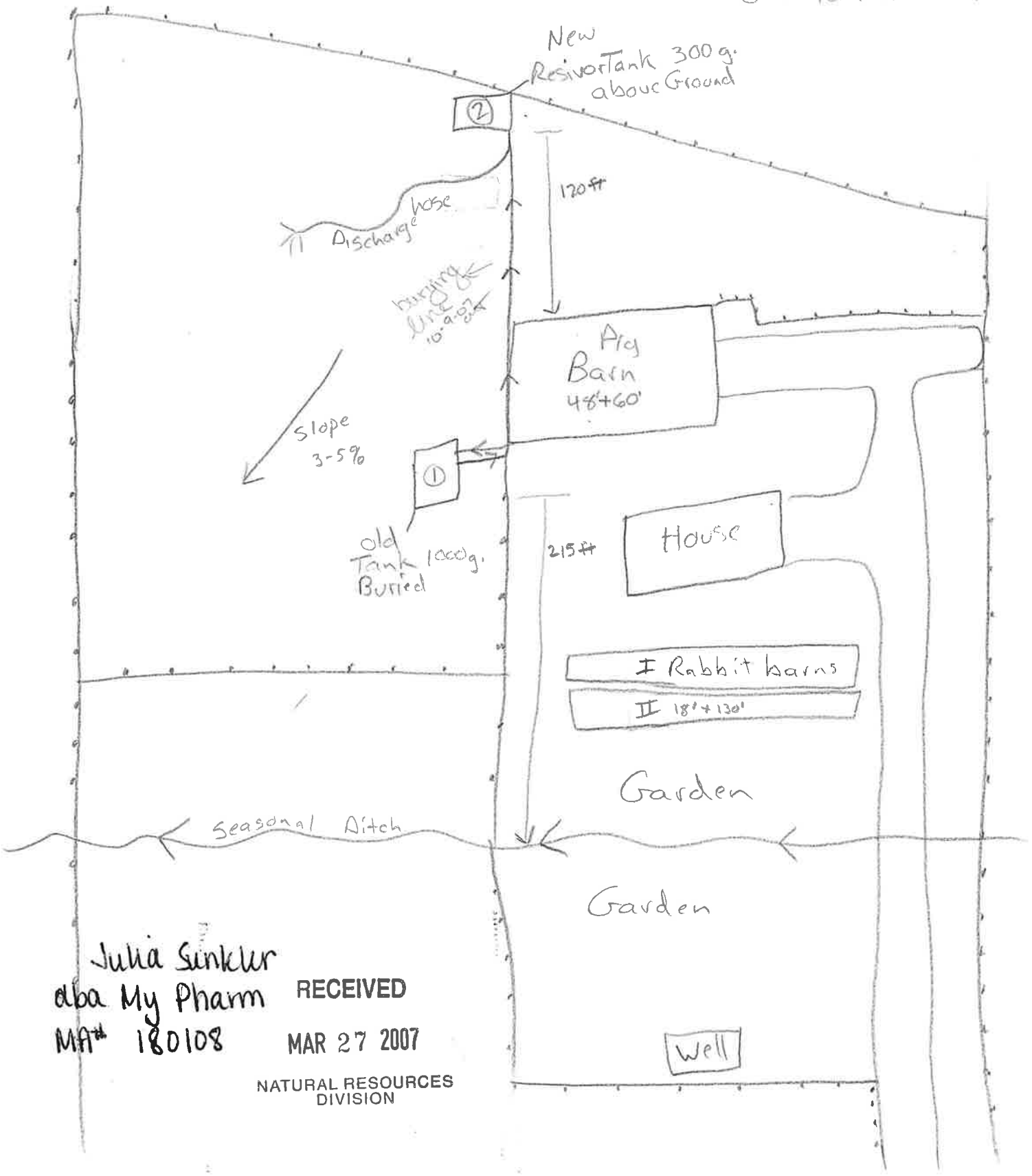
Kathryn Higgs asked That I send a map showing the Addition I made to existing waste Management Plan.

Julia Sunkler
(541) 424-2233

New Addition: March 1, 2007

Add reserve Tank above Ground and New Sewage pump in old Tank.



Julia Sinkler
dba My Pharm
MF# 180108

RECEIVED
MAR 27 2007
NATURAL RESOURCES DIVISION

ANIMAL WASTE MANAGEMENT PLAN
MINIMUM REQUIRED ELEMENT

AMENDMENT TO THE ANIMAL WASTE MANAGEMENT PLAN

My Pharm — CONFINED ANIMAL FEEDING OPERATION

Julia Sunkler — CAFO OPERATOR'S NAME

25825 Foster Rd, Monroe OR 97456 — STREET ADDRESS, CITY, STATE, ZIP

(541) 424-2233 — PHONE NUMBER

On May 1, 2006, KATHRYN HIGGS — INSPECTOR'S NAME

of the Oregon Department of Agriculture discussed modifications to Animal Waste Management Plan (AWMP) # 05236.

The following modifications were made to this AWMP:

1) P. Index (4/28/2006)

2) New/updated narrative - includes page numbers and corrects typos found in AWMP #05236.

3)

CONCLUSION:

X The above amendments are accepted.

Kathryn Higgs — INSPECTOR'S SIGNATURE

Julia Sunkler — OPERATOR'S SIGNATURE

USDA-NRCS WESTERN OREGON PHOSPHORUS INDEX WORKSHEET

Farm Operator	Julia Sunkler		Farm	My Pharm	Date: 4/28/2006
Soil Map Units	Jory		Tract		
Soil Test P Results	43	ppm and depth	Field	Garden/Pasture	
Tested by & Date			County	Benton	

Site Characteristic	None	Low	Medium	High	Very High	WEIGHT	FARM	CURRENT SCORE	FARM	FUTURE SCORE
Weight Factor	0	1	2	4	8					
TRANSPORT FACTORS										
Soil Erosion (T/A/yr)	<1	1-3	4-6	7-15	>15	1.50	1	1.5		
Soil Erosion from Sprinkler Irrigation	No sprinkler irrigation	Application rate < infiltration rate OR no visible runoff at field borders	Application rate = infiltration rate OR little to no visible runoff at field borders	Application rate > infiltration rate OR visible runoff at field borders	Application rate > infiltration rate OR excessive runoff at field borders. Rills and gullies present	0.75	1	0.75		
Runoff Class	Negligible	Very low OR Low	Medium	High	V.High	1.00	2	2		
Flooding Frequency Class	None or very rare	Rare	Occasional	Frequent	Very Frequent	0.75	1	0.75		
Distance to Perennial Surface Waters OR Buffer Widths Next to Surface Waters	>500 feet OR >30 ft	300-500 feet OR 20-30 ft	200-299 feet OR 10-19 feet	100-199 feet OR <10 feet	<100 feet OR No buffer	0.75	2	1.5		
Subsurface Drainage	None	Tile drains present and Bray P1<60ppm	Tile drains present and Bray P1=61-140ppm	Tile drains present and Bray P1=141-190ppm	Tile drains present and Bray P1>190ppm	0.50	0	0		
							TRANSPORT FACTORS (TFS) SUB-TOTAL	6.5		

SOURCE FACTORS										
Soil Test P (Bray P1 in ppm)		(Soil Test P - 40)x 0.10 Assign 0 pts if Soil test P<40ppm				1.00	43	0.3		
Comm P Appl Rate	0	P_2O_5 (lb/A) x 0.02 =				1.00	0	0.0		
Commercial P Fertilzer Application Method	None applied	Injected or banded deeper than 2 inches OR Incorporated within 5 days of application March-Sept	Incorporated within 5 days of application Oct-Feb OR Surface applied March-August	Incorporated within 5 days of application OR Surface applied Sept-Oct	Surface applied November - February	1.00	0	0.0		
Organic P Appl Rate	330	P_2O_5 (lb/A) x 0.02 =				1.00		6.6		
Organic P Source Application Method	None applied	Injected deeper than 2 inches OR Incorporated within 5 days of application March-Sept	Incorporated within 5 days of application Oct-Feb OR Surface applied March-August	Incorporated within 5 days of application OR Surface applied Sept-Oct	Surface applied November - February	1.00	4	4.0		
							SOURCE FACTORS (SFS) SUB-TOTAL	10.9		
							TOTAL RATING (TFS+SFS)	17.4		
							SITE VULNERABILTY CLASS	Medium		

Total of Weighted Rating Values	Site Vulnerability	Nutrient to Manage
<13.0	Low	N
13.0-25.0	Medium	N
25.1-50.0	High	P
>50.0	Very High	No application

Animal Waste Management Plan

December 2005

My Pharm

Operated by:

Julia Sunkler
25825 Foster Road
Monroe, Oregon 97456

Operation:

Swine and Rabbit Operation
State CAFO

As owner and operator of My Pharm, I intend to manage in accordance with the practices and operation and maintenance described in this animal waste management plan.

Signature Julia Sunkler Date 5-1-06

GENERAL NARRATIVE DESCRIPTION

My Pharm is located at 25825 Foster Road, Monroe, Oregon and is owned and operated by Julia Sunkler. My Pharm is 5 acres which is intensively farmed for fresh produce and meat products for local farmer markets. The operation raises rabbits for fryers and pigs to be sold at weaning. When in full operation, My Pharm will house 280 breeding does and 15 bucks. Up to a total of 2000 fryers ranging from day of age to 10 weeks old may be housed on farm at any given time. Fryers are sold every other week at 10 weeks of age. The pig operation consists of 8 breeding sows and 2 boars. There are typically 2 farrowing seasons each year. Nursery pigs will be sold at 8 weeks old or at weaning. In the future there may be a few pigs kept on farm as feeders (10 to 12 per year). A small flock of pasture poultry is also on farm to provide additional products for the farmer's market.

Manure Collection Methods

The rabbits are housed in cages in two covered barns all manure is handled in a dry solid form. Manure falls through the bottom of the cages and collects beneath, where it is stored. Manure is scooped out from underneath the cages and applied to the garden areas. As the rabbit operation grows to the permitted size, rabbit manure will be sold to other landowners to be used as fertilizer.

All pigs are housed in a barn that is equipped with concrete floors and curbs to contain manure. All of the solid manure is scraped from the concrete pens twice a week. Breeding stock are bedded with straw. Solid manure is applied to the garden areas year round, approximately 3 wheelbarrows full per week. Urine and wasted drinking water, and wash down water flows into a concrete gutter. A PVC pipe carries the liquid to a 1000 gallon pre-fabricated plastic tank. This system is closed and does not allow for any rainfall to enter the liquid system.

Manure Storage Facilities and Transfer

Pipes transfer all liquid to a 1000 gallon re-fabricated plastic tank. All barns have cement curbs and flooring. Rain runoff from the roofs is directed away from the manure system. Collected liquid is applied via a flexible hose onto a permanent grass pasture. The grass pasture does not have irrigation, so the small amount of liquid applied to the pasture has much benefit. The dry matter is collected directly from the barns, transferred to a wheelbarrow and hand applied.

Manure Utilization

Liquids are applied to permanent pasture. Dry manure and bedding is applied to the intensively farmed garden area. Excess rabbit manure will be transferred off-farm.

SPECIFIC DESCRIPTIONS AND CALCULATIONS

Land Application Areas

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

Two different soil types make up the manure application acreage, as determined by the Benton County Soil Survey. Soil Types include Bellpine silty clay loam and Jory silty clay loam. These soils are moderately well and well drained soils. A soils map and soil map unit descriptions for the manure application areas are included in this Animal Waste Management Plan.

Manure and Wastewater Volumes

Calculated volumes of all manure and wash 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, Litter and Process Waste Water

The USDA/NRCS Animal Waste Management Worksheet to estimate the content and volume of nutrients pig manure, litter and process waste water for nutrient balance. The USDA Agricultural Waste Management Handbook states "Reliable information on daily production of rabbit manure, feces, and urine is not available." Data from the Australia's NSW Department of Primary Industry-Agriculture is used to roughly estimate volume and nutrient content of rabbit manure. Refer to attachment entitled "Rabbit Manure Value Rational".

Farm Nutrient Balance

A phosphorus index has been completed for this farm. The farm currently balances for nitrogen which is the most limited factor.

Application Schedule and Limitations

The land to which manure is applied is more than 500' away from all surface water and consists of well drained, moderately deep soils. Manure is applied to permanent grass pastures and to an intensive garden system. There is no fresh water irrigation used on the pastures, where liquid manure is applied. Conservative irrigation is used on the garden in the summer time, where solid manure and bedding is applied.

Animal Mortality Management

Animal mortalities are donated to a reptile farm.

Record Keeping and Reporting

Soil samples will be taken in fields where manure is applied, once every 5 years. Protocol for sampling and testing soil and manure included in this Animal Waste Management Plan. Records of all manure applications, including the amount of nitrogen and phosphorus will be kept. All manure that is exported off the farm will also be recorded.

Julia Sunkler will report any manure discharge within 24 hours to the Oregon Department of Agriculture. Annual reports including amount of manure and wastewater applied and exported will be submitted each year.

Sampling Protocol

Manure Testing

The main purpose of manure testing is to obtain reasonably accurate values for the nutrients that are contained in the manure which will allow application rates to be determined for various crops. Oregon State University (OSU) has fertilizer guides available for the commonly grown crops in the state. Manure tests are obtained from the irrigation system during application to determine the amount of nutrients applied to the crops. Samples are also taken of solid manure.

Liquid manure Samples from the tank are obtained by dipping a bucket into the tank while it is being agitated. Other samples may also be obtained form the gun during irrigation. A subsample is placed in screw lid container and frozen prior to shipping unless shipment is to occur that day. At a minimum the samples will be tested for Total nitrogen (TKN), phosphorus (P), potassium (K) and moisture content (%).

Solid manure and/or Compost samples will be obtained from a minimum of 10 locations around the solids pile and placed in a suitable, non-leaking and airtight enclosure such as a Ziploc type plastic bag. The samples will be placed in a freezer until shipment or shipped immediately to a laboratory for testing. At a minimum, the samples will be tested for Total nitrogen (TKN), phosphorus (P), potassium (K) and moisture content (%). The test results will be kept at the office.

If any manure is hauled off-farm, records will be kept of customer names and addresses for all manure and/or compost sold. Additionally, the customer will be given a data sheet showing the nutrient content of the manure and appropriate agronomic rates for the crop. The level of responsibility for application at proper agronomic rates rest with the customer.

Soil Testing

The main purpose of soil testing is to determine the current nutrient status of the soil at the depth of the test. Fields will be sampled at least once every five years. As the soil is a dynamic system highly influenced by climatic conditions, cropping, and farming operations, it is important that adequate sites be sampled in the field to represent the true condition of the soil at the time of the test and , for comparison purposes, that the sampling occur at the same time each year. The OSU Bulletins below provide guidance for soil sampling and interpretation.

OSU BULLETINS

EC 628 - Soil Sampling for Home Gardens and Small Acreages outlines approved methods for obtaining soil samples which are representative of the area being tested and proper handling and shipping procedures.

EC 1478 Soil Test Interpretation Guide outlines interpretations and needs for various crops commonly grown in the state.

EM 8677 - A List of Analytical Laboratories Serving Oregon

Soils will be sampled on a field basis with a minimum of 20 cores taken per field to a depth of 12 inches. The sample will be homogenized and placed into a suitable container for shipping. If shipping is not to occur the day of sampling, the sample will be frozen until shipment.

At a minimum, the sample will be tested for nitrate-nitrogen (NO_3-N), ammonium-nitrogen (NH_4-N), phosphorus (P), and potassium (K).

Operation and Maintenance

Dry Stack Storage Facility

Solid manure storage facility will be inspected annually. Broken slabs and curbs will be repaired. Repair or replace rusted or damaged areas on roof structure. Broken gutters and/or downspouts will be repaired or replaced. Check for adequacy and function of drain away from downspouts. Check floor, side and back walls for soundness. Manure solids and leachate will not escape through cracks in the facility.

Manure Application Equipment

All manure application equipment (including but not limited to sprinklers, big gun irrigators, spreaders and/or tank wagons) will be operated and maintained according to the manufacturer's manual. Equipment found to be broken or worn will be replaced. Equipment will be calibrated to ensure recommended rates are applied. Liquids will be drained from sprinklers or big guns prior to freezing weather. When system is flushed, rinse water is used following waste, and liquid and sediment is applied agronomically. Nozzles will be checked periodically and if worn, nozzles will be replaced. Minimize exposure to animal and organic waters and manure gasses. Wear protective clothing when appropriate. When cleaning equipment after nutrient application, remove and save wastes in an appropriate manner. Avoid applying manure near surface water by establishing buffer strips and set backs, and use extreme care to avoid contaminating ground water.

Manure Effluent and Irrigation Transfer Lines

Manure, effluent and irrigation lines shall be flushed with clean water periodically to prevent particle buildup and plugging. Manure flushed from the lines will be applied agronomically so that surface and groundwater will be protected. Manure, effluent and irrigation lines shall be inspected periodically for leaks or worn out nozzles, and repairs or replacements made as needed. Special inspection shall be done to pressure relief valves, risers and control valves. Shut off valves will be inspected annually. Avoid unnecessary travel over pipelines that will damage their integrity. Equipment found to be broken or worn will be replaced. Water will be drained during cold weather to prevent frozen or broken lines. These lines can explode if not properly maintained and may cause human injury.

Pumps

Pumps will be maintained in accordance with manufacturer's operation and maintenance manual. Effluent will be drained from pumps prior to freezing weather. Pumps will be inspected periodically to identify and remove debris wrapped around impeller or worn parts. Appropriate action will be taken to repair any worn parts. Liquids will be drained from pump prior to freezing weather to prevent breakage. It is recommended to have a spare pump or back up system in case a pump must be removed for an extended time for repair.

Trough or Tank

Watering facility will be inspected periodically. Damaged tank/trough will be repaired or replaced. Float valves will be maintained in good working order. Area immediately surrounding the trough/tank will be maintained in a stable condition.

Watering facilities will not be allowed to overflow if additional liquid will affect waste storage capacities.

Animal Waste Management Plan

December 2005

My Pharm

Operated by:

Julia Sunkler
25825 Foster Road
Monroe, Oregon 97456

Operation:

Swine and Rabbit Operation
State CAFO

As owner and operator of My Pharm, I intend to manage in accordance with the practices and operation and maintenance described in this animal waste management plan.

Signature _____ Date 12-21-05

Animal Waste Management Plan

December 2005

My Pharm

Operated by:

Julia Sunkler
25825 Foster Road
Monroe, Oregon 97456

MA# 180108
Plan# 052360
Rec'd: 12/21/2005

Operation:

Swine and Rabbit Operation
State CAFO

As owner and operator of My Pharm, I intend to manage in accordance with the practices and operation and maintenance described in this animal waste management plan.

Signature _____ Date _____

GENERAL NARRATIVE DESCRIPTION

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Manure Collection Methods

The rabbits are housed in cages in two covered barns all manure is handled in a dry solid form. Manure falls through the bottom of the cages and collects beneath, where it is stored. Manure is scooped out from underneath the cages and applied to the garden areas. As the rabbit operation grows to the permitted size, rabbit manure will be sold to other landowners to be used as fertilizer.

All pigs are housed in a barn that is equipped with concrete floors and curbs to contain manure. All of the solid manure is scraped from the concrete pens daily. Breeding stock are bedded with straw. Solid manure is applied to the garden areas year round, approximately 3 wheelbarrows full per week. Urine and wasted drinking water, and wash down water flows into a concrete gutter. A PVC pipe carries the liquid to a 1000 gallon pre-fabricated plastic tank. This system is closed and does allow for any rainfall to enter the liquid system.

Manure Storage Facilities and Transfer

Pipes transfer all liquid to a 1000 gallon re-fabricated plastic tank. All barns have cement curbs and flooring. Rain runoff from the roofs is directed away from the manure system. Collected liquid is applied via a flexible hose onto a permanent grass pasture. The grass pasture does not have irrigation, so the small amount of liquid applied to the pasture has much benefit. The dry matter is collected directly from the barns, transferred to a wheelbarrow and hand applied.

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Two different soil types make up the manure application acreage, as determined by the Benton County Soil Survey. Soil Types include Bellpine silty clay loam, 12 to 20 % slope (BeD) and Jory silty clay loam 2 to 12 % slopes (JoC). These soils are moderately well and well drained soils. A soils map and soil map unit descriptions for the manure application areas are included in this Animal Waste Management Plan.

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Application Schedule and Limitations

The land to which manure is applied is more than 500' from perennial surface water and consists of well-drained, moderately deep soils. A small seasonal drainage ditch runs through the garden plots. At times of heavy rains the ditch runs.

A 15 – 20 foot vegetative buffer is maintained next to the drainage ditch when it is flowing. Manure is applied in a manner that avoids surface runoff or leaching. During saturated or frozen conditions the operator has the ability to store the manure covered until she can spread. If emergency application is necessary the operator will spread manure 100'+ from any surface water.

Mortality

All rabbits are sold to pet and reptile dealers. Hog mortalities are buried on site.

Animal Mortality Management

Animal mortalities are buried on farm.

Record Keeping and Reporting

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Watering facility will be inspected periodically. Damaged tank/trough will be repaired or replaced. Float valves will be maintained in good working order. Area immediately surrounding the trough/tank will be maintained in a stable condition.

Watering facilities will not be allowed to overflow if additional liquid will affect waste storage capacities.

USDA-NRCS WESTERN OREGON PHOSPHORUS INDEX WORKSHEET

Farm Operator	Julia Sunkler		Farm	My Pharm	Date: 12/19/2005
Soil Map Units	Jory		Tract		
Soil Test P Results	90	ppm and depth	Field	Garden/Pasture	
Tested by & Date			County	Benton	

Site Characteristic	None	Low	Medium	High	Very High	WEIGHT	FARM	CURRENT SCORE	FARM	FUTURE SCORE
Weight Factor	0	1	2	4	8					
TRANSPORT FACTORS										
Soil Erosion (T/A/yr)	<1	1-3	4-6	7-15	>15	1.50	1	1.5		
Soil Erosion from Sprinkler Irrigation	No sprinkler irrigation	Application rate < infiltration rate OR no visible runoff at field borders	Application rate = infiltration rate OR little to no visible runoff at field borders	Application rate > infiltration rate OR visible runoff at field borders	Application rate > infiltration rate OR excessive runoff at field borders. Rills and gullies present	0.75	1	0.75		
Runoff Class	Negligible	Very low OR Low	Medium	High	V.High	1.00	2	2		
Flooding Frequency Class	None or very rare	Rare	Occasional	Frequent	Very Frequent	0.75	1	0.75		
Distance to Perennial Surface Waters OR Buffer Widths Next to Surface Waters	>500 feet OR >30 ft	300-500 feet OR 20-30 ft	200-299 feet OR 10-19 feet	100-199 feet OR <10 feet	<100 feet OR No buffer	0.75	1	0.75		
Subsurface Drainage	None	Tile drains present and Bray P1<60ppm	Tile drains present and Bray P1=61-140ppm	Tile drains present and Bray P1=141-190ppm	Tile drains present and Bray P1>190ppm	0.50	0	0		
						TRANSPORT FACTORS (TFS) SUB-TOTAL		5.75		

SOURCE FACTORS										
Soil Test P (Bray P1 in ppm)		(Soil Test P - 40)x 0.10 Assign 0 pts if Soil test P<40ppm				1.00	90	5.0		
Comm P Appl Rate		0	P_2O_5 (lb/A) x 0.02 =			1.00	0	0.0		
Commercial P Fertilzer Application Method	None applied	Injected or banded deeper than 2 inches OR Incorporated within 5 days of application March-Sept	Incorporated within 5 days of application Oct-Feb OR Surface applied March-August	Incorporated within 5 days of application OR Surface applied Sept-Oct	Surface applied November - February	1.00	0	0.0		
Organic P Appl Rate		330	P_2O_5 (lb/A) x 0.02 =			1.00		6.6		
Organic P Source Application Method	None applied	Injected deeper than 2 inches OR Incorporated within 5 days of application March-Sept	Incorporated within 5 days of application Oct-Feb OR Surface applied March-August	Incorporated within 5 days of application OR Surface applied Sept-Oct	Surface applied November - February	1.00	4	4.0		
						SOURCE FACTORS (SFS) SUB-TOTAL		15.6		
						TOTAL RATING (TFS+SFS)		21.35		
						SITE VULNERABILTY CLASS		Medium		

Total of Weighted Rating Values	Site Vulnerability	Nutrient to Manage
<13.0	Low	N
13.0-25.0	Medium	N
25.1-50.0	High	P
>50.0	Very High	No application

RABBIT MANURE VALUE RATIONAL

Research data for rabbit manure volume and nutrient content in the United States is minimal. The USDA Agricultural Waste Management Handbook states "Reliable information on daily production of rabbit manure, feces and urine is not available." In researching information for this Animal Waste Management Plan, relevant data was found on Australia's NSW Department of Primary Industry-Agriculture regulatory website.

http://www.agric.nsw.gov.au/reader/an-rabbit/rabbit-guidelines.htm#Appendix%202

Factors in determining when rabbit farms should trigger requirement for development consent

State Environmental Planning Policy (SEPP) No. 30 stipulates that development consent must be obtained for cattle feedlots of 50 or more steers, or for piggeries with more than 20 breeding sows. This policy should be considered when determining the size of rabbit farms that are likely to be categorized as 'intensive livestock agriculture' and trigger the need for development consent.

When comparing rabbits with other animals, a breeding doe and progeny relate best to a breeding sow and progeny. Using data from Table 3, it can be seen that, in terms of manure production, 20 sows (including progeny to finishing stage) equates to 372 breeding does and progeny (ratio of 18.6 to 1). The ratio comparing sows and does in terms of nitrogen production in manure is around 11 to 1, and for phosphorus is 8 to 1. As rabbit manure has a high concentration of phosphorus, then phosphorus is the limiting factor. In Table 3, 'waste' includes both liquid and solid wastes.

Table 3. Intensive livestock relative manure and nutrient loads

Animal	Waste (kg/animal/day)	Waste relative to one sow and progeny	N (kg/animal/day)	P (kg/animal/day)
1 breeding doe and progeny (av. 23 kg)	1.53	18.6	0.0195	0.009
1 breeding sow and progeny to finishing stage (av. 496 kg)	28.46	1	0.217	0.073
1 beef steer (av. 568 kg)	34.09	0.83	0.195	0.062

Figures calculated from Kruger (unpublished) and Lebas et al. (1986) — see References.

In terms of phosphorus production, 20 sows equates to 160 rabbits. The minimum numbers for development consent given in Section 3 of this document for a 'dry' operation have been based on this figure. The figures for breeding does are based on 6 litters of 9 kittens per year per doe. This level of production is unlikely to be achieved in the majority of commercial enterprises, therefore effluent production figures are conservative. Moisture percentage of manure is around 30–40%.

Under a litter-based system in a well-ventilated shed, rabbit urine would largely evaporate, leaving in the order of 0.6 kg of waste per breeding doe and progeny, per day. Microbial breakdown would further reduce this quantity over a period of time. Quantities will vary between enterprises, and efficiently run rabbit farms may produce less wastage. Applicants may provide their own figures if these can be substantiated.

Appendix 2

Rabbit manure composition

The composition of the waste produced varies with the type and age of the rabbit, and particularly with the diet. The figures in Table 4 from Lebas et al. (1986) provide some guide for developing nutrient budgets.

Table 4. Quantities and composition of excrement produced by rabbits

Origin	Weight per day (g)	Content of fresh product (%)	
		Nitrogen	P_2O_5
Faeces:			
Fattening young	40–50	1.5–1.7	2.0–5.0
Nursing doe	150–200	1.2–1.5	5.0–7.0
Resting adult	70–80	1.2–1.5	2.0–4.0
Urine:			
Fattening young	80–110	1.0–1.3	0.05
Nursing doe	250–300	1.0–1.3	>0.02
Resting adult	100	1.0–1.3	0.08

In terms of volume of solid waste, on an annual basis, American literature suggests that a doe and her 30–40 kittens will create a combined total of 0.2–

0.25 cubic metres of manure annually. This figure relates to a commercial situation where kittens are removed at approximately 12 weeks of age.

The following calculations were completed using the Australian data:

Breeding doe and progeny produces — 3.37 lbs manure/animal/day

Or

1231 lbs manure/animal/year

Nutrient Content

Nitrogen — 0.043 lb N produced/animal/day

Or

280 breeding does — 15.69 lb N/animal/year

Or

4394 lbs N/year

Phosphorus — 0.019 lb P/animal/day

Or

7.24 lb P/animal/year

Or

2028 lb P/year

Or **4646 lb $P_2 0_5$/year**

These values are estimates based on many variables and assumptions due to the lack of local data. Variables include number of litters per year and litter size and nutrient uptake values of an intensive gardening program that produces many plant species with variable yield. The OSU Extension publication EC 1503, a fertilizer guide called "Fertilizing Your Garden" was used to calculate nutrient uptake for 2 acres of garden area. In the future, the landowner will likely have the manure tested for a more accurate nutrient balance.

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.0

12/21/2005
STATE: OREGON

CLIENT: MY PHARM/Julia Sunkler
ASSISTED BY: | CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

ANIMAL INVENTORY

Type of Animal	Number of Animals	Average Weight (lbs.)	Animal Units (1,000 lb.)	Nutrient Production (lbs./day/1000 lb. Animal Unit) N	P	K	Nutrient Production (lbs./day) N	P	K	Manure CF/D/AU	Annual Days Confined	Annual Days Off Farm
SOW(GESTATION)	9	450	4.1	0.19	0.06	0.12	0.77	0.26	0.50	0.44	365	0
BOAR	2	1,000	2.0	0.15	0.05	0.10	0.30	0.10	0.20	0.33	365	0
NURSING/NURSERY PIG	80	20	1.6	0.60	0.25	0.35	0.96	0.40	0.56	1.70	120	245
										Nursery pigs are sold at 8 weeks old.		
Totals/Averages-	91	490	7.7	0.27	0.10	0.16	2.0	0.8	1.3	0.7		

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.
SOW(GESTATION)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	9	9	9	9	9	9	9	9	9	9	9	9	0
BOAR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	2	2	2	2	2	2	2	2	2	2	2	2	0
NURSING/NURSERY PIG	100%	100%	100%	0%	0%	100%	100%	100%	100%	100%	0%	0%	
	80	80	80	80	80	80	80	80	80	80	80	80	13
													0
													0
													0
													0
													0
													0
													0
Total AUM's Available>													0
Total AUM's Needed>>>	2	2	2	0	0	2	2	2	2	2	0	0	13
Total AUM's>>>>>>>>>>	-2	-2	-2	0	0	-2	-2	-2	-2	-2	0	0	-13

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Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET
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ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

WEATHER STATION CORVALLIS STATE UNIV

Month	25Yr-24Hr	4.50	Lot Runoff Factors as a Percent of Monthly Precipitation	
	Monthly Average in Inches			
	Precipitation	Evaporation	Paved	Unpaved
October	3.08	1.64	50%	20%
November	6.82	0.71	50%	25%
December	7.72	0.61	55%	20%
January	6.82	0.73	55%	25%
February	5.04	0.97	50%	20%
March	4.55	1.32	45%	15%
April	2.56	2.16	40%	10%
May	1.95	3.34	35%	10%
June	1.23	4.31	35%	10%
July	0.52	5.59	30%	0%
August	0.87	5.12	35%	10%
September	1.51	3.46	45%	15%
Annual	42.67	29.96		

AREAS CONTRIBUTING RUNOFF TO LIQUID STORAGE FACILITY

Description of Runoff Area	Area in SF
Paved Lot Area >>> Is paved lot scraped daily? (Y/N) NO	0
Unpaved Lot Area >>>	0
Roof Area >>>	0
Surface Area of Silage Storage Facility>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> Does Silage Seepage Drain to Storage Facility? (Y/N) NO	0
Total Runoff Area Contributing to Liquid Storage Facility>>>>>>>>>>>>>>>>>	0

WATER USE THAT ENTERS LIQUID STORAGE FACILITY

Type of Water Use	Number of Animals	Number of Washes per Day	Gallons of Water Used per Wash-Day	Total Water Use per Day, Gallons	Total Water Use per Day, Cubic Feet
Animal Washwater				0	0.0
Equipment Wash				0	0.0
Flushwater				0	0.0
Miscellaneous		1	40.00	40	5.3
Total>>				40	5.3

CROP DATA

Field Number	Acres	Crop	Condition	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre Nitrogen N	Phosphorous P2O5	Potassium K2O
Garden	2.0	Peas, Green	As Harvested	Ton	2.60	191	191	191
Pasture	2.0	Orchard Grass Hay/Pasture	DHM	Ton	3.00	160	59	67
Off-Farm								

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ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

BEDDING VOLUME

Type of Animal	Type of Bedding Facility	Bedding Material	Unit Weight Lbs/CF	Amount Needed Lbs/Day/AU	Volume CF/Day/AU	Total Volume CF/Day	Total Weight Lbs/Day
SOW(GESTATION)	Confined	Chopped Straw	**0.50**	**0.30**	**0.30**	1	1
BOAR	Confined						
NURSING/NURSERY PIG	Confined						

SOLIDS SEPARATION FACTOR

Type of Animal	Type of Separator	Separation Factor %	Volume of Solids Separated CF/Day	Volume of Solids in Liquids CF/Day	Volume of Manure in Liquids CF/Day	Volume of Manure in Solids CF/Day	Accumulated Sludge in Storage CF/Day	Density of Separated Solids Lbs/CF	Weight of Separated Solids Lbs/Day
SOW(GESTATION)	Dry Scrape System	**90%**	3	0	0	2	0	**36**	97
BOAR	Dry Scrape System	**90%**	1	0	0	1	0	**36**	21
NURSING/NURSERY PIG	Dry Scrape System	**90%**	2	0	0	2	0	**36**	88
Total Solids>>			6	1	1	5	0		207

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Natural Resources Conservation Service

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12/21/2005
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ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

Month	Runoff in Cubic Feet: Roof Area Square Feet 0	Runoff in Cubic Feet: Paved Slab Area Square Feet 0	Runoff in Cubic Feet: Unpaved Lot Area Square Feet 0	Runoff in Cubic Feet: Silage Pit Surface Area, SF 0	Facility Water Use Cubic Feet	Manure Solids Cubic Feet	Manure Liquids Cubic Feet	Bedding Cubic Feet	Bedding Pounds	Solids Separated Cubic Feet	Solids Separated Pounds	Solids in Liquids Cubic Feet	Solids in Liquids Pounds	Total Solids Cubic Feet	Total Liquids Cubic Feet
October	0	0	0	0	166	15	145	38	38	102	3,673	11	408	102	185
November	0	0	0	0	160	15	140	36	36	99	3,555	11	395	99	179
December	0	0	0	0	166	15	145	38	38	102	3,673	11	408	102	185
January	0	0	0	0	166	15	145	38	38	178	6,405	20	712	178	202
February	0	0	0	0	150	14	131	34	34	161	5,785	18	643	161	184
March	0	0	0	0	166	15	145	38	38	102	3,673	11	408	102	185
April	0	0	0	0	160	15	140	36	36	99	3,555	11	395	99	179
May	0	0	0	0	166	15	145	38	38	102	3,673	11	408	102	185
June	0	0	0	0	160	15	140	36	36	99	3,555	11	395	99	179
July	0	0	0	0	166	15	145	38	38	102	3,673	11	408	102	185
August	0	0	0	0	166	15	145	38	38	178	6,405	20	712	178	202
September	0	0	0	0	160	15	140	36	36	172	6,198	19	689	172	196
Annual	**0**	**0**	**0**	**0**	**1,952**	**182**	**1,703**	**443**	**443**	**1,495**	**53,823**	**166**	**5,980**	**1,495**	**2,243**

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from LIQUIDS			Pounds/Day of Nutrients from SOLIDS			Pounds/Day of Nutrients from GRAZING		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
SOW(GESTATION)	0.08	0.06	0.06	0.69	0.53	0.54	0.77	0.58	0.60
BOAR	0.03	0.02	0.02	0.27	0.21	0.22	0.30	0.23	0.24
NURSING/NURSERY PIG	0.10	0.09	0.07	0.86	0.82	0.61	0.96	0.92	0.67
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.0

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ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			Pounds of Nutrients going OFF-FARM			Total Pounds of Nutrients from ALL SOURCES		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
October	3	3	3	30	23	23	30	28	21	0	0	0	63	54	47
November	3	2	3	29	22	23	29	27	20	0	0	0	61	52	45
December	3	3	3	30	23	23	30	28	21	0	0	0	63	54	47
January	6	5	5	57	48	42	0	0	0	0	0	0	63	54	47
February	6	5	4	51	44	38	0	0	0	0	0	0	57	48	42
March	3	3	3	30	23	23	30	28	21	0	0	0	63	54	47
April	3	2	3	29	22	23	29	27	20	0	0	0	61	52	45
May	3	3	3	30	23	23	30	28	21	0	0	0	63	54	47
June	3	2	3	29	22	23	29	27	20	0	0	0	61	52	45
July	3	3	3	30	23	23	30	28	21	0	0	0	63	54	47
August	6	5	5	57	48	42	0	0	0	0	0	0	63	54	47
September	6	5	5	55	47	41	0	0	0	0	0	0	61	52	45
Annual	**51**	**41**	**39**	**455**	**366**	**349**	**235**	**225**	**165**	**0**	**0**	**0**	**741**	**631**	**553**

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.0

CLIENT: **MY PHARM/Julia Sunkler**
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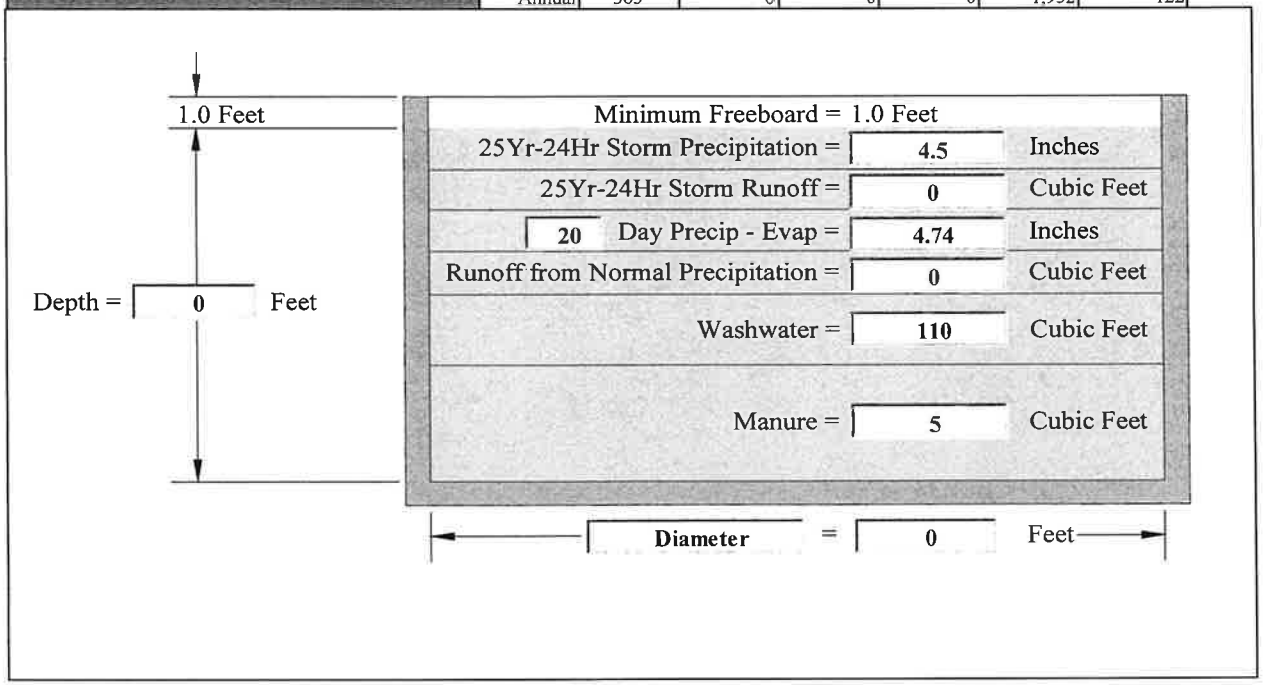
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

TANK

Tank Parameters	Value
Storage Period, Days=	20
Tank Diameter, Feet=	0
Existing Storage, Cubic Feet=	135.00
Surface Area of Existing Storage, SF=	0
25 Year-24 Hour Storm Runoff, CF=	0
Volume Needed, Cubic Feet=	123
Design Volume, Cubic Feet=	0
Is Tank Covered?	YES
Tank Dimensions?	Circular

MONTHLY INFLOWS INTO TANK

Month	Number of days	Rain-Evap on Tank CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Manure CF
October	31	0	0	0	166	8
November	30	0	0	0	160	7
December	31	0	0	0	166	8
January	31	0	0	0	166	16
February	28	0	0	0	150	14
March	31	0	0	0	166	8
April	30	0	0	0	160	7
May	31	0	0	0	166	8
June	30	0	0	0	160	7
July	31	0	0	0	166	8
August	31	0	0	0	166	16
September	30	0	0	0	160	15
Annual	365	0	0	0	1,952	122



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ANIMAL WASTE MANAGEMENT WORKSHEET
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ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

THIS WORKSHEET ACCOUNTS FOR SWINE MANURE ONLY!

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation / Type of Storage Facility	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
	Swine	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Tank (Covered)	51	41	39	**80%**	**90%**	**90%**	40	37	35
Solids	Solids Storage Facility (Roofed)	455	366	349	**70%**	**90%**	**90%**	319	330	314
Grazing	NONE	0	0	0	**0%**	**0%**	**0%**	0	0	0

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_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Broadcast (Incorporated 7 or more days after application)	40	37	35	**80%**	**100%**	**100%**	32	37	35
Solids	Broadcast (Incorporated 7 or more days after application)	319	330	314	**80%**	**100%**	**100%**	255	330	314
Grazing	Grazing	0	0	0	**0%**	**0%**	**0%**	0	0	0

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location: Between Coastal and Cascade Mountains / Soil Drainage Class	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Moderately Well Drained	32	37	35	**87%**	**100%**	**100%**	28	37	35
Solids	Moderately Well Drained	255	330	314	**87%**	**100%**	**100%**	222	330	314
Grazing	Moderately Well Drained	0	0	0	**0%**	**0%**	**0%**	0	0	0

CLIENT: **MY PHARM/Julia Sunkler**
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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
Garden	2.0	Peas, Green	**0%**	0	0	**100%**	222	1	**0%**	0	0
Pasture	2.0	Orchard Grass Hay/Pasture	**100%**	28	0	**0%**	0	0	**0%**	0	0
0											
0											
0											
0											
0											
0											
0											
Off-Farm			**0%**	0		**0%**	0		**100%**	0	
		TOTALS-	**100%**	**28**	**0**	**100%**	**222**	**1**	**100%**	**0**	**0**

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED			- NUTRIENTS REMOVED			= NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre
Garden	2.0	Peas, Green	111	165	157	191	191	191	-81	-26	-34
Pasture	2.0	Orchard Grass Hay/Pasture	14	18	17	160	59	67	-146	-41	-50
0											
0											
0											
0											
0											
0											
0											
Off-Farm											

Nutrient Balance for Swine/Rabbit Operation

Pottasium values are unknown for rabbit manure.

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation **SWINE/RABBIT** Type of Storage	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Liquid Tank	51	41	39	80%	90%	90%	41	37	35.1
Solids	Roofed Storage	4849	5012	349	70%	90%	90%	3394	4511	314

NUTRIENTS AVAILABLE AFTER APPLICATION

Nutrient Source	Type of Application	Pounds of Nutrients Available			Percent Nutrients Retained After Application			Pounds of Nutrients Retained After Application		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Sprinkling	41	37	35.1	80%	100%	100%	33	37	35.1
Solids	Broadcast	3394	4511	314	80%	100%	100%	2715	4511	314

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Soil Drainage Class	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Moderately Well Drained	33	37	35.1	87%	100%	100%	28	37	35.1
Solids	Moderately Well Drained	2715	4511	314	87%	100%	100%	2362	4511	314

PERCENT OF MANURE TO BE APPLIED TO FIELD AND UTILIZATION ACRES NEEDED BASED ON ***NITROGEN***

Field Number	Acres	Crop	LIQUIDS			SOLIDS		
			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
Vegetables	2.0	Vegetable Garden	**0%**	0		**16%**	382	2
Pasture	2.0	Orchard Grass Pasture	**100%**	28	0	**12%**	283	2
Off-Farm			**0%**	0		**72%**	1,697	
		TOTALS-	**100%**	**28**	**0**	**100%**	**2,362**	**4**

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

OSU Fertilizer Guide reccommends applying 15-15-15

Field Number	Acres	Crop	NUTRIENTS APPLIED			- NUTRIENTS REMOVED			= NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre
Garden		Vegetable Garden	191	360	unknown	196	196	196	-5	164	unknown
Pasture		Orchard Grass Hay/Pasture	169	307	unknown	160	59	67	9	248	unknown

EC 1503 • April 2000
$1.50

FERTILIZERguide

Fertilizing Your Garden

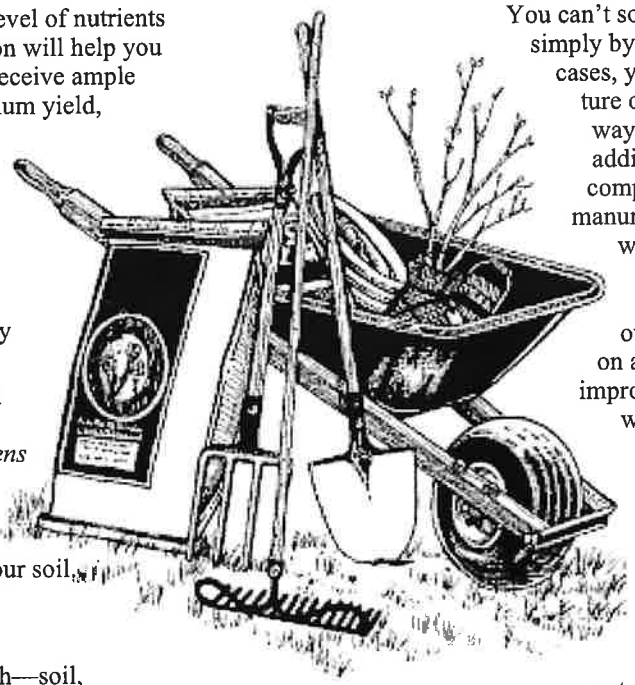
Vegetables, Fruits, and Ornamentals

J. Hart and R. McNeilan

Plants need an adequate level of nutrients to thrive. This publication will help you ensure that your plants receive ample levels of all nutrients for optimum yield, quality, and aesthetic value. It discusses the following:

- Factors involved in plant growth
- Types of fertilizer
- How much fertilizer to apply

The fertilizer recommendations in this guide are based on soil test results. See EC 628, *Soil Sampling for Home Gardens and Small Acreages*, and *EM 8677, A List of Analytical Labs Serving Oregon*, for more information on testing your soil.



Plant growth

Some factors in plant growth—soil, nutrients, and soil pH—are discussed below. These are only a few of the factors involved in healthy plant growth. Other important practices include plant spacing; insect, weed, and disease control; irrigation; and timely harvest.

Soil

In many cases, garden soil suffers from a variety of problems. For example:

- Topsoil often is removed or covered with fill material during construction. Although a 2- to 4-inch layer of topsoil may be placed over fill, this shallow layer may not support vigorous plant growth without improvement.
- Heavy construction equipment may compact soil, thus slowing root growth and water movement.
- Construction wastes may be buried near the house. These hidden wastes can lead to sudden death of plants.
- Many soils are naturally "heavy" due to high clay content.

You can't solve these kinds of problems simply by adding fertilizer. In all of these cases, you need to improve the structure of your soil. The most effective way to improve soil structure is by adding organic matter, such as composted plant material or manure. These materials increase soil workability at the same time they provide nutrients. Since organic matter is "used up" over time, you'll need to add it on a regular basis. Gypsum can improve structure in eastern Oregon where sodium (Na) is a problem and soil pH is above 8.5, but it does not appreciably improve clay soils in western Oregon.

Nutrients

The three key nutrients for plant growth are nitrogen (N), phosphorus (P), and potassium (K). These nutrients are contained in most commercial fertilizer mixes. Other materials you may need to add are lime, sulfur, magnesium, and boron.

How big is your garden?

To know how much fertilizer to apply, you need to know how big your garden is. To find the square footage of your garden, multiply the width times the length. For example, if your garden is 30 feet long and 10 feet wide, it totals 300 square feet (30 x 10).

The tables in this publication recommend quantities of fertilizer material to apply per 100 square feet. For a 300-square foot garden, you need three times as much fertilizer as you need for a 100-square foot garden.

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John Hart, Extension soil scientist; and Ray McNeilan, Extension agent emeritus; Oregon State University. This publication replaces FG 66, *Evaluating Home Fruit, Vegetable, and Ornamental Gardens Fertilizer Guide.*

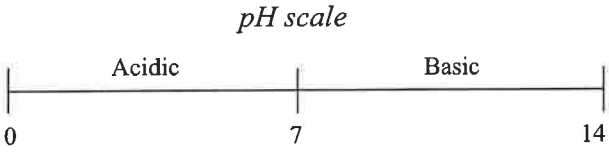
Nitrogen is important for healthy plant growth. It usually needs to be applied each year because rain and irrigation remove most of the nitrogen not used by plants. Phosphorus is essential for vigorous growth of seedlings, especially in cool, wet, spring weather. Potassium is important for disease resistance and starch formation.

Plants use the most nitrogen during or just before the time of rapid growth. For most plants, this is the best time to add nitrogen.

If you apply nitrogen fertilizers late in the growing season, most plants can't efficiently utilize the nitrogen, and the excess is likely to remain in the soil after the growing season. This extra nitrogen is not a groundwater problem in the dry climate of central and eastern Oregon. In western Oregon, however, winter rains will move nitrogen in the form of nitrate below the root zone and possibly deposit it in groundwater. Nitrate in groundwater is a contaminant that poses a health risk. See EC 1492 and EC 1493 for more information.

pH

Soil pH is a measure of how acidic or alkaline a soil is. A soil with low pH (below 7.0) is acidic, while a soil with high pH (above 7.0) is alkaline (basic).



Vegetable gardens produce well in a soil pH of 6.0–7.0, and lawns do well in a pH of 6.0. "Acid-loving" plants such as azaleas, blueberries, and rhododendrons require a soil pH below 6.0 and preferably 4.5 to 5.5.

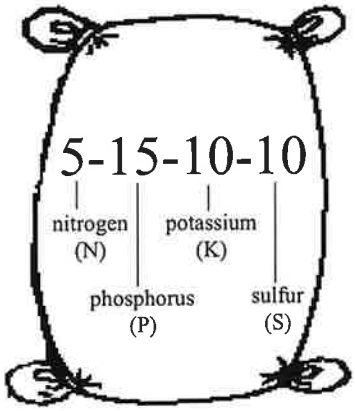
If soil pH is too low, add lime to make the soil less acidic. Use 5 to 10 lb lime per 100 square feet if mixing into the soil before planting. For established lawns or plants, add 5 lb per 100 square feet. Retest soil pH 3 to 6 months later to see whether you've achieved the target pH.

You can use various methods to acidify the soil if pH is too high. A soil pH greater than 7.0 is uncommon west of the Cascades, so gardeners in western Oregon typically need to acidify their soil only if they are growing acid-loving plants. Many soils on the east side of the Cascades are very alkaline, and need to be acidified for all crops.

Types of fertilizer

Opinions vary concerning the merits of manures or other organic fertilizers versus "chemical" fertilizers. Excellent gardens may be grown using either method. Plants do not differentiate between nutrients from organic and chemical fertilizers; the form absorbed by plant roots from both sources is identical.

Plants can use chemical fertilizers as soon as they are applied. Soil bacteria and fungi must act on most organic nutrient sources to change them into a usable form. Thus, if you use mostly organic fertilizers, you may need to add a small amount of a source of more readily available nitrogen early in the season to ensure adequate plant nutrition until the organic sources become available to plants. Options include liquid fish, blood meal, and chemical fertilizer.



Packaged mixes

Both chemical and organic fertilizers are available as packaged mixes containing N, P, K, and sometimes sulfur (S). Package labels tell how much of each nutrient the fertilizer contains.

The nutrients always are listed in this order on the label: nitrogen-phosphorus-potassium. Thus, a fertilizer labeled 5-15-10 contains 5 percent nitrogen, 15 percent phosphorus (in the form of phosphate), and 10 percent potassium (in the form of potash). In other words, every 10 pounds of this fertilizer material contains 0.5 pound nitrogen, 1.5 pounds phosphorus, and 1 pound potassium (10 lb material x 0.05 N = 0.5 lb N).

If a fourth number is listed, it represents sulfur. Thus, a 5-15-10-10 fertilizer also contains a 10-percent concentration of sulfur (in the form of sulfate).

The remaining components of the fertilizer material include carbon, hydrogen, oxygen, and coating materials.

Many fertilizers are labeled for specific uses such as roses, azaleas, or vegetables. These specialty blends generally are an expensive alternative to standard blends applied at an adequate rate.

Unblended organic sources

Wood ash

Wood ash is a good source of potassium. You can use ash as a fertilizer and liming material on vegetable gardens, flower beds, lawns, and most shrubs. It's particularly useful on acid soils low in potassium.

The fertilizer value of wood ash depends on the type of wood burned. Generally, hardwoods weigh more per cord than softwoods and yield more ash per pound of wood. Their ash also contains higher percentages of nutrients.

Ash from a cord of oak meets the potassium needs of a garden 60 feet by 70 feet (4,200 square feet), and ash from a cord of Douglas-fir, a garden 30 feet by 30 feet (900 square feet). Both contain enough calcium and magnesium to reduce soil acidity slightly. See Table 4c (page 7) for application rates.

Elements in ash are water-soluble. Therefore, always store ash in a dry place until you're ready to use it.

Apply ashes evenly, and if possible mix them into the soil. Never leave ashes on the surface in lumps or piles. If ashes are concentrated in one place, excessive salt leaches into the soil, creating a harmful environment for plants. Spreading wood ashes in a thin layer over your lawn is a safer application than to use them in your garden, where they are more likely to be concentrated in the soil.

Be aware of several precautions if you use wood ashes:

- Don't apply wood ashes to acid-loving plants such as blueberries, rhododendrons, and azaleas.
- You may have problems with potato scab, a fungus disease, if you use ashes where you grow potatoes.
- Don't add fertilizer containing nitrogen in the form of ammonium immediately after adding wood ash; the presence of ash can result in the loss of ammonia.
- Don't add fresh ashes to newly germinated seeds.
- Some types of ash are not safe to use on plants, including coal ashes, ashes from lead-painted or chemically treated wood, and ashes from fireplaces or incinerators where trash has been burned.
- Don't use ashes in eastern and southeastern Oregon, where soils are naturally high in potassium and soil pH.
- If the potassium soil test value is above 600 ppm, do not apply wood ashes for 5 years.

Grass clippings

A 6- to 8-inch layer of grass clippings can be added to gardens as a fertilizer material. Grass clippings are a good source of potassium. Do not use fresh clippings from weedy lawns, bentgrass lawns, or turf with rhizomes. These sources may introduce weeds and unwanted grass.

Manure

Manure can modify the soil structure and water-holding capacity of a garden. In fact, these benefits often are greater than the nutrient benefit of manures.

Manures are extremely variable in their nitrogen content. Table 1 shows typical nutrient contents of various types of manure. As little as 20 pounds of poultry droppings or as much as 150 pounds of manure mixed with straw, shavings, or sawdust may be required for each 100 square feet.

More than 50 percent of the nitrogen in manure can be lost during storage or after it is applied to the soil surface. Nitrogen loss is least when fresh manure is spread in the fall and worked into the soil immediately.

Manures often contain weed seeds. Some of these weeds may be very difficult to control. In addition, manure that has been in contact with soil may contain symphylans, insects that can be very damaging to plant roots.

Don't use fresh manure in vegetable gardens. The manure may contain disease-causing organisms that can make people sick when they eat the vegetables.

Blood meal

Blood meal applied at 1.5 to 2 pounds per 100 square feet is another good source of organic nitrogen.

Methods of applying fertilizer

Three ways to apply fertilizer are described below. Regardless of the method you use, keep the following facts in mind:

- The nitrogen in chemical fertilizers is highly water-soluble and is carried to the roots by irrigation and rain. Thus, you don't need to mix these materials into the soil, but you do need to water your garden if rain doesn't fall within a day after you apply them.
- Organic sources of nitrogen are most accessible to plants if mixed into the top 2–3 inches of soil.
- Phosphate moves slowly in the soil. You'll obtain best results by banding phosphate-containing fertilizer 2 inches below the seed when you plant or by tilling it into the soil during spring preparation.
- Work potassium fertilizers into the soil using the banding or broadcast methods. Do not allow potassium fertilizers to contact plant roots.

Broadcast

Scatter the material uniformly over the surface. If an application method is not mentioned, broadcasting is implied.

Band

Place the fertilizer in a trench about 3 inches deep. The corner of a hoe works well to make the trench. Sow seeds 1½ to 2 inches above and to the side of the fertilizer. The plant roots quickly absorb the nutrients and grow rapidly.

Sidedress

Scatter the fertilizer material close to growing plants. Keep fertilizer granules off leaves to prevent burning. Nitrogen is very soluble and need not be mixed with the soil. A fertilizer blend containing nitrogen, phosphate, and potash should be lightly scratched in, but take care to avoid damaging plant roots. Apply irrigation so the plants can absorb the nutrients.

***Table 1.*—Nutrient content of manures.**

Kind of Manure	Water and nutrient content (percent)			
	Water	N	P_2O_5	K_2O
Dairy	87	0.5	0.16	0.44
Beef	82	0.65	0.43	0.53
Poultry	73	1.30	1.02	0.50
Swine	84	0.45	0.27	0.40
Sheep	73	1.00	0.36	1.00
Horse	60	0.70	0.25	0.60

Vegetable gardens

Before planting

If you use a packaged fertilizer mix (organic or chemical)

Use Table 3a (western Oregon) or Table 3b (eastern Oregon) on page 6 to determine how much fertilizer to apply before planting. The tables are based on soil test results for phosphorus and potassium. If you follow these recommendations, you'll automatically apply sufficient nitrogen for initial growth of newly planted seeds and plants.

If you live in western Oregon, choose a fertilizer mix that also contains sulfur (S). Look for a fourth number on the fertilizer package, e.g., 10-10-10-10. In central Oregon, you may wish to try a sulfur-containing fertilizer on a trial basis.

If you use unblended organic sources

Use Table 4a (page 7) for manure application rates. If the soil test for phosphorus is low, add P according to Table 4b. Additional potassium usually isn't needed unless the soil test for potassium is less than 300 ppm.

All of the nutrients in manure are not completely available the first year. Approximately 75 percent of the nitrogen from poultry manure is available the first year, while only 25–50 percent of the nitrogen from other manures may be available during this time. Thus, during the first 3 years of manure application, add a source of more readily available nitrogen such as liquid fish, blood meal, or chemical fertilizer. Or triple the amount of manure you use (column 1 in Table 4a).

A note about boron

Many soils in western Oregon are deficient in boron (B). Several crops (cabbage, broccoli, cauliflower, caneberries, strawberries, beets, carrots, etc.) can benefit from an application of boron.

If the soil test for boron is less than 1 ppm, apply household or agricultural grade borax (11 percent B) at the rate of 1 tablespoon per 100 square feet where boron-requiring plants will be grown. Apply the borax evenly and mix thoroughly with the soil. It may be easier to dissolve 1 tablespoon of borax in 1 gallon of water and apply the solution evenly with a sprinkling can. Apply 1 fluid ounce of solution per plant. You can find borax in the cleaning supplies section of most grocery stores.

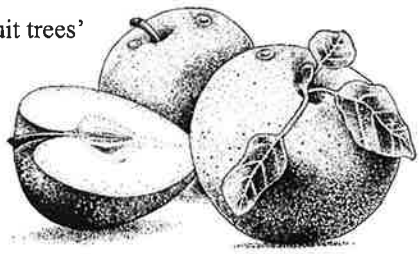
Be careful! Excessive quantities of boron are highly toxic to plants, especially young bean plants. One application should be sufficient for up to 3 years or until another soil test is made.

During the growing season

Nitrogen is needed for continued healthy growth. If you notice a pale green or yellow color and a slower rate of growth about 4–5 weeks after planting, your vegetable plants may need additional nitrogen.

Sidedress ½ cup of ammonium sulfate (21-0-0-24) or equivalent fertilizer per 10 feet of row, and then water the plants. Do not apply this extra nitrogen to peas or tomatoes. If other nutrients have been omitted, you can add them at this time.

Fruit trees



To determine fruit trees' need for fertilizer, observe tree growth, as well as the size and color of leaves and fruit. Young trees should grow 18–30 inches each year. You also can have a laboratory do a leaf analysis to determine which nutrients are present in leaf tissue in adequate, deficient, or excessive amounts. To determine the need for lime or sulfur, perform a soil test.

Nitrogen probably is the only nutrient needed in most home orchards. Apply according to Table 2 in the spring around the time the trees finish blooming. Broadcast the fertilizer under the entire canopy of the tree. Be careful! One- and two-year-old trees can be injured if nitrogen is banded around the tree.

Phosphorus also is needed in the Hood River area. Add ¼ pound P_2O_5 when you plant your trees.

Suspect a nutrient deficiency if poor tree performance cannot be explained by lack of pruning, poor pollination, disease, winter injury, deep cultivation, insects, physical injury, limited moisture, rodents, poor weather, and/or poor soil drainage.

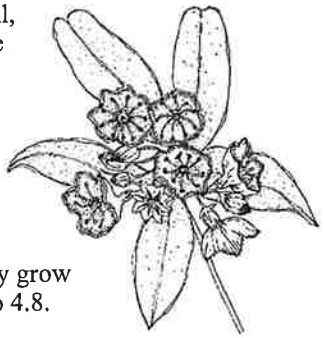
Table 2.*—Fertilization rates for fruit trees.

Tree age (years)	Pounds of fertilizer to apply (per tree)** Apples, pears, prunes	Cherries, peaches
1	0–1.25	0–5
2	2.5	5
3–5	2.5–3.25	5–7.5
6–7	3.5–5	7.5–10

* Based on 10%-nitrogen fertilizer. For 5%-nitrogen fertilizer, multiply times 2. For 20%-nitrogen fertilizer, divide by 2.

** 1 pound of fertilizer usually equals about 2 cups.

Ornamental shrubs



In general, if your ornamental shrubs are growing well, there is no need to fertilize them.

Azaleas, blueberries, and rhododendrons may require special care. These acid-loving plants require a soil pH below 6.0 and preferably below 5.5. They grow best when soil pH is 4.5 to 4.8.

If your soil pH is above 5.0

Fertilize acid-loving shrubs with ammonium sulfate (21-0-0-24) to lower soil pH. For mature bushes, use ⅔ to ¾ pound (about 1⅓ to 1½ cups) ammonium sulfate per bush. For younger plants, use one-third to one-half as much, depending on age.

For lower analysis organic materials, increase the application rate proportionally. For example, if the organic material has an analysis of 7-3-2, use three times the amount listed above (4 cups per mature bush or 1½ to 2 cups for younger plants).

If your soil pH is below 5.0

Use any of the fertilizer recommendations in Tables 3–4 for your acid-loving plants. Use Table 3a (western Oregon) or Table 3b (eastern Oregon) on page 6 for packaged mixes, either organic or chemical. For unblended organic sources, use Tables 4a–4c on page 7.

For azaleas and rhododendrons, fertilize around the time the plants bloom. For blueberries, which are both shallow rooted and inefficient in using nitrogen fertilizer, it's best to split fertilization over two or three applications. Apply half before bud break in the spring and half about 6 weeks later. Or, if using three applications, apply one-third at each of the above times and the last application no later than July 1.

Flowers

In cool, wet spring weather, phosphorus can enhance early growth, so apply phosphorus-containing fertilizer before planting. Use Table 3a (western Oregon) or Table 3b (eastern Oregon) on page 6 for packaged mixes, either organic or chemical. For unblended organic sources, use Tables 4a and 4b on page 7. Be sure to work phosphorus and potassium into the soil. Do not allow potassium fertilizers to contact plant roots.

An annual flower planting may or may not require additional fertilizer during the growing season. If the soil fertility is low, fertilize at a rate of ½ to 1 pound (about 1 to 2 cups) of 5-10-5 per 100 square feet every 4 to 6 weeks. Sprinkle the fertilizer lightly around the plants and scratch it into the soil. Additional fertilizer may be necessary if you use an organic mulch.

Caneberries and roses

You can meet the needs of caneberries and roses for nutrients by following the recommendations in Tables 3–4. Use Table 3a (western Oregon) or Table 3b (eastern Oregon) on page 6 for packaged mixes, either organic or chemical. For unblended organic sources, use Tables 4a–4c on page 7. If you use wood ashes, apply no more than ½ to 1 cup per plant per application. Spread the ash over a 1-square-foot area around the base of the plant. Apply during the dormant season. If cane growth is excessive, use less fertilizer in following years.

Strawberries

You can meet the needs of strawberries for nutrients by following the recommendations in Tables 3–4. Use Table 3a (western Oregon) or Table 3b (eastern Oregon) on page 6 for packaged mixes, either organic or chemical. For unblended organic sources, use Tables 4a–4c on page 7. Fertilize June-bearing strawberries around August 1, and then water the plants to move the fertilizer into the soil.

Table 3—Recommendations for fertilizer mixes—organic and chemical.

Table 3a.—Western Oregon.

If soil test for phosphorus is (ppm)	AND	Soil test for potassium is (ppm)	Use this kind of fertilizer*	Apply this much (pounds per 100 square feet)
less than 25		0–300	15-15-15	2.0
less than 25		greater than 300	16-20-0	2.0
25–60		0–300	15-15-15	1.5
25–60		greater than 300	16-20-0	1.5
greater than 60		0–300	15-15-15	1.5
greater than 60		greater than 300	21-0-0	1.5

*A common organic blend is 7-3-2. To use a 7-3-2 fertilizer, double the 15-15-15 rate or triple the 16-20-0 rate. See "Some handy conversions" below for other fertilizers.

Table 3b.—Eastern Oregon.

If soil test for phosphorus is (ppm)	AND	Soil test for potassium is (ppm)	Use this kind of fertilizer*	Apply this much (pounds per 100 square feet)
less than 10		0–300	15-15-15	2.0
less than 10		greater than 300	16-20-0	2.0
10–20		0–300	15-15-15	1.5
10–20		greater than 300	16-20-0	1.5
greater than 20		0–300	15-15-15	1.5
greater than 20		greater than 300	21-0-0	1.5

*A common organic blend is 7-3-2. To use a 7-3-2 fertilizer, double the 15-15-15 rate or triple the 16-20-0 rate. See "Some handy conversions" below for other fertilizers.

Some handy conversions

To convert from:	To:	Do this:
100 square feet	10-foot row	Divide the 100-square foot rate by 10.
100 square feet	1 large plant (e.g., tomato)	Divide the 100-square foot rate by 20.
100 square feet	1 smaller plant (e.g., broccoli)	Divide the 100-square foot rate by 40.
15-15-15 fertilizer	10-10-10 fertilizer	Multiply the 15-15-15 rate by 1.5.
15-15-15 fertilizer	7-3-2 fertilizer	Multiply the 15-15-15 rate by 2.
15-15-15 fertilizer	5-5-5 fertilizer	Multiply the 15-15-15 rate by 3.
21-0-0 fertilizer	10-10-10 fertilizer	Multiply the 21-0-0 rate by 2.
21-0-0 fertilizer	7-3-2 fertilizer	Multiply the 21-0-0 rate by 3.
21-0-0 fertilizer	5-5-5 fertilizer	Multiply the 21-0-0 rate by 4.
pounds of fertilizer	cups of fertilizer	Multiply pounds by 2.

For more information

Fertilizer and Lime Materials, FG 52 (reprinted 1998). No charge.

Fertilizing Shade and Ornamental Trees, FS 103 (reprinted 1999). No charge.

Gardening and Water Quality Protection: Understanding Nitrogen Fertilizers, EC 1492 (1998). $1.00

Gardening and Water Quality Protection: Using Nitrogen Fertilizers Wisely, EC 1493 (1998). $1.00

Soil Sampling for Home Gardens and Small Acreages, EC 628 (reprinted 2000). No charge.

A List of Analytical Labs Serving Oregon, EM 8677 (revised 2000). No charge.

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Table 4.—Recommendations for unblended organic sources.

Table 4a.—Fertilizer recommendations using manure.*

	Amount of manure to apply	
	First 3 years	Subsequent years
Manure containing little bedding	1.5 inches	0.5 inch
Manure containing 50 percent bedding	3 inches	1 inch

*It takes about five 5-gallon buckets to spread a ½-inch layer of manure over 100 square feet.

Table 4b.—Phosphorus (P) recommendations using bonemeal or rock phosphate.

Western Oregon If soil test for phosphorus is (ppm)	*Eastern Oregon* If soil test for phosphorus is (ppm)	Apply this much bonemeal (pounds per 100 square feet)	OR	Apply this much rock phosphate (pounds per 100 square feet)
less than 25	less than 10	4		5
25–60	10–20	2.5		3
greater than 60	greater than 20	0		0

Table 4c.—Potassium (K) recommendations using wood ash.

If soil test for potassium is (ppm)	Apply this much wood ash (pounds per 100 square feet)*
less than 300	1–1.5
300–600	0
greater than 600	0**

*Never apply more than 5–10 lb of wood ash per 100 square feet.
*If the potassium soil test value is greater than 600, do not use wood ashes for 5 years.

Commonly asked questions

- *The fertilizer rates are given for 100 square feet, and my garden is 25 x 8 feet. What should I do?*

  Multiply 25 x 8 to find the square footage of your garden (200 square feet). Multiply the 100-square foot rate times 2 to find out how much fertilizer to apply.

- *I don't want to broadcast fertilizer over my entire garden, but rather along a row. How much do I use?*

  Each 10-foot row of a crop such as lettuce or carrots is about 10 square feet (10 feet long x 1 foot wide). Divide the 100-square foot rate by 10 to find out how much to apply along a 10-foot row.

- *I just want to apply fertilizer to individual plants. How much do I use?*

  One large plant (such as a tomato or melon) equals about 5 square feet. Smaller plants (such as broccoli) equal about 2.5 square feet. Divide the 100-square foot rate by 20 to find out how much to apply to each large plant. Or divide by 40 to find out how much to apply to each smaller plant.

- *The fertilizer recommendation is for 15-15-15, and I have 10-10-10 fertilizer. What should I do?*

  Since there's 15 percent nitrogen in the 15-15-15, but only 10 percent nitrogen in the 10-10-10, you'll need more fertilizer to get the same amount of nitrogen. Multiply the rate for 15-15-15 fertilizer by 1.5 to get the rate for 10-10-10 fertilizer. Similarly, multiply by 3 to get the rate for 5-5-5 fertilizer.

- *I don't have a scale to weigh fertilizer. Can I measure by cups instead of weight?*

  Although it's impossible to correlate pounds to cups for all fertilizer mixes, generally speaking 1 pound of packaged fertilizer mix usually equals about 2 cups. So if the recommendation is for 4 pounds of fertilizer, multiply by 2 to find out how many cups to use (8).

An example

Suppose your vegetable garden is 20 x 30 feet. Based on a soil test and Table 1a, you determine that you should apply 2 pounds of 15-15-15 fertilizer per 100 square feet. But you only plan to broadcast fertilizer over a 20 x 15 foot area for corn. You also have three 10-foot rows—one each of carrots, lettuce, and spinach. You also have 10 tomato plants, which you prefer to fertilize individually. Your garden center only sells bags of 10-10-10 fertilizer. What should you do?

- The 20 x 15 foot area for corn equals 300 square feet. Multiply the fertilizer rate given for 100 square feet by 3 to find out how much to apply:

  2 pounds x 3 = 6 pounds

  Since your fertilizer is 10-10-10, multiply 6 pounds by 1.5 to get the correct rate:

  6 pounds x 1.5 = 9 pounds

- Each 10-foot row equals about 10 square feet. Divide the fertilizer rate given for 100 square feet by 10 to find out how much to apply to the row crops:

  2 pounds ÷ 10 = 0.2 pound per 10-foot row

  Since your fertilizer is 10-10-10, multiply 0.2 pound by 1.5 to get the correct rate:

  0.2 pound x 1.5 = 0.3 pound per 10-foot row

  Since this is a small amount, it may be easier to measure it as cups. There are about 2 cups per pound of fertilizer, so multiply the rate by 2:

  0.3 pound x 2 = 0.6 (about ⅔) cup

- Each tomato plant equals about 5 square feet. Divide the fertilizer rate given for 100 square feet by 20 to find out how much fertilizer to apply per plant:

  2 pounds ÷ 20 = 0.1 pound per plant

  Since your fertilizer is 10-10-10, multiply 0.1 pound by 1.5 to get the correct rate:

  0.1 x 1.5 = 0.15 pound per plant

  Multiply x 2 to find out how many cups to apply:

  0.15 pound x 2 = 0.3 (about ⅓) cup

Many of the significant improvements in wording and format found in this version of *Fertilizing Your Garden* are the effort of Teresa Welch. Teresa is an avid gardener and editor for Oregon State University Extension and Experiment Station Communications. We thank her for her effort beyond that of normal editing in improving this publication for all gardeners.

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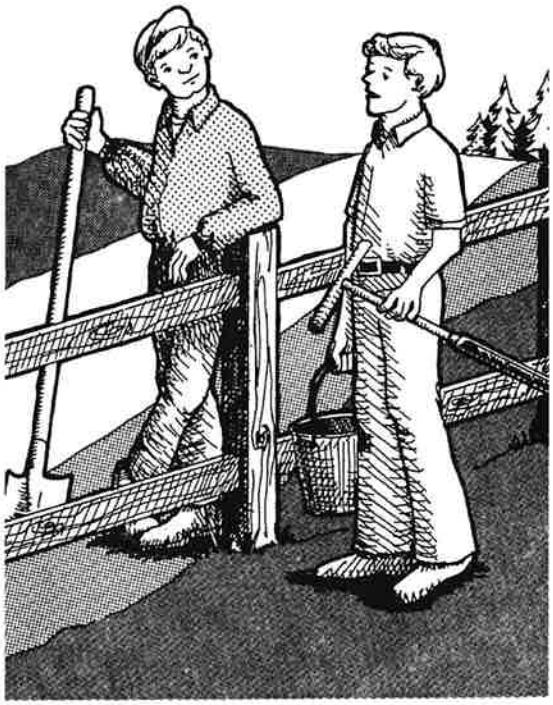
Soil Sampling

for Home Gardens and Small Acreages



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Laboratory soil tests will help you develop and maintain more productive soil and increase crop production by providing information on the available nutrient content of your soil. Soil testing helps you select the correct kind and amount of fertilizer and liming material. Recommendations are based on the results of fertilizer experiments, soil surveys, and results obtained by farmers.

A soil sample weighing about 0.5 pound represents from 2 to 40 million pounds of soil in the field. Thus, care in sampling is essential.

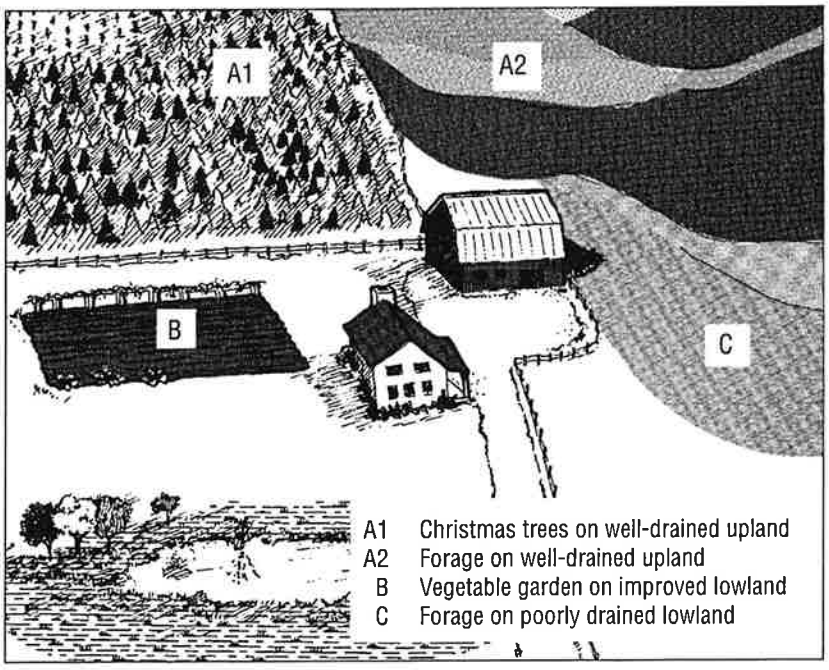
When should I test my soil?

- *For perennial crops* such as orchards, Christmas trees, alfalfa, grass seed, and permanent pasture, the most important time to test the soil is before planting so that necessary nutrients can be mixed into the soil. This test is especially important in acidic soils where liming is likely to be needed. Apply lime and mix it with the soil several months before planting (for example, in the fall for spring planting), since it reacts slowly with the soil. Then:
  - For perennial grass seed, legumes, and pastures, test soil every 3 years after planting.
  - Soil testing usually is not used for established fruit trees, berries, or grapes. Use foliar nutrient analysis instead.
  - Testing soil in timber or Christmas tree plantings usually is not necessary until replanting, unless tree growth is unsatisfactory.
- *For annual crops,* especially vegetables, test soil each year before planting. If you plant successive crops in a single season, you don't need to test before each planting.
- *Additional information* on nutrient testing methods and requirements for various crops is available in OSU Extension publications.

Each soil sample should represent only one soil type or soil condition

The farm in the illustration below has three soil types: A (upland), B (improved lowland), and C (poorly drained lowland). On the upland soil, two areas have different management histories: A1 (Christmas trees) and A2 (pasture).

Sample each soil type (A, B, and C) separately. Areas with different management histories (A1 and A2) also should be sampled separately. In this example, a separate soil sample should be taken from each of the four areas.



How to sample

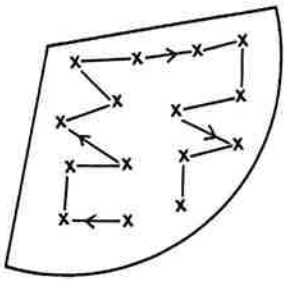
Sample where the crop will be planted

If you are using raised beds, such as for vegetable crops, take your samples in the beds, not in the areas between them.

Avoid unusual areas

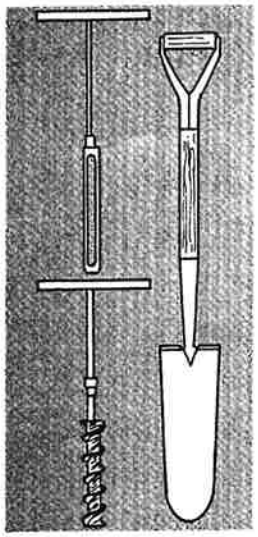
Avoid sampling in small areas where you know that conditions are different than the rest of the field (for example, former manure piles or fertilizer bands). You often can spot these areas by looking for plants growing very well or very poorly.

Take 15 to 20 subsamples



Each sample should consist of subsamples (X) taken from 15 to 20 locations within the sampling area.

Avoid contaminating the sample



- Use clean sampling tools and avoid contaminating the sample during mixing or packaging. A small amount of fertilizer residue on tools or hands, for instance, can cause serious contamination of the soil sample.
- Do not use galvanized, brass, or bronze sampling tools to collect samples that will be tested for micronutrients such as zinc.

Note: This publication is not intended to be used as guidance for obtaining soil samples for environmental testing.

Take the soil sample to the correct depth

- Sample the part of the soil where the plant roots will grow. For most annual and perennial crops, sample from the surface down to about 6 to 9 inches.

Carefully mix the soil sample

Place all of the soil subsamples from a single sampling area in a clean container and mix thoroughly.

Forwarding the soil sample

- A list of laboratories that perform soil tests is available on the Web (http://eesc.oregonstate.edu) or from your county office of the OSU Extension Service.
- Call one or more labs to determine the cost of the soil test you need.
- After choosing a lab, request any necessary paperwork (such as an information sheet), find out how you should prepare and submit the sample, and obtain the address where you should send the sample.
- Prepare and submit the sample according to the instructions. Plastic zipper bags work best; do not use a paper bag. Most laboratories ask you to label the sample bag with identifying information and to fill out and include an information sheet with the sample. Don't forget to include payment.
- Number each sample and keep a record of the fields and areas sampled.

What analysis should I request?

The standard soil test from most laboratories measures organic matter, phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sodium (Na), and soil pH (acidity). For acidic soils, the SMP buffer test is the best way to determine how much lime is needed. Certain crops might have higher requirements for specific nutrients. Consult OSU Extension publications to determine whether you should test for nutrients such as sulfur (S), boron (B), or zinc (Zn).

Special soil-sampling techniques sometimes are required

- Nitrate nitrogen soil tests are recommended only for a few crops in eastern Oregon.
- For orchards, leaf sampling is more useful than soil sampling.

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religion, sex, sexual orientation, national origin, age, marital status, disability

This publication, originally prepared by E. Hugh Gardner, former Extension soil science specialist, was revised by Michael Robotham, Extension small farms faculty, Clackamas County, and John Hart, Extension soil science specialist; Oregon State University.

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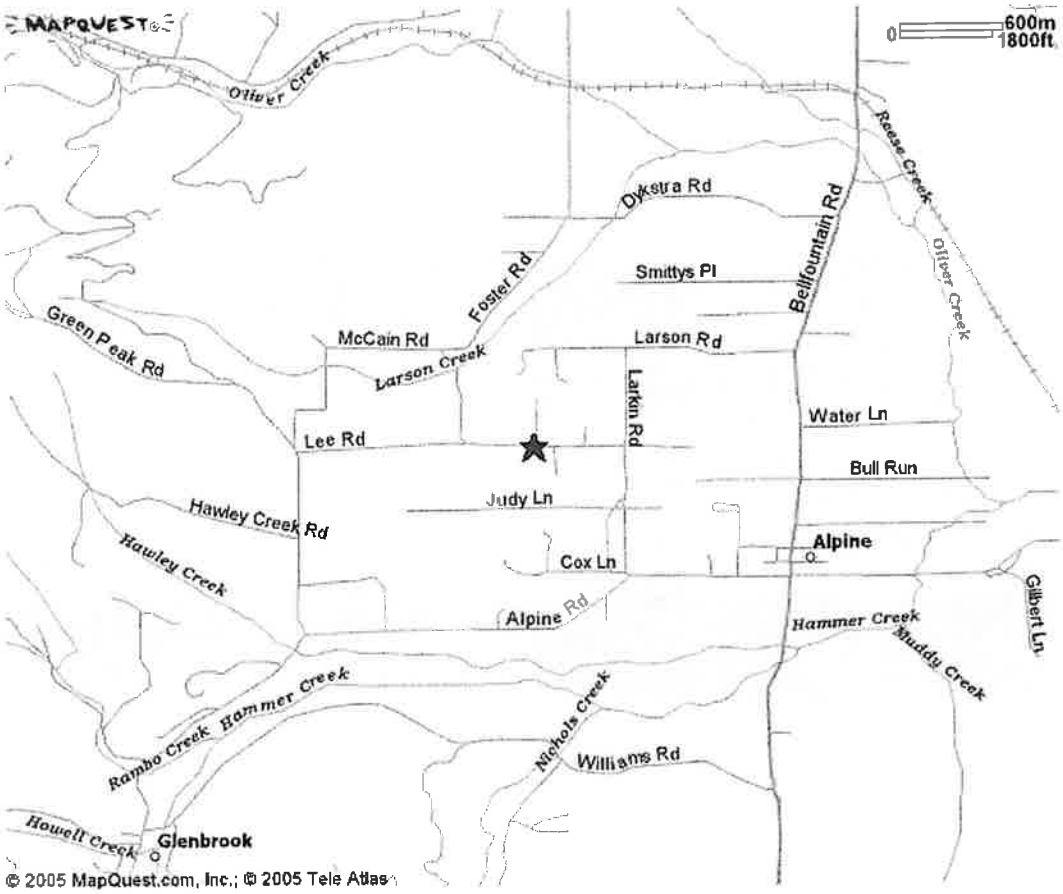
Revised May 1995. Reprinted April 2003.

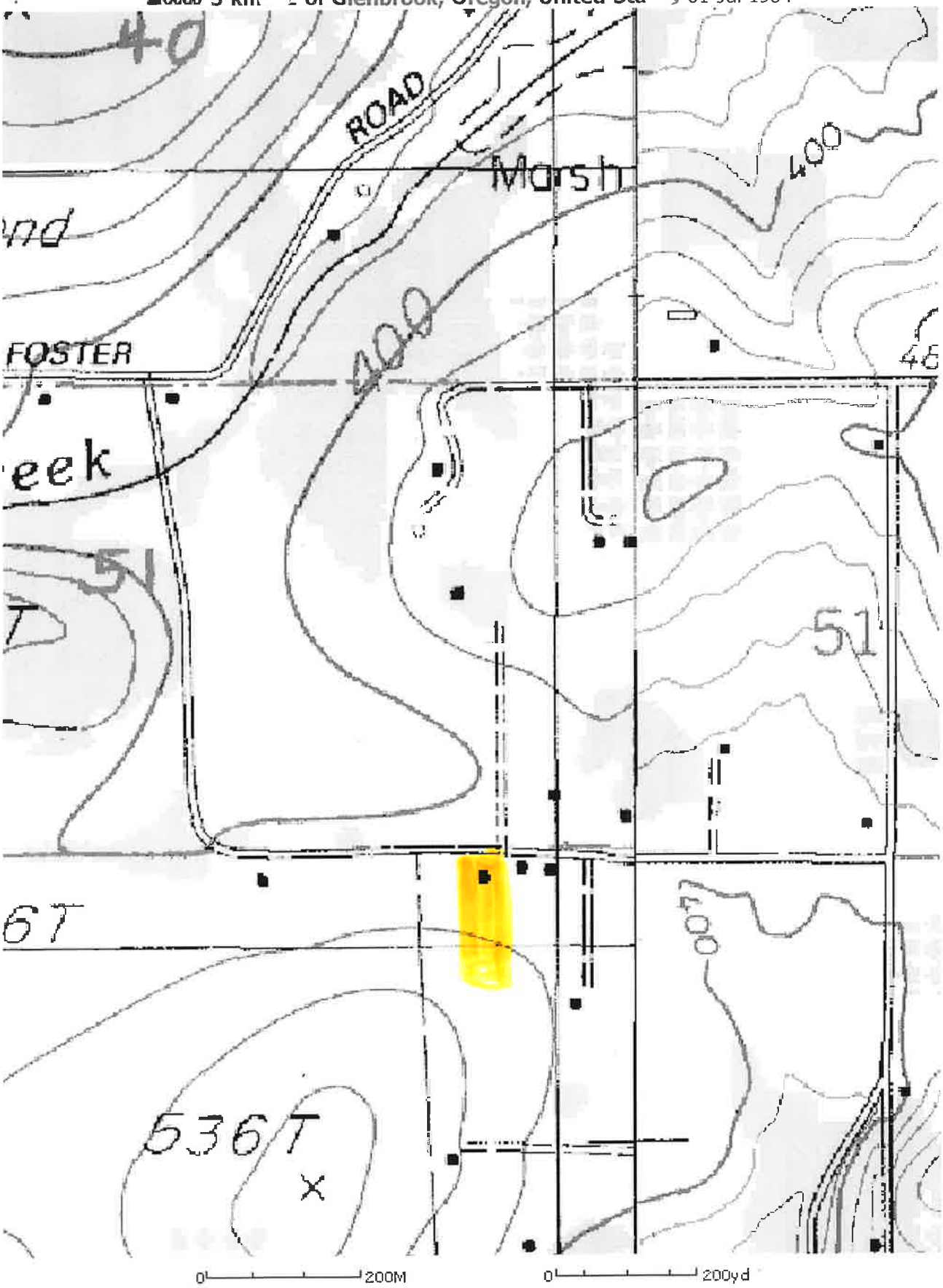
MAPQUEST.

25825 Foster Rd
Monroe OR
97456-9709 US

Notes:



USGS 3 km E of Glenbrook, Oregon, United Sta 01 Jul 1984



USGS 3 km E of Glenbrook, Oregon, United Sta 30 Jul 2000

Image courtesy of the U.S. Geological Survey


Bellfountain
SOUTHERN PACIFIC
Reese Creek
Wa Larsen Creek
14
13
23
24
BeD
JoC
JoD
WoA
Ms
Da
DuC
BeC
WeC
Wa
BeF
HeC
BeE
HaC
VeD
BeG
Am
Wc
Cn
(Joins sheet 42)

Runoff is very slow or ponded. The hazard of erosion is slight. Permeability is very slow on this Bashow soil. Rooting depth is restricted by a high water table and a very firm clay substratum. Available water capacity is 8 to 10 inches. Workability is poor. This soil is subject to stream overflow in some areas.

This soil is used for pasture. It is used for spring grain, grass seed, and hay where drainage has been installed. Capability unit IVw–4; wildlife group 2.

Bashaw silty clay loam (Bc).—This soil is similar to Bashaw clay, but the surface layer is heavy silty clay loam. Slopes are 0 to 3 percent. Depth to clay generally ranges from 10 to 18 inches. A silty clay layer is above the clay in some places.

Permeability is moderate above the clay and very slow in the clay. This soil is subject to stream overflow.

This soil is used for pasture. It is used for spring grain, grass seed, and hay where it is drained. Many areas are in dense stands of hardwoods and shrubs. Because of its silty clay loam surface layer, this soil has a somewhat better response to surface and subsurface drainage where outlets are available. Capability unit IVw–5; wildlife group 2.

Bellpine Series

The Bellpine series consists of moderately deep, well-drained soils that formed in colluvium weathered from sedimentary rocks. These soils are on the low foothills and the higher, rolling uplands. Slopes are 3 to 50 percent.

Where these soils are not cultivated, the vegetation is Douglas-fir and oak and an understory of snowberry, trailing blackberry, poison-oak, and brackenfern. Elevation ranges from about 300 to 800 feet. Average annual precipitation is 40 to 60 inches, average annual air temperature is about 52° to 54° F., and the average frost-free season is 165 to 200 days.

In a representative profile the surface layer is dark reddish-brown silty clay loam about 6 inches thick. The subsoil is dark-red and dark reddish-brown silty clay loam, silty clay, and clay about 20 inches thick. It is underlain by fragmented, partly weathered sandstone.

Bellpine soils are used for cereal grain, orchards, hay, pasture, water supply, timber, wildlife habitat, and recreation.

Bellpine silty clay loam, 12 to 20 percent slopes (BeD).—This soil is on low foothills. Slopes are long and smooth and average about 18 percent.

Representative profile, in the SE¼SE¼ sec. 34, T. 12 S., R. 6 W.:

Ap—0 to 6 inches, dark reddish-brown (5YR 3/3) silty clay loam, reddish brown (5YR 5/4) dry; moderate, very fine to medium, granular structure; hard, friable, sticky and plastic; many very fine roots; many very fine interstitial pores; medium acid; clear, smooth boundary. 3 to 6 inches thick.

B1—6 to 10 inches, dark reddish-brown (5YR 3/4) heavy silty clay loam, reddish brown (5YR 4/4) dry; moderate, very fine and fine, subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; many very fine and fine tubular pores; few, unweathered, basalt pebbles and cobblestones at lower boundary; medium acid; abrupt, wavy boundary. 3 to 10 inches thick.

IIB21t—10 to 20 inches, dark-red (2.5YR 3/6) silty clay, red (2.5YR 4/6) dry; moderate, fine and medium, subangular blocky structure; extremely hard, very firm, very sticky and very plastic; common very fine roots; many very fine and fine tubular pores; common moderately thick clay films on peds and in pores; few, fine, weathered, sandstone pebbles; strongly acid; gradual, wavy boundary. 8 to 16 inches thick.

IIB22t—20 to 26 inches, dark-red (2.5YR 3/6) clay, red (2.5YR 4/6) dry; moderate, medium, subangular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; many very fine tubular pores; common moderately thick clay films; 20 percent yellowish-brown weathered pebbles; strongly acid; abrupt, irregular boundary. 4 to 10 inches thick.

IIIC—26 to 36 inches, pinkish-gray (7.5YR 7/2) and reddish-brown (5YR 5/4) partly weathered sandstone; many, thick, reddish-brown (5YR 4/4) and dark-red (2.5YR 3/6) clay films on fragments; thin tongues of the B22t horizon extend into the C horizon.

The A horizon has a dry value of 4 or 5. It has a chroma of 3 or 4. The B horizon has a moist value of 3 or 4 and a chroma from 3 to 6. It is 5YR or 2.5YR in hue. The content of coarse fragments of sedimentary rock in the lower part of the B horizon ranges from 10 to 30 percent. Depth to the underlying, partly weathered bedrock ranges from 20 to 40 inches.

Included with this soil in mapping were about 10 percent Jory soils and 5 percent Dupee, Hazelair, and Veneta soils.

Runoff is medium, and the hazard of erosion is moderate. Root penetration is restricted by the underlying bedrock. Permeability is slow. Available water capacity is 3.5 to 7 inches.

This soil is used for cereal grain, hay, pasture, water supply, and wildlife habitat. Capability unit IIIe–1; woodland suitability group 2c4; wildlife group 4.

Bellpine silty clay loam, 3 to 12 percent slopes (BeC).—This soil is similar to Bellpine silty clay loam, 12 to 20 percent slopes.

The hazard of erosion is slight, and runoff is slow to medium.

This soil is used for cereal grain, hay and pasture, orchards, water supply, and wildlife habitat. Capability unit IIe–2; woodland suitability group 2c4; wildlife group 4.

Bellpine silty clay loam, 20 to 30 percent slopes (BeE).—This soil is similar to Bellpine silty clay loam, 12 to 20 percent slopes.

Runoff is rapid, and the hazard of erosion is high.

This soil is used for woodland, pasture, water supply, and wildlife habitat. Capability unit IVe–1; woodland suitability group 2c4; wildlife group 4.

Bellpine silty clay loam, 30 to 50 percent slopes (BeF).—This soil is similar to Bellpine silty clay loam, 12 to 20 percent slopes. Included in mapping was a soil that is similar to this Bellpine soil, except that depth to underlying bedrock is less than 20 inches. This soil makes up as much as 15 percent of this mapping unit in some places.

Runoff is very rapid, and the hazard of erosion is high.

This soil is used for timber production, pasture, water supply, and wildlife habitat. Capability unit VIe–2; woodland suitability group 2c5; wildlife group 4.

Blachly Series

The Blachly series consists of deep, well-drained soils that formed in colluvium over basalt or sedimentary rock. These soils are on the mountainous uplands in the Coast Range. Slopes are 3 to 50 percent.

The A horizon has a moist value of 2 or 3 and a dry value of 3 or 4. It is 7.5YR or 5YR in hue. The B horizon is 5YR or 2.5YR in hue. Depth to underlying sedimentary bedrock ranges from about 5 to 10 feet. The lower part of the B horizon is as much as 15 percent coarse fragments in some places.

Included with this soil in mapping was about 5 to 10 percent Apt and Peavine soils. Also included, where dikes of igneous rock intrude, was about 5 percent Klickitat soils. Because this soil is mapped only in forested areas, it is not so intensively mapped as cultivated areas.

Runoff is medium, and the hazard of erosion is moderate. Available water capacity is 8 to 10 inches. Permeability is moderately slow. Rooting depth is unrestricted and is deep.

This soil is used mainly for timber production (fig. 14), water supply, and wildlife habitat. About 10 percent of this soil is used for natural and improved pasture and for cereal grain. Capability unit IVe–3; woodland suitability group 2c1; wildlife group 4.

Honeygrove silty clay loam, 3 to 12 percent slopes (HgC).—This soil has slopes that average about 9 percent.

Runoff is medium. The hazard of erosion is moderate.

About 25 percent of the acreage of this soil is cultivated to cereal grain, hay, and improved pasture. The remaining acreage is in unimproved pasture and woodland. This soil is also used for wildlife habitat and water supply. Capability unit IIIe–4; woodland suitability group 2c1; wildlife group 4.

Honeygrove silty clay loam, 25 to 50 percent slopes (HNF).—This soil has slopes that average about 35 percent.

Runoff is rapid, and the hazard of erosion is high.

This soil is used for timber production, water supply, and wildlife habitat. Because slopes are steep, this soil is not suited to cultivation. Capability unit VIe–1; woodland suitability group 2c3; wildlife group 4.

Honeygrove silty clay loam, uneven, 5 to 25 percent slopes (HOD).—This soil has slopes that average about 15 percent.

The uneven slopes are small steplike benches at right angles to the direction of the slope. In a gross cross section the downward slope is generally interrupted and irregular like stairsteps. Uneven slopes are caused by sliding and slumping.

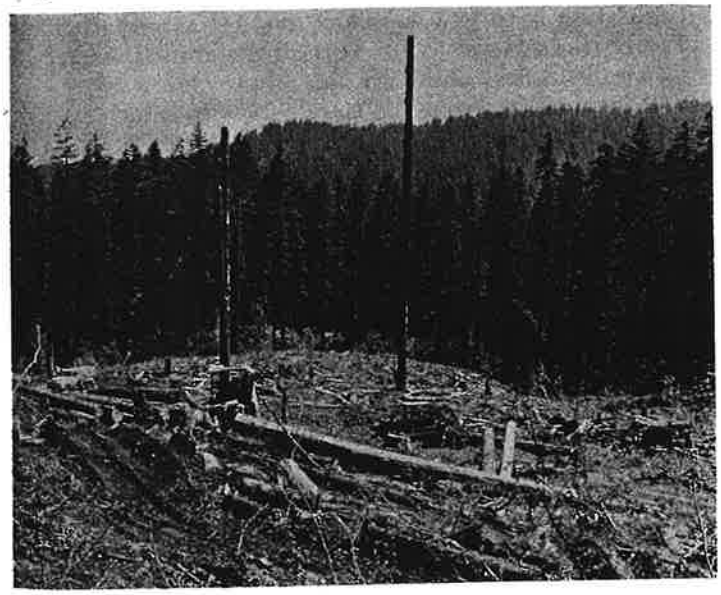


Figure 14.—**Cable logging Douglas-fir on Honeygrove silty clay loam, 3 to 25 percent slopes.**

Runoff is medium, and the hazard of erosion is moderate. The slide and slump hazard is severe.

This soil is used mainly for timber production, water supply, and wildlife habitat. Small areas are in pasture. Capability unit IVe–4; woodland suitability group 2c2; wildlife group 4.

Jory Series

The Jory series consists of deep, well-drained soils that formed in colluvium weathered from sedimentary and basic igneous rocks. These soils are on the higher rolling uplands that border the steeper mountainous areas. Slopes are 2 to 50 percent.

The vegetation is Douglas-fir, grand fir, and Oregon white oak and an understory of poison-oak, snowberry, grass, and fern. Elevation ranges from 400 to 1,200 feet. Average annual precipitation is 40 to 60 inches, average annual air temperature is 52° to 54° F., and the frost-free season is 165 to 200 days.

In a representative profile, the surface layer is dark reddish-brown silty clay loam about 15 inches thick. The subsoil is dark-red and dark reddish-brown silty clay and clay that extends to a depth of 60 inches.

Jory soils are used for small grain, grass seed, hay, timber production, recreation, water supply, and wildlife habitat.

Jory silty clay loam, 2 to 12 percent slopes (JoC).—This soil occupies broad ridges and side slopes. Slopes average about 7 percent.

Representative profile, 2 miles south of Inavale School, in the SW¼NW¼ sec. 20, T. 13 S., R. 5 W.:

A1—0 to 7 inches, dark reddish-brown (5YR 3/4) silty clay loam, reddish brown (5YR 4/3) dry; moderate, fine, granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; few fine concretions; very strongly acid; clear, smooth boundary. 5 to 8 inches thick.

A3—7 to 15 inches, dark reddish-brown (5YR 3/4) silty clay loam, reddish brown (5YR 4/4) dry; moderate, fine, granular structure and moderate, very fine, subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; common very fine interstitial and tubular pores; very strongly acid; clear, wavy boundary. 4 to 12 inches thick.

B1—15 to 23 inches, dark reddish-brown (2.5YR 3/4) silty clay, red (2.5YR 4/6) dry; moderate, fine and very fine, subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine and few medium and coarse roots; many very fine tubular pores; few, fine, reddish-brown and black concretions; very strongly acid; abrupt, wavy boundary. 7 to 12 inches thick.

IIB21t—23 to 35 inches, dark-red (2.5YR 3/6) clay, red (2.5YR 4/6) dry; moderate, medium, subangular blocky structure; very hard, very firm, sticky and very plastic; common very fine tubular pores; few very fine pores; common moderately thick clay films; many, coarse, black stains; very strongly acid; gradual, wavy boundary. 9 to 16 inches thick.

IIB22t—35 to 51 inches, dark-red (2.5YR 3/6) clay, red (2.5YR 4/5) dry; moderate, medium, subangular blocky structure; very hard, very firm, sticky and very plastic; common very fine tubular pores; few very fine roots; many moderately thick clay films; strong-brown (7.5YR 5/8) weathered fragments 2 to 5 millimeters

in size; common, medium, black stains; very strongly acid; gradual, wavy boundary. 10 to 21 inches thick.

IIB23t—51 to 60 inches, dark-red (2.5YR 3/6) silty clay, red (2.5YR 4/6) dry; weak, medium and coarse, subangular blocky structure; very hard, firm, sticky and plastic; common very fine tubular pores; no roots; common moderately thick clay films; many, medium and coarse, strong-brown (7.5YR 5/6), weathered fragments; very strongly acid.

The A horizon is 7.5YR or 5YR in hue. The B horizon ranges from 5YR to 2.5YR in hue and has a moist value of 3 or 4. Depth to the underlying bedrock ranges from 40 inches to many feet. As much as 15 percent coarse fragments are in the lower part of the B horizon in some places. The underying bedrock may be basic igneous rock or sedimentary rock.

Included with this soil in mapping were about 5 to 10 percent Price and Ritner soils, 5 percent Bellpine soils, and 1 percent Dupee soils.

Runoff is medium on this Jory soil. The hazard of erosion is slight. Available water capacity is 7 to 11 inches. Permeability is moderately slow. Root penetration is deep.

This soil is used mainly for cereal grain, grass seed, orchards, hay, and pasture. Some areas are used for timber production, water supply, wildlife habitat, and recreation (fig. 15). Capability unit IIe–2; woodland suitability group 2c4; wildlife group 3.

Jory silty clay loam, 12 to 20 percent slopes (JoD).—This soil is similar to Jory silty clay loam, 2 to 12 percent slopes.

Runoff is medium on this Jory soil, and the hazard of erosion is moderate.

About 40 percent of the acreage of this soil is used for grain, hay, and pasture. The remaining acreage is in woodland or natural pasture. This soil is also used for water supply, wildlife habitat, and recreation. Capability unit IIIe–1; woodland suitability group 2c4; wildlife group 3.

Figure 15.—**Picnic area on Jory silty clay loam, 2 to 12 percent slopes. Tabletop is solid plank, 85 feet long, from a Douglas-fir grown in Benton County Area.**

Jory silty clay loam, 20 to 30 percent slopes (JoE This soil has slopes that average about 25 percent.

Runoff is medium, and the hazard of erosion is hi

About 15 percent of the acreage of this soil is used cereal crops and pasture. This soil is used mainly for t ber production, natural pasture, water supply, wildl habitat, and recreation. Capability unit IVe–1; woodla suitability group 2c4; wildlife group 4.

Jory silty clay loam, 2 to 30 percent slopes (JRE) This soil has slopes that average about 20 percent.] cause this soil is mapped only in forested areas, it is so intensively mapped as soils in cultivated areas.

Runoff is medium to rapid, and the hazard of erosi is moderate to high.

This soil is used mainly for timber production, wa supply, and wildlife habitat. A few areas are in natu pasture. Capability unit IVe–1; woodland suitabili group 2c4; wildlife group 4.

Jory silty clay loam, 30 to 50 percent slopes (JRF). This soil is similar to Jory silty clay loam, 2 to 12 perce slopes, except that it is somewhat shallower, 40 to 48 inch to bedrock. This soil occupies steep uplands and has slop that average about 35 percent.

Runoff is rapid, and the hazard of erosion is high.

This soil is used for timber production, unimproved pa ture, water supply, and wildlife habitat. Because slopes a steep this soil is not suited to cultivation. Capability un VIe–2; woodland suitability group 2c5; wildlife group

Kilchis Series

The Kilchis series consists of shallow, well-drained o excessively drained soils that formed in colluviu weathered from basic igneous rocks. These soils are o mountainous topography in the Coast Range (fig. 16) Slopes are 50 to 100 percent.

The vegetation is Douglas-fir, hemlock, and noble fir an an understory of brackenfern, salal, and Oregongrape Elevation ranges from 3,000 to 4,000 feet. Average annua precipitation is 60 to 120 inches, average annual air tem perature is about 45° to 48° F., and the annual frost-fre season is about 120 to 150 days.

In a representative profile the surface layer is dark reddish-brown very cobbly loam about 5 inches thick. The subsoil is a dark reddish-brown very cobbly loam about 14 inches thick. It is underlain by fractured diorite bedrock at a depth of about 19 inches.

This soil is used for timber production, water supply, wildlife habitat, and recreation.

Kilchis very cobbly loam, 50 to 100 percent slopes (KHG).—This soil has average slopes of about 65 percent.

Representative profile, 1 mile northwest of the summit of Marys Peak, in the SE¼SW¼ sec. 20, T. 12 S., R. 7 W.:

A1—0 to 5 inches, dark reddish-brown (5YR 3/2) very cobbly loam, dark brown (7.5YR 4/4) dry; moderate, very fine, granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many fine interstitial pores; 40 percent angular cobblestones and 15 percent pebbles; very strongly acid; clear, wavy boundary. 4 to 8 inches thick.

B1—5 to 13 inches, dark reddish-brown (5YR 3/2) very cobbly loam, dark brown (7.5YR 4/4) dry; moderate, very fine, subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very

NUTRIENT MANAGEMENT guide

EM 8677
Revised January 2002

A List of

Analytical Laboratories

Serving Oregon

J. Hart

Soil testing and plant analysis aid commercial growers, gardeners, and homeowners in making decisions about fertilizing or applying soil amendments. This fertilizer guide lists a variety of laboratories serving Oregon, and provides specific information about laboratory services.

To compile this list, the OSU Extension Service requested information from labs providing services for Oregon and adjacent areas. OSU Extension Service makes no endorsement by listing a laboratory; conversely, omission of a laboratory does not indicate that it's unsuitable. Another source for locating commercial laboratories is the yellow pages of your local telephone directory.

Before submitting material to a lab, pay attention to the following guidelines:

- Be sure the test you request is the right one to answer your question. Nutrients aren't the only factor for successful crop production, so a soil test may not tell you why your plants don't grow. Ask a county agent or other agriculture professional which tests you may need.
- The goal of a soil or tissue test is a fertilizer recommendation. Fertilizer recommendations are based on soil/tissue tests that follow a set procedure or recipe. For example, OSU fertilizer recommendations are based on procedures used in OSU's Central Analytical Laboratory. Many labs say they use "comparable" procedures, but they may not. A laboratory that uses a procedure different from OSU's most likely will give a different fertilizer recommendation.
- Before sending samples, call the lab to inquire about costs and shipping instructions. For example, soil samples to be tested for nitrate-nitrogen should be refrigerated or dried rather than sent moist at room temperature.
- Beware of low prices. Laboratory procedures cost money to perform. A lab quoting a low price usually analyzes a few elements and estimates the others. You do not want estimates—make sure you obtain results from analytical work.
- For information on taking soil samples, see EC 628, *Soil Sampling for Home Gardens and Small Acreages.*

Laboratories wishing to be added to this list may contact:
John Hart, Extension Soil Science Specialist
Department of Crop and Soil Science
Ag & Life Sciences Building 3017
Oregon State University
Corvallis, OR 97331-7306
541-737-5712
This list will be revised regularly.

A list of laboratories approved by the Oregon Health Division for drinking water analysis can be obtained by contacting the Oregon Health Division, Drinking Water Systems, P.O. Box 14450, Portland, OR 97214-0450, or calling 503-731-4010 or 503-731-4009.

For additional copies of this publication, visit your local county office of the OSU Extension Service, or contact:
Publication Orders
Extension & Station Communications
Oregon State University
422 Kerr Administration
Corvallis, OR 97331-2119
Fax: 541-737-0817

You may order up to six copies of this publication at no charge. If you request seven or more copies, include 25 cents for each copy beyond six.

This publication also is available on the World Wide Web (**eesc.orst.edu**). Open our Publications and Videos catalog and choose Agriculture, followed by Soil and Water.

John Hart, Extension soil scientist, Oregon State University. This publication replaces FG 74, *A List of Analytical Laboratories Serving Oregon.*

OREGON STATE UNIVERSITY
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Revised April 2000. Revised January 2002.

Laboratory	Area Served*			Analyses								Other Services	
				Soil			Water			Plant Tissue	Feed		
	Oregon (OR)	Idaho (ID)	Washington (WA)	Agricultural	Environmental (heavy metals)	Environmental (pesticides, chem. cont.)	Biological (total & fecal coliform)	Chemical (pesticides)	Chemical (nitrate in drinking water)	Plant tissue	Feed	Fertilizer recomm. (FR)	Consulting (Cnslt.)
A & L Western Agricultural Laboratories ..... 1311 Woodland Ave., Suite 1 Modesto, CA 95351-4732 209-529-4080 • FAX 209-529-4736 **Portland Office** 10220 S.W. Nimbus Ave., Bldg. K-9 Portland, OR 97223 503-968-9225 • FAX 503-598-7702	●	●	●	●	●	●	●	●	●	●	●	●	●
Agri-Check, Inc. ..... 323 Sixth St. P.O. Box 1350 Umatilla, OR 97882 541-922-4894 or 800-537-1129	●	●	●	●	●		●		●	●	●	●	●
Agri-Test, Inc. ..... 2043 Kimberly Rd. P.O. Box 4 Twin Falls, ID 83303-0004 208-734-2303 or 800-632-0842	●	●	●	●	●	●	●	●	●	●	●	●	●
AmTest, Oregon, LLC ..... 13035 S.W. Pacific Highway Portland, OR 97223 503-639-9311	●				●	●	●		●				●
Analytical Laboratory and Consultants, Inc. ... 361 W. 5th Ave. Eugene, OR 97401 541-485-8404 or 800-262-5973 FAX 541-484-5995 • anlabinc@rio.com	●			SC	●	SC	●	SC	●				●
Basin Agri-Serve ..... 22109 Stateline Rd. P.O. Box R Merrill, OR 97633 541-798-5112 • FAX 541-798-5114	●			●					●	●	●	●	
Brookside Laboratories, Inc. ..... 308 S. Main St. New Knoxville, OH 45871 419-753-2448 • FAX 419-753-2949	●	●	●	●	●	●	●	●	●	●	●		●
Cascade Analytical, Inc. ..... 3019 G.S. Center Rd. Wenatchee, WA 98801 509-662-1888			●	●	●	●	●	●	●	●			●
Dairy One Forage Lab ..... 730 Warren Rd. Ithaca, NY 14850 607-257-1272 • FAX 607-257-1350	●	●	●								●		

*E, W, S, or N indicates a portion of a state. SC indicates that a service is subcontracted.

Laboratory	Area Served*			Analyses									Other Services	
				Soil			Water				Plant Tissue	Feed		
	Oregon (OR)	Idaho (ID)	Washington (WA)	Agricultural	Environmental (heavy metals)	Environmental (pesticides, chem. cont.)	Biological (total & fecal coliform)	Chemical (pesticides)	Chemical (nitrate in drinking water)		Plant tissue	Feed	Fertilizer recomm. (FR)	Consulting (Cnslt.)
Dellavalle Laboratory, Inc. 1910 W. McKinley, Suite 110 Fresno, CA 93728-1298 559-233-6129 • FAX 559-268-8174 ndellavalle@dellavallelab.com	●	●	●	●	●	●	●		●		●	●	●	●
Food Products Laboratory, Inc. 12003 N.E. Ainsworth Circle Portland, OR 97220 503-253-9136 or 800-375-9555 FAX 503-253-9019	●	●	●		●	●	●	●	●					●
Kuo Testing Laboratories, Inc. 337 S. 1st Ave. Othello, WA 99344 509-488-0112 • FAX 509-488-0118 kuotest@atnet.net www.kuotesting.com	●	●	●	●	●	●		●	●		●	●	●	●
Laucks Testing Laboratory 940 S. Harney St. Seattle, WA 98108 206-767-5060 • FAX 206-767-5063	●	●	●		●	●	●	●	●			●		●
North Creek Analytical 20332 Empire Ave., F-1 Bend, OR 97701 541-383-9810 • FAX 541-382-7588	●	●	●		●	●	●	●	●					
Northwest Agricultural Consultants 2545 W. Falls Kennewick, WA 99336 509-783-7450	●	●	●	●					●		●	●	●	●
Oregon State University Central Analytical Laboratory Ag & Life Sciences Bldg. Rm. 3079 Corvallis, OR 97331-7306 541-737-2187 • FAX 541-737-5725	E W										●		●	
Pacific Agricultural Laboratory 12505 N.W. Cornell Rd. Portland, OR 97229 503-626-7943 • FAX 503-641-0644 sthun@pacaglab.com	●	●	●			●		●			●			●
Soil & Plant Laboratory, Inc. P.O. Box 1648 Bellevue, WA 98009-1648 13547 S.E. 27th Place, Suite 3B Bellevue, WA 98005 425-746-6665 • FAX 425-562-9531 splabnw@flash.net Oregon 503-557-4959 • FAX 503-557-0713 splabor@flash.net	S	●	●	●					●		●		●	●

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Laboratory	Area Served*			Analyses									Other Services	
				Soil			Water			Plant Tissue		Feed		
	Oregon (OR)	Idaho (ID)	Washington (WA)	Agricultural	Environmental (heavy metals)	Environmental (pesticides, chem. cont.)	Biological (total & fecal coliform)	Chemical (pesticides)	Chemical (nitrate in drinking water)	Plant tissue	Feed	Fertilizer recomm. (FR)	Consulting (Cnslt.)
Soil Search Labs 42125 S. Morton Rd. Kennewick, WA 99337 509-585-8875 • FAX 509-586-0958 soilsrch@gte.net	●		●	●					●	●	●		
Soiltest Farm Consultants, Inc. 2925 Wapato Dr. Moses Lake, WA 98837 509-765-1622 • FAX 509-765-0314 www.soiltestlab.com	●	●	●	●					●	●	●	●	●
Stukenholtz Laboratory, Inc. 2924 Addison Ave. E. P.O. Box 353 Twin Falls, ID 83303-0353 208-734-3050 or 800-759-3050 FAX 208-734-3919 stuklab@rmindspring.com	●	●		●	●		●	●	●	●	●	●	●
Sustainable Soils 5807 S.E. Westfork Portland, OR 97206 503-774-3945 beheveor@teleport.com	W			●	●					●		●	●
Umpqua Research Company P.O. Box 609—626 N.E. Division Myrtle Creek, OR 97457 541-863-5201 • FAX 541-863-6199 lab@urcmail.net	●	●	●		●	●	●	●	●				
USAg Analytical Services, Inc. 1320 E. Spokane St. Pasco, WA 99301 509-547-3838 • FAX 509-547-8645 certified NFTA	●	●	●	●					●	●	●	●	●
Waterlab Corp. 2603 12th St. S.E. Salem, OR 97302 503-363-0473 • FAX 503-363-8900	●			●	●	●	●		●				
Western Laboratories, Inc. P.O. Box 1020 Parma, ID 83660 208-722-6564 or 800-658-3858 FAX 208-722-6550 jptaberna@w-idaho.net	●	●	●	●						●	●	●	●
William F. Black Soil Testing 503 N. Gardner P.O. Box 317 Burlington, WA 98233 360-757-6112	●		●	●					●	●		●	●

*E, W, S, or N indicates a portion of a state.

X-SpamCatcher-Score: 2 [X]
From: "Donna Schmitz" <donna.schmitz@oacd.org>
To: "'Melissa Fery'" <mfery@comet.oda.state.or.us>
Subject: RE: Julia Sunkler
Date: Fri, 22 Oct 2004 07:45:57 -0700
X-Priority: 3 (Normal)
Importance: Normal
X-Scanned-By: MIMEDefang 2.39

Melissa,

I've attached the ORAWM file. Here are the specifics:
8 sows
2 boars
from Jan to March there will be 80-95 nursing pigs
from July to Sept there will be 80-95 nursing pigs

The only way I could take the little pigs out of the calculations when she sells them is to put them in the field grazing 100%. Is there another way to avoid calculating their contribution during the time when they are gone?

Thanks for your help on this. We talked about an OWEB grant for her storage tank, but I might encourage her to apply for EQIP, which means most likely nothing would go in until next year sometime. Would ODA be okay with this? I know she is anxious to get something in really soon.

Donna

-----Original Message-----
From: Melissa Fery [mailto:mfery@comet.oda.state.or.us]
Sent: Thursday, October 21, 2004 4:54 PM
To: Donna Schmitz
Subject: Re: Julia Sunkler

Donna,

I have quite a bit of experience with ORAWM and would be more than willing to work through the worksheet with you or try to answer any questions you may have! We can work on it one of several ways, I can meet you at your office, you can e-mail me the ORAWM worksheet you are working on, or we can visit on the telephone. I'll be in Salem (503) 986-6468 tomorrow (Friday) afternoon.

Let me know what works best for you and THANK YOU so much for working with Julia.

Melissa

>Hi Melissa,
>
>I'm working on Julia Sunkler's ORAWM calculations of liquid storage needed
>for her pig operation. I've used 1500 gallon (201 cubic feet) storage tank
>and two week storage, but the program suggested that she needs lots more
>(1341 cubic feet more!). I've taken all lot contributions and wash water
out
>of the storage volume, but it still seems excessive to me. Are you
>knowledgeable of inputs into the ORAWM program? Is there someone I can call
>to go over the calculations and make sure it's correct?
>
>Thanks,

>Donna
>
>Donna Schmitz
>Watershed Technical Specialist
>Benton Soil and Water Conservation District
>(541)753-7208

Sunklerpigs.xls