habitats, and land use planning goals and policies would continue to provide protective measures for these resources.	There would be no measurable cumulative effects to riparian habitats or vegetation in the Action Area from implementing the Proposed Action when evaluated in combination with the present and reasonably foreseeable future actions. Current land use activities already stress these habitats and the Proposed Action would not measurably decrease quality or quantity of habitat, neither would it directly increase the extent of invasive species coverage. Population growth and the conversion of natural habitats into urban and rural land uses are expected to occur regardless of implementing the Proposed Action. However, the rate and extent of growth is speculative, and the Proposed Action would support increased demand for reliable water supply. Despite growth, statewide planning goals and conservation policies provide a multitude of safeguards to protect these resources. Planning and conservation options identified by LCOG are expected to minimize adverse effects to riparian areas that would result from increased growth, which is expected to occur irrespective of the additional supply of reliable water. Any impacts to riparian areas or other sensitive habitats are expected to be similar to those that would occur as a result of changing land use

	No Action Alternative	Proposed Action
		practices under the expected population growth, and therefore indirect impacts from the Proposed Action are considered to be inconsequential. Consequently the Proposed Action is not expected to result in cumulative impact to riparian habitats in the Action Area.
Wetlands and Aquatic Habitats	The No Action Alternative would not measurably increase impacts to wetlands and aquatic habitats above the baseline conditions currently present in the Coast Fork watershed. Existing regulatory mechanisms prevent the widespread loss or conversion of wetland habitats. In addition, the above listed present and future actions are not expected to substantially impact wetland or aquatic habitats, and as a result, there would be no measurable cumulative effects to these areas under the No Action Alternative.	There would be no measurable cumulative effects to wetlands and aquatic habitats in the Action Area from implementing the Proposed Action when evaluated in combination with the present and reasonably foreseeable future actions. Current land use activities already stress these habitats and the Proposed Action would not measurably decrease quality or quantity of habitat, neither would it directly increase the extent of invasive species coverage. Population growth and the conversion of natural habitats into urban and rural land uses are expected to occur regardless of implementing the Proposed Action. However, the rate and extent of growth is speculative and the Proposed Action would support increased demand for reliable water supply. Despite growth, statewide planning goals and conservation policies provide a multitude of safeguards to protect these valuable resources. Similar to riparian areas, wetlands are protected under the statewide planning goals (Goal 5), and further protected under the Clean Water Act (CWA). While development or expansion of the urban growth boundary could adversely affect wetlands or aquatic habitats, these impacts would be minimized to the extent practicable. Consequently, the Proposed Action and all present and future actions are not expected cumulative impact wetland habitats in the Action Area.
Water Quality	The combined effects of the present and future actions listed above are not expected to measurably degrade water quality over baseline conditions or impact specific water quality parameters over time. Current regulatory mechanisms would continue to safe guard water quality, and the No Action Alternative would have no measurable cumulative effect to water quality in the	The combined effects of the Proposed Action and all present and future actions listed above are not expected to measurably degrade water quality over baseline conditions or impact specific water quality parameters over time. Current regulatory mechanisms safeguard water quality

	No Action Alternative	Proposed Action
	Coast Fork Willamette River.	and the Proposed Action would have immeasurable effects to water quality in the Coast Fork Willamette River. Minimum flows in the river are maintained to support water quality, and the volume of water withdrawn from the river is too inconsequential to affect downstream water quality, resulting in no measureable cumulative effects from implementing the Proposed Action.
Fish and Wildlife	Cumulative impacts to fish and wildlife resources would result from habitat loss and degradation, which are summarized in Chapter 4. For example, habitats could become increasingly fragmented or degraded to a point where they are non-functional for feeding, sheltering and migrating fish and wildlife.	Cumulative impacts to fish and wildlife resources result from indirect effects of habitat loss and degradation which results from increased growth and development in the Action Area. As population growth occurs in the watershed land use conversion is expected to occur, which could reduce the availability, quality and quantity, and accessibility of habitats for fish and wildlife. However, local and regional planning goals and objectives consider impacts to fish and wildlife, and consequently impacts to these resources is expected to be minimized, even if the Proposed Action were implemented (DLCD 2010 and LCOG 2010). Despite these goals and objectives, there may be minor changes to land uses resulting from implementing the Proposed Action. While these changes are not expected to result in substantial impacts to fish and wildlife, there could be minor, cumulative effects to these resources.
Air Quality and Noise Pollution	The cumulative effects to air quality and noise pollution in the Action Area would not measurably degrade or increase over the existing baseline conditions in response to the present and future actions. While population growth is expected to occur, increasing the volume of traffic, traffic patterns along major highways and roads would remain similar to current conditions in the future. Road improvements would be largely restricted to existing roadways. It is assumed that no major changes to noise patterns would occur in the Action Area as a result of increased traffic, as a result of population growth and development.	The cumulative effects to air quality from implementing the Proposed Action, when considered in tandem with the present and future actions listed above, are not expected to measurably change from current conditions and trends in the Action Area. All present and future actions would adhere to state and federal air quality standards, and as a result, the cumulative effects are not expected to increase from current conditions. While population growth is expected to occur, this could result in more roaded areas and increased traffic throughout the region. However, these actions are speculative and are not expected to occur within the temporal scope of this analysis. As a result, the cumulative effects on air quality and noise pollution

	No Action Alternative	Proposed Action
		from traffic would be slightly different from current conditions.
Cultural Resources	Under the No Action Alternative, the cumulative effects to cultural and historic resources in the Action Area would not measurably increase over existing conditions. The present and reasonably foreseeable future actions would not impact cultural or historic resources, and as a result, these resources would not experience substantially greater impacts over time.	Under the Proposed Action, the cumulative effects to cultural and historic resources in the Action Area would not be measurably greater than aggregate effects of past actions. Increased population growth and development is assumed to occur with a reliable supply of water for M&I use. As a result, the Proposed Action could have the potential to indirectly affect cultural and historic resources. However, existing regulatory mechanisms at the local, state, national and tribal level would protect these resources where construction or ground disturbing activities would occur. For this reason, the present and reasonably foreseeable future actions are not expected to impact cultural or historic resources, and as a result, these resources would not experience substantially greater impacts over time.
Recreation	Recreational use of the Dorena and Cottage Grove reservoirs, the Coast Fork Willamette River and its watershed are expected to increase over time in response to natural population growth. As more natural areas are used for recreation, the existing pressures on natural resources are expected to continue into the future, causing increase habitat degradation and further limiting recovery of threatened and endangered species. For this reason, the cumulative effects to (and of) recreation in the Coast Fork Willamette River watershed would not be measurably greater than existing conditions under the No Action Alternative.	Similar to the No Action Alternative, as more natural areas are used for recreation, the existing pressures on natural resources are expected to continue into the future, cumulatively degrading habitats. However, many regulatory mechanisms are in place to safe guard natural resources and prevent the continued degradation of public use areas. As a result, the cumulative effects to (and of) recreation in the Coast Fork Willamette River watershed would not be measurably greater than existing conditions under the Proposed Action. As population growth occurs throughout the Willamette Basin, increased use of the reservoirs and the river is expected to occur. While the magnitude or frequency of recreation may increase, the types of recreation are not expected to differ from what the current types of opportunities (fishing, boating, swimming, etc.). However, any potential population growth associated with the Proposed Action is not likely to substantially impact the magnitude, frequency or type of recreation that current occurs in the Coast Fork watershed.

	No Action Alternative	Proposed Action
Socio-Ecomonics	Population growth is expected to continue into the future, though the rates and extent of growth is speculative. Current living practices are not expected to change in the future, and it is expected that future trends will mimic regional trends and conditions. Under the No Action Alternative, the socio-economic conditions and population growth in the Action Area is expected to result increased stress to other resources.	Population growth is expected to continue into the future, which would be supported by implementing the Proposed Action. Current living practices are expected to continue and all future land plans would be guided by local and comprehensive statewide community plans and goals. The socio-economic conditions for the City are not expected to cumulatively change in response to the present and reasonably foreseeable future actions. This analysis is limited to a 10-year time period, and all population growth and resulting effects from the present and future actions would be supported by the Proposed Action.
Hydropower	Hydropower generation is expected to increase in the future as the private plant at Dorena comes online. However, the Dorena dam would not impact reservoir elevations, downstream flows, or the Corps operations of Dorena. As a result, the cumulative effects of present and future actions under the No Action Alternative would not result in measurable changes to hydropower resources in the Coast Fork watershed.	Hydropower generation is expected to increase in the future as the private plant at Dorena comes online. However, the Dorena dam would not impact reservoir elevations, downstream flows, or the Corps operations of Dorena. As a result, the cumulative effects of present and future actions under the Proposed Action would not measurably change hydropower generation in the Coast Fork watershed.
Irrigation	While population growth is expected to occur throughout the Action Area, there are no known plans to expand agricultural areas (and consequential expansion of irrigation) to support this growth. As a result, implementation of the No Action alternative, combined with the present and future actions listed above, are not expected to result in measurable, cumulative effects to irrigation throughout the Coast Fork watershed.	The Proposed Action would support increased population growth, and no agricultural expansion is foreseeable. Any future irrigation in the Coast Fork watershed is not expected to substantially exceed the relative proportion of water currently used for these purposes or measurably impact other authorized purposes. Consequently, when the Proposed Action is evaluated with regards to the present and future actions listed above, no measurable cumulative effects to irrigation would occur throughout the Action Area.
Navigation	The cumulative effects of present and future actions would have no measurable impact on minimum flows in the Coast Fork Willamette River. Consequently, there are no measurable cumulative effects on navigation in the Coast Fork watershed with the No Action alternative	The cumulative effects of present and future actions would have no measurable impact on minimum flows in the Coast Fork Willamette River. Consequently, there are no measurable cumulative effects on navigation in the Coast Fork watershed with the Proposed Action.

	No Action Alternative	Proposed Action
Municipal & Industrial Water Supply	The City of Creswell cannot currently meet existing water supply needs. As population growth occurs in the future the demand for M&I water supply is expected to measurably increase. The City would have decreased ability to support increased M&I needs under the No Action alternative.	Under the Proposed Action, the City of Creswell would have a reliable source of water to meet its current and forecasted M&I water needs. As population growth occurs, the demands for M&I water supply are expected to measurably increase. Assuming growth rates do not exceed the City's projected population by 2025, implementation of the Proposed Action would meet present and future M&I water supply needs, and the cumulative effects would be immeasurable.

6. STATUS OF ENVIRONMENTAL COMPLIANCE

The following laws provide environmental standards for operation and maintenance activities at Corps civil works projects, associated lands, and outgrant, and are related to environmental stewardship. The following discussions demonstrate how the Proposed Action complies with environmental laws and executive orders for operation and maintenance activities at Corps civil works projects, associated lands, and out-grants.

6.1. National Environmental Policy Act (NEPA) of 1969

Under NEPA, federal agencies are required to identify significant environmental resources likely to be affected by proposed activities as well as make an assessment of the impacts to those resources and consider a full range of alternative actions. Environmental considerations are fully integrated into the decision-making process. The analysis of impacts to the environmental baseline in response to the proposed alternatives, and in consideration of the laws and Executive Orders described herein, this Environmental Assessment furthers the requirements of the NEPA, as amended (42 U.S.C. § 4321 et seq.) as discussed within this document.

Finding: After the public comment period for this EA, the Corps would consider their impacts and their level of significance.

6.2. Endangered Species Act (ESA) of 1973

The ESA (16 U.S.C. § 1531 *et seq*.) was enacted to protect and conserve endangered and threatened species and critical habitat. Requirements established in 16 U.S.C. § 1531 ensure activities authorized, funded, and carried out by federal agencies are not likely to jeopardize the continued existence of any listed species or result in adverse impacts to designated critical habitat of a listed species. The USFWS and NMFS share responsibility for the administration of ESA listed species.

Finding: The proposed action will not disturb physical, chemical, or biological resources in the project area. The loss of 2 cfs from the Coast Fork Willamette River downstream from the City of Creswell will not measurably affect velocities and therefore will not measurably influence parameters associated with water quantity or quality (temperature, pH, turbidity, etc.), thereby having no effect to habitat availability. Furthermore, minimum flows for ESA-listed fish are a required component of the 2008 biological opinions which further support the continued existence and recovery of threatened and endangered fish. The proposed use of surplus water will not decrease minimum flows in the Coast Fork watershed.

For these reasons, the City's withdrawal of 437 acre-feet of water from the Coast Fork Willamette River for M&I use will have *"no effect"* on any ESA-listed species or their habitats that may be present in the project area.

6.3. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, 6 November 2000

Executive Order 13175 requires all Federal agencies to formulate "an accountable process to ensure meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications. This consultation is meant to work towards a mutual consensus

and is intended to begin at the earliest planning stages, before decisions are made and actions are taken.

Finding: Government-to-government coordination for cultural and natural resources was coordinated via letter correspondence (5 May 2014) with the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians; Confederated Tribes of the Grand Ronde; Confederated Tribes of Siletz Indians; Confederated Tribes of the Warm Springs; Cow Creek Band of Umpqua Indians; and the Cowlitz Indian Tribe. To date, no response has been received.

6.4. Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976

The MSA (U.S.C. 1801 *et seq*.) is designed to actively conserve and manage fishery resources found off the coasts of the United States to support international fishery agreements for the conservation and management of highly migratory species. The MSA established procedures designed to identify, conserve and enhance Essential Fish Habitat (EFH) for fisheries regulated under a federal fisheries management plan. EFH is defined as "…those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Federal agencies must consult with the NMFS on all proposed actions authorized, funded or carried out by the agency which may adversely affect EFH.

Finding: As with the above determination for ESA, the effects of the proposed action will not affect ESA-listed fish or their designated critical habitat. As a result, there will be *"no adverse effect"* on EFH.

6.5. National Historic Preservation Act

This Act is designed to protect and conserve cultural resources and ensure that development does not harm or degrade them. Section 106 of the National Historic Preservation Act (NHPA) requires all Federal agencies to consider the potential effects of their projects and undertakings on historic properties eligible for or currently listed on the National Register of Historic Places (National Register): http://www.cr.nps.gov/nr/. Historic properties are archaeological sites or historic structures or the remnants of sites or structures. To determine the potential effect of the project on known or unknown historic properties: the nature of the proposed activity and its effect on the landscape is evaluated; the likelihood that historic properties are present within a project area is assessed; an assessment is made as to whether the ground is disturbed by previous land use activities and the extent of the disturbance; and there is a review of listings of known archeological or historic site locations, including site data bases and areas previously surveyed or listings of sites on the National Register of Historic Places.

Finding: Although Dorena Dam and Cottage Grove Dam (constructed in 1949 and 1942, respectively) are both considered historic properties, neither would be affected by the withdrawal of surplus water. Furthermore, use of surplus water from the Dorena and Cottage Grove reservoirs for use in the Coast Fork sub-basin would not require additional construction, ground-disturbing activities or cause changes to the landscape. Surplus water would only involve water redistribution through existing infrastructure and would not cause changes in reservoir elevations and downstream river levels. Therefore, on 31 July 2013, the District Archaeologist, Daniel Mulligan, determined that the proposed undertaking will result in a determination of "*no potential to affect*" and that Section 106

coordination with the Oregon State Historic Preservation Office and Native American Tribes is not required.

6.6. Other Laws and Executive Orders

Supplying the City with 437 acre-feet of surplus water is confined to the Coast Fork Willamette River, including the Cottage Grove and Dorena reservoirs and areas downstream of the dam. The proposed action, the release and use of surplus water, will not involve the construction of any new infrastructure and is not considered a new water resource project. The proposed action would not impact farmlands, cultural or natural resources (including fish and wildlife, nor would it impact wetlands or floodplain habitats), nor would it alter or degrade the physical, chemical, or biological components in the Coast Fork watershed, including air and water quality. No birds will be negatively impacted by the release or M&I use of surplus water, and no nesting habitat will be destroyed or adversely modified. The Coast Fork watershed is outside of the coastal zone and inaccessible to marine mammals. In addition, neither the Coast Fork of the Willamette River nor the Row River are designated as Wild and Scenic Rivers. No communities or environmental justice populations will be impacted by the proposed action.

For these reasons, the following laws do not require further evaluation for impact or assessment for compliance:

- Bald and Golden Eagle Protection Act, 1940
- Clean Air Act, 1970
- Clean Water Act, 1972
- Coastal Zone Management Act, 1972
- Comprehensive Environmental Response, Compensation and Liability Act, 1980
- Farmlands Protection Policy Act, 1994
- Fish and Wildlife Coordination Act, 1958
- Marine Mammal Protection Act, 1972
- Marine Protection, Research and Sanctuaries Act (Section 103), 1972
- Migratory Bird Treaty Act, 1918
- Native American Graves Protection and Repatriation Act, 1990
- Wild and Scenic Rivers Act, 1968
- Executive Order 11593, Protection and Enhancement of the Cultural Environment, May 1971
- Executive Order 11988, Flood Plain Management, 24 May 1977
- Executive Order 11990, Protection of Wetlands, 24 May 1977
- Executive Order 12898, Environmental Justice, 11 February 1994
- Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance, 5 October 2009
- Executive Order 13186, Migratory Birds, 10 January 2001

7. COORDINATION AND DISTRIBUTION

Public concerns identified in comments would aid in determination of whether or not an EIS is necessary for the Proposed Action. If it is determined that an EIS is not required, a FONSI would be prepared and signed, concluding the NEPA process.

This draft EA is being issued for a 15-day public review period, beginning 5 May 2014 and ending 20 May 2014. Comments are requested from all members of the public, federal and state agencies, interested Tribes and other interested parties. The Surplus Letter Report (Corps 2014) was made available for public review and comment via the Corps' website in February 2014, http://www.nwp.usace.army.mil/Media/Announcements.aspx. A public notice was sent to all interested parties with water rights on the Coast Fork Willamette River for the public review period for this EA, including the following agencies and groups:

City of Creswell, Oregon

City of Cottage Grove, Oregon

City of Eugene, Oregon

Coast Fork Willamette Watershed Council

Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians

Confederated Tribes of the Grand Ronde

Confederated Tribes of Siletz Indians

Confederated Tribes of the Warm Springs

Cow Creek Band of Umpqua Indians

Cowlitz Indian Tribe

Junction City Water Control District

Lane County, Oregon

National Marine Fisheries Service

Natural Resources Conservation Service

Oregon State Historic Preservation Office

Oregon Department of Environmental Quality

Oregon Department of Fish and Wildlife

Oregon Department of Geology and Mineral Industries

Oregon Department of Land Conservation and Development

Oregon Department of Parks and Recreation

Oregon Department of State Lands

Oregon Natural Resources Council

Oregon Water Resource Department, District #2 Watermaster

State of Oregon, Governor's Office

U.S. Bureau of Reclamation

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

Willamette Riverkeeper

8. REFERENCES AND LITERATURE CITED

Council on Environmental Quality (CEQ). 2011a. Federal agency climate change adaptation planning: Implementing instructions. 4 March 2011. President's Council on Environmental Quality, Office of the White House, Washington, DC. http://www.whitehouse.gov/sites/default/files/microsites/ceq/adaptation_final_implementing_instructions_3_3.pdf

CEQ (Council on Environmental Quality). 2011b. Federal agency climate change adaptation planning: Support Document. 4 March 2011. President's Council on Environmental Quality, Office of the White House, Washington, DC. http://www.whitehouse.gov/sites/default/files/microsites/ceq/adaptation_support_document_3_3.pdfCoast Fork Willamette Watershed Council (CFWWC) 2005. Lower Coast Fork Willamette River, Oregon Watershed Assessment.

Cottage Grove Historical Society. 2012. Website accessed at: *http://cottagegrovehistoricalsociety.com/*

DEQ 2012. 2012 Oregon Air Quality Data Summaries. State of Oregon Department of Environmental Quality. November 2013. DEQ-AQ-034-13.

Dykaar, B.B. July 2005. Status and trends of Middle and Coast Forks Willamette River and their floodplain habitat using geomorphic indicators. Prepared for Willamette Partnership and U.S. Army Corps of Engineers by Ecohydrology West, Santa Cruz CA.

GSI Water Solutions, Inc., CH2M Hill, and HDR Inc. 2010. City of Corvallis, Water Use and Water Conservation Project, August 2010.

Heritage Research Associates (HRA). 2012. Archaeological Survey of The Nature Conservancy's Willamette Confluence Preserve, Lane County, Oregon. Heritage Research Associates Report No. 369.

Hulse, D., S. Gregory and J. Baker (eds.). 2002. *Willamette River Basin Planning Atlas*, *Trajectories of environmental and ecological change*. 2nd Edition. Prepared by the Pacific Northwest Ecosystem Research Consortium. Oregon State University Press, Corvallis.

ISAB (Independent Scientific Advisory Board). 2007. Climate change impacts on Columbia River Basin fish and wildlife. ISAB Climate Change Report, ISAB 2007-2, Northwest Power and Conservation Council, Portland, OR. Jones, Philip. 2005. Lower Coast Fork Willamette River Watershed Assessment. Final Report, June 2005. Prepared for Coast Fork Willamette Watershed Council.

Lane Council of Governments (LCOG) 2010. Inventory, Assessment, and Protection of Wetland and Riparian Resources Using Oregon Statewide Planning Goal 5 and Goal 6: Options to Consider. Produced by the Lane Council of Governments for the Multi-City County Water Resource Assessment Project Team. June 2010.

LCOG 2013. City of Creswell Community Water Profile, June 2013.

Lane County. 2009. Report on Lane County Coordinated Population Forecast 2025-2030

Lane Regional Air Protection Agency (LRAPA). 2010. 2010 Annual Report.

National Marine Fisheries Service (NMFS). 2008. Endangered Species Act Section 7(a)(2) Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and

Management Act Essential Fish Habitat Consultation on the Willamette River Basin Flood Control Project. July 11, 2008. NOAA Fisheries Log Number: F/NWR/2000/02117.

Northwest Power and Conservation Council (NPCCa). May 28, 2004a. Draft Willamette Subbasin Plan. Prepared for the Northwest Power and Conservation Council by the Willamette Restoration Initiative.

Northwest Power and Conservation Council (NPCCb). May 28, 2004b. Protection, restoration, and management of terrestrial habitats and species of the Willamette subbasin. Technical Appendix D to the Draft Willamette Subbasin Plan. Prepared for the Northwest Power and Conservation Council by the Willamette Restoration Initiative.

O'Neill, B.L., T.J. Connolly, and D.E. Freidel. 2004. A Hologene Geoarchaeological Record for the Upper Willamette Valley, Oregon: The Long Tom and Chalker Sites. University of Oregon Anthropological Papers No. 61, Eugene, OR.

Oregon Department of Land Conservation and Development (DLCD). 2010. Oregon's Statewide Planning Goals and Guidelines. March 2010. Salem, Oregon.

Oregon Natural Heritage Information Center (ORNHIC). 2004. Rare, threatened and endangered species of Oregon. Oregon Natural Heritage Information Center, Oregon State University, Portland OR.

Southwood Engineering Corporation (Southwood). 2004. City of Creswell Water System Master Plan, July 2004.

Southwood Engineering Corporation. 2012. City of Creswell Water System Analysis, April 2012.

SWVMWP 2008. Southern Willamette Valley Municipal Water Providers (SWMWP), Final Report. Prepared by GSI, Water Solutions, Inc. for the Oregon Water Supply and Conservation Initiative (OWSCI). November 2008.

Thompson, K.E., J.M. Hutchison, J.D. Fortune, and R.W. Phillips. 1966. Fish resources of the Willamette Basin. Willamette Basin Review, App. D: Fish and Wildlife; Sect. II: Present Status. Oregon State Game Commission, Portland.

U.S. Army Corps of Engineers (Corps). 1982. Willamette River projects: hydrologic and temperature effects, preliminary literature review and data analysis. Portland District, Portland OR.

Corps. 2000. Biological Assessment of the Effects of the Willamette River Basin Flood Control Project on Species Listed under the Endangered Species Act. Prepared by U.S. Army Corps of Engineers, Portland, OR and R2 Resource Consultants, Seattle, WA.

Corps. 2011. USACE Climate Change Adaptation Policy Statement. 3 June 2011. Office of the Assistant Secretary of the Army for Civil Works, Washington, DC. http://www.corpsclimate.us/docs/USACEAdaptationPolicy3June2011.pdf

Corps. 2012. USACE 2012 Climate Change Adaptation Plan and Report. 23 June, 2012. https://corpsclimate.us/docs/2012_USACE_Adaptation_Plan_and_Report_23_June_2012%20final.pdf

Corps. 2013. 2013 Strategic Sustainability Performance Plan. 28 June 2013. Office of the Assistant Secretary of the Army for Civil Works, Washington, DC. http://www.usace.army.mil/missions/sustainability/strategicsustainabilityperformanceplans.aspx

Corps. 2014. Coast Fork Willamette River, Oregon Surplus Water Supply Letter Report. U.S. Army Corps of Engineers, Portland District. March 2014.

U.S. Fish and Wildlife Service (USFWS). 2008. Endangered Species Act Section 7 Consultation Biological Opinion on the Continued Operation and Maintenance of the Willamette River Basin Project and Effects to Oregon Chub, Bull Trout, and Bull Trout Critical Habitat Designated Under the Endangered Species Act. July 11, 2008. File number: 8330.F0224(07).

USGCSP (U.S. Global Change Research Program). 2009. Our Changing Planet: The U.S. Climate Change Science Program. Available at http://www.usgcrp.gov/usgcrp/Library/ocp2009/.