

Animal Waste Management Plan

August 23, 2016

Harmon & Son Dairy LLC.

Operated by:

Mr. Dennis Harmon
dba: Harmon & Son Dairy LLC.
6124 New Hope Rd.
Grants Pass, OR 97527

Facility Address:

6124 New Hope Rd.
Grants Pass, OR 97527

Operation:

Beef production
and
Grade A Dairy
Small CAFO

As owner and operator of Harmon & Son Dairy LLC. I intend to manage in accordance with the practices, and operation and maintenance described in this animal waste management plan.

Signature Annette Harmon

Date 5-31-17

GENERAL NARRATIVE DESCRIPTION

Harmon & Son Dairy LLC. is located at 6124 New Hope Road in Grants Pass, Oregon and is owned and operated by Annett and Dennis Harmon. The operation has been a Grade A Dairy. When the dairy is at maximum capacity, the Holstein dairy herd consists of 255 mature cows, 77 animals 750-1200 pounds, 55 animals 300-500 pounds, 12 animals 200-300 pounds, and 11 animals <200 pounds, totaling 410 animals. The cows and heifers are typically on pasture during April through October.

Dennis has decided to move out of dairying and has transitioned his herd to a beef herd. The facility is not being modified for the new herd, and only slight operational changes are expected. Without the dairy animals less process wastewater will be produced and manure may be slightly thicker. More scraping and less pumping may occur due to manure consistency differences. Mr. Harmon has decided to Request a permit for 272 animals with a herd composition of 125 mother cows, 125 calves, 14 replacement heifers, and 8 bulls .

Manure Collection Methods

The animals are housed in free stall barns that are cleaned by scraping. Manure is scraped from the barns daily. Manure is scraped directly into a 40'x 8', 75,200 gallon below ground tank.

Animals are also housed in a separate facility that was used for heifers when the operation was dairying. The facility is curbed and sloped to drain into a 48'x24'x6' concrete reception pit. There is also a 40'x 20' roofed dry stack facility for storage of bedding and solid manure.

Wastewater generated from the milking parlor and wash water from the holding pen as well as stormwater is collected in the 75,200 gallon below

ground tank. This tank has a float valve that automatically starts the pump to pass the material over the inclined screen separator and into the 5.7 ac/ft manure lagoon.

Runoff from concrete slab areas totaling 7,000 square feet drains to the 75,200 gallon tank. All roofs are guttered and maintained to divert clean rainwater from the storage system. The gutter downspouts outlet in the buried, piped, irrigation ditch that borders the facility.

Manure Storage Facilities and Transfer

Manure from the free-stall barns and wastewater runoff is collected in the below ground tank, that has a 75,200 gallon capacity. The manure slurry from the tank is separated using an inclined screen separator. Approximately 20% of the total solids are removed from the slurry. Solids are stored on a 70'x70' manure storage pad that drains back into the 75,200 gallon tank. The remaining manure slurry is pumped into a 5.7 acre-foot waste storage pond. The storage pond will contain manure slurry and contaminated water for 135 days. Liquid manure from the storage pond is utilized on crop fields and pastures for its nutrient value. The liquid is agitated, then pumped from the storage pond and transported through underground mainlines to the crop and pasture acreage. Four traveling big guns are used to irrigate liquid manure.

The old heifer facility has both a concrete reception pit and a solid manure storage shed. The reception pit is 42'x24'x8', or 8064 cubic feet of storage. This is not considered in the long term storage calculations and manure can be transferred to the lagoon if additional storage is needed. The solid manure storage shed is a 40'x 20' roofed building with a concrete floor and 4' concrete walls. This storage facility can hold approximately 4,800 cubic feet of manure, which gives about 120 days storage. Solid manure is then exported. Liquids from the reception pit are applied by 1800 gallon tanker.

Manure Utilization

All liquid manure is utilized on grass pastures. Harmon And Son Dairy LLC. own 189 acres that are available for manure applications. The pasture is primarily an orchard grass, clover, and ryegrass blend. Another 30 acres is available approximately 2 miles away. Average yields are 5 tons/acre of grass hay (50% dry matter) or 15 AUM's pasture. A buried 8" mainline system transports the liquid manure from the waste storage pond to all of the described acreage except the 30 acres two miles away.

100% of the separated manure solids are exported off the farm by local farmers, Landscape contractors, and gardeners. These manure solids are exported year round, with a majority leaving the farm in spring through fall. Should the solid manure storage fill to capacity, Harmon & Son Dairy LLC. calls a Landscaping contractor who will export as needed.

SPECIFIC DESCRIPTIONS AND CALCULATIONS

Land Application Areas

Aerial photos showing numbered field locations for all manure application acreage and surface water features, a topography map and a schematic of the dairy headquarters are included in this Animal Waste Management Plan.

A soils map and soil map unit descriptions for all manure application areas are included in this Animal Waste Management Plan.

Manure and Wastewater Volumes

Calculated volumes of all manure, bedding, wash water, silage leachate, and contaminated storm water have been completed using the USDA/NRCS

Animal Waste Management Worksheet. The worksheet is included in this Animal Waste Management Plan.

Nutrient Content of Manure, Little and Process Waste Water

The USDA/NRCS Animal Waste Management Worksheet, to estimate content and volume of nutrients in manure, little and process waste water for nutrient balance.

Farm Nutrient Balance

The Animal Waste Management Worksheet also includes calculated data for nutrient balance for the operation. Harmon & Son Dairy LLC. is balancing for Nitrogen which is the most limiting nutrient as determined by the NRCS Phosphorus Index.

Application Schedule and Limitations

Liquid manure will be field applied to fields beginning in March and continuing through the growing season that ends in October. Liquid manure will be applied to serve as fertilizer and irrigation water, throughout the growing season. The traveling big guns are calibrated using the catch can method.

Solid manure is exported.

A 35 foot vegetated buffer along all surface water bodies is in place that does not receive manure application. This area is naturally vegetated with grasses, shrubs and small trees.

Irrigation water from the Applegate River is used on all of the manure application acreage. The irrigation season runs from approximately June through September. To reduce potential for runoff and leaching, irrigation water is applied at approximately 1 inch per week.

Animal Mortality Management

Deceased animals are buried, sent to a renderer, taken to a local landfill or donated to a local wild animal park as food for the carnivorous animals. The carcasses are handled to prevent creation of contaminated rainwater.

Record Keeping and Reporting

Soil samples will be taken in each field where manure is applied, once every 5 years. Protocol for sampling and testing soil, is included in this Animal Waste Management Plan. Applications of manure, litter and process waste will be kept, including the date and the amount of N and P applied during each application. Records of exporting manure, litter and process waste will also be kept. Any discharge will be reported orally to ODA within 24 hours. Within 5 days, a written statement describing this discharge will also be submitted to ODA. The amount of manure, litter and process waste applied will be reported annually. The amount of manure, litter and process waste exported will be reported annually.

DESIGN USE:

This design aid has been developed for planning animal waste management systems. The following NRCS Practice Standards (PS) for Oregon were used to develop the design aid;

(PS) 313, Waste Storage Facility
(PS) 590, Nutrient Management
(PS) 633, Waste Recycling

LIMITATIONS:

This design aid does not address the structural design of waste storage structures but provides storage volumes needed in accordance with (PS) 313, Waste Storage Facility design criteria. Additional documentation is needed to meet the requirements of (PS) 590, Nutrient Management and (PS) 633, Waste Recycling. This spreadsheet is a read only file and should be saved to a new filename before use.

WORKSHEET TABS:

ReadMe Spreadsheet documentation for all information regarding the use of this spreadsheet.

Inventory Start with this tab to input all of the inventory information for the client and their operation. The Animal Feeding Operation Inventory Worksheet in Agronomy Technical Note 20 can be used to record data collected in the field and/or from interviews with the client.

Production This worksheet will display monthly volumes of liquids and solids produced from the operation. Daily and monthly nutrient production from the operation are also displayed. The information displayed on this worksheet is for use in planning and is used for computations made in other worksheets. No inputs are required on this worksheet.

Storage The type of storage facility for solids and liquids can be selected and sized based on the number of days of storage desired using this worksheet.

Application This worksheet allows the user to determine the amounts of nutrients from liquid manure to be applied based on "Big Gun" travel rates and set times and for tank wagons based on travel length and spread width. The worksheet also allows the user to compute the amounts of nutrients from solid manure to be applied based on travel lengths and spread width of tractor spreader equipment.

Utilization This worksheet allows the user to determine the approximate amount of nutrients lost during storage, application, and denitrification. The worksheet also allows the user to determine what crops the manure is to be applied to and the amount of manure to apply based on the nutrient application desired. The worksheet also computes a nutrient balance based on available acres and crop uptake of nutrients.

VTA This worksheet allows the user to determine the size of a Vegetated Treatment Area based on user inputs. Weather station data input on the Inventory worksheet and crop data are used to compute the Vegetated Treatment Area size.

INPUT & OUTPUT:

Input cells will be shaded gray with **red text/numbers**. Output cells will be formatted with **blue text/numbers** with white background. Cells where data is inserted, from a database, will be **black text/numbers** with white background. Cells will be formatted the same as input cells where cells contain data from a database that can be changed by the user. Errors will be indicated with red text that says **ERROR** on a white background.

QUESTIONS: Direct all questions regarding this design aid to the following person who developed the workbook.

Developed by: Bruce D. Wilson, Professional Engineer, Keizer, Oregon
Version of spreadsheet: Version 5.1 October 2015
Phone: (866) 493-3243 email: BDWEng@comcast.net

REFERENCE MATERIAL:

In addition to the applicable NRCS Practice Standards listed under DESIGN USE and OTHER DESIGN RESOURCES:

NRCS National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook (AWMFH)

Manure application rates for forage production, EM8585, OSU Extension Service, July 2007

NRCS National Engineering Handbook, Part 652, Irrigation Guide

NRCS Practice Planning and Design Guide for practice standard 313, Waste Storage Facility.

NRCS Nutrient Management Jobsheet for practice standard 590, Nutrient Management.

NRCS Waste Recycling Jobsheet for practice standard 633, Waste Recycling.

If a cell contains a red triangle in the upper right corner, simply passing the cursor over the cell will reveal references used in the development of the worksheet. See Reference Material cell above for an example.

RESOURCE DATA:

A field visit is required to obtain physical information about the site and interview the landowner/operator. The Animal Feeding Operation Inventory Worksheet in Agronomy Technical Note 20 can be used to record data collected in the field and/or from interviews with the client. The use of some kind of photo base to make notes on is recommended.

Data to Collect:

- >> Clients name, address, phone number, facsimile number, and email.
- >> Type of operation(Dairy, Beef, Swine, Poultry, etc)
- >> Description of livestock, number to utilize facility, average weight, dates confined, and dates animals grazed for current and planned operation. If the operation is a dairy then include the average daily milk production per cow in pounds.
- >> Type of bedding &volume used per day.
- >> Solids separation system planned and efficiency of system.
- >> Dimensions of existing solids & liquid storage facilities.
- >> Roofed and unroofed areas that contribute rainwater to storage facilities.
- >> Roofed areas that are guttered or drain clean water away from storage facilities.
- >> Clients desired solid and liquid storage time.
- >> Water use that contributes gray water to storage facility, e.g. milkhouse washwater.
- >> Planned location of storage facility.
- >> Location of domestic wells, streams, lakes and other sensitive water bodies.
- >> Climatic station to use to retrieve needed climatic data.
- >> Topographic information from surveys or USGS Quadrangle maps or other maps or photos.
- >> Geologic considerations which will effect the planned storage structure such as shallow bedrock, unsuitable soils, coarse gravel subsoil, slide areas, wetlands, sharp breaks in slope, floodplains, etc.
- >> Property lines and ownership considerations that may effect location of planned facilities.

OTHER DESIGN RESOURCES:

For additional information on wastewater production from confined animal facilities and other manure management issues, refer to the Oregon State University Extension homepage for publications at <http://extension.oregonstate.edu/catalog/>.

Other computer programs and spreadsheet design aids that might assist you in developing specific design information for planned facilities can be found on the Oregon NRCS website at

http://www.or.nrcs.usda.gov/technical/engineering/environmental_engineering/index.html. If you have not had training and/or experience with the use of computer programs and spreadsheet design aids, you should contact the appropriate NRCS basin or state office technical staff for assistance before attempting to use them.

Standard drawings and forms associated with the design of waste management systems can be found in the Oregon NRCS Standard Drawings and Forms Catalog and on the Oregon NRCS website at

<http://www.or.nrcs.usda.gov/technical/engineering/eng-cad-drawings.html>. Use of standard drawings requires appropriate review of foundation and site conditions before they are used for a final design and should be approved by someone with appropriate job approval authority.

NRCS Standards and Specifications that are applicable to the development of agricultural waste management systems to address site specific resource problems can be found in conservation system guidesheets (CSG) which are located on the NRCS eFOTG website for Oregon at <http://www.nrcs.usda.gov/technical/efotg/>.

PRINT & PROTECTION:

Each individual spreadsheet (tab) within this Excel Design Aid is set to print with enough margin to fit on 8 1/2 x 11 paper. All pages are designed to print on HP Deskjet and Lazerjet printers. All worksheets are protected so the formulas and certain text cannot be edited. Contact the developer with any requests for changes to the ORAWM Design Aid.

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.1

CLIENT: **Example Dairy**
 ASSISTED BY: **Technical Service Provider**

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

ANIMAL INVENTORY

Type of Animal	Number of Animals	Average Weight (lbs.)	Animal Units (1,000 lb.)	Nutrient Production						Manure CF/D/AU	Annual			
				(lbs./day/1000 lb. Animal Unit)			(lbs./day)				Days Confined	Days Grazed	Days Off Farm	
				N	P	K	N	P	K					
BULL	▼	8	1,000	8.0	0.31	0.11	0.24	2.48	0.88	1.92	0.95	0	365	0
BEEF COW	▼	125	1,200	150.0	0.35	0.08	0.25	52.50	12.00	37.50	1.67	54	311	0
HEIFERS (12-24 Months)	▼	14	970	13.6	0.27	0.05	0.12	3.61	0.62	1.63	0.90	74	291	0
CALVES (1-12 Months)	▼	125	150	18.8	0.42	0.05	0.11	7.88	1.01	2.06	1.34	23	281	61
	▼													
	▼													
	▼													
	▼													
	▼													
	▼													
	▼													
	▼													
Totals/Averages-		272	830	190.3	0.35	0.08	0.23	66.5	14.5	43.1	1.6			

GRAZING PERIOD

Type of Animal	Percent of Month and Number of Animals Grazing												
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AU-YR.
BULL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	8	8	8	8	8	8	8	8	8	8	8	8	96
BEEF COW	100%	100%	0%	25%	100%	100%	100%	100%	100%	100%	100%	100%	
	125	125	125	125	125	125	125	125	125	125	125	125	1,538
HEIFERS (12-24 Months)	100%	100%	30%	30%	100%	0%	100%	100%	100%	100%	100%	100%	
	14	14	14	14	14	14	14	14	14	14	14	14	130
CALVES (1-12 Months)	100%	0%	0%	25%	100%	100%	100%	100%	100%	100%	100%	100%	
	125	0	0	37	125	125	125	125	125	125	125	125	170
													0
													0
													0
													0
													0
													0
													0
Total AUM's Available>	0	0	0	0	0	0	0	0	0	0	0	0	0
Total AUM's Needed>>>>	190	172	12	51	190	177	190	190	190	190	190	190	1,934
Total AUM's>>>>>>>>>>	-190	-172	-12	-51	-190	-177	-190	-190	-190	-190	-190	-190	-1,934

Version 5.1

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

GRANTS PASS

AREAS CONTRIBUTING RUNOFF TO LIQUID STORAGE FACILITY

WATER USE THAT ENTERS LIQUID STORAGE FACILITY

CROP DATA

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ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

[illegible][illegible]

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.1

CLIENT: **Example Dairy**

ASSISTED BY: **Technical Service Provider**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

Month	Runoff in Cubic Feet				Facility Water Use Cubic Feet	Manure		Bedding		Solids Separated		Solids in Liquids		Total Solids	Total Liquids
	Roof Area Square Feet	Paved Slab Area Square Feet	Unpaved Lot Area Square Feet	Silage Pit Surface Area, SF		Solids	Liquids	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Cubic Feet
	0	7,000	1,500	0		Cubic Feet	Cubic Feet								
October	0	1,248	54	0	0	0	0	0	0	0	0	0	0	0	1,302
November	0	2,987	192	0	0	0	0	0	0	0	0	0	0	0	3,179
December	0	3,150	135	0	0	972	7,058	707	6,181	2,026	72,945	6,711	241,600	2,026	9,996
January	0	2,905	187	0	0	758	5,504	1,881	8,012	2,712	97,639	5,431	195,510	2,712	8,523
February	0	2,543	109	0	0	0	0	0	0	0	0	0	0	0	2,652
March	0	2,135	92	0	0	58	321	345	859	543	19,550	181	6,517	543	2,408
April	0	1,178	25	0	0	0	0	0	0	0	0	0	0	0	1,204
May	0	718	15	0	0	0	0	0	0	0	0	0	0	0	733
June	0	309	7	0	0	0	0	0	0	0	0	0	0	0	316
July	0	216	0	0	0	0	0	0	0	0	0	0	0	0	216
August	0	274	6	0	0	0	0	0	0	0	0	0	0	0	280
September	0	502	22	0	0	0	0	0	0	0	0	0	0	0	523
Annual	0	18,165	842	0	0	1,789	12,883	2,933	15,052	5,281	190,134	12,323	443,627	5,281	31,330
Annual Gallons	0	135,874	6,301	0	0	13,381	96,364	21,936		39,506		92,176		39,506	234,351

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from LIQUIDS			Pounds/Day of Nutrients from SOLIDS			Pounds/Day of Nutrients from GRAZING			Grazing Manure	Confined Manure
	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O	Gallons/Yr	Cubic Feet/Yr
BULL	1.98	1.61	1.85	0.50	0.40	0.46	2.48	2.02	2.31	20,750	0
BEEF COW	42.00	21.99	36.15	10.50	5.50	9.04	52.50	27.49	45.19	582,265	13,590
HEIFERS (12-24 Months)	0.90	0.35	0.49	2.71	1.06	1.47	3.61	1.42	1.96	26,567	909
CALVES (1-12 Months)	1.97	0.58	0.62	5.91	1.74	1.86	7.88	2.32	2.49	48,975	542
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
Total-										678,556	15,041

CLIENT: **Example Dairy**

ASSISTED BY: **Technical Service Provider**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			Total Pounds of Nutrients from ALL SOURCES		
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
October	0	0	0	0	0	0	2,060	1,031	1,610	2,060	1,031	1,610
November	0	0	0	0	0	0	1,758	928	1,484	1,758	928	1,484
December	1,322	689	1,131	384	193	312	110	76	90	1,816	959	1,533
January	1,010	523	855	344	163	255	535	294	446	1,889	980	1,556
February	0	0	0	0	0	0	1,861	931	1,455	1,861	931	1,455
March	28	11	15	84	33	46	1,949	987	1,550	2,060	1,031	1,610
April	0	0	0	0	0	0	1,994	997	1,559	1,994	997	1,559
May	0	0	0	0	0	0	2,060	1,031	1,610	2,060	1,031	1,610
June	0	0	0	0	0	0	1,994	997	1,559	1,994	997	1,559
July	0	0	0	0	0	0	2,060	1,031	1,610	2,060	1,031	1,610
August	0	0	0	0	0	0	2,060	1,031	1,610	2,060	1,031	1,610
September	0	0	0	0	0	0	1,994	997	1,559	1,994	997	1,559
Annual	2,359	1,223	2,002	812	389	613	20,437	10,329	16,141	23,608	11,942	18,756

MONTHLY IMPORTS INTO STORAGE FACILITIES

Month	Liquids		Solids	
	Cubic Feet	Gallons	Cubic Feet	Tons
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
Totals-	0	0	0	0

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Version 5.1

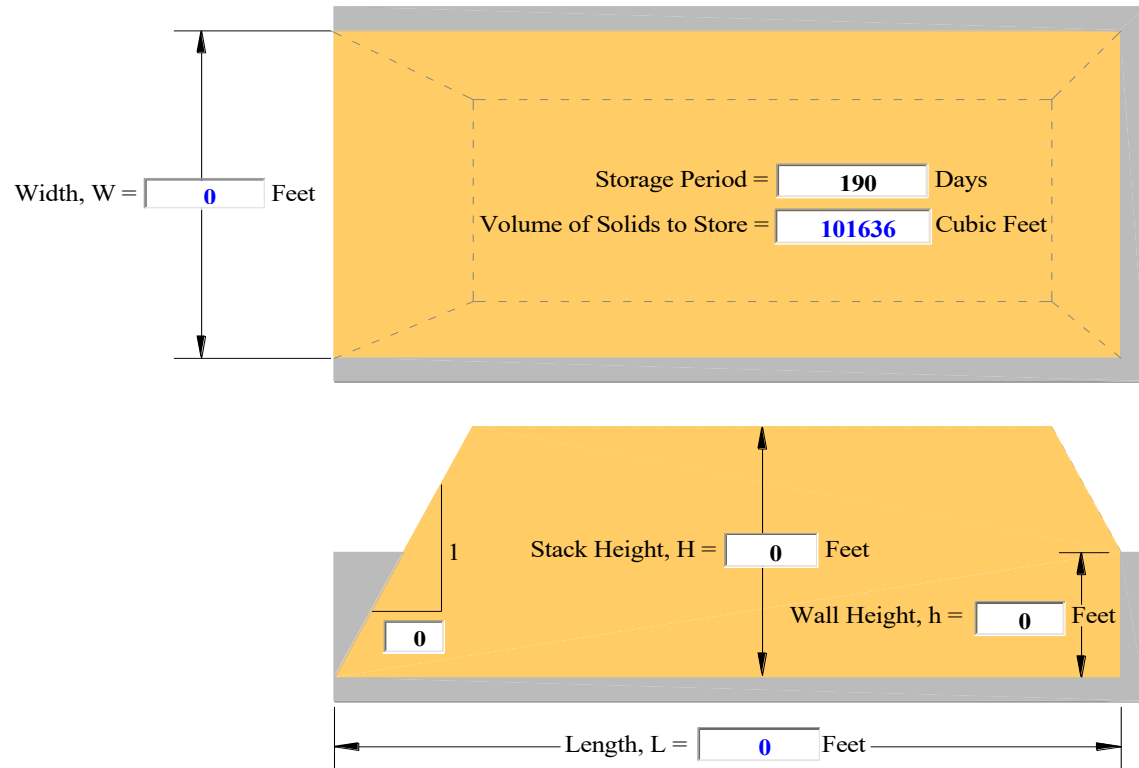
CLIENT: **Example Dairy**
ASSISTED BY: **Technical Service Provider**

ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

SOLIDS STACKING FACILITY

VOLUME OF MONTHLY SOLIDS STACKED IN FACILITY

Solids Storage Facility Parameters	Value	Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Solids to Store Tons	Normal Runoff CF
Storage Period, Days=	365	October	31	0	0	0	0	150
Stacking Width, W in Feet=	0	November	30	0	0	0	0	538
Stacking Height, H in Feet=	0.00	December	31	1,752	274	1,013	36	378
Wall Height, h in Feet=	0.00	January	31	1,493	1,219	1,356	49	523
Stack Side Slope (X:1)=	0.00	February	28	0	0	0	0	305
Existing Storage, Cubic Feet=	22,800	March	31	284	259	272	10	256
Surface Area of Existing Storage, SF=	4,200	April	30	0	0	0	0	71
25 Year-24 Hour Storm Runoff, CF=	1,547	May	31	0	0	0	0	43
Volume Needed, Cubic Feet=	2,641	June	30	0	0	0	0	19
Design Volume, Cubic Feet=	0	July	31	0	0	0	0	0
Is Facility Covered? NO	▼	August	31	0	0	0	0	16
Volume Reduction Factor=	0.50	September	30	0	0	0	0	60
		Annual	365	3,530	1,752	2,640	95	2,359



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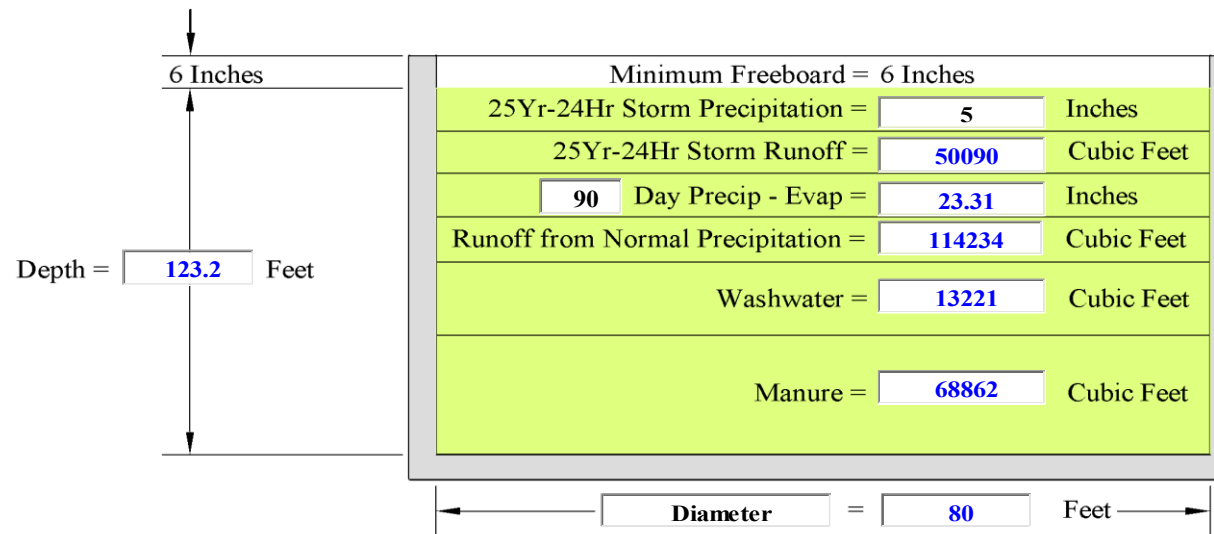
CLIENT: **Example Dairy**
ASSISTED BY: **Technical Service Provider**

ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

TANK

MONTHLY INFLOWS INTO TANK

Tank Parameters	Value	Month	Number of days	Rain-Evap on Tank CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Solids CF	Waste to Store CF	Waste to Store Gallons
Storage Period, Days=	13	October	31	0	0	1,452	0	0	1,452	10,859
Tank Diameter, Feet=	0	November	30	0	0	3,716	0	0	3,716	27,800
		December	31	0	0	3,663	0	6,711	10,374	77,604
Existing Storage, Cubic Feet=	10,040	January	31	0	0	3,615	0	5,431	9,045	67,665
Surface Area of Existing Storage, SF=	0	February	28	0	0	2,958	0	0	2,958	22,124
25 Year-24 Hour Storm Runoff, CF=	4,677	March	31	0	0	2,483	0	181	2,664	19,926
Volume Needed, Cubic Feet=	9,172	April	30	0	0	1,274	0	0	1,274	9,532
Design Volume, Cubic Feet=	0	May	31	0	0	776	0	0	776	5,804
Is Tank Covered? YES	▼	June	30	0	0	334	0	0	334	2,501
Tank Dimensions? Circular	▼	July	31	0	0	216	0	0	216	1,615
		August	31	0	0	296	0	0	296	2,218
		September	30	0	0	583	0	0	583	4,364
		Annual	365	0	0	21,366	0	12,323	33,689	252,011



OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.1

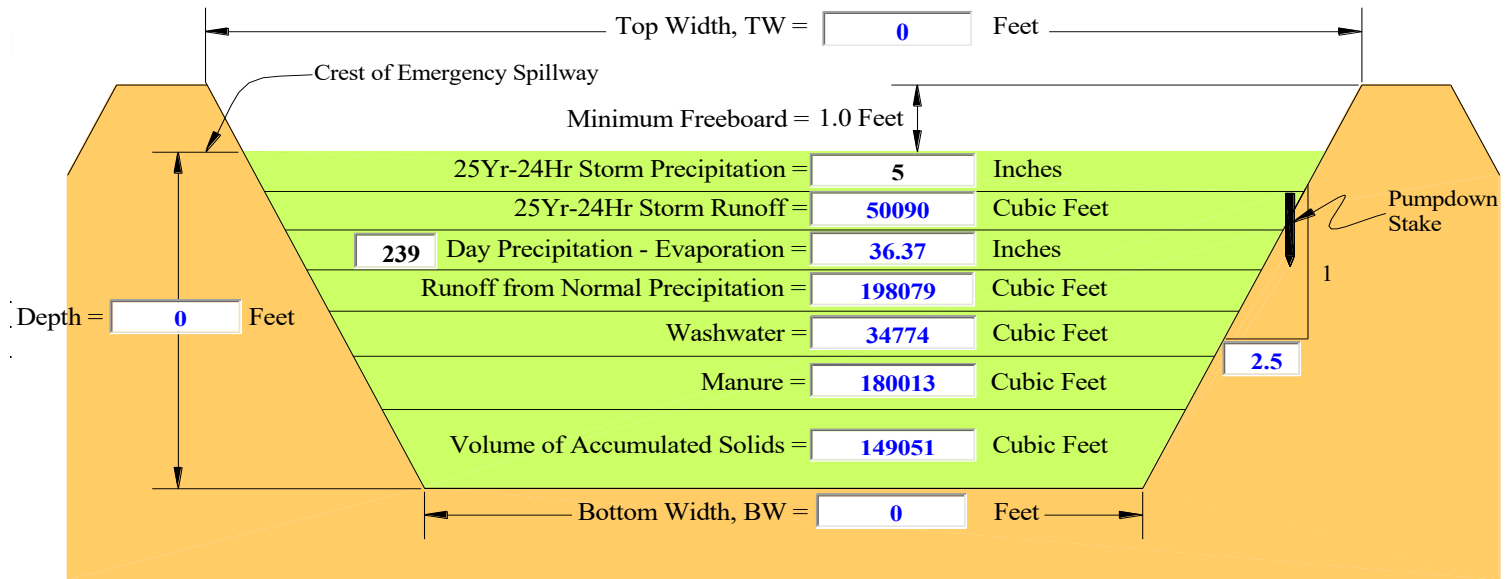
CLIENT: **Example Dairy**
 ASSISTED BY: **Technical Service Provider**

ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

WASTEWATER STORAGE POND

MONTHLY INFLOWS INTO WASTEWATER STORAGE POND

Pond Parameters	Value	Month	Number of Days	Rain-Evap on Pond CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Solids CF	Waste to Store CF	Waste to Store Gallons
Storage Period, Days=	365	October	31	0	4,447	1,452	0	0	5,899	44,127
Side Slope (X:1)=	2.50	November	30	0	21,102	3,716	0	0	24,818	185,654
Bottom Width, BW, Feet=	0	December	31	0	23,235	3,663	0	6,711	39,888	298,382
Bottom Length, BL, Feet=	0	January	31	0	21,102	3,615	0	5,431	34,916	261,193
Accumulated Solids Duration, Years=	1	February	28	0	16,156	2,958	0	0	19,113	142,976
Existing Storage, Acre Feet=	5.70	March	31	0	10,256	2,483	0	181	13,015	97,355
Surface Area of Existing Storage, SF=	54,457	April	30	0	-1,044	1,274	0	0	231	1,724
Minimum Soil Liner Depth, Feet=	1.00	May	31	0	-9,575	776	0	0	-8,799	-65,824
25 Year-24 Hour Storm Runoff, CF=	4,677	June	30	0	-16,519	334	0	0	-16,184	-121,067
Top Width, TW, Feet=	0	July	31	0	-22,010	216	0	0	-21,794	-163,029
Top Length, TL, Feet=	0	August	31	0	-17,335	296	0	0	-17,039	-127,460
Volume Needed, Acre Feet=	4.95	September	30	0	-7,851	583	0	0	-7,268	-54,365
Design Volume, Acre Feet=	0.00	Annual	365	0	21,964	21,366	0	12,323	55,653	416,316



OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.1

CLIENT: **Example Dairy**
ASSISTED BY: **Technical Service Provider**

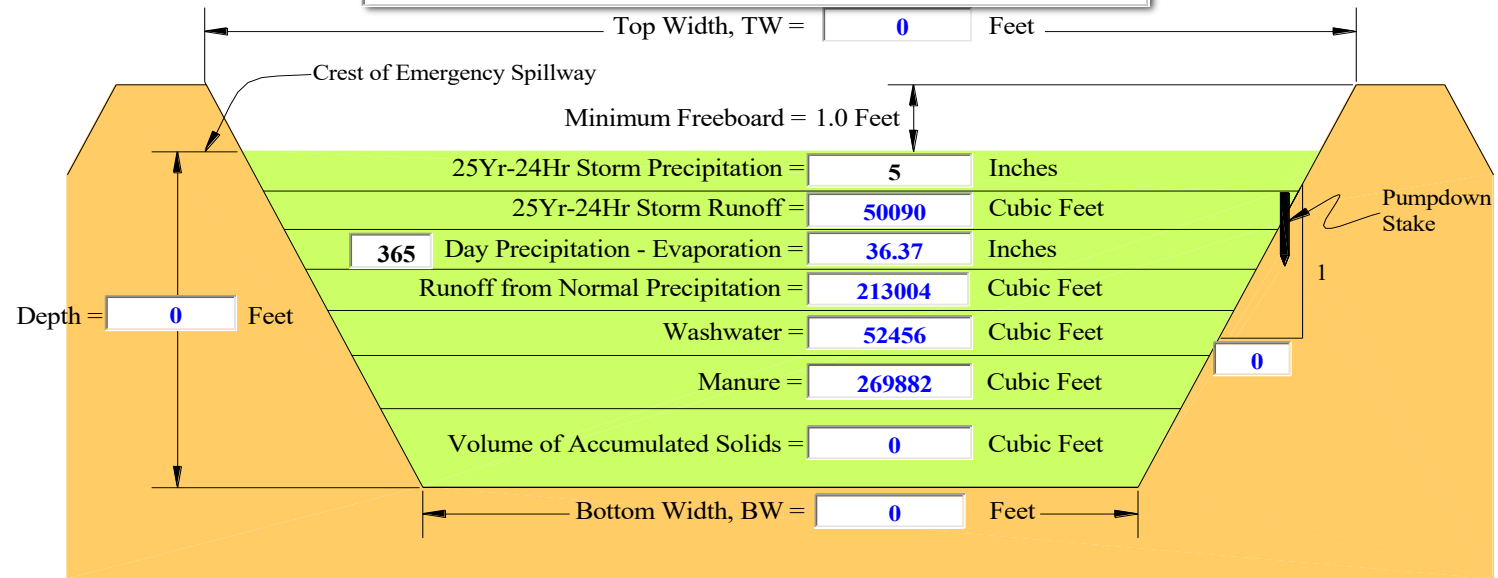
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

EVAPORATION POND

MONTHLY INFLOWS INTO EVAPORATION POND

Evaporation Pond Parameters	Value	Month	Number of Days	Rain-Evap on Pond CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Solids CF	Waste to Store CF	Waste to Store Gallons
Storage Period, Days=	365	October	31	0	0	1,452	0	0	1,452	10,859
Side Slope (X:1)=	0.00	November	30	0	0	3,716	0	0	3,716	27,800
Bottom Width, BW, Feet=	0	December	31	0	0	3,663	0	6,711	16,653	124,572
Bottom Length, BL, Feet=	0	January	31	0	0	3,615	0	5,431	13,814	103,338
Accumulated Solids Duration, Years=	0	February	28	0	0	2,958	0	0	2,958	22,124
Existing Storage, Acre Feet=	0.00	March	31	0	0	2,483	0	181	2,758	20,635
Surface Area of Existing Storage, SF=	0	April	30	0	0	1,274	0	0	1,274	9,532
Minimum Soil Liner Depth, Feet=	1.00	May	31	0	0	776	0	0	776	5,804
25 Year-24 Hour Storm Runoff, CF=	4,677	June	30	0	0	334	0	0	334	2,501
Top Width, TW, Feet=	0	July	31	0	0	216	0	0	216	1,615
Top Length, TL, Feet=	0	August	31	0	0	296	0	0	296	2,218
Volume Needed, Acre Feet=	0.9	September	30	0	0	583	0	0	583	4,364
Design Volume, Acre Feet=	0.0	Annual	365	0	0	21,366	0	12,323	33,689	252,011

NOT ENOUGH EVAPORATION TO DESIGN POND!



CLIENT: **Example Dairy**
 ASSISTED BY: **Technical Service Provider**

ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TRACTOR SPREADER APPLICATION OF SOLIDS

To apply 5,281 cubic feet of solids generated from the operation it will take approximately 27 trips annually. Based on applying NITROGEN, N													
Field Number	Acres	Crop	Tractor Spreader Capacity		Spread Width Feet	NITROGEN, N Concentration in Storage Facility		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Tons per Acre of Solids to Apply	Travel Length per Load Needed in Feet	Loads per Acre	Assumed Solids Density lbs/CF
			Bushels	CF		PPM	Lbs/Ton						
	189	Grass Hay/Pasture	160	199	15	2,990	5.98	247	1.00	73.6	141	21	36
	30	Grass Hay/Pasture	160	199	15	2,990	5.98	247	1.00	73.6	141	21	36

MANAGEMENT CRITERIA FOR BIG GUN SPRINKLER APPLICATION OF LIQUIDS

To apply 416,287 gallons of liquids generated from the operation it will take approximately 23 hours of pumping annually. Based on applying NITROGEN, N at agronomic rate use the application depths, set times, and travel rates listed below for each crop.													
Field Number	Acres	Crop	Sprinkler Flowrate GPM	Wetted Diameter Feet	Portion of Wetted Diameter Receiving Liquids	NITROGEN, N Concentration in Storage Facility		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Liquids to Apply	Application Rate in Inches/Hour	Set Time Needed in Hours	Travel Rate Needed in Feet/Minute
						PPM	Lbs/1000Gal						
	189	Grass Hay/Pasture	300	250	1/2 Circle ▼	475	3.97	247	1.00	3.82	1.45	6.47	0.50
	30	Grass Hay/Pasture	300	250	1/2 Circle ▼	475	3.97	247	1.00	3.82	1.45	6.47	0.50
					▼								
					▼								
					▼								
					▼								
					▼								
					▼								
					▼								

CLIENT: **Example Dairy**
 ASSISTED BY: **Technical Service Provider**

ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TANK WAGON APPLICATION OF LIQUIDS

To apply 416,287 gallons of liquids generated from the operation it will take approximately 104 trips annually. Based on applying							NITROGEN, N				
at agronomic rates use the application depths, travel lengths, and loads per acre listed below for each crop.											
Field Number	Acres	Crop	Tank Wagon Capacity Gallons	Spread Width Feet	NITROGEN, N		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Liquids to Apply	Travel Length per Load Needed in Feet	Loads per Acre
					Concentration in Storage Facility						
					PPM	Lbs/1000Gal					
	189	Grass Hay/Pasture	4,000	15	475	3.97	247	1.00	1.37	311	9.3
	30	Grass Hay/Pasture	4,000	15	475	3.97	247	1.00	1.37	311	9.3

COMPUTED NUTRIENT CONCENTRATIONS IN STORAGE

Storage Facility	Annual Volume Production	Units	Concentration of Nutrients in Storage			
			N	P ₂ O ₅	K ₂ O	Units
Storage Pond (>50%) Dilution	416,287	Gallons	3.97	2.50	4.09	lbs/1,000 Gal
Solids Storage Facility (Unroofed)	48	Tons	5.98	3.28	5.16	lbs/Ton

CLIENT: **Example Dairy**
 ASSISTED BY: **Technical Service Provider**

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
	Type of Storage Facility	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Liquids	Storage Pond (>50%) Dilution	2,359	1,223	2,002	70%	85%	85%	1,651	1,040	1,702
Solids	Solids Storage Facility (Unroofed)	812	389	613	70%	80%	80%	568	311	490
Grazing	NONE	20,437	10,329	16,141	100%	100%	100%	20,437	10,329	16,141

NUTRIENTS AVAILABLE AFTER APPLICATION

Nutrient Source	Type of Application System	Pounds of Nutrients Available			Percent Nutrients Retained After Application			Pounds of Nutrients Retained After Application		
		N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Liquids	Sprinkling	1,651	1,040	1,702	75%	100%	100%	1,239	1,040	1,702
Solids	Broadcast (Incorporated 7 or more days after application)	568	311	490	70%	100%	100%	398	311	490
Grazing	Grazing	20,437	10,329	16,141	85%	100%	100%	17,372	10,329	16,141

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
	Between Coastal and Cascade Mountains									
	Soil Drainage Class	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Liquids	Somewhat Poorly Drained	1,239	1,040	1,702	80%	100%	100%	991	1,040	1,702
Solids	Somewhat Poorly Drained	398	311	490	80%	100%	100%	318	311	490
Grazing	Somewhat Poorly Drained	17,372	10,329	16,141	80%	100%	100%	13,897	10,329	16,141
TOTAL-								15,206	11,680	18,333

CLIENT: **Example Dairy**
 ASSISTED BY: **Technical Service Provider**

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

PERCENT OF MANURE TO BE APPLIED TO FIELD AND UTILIZATION ACRES NEEDED BASED ON											
NITROGEN, N											
Field Number	Acres	Crop	LIQUIDS			SOLIDS			GRAZING		
			Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients
	189.0	Grass Hay/Pasture	86%	855	3	86%	275	1	86%	11,994	49
	30.0	Grass Hay/Pasture	14%	136	1	14%	44	0	14%	1,904	8
Off Farm			0%	0		0%	0		0%	0	
TOTALS-	219		100%	991	4	100%	318	1	100%	13,897	56

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED			-	NUTRIENTS REMOVED			=	NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P ₂ O ₅ Lbs/Acre	Potassium, K ₂ O Lbs/Acre		Nitrogen, N Lbs/Acre	Phosphorous, P ₂ O ₅ Lbs/Acre	Potassium, K ₂ O Lbs/Acre		Nitrogen, N Lbs/Acre	Phosphorous, P ₂ O ₅ Lbs/Acre	Potassium, K ₂ O Lbs/Acre
	189.0	Grass Hay/Pasture	69	53	84		247	78	205		-177	-25	-121
	30.0	Grass Hay/Pasture	69	53	84		247	78	205		-177	-25	-121
Off Farm													

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.1

CLIENT: **Example Dairy**
ASSISTED BY: **Technical Service Provider**

Vegetated Treatment Area Worksheet

Climatic Station- **GRANTS PASS**

25 year-24 hour Storm- **5.00** Inches
Runoff Curve Number- **95**
25 year-24 hour Storm Runoff- **4.42** Inches
Runoff Area- **87,120** SF
25 year-24 hour Storm Runoff- **240,669** Gallons
Max Application to VTA- **0.50** Inches

VTA Crop- Grass Hay/Pasture

Yield- **6** Tons/Acre

Nutrients Utilized- N= **348** lbs/Acre
P₂O₅= **110** lbs/Acre
K₂O= **289** lbs/Acre

Available Nutrients in Runoff- N= **2.70** lbs/1,000 Gallons
P₂O₅= **1.00** lbs/1,000 Gallons
K₂O= **8.60** lbs/1,000 Gallons

Nutrients Entering VTA- N= **650** lbs
P₂O₅= **241** lbs
K₂O= **2,070** lbs

Area Needed to Utilize Nutrients- N= **81,338** SF or **1.87** Acres
P₂O₅= **95,333** SF or **2.19** Acres
K₂O= **311,751** SF or **7.16** Acres

Area Needed for Runoff= **112,248** SF or **2.58** Acres



United States
Department of
Agriculture

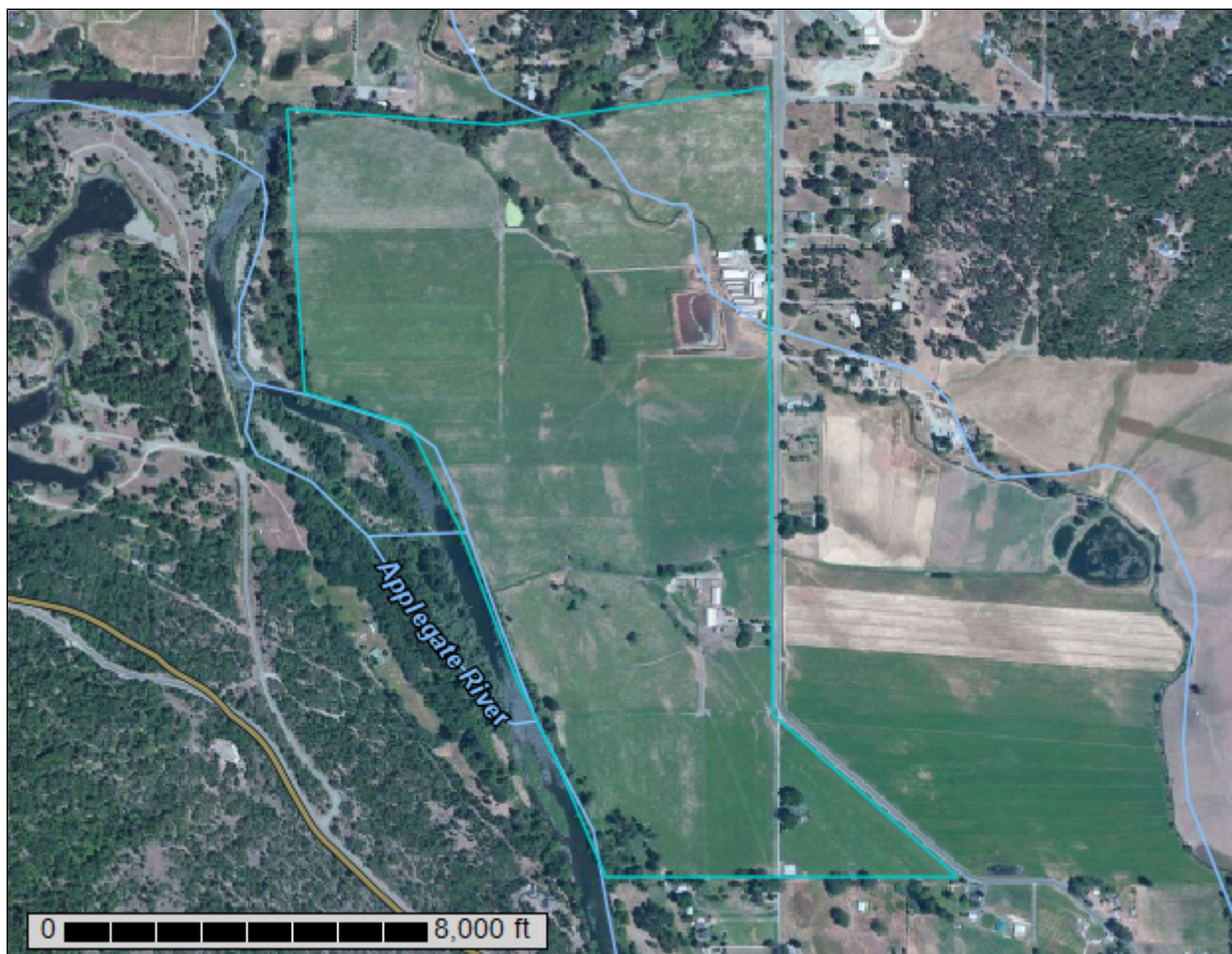
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Josephine County, Oregon**

Home place



August 25, 2016

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

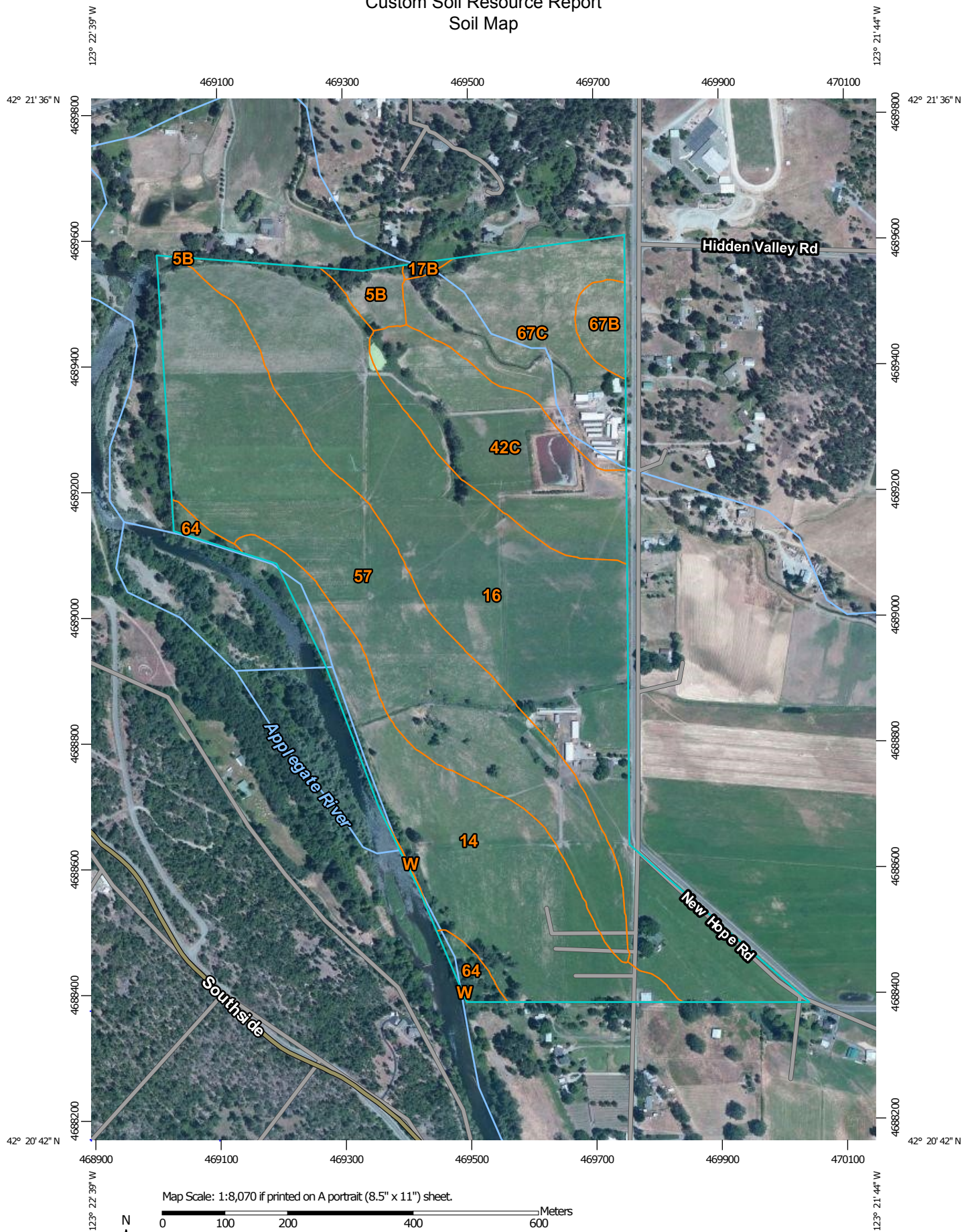
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:8,070 if printed on A portrait (8.5" x 11") sheet.

0 100 200 400 600 Meters
0 350 700 1400 2100 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Josephine County, Oregon
Survey Area Data: Version 12, Sep 18, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 30, 2010—Jul 17, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Josephine County, Oregon (OR033)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5B	Barron coarse sandy loam, 2 to 7 percent slopes	2.1	1.3%
14	Camas gravelly sandy loam	28.2	16.8%
16	Central Point sandy loam	52.9	31.6%
17B	Clawson sandy loam, 2 to 7 percent slopes	0.3	0.2%
42C	Holland sandy loam, cool, 7 to 12 percent slopes	17.2	10.3%
57	Newberg fine sandy loam	44.3	26.4%
64	Riverwash	2.1	1.2%
67B	Ruch gravelly silt loam, 2 to 7 percent slopes	2.4	1.4%
67C	Ruch gravelly silt loam, 7 to 12 percent slopes	17.8	10.6%
W	Water	0.1	0.1%
Totals for Area of Interest		167.4	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified

by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Josephine County, Oregon

5B—Barron coarse sandy loam, 2 to 7 percent slopes

Map Unit Setting

National map unit symbol: hrk5
Elevation: 800 to 2,500 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 140 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Barron and similar soils: 78 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Barron

Setting

Landform: Alluvial fans, toes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainbase, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and colluvium derived from granite

Typical profile

H1 - 0 to 9 inches: coarse sandy loam
H2 - 9 to 60 inches: coarse sandy loam

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Other vegetative classification: Somewhat Excessively Drained (G005XY002OR)
Hydric soil rating: No

Minor Components

Clawson

Percent of map unit: 10 percent
Landform: Alluvial fans, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Custom Soil Resource Report

Other vegetative classification: Poorly Drained (G005XY009OR)
Hydric soil rating: Yes

Jerome

Percent of map unit: 5 percent
Landform: Alluvial fans, drainageways
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G005XY009OR)
Hydric soil rating: Yes

Aquepts

Percent of map unit: 1 percent
Landform: Alluvial fans
Hydric soil rating: Yes

14—Camas gravelly sandy loam

Map Unit Setting

National map unit symbol: hrh2
Elevation: 750 to 2,500 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Camas and similar soils: 73 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Camas

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile

H1 - 0 to 10 inches: gravelly sandy loam
H2 - 10 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 9 to 17 inches to strongly contrasting textural stratification
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Custom Soil Resource Report

Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A
Other vegetative classification: Excessively Drained (G005XY001OR)
Hydric soil rating: No

Minor Components

Riverwash

Percent of map unit: 10 percent
Landform: Flood plains
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

16—Central Point sandy loam

Map Unit Setting

National map unit symbol: hrh4
Elevation: 800 to 2,000 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 140 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Central point and similar soils: 88 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Central Point

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 15 inches: sandy loam
H2 - 15 to 36 inches: sandy loam

Custom Soil Resource Report

H3 - 36 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: About 48 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): 2s

Land capability classification (nonirrigated): 4c

Hydrologic Soil Group: A

Other vegetative classification: Well Drained < 15% Slopes (G005XY004OR)

Hydric soil rating: No

Minor Components

Aquolls

Percent of map unit: 1 percent

Landform: Stream terraces

Hydric soil rating: Yes

17B—Clawson sandy loam, 2 to 7 percent slopes

Map Unit Setting

National map unit symbol: hrh5

Elevation: 800 to 2,000 feet

Mean annual precipitation: 30 to 40 inches

Mean annual air temperature: 52 to 54 degrees F

Frost-free period: 140 to 170 days

Farmland classification: Prime farmland if drained

Map Unit Composition

Clawson and similar soils: 75 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clawson

Setting

Landform: Alluvial fans, stream terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 3 inches: sandy loam

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H2 - 3 to 46 inches: sandy loam

H3 - 46 to 60 inches: coarse sandy loam

Properties and qualities

Slope: 2 to 7 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: About 12 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: B

Other vegetative classification: Poorly Drained (G005XY009OR)

Hydric soil rating: Yes

42C—Holland sandy loam, cool, 7 to 12 percent slopes

Map Unit Setting

National map unit symbol: hrjc

Elevation: 800 to 4,000 feet

Mean annual precipitation: 30 to 40 inches

Mean annual air temperature: 48 to 54 degrees F

Frost-free period: 140 to 170 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Holland, cool, and similar soils: 78 percent

Minor components: 1 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holland, Cool

Setting

Landform: Ridges, hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Colluvium and residuum weathered from granite

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

H1 - 1 to 15 inches: sandy loam

H2 - 15 to 29 inches: sandy clay loam

H3 - 29 to 50 inches: sandy loam

H4 - 50 to 54 inches: weathered bedrock

Properties and qualities

Slope: 7 to 12 percent

Depth to restrictive feature: 40 to 60 inches to paralithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Other vegetative classification: Well Drained < 15% Slopes (G005XY004OR)

Hydric soil rating: No

Minor Components

Aqualfs

Percent of map unit: 1 percent

Landform: Mountains

Hydric soil rating: Yes

57—Newberg fine sandy loam

Map Unit Setting

National map unit symbol: hrk1

Elevation: 750 to 2,500 feet

Mean annual precipitation: 30 to 60 inches

Mean annual air temperature: 50 to 54 degrees F

Frost-free period: 150 to 170 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Newberg and similar soils: 81 percent

Minor components: 3 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newberg

Setting

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

H1 - 0 to 15 inches: fine sandy loam
H2 - 15 to 24 inches: sandy loam
H3 - 24 to 61 inches: loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 2 percent
Landform: Basin floors, flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G005XY009OR)
Hydric soil rating: Yes

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

64—Riverwash

Map Unit Composition

Riverwash: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 60 inches: stratified sand to gravel

Properties and qualities

Slope: 0 to 3 percent
Natural drainage class: Poorly drained
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Yes

67B—Ruch gravelly silt loam, 2 to 7 percent slopes

Map Unit Setting

National map unit symbol: hrkk
Elevation: 800 to 3,000 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 140 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Ruch and similar soils: 74 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ruch

Setting

Landform: Alluvial fans, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metavolcanics and metasedimentary rock

Typical profile

H1 - 0 to 5 inches: gravelly silt loam
H2 - 5 to 60 inches: gravelly clay loam

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e

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Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Other vegetative classification: Well Drained < 15% Slopes (G005XY004OR)

Hydric soil rating: No

Minor Components

Aqualfs

Percent of map unit: 1 percent

Landform: Alluvial fans

Hydric soil rating: Yes

67C—Ruch gravelly silt loam, 7 to 12 percent slopes

Map Unit Setting

National map unit symbol: hrkl

Elevation: 800 to 3,000 feet

Mean annual precipitation: 30 to 35 inches

Mean annual air temperature: 52 to 54 degrees F

Frost-free period: 140 to 170 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Ruch and similar soils: 74 percent

Minor components: 1 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ruch

Setting

Landform: Alluvial fans, hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope, riser

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from metavolcanics and metasedimentary rock

Typical profile

H1 - 0 to 5 inches: gravelly silt loam

H2 - 5 to 60 inches: gravelly clay loam

Properties and qualities

Slope: 7 to 12 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 8.4 inches)

Custom Soil Resource Report

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Other vegetative classification: Well Drained < 15% Slopes (G005XY004OR)

Hydric soil rating: No

Minor Components

Aqualfs

Percent of map unit: 1 percent

Landform: Alluvial fans

Hydric soil rating: Yes

W—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Waste Management

Waste Management interpretations are tools designed to guide the user in evaluating soils for use of organic wastes and wastewater as productive resources. Example interpretations include land application of manure, food processing waste, and municipal sewage sludge, and disposal of wastewater by irrigation or overland flow process.

Manure and Food-Processing Waste

The application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include saturated hydraulic conductivity (Ksat), depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, soil erosion factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones,

Custom Soil Resource Report

cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

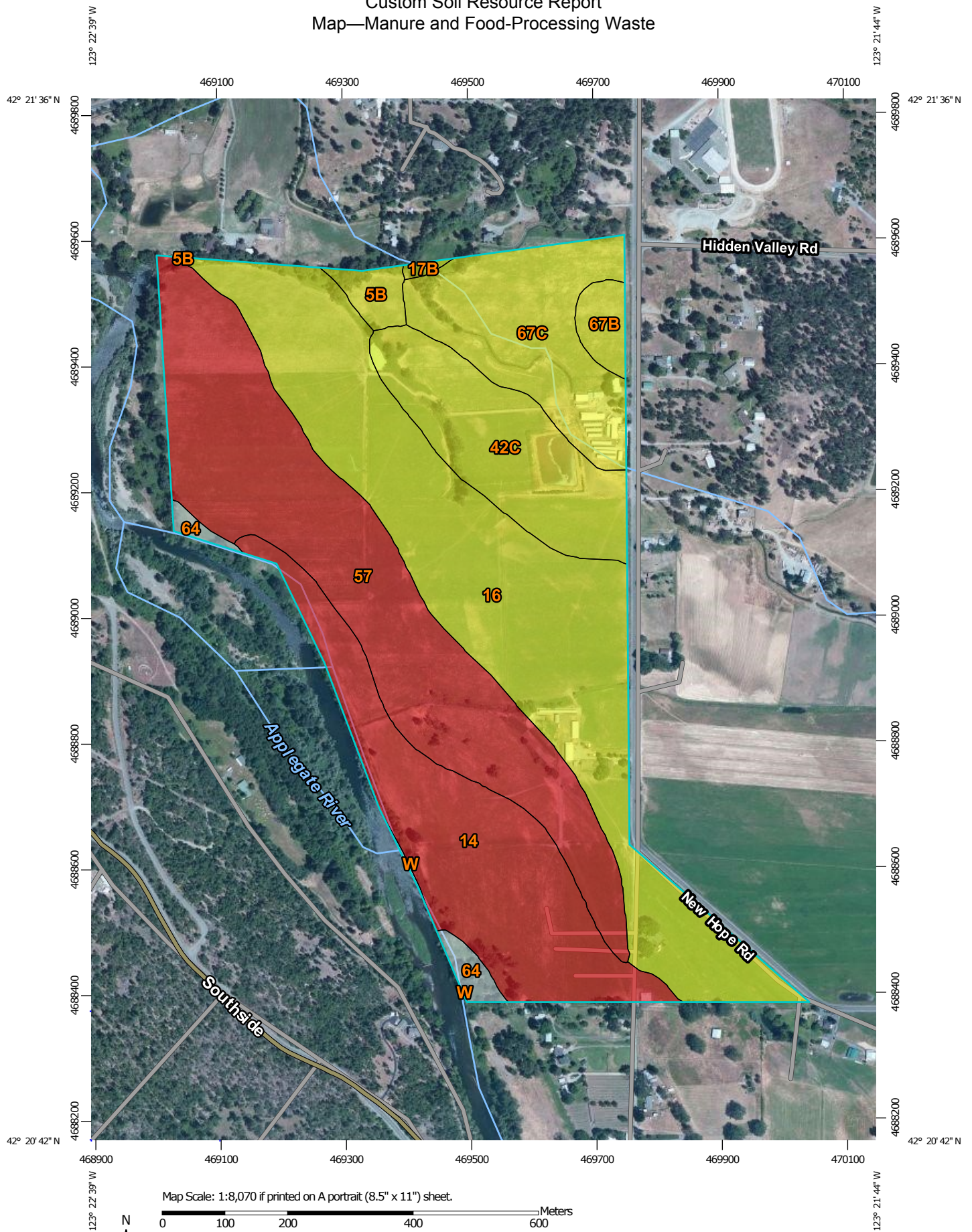
The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Custom Soil Resource Report Map—Manure and Food-Processing Waste



Map Scale: 1:8,070 if printed on A portrait (8.5" x 11") sheet.

0 100 200 400 600 Meters

0 350 700 1400 2100 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Background

 Aerial Photography

Soils

Soil Rating Polygons

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Lines

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Points

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Josephine County, Oregon
Survey Area Data: Version 12, Sep 18, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 30, 2010—Jul 17, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Custom Soil Resource Report

Tables—Manure and Food-Processing Waste

Manure and Food-Processing Waste— Summary by Map Unit — Josephine County, Oregon (OR033)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
5B	Barron coarse sandy loam, 2 to 7 percent slopes	Somewhat limited	Barron (78%)	Leaching (0.45)	2.1	1.3%
				Too acid (0.11)		
			Clawson (10%)	Depth to saturated zone (1.00)		
				Runoff (0.40)		
14	Camas gravelly sandy loam	Very limited	Camas (73%)	Filtering capacity (1.00)	28.2	16.8%
				Strongly contrasting textural stratification (1.00)		
				Droughty (1.00)		
				Flooding (0.60)		
				Leaching (0.45)		
16	Central Point sandy loam	Somewhat limited	Central Point (88%)	Leaching (0.45)	52.9	31.6%
				Too acid (0.03)		
				Droughty (0.01)		
17B	Clawson sandy loam, 2 to 7 percent slopes	Somewhat limited	Clawson (75%)	Depth to saturated zone (1.00)	0.3	0.2%
42C	Holland sandy loam, cool, 7 to 12 percent slopes	Somewhat limited	Holland, cool (78%)	Too acid (0.78)	17.2	10.3%
				Slow water movement (0.30)		
				Slope (0.16)		
57	Newberg fine sandy loam	Very limited	Newberg (81%)	Filtering capacity (1.00)	44.3	26.4%
				Flooding (0.60)		
				Leaching (0.45)		
				Too acid (0.03)		
			Wapato (2%)	Ponding (1.00)		
				Depth to saturated zone (1.00)		
				Flooding (1.00)		
				Runoff (0.40)		
				Slow water movement (0.30)		

Custom Soil Resource Report

Manure and Food-Processing Waste— Summary by Map Unit — Josephine County, Oregon (OR033)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
64	Riverwash	Not rated	Riverwash (100%)		2.1	1.2%
67B	Ruch gravelly silt loam, 2 to 7 percent slopes	Somewhat limited	Ruch (74%)	Slow water movement (0.30)	2.4	1.4%
67C	Ruch gravelly silt loam, 7 to 12 percent slopes	Somewhat limited	Ruch (74%)	Slow water movement (0.30)	17.8	10.6%
				Slope (0.16)		
W	Water	Not rated	Water (100%)		0.1	0.1%
Totals for Area of Interest					167.4	100.0%

Manure and Food-Processing Waste— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Somewhat limited	92.7	55.4%
Very limited	72.4	43.3%
Null or Not Rated	2.2	1.3%
Totals for Area of Interest	167.4	100.0%

Rating Options—Manure and Food-Processing Waste

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Disposal of Wastewater by Irrigation

Wastewater includes municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. The effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

Custom Soil Resource Report

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also can improve crop production by increasing the amount of water available to crops. The ratings are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, saturated hydraulic conductivity (Ksat), slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, depth to a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals. Permanently frozen soils are not suitable for disposal of wastewater by irrigation.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Custom Soil Resource Report
Map—Disposal of Wastewater by Irrigation



Map Scale: 1:8,070 if printed on A portrait (8.5" x 11") sheet.

0 100 200 400 600 Meters

0 350 700 1400 2100 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Background

 Aerial Photography

Soils

Soil Rating Polygons

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Lines

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Points

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Josephine County, Oregon
Survey Area Data: Version 12, Sep 18, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 30, 2010—Jul 17, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables—Disposal of Wastewater by Irrigation

Disposal of Wastewater by Irrigation— Summary by Map Unit — Josephine County, Oregon (OR033)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
5B	Barron coarse sandy loam, 2 to 7 percent slopes	Somewhat limited	Barron (78%)	Too acid (0.42)	2.1	1.3%
				Too steep for surface application (0.32)		
			Clawson (10%)	Depth to saturated zone (1.00)		
				Too steep for surface application (0.32)		
14	Camas gravelly sandy loam	Very limited	Camas (73%)	Filtering capacity (1.00)	28.2	16.8%
				Droughty (1.00)		
				Flooding (0.60)		
16	Central Point sandy loam	Somewhat limited	Central Point (88%)	Too acid (0.14)	52.9	31.6%
				Droughty (0.01)		
17B	Clawson sandy loam, 2 to 7 percent slopes	Somewhat limited	Clawson (75%)	Depth to saturated zone (1.00)	0.3	0.2%
				Too steep for surface application (0.32)		
42C	Holland sandy loam, cool, 7 to 12 percent slopes	Very limited	Holland, cool (78%)	Too steep for surface application (1.00)	17.2	10.3%
				Too acid (1.00)		
				Too steep for sprinkler application (0.40)		
				Slow water movement (0.22)		
57	Newberg fine sandy loam	Very limited	Newberg (81%)	Filtering capacity (1.00)	44.3	26.4%
				Flooding (0.60)		
				Too acid (0.14)		
			Wapato (2%)	Ponding (1.00)		
				Depth to saturated zone (1.00)		

Custom Soil Resource Report

Disposal of Wastewater by Irrigation— Summary by Map Unit — Josephine County, Oregon (OR033)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Flooding (1.00)		
				Slow water movement (0.22)		
64	Riverwash	Not rated	Riverwash (100%)		2.1	1.2%
67B	Ruch gravelly silt loam, 2 to 7 percent slopes	Somewhat limited	Ruch (74%)	Too steep for surface application (0.32)	2.4	1.4%
				Slow water movement (0.22)		
67C	Ruch gravelly silt loam, 7 to 12 percent slopes	Very limited	Ruch (74%)	Too steep for surface application (1.00)	17.8	10.6%
				Too steep for sprinkler application (0.40)		
				Slow water movement (0.22)		
W	Water	Not rated	Water (100%)		0.1	0.1%
Totals for Area of Interest					167.4	100.0%

Disposal of Wastewater by Irrigation— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Very limited	107.4	64.2%
Somewhat limited	57.8	34.5%
Null or Not Rated	2.2	1.3%
Totals for Area of Interest	167.4	100.0%

Rating Options—Disposal of Wastewater by Irrigation

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Water Features

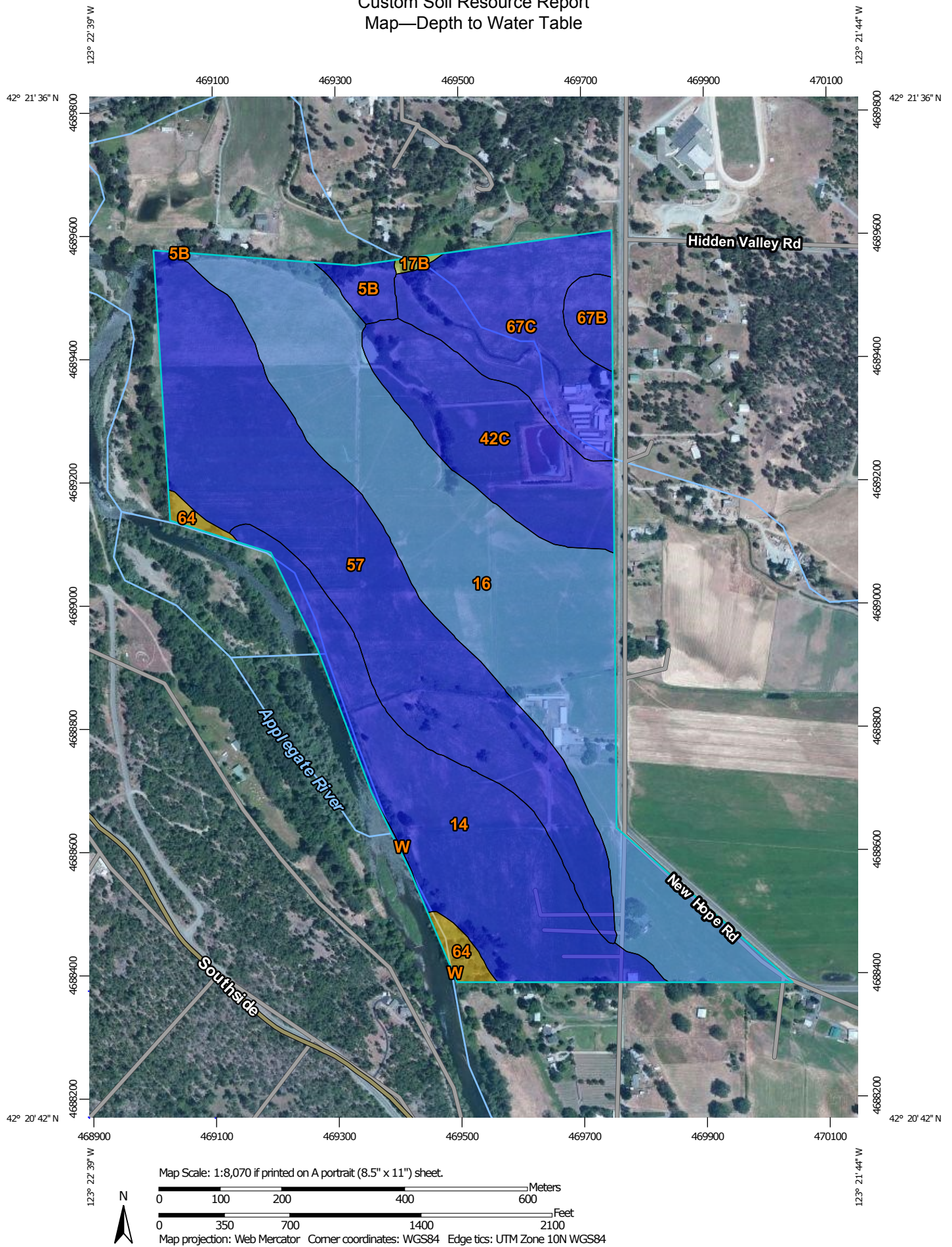
Water Features include ponding frequency, flooding frequency, and depth to water table.

Depth to Water Table

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report Map—Depth to Water Table



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

Soil Rating Lines

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

Soil Rating Points

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200

 Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Josephine County, Oregon
Survey Area Data: Version 12, Sep 18, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 30, 2010—Jul 17, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Depth to Water Table

Depth to Water Table— Summary by Map Unit — Josephine County, Oregon (OR033)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
5B	Barron coarse sandy loam, 2 to 7 percent slopes	>200	2.1	1.3%
14	Camas gravelly sandy loam	>200	28.2	16.8%
16	Central Point sandy loam	153	52.9	31.6%
17B	Clawson sandy loam, 2 to 7 percent slopes	61	0.3	0.2%
42C	Holland sandy loam, cool, 7 to 12 percent slopes	>200	17.2	10.3%
57	Newberg fine sandy loam	>200	44.3	26.4%
64	Riverwash	31	2.1	1.2%
67B	Ruch gravelly silt loam, 2 to 7 percent slopes	>200	2.4	1.4%
67C	Ruch gravelly silt loam, 7 to 12 percent slopes	>200	17.8	10.6%
W	Water	>200	0.1	0.1%
Totals for Area of Interest			167.4	100.0%

Rating Options—Depth to Water Table

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-

swell potential, saturated hydraulic conductivity (K_{sat}), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (K_{sat}) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (K_{sat}) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tillage. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (K_w and K_f) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the

Custom Soil Resource Report

Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service.
National soil survey handbook, title 430-VI. (<http://soils.usda.gov>)

Custom Soil Resource Report

Physical Soil Properties—Josephine County, Oregon														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
5B—Barron coarse sandy loam, 2 to 7 percent slopes														
Barron	0-9	-68-	-19-	8-13- 18	1.40-1.50-1.60	14.00-28.00-42.00	0.07-0.10-0.12	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.10	.10	5	3	86
	9-60	-68-	-19-	8-13- 18	1.40-1.50-1.60	14.00-28.00-42.00	0.07-0.10-0.12	0.0- 1.5- 2.9	0.1- 0.6- 1.0	.20	.20			
14—Camas gravelly sandy loam														
Camas	0-10	-69-	-24-	5- 8- 10	1.30-1.40-1.50	14.00-28.00-42.00	0.07-0.08-0.09	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.15	.24	2	5	56
	10-60	-96-	- 2-	0- 3- 5	1.40-1.50-1.60	141.00-150.00-705.00	0.03-0.04-0.05	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.02	.02			
16—Central Point sandy loam														
Central point	0-15	-66-	-19-	12-15- 18	1.35-1.43-1.50	14.00-28.00-42.00	0.08-0.10-0.11	0.0- 1.5- 2.9	2.0- 5.0- 8.0	.17	.17	5	3	86
	15-36	-66-	-19-	12-15- 18	1.40-1.50-1.60	14.00-28.00-42.00	0.08-0.10-0.12	0.0- 1.5- 2.9	0.5- 1.3- 2.0	.20	.20			
	36-60	-66-	-23-	8-11- 13	1.45-1.55-1.65	14.00-28.00-42.00	0.06-0.09-0.11	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.17	.28			

Custom Soil Resource Report

Physical Soil Properties—Josephine County, Oregon														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
17B—Clawson sandy loam, 2 to 7 percent slopes														
Clawson	0-3	-67-	-20-	8-13- 18	1.40-1.50-1.60	14.00-28.00-42.00	0.11-0.12-0.13	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.10	.10	5	3	86
	3-46	-67-	-20-	8-13- 18	1.40-1.50-1.60	14.00-28.00-42.00	0.10-0.12-0.13	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.24	.24			
	46-60	-68-	-19-	8-13- 18	1.40-1.53-1.65	14.00-28.00-42.00	0.07-0.11-0.14	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.20	.20			
42C—Holland sandy loam, cool, 7 to 12 percent slopes														
Holland, cool	0-1	-35-	-50-	0-15- 25	0.10-0.20-0.30	42.00-373.00-705.00	0.30-0.45-0.60	—	60.0-75.0-90.0			4	3	86
	1-15	-67-	-19-	10-14- 18	1.20-1.25-1.30	14.00-28.00-42.00	0.10-0.12-0.13	0.0- 1.5- 2.9	2.0- 5.0- 8.0	.10	.10			
	15-29	-56-	-18-	22-26- 30	1.30-1.40-1.50	1.40-3.00-4.00	0.14-0.16-0.17	3.0- 4.5- 5.9	1.0- 1.5- 2.0	.24	.24			
	29-50	-65-	-15-	15-20- 25	1.30-1.40-1.50	4.00-9.00-14.00	0.13-0.15-0.16	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.20	.20			
	50-54	—	—	—	—	—	—	—	—					

Custom Soil Resource Report

Physical Soil Properties—Josephine County, Oregon														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
57—Newberg fine sandy loam														
Newberg	0-15	-63-	-26-	7-11- 15	1.20-1.30-1.40	14.00-28.00-42.00	0.12-0.14-0.15	0.0- 1.5- 2.9	2.0- 3.0- 4.0	.28	.28	3	3	86
	15-24	-67-	-23-	5-10- 15	1.20-1.30-1.40	14.00-28.00-42.00	0.12-0.14-0.15	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.28	.28			
	24-61	-87-	- 7-	2- 6- 10	1.20-1.30-1.40	42.00-92.00-141.00	0.09-0.11-0.13	0.0- 1.5- 2.9	0.2- 0.6- 1.0	.15	.15			
64—Riverwash														
Riverwash	0-60	—	—	—	—	—	—	—	—				1	220
67B—Ruch gravelly silt loam, 2 to 7 percent slopes														
Ruch	0-5	-30-	-54-	12-16- 20	1.15-1.30-1.45	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.24	.37	5	6	48
	5-60	-34-	-38-	24-28- 30	1.45-1.58-1.70	1.40-3.00-4.00	0.12-0.14-0.16	3.0- 4.5- 5.9	0.1- 1.0- 2.0	.20	.32			
67C—Ruch gravelly silt loam, 7 to 12 percent slopes														
Ruch	0-5	-30-	-54-	12-16- 20	1.15-1.30-1.45	4.00-9.00-14.00	0.13-0.15-0.17	0.0- 1.5- 2.9	1.0- 2.0- 3.0	.24	.37	5	6	48
	5-60	-34-	-38-	24-28- 30	1.45-1.58-1.70	1.40-3.00-4.00	0.12-0.14-0.16	3.0- 4.5- 5.9	0.1- 1.0- 2.0	.20	.32			
W—Water														
Water	—	—	—	—	—	—	—	—	—					

Vegetative Productivity

This folder contains a collection of tabular reports that present vegetative productivity data. The reports (tables) include all selected map units and components for each map unit. Vegetative productivity includes estimates of potential vegetative production for a variety of land uses, including cropland, forestland, hayland, pastureland, horticulture and rangeland. In the underlying database, some states maintain crop yield data by individual map unit component. Other states maintain the data at the map unit level. Attributes are included for both, although only one or the other is likely to contain data for any given geographic area. For other land uses, productivity data is shown only at the map unit component level. Examples include potential crop yields under irrigated and nonirrigated conditions, forest productivity, forest site index, and total rangeland production under of normal, favorable and unfavorable conditions.

Irrigated and Nonirrigated Yields by Map Unit Component

The average yields per acre that can be expected of the principal crops under a high level of management are shown in this table. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

If yields of irrigated crops are given, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

Pasture yields are expressed in terms of animal unit months. An animal unit month (AUM) is the amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the table are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

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The land capability classification of map units in the survey area is shown in this table. This classification shows, in a general way, the suitability of soils for most kinds of field crops (United States Department of Agriculture, Soil Conservation Service, 1961). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

- Class 1 soils have slight limitations that restrict their use.
- Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.
- Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.
- Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.
- Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.
- Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.
- Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.
- Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, 2*e*. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class 5 are subject to little or no erosion.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally

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designated by adding an Arabic numeral to the subclass symbol, for example, 2e-4 and 3e-6. These units are not given in all soil surveys.

Reference:

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210.

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Irrigated and Nonirrigated Yields by Map Unit Component—Josephine County, Oregon								
Map symbol and soil name	Land capability		Alfalfa hay		Corn silage		Grass-legume hay	
	Irrigated	Nonirrigated	Irrigated	Nonirrigated	Irrigated	Nonirrigated	Irrigated	Nonirrigated
			Tons		Tons		Tons	
5B—Barron coarse sandy loam, 2 to 7 percent slopes								
Barron	3e	4e	7.00	3.00	25.00	—	5.00	2.00
14—Camas gravelly sandy loam								
Camas	4w	4w	5.00	2.50	—	—	2.50	—
16—Central Point sandy loam								
Central point	2s	4c	8.00	3.00	30.00	—	5.50	3.00
17B—Clawson sandy loam, 2 to 7 percent slopes								
Clawson	3w	3w	—	—	—	—	—	—
42C—Holland sandy loam, cool, 7 to 12 percent slopes								
Holland, cool	2e	2e	6.50	3.00	20.00	—	5.00	—
57—Newberg fine sandy loam								
Newberg	2w	2w	7.00	5.00	—	—	—	—
64—Riverwash								
Riverwash	—	8	—	—	—	—	—	—
67B—Ruch gravelly silt loam, 2 to 7 percent slopes								
Ruch	3e	2e	7.00	3.50	25.00	—	5.00	2.50
67C—Ruch gravelly silt loam, 7 to 12 percent slopes								
Ruch	4e	2e	7.00	3.50	25.00	—	5.00	2.50
W—Water								
Water	—	—	—	—	—	—	—	—

Waste Management

This folder contains a collection of tabular reports that present soil interpretations related to waste management. The reports (tables) include all selected map units and components for each map unit, limiting features and interpretive ratings. Waste management interpretations are tools designed to guide the user in evaluating soils for use of organic wastes and wastewater as productive resources. Example interpretations include land application of manure, food processing waste, and municipal sewage sludge, and disposal of wastewater by irrigation or overland flow process.

Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

This table shows the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of this table, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the table are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include saturated hydraulic conductivity (Ksat), depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erosion factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Application of sewage sludge not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include Ksat, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erosion factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge. Permanently frozen soils are unsuitable for waste treatment.

Report—Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge—Josephine County, Oregon					
Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
5B—Barron coarse sandy loam, 2 to 7 percent slopes					
Barron	78	Somewhat limited		Somewhat limited	
		Leaching	0.45	Too acid	0.42
		Too acid	0.11		
14—Camas gravelly sandy loam					
Camas	73	Very limited		Very limited	
		Filtering capacity	1.00	Filtering capacity	1.00
		Strongly contrasting textural stratification	1.00	Flooding	1.00
		Droughty	1.00	Strongly contrasting textural stratification	1.00
		Flooding	0.60	Droughty	1.00
		Leaching	0.45		
16—Central Point sandy loam					
Central point	88	Somewhat limited		Somewhat limited	
		Leaching	0.45	Too acid	0.14
		Too acid	0.03	Droughty	0.01
		Droughty	0.01		
17B—Clawson sandy loam, 2 to 7 percent slopes					
Clawson	75	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.99
42C—Holland sandy loam, cool, 7 to 12 percent slopes					
Holland, cool	78	Somewhat limited		Very limited	
		Too acid	0.78	Too acid	1.00
		Slow water movement	0.30	Slow water movement	0.22
		Slope	0.16	Slope	0.16

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Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge—Josephine County, Oregon					
Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
57—Newberg fine sandy loam					
Newberg	81	Very limited		Very limited	
		Filtering capacity	1.00	Filtering capacity	1.00
		Flooding	0.60	Flooding	1.00
		Leaching	0.45	Too acid	0.14
		Too acid	0.03		
64—Riverwash					
Riverwash	100	Not rated		Not rated	
67B—Ruch gravelly silt loam, 2 to 7 percent slopes					
Ruch	74	Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Slow water movement	0.22
67C—Ruch gravelly silt loam, 7 to 12 percent slopes					
Ruch	74	Somewhat limited		Somewhat limited	
		Slow water movement	0.30	Slow water movement	0.22
		Slope	0.16	Slope	0.16
W—Water					
Water	100	Not rated		Not rated	

Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit. Water Features include ponding frequency, flooding frequency, and depth to water table.

Water Features

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The *months* in the table indicate the portion of the year in which a water table, ponding, and/or flooding is most likely to be a concern.

Water table refers to a saturated zone in the soil. The water features table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is

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unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

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Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Water Features—Josephine County, Oregon										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
5B—Barron coarse sandy loam, 2 to 7 percent slopes										
Barron	A	—	January	—	—	—	—	None	—	None
			February	—	—	—	—	None	—	None
			March	—	—	—	—	None	—	None
			April	—	—	—	—	None	—	None
			May	—	—	—	—	None	—	None
			June	—	—	—	—	None	—	None
			July	—	—	—	—	None	—	None
			August	—	—	—	—	None	—	None
			September	—	—	—	—	None	—	None
			October	—	—	—	—	None	—	None
			November	—	—	—	—	None	—	None
			December	—	—	—	—	None	—	None

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Water Features—Josephine County, Oregon										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
14—Camas gravelly sandy loam										
Camas	A	—	January	—	—	—	—	None	Brief (2 to 7 days)	Occasional
			February	—	—	—	—	None	Brief (2 to 7 days)	Occasional
			March	—	—	—	—	None	Brief (2 to 7 days)	Occasional
			April	—	—	—	—	None	Brief (2 to 7 days)	Occasional
			May	—	—	—	—	None	Brief (2 to 7 days)	Occasional
			June	—	—	—	—	None	—	None
			July	—	—	—	—	None	—	None
			August	—	—	—	—	None	—	None
			September	—	—	—	—	None	—	None
			October	—	—	—	—	None	—	None
			November	—	—	—	—	None	Brief (2 to 7 days)	Occasional
			December	—	—	—	—	None	Brief (2 to 7 days)	Occasional

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Water Features—Josephine County, Oregon										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
16—Central Point sandy loam										
Central point	A	—	January	4.0-6.0	>6.0	—	—	None	—	None
			February	4.0-6.0	>6.0	—	—	None	—	None
			March	4.0-6.0	>6.0	—	—	None	—	None
			April	—	—	—	—	None	—	None
			May	—	—	—	—	None	—	None
			June	—	—	—	—	None	—	None
			July	—	—	—	—	None	—	None
			August	—	—	—	—	None	—	None
			September	—	—	—	—	None	—	None
			October	—	—	—	—	None	—	None
			November	—	—	—	—	None	—	None
			December	4.0-6.0	>6.0	—	—	None	—	None

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Water Features—Josephine County, Oregon										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
17B—Clawson sandy loam, 2 to 7 percent slopes										
Clawson	B	—	January	1.0-3.0	>6.0	—	—	None	—	None
			February	1.0-3.0	>6.0	—	—	None	—	None
			March	1.0-3.0	>6.0	—	—	None	—	None
			April	1.0-3.0	>6.0	—	—	None	—	None
			May	1.0-3.0	>6.0	—	—	None	—	None
			June	1.0-3.0	>6.0	—	—	None	—	None
			July	—	—	—	—	None	—	None
			August	—	—	—	—	None	—	None
			September	—	—	—	—	None	—	None
			October	—	—	—	—	None	—	None
			November	1.0-3.0	>6.0	—	—	None	—	None
			December	1.0-3.0	>6.0	—	—	None	—	None

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Water Features—Josephine County, Oregon										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
42C—Holland sandy loam, cool, 7 to 12 percent slopes										
Holland, cool	C	—	January	—	—	—	—	None	—	None
			February	—	—	—	—	None	—	None
			March	—	—	—	—	None	—	None
			April	—	—	—	—	None	—	None
			May	—	—	—	—	None	—	None
			June	—	—	—	—	None	—	None
			July	—	—	—	—	None	—	None
			August	—	—	—	—	None	—	None
			September	—	—	—	—	None	—	None
			October	—	—	—	—	None	—	None
			November	—	—	—	—	None	—	None
			December	—	—	—	—	None	—	None

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Water Features—Josephine County, Oregon										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
57—Newberg fine sandy loam										
Newberg	A	—	January	—	—	—	—	None	Brief (2 to 7 days)	Occasional
			February	—	—	—	—	None	Brief (2 to 7 days)	Occasional
			March	—	—	—	—	None	Brief (2 to 7 days)	Occasional
			April	—	—	—	—	None	—	None
			May	—	—	—	—	None	—	None
			June	—	—	—	—	None	—	None
			July	—	—	—	—	None	—	None
			August	—	—	—	—	None	—	None
			September	—	—	—	—	None	—	None
			October	—	—	—	—	None	—	None
			November	—	—	—	—	None	—	None
			December	—	—	—	—	None	Brief (2 to 7 days)	Occasional

Custom Soil Resource Report

Water Features—Josephine County, Oregon										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
64—Riverwash										
Riverwash	—	—	January	0.0-2.0	>6.0	—	—	None	Very long (more than 30 days)	Frequent
			February	0.0-2.0	>6.0	—	—	None	Very long (more than 30 days)	Frequent
			March	0.0-2.0	>6.0	—	—	None	Very long (more than 30 days)	Frequent
			April	0.0-2.0	>6.0	—	—	None	Very long (more than 30 days)	Frequent
			May	0.0-2.0	>6.0	—	—	None	Very long (more than 30 days)	Frequent
			June	0.0-2.0	>6.0	—	—	None	Very long (more than 30 days)	Frequent
			July	0.0-2.0	>6.0	—	—	None	Very long (more than 30 days)	Frequent
			August	0.0-2.0	>6.0	—	—	None	—	None
			September	0.0-2.0	>6.0	—	—	None	—	None
			October	0.0-2.0	>6.0	—	—	None	Very long (more than 30 days)	Frequent
			November	0.0-2.0	>6.0	—	—	None	Very long (more than 30 days)	Frequent

Custom Soil Resource Report

Water Features—Josephine County, Oregon										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
			December	0.0-2.0	>6.0	—	—	None	Very long (more than 30 days)	Frequent
67B—Ruch gravelly silt loam, 2 to 7 percent slopes										
Ruch	C	—	January	—	—	—	—	None	—	None
			February	—	—	—	—	None	—	None
			March	—	—	—	—	None	—	None
			April	—	—	—	—	None	—	None
			May	—	—	—	—	None	—	None
			June	—	—	—	—	None	—	None
			July	—	—	—	—	None	—	None
			August	—	—	—	—	None	—	None
			September	—	—	—	—	None	—	None
			October	—	—	—	—	None	—	None
			November	—	—	—	—	None	—	None
			December	—	—	—	—	None	—	None

Custom Soil Resource Report

Water Features—Josephine County, Oregon										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
67C—Ruch gravelly silt loam, 7 to 12 percent slopes										
Ruch	C	—	January	—	—	—	—	None	—	None
			February	—	—	—	—	None	—	None
			March	—	—	—	—	None	—	None
			April	—	—	—	—	None	—	None
			May	—	—	—	—	None	—	None
			June	—	—	—	—	None	—	None
			July	—	—	—	—	None	—	None
			August	—	—	—	—	None	—	None
			September	—	—	—	—	None	—	None
			October	—	—	—	—	None	—	None
			November	—	—	—	—	None	—	None
			December	—	—	—	—	None	—	None
W—Water										
Water	—	—	Jan-Dec	—	—	—	—	—	—	—

Water Management

This folder contains a collection of tabular reports that present soil interpretations related to water management. The reports (tables) include all selected map units and components for each map unit, limiting features and interpretive ratings. Water management interpretations are tools for evaluating the potential of the soil in the application of various water management practices. Example interpretations include pond reservoir area, embankments, dikes, levees, and excavated ponds.

Irrigation - General and Sprinkler

This table shows the degree and kind of soil limitations that affect irrigation systems on mineral soils. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Irrigation systems are used to provide supplemental water to crops, orchards, vineyards, and vegetables in area where natural precipitation will not support desired production of crops being grown.

Irrigation – general evaluates a soil's limitation(s) for installation and use of non-specific irrigation methods and is intended to provide initial planning information. Additional interpretations provide more specific information. This interpretation does not apply if the crop planned for irrigation is rice or other crops with unique plant physiological characteristics (such as cranberries). The ratings are for soils in their natural condition and do not consider present land use.

The soil properties and qualities important in design and management of irrigation systems are sodium adsorption ratio, depth to high water table, available water holding capacity, permeability, slope, calcium carbonate content, ponding, and flooding. Soil properties and qualities that influence installation are stones, depth to bedrock or cemented pan, and depth to a high water table. The properties and qualities that affect performance of the irrigation system are depth to bedrock or to a cemented pan, the sodium adsorption ratio, salinity, and soil reaction.

Irrigation, sprinkler (close spaced outlets drops) evaluates a soil for installation and use of sprinkler irrigation systems equipped with close spaced outlets on drops. The ratings are for soils in their natural condition and do not consider present land use.

Sprinkler irrigation systems equipped with low pressure spray nozzles mounted on close spaced drops apply water close to the ground surface. These systems are generally found on linear move or center pivot systems and they have separate slope criteria from other sprinkler systems due to their higher application rate which increase risk of runoff and irrigation-induced erosion on steeper slopes. Examples of these types of systems include Low Pressure in Canopy (LPIC), Low Energy Precision Application (LEPA), Low Elevation Spray Application (LESA), and Mid-Elevation Spray Application (MESA) systems. These types of irrigation systems are generally suitable for small grains, row crops, and vegetables.

The soil properties and qualities important in the design and management of sprinkler irrigation systems utilizing close spaced spray nozzles on drops are depth, available water holding capacity, sodium adsorption ratio, surface coarse fragments, permeability, salinity, slope, wetness, and flooding. The features that affect performance of the system and plant growth are surface texture, surface rocks, salinity, sodium adsorption ratio, wetness, erosion potential, and available water holding capacity.

Irrigation, sprinkler (general) evaluates a soil for installation and use of sprinkler irrigation systems excluding those equipped with close spaced outlets on drops. The ratings are for soils in their natural condition and do not consider present land use.

Sprinkler irrigation systems apply irrigation water to a field through a series of pipes and nozzles and can be either solid set or mobile. Generally, this type of irrigation system is suitable for small grains, row crops, vegetables, and orchards.

The soil properties and qualities important in the design and management of sprinkler irrigation systems are depth, available water holding capacity, sodium adsorption ratio, surface coarse fragments, permeability, salinity, slope, wetness, and flooding. The features that affect performance of the system and plant growth are surface rocks, salinity, sodium adsorption ratio, wetness, and available water holding capacity.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design. The irrigation interpretations are not designed or intended to be used in a regulatory manner.

Report—Irrigation - General and Sprinkler

[The information in this table provides irrigation interpretations for mineral soils. Onsite investigation may be needed to validate the interpretations and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Custom Soil Resource Report

Irrigation - General and Sprinkler—Josephine County, Oregon							
Map symbol and soil name	Pct. of map unit	Irrigation (general)		Irrigation, Sprinkler (close spaced outlet drops)		Irrigation, Sprinkler (general)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
5B—Barron coarse sandy loam, 2 to 7 percent slopes							
Barron	78	Very limited		Somewhat limited		Somewhat limited	
		Rapid water movement	1.00	Slope	0.99	Low water holding capacity	0.16
		Seepage	0.43	Low water holding capacity	0.16		
		Low water holding capacity	0.16				
		Slope	0.16				
14—Camas gravelly sandy loam							
Camas	73	Very limited		Very limited		Very limited	
		Rapid water movement	1.00	Low water holding capacity	1.00	Low water holding capacity	1.00
		Seepage	1.00	Occasional flooding	0.40	Occasional flooding	0.40
		Low water holding capacity	1.00	Slope	0.12		
		Occasional flooding	0.40				
		Slope	0.01				
16—Central Point sandy loam							
Central point	88	Very limited		Somewhat limited		Somewhat limited	
		Rapid water movement	1.00	Low water holding capacity	0.18	Low water holding capacity	0.18
		Seepage	0.43	Slope	0.12		
		Low water holding capacity	0.23				
		Slope	0.01				
17B—Clawson sandy loam, 2 to 7 percent slopes							
Clawson	75	Very limited		Somewhat limited		Somewhat limited	
		Rapid water movement	1.00	Slope	0.99	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Depth to saturated zone	0.99		
		Seepage	0.43				
		Slope	0.16				
		Low water holding capacity	0.01				

Custom Soil Resource Report

Irrigation - General and Sprinkler—Josephine County, Oregon							
Map symbol and soil name	Pct. of map unit	Irrigation (general)		Irrigation, Sprinkler (close spaced outlet drops)		Irrigation, Sprinkler (general)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
42C—Holland sandy loam, cool, 7 to 12 percent slopes							
Holland, cool	78	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Slope	1.00	Slope, sprinkler irrigation	0.40
		Slope	0.75	Too acid	0.22	Too acid	0.22
		Too acid	0.22				
		Depth to soft bedrock	0.12				
		Rapid water movement	0.03				
57—Newberg fine sandy loam							
Newberg	81	Very limited		Somewhat limited		Somewhat limited	
		Rapid water movement	1.00	Occasional flooding	0.40	Occasional flooding	0.40
		Seepage	1.00	Slope	0.12		
		Occasional flooding	0.40				
		Slope	0.01				
64—Riverwash							
Riverwash	100	Not rated		Not Rated		Not Rated	
67B—Ruch gravelly silt loam, 2 to 7 percent slopes							
Ruch	74	Somewhat limited		Somewhat limited		Not limited	
		Slope	0.16	Slope	0.99		
		Rapid water movement	0.03	Water Erosion	0.02		
67C—Ruch gravelly silt loam, 7 to 12 percent slopes							
Ruch	74	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.75	Slope	1.00	Slope, sprinkler irrigation	0.40
		Rapid water movement	0.03	Water Erosion	0.82		
W—Water							
Water	100	Not rated		Not Rated		Not Rated	

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