

WATER MANAGEMENT AND CONSERVATION PLAN

FINAL REVISED VERSION
January 13, 2011

FARMERS IRRIGATION DISTRICT
1985 COUNTRY CLUB ROAD
HOOD RIVER, OREGON 97031

VERSION 9.0

Farmers Irrigation District

1985 Country Club Road
Hood River, Oregon 97031
(503) 386-3115

RESOLUTION NO. 06-95

WHEREAS, the Farmers Irrigation District has adopted a Conservation, Pressurization, Construction and Contract Review Board Policy, and that Policy requires that all District plans and activities conform to the District's Water Conservation and Management Plan; and

WHEREAS, the District's Water Conservation and Management Plan is being submitted to the State of Oregon Water Resources Department for evaluation and adoption; therefore,

IT IS RESOLVED that the District Board hereby adopts as its Conservation policy the District's March 17, 1995 Water Conservation and Management Plan in its present form, together with all future modifications, amendments and deletions thereto which further the goals of the March 17, 1995 Plan and which conform to Oregon Water Law and to the Administrative Rules of the Oregon Water Resources Department.

DATED this 15th day of March, 1995.



TIM ANNALA, District Chairman

ATTEST:



Recording Secretary

PREFACE

Oregon statute and administrative rules require under some circumstances that irrigation districts adopt and implement water conservation plans. Insofar as any legislative mandate creates a necessary force for change, it might be argued that the Farmers Irrigation District, in writing this document, is merely attempting to obey the laws of the state. Those who created this document, nevertheless, hope such an argument is without substance. In drafting this comprehensive plan, it is our intent to transcend any notion that it is acceptable for anyone to behave avariciously by appropriating water for a single purpose.

As it is finally beginning to unfold, the new Oregon water policy has within it the seeds of hope for a broad, balanced ecological perspective that acknowledges the simple tenet that no part of the world may be understood apart from the whole. In his book, The Diversity of Life, Edward O. Wilson wrote that "[e]xcept in pockets of ignorance and malice, there is no longer an ideological war between conservationists and developers." This truth forms the core and spirit of this document.

March 1995

EXECUTIVE SUMMARY

The Farmers Irrigation District (FID or District) Water Management and Conservation Plan (WMCP or Plan) responds to legal and ethical mandates and establishes goals, objectives, and methods to balance economic growth, enhance crop yield, decrease kilowatt hour demand, increase kilowatt hour production, increase summer in-stream flow, increase fish populations, and increase irrigation efficiency within a watershed system context. The core hypothesis of this Plan suggests that summer in-stream flow can be increased with an associated benefit to irrigated agriculture. The District's first Plan, created in 1995, resulted in the realization of virtually all of these goals, objectives, and methods, but the quest to further realize District goals continues. The District serves irrigation water to 5,888.25 acres and 1851 accounts in northern Hood River County and annually generates up to 27 million kilowatt hours of certified Low Impact Hydropower Institute (LIHI) power. District projects are funded by annual assessments, generation revenue, loans, and grants. Financial assistance has historically been provided by many partners but more recently has shifted almost exclusively to the Oregon Department of Environmental Quality (ODEQ) State Revolving Fund (SRF) and the American Recovery and Rehabilitation Act (ARRA) along with the Energy Trust of Oregon. Special mention is made of David Ulbricht and the Special Districts Association of Oregon (SDAO) Flex-lease program, without which the District's original conservation and pressurization project would never have seen the light of day. The Hood River Valley's relatively dry, warm summers used to instill a perceived need to exploit virtually all District surface water sources, and, historically, the District maintained 34 unscreened water diversions to provide water to three primary service canals, which are Farmers Canal, Lowline Canal, and Highline Canal. As a result of its water conservation projects, however, the District now operates with only 6 water diversions, and these diversions are fully screened and fish safe. One thousand acre-feet of supplemental water are stored in Kingsley Reservoirs, which receive water through the Stanley Smith Pipeline from Gate Creek. The irrigation distribution system consisted of open, gravity flow canals and flood systems for about the first 100 years of the District's existence, but, as of Summer 2010, as measured by length, 99.5 percent of the District's system has been converted to a fully enclosed pressure pipe irrigation distribution system. A comprehensive remote telemetry network provides stream flow and diversion data for ongoing efficiency assessments, compliance with minimum in-stream flow agreements, and state-of-the-art District operations. The District service area elevations range from 2250 feet to 180 feet above sea level, providing substantial potential energy, which the District exploits for the production of hydroelectricity. Fully regulated or metered water is supplied to all District water users for irrigation at 5.6 gallons/minute/acre, and the seasonal limit is 3.0 acre-feet/acre although most users rarely exceed 2.0 acre-feet/acre. If drought conditions of a magnitude sufficient to impact District water delivery were to arise, the District's curtailment plan calls for public notices, flow reductions, supply rotation, or, finally, delivery shutdown. Since virtually all of the conservation strategies from the 1995 Plan are complete, this 2010 Plan requires the District to complete what little remains of the 1995 Plan and to continue various ongoing water conservation practices. Accordingly, pipe construction in the final open reaches on Farmers and Lowline canals, pressurization of the last 35 accounts on the District system, and enhancement or possible consolidation of the District's reservoirs remain on the list and are identified as work items in this 2010 Plan. This 2010 Plan also requires ongoing water user education programs, compliance with established minimum in-stream flow agreements, on-farm sprinkler enhancement programs, cooperation and participation with the Hood River Watershed Group, and stream restoration projects. Irrigation, spray, and other agricultural water rights are now delivered without end-loss. The Hood River Basin is closed to further appropriation, and no increased irrigation water demand is anticipated. Abandoned water rights, typically the result of urbanization, after holding an appropriate amount in reserve, are leased in-stream through OWRD for the common good. Watershed and fish restoration projects ensure that in-stream summer flows are beneficial to fish and other aquatic species. Enhanced on-farm irrigation water delivery and water use ensure that water is reasonably used without waste based on actual crop needs. Except for the aforementioned 35 accounts, all private pumps have been eliminated from the District system. Most of the District's water pressure is induced by gravity (elevation difference), but the flat areas of the District are served pressure by a single central pump station with 5 highly efficient variable frequency drive (VFD) pumps. The District's 1995 conservation plan has been very successful, resulting in the elimination of nearly all canal water losses, improved headgates, fully gauged, metered, or regulated water diversions and supply taps, state-of-the-art horizontal fish screen and sediment management facilities, water user education programs, restored watersheds, and a highly professional staff of District employees. Periodic reviews of this Plan are required to assess effectiveness. For a useful version of this Plan, see the District's WMCP implementation document, which is its Sustainability Plan, at <http://www.fidhr.org/pdf/policies/Spring-2009-Sustainability-Vision-Document-revision.pdf>.

WMCP Item	Section
Section 1 Water Supplier Description - OAR 690-086-0240	
Summary of water rights	1.1
Source(s) of water	1.2
Schematic of the system	1.3
Current water use, including peak and average annual diversions	1.4
Summary of major classifications of uses and users	1.5
Types of on-farm irrigation systems commonly used	1.6
Crops commonly grown, estimated average and peak consumptive use	1.7
Description of the operation and maintenance program.	1.8
Section 2 Water Conservation Element - OAR 690-086-0250	
Progress report on conservation measures from previously approved WMCP	2.1
Description of the water supplier's agricultural water measurement program	2.2
Description of other conservation measures currently implemented	2.3
Short and long-term goals of the water supplier to improve water management	2.4
Evaluation of the opportunities for improving water use efficiency:	
Description of losses of water from canals, pipelines, and laterals	2.5
Assessment of whether water deliveries are insufficient to meet crop needs	2.5
List of alternative conservation measures to reduce the losses of water identified in (a) and address insufficiencies of water deliveries identified in (b)	2.5
Assessment of alternatives to finance conservation measures	
For each of the following conservation measures not currently implemented, an evaluation of whether implementation is feasible and appropriate:	
Promotion of energy audits for district water users	2.6
Conversion to metered, pressurized deliveries to all parcels of 1 acre or less	2.6
Piping or lining earthen canals to reduce losses	2.6
Modifying facilities and policies to increase the flexibility of deliveries	2.6
Provision of on-farm irrigation scheduling assistance	2.6
Construction of re-regulating reservoirs	2.6
Adoption of rate structures that support and encourage water conservation	2.6
Any other conservation measures identified by the water supplier that would improve water use efficiency.	2.6
Description and estimated schedule for implementation of each of the following conservation measures:	
Information and education program addressing all types of uses served	2.7
Any other conservation measures identified as feasible and appropriate	2.7
A program to monitor and evaluate implemented conservation measures	2.8

Section 3 Water Curtailment Element - OAR 690-086-0260		
	Description of past supply deficiencies and current capacity limitations	3.1
	Description of situation(s) that trigger implementation of water curtailment element	3.2
	Description of the procedure used to allocate water during shortages	3.3
Section 4 Water Supply Element - OAR 690-086-0270		
	Estimate of long-range water demand projections for 20 years	4.1
	Comparison of the projected water needs and available sources	4.2
	List of potential sources of water to supply the long-range needs	4.3
	Comparison of potential sources of additional water	4.4
Evaluation of the effects of the following factors on long-range water needs:		
	Regional options for meeting future water needs	4.5
	Urbanization and other land use trends	4.5
	Local government related plans or ordinances	4.5
Section 5 Additional Requirements - OAR 690-086-0225		
	List of the affected local governments to whom the plan water made available and a copy of any comments on the plan provided by the local governments	5.1
	Proposed date for submittal of an updated WMCP	5.2
Section 6 Background Information		

INTRODUCTION

This Farmers Irrigation District (FID or District) Water Management and Conservation Plan (WMCP or Plan) describes steps to further enhance District water delivery, Low Impact Hydropower (LIHI) production, and in-stream flow and fish restoration work. District goals reflect awareness that actions have consequences for future generations. This plan seeks balance and provides irrigators with the opportunity to reduce carbon footprint and ecosystem load. The goals of the District and fish agencies are fundamentally the same. A properly managed irrigation district advances the common good. Submitted in accordance with OAR Chapter 690 Division 86, this Plan provides District base data and specifically describes conservation goals and objectives. The first five sections follow the order of the OAR 690 Division 86 rules; Section 6 describes District history, climate, and geography. The District's first Plan was approved in 1995 by then-acting OWRD Director, Martha Pagel. This 2010 Plan updates the original 1995 Plan.

SECTION 1: SYSTEM DESCRIPTION (OAR 690-086-0240)

Overview and Location

Farmers Irrigation District is organized under the provisions of Chapter 545 of the Oregon Revised Statutes. The District is located in the Columbia River Gorge and the Hood River Basin in northern Hood River County, Oregon. The City of Hood River and the Columbia River form the north border of the District, and the Hood River creates the southeastern border. The Cascade Mountain Range forms the western District boundary. The District is part of the Oak Grove Watershed in the Hood River Basin. The City of Portland is approximately sixty miles to the west. The present-day District consists of the original Farmers Irrigation District and the former Hood River Irrigation District. These two former districts shared a common boundary nearly eight miles long. Irrigated lands in the

District range in elevation above sea level from 2250 feet down to 180 feet. Gross area within the District exceeds 12,000 acres. Figure 1 shows the general location of FID within Hood River County in Oregon.

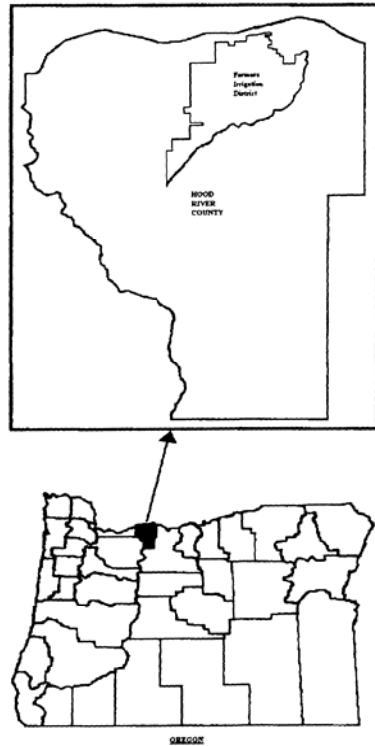


Figure 1
Location map of the
Farmers Irrigation District

The irrigation season for FID is April 15th through September 30th. The Farmers Canal service area is referred to as the Lower District, the Lowline Canal service area is referred to as the Middle District, and the Highline Pipe service area as the Upper District. Water rights held in trust by FID for District water users are specifically as follows:

Certificate 67266

Permit	48576
Source	North Fork Pine Creek, South Fork Pine Creek, Deadpoint Creek, Ditch Creek, and Hood River.
Priority	02/11/1981
Use	Development of 4885 theoretical horsepower at generation Plant #2.
Rate	108 cfs, being 20.0cfs from Dead Point Cr.; 5.0 cfs from North Fork Pine Cr.; 5.0 cfs from South Fork Pine Cr.; 20.0 from Ditch Cr., being a maximum of 35.0 cfs from all sources at any one time, and 73.0 cfs from Hood River.
Duty	N/A
Legal Season	N/A
Actual Season	N/A
Remarks	Hydro-generation certificate

Certificate 67267

Permit	49871
Source	North Fork Pine Creek, South Fork Pine Creek, Deadpoint Creek, and

Ditch Creek.
 Priority 02/11/1981
 Use Development of 2948 theoretical horsepower at generation Plant #3.
 Rate 35 cfs, being 20.0cfs from Dead Point Cr.; 5.0 cfs from North Fork Pine Cr.;
 5.0 cfs from South Fork Pine Cr.; 20.0 from Ditch Cr., being a maximum of 35.0 cfs
 from all sources at any one time.
 Duty N/A
 Legal Season N/A
 Actual Season N/A
 Remarks Hydro-generation certificate

Certificate 74299

Permit Hood River Adjudication 3/13/1922
 Source North Fork Greenpoint Creek, South Fork Greenpoint Creek, Deadpoint Creek and South
 Fork Pine Creek.
 Priority 12/01/1905
 Use Primary irrigation of 191.7 acres, supplemental irrigation 1,745.1 acres.
 Rate 37.5 cfs, being 10.0 cfs from North Fork Green Point Cr.; 15.0 cfs from South Fork Point
 Cr.; 10.0 from Dead Point Cr., and 2.5 cfs from South Fork Pine Cr.
 Duty Not to exceed 3 acre-feet per acre irrigated, per year.
 Legal Season April 15 – September 30.
 Actual Season April – September.
 Remarks This certificate includes primary and supplemental water rights.

Certificate 74302

Permit 12362
 Source North Fork Greenpoint Creek, Upper Greenpoint Reservoir, Lower Greenpoint
 Reservoir.
 Priority 11/22/1933
 Use Supplemental irrigation of 700 acres.
 Rate 8.75 cfs.
 Duty Not to exceed 3 acre-feet per acre irrigated, per year.
 Legal Season April 15 – September 30.
 Actual Season April – September.
 Remarks This supplemental certificate may supply the Middle (Lowline Canal) District.

Certificate 74304

Permit 34538
 Source Hood River
 Priority 07/16/1969
 Use Supplemental irrigation of 1,853.7 acres.
 Rate 7.5 cfs.
 Duty Not to exceed 3 acre-feet per acre irrigated, per year.
 Legal Season April 15 – September 30.
 Actual Season April – September.
 Remarks This supplemental certificate can supply the Middle (Lowline Canal) District.

Certificate 74306

Permit Hood River Adjudication 3/13/1922
 Source Hood River
 Priority 05/07/1906
 Use Primary irrigation of 3,188.05 acres.
 Rate 39.85 cfs.
 Duty Not to exceed 3 acre-feet per acre irrigated, per year.
 Legal Season April 15 – September 30.
 Actual Season April – September.

Remarks

This is the primary water right for the Lower (Farmers Canal) District.

Certificate 74307

Permit Hood River Adjudication 3/13/1922
Source Hood River
Priority 05/07/1906
Use Primary irrigation of 15.4 acres.
Rate 0.19 cfs.
Duty Not to exceed 3 acre-feet per acre irrigated, per year.
Legal Season April 15 – September 30.
Actual Season April – September.
Remarks Additional water right for the Lower (Farmers Canal) District.

Certificate 48819—storage facilities

Permit R-698
Source Gate Creek
Priority 11/22/1933
Use Irrigation
Storage 1003.0 acre feet (af), being 715.0 af in Upper Green Point Res. and 288.0 af in Lower Green Point Res.
Duty N/A
Legal Season January – August
Actual Season February – September
Remarks Upper and Lower Reservoir storage.

Certificate 75809

Permit 49871
Source Gate Creek, Cabin Creek, and North Fork Greenpoint Creek.
Priority 02/11/1981
Use Development of 2097 theoretical horsepower at generation plants 2 and 3.
Rate 25 cfs
Duty N/A
Legal Season N/A
Actual Season N/A
Remarks Linked to Greenpoint Creek Restoration Project, minimum in-stream Green Point Creek flow, fish screen, and water conservation requirements.

Certificate 76230

Permit 51189
Source Rainy Creek, with any deficiency to be made up from Gate Creek, Cabin Creek, Ditch Creek, Deadpoint Creek, Upper and Lower Greenpoint Reservoirs.
Priority 04/27/1989
Use Primary irrigation of 149.5 acres.
Rate 1.87 cfs.
Duty Not to exceed 3 acre-feet per acre irrigated, per year.
Legal Season April 15 – September 30.
Actual Season April – September.
Remarks FID's most junior irrigation water right.

Certificate 77288

Permit Hood River Adjudication 3/13/1922
Source Phelps Creek
Priority 09/15/1904
Use Supplemental irrigation of 166.6 acres.
Rate 2.08 cfs.
Duty Not to exceed 3 acre-feet per acre irrigated, per year.
Legal Season April 15 – September 30.

Actual Season	April – September.
Remarks	This source is collected by the Highline Pipe.
<u>Certificate 81600</u>	
Permit	43968
Source	Deadpoint Creek., with any deficiency in the available supply of water from Dead Point Cr. to be made up by diversion of water from Green Point Cr.
Priority	01/22/1979
Use	Primary irrigation of 1.5 acres.
Rate	0.02 cfs.
Duty	Not to exceed 3 acre-feet per acre irrigated, per year.
Legal Season	April 15 – September 30.
Actual Season	April – September.
<u>Certificate 85974</u>	
Permit	Hood River Adjudication 3/13/1922
Source	Ditch Creek and Deadpoint Creek.
Priority	12/31/1874, 12/19/1892, 10/06/1902
Use	Primary irrigation of 2,260.4 acres.
Rate	30 cfs; being 5.0 cfs from Ditch Creek with a priority of 1874; 15.0 cfs from Dead Point Creek with a priority of December 19, 1892; and 10.0 cfs from Dead Point Creek with a priority of October 6, 1902.
Duty	Not to exceed 3 acre-feet per acre irrigated, per year.
Legal Season	April 15 – September 30.
Actual Season	April – September.
Remarks	This is the Primary water right for the Upper (Highline Pipe) and Middle (Lowline Canal) areas of FID.
<u>Certificate 85975</u>	
Permit	Hood River Adjudication 3/13/1922
Source	Ditch Creek, Parker Springs, North Fork Greenpoint Creek and Spring at Camp #4.
Priority	1891 for Ditch Creek and Parker Springs, and 1899 for North Fork Green Point Creek and Spring at Camp #4
Use	Primary irrigation of 57.3 acres and supplemental irrigation of 2,410.2 acres.
Rate	6.25 cfs, being 1.25 cfs from Ditch Creek and Parker Springs; and 5.0 from North Fork Green Point Creek and Spring at Camp #4.
Duty	Not to exceed 3 acre-feet per acre irrigated, per year.
Legal Season	April 15 – September 30.
Actual Season	April – September.
Remarks	A primary and supplemental right.
<u>Certificate 85976</u>	
Permit	6575
Source	Capron Spring, Winan Spring, Dago Spring, Savage Spring, No Name Spring, Yumbie Spring, North Fork Pine Creek, Unnamed Stream, and Indian Creek.
Priority	02/29/1924
Use	Supplemental irrigation of 1,935.35 acres.
Rate	6.00 cfs.
Duty	Not to exceed 3 acre-feet per acre irrigated, per year.
Legal Season	April 15 – September 30.
Actual Season	April – September.
Remarks	Middle District diversions; flow may be leased in-stream when Lowline Canal is piped.

Certificate Not certificated at this time.
 Permit 39822
 Source Hood River
 Priority 12/05/1974
 Use Orchard spray water
 Rate 30 cfs.
 Duty N/A
 Legal Season February 15 – November 15.
 Actual Season Weather and season dependent.

Certificate Not certificated at this time.
 Permit S-41178
 Source Gate Creek, Deadpoint Creek, Unnamed Stream, Ditch Creek, Greenpoint Creek, North Fork Greenpoint Creek, South Fork Pine Creek, North Fork Pine Creek, and Indian Creek
 Priority 05/17/1976
 Use Orchard spray and frost water.
 Rate 12.99 cfs.

Source	Quantity (cfs) Spraying	Quantity (cfs) Frost Protection	Source	Quantity (cfs) Spraying	Quantity (cfs) Frost Protection
Gate Creek	0.22	0.54	N. Fork Green Point Creek	0.40	1.02
Dead Point Creek	0.61	1.56	S. Fork Pine Creek	0.41	1.02
Unnamed Stream	0.21	0.54	N. Fork Pine Creek	0.41	1.02
Ditch Creek	0.63	1.56	Indian Creek	0.41	1.02
Green Point Creek	0.40	1.01			

Duty N/A
 Legal Season February 15 – November 15.
 Actual Season Weather and season dependent.

Certificate Not certificated at this time.
 Permit S-44002
 Source Hood River, with any deficiency in the available supply of water to be made up by diversion of water from Pine Creek, Ditch Creek, and Spring Brook
 Priority 07/28/1977
 Use Fertilization and Temperature Control
 Rate 26 cfs; being 10.0 cfs for Fertilization and 16.0 for Temperature Control.
 Duty N/A
 Legal Season February 15 – November 15.
 Actual Season Weather and season dependent.

Certificate Not certificated at this time.
 Permit S-45204
 Source Ditch Creek
 Priority 01/08/1980
 Use Primary irrigation of 4.89 acres.
 Rate 0.06 cfs.
 Duty Not to exceed 3 acre-feet per acre irrigated, per year.
 Legal Season April 15 – September 30.
 Actual Season April – September.

Copies of the District’s water permits and certificates follow in Appendix A.

SECTION 1.2: Sources of Water; Storage and Regulation Facilities; and Summary of Transfer, Exchange, or Intergovernmental Agreements (OAR 690-086-0240(2))

The primary sources of water for the FID system are the Hood River, North Fork Green Point Creek, Deadpoint Creek, and Ditch Creek. The Upper (Highline Pipe) and Middle (Lowline Canal) service areas of the District are also dependent upon water from Gate Creek, 1000 acre-feet of which are stored in the District’s Kingsley (also called Greenpoint) reservoirs. Historically, the District utilized 34 points of diversion, but, with the completion of the District’s pressure pipe distribution system, most of these original sources are no longer needed. The Hood River provides water through Farmers Canal to the Lower District. North Fork Green Point Creek and Deadpoint Creek flow through Lowline Canal to serve the Middle District. In addition to the primary sources mentioned above, the District continues to utilize water from Rainy Creek and South Pine Creek to supply water for a small number of primary and supplemental irrigation acres.

Flows from the Kingsley reservoirs are conveyed through Ditch Creek to provide water to both the Middle and Upper Districts. Characteristics of the Kingsley reservoirs are as follows:

Upper Greenpoint Reservoir

Capacity	715 ac-ft
Crest Elevation	3,162 ft
Dam height	50 ft
Crest Length	975 ft
Use	Irrigation
Construction Type/Date	Earthen Fill/1937

Lower Greenpoint Reservoir

Capacity	288 ac-ft
Crest Elevation	3,132 ft
Dam height	80 ft
Crest Length	450 ft
Use	Irrigation
Construction Type/Date	Earthen Fill/1936

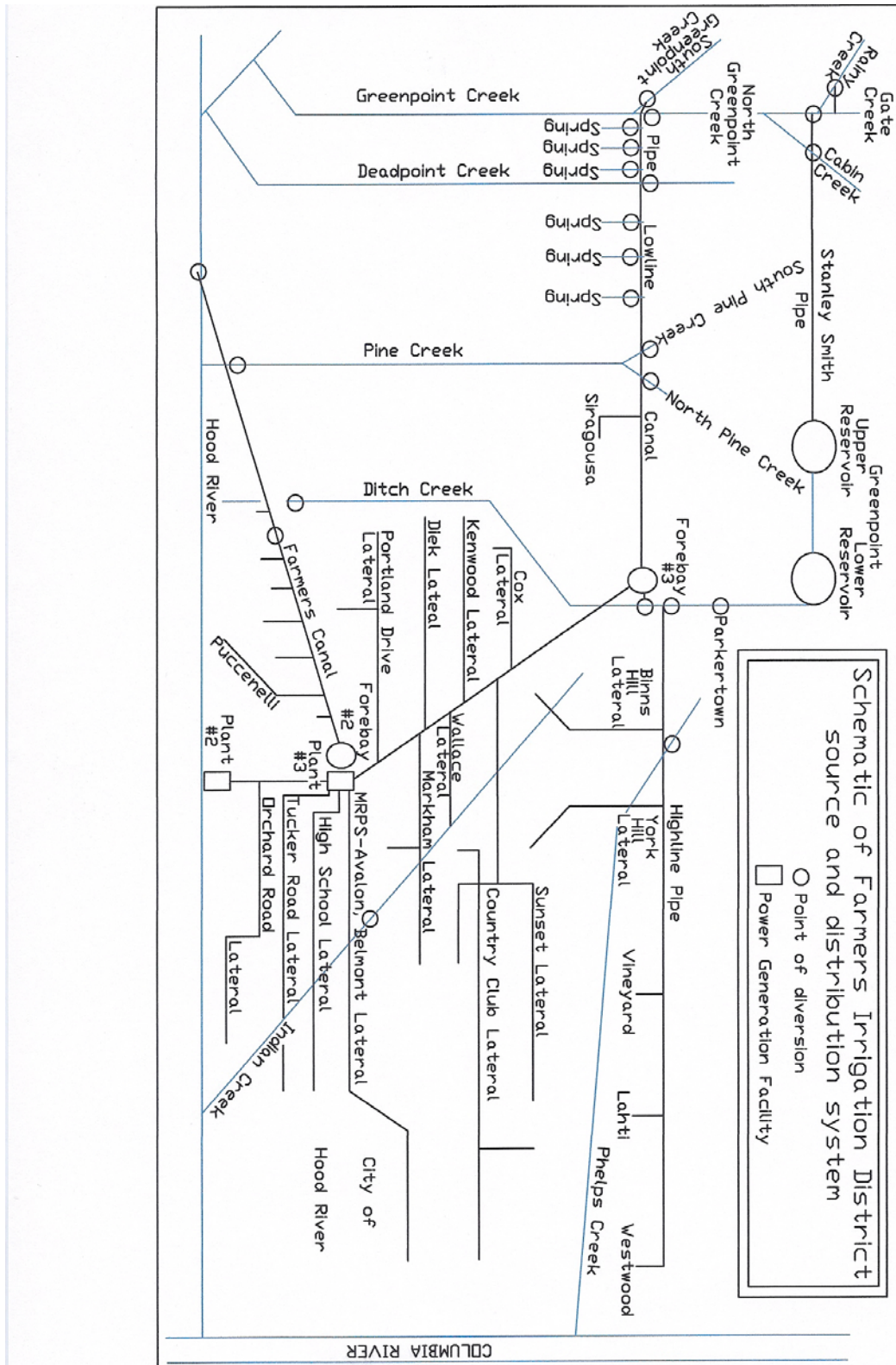
In addition to providing supplemental irrigation water, the reservoirs add to the recreational value of the entire Hood River Valley as a camping, fishing, and boating resource, and they also provide emergency water for fighting forest fires. In 1991 and 1992, the District began conducting a reservoir assessment program using dam safety engineers and geotechnical consultants. Four pore pressure piezometers were installed on each dam to better monitor structural integrity, and piezometer values are collected weekly when the reservoirs contain water. A reservoir rehabilitation design is on-shelf and ready to implement if pore pressure piezometers were ever to suggest that a problem was beginning to develop with one of the dams.

In addition to the above systems, the District also operates two small regulation ponds – Forebay 2 and Forebay 3 – which serve as attenuation inlet facilities for the hydroelectric plants and Middle and Lower District pressure irrigation and pump system.

Parker Town Springs, located downstream of the Greenpoint Reservoirs, provides water to serve the Parker Town Springs Water Association. This association has a water right of 50 miner's inches (1.25 cfs) from Parker Town Springs, and this right is senior to the District’s rights. The Parker Town Association is not part of the District, but, by court agreement dated 24 October, 1921, the District shall convey water in perpetuity to the Association's inlet structure. Furthermore, as prescribed by an intergovernmental urban services agreement between the District and the City of Hood River dated 2 September, 2005, the District may continue to deliver irrigation water within the city limits and the Urban Growth Area. The District has also entered into minimum in-stream flow agreements for Green Point Creek, under OWRD Certificate 75809, and Hood River, dated 13 February, 2009, under an intergovernmental agreement involving ODFW, ODEQ, and FID.

Water quality varies significantly between the higher elevation and the lower elevation District sources. Higher elevation sources originating from groundwater and filtered precipitation off of Mount Defiance are normally very low in turbidity although canal failures and poor forest management practices frequently compromise water quality. Water temperatures are typically quite cool even in the summer months. Due to glacial melt, and periodic debris torrents the consequence of global warming and glacial recession, the Hood River carries relatively large amounts of sediment throughout the irrigation season, and algae can also be an occasional problem although the District's horizontal screen system manages algae without a problem. The District operates a sediment trap at the intake of the Farmers Canal which effectively removes coarse- and medium-grained sand, but silt tends to remain in the diverted water. Bed load consisting of pebble, cobble, and boulder size particles is particularly high during winter months when the District hydroelectric generators approach capacity.

SECTION 1.3: Irrigation System Schematic (OAR 690-086-0240(3))



SECTION 1.4: Current Water Use and Return Flows (OAR 690-086-0240(4))

Current Water Use – Peak Diversions, Average Annual Diversions, and Peak Monthly Diversions

Year	Diversion Name	P.O.D.	Time of Use	Total Annual	Peak Monthly	
				Diversion	Diversion	Peak
				(ac-ft)	(ac-ft)	Diversion (cfs)
2009	Hood River	16129	Year Round	47,811	4,480	72.9
	Deadpoint Creek#3	16098	Year Round	7,115	1,009	16.4
	Gate Creek #1	16114	Year Round	1,592	240	3.91
2008	Hood River	16129	Year Round	49,764	4,905	79
	Deadpoint Creek#3	16098	Year Round	7,830	1,100	17.92
	Gate Creek #1	16114	Year Round	1,582	390	6.35
2007	Hood River	16129	Year Round	40,448	4,702	76
	Deadpoint Creek#3	16098	Year Round	8,062	1,106	18.01
	Gate Creek #1	16114	Year Round	2,057	400	6.51
2006	Hood River	16129	Year Round	46,683	6,465	73
	Deadpoint Creek#3	16098	Year Round	6,737	1,112	18.1
	Gate Creek #1	16114	Year Round	1,965	410	6.68
2005	Hood River	16129	Year Round	63,636	6,465	75
	Deadpoint Creek#3	16098	Year Round	6,772	1,005	16.2
	Gate Creek #1	16114	Year Round	2,065	468	7.62
2004	Hood River	16129	Year Round	53,760	4,480	73
	Deadpoint Creek#3	16098	Year Round	6,645	1,061	17.3
	Gate Creek #1	16114	Year Round	4,918	409.86	6.9
Average						
	Hood River	16129	Year Round	50,350.33	5,249.50	74.8
	Deadpoint Creek#3	16098	Year Round	7,193.50	1,065.50	17.32
	Gate Creek #1	16114	Year Round	2,363.16	386.3	6.32

District flows are quantified utilizing standard USGS methodology including stage-discharge curves, weirs, and meters. Flow data are transmitted via the District’s remote telemetry system into the FID data base computers. Since FID is fully pressurized, end loss is non-existent and return flow is very limited.

Reservoir Storage, Average Monthly Releases, and Daily Average Releases

Year	Reservoir Name	Certificate		Annual	Peak	Daily
		Number	Time of Use	Releases	Monthly	Peak
				(ac-ft/yr)	(ac-ft/mo)	Releases (cfs)
2009	Upper Greenpoint Reservoir	48819	Feb - Sept	715	309	5.2
	Lower Greenpoint Reservoir	48819	Feb - Sept	288	345	5.8
2008	Upper Greenpoint Reservoir	48819	Feb - Sept	715	239	4.02
	Lower Greenpoint Reservoir	48819	Feb - Sept	288	244	4.11
2007	Upper Greenpoint Reservoir	48819	Feb - Sept	715	315	5.3
	Lower Greenpoint Reservoir	48819	Feb - Sept	288	315	5.3
2006	Upper Greenpoint Reservoir	48819	Feb - Sept	715	356	5.9
	Lower Greenpoint Reservoir	48819	Feb - Sept	288	368	6.2
2005	Upper Greenpoint Reservoir	48819	Feb - Sept	715	369	6.21
	Lower Greenpoint Reservoir	48819	Feb - Sept	288	369	6.22
2004	Upper Greenpoint Reservoir	48819	Feb - Sept	715	594	10
	Lower Greenpoint Reservoir	48819	Feb - Sept	288	357	6.01

SECTION 1.5: Classification of User Accounts (OAR 690-086-0240(5))

Based on the 2010 irrigation season billing, the District provides irrigation water to 1851 accounts on 5888.25 acres. Account distributions are as follows:

<u>Acres Distribution Range</u>	<u>Number of Accounts</u>	<u>Total Acres within Range</u>
0.00 - 0.50 Acres	1,232 Accounts	173.00 Acres
0.51 - 1.00 Acres	161 Accounts	197.05 Acres
1.01 - 2.50 Acres	207 Accounts	505.55 Acres
2.51 - 5.00 Acres	117 Accounts	628.95 Acres
5.01 - 10.00 Acres	55 Accounts	625.40 Acres
10.01 - 20.00 Acres	29 Accounts	716.45 Acres
20.01 - 40.00 Acres	24 Accounts	807.75 Acres
40.01 Acres Plus	26 Accounts	2234.10 Acres
Total	1851 Accounts	5888.25 Acres

SECTION 1.6: Types of Irrigation Systems (OAR 690-086-0240(6))

The irrigation systems in the FID are almost entirely solid-set micro-sprinklers and some residual set-move sprinklers. Over the past 25 years, approximately 85 percent of all FID orchardists have converted to solid-set micro-sprinklers.

SECTION 1.7: Crops Commonly Grown, Average and Peak Water Use (OAR 690-086-0240(7))

For ease of estimating irrigation water requirements, information on crops commonly grown and the estimated average and peak consumptive irrigation water use of the crops are combined into this section.

Commonly Grown Crops

Crop types and acreage commonly grown in Hood River Valley are determined by the OSU Extension Service utilizing personal knowledge and the USDA Agricultural Census, corrected to reflect actual values in Hood River Valley. District acres are calculated based on the percentage of total Hood River Valley crop land that is specifically within FID. These values are shown in the table immediately below.

Crop	HR Valley Acres	FID Acres
Pears	11,306	2,889
Apples	1,168	303
Cherries	1,988	517
Hay and forage	1,577	410
Berries, wine grapes, and vegetables	500	130
Total	16,539	4,249

Crop types grown in the District are relatively stable although urban encroachment is systematically chipping away at farm land. About 15 percent of the District consists of land blocks of 2.5 acres or less (see Section 1.5). Now that the District's distribution system is fully enclosed, water is sufficient for crop and urban irrigation needs.

Estimates of Crop Consumptive Use

Water requirements are determined utilizing the [Oregon Crop Water Use and Irrigation Requirements](#) publication as a starting place and then adjusting the values to match actual orchardist data. Accordingly, the values shown below represent irrigation water actually applied on the land. Since the District's distribution system is fully enclosed, water delivery efficiency is very high, system losses are very low, application efficiency is high, and gross and net irrigation requirements are virtually the same. As most of the agricultural land in FID is committed to long term orchards, crops with variable water demands are uncommon. Pesticide and herbicide water (spray water) demands begin in February and continue through December, but these uses are de minimis since the District's system is fully enclosed and pressurized. Irrigation season startup varies widely and begins as early as mid-April or as late as early-July of any given year depending on annual seasonal variations. Irrigation demands typically last through mid-September. Maximum average irrigation requirements occur in July. The following table shows typical irrigation requirements for FID crops over the regular irrigation season of April 15 through September 30 based on average values for 19 out of 20 years. The values assume that about 6 inches of water, on average, are stored in the soil and available for crop use prior to irrigation startup each season.

Irrigation Requirements									
Crop	Acres	Usage in inches						Seasonal Total (inches)	Seasonal Total (ac-ft)
		April	May	June	July	August	September		
Pears	2,889	2.02	3.43	4.53	5.63	4.73	3.05	23.39	5,631
Apples	303	2.13	3.82	4.97	6.14	5.22	3.35	25.63	647
Cherries	517	2.13	3.82	4.97	6.14	5.22	3.35	25.63	1,104
Hay, forage	410	2.24	4.88	5.87	7.13	6.06	4.09	30.27	1,034
Berries, grapes	130	0.00	0.57	2.23	3.38	3.05	2.05	11.28	122
Suburban/urban	1,639	2.50	4.20	5.00	8.50	7.00	4.50	31.70	4,330
Total	5,888	11.02	20.72	27.57	36.92	31.28	20.39	147.90	12,869

When the District's first Water Conservation and Management Plan was implemented in 1995, annual irrigation usage exceeded 27,000 ac-ft.

SECTION 1.8: Operation and Maintenance (OAR 690-086-0240(8))

Operation

The District is divided into five divisions and governed by a five-member Board of Directors, one director per division, elected by the vote of the landowners in each division. Each director serves a three year term. The Board sets District Policy and hires a full time District manager to implement policy and manage District operations. The manager reports to the board; nine full time regular employees report to the District manager.

The District staff consists of an office and finance administrator, administrative assistant, water rights specialist, equipment operator, electrician and hydroelectric plant manager, and four operation and maintenance technicians, one of whom specializes in data collection and analysis. With the District's distribution system fully enclosed in pipe, the operation technicians focus on problem solving for District customers, main canal inspections, reservoir inspections (including dam core piezometer readings) and adjustments, pump and hydroelectric plant operation, fish screen inspections, in-stream minimum flow maintenance, and miscellaneous repair work as required. The operation technicians also rotate on-call duty in order to ensure coverage during non-working hours.

Maintenance and Repair

Following irrigation season, the month of October is reserved for all major repairs to the District's canals, pump and hydroelectric systems, and the distribution system. Canal maintenance consists of mechanical removal of vegetation and sediment. Major capital improvements are also completed during the month of October.

The District maintains a staff of three technical people – a licensed electrician, a physicist, and a geologist – to maintain its master meters and telemetry system. An information technologist is also retained on an annual basis to maintain and upgrade the District's computer system and data storage arrays. The meters are calibrated at least annually or as needed throughout the irrigation and hydroelectric seasons. The District's telemetry system is maintained as needed, and the District's monitoring program calls for adding new data acquisition points and updating the entire system as revenue allows.

The District has no significant recurring operational problems. The District's horizontal screen systems eliminate fish screen operation issues, and the fact that virtually all of the District system is enclosed in pipe eliminates the ongoing need for ditch maintenance. The one exception to this is the need to inspect and monitor approximately four miles of open conveyance canal, but these remaining open canal sections are located in topography that is relatively stable. Accordingly, provided the canals are inspected daily, the canals no longer pose a recurring operational problem.

SECTION 2: WATER CONSERVATION ELEMENT (OAR 690-086-0250)

SECTION 2.1: Progress Report on Previous Measures (OAR 690-086-0250(1))

Since the beginning of its water conservation work in the early 1980s, the District has expended in excess of 30 million dollars on system enhancements. Since the adoption of its 1995 Water Conservation and Management Plan, the District and its Hood River Basin partners have accomplished the following:

- Reduced 34 unscreened water diversions to 6 fully screened diversions
- Returned 2535 acres of supplemental water rights to in-stream flow and reduced frost, temperature control, and spray water requirements by over 95 percent
- Provided agricultural producers with reliable, pressurized water delivery in correct volumes, enabling the use of less water more often, thus reducing overall seasonal use
- Installed pressurized pipe in 99.5 percent of the District, greatly enhancing irrigation efficiency, eliminating end-loss, reducing canal failures and associated habitat destruction, and increasing in-stream flow

- Eliminated 1450 individual pumps and reduced power consumption by 1.45 million kilowatt hours per irrigation season
- Increased renewable Low Impact Hydropower production by 2,255,000 kilowatt hours per irrigation season
- Converted 95 percent of the residential water users to micro-sprinkler technology via the micro-sprinkler exchange program with meters or gauges, reducing individual water use by as much as 300 percent
- Planted 7,800 trees in riparian zones and placed 85,000 board feet of large woody debris at 12 sites on Green Point Creek to restore habitat, regain flood plains, increase complexity, enhance sinuosity, and increase in-stream flow
- Adopted and met minimum flow standards for Green Point Creek and implemented a fish monitoring program with the Oregon Department of Fish and Wildlife and the Confederated Tribes of Warm Springs
- Adopted minimum flow and temperature standards for the Hood River for low flow periods of the year. This is a new agreement with ODFW and ODEQ as of 2009, and the District is committed to complying with the vision and intent of this agreement
- Established a comprehensive stream flow and system efficiency data collection and reporting program, including 15 remote telemetry sites, which ensures minimum in-stream flow compliance and increases hydroelectric revenue by 150 percent
- Reduced operation and maintenance costs, fuel consumption, and wear on equipment and people
- Reduced debt service and established a Project and Watershed Enhancement Fund dedicated to the continuation of projects that restore ecosystem health
- Reduced the potential for canal failures, each one of which costs the aquatic ecosystem an estimated \$485,000 in injury (in 2010 dollars US)
- Constructed Farmers Canal Davenport Fish Screen, enhancing fish protection and eliminating ongoing operation and maintenance costs
- Replaced old Farmers Canal flume with large diameter pipe, and installed an additional 6,000 feet of large diameter pipe to eliminate leaky, unstable sections of Farmers Canal
- Mapped all district water rights in an interactive computer data base and established an on-going program to annually correct and adjust water rights to reflect actual beneficial use

The following two tables summarize the diversion and piping projects completed since 1995 Plan adoption.

Diversion Projects	Description
Farmers Canal Intake	Armored reinforced concrete walls, vortex sediment management tubes Horizontal fish screen and fish return Flume replacement with PVC pipe Telemetric flow data collection system Telemetrically controlled headgate Tunnel bullnose and headgate seal for downstream system protection Riparian enhancement
North Greenpoint Creek	Horizontal fish screen with fish return and riparian enhancement
Deadpoint Creek	Horizontal fish screen connected to Lowline Pipe, riparian enhancement
South Pine Creek	Horizontal fish screen connected to Lowline Pipe, riparian enhancement
North Pine Creek	Horizontal fish screen connected to Lowline Pipe
Mainstem Greenpoint	Telemetric flow data collection system for minimum in-stream flow compliance
Gate Creek	Horizontal fish screen connected to Stanley Smith Pipeline
Cabin Creek	Inlet structure and horizontal fish screen connected to Stanley Smith Pipeline with fish return to Cabin Creek
Upper Greenpoint Reservoir	New upper dam face rip rap, weir, and telemetry
Lower Greenpoint Reservoir	Weir
Ditch Creek	Inlet structure and horizontal fish screen connected to Forebay 3 with fish return and ladder connected to Ditch Creek
South Green Point Creek	Sill and stoplog diversion structure with fish ladder
Rainy Creek	Horizontal fish screen inlet structure

Highline Canal on Ditch Creek	Horizontal fish screen
Parker Town Springs	Horizontal fish screen and inlet structure with fish return chute

Open Canals and Laterals Converted to Pipe

Piping Projects	Length (miles)	Description
Highline Canal	5.10	HDPE and PVC pipe
Farmers Canal (partially piped)	2.50	HDPE and PVC pipe; 3 miles remain to be piped
Lowline Canal (partially piped)	2.50	HDPE pipe; 3 miles remain to be piped
Greenpoint Canal	5.20	PVC and steel pipe
South Greenpoint Canal	0.50	ADS pipe
Stanley Smith Pipe	4.60	PVC pipe, Gate Creek to Upper Kingsley Reservoir
York Hill Lateral	1.30	PVC pipe
Binns Hill Lateral	0.50	PVC pipe
Cox Lateral	0.60	PVC pipe
Golf Course Lateral	4.56	PVC pipe, includes Country Club, Sunset, Ing, and Sterr
Kenwood Lateral	1.17	PVC pipe
Dieck Lateral	0.90	PVC pipe
Portland Drive Lateral	0.80	PVC pipe
Markham Lateral	2.23	PVC pipe, includes Hayes Drive and Wallace Lateral
MRPS Avalon/Belmont Lateral	11.15	HDPE and PVC pipe, includes May, Muddy, and Frankton sublaterals
Tucker Lateral	6.25	HDPE and PVC pipe, includes Cemetery, Eliot, Barker, and Nickelsen sublaterals
High School Lateral	1.72	PVC pipe
Orchard Road Lateral	2.12	PVC pipe
Various pipeline replacements	4.00	PVC pipe replacing small sublaterals and user group lines
Total miles =	57.70	

In addition to all the above projects, the District has also installed and operates a central pump station consisting of five highly efficient variable frequency drive pumps that are used in various combinations to provide pressure water to the flat shadow of the District. While the District's pump station has a capacity in excess of 8,000 gpm, the typical average seasonal daily rate of flow is less than 6,300 gpm.

Pursuant to various action items delineated in the District's 1995 WCMP, the following outcomes have been realized:

Existing system maintenance

The District established and implemented an ongoing maintenance program for its new water delivery system to avoid deterioration of the new system over time. Fortunately, the new pipe system has a life expectancy of at least 100 years, which is projected to outlive *Homo sapiens* on Earth. The generators, pump systems, filters, meters, and telemetry systems (as previously described above in Section 1.8) are maintained on a five year rotation program or as needed to maintain reliable and efficient operation.

Determine reservoir capacity requirements, determine reservoir expansion feasibility, and increase reservoir capacity

As discussed in other sections of this Plan, the District's required reservoir capacity, as determined by quantifying the maximum probable shortfall of supplemental water for irrigation during a drought year, has been calculated to be 1,125 acre-feet or about 120 acre-feet above the present-day reservoir capacity. The District's reservoir expansion project is a design on-shelf awaiting funding, and the project will be implemented immediately upon

receipt of sufficient dollars to complete the project. The project calls for decommissioning the Lower Reservoir and expanding the Upper Reservoir to 1,125 acre-feet. The project also calls for allowing recreational use under the guidance of Hood River Parks and Recreation and the Oregon Marine Board. In addition to expanding existing reservoir capacity by excavating additional soil volume from the upstream side of the dam, the project also requires enhancing the existing dam, outlet works, and spillway facilities. No increase in dam height is required.

Meter all water users and create incentive rate program

All District water users are now either metered or restricted in usage by Dole flow regulators. The major irrigation mainlines have calibrated, individual meters that report data to the District's SCADA system. District water usage is reported annually to OWRD for each Water Year. Since all District water users are now restricted to their water right, the incentive rate program, which was intended to incentivize voluntary installation of a flow regulator, is meaningless. Flow regulators are required on all District services, and water service is suspended in the event of noncompliance.

Participation in K-12 watershed education programs

This program was conceived at a time when several extraordinarily talented women educators and AmeriCorps volunteers worked at the District, and the program was a fantastic success under their direction. These teachers have since moved on to their own schools and are no longer available to continue the District's education programs. Some of the men remaining at the District attempted to continue the program, but their efforts were pathetic, the younger K-9 kids were intimidating, and the vacant, deathlike, and sometimes homicidal stares from the high school students, some obviously numbed by the requirements of standardized tests and corporate America, were too much to endure. Accordingly, with the exception of one excellent annual event directed by the Environmental Biology teacher at HR Valley High School, the program has been abandoned.

Land use planning interaction

The District's Water Rights Specialist has established an ongoing program with the Hood River County Planning Department to ensure water conservation standards are correctly established for new or altered residences and subdivisions. While developers are sometimes hostile toward the program, the program has played a vital role in enhancing the District's overall ability to fully implement its ongoing water conservation program.

SECTION 2.2: District's Water Measurement Program (OAR 690-086-0250(2))

Water rights to divert and use surface water are established and regulated by the Oregon Water Resources Department (OWRD) under Oregon law and administrative rule. Irrigation rights in the Hood River Basin are limited to a flow rate of 1/80 cfs per acre (about 5.6 gpm) and a total volume of 3.0 acre-feet per acre per season. A court decree for the Hood River Basin allows District irrigation from April 15 to September 30 within the limitations of these rates and volumes.

Spray water is made available by request from February to December of each year. Because the District distribution system is enclosed in pipe, the rate of flow for spray water is limited to what little amount is needed to fill individual sprayers.

Beyond limitations prescribed by State law, other uses of water through the District system are authorized and controlled by District Policy. These other uses include water for temperature control, crop fertilization, hydropower generation, and frost control. Water for frost control is limited by District Policy to a rate not to exceed the user's irrigation water right. District Policy does not allow for the allocation of any additional frost water rights. By agreement with ODFW and ODEQ, District Policy limits hydropower water diversion as required to meet certain in-stream temperature and flow standards. Re-regulation reservoirs are obviously unnecessary in the District since the entire distribution system is enclosed in pipe, and there are no operational spills associated with the District system.

The District maintains and operates a comprehensive water measurement program that includes weirs, meters, and flow regulators to provide water in amounts well within State and District limits. The water use reporting period is for the water year from October 1 through September 30, and District water use is reported annually in compliance

with OAR 690 Division 85 requirements. As described in Section 2.1, since all District water users are now restricted to their water right, and all District water users irrigate with less than their State allotment, incentive rate programs to encourage water conservation are a meaningless harassment. Flow regulators are required on all District services, and water service is suspended in the event of noncompliance. Once connected to the enclosed District distribution system, irrigators do not exceed their water right limits, and, accordingly, volumetric rate structures to incentivize water conservation are a wasteful expenditure of public dollars. Instead, the District charges its water users an annual base fee plus a per water right acre charge.

The following table shows the major flow measurement sites at District diversions and canals. All individual water users are provided water through flow regulators or meters, and District mainlines and penstocks are metered with state-of-the-art systems.

USGS Flow Measurement Site, Hood River at Tucker Bridge

Location	Gage Number	Data Base
Hood River at Tucker Bridge	14120000	October 1897 to December 1899 September 1913 to September 1914 August 1915 to September 1817 January 1965 to Current year

District Operated Measuring Sites

Location	Description	System type
Farmers Canal headgates	Diversion	Telemetry
Farmers Canal fish screen	Fish return	Telemetry
Farmers Canal at Ditch Creek	Canal	Telemetry
Farmers Canal at Fleck's	Canal	Telemetry
Farmers Canal at McCurdy's	Canal	Telemetry
Lowline Canal at grate	Canal	Telemetry
Lowline Canal at collector	Canal	Telemetry
North Greenpoint Creek diversion	Diversion / Return	Telemetry
Deadpoint Creek diversion	Diversion	Telemetry
Mainstem Greenpoint Creek	Creek	Telemetry
Highline Pipe diversion	Diversion	Telemetry
Ditch Creek at Parker Town	Creek	Telemetry
Gate Creek	Diversion	Telemetry
Upper Greenpoint Reservoir	Flow in, Flow out	Telemetry

SECTION 2.3: Other Conservation Measures Currently Implemented (OAR 690-086-0250(3))

The District's currently implemented conservation measures include further enhancement of its diversion fish screens, stream and system flow data collection and analyses, watershed restoration work, system maintenance programs, water user education programs, and the development and implementation of a program to read and record individual water user meters.

SECTION 2.4: District Goals for Improving Water Conservation and Management (OAR 690-086-0250(4))

The Farmers Irrigation District strives to promote ecologically, socially, and economically sustainable agriculture by providing renewable energy and irrigation service for the common good. The District guides its practices according to the following tenets:

- Sustainable on-farm practices

- Renewable, Low Impact Hydropower Institute Certified energy production
- Resource use conservation, efficiency, and balance
- Community relations and social equity
- Ecosystem protection

The District adheres to the following core practices:

- Meet or exceed all legislative and agency environmental requirements
- Integrate ecological, social, and economical factors into all decision-making practices
- Use group process to reflect upon and reform these core practices
- Further develop renewable and sustainable energy and water-use practices
- Educate, encourage, and empower employees and community to conduct activities in a sustainable manner
- Communicate via all media the progress made working toward these sustainable practices

In an ongoing manner, FID develops and implements its sustainable practices through the following generally described opportunities:

- Pipe the balance of the District's two main canals
- Further water user education to irrigate by actual crop need
- Install solid-set, micro-head systems and moisture sensors throughout the entire District
- Develop water cycle awareness among water users
- Maintain on-going, active cooperation with other irrigation districts
- Encourage social equity through District Policy
- Participate with HR Watershed Group to ensure that work is in concert with resource agencies
- Maintain irrigation service to the UGA as prescribed by the FID-City of HR MOA
- Complete reservoir rehabilitation for ongoing safe operation and enhanced recreational opportunities
- Support watershed restoration on Indian Creek for the common good

The District promotes and offers assistance for on-farm irrigation scheduling to its farmers by extending an open invitation to all growers with soil moisture sensors to visit with District personnel to read and interpret the sensors and offer suggestions as to when and how much to irrigate. This service remains available to all District irrigators, but most District growers are so well informed these days that they rarely need to make use of the program anymore. Nevertheless, the District maintains the program to encourage continued state-of-the-art practices over time.

The opportunities listed above generate the following specific tasks and timelines:

- Complete Lowline Canal pipe project (2011, following, as funds are available)
- Complete Farmers Canal pipe system (2014, following, as funds are available)
- Complete Reservoir Enhancement Program (2017)
- Eliminate North Pine, South Green Point, Cabin, and Phelps creeks diversions (2018)
- Complete North Green Point Creek pipe enhancement project (2019)
- Install on-farm soil moisture sensors and poly-tube micro-sprinkler systems (2020)
- Enhance all existing fish screens to Farmers Screen technology (2025)
- Further enhance and integrate metering and remote telemetry systems (ongoing)
- Further water rights, in-stream flow, data acquisition, and GIS management (ongoing)
- Continue Water Use Education Program (ongoing)

Funding for District projects is, or will be, obtained from the following sources:

- PacifiCorp
- LIHI Certified power sales premiums
- Self-imposed carbon taxes
- Water user fees
- ETO and BETC
- ODEQ SRF
- ARRA
- OWRD

- CTWS
- SDAO
- ODFW
- FCA

SECTION 2.5: Improving Water Use Efficiency (OAR 690-086-0250(5))

District water deliveries are more than sufficient to meet historic crop needs, and future District water demands, if any, will be met through water conservation strategies rather than increased diversion. First and foremost, the Hood River Basin is closed to further appropriation anyway, and, secondly, with the exception of expanding the Upper Reservoir to store an additional 125 acre-feet for severe drought years, the District has no need for additional water. Abandoned water rights, the consequences of urbanization, are always available to meet the few requests the District receives for additional water rights on various parcels. At this point in the District's history, since the District's pressure distribution system is complete and there are no water losses or operational spills associated with this comprehensive system, water use efficiency improvements will be realized through the projects anticipated in Section 2.4. Complete piping of the Farmers Canal, at an estimated cost of \$25.0 million, will conserve approximately 2,000 ac-ft per year; complete piping of Lowline Canal, at an estimated cost of \$4.5 million, will conserve about 1,200 ac-ft per year. As determined via direct flow measurements and mass balance equations, both Farmers Canal and Lowline Canal are 90 percent efficient. Once the water from the canals flows into the forebay inlet ponds, however, water delivery efficiency to the water user's parcel approaches 100 percent. Since the District's distribution system was constructed according to the specifications of registered professional engineers, the risk of system leaks is greatly ameliorated. Furthermore, system installation was monitored, inspected, pressure tested, and approved throughout the entire construction period, and thrust restraint has been provided at every angle and at all valves and fittings throughout the system's length. Metering systems throughout the District's pipe network allow District crew members to detect leakage should any problem develop in the future as the pipe ages. Since the water users of the District with small water rights are all regulated to their specific water right amount, it is not possible for them to overuse unless they tamper with the flow regulator. District water users with flow meters have the potential to overuse, but, in recent years, the District has rarely found instances where a user with a large water right is abusing his or her privilege. It is counterproductive for a farmer to over-irrigate as such practices compromise production and crop quality. Since the District's entire delivery system is enclosed in pipe, water is always available to each District user without end spill, and fully regulated water delivery is ensured. Accordingly, no District Policy modification is required to ensure water delivery flexibility.

SECTION 2.6: Evaluation of Water Conservation Projects (OAR 690-086-0250(6))

Over the past six years, the District has asked the Energy Trust of Oregon to conduct formal energy and water conservation audits, through which the District assesses program efficacy. The District has met or, in most cases, exceeded projected water and energy savings. These various audits and reports are available on the District's website at www.fidhr.org.

SECTION 2.7: Schedule for Implementation of Projects (OAR 690-086-0250(7))

The implementation schedule is delineated in Section 2.4, and Section 2.5 also contains text related to this section. For convenience, it is repeated here.

- Complete Lowline Canal pipe project (2011, following, as funds are available)
- Complete Farmers Canal pipe system (2014, following, as funds are available)
- Complete Reservoir Enhancement Program (2017)
- Eliminate North Pine, South Green Point, Cabin, and Phelps creeks diversions (2018)
- Complete North Green Point Creek pipe enhancement project (2019)
- Install on-farm soil moisture sensors and poly-tube micro-sprinkler systems (2020)
- Enhance all existing fish screens to Farmers Screen technology (2025)
- Further enhance and integrate metering and remote telemetry systems (ongoing)
- Further water rights, in-stream flow, data acquisition, and GIS management (ongoing)
- Continue Water Use Education Program (ongoing)

SECTION 2.8: Program for Projects Evaluations (OAR 690-086-0250(8))

The Farmers Irrigation District will use the following parameters to assess the efficacy of this planning process:

- Assess FID - ODFW Green Point Creek and Hood River minimum in-stream flow agreement outcomes
- Increase Green Point Creek average in-stream flow (June 1 to August 31) to 20 cfs
- Assess FID – ODEQ Hood River temperature standards agreement outcomes
- Build District reserves to 2 million dollars by 2030
- Eliminate all District debt by 2030
- Increase net hydropower production to an average 27,000 MW hours per year by 2015

These parameters provide a comprehensive, systemic evaluation of the District's projects. This plan will be periodically updated by District staff and reviewed by the District Board of Directors approximately every two years.

SECTION 3: WATER ALLOCATION AND CURTAILMENT ELEMENT (OAR 690-086-0260)

SECTION 3.1: Frequency and Magnitude of Past Supply Deficiencies (OAR 690-086-0260(1))

For the first 130 years of the District's existence, serious cyclical droughts and annual supply deficits were simply a way of life. With the completion of each phase of the District's water conservation program, however, the District's vulnerability to drought conditions has been ameliorated. Since the District just completed the final phase of its pressurization project this year, 2010, it remains to be seen if virtually all risk of drought has been eliminated from the District, but when comparing the water shortfalls associated with historic droughts to the water surplus associated with the District's water conservation projects, it appears that future water shortfalls will be virtually non-existent. If the draconian manifestations of global warming persist, then, of course, the District might once again find itself subject to shortfalls, but present day data justify a high level of confidence in the District's ability to deliver adequate supplies of water.

SECTION 3.2: Criteria for Water Allocation/Curtailment Element Implementation (OAR 690-086-0260(2))

During March of each year, a careful analysis is made of the snow pack, stream flows, and stored water for the year. Furthermore, long range weather forecasts are used to predict the type of summer that might be forthcoming. In the event that supply deficiencies are anticipated, then the program described below in Section 3.3 is implemented to the extent required.

SECTION 3.3: Procedure for Allocating Water During Shortages (OAR 690-086-0260(3))

In instances where demand exceeds supply, which, if anywhere, will occur in the Upper and Middle areas of the District, water supply is first reduced from the allowed 5.6 gpm down to 4.5 gpm. Worse cases require water delivery rotation, wherein water users might have no water supplied for as long as a week before water service is returned. Rotation techniques can be economically devastating and have detrimental sociological implications. Furthermore, any water delivery curtailment negatively impacts the District's ability to implement its water conservation projects because hydroelectric revenue is reduced. Curtailment procedures, if required, are implemented as described below. Note that the process progresses from relatively light impact to severe impact as dictated by available water.

1. Notices of lower flow or drought conditions are posted on the District's website and submitted to the local radio station and newspaper for public information.
2. Voluntary reductions are requested, including economic incentives for non-use during the drought season.
3. Flow reductions are made from 5.6 gpm/acre down to 4.5 gpm/acre.

4. Supply rotation begins with the ends of branching lines and then expands to include entire main lines as required.

6. The last and worst case calls for shutdown of entire main lines for the balance of the season if flow becomes non-existent.

SECTION 4: WATER SUPPLY ELEMENT (OAR 690-086-0270)

SECTION 4.1: Long Range Water Demand Projections (OAR 690-086-0270(1))

As previously described in Section 2.5, District water deliveries are more than sufficient to meet historic crop needs, and future District water demands, if any, will be met through water conservation strategies rather than increased diversion. First and foremost, the Hood River Basin is closed to further appropriation anyway, and, secondly, the District has no need for additional water. Abandoned water rights, the consequences of urbanization, are always available to meet the few requests the District receives for additional water rights on various parcels. At this point in the District's history, since the District's pressure distribution system is complete, water use efficiency improvements will be realized through the complete piping of its two major conveyance canals, and ongoing water user education will also result in more conserved water. In the unlikely event that the District might need more water, well water is a possible option, but, when taking into account the hydraulic and hydrologic connection between ground water and surface water, even the exploitation of ground water is contraindicated.

SECTION 4.2: Projected Water Needs, Size, and Reliability of Water Rights (OAR 690-086-0270(2))

As described in sections 2.5 and 4.1 above, FID anticipates that agricultural and residential water demand will remain relatively constant, or even decrease, over the next 20 years. The one notable exception to this is a recent study that demonstrates that the District's Upper Division service area, during drought years, could benefit from an additional 125 acre-feet of stored water in the District's Upper Reservoir. Other than this reservoir consideration, however, there are no physical restrictions that might limit actual delivery of a District water source. Furthermore, since District irrigators use well below their water right allotment, seasonal limits are clearly not a problem, and there are no institutional restrictions such as EPA Threatened or Endangered Species or in-stream flow requirements that are of grave concern to the District. In fact, while it is true that there are fish species federally listed in the Hood River as Threatened, including Lower Columbia Chinook Salmon, Coho Salmon and Steelhead, and while the state also lists Lower Columbia Coho Salmon as Endangered, the District supports these listings and strives to conduct its business in a manner that protects these species. There are also potential in-stream flow requirements that may be associated with the Powerdale Dam water rights, but the District has already taken steps to address minimum in-stream summer flows in the Hood River by entering into an agreement with ODFW and ODEQ that requires that the District reduce its summer time water diversion pursuant to the terms of this agreement. This agreement is an integral requirement in order for the District to maintain its Low Impact Hydro Institute (LIHI) certification, and compliance with this agreement allows the District to be eligible for renewable energy premiums. Accordingly, minimum in-stream flows requirements actually have the potential to optimize District revenue without compromising the District's ability to fully meet the demands of its irrigators.

SECTION 4.3: Potential Water Sources (OAR 690-086-0270(3))

Other than the small proposed expansion of the District's Upper reservoir, the District has no need to investigate additional sources of water at this time. No municipal or industrial effluents are available for reuse by the District, and, furthermore, since the District's system is enclosed in pipe and fully pressurized, there would be no practical way to force these effluents into the District system anyway.

SECTION 4.4: Comparison of Potential Water Sources (OAR 690-086-0270(4))

Pursuant to Section 4.3 immediately above, there is no need for the District to conduct this comparison.

SECTION 4.5: Evaluation of Effects of Long Range Water Needs (OAR 690-086-0270(5))

The conservation objectives in this Plan seek to return as much water as is possible to the Hood River Basin and, at the same time, improve irrigation deliveries and use patterns such that net income to farmers is increased. For all purposes set forth in the District's Plan, there are no sources of water, other than conserved water and slightly increased storage in the District's Upper Reservoir, that may be gainfully exploited. Overall, the remaining long-range District conservation objectives seek to:

- restore watershed health

- increase summer in-stream flow
- decrease net supplemental water diversion
- decrease summer water diversion
- increase LIHI power production and revenue
- decrease power consumption
- increase irrigation application efficiency
- increase on-farm revenue, and, finally
- increase water conveyance and distribution efficiency

The successful pursuit of these objectives over the past 25 years has resulted in a District with a fully piped and pressurized irrigation distribution network. The system is also capable of delivering spray water, crop fertilization water, and other agricultural water without loss. As a result, many of the 34 original District water diversion are no longer necessary. District watershed restoration projects ensure that summer flows remaining in-stream are beneficial to fish and other aquatic species in the Hood River Basin. This restoration work also increases base stream flow, which helps ensure that water is available for fish and farms. Enhanced on-farm irrigation systems and scheduling ensure that water is reasonably used without waste, based upon actual crop requirements for maximum yield. Because additional irrigation demands, if any, will be addressed through conservation strategies rather than increased diversion, no effects from long range water needs are anticipated, and the long-term planning activities conducted by the Hood River Watershed Group are perfectly compatible with the District’s efforts to manage its available water supply.

SECTION 5: ADDITIONAL REQUIREMENTS (OAR 690-086-0225)

SECTION 5.1: List of Affected Governments, Copy of Comments (OAR 690-086-0225(5))

Thirty days prior to submitting this draft Plan to OWRD, the District made it available to each affected local government. The Plan is posted on the District’s website, and notices of the Plan’s availability for review were mailed to the following governments and agencies:

- Hood River County
- City of Hood River
- HRWG – Hood River Watershed Group
- NRCS – Natural Resources Conservation Service
- SWCD – Soil and Water Conservation District
- OSU (Oregon State University) Extension, Hood River
- EFID – East Fork Irrigation District
- MFID – Middle Fork Irrigation District
- DID – Dee Irrigation District
- MHID – Mount Hood Irrigation District
- IFWD – Ice Fountain Water District
- CTWS – Confederated Tribes of Warm Springs
- USFS – United States Forest Service
- ODFW – Oregon Department of Fish and Wildlife
- ODEQ – Oregon Department of Environmental Quality
- OWRD – Oregon Water Resources Department

As appropriate, comments and suggestions received have been incorporated into this Plan, and copies of the comments are included in Appendix B.

SECTION 5.2: Submittal of Updated Plan, Implementation Schedule (OAR 690-086-0225(6))

It is proposed that the District will provide an updated Plan to OWRD 15 years from now, on approximately 4 July 2025.

SECTION 6: BACKGROUND INFORMATION

History of District

Irrigation started in the former Hood River Irrigation District area in 1874 when the Water Supply Company of Hood River Valley was formed to irrigate about 1,000 acres of land. Irrigation water rights were acquired on Ditch Creek, Dead Point Creek, and several springs. In 1905, the Hood River Irrigation District was formed, and the boundaries of the district included all the adjacent land which could be irrigated to produce a crop and also included hundreds of acres of timber land on slopes above the valley floor. The gross area within the district was 5,275 acres. The newly formed district took over the water rights of the Water Supply Company and filed for additional water rights on Pine Creek and the North and South Forks of Green Point Creek. After experiencing late summer water shortages, in order to supply supplemental water during this typically dry period, the district began to acquire easements in 1923 for storage reservoirs in the Green Point area west of the small community of Oak Grove. In 1937, a permit was issued authorizing reservoir and dam construction. The present-day Green Point Reservoirs have 288 acre-feet of storage capacity in the lower reservoir (which was built in 1936) and 715 acre-feet of storage in the upper reservoir (constructed in 1937).

Irrigation started in the original Farmers Irrigation District area in 1906 when the Farmer's Irrigation Company was organized. Shares were sold, and each share entitled the holder to one miner's inch of water [1/40 of a cubic foot per second (cfs)]. Irrigation water rights were acquired on Hood River in the amount of 41.11 cfs to irrigate 3,288.7 acres at a reduced duty of 1/80 cfs per acre. An intake structure was built on the Hood River, and the Farmers Canal was constructed to convey water to the area to be irrigated. During the winter of 1964-1965, the headgates of the Farmers Canal suffered substantial damage due to a flood in the Hood River Basin. In May, 1965, the Farmers Irrigation District was formed under Oregon law in order to be eligible for canal restoration money via a program through a former branch of the United States Bureau of Reclamation. Encompassing a gross area of 5,360 acres, the district included the original area, water rights, and facilities of the Farmer's Irrigation Company. The district then received federal financial assistance to rebuild the headgate, flume, and a bridge across the Hood River to restore water service to the users.

Chronic water shortages in the former Hood River Irrigation District resulted in water rotation virtually every year. In 1968, an agreement was reached between the two original districts to install a pump on Farmers Canal, and water rights were acquired to lift water into the Hood River Irrigation District. Although helpful, this project did not completely alleviate the water shortages. During the drought of 1977, approximately one-third of the irrigated lands in the Hood River Irrigation District received no water during the latter part of the irrigation season.

Since the two former districts were adjacent to each other with one common boundary, possible merger of the districts was discussed for a number of years. The drought of 1977 resulted in serious efforts to merge the two districts. After a favorable vote in May of 1978, the two districts were officially merged on July 1, 1978. The newly formed district became Farmers Irrigation District. The two districts were merged to more efficiently utilize the combined water resources, to expand the account base for increased operating capital, and to take advantage of the extreme elevation changes to generate electricity to provide revenue for a fully pressurized irrigation system.

Climate

The climate of Hood River Valley is characterized by generally moderate winters, long, cool summers, moderately abundant rainfall, and comparative freedom from damaging spring frosts. Precipitation, however, is much less than what falls upon the western slopes of the Cascade Mountains. Average annual precipitation, as measured at the Oregon State University Hood River Experiment Station, located in the northeast corner of the District, is about 31 inches. About 75 percent of the annual precipitation occurs during the months of November through March. Precipitation in July and August is usually less than two percent of the yearly total, and rain showers during the summer months rarely offset irrigation demands.

The prevailing winds during the summer are from the west because the gorge of the Columbia River acts as a gigantic flue and creates a concentrated passage for the wind from the cool coast country eastward toward the heated interior. The velocity of the wind is lowest during the winter season when the gradient between the coast and the interior is lower. The usual drift of the wind from the coast toward the interior is the principal factor in maintaining the generally lower temperature of the summer season and in preventing excessively low temperatures

during the winter. Only when the normal conditions are disturbed is there any noticeable movement of air from the interior toward the coast, and, whenever this occurs, the extremes of temperature for the season follow. In the summer season, the winds from the heated interior to the east cause the temperature to rise above 90 degrees Fahrenheit, and this heat typically persists for one to four days. If there are winds from the interior during the winter season, the temperature drops, and this condition typically lasts only a few days. When the wind shifts into the west, the severe temperature is replaced by a noticeably warmer period. The average growing season in FID is from May 1 to October 1.

Topography, Geology, and Soils

Topography varies from mountainous terrain in the western part of the District to gently rolling or flat lands in the eastern portion. Elevations above mean sea level in the District's water supply area range from approximately 2,250 feet down to about 180 feet. The parent geology of the District consists generally of andesitic and basaltic flows, which are typically part of the Cascade andesite and Columbia River basalt flow events. Volcaniclastic deposits such as mud flows, lahar deposits, intracanyon flows, and ashfall events may be observed locally, especially in the Mount Defiance watershed serving the Upper and Middle district. Some fluvial and glacial influences are also present.

According to the Natural Resource Conservation Service (NRCS) Soil Survey of Hood River County, Oregon, the irrigable soils of the District consist predominately of Class I through IV soils and are generally described as loams with particle sizes ranging from fine silts to sand. Some of the loams include pebble and cobble size particles. The soil associations of the District include Wind River, Hood-Van Horn, Oak Grove-Rockford, Wyeast, Parkdale-Dee, Culbertson, Bins-Bindle-Ketchly, and Bins-Bindle.

There are several natural streams throughout the watershed which flow yearlong. District stream flows vary considerably, however, from month to month and also from year to year. Much of the surface water flow during the summer appears to be dependent upon groundwater in-flow, but groundwater studies specific to the District are limited. Local wetlands are identified variously within the District.

Farmers Irrigation District
Water Management Conservation Plan
4 July 2010

Appendix A
Permits and Certificates

(Because Appendix A is a 10 MB file, it is maintained in a separate folder, which is available upon request.)

Farmers Irrigation District
Water Management Conservation Plan
4 July 2010

Appendix B
Review Comments

Dear FID,

I took an hour today to review your 2010 (Version 9) FID Water Management and Conservation Plan.

I was really impressed by the document, especially what's been accomplished during the previous plan horizon, and the actions proposed during the upcoming 15 year period. The plan fits perfectly with the goals, objectives and tasks outlined in the 2008 Hood River Watershed Action Plan.

The only notes I made during review of the plan include: a) it might be good to have an appendix that defines the various acronyms, and b) what I think is the acronym for the Hood River Watershed Group listed on page 25, should read HRWG instead of HRWSG.

Note that we remain willing and ready to provide any assistance needed during performance of this plan. It is exciting to see that projects such as the Indian Creek Stewards, Lowline Ditch pipeline, reservoir enhancement, and Farmers Canal pipeline are referenced. I look forward to assisting you whenever opportunities arise.

Again, nice work! I am sure this plan will be held out as a model for any number of special use districts during the future.

sms

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FID Action/Response: Suggestions incorporated.