Nutrient Management Plan

For Kuipers Farms LLC

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GENERAL INFORMATION

2020 Operation Information for Kuipers Farms LLC

Calendar Year: 2020 **Reporting period:** January 1 through December 31, 2020

Name:	Cory Kuipers		
Business	Kuipers Farms LLC		
Mailing	4030 Highway 101 S, Tillamook, OR, 97141		
Facility	4030 Highway 101 S, Tillamook, OR 97141	**County:**	Tillamook
Telephone	null	**Cell Phone**	(360)661-4265
E-mail	corykuipers25@hotmail.com		

Permitted and Actual number of animals by type at the CAFO averaged over the year [S4.D.2(a)/S4.D.2(a)(ii) of

Animal Type	Average Weight (Lbs)	Days on Farm		Permitted	Actual
		Start Month	End Month		
Dairy Heifers	500	January	December	30	30
Milker - Dry	1100	January	December	170	170
Calf	350	January	December	80	80
Milker - Jersey	900	January	December	350	105
Milker - Dry	1050	January	December	1	35
Dairy Heifers	150	January	December	80	80
Milker - Holstein	1200	January	December	348	105
			Total Animals -	1,059	605

Manure Solids Generated -	0 CF
Bedding Generated -	58,320 CF
Imported Solids -	0 CF
Total Solids Generated -	58,320 CF
Total Solids to Store based on a Volume Reduction Factor of 0.0 -	58,320 CF

Manure Liquids Generated -	555,165 CF
Rainfall-Evaporation on Storage plus Runoff Generated -	87,176 CF
Process Water Generated -	146,800 CF
Imported Liquids -	0 CF
Total Liquids to Store -	789,141 CF

Liquids Applied to Land -	319,161 CF
Solids Applied to Land -	14,000 CF
Grazing Manure Applied to Land -	0 CF
Liquids Exported -	13,368 CF
Solids Exported -	0 CF
Acres of Land for Land Application Covered by NMP -	244.5 AC
Acres of Land Under Operator Control Used for Manure Applications -	244.5 AC

GENERAL INFORMATION

2020 Storage Facilities for Kuipers Farms LLC

Facility Name	Description	Type	Storage Period (days)	Diameter (ft)	Top Length (ft)	Top Width (ft)	Depth (ft)	Side slope Z	Free board (ft)	Volume (CF)	Uncovered Surface Area (SF)
Big Slurry		Liquid	49	100			16		1	117,750	7,854
Dairy Solid Manure	uncovered area by block wall	Solid	125		100	25	8			20,000	2,500
Dry storage	covered are at S end of barns	Solid	45		30	30	8	0	0	7,200	0
Freestall Tank	UGT in barns	Liquid	2	30			8	0	0	5,652	0
Little Slurry		Liquid	32	80			16	0	1	75,360	5,027
Parlor Tank	open tank at S end of Parlor	Liquid	0		16	10	5	0	0	800	160
Tupper Barn Tank	UGT	Liquid	1		16	30	5	0	0	2,400	0
Tupper Solid Manure		Solid	75		40	50	6	0		12,000	0
Tupper Tank	UGT w cover	Liquid	9	60			8	0	0	22,608	0

GENERAL INFORMATION

2020 Storage Period Calculations for Kuipers Farms LLC

Solids Storage

Storage Unroofed Surface Area, SF	2500	Manure Solids, CF/Day =	1,521	Volume Reduction Factor =	0
Available Storage, CF =	39200			Solids Storage Period, Days =	245

Month	Number Of Days	Manure Lost In Grazing	Filtered Solids (CF)	Bedding (CF)	Solids Removal Factor (Pct)	Imported Solids (CF)	Solids To Store (CF)	Storage Volume Needed, CF
October	31	0	0	4860	0	0	4860	4860
November	30	0	0	4860	0	0	4860	9720
December	31	0	0	4860	0	0	4860	14580
January	31	0	0	4860	0	0	4860	19440
February	28	0	0	4860	0	0	4860	24300
March	31	0	0	4860	0	0	4860	29160
April	30	0	0	4860	0	0	4860	34020
May	31	0	0	4860	0	0	4860	38880
June	30	0	0	4860	0	0	4860	43740
July	31	0	0	4860	0	0	4860	48600
August	31	0	0	4860	0	0	4860	53460
September	30	0	0	4860	0	0	4860	58320
Annual	**365**	**0**	**0**	**58320**	**0**	**0**	**58320**	

Liquids Storage

Climate Station: TILLAMOOK 1 W

Storage Unroofed Surface Area, SF =	13041	25Yr-24Hr Storm Precip, In =	6	Total 25Yr-24Hr Storm Storage Needed, CF	7,771
Available Liquid Storage, CF =	224570	25Yr-24H4 Storm Runoff, CF =	0	Storage Period without 25yr-24hr Storm =	94
Unroofed Runoff Area, SF =	0	25Yr-24Hr Storm on Unroofed Storages, CF =	7,771	Storage Period with 25yr-24hr Storm =	91

Month	Number Of Days	Rainfall (Inches)	Evaporation (Inches)	Rain-Evap on Storages (CF)	Rainfall Runoff (CF)	Manure (CF)	Process Water (CF)	Imported Liquids (CF)	Monthly Liquids to Store (CF)	Total Storage Volume Needed (CF)
October	31	7.16	1.42	7434	0	47151	12400	0	66985	66985
November	30	13.71	0.75	16784	0	45630	12400	0	74814	141799
December	31	13.94	0.6	17276	0	47151	12400	0	76827	218626
January	31	13.09	0.48	16331	0	47151	12400	0	75882	294508
February	28	10.79	0.78	12964	0	42588	11200	0	66752	361260
March	31	9.9	1.26	11190	0	47151	12400	0	70741	432001
April	30	6.81	1.9	6359	0	45630	12400	0	64389	496390
May	31	4.84	3.22	2098	0	47151	12400	0	61649	558039
June	30	3.41	3.4	13	0	45630	12000	0	57643	615682
July	31	1.64	3.91	-2467	0	47151	12400	0	57084	672766
August	31	1.42	3.52	-2282	0	47151	12400	0	57269	730035
September	30	3.68	2.54	1476	0	45630	12000	0	59106	789141
Annual	**365**	**90.39**	**23.78**	**87176**	**0**	**555165**	**146800**	**0**	**789141**	

GENERAL INFORMATION

2020 Manure Nutrient Balance for Kuipers Farms LLC

Manure Nutrients in

Nutrient Concentrations:	Nitrogen (Total N)	Phosphorus (P_2O_5)	Potassium (K_2O)	Units
Liquid Manure-	21.82	5.22	19.28	lbs/1000 Gal
Solid Manure-	10.60	3.65	6.36	lbs/Ton

Manure Nutrient

Nutrients Generated:	N Generated (lbs) after Losses	P_2O_5 Generated (lbs) after Losses	K_2O Generated (lbs) after Losses
Liquid Manure-	128822 lbs	30801 lbs	113829 lbs
Solid Manure-	11127 lbs	3832 lbs	6676 lbs
Grazing Manure-	0 lbs	0 lbs	0 lbs
Total-	**139950 lbs**	**34632 lbs**	**120506 lbs**

Exported Nutrients:	N Exported (lbs) after Losses	P_2O_5 Exported (lbs) after Losses	K_2O Exported (lbs) after Losses
Liquid Manure-	2440 lbs	320 lbs	1710 lbs
Solid Manure-	0 lbs	0 lbs	0 lbs
Total-	**2440 lbs**	**320 lbs**	**1710 lbs**

Crop Nutrient Removal:	N Utilized (lbs)	P_2O_5 Utilized (lbs)	K_2O Utilized (lbs)
Total-	**99776 lbs**	**32150 lbs**	**84549 lbs**

Net Nutrients:	Nutrients Generated after Losses (lbs)	Nutrients Removed by Crop and Exported after Losses (lbs)	Net Nutrient Balance after Losses (lbs)
Nitrogen (N) -	139950 lbs	102216 lbs	37733 lbs
Phosphate (P_2O_5) -	34632 lbs	32470 lbs	2162 lbs
Potassium (K_2O) -	120506 lbs	86259 lbs	34246 lbs

System Losses:	Nutrients Generated (lbs)	Nutrients Remaining after Losses (lbs)	Nutrients Lost in System (lbs)
Nitrogen (N) -	91899 lbs	139950 lbs	-48051 lbs
Phosphate (P_2O_5) -	34059 lbs	34632 lbs	-573 lbs
Potassium (K_2O) -	52067 lbs	120506 lbs	-68438 lbs

Note: Total nutrients utilized and generated are computed from reference data taken from Extension Publications or the USDA Natural Resources Conservation Service National Agricultural Waste Management Field Handbook. Nutrients generated after losses are computed from analytical data by taking the total volume of material times the nutrient analysis of the material except for grazing where reference data is used.

Background And Site Information

BACKGROUND AND SITE INFORMATION

Kuipers Farms is located approximately 3 miles south of Tillamook, Oregon in Tillamook County, Oregon. It is in the Tillamook River watershed which drains to Tillamook Bay. The dairy is owned and managed by Garritt and Cody Kuipers and family and consists of two permitted facilities, some owned acreage, as well as some leased cropland.

The Dairy is currently permitted for 405 animals consisting of 245 milk and dry cows and 160 young stock (heifers and calves). The Tupper facility is currently permitted for 200 animals (170 mature and 30 young stock) The Dairy seeks an increase in animal numbers to 500 milkers, 100 dry cows, and 160 young stock with the Tupper permit remaining the same. Calves are born at the dairy and raised there for about 4 months, then they are sent to a calf raising facility and returned to the dairy as springers at about 22 months of age. Milk cows are housed at the dairy (Tract 1) while dry cows are housed at the Tupper facility (Tract).

Other leased ground, as described below, is available for crop production and manure management.

The actual number of livestock at the two facilities may vary depending on economic conditions, culling rates, and/or livestock health. Grazing is dependent on weather conditions, livestock health, and forage production.

Livestock mortality service is provided by the Tillamook County Creamery Association.

Dairy (T1)
At the Dairy manure handled as a liquid is scraped through the barns to the underground collection tanks where the manure is collected and stored. Liquid manure is transferred to either one of the open above ground tank via pumps and pipelines as needed for additional storage. Manure handled as a solid is transferred to the roofed solids storage facility for storage.

Liquid manure may also be transferred to the Port of Tillamook anaerobic digester each week. After the liquid manure has completed the digestion process it is returned to the dairy for storage. The digested manure may be returned to storage facilities on other farms as needed to improve storage conditions.

The manure storage system at the Dairy consists of below ground liquid waste storage tanks and two above ground liquid waste storage tanks. Tank sizes and locations are noted on the Headquarters map. In combination, the liquid waste storage tanks can store the liquid waste produced from the dairy operation for 81 days. The leachate from the silage bunker at dairy is diverted into the liquid waste storage system. The covered solids manure storage facility can store the solid manure produced from the dairy operation for 253 days. Liquid manure may be applied to the Dairy fields using a tank wagon, a big gun

sprinkler, or a dragline while manure solids are applied using a solids spreader.

There are 47.8 acres of crop and pastureland available for manure application as a nutrient source.

Tuppers

The Tupper facility manure is scraped through the barns to the underground collection tank where the manure is collected and stored. Liquid manure is transferred to the open above ground tank via pumps and pipelines as needed for additional storage. Manure handled as a solid is transferred to the roofed solids storage facility for storage. Liquid manure may be transferred to the Port of Tillamook anaerobic digester for treatment each week. After the liquid manure has completed the digestion process it is returned to the dairy and/or the other facilities for storage.

The Tupper Headquarters map shows the location and size of the manure storage facilities. There is approximately 11 days of liquid storage and 112 days of solids storage at this facility. Liquid manure may be applied to the fields using a big gun sprinkler system, tank wagon, or a dragline. Manure solids applied using a solids spreader.

There are 38.2 acres of crop and pastureland that is used for the application of liquid and solid manure as a nutrient source.

Eckloff Farm

The Eckloff Farm has 73.1 tillable acres and is used for forage production and manure application at agronomic rates. No animals will be housed at this facility.

Christy Farm (T450)

The Christy Farm has 21.0 tillable acres and is used for forage production and manure application at agronomic rates. No animals will be housed at this facility.

Leased Ground

Additional leased acres are used to produce forage for the dairy livestock and may receive liquid and solid manure at agronomic rates. No animals housed at these farms. Manure is applied using a solids spreader or a tank wagon.

The leased acres consist of:
Port Tract 622 44.2 acres

General Note

Applications of liquid and solid manure are planned for agronomic rates on a nitrogen basis for all fields. Soil phosphorus concentrations will be monitored using soil tests. Supplemental nutrient applications to the crop and pastureland should be based on soil testing and fertilizer guides to prevent excess soil nutrient concentrations. Plant uptake of nutrients may be determined through forage testing of the harvested crop.

Emergency Response Plan

In Case of an Emergency Storage Facility Spill, Leak or Failure-

Implement the following first containment steps:

Stop all other activities to address the spill.
Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
Call for help and excavator if needed.
Complete the clean-up and repair the necessary components.
Assess the extent of the emergency and request additional help if needed.

In Case of an Emergency Spill, Leak or Failure during Transport or Land Application-

Implement the following first containment steps:

Stop all other activities to address the spill and stop the flow.
Call for help if needed.
If the spill posed a hazard to local traffic, call for local traffic control assistance and clear the road and roadside of spilled material.
Contain the spill or runoff from entering surface waters using straw bales, saw dust, soil or other appropriate materials.
If flow is coming from a tile, plug the tile with a tile plug immediately.
Assess the extent of the emergency and request additional help if needed.

Contacts to be made by the owner or operator within 24 hours-

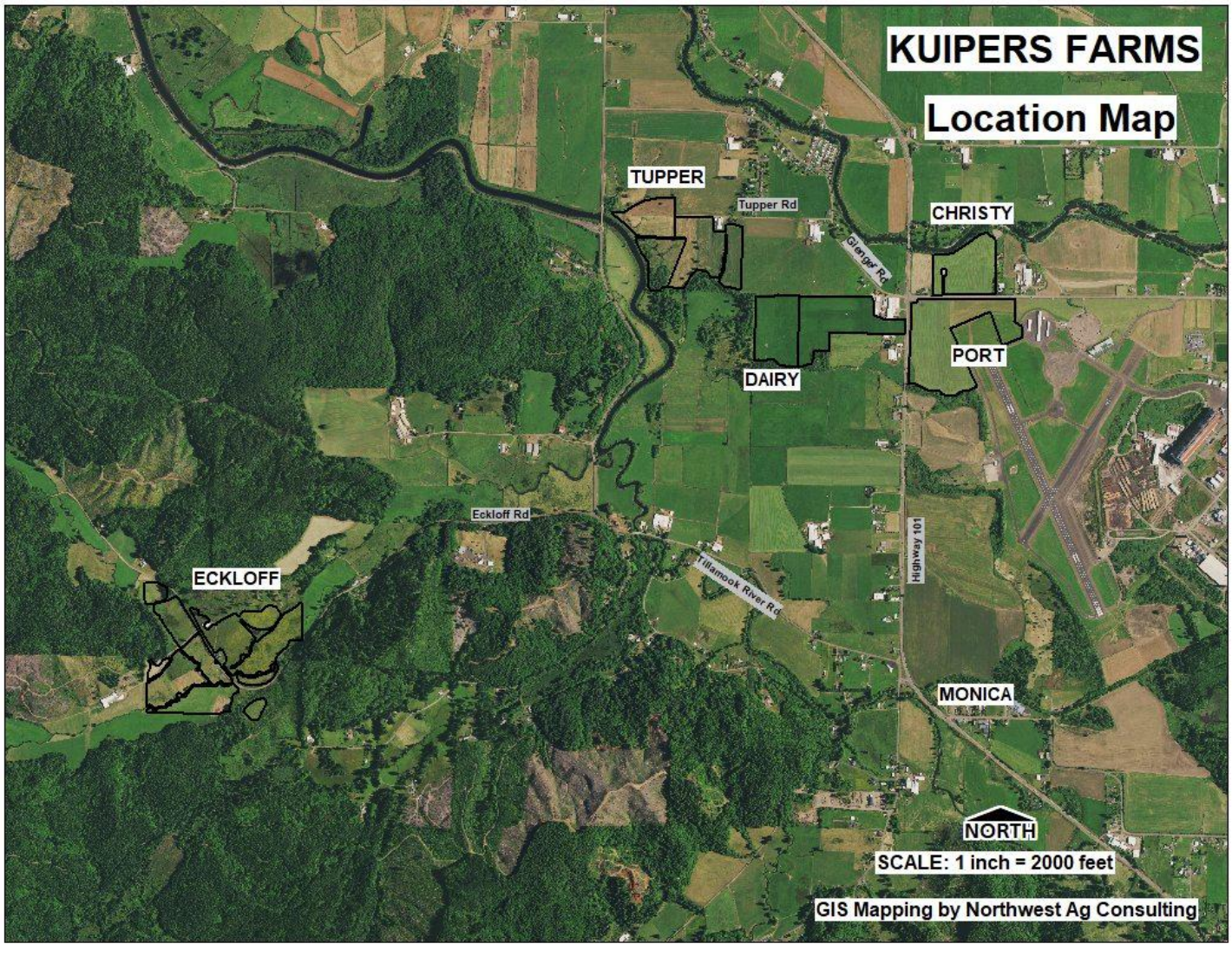
Organization	**Phone Number**
Oregon Department of Agriculture Natural Resources Division TTD 635 Capitol St., N.E. Salem, OR 97301-2532	(503) 986-4699 (503) 986-4762
Oregon Emergency Response (System OERS)	(800) 452-0311

Be prepared to provide the following information:

Your name and contact information.
Farm location (driving directions) and other pertinent information.
Description of emergency.
Estimate of the amounts, area covered, and distance traveled.
Whether manure has reached surface waters or major field drains. Include the name of the surface water source that manure reached. Contact the Oregon Emergency Response System if manure entered a drinking water source.
Whether there is any obvious damage: employee injury, fish kill, or property damage.
If a grab sample of the discharge was taken.
Current status of containment efforts.

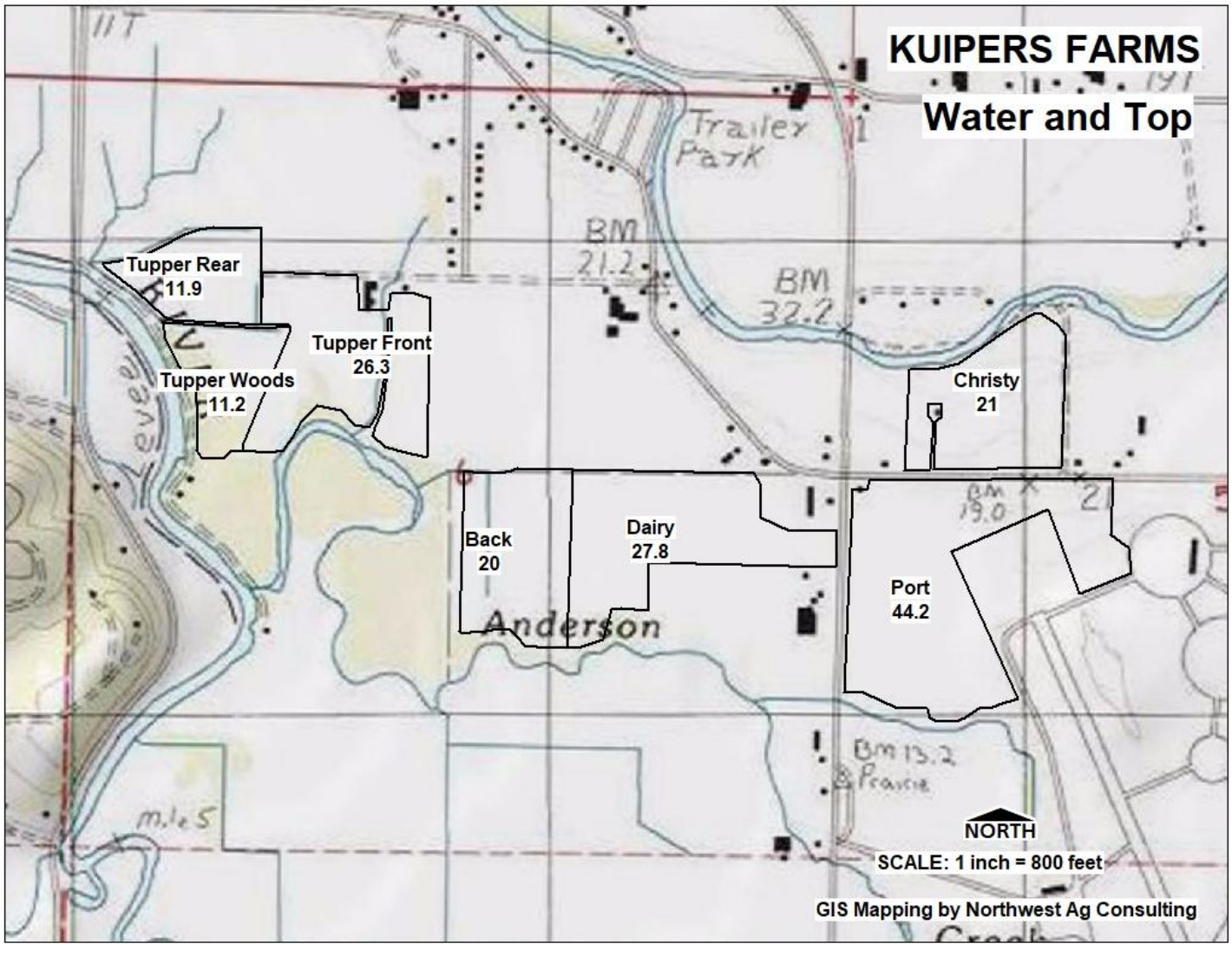
GENERAL INFORMATION

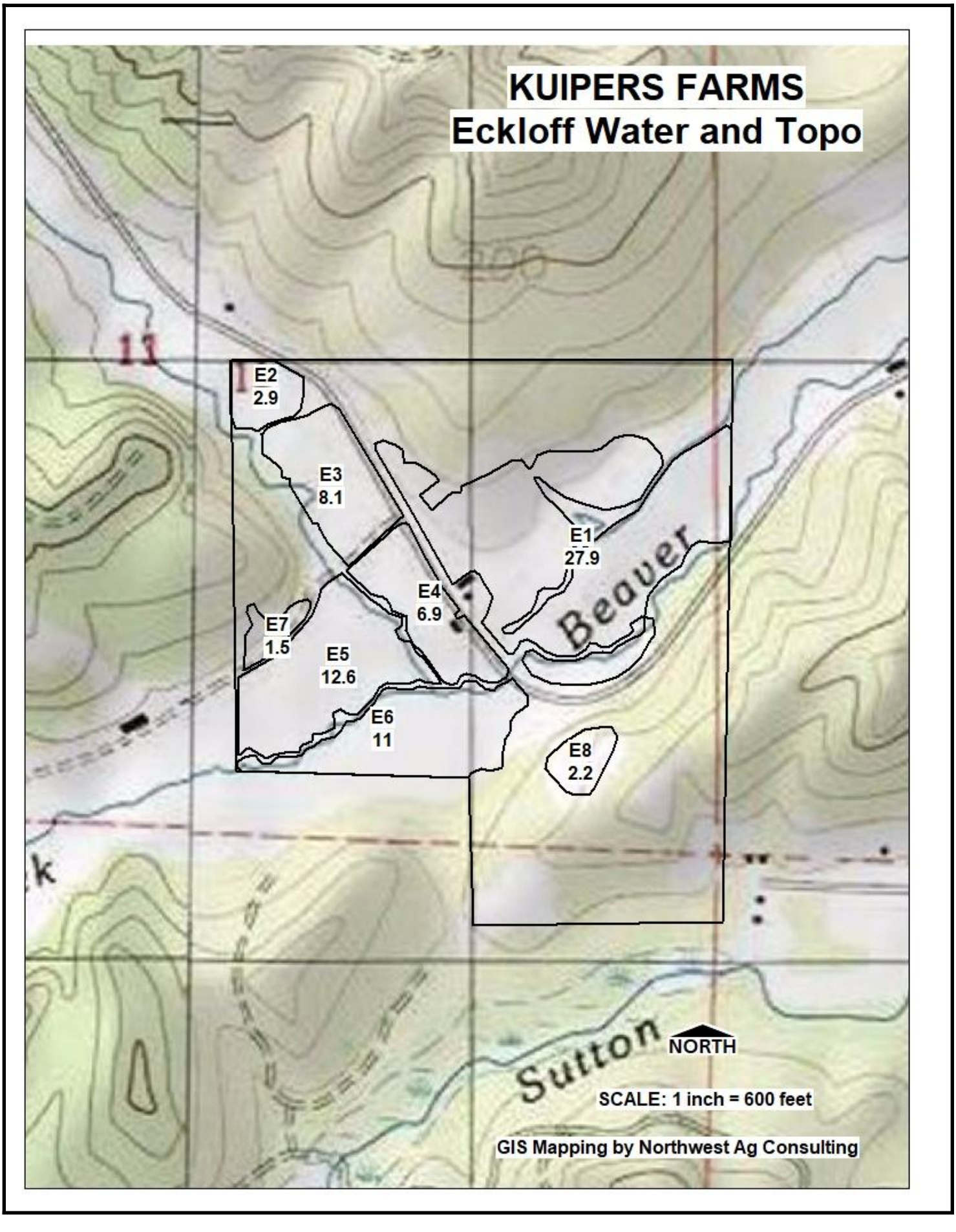
Location Maps for Kuipers Farms LLC



GENERAL INFORMATION

Topographical Maps for Kuipers Farms LLC




KUIPERS FARMS
Eckloff Water and Topo
E2
2.9
E3
8.1
E1
27.9
E4
6.9
E7
1.5
E5
12.6
E6
11
E8
2.2
Beaver
Sutton
NORTH
SCALE: 1 inch = 600 feet
GIS Mapping by Northwest Ag Consulting

Animal Mortality

To decrease non-point source pollution of surface and ground water resources, reduce the impact of odors that result from improperly handled animal mortality, and decrease the likelihood of the spread of disease or other pathogens, approved handling and utilization methods shall be implemented in the handling of normal mortality losses.
Animal mortalities must be handled in accordance to ORS 601.140 to prevent the discharge of pollutants to state waters. Animal mortalities will be managed to ensure that they are not disposed of in a liquid manure, storm water, process waste water storage or treatment system, or that is not specifically designed to treat animal mortalities.
Under no circumstances are animal mortalities to be disposed of in any type of liquid manure storage facility.

Guidance for Proper Management of Dead Animals
Refer to Plan for Catastrophic Animal Mortality Handling for guidance on what steps to take for a catastrophic animal mortality event. Having dead animals sent to an acceptable disposal site is the best method to deal with animal mortalities. A list of landfills and phone numbers can be found on the internet at http://www.deq.state.or.us/lq/sw/disposal/permittedfacilities.html. If a local landfill is not permitted to accept animal carcasses, the Oregon Department of Environmental Quality (DEQ) may grant an exception. Phone numbers to local DEQ offices can be found in most phone books or on the internet at http://www.deq.state.or.us/about/locations.html.

Under no circumstances are animal mortalities to be disposed of in any type of liquid manure storage facility.

Acceptable methods and guidance for animal mortality disposal are:
Composting- Composting animal mortalities requires a composting plan be prepared and submitted to the Oregon Department of Agriculture, Natural Resources Division. A composting plan consists of a site plan drawing of the composting facility, a description of how any runoff from the facility will be contained, a description of the composting process to be used and how the compost will be used. The composting facility for animal mortalities must have a concrete floor or similar impervious surface to prevent nutrient leaching. A roof covering the animal mortality composting facility is recommended to control moisture added by rainfall and rainfall runoff. Assistance to develop a composting plan is available from the Natural Resources Division of the Oregon Department of Agriculture, (503) 986-4700. A permit is also needed from the Department of Environmental Quality (DEQ) if animal mortalities will be imported from other farms for composting.
Rapid composting of dead animals occurs when the carbon to nitrogen (C:N) ratio of the compost mix ranges between 10 and 20 to 1. To achieve the recommended C:N ratio, build the initial compost pile by placing 18 inches of sawdust or other bulking agent on the floor of the composting area. The bulking agent should extend beyond the perimeter of the animal to be composted by at least 2 feet. If using a compost bin the bulking material should extend at least 1 foot beyond the perimeter of the animal being composted. Using a bulking agent such as sawdust will absorb any liquids as the animal decomposes during the composting process.
Once the bulking agent has been placed on the floor of the composting area, place the animal carcass on top. To decrease composting time and prevent bloating the body cavity should be cut open. Cover the carcass with 1 to 3 feet of separated manure solids or other material that has a moisture content between 30 to 60 percent and a C:N ratio of not more than 30 to 1. Use 1 foot of material for small carcasses and 3 feet for large carcasses such as cattle. Be careful not to add material that is to wet as it will hinder the composting

process and cause odors. Small animals can be layered in a compost pile by placing 12 inches of the bulking agent between layers as shown in the figure below. Be sure the total height of the compost pile does not exceed 7 feet in height as it may spontaneously combust causing a fire.
The first heating or primary composting cycle will take approximately 15 to 90 days depending on the size of the animal being composted. Refer to the table below for estimated primary composting times. Check pile temperature using thermometer probe on a daily basis. The pile temperature should be checked at multiple points around the compost pile and at a point approximately 3 feet into the pile. The temperature of the compost pile should reach 130 degrees Fahrenheit (F) within a few days. Temperatures should peak between 130 and 150 degrees F in 3 to 4 days. When the temperature of the compost pile falls below 130 degrees F, the compost needs to be aerated by turning or other means. Be sure carcasses remain covered with the bulking agent after being aerated. It is important to maintain a temperature above 130 degrees F for at least 7 days during the primary composting cycle as failure to do so may result in the incomplete destruction of pathogens and can cause fly and odor problems. After aerating the compost pile, the secondary composting times will be similar to the first.
CAUTION: It is unclear whether prions that are the proteins that cause Bovine Spongiform Encephalitis (BSE or Mad Cow Disease) are destroyed in the composting process. Animals showing signs of Mad Cow Disease and those with anthrax should not be composted and must be reported to the Oregon Department of Agriculture, Animal Health and Identification Division at (503) 986-4680 for guidance on disposal.
After aerating the compost pile by turning or other means, be sure to check the moisture content and add water if necessary being careful not to add to much water. The compost pile should feel moist to the touch but you should not be able to squeeze any water out of it.
Odors given off by the composting operation is a good indicator of how the compost operation is proceeding. Foul odors may mean that the process has turned from aerobic to anaerobic. Anaerobic conditions are the result of insufficient oxygen in the compost. This may be caused by excessive moisture in the compost or the need for turning or aerating of the compost pile.
After the composting process is finished, it may be used as a bulking agent for a new compost pile. A rule of thumb is to use 50 percent of the composted material for a bulking agent but you may want to use more or less depending on how degraded the bulking agent is in the finished compost. Using finished compost in a new compost pile reduces the amount of bulking agent needed for the new pile and provides microbial inoculants to get the composting process started.
Finished compost can also be applied to crop and pasture land fields for utilization of the nutrients and organics in the composted material. Compost from animal mortalities should not be applied to crops that will be consumed directly by humans. The nutrient content of the composted material should be determined and application equipment calibrated to ensure nutrients contained in the composted material are not over applied.

Natural Disposal- To allow nature to take its course the dead animal needs to be transported to a location at least ½ mile from any off-farm dwelling and at least ¼ mile from any water way in accordance with ORS 601.140. Once this criteria is met the carcass can be left to degrade naturally with the help of scavengers. This method is not an acceptable means of disposal for a large number of animal mortalities or for byproducts generated during butchering.

Landfill- Dead animals may be transported to a permitted landfill that accepts animal carcasses for disposal. Be sure to call the chosen landfill first to insure a landfill will accept your animal carcasses. Refer to the website given previously for permitted landfills to call. Contact the landfill operator and the DEQ at (800) 452-4011 if the landfill you would like to use is not a permitted facility to see if an exception may be granted for the disposal of animal carcasses.

Incineration- Dead animals may be burned as a method of disposal and as a method to control diseases. The economics of incineration and availability of incineration units usually make this option undesirable. A permit is needed from the Oregon Department of Environmental Quality (DEQ) Air Quality program to operate an incineration unit. Contact your DEQ at (800) 452-4011 for guidance on incineration of animal carcasses.

Burial- Dead animals may be buried in accordance with ORS 601.090(7) as a method of disposal. Large animals such as an adult cow will require a hole approximately 2 feet by 7 feet by 8 feet deep. Be sure to select a site that doesn't have a water table to insure the bottom of the hole will be dry. The animal carcass should be covered with hydrated lime and covered with at least 4 feet of soil mounded 2 feet above the natural ground line to allow for settling as the carcass decomposes. Burial sites should be located at least 500 feet down slope from surface waters or wells.
Burial is not an acceptable method of disposal for animal byproducts generated from butchering. Burial of large numbers of animal mortalities is not acceptable unless performed in accordance with a Catastrophic Animal Mortality Management Plan. Burial of imported animal mortalities is subject to disposal regulations and the Oregon Department of Environmental Quality (DEQ), the Oregon Department of Agriculture (ODA) and the local land use planning authority should be contacted.

Plan for Catastrophic Animal Mortality Handling

The following information describes how you plan to manage catastrophic loss of animals in a manner that protects surface and ground water quality. You must follow all national, state and local laws, regulations and guidelines that protect soil, water, air, plants, animals and human health.

Guidance in the event of a catastrophic animal mortality event:
Remove animal mortalities from the livestock production area and place in an area designated for mortality storage to be determined at the time of the catastrophic event.

Contact the state veterinarian if animal death is suspicious or animal displayed unusual symptoms before death.
If it is determined that a disease outbreak may be eminent, implement procedures as directed by the State Veterinarian. This may include killing exposed animals, burning carcasses and burial of ashes in a predetermined catastrophic mortality burial areas.
Refer to state guidance regarding appropriate catastrophic animal mortality handling methods.

Contact Information-

Organization	**Phone Number**
Oregon Department of Agriculture Natural Resources Division 635 Capitol St. NE Salem, OR 97301-2532	(503) 986-4699 TTD- (503) 986-4762
Oregon Emergency Response System (OERS)	(800) 452-0311
Oregon State Veterinarian USDA APHIS 530 Center Street NE, Suite 335 Salem, OR 97301	(503) 378-4710 (503) 399-5871 Fax- (503) 399-5607

Operation and Maintenance Considerations

Wastewater Collection Tank-
The wastewater collection tank is used to collect and temporarily store wastewater containing manure generated by the farm. Wastewater temporarily stored in the wastewater collection tank is periodically pumped to the long term wastewater storage facility. Any annual buildup of solids in the wastewater collection tank must be removed to maintain design capacity and applied to land application areas in accordance with guidance given in the nutrient management section.

Inspect the collection tank weekly to insure structural integrity. If the structural integrity of the tank is compromised, immediately empty the tank to determine the cause and make necessary repairs before putting the tank back into service. Do not allow equipment that exceeds the design limit of the tanks on or within 20 feet of the structure.
Keep pumps, agitators, piping, valves and all other electrical and mechanical equipment in good condition by following the manufacturer's recommendations. Maintain grounding rods and wiring for all electrical equipment in good condition. Immediately remove all foreign debris within the structure that may cause damage to pumps or agitators.
Pump the wastewater collection tank completely empty during the summer months and cleanout any debris and other solid materials that may have accumulated in the tank. Inspect the tank for structural damage and if structural damage to a tank is discovered seek the services of a qualified engineer to assess the damage and recommend necessary repairs before putting the tank back into service. Follow the guidance given in nutrient management section when applying wastewater to fields.

Do not dispose of animal carcasses in the wastewater collection tank. It is against the law to do so.

Maintain all fences, railings, and/or warning signs to provide warning and/or prevent unauthorized human or livestock entry. Immediately repair vandalism, vehicular or livestock damage to the structure, earthen areas surrounding the structure, or any appurtenances. Maintain lids, grates and shields on openings.
Provide proper ventilation before entering the tank, for any reason what so ever. Provide and use self - contained breathing apparatus (scuba) equipment when entering a tank. No persons should enter the tank unless safety ropes are used and someone else capable of providing rescue assistance is outside the tank.
Do not assume any tank, including open top tanks, are well ventilated.

Wastewater Storage Tanks-
The wastewater storage tank is used to collect and store wastewater containing manure generated by the farm. Emptying of the wastewater storage tank should begin in the spring and continue through the spring and summer months as weather conditions permit applying wastewater in accordance with the guidance given in the nutrient management section. To function properly and have the greatest management flexibility, the wastewater storage tank must be as empty as possible in the fall before the fall and winter rainy season begins. Any annual buildup of solids in the wastewater storage tank must be removed to maintain design capacity and applied to land application areas in accordance with guidance given in the nutrient management section.

Inspect all tanks weekly to insure structural integrity. If the structural integrity of a tank is compromised, immediately empty the tank to determine the cause and make necessary repairs before putting the tank back into service. Do not allow equipment that exceeds the design limit of the tanks on or within 20 feet of the structure.
Inspect all uncovered tanks on a biweekly basis to insure at least 6 inches of freeboard is being maintained to accommodate excess rainfall such as a 25 year-24hour storm and prevent overtopping of the tank.

Keep pumps, agitators, piping, valves and all other electrical and mechanical equipment in good condition by following the manufacturer's recommendations. Maintain grounding rods and wiring for all electrical equipment in good condition. Immediately remove all foreign debris within the structure that may cause damage to pumps or agitators.
Pump the wastewater storage tanks completely empty during the summer months and cleanout any debris and other solid materials that may have accumulated in the tanks. Inspect the tanks for structural damage and if structural damage to a tank is discovered seek the services of a qualified engineer to assess the damage and recommend necessary repairs before putting the tank back into service. Follow the guidance given in nutrient management section when applying wastewater to fields.

Do not dispose of animal carcasses in any wastewater storage tank. It is against the law to do so.

Maintain all fences, railings, and/or warning signs to provide warning and/or prevent unauthorized human or livestock entry. Immediately repair vandalism, vehicular or livestock damage to the structure, earthen areas surrounding the structure, or any appurtenances. Maintain lids, grates and shields on openings.
Provide proper ventilation before entering the tank, for any reason what so ever. Provide and use self - contained breathing apparatus (scuba) equipment when entering a tank. No persons should enter the tank unless safety ropes are used and someone else capable of providing rescue assistance is outside the tank.
Do not assume any tank, including open top tanks, are well ventilated.

Wastewater Storage Ponds-
The wastewater storage ponds are used to store wastewater containing manure generated by the farm. Emptying of the wastewater storage ponds should begin in the spring and continue through the spring and summer months as weather conditions permit applying wastewater in accordance with the guidance given in nutrient management section. To function properly and have the greatest management flexibility, the wastewater storage ponds must be as empty as possible in the fall before the fall and winter rainy season begins. Any annual sludge buildup in the wastewater storage ponds must be removed to maintain design capacity and applied to land application areas in accordance with guidance given in nutrient management section.

Inspect the wastewater storage ponds weekly to insure structural integrity and that at least 1 foot-6 inches of freeboard is being maintained to accommodate excess rainfall such as a 25 year-24hour storm and prevent overtopping embankment. If the structural integrity of a wastewater storage ponds embankment is found to be compromised, immediately draw the liquid level down below the damaged area to determine the cause. Seek the services of a qualified engineer to assess the damage and recommend necessary repairs before allowing wastewater levels above the damaged area.

Pump the wastewater storage pond to the lowest level possible during the summer months and inspect the embankments for structural damage. If structural damage to the embankment of a wastewater storage pond is discovered, seek the services of a qualified engineer to assess the damage and recommend necessary repairs before allowing wastewater levels above the damaged area. Follow the guidance given in nutrient management section when applying wastewater to fields.

Do not permit livestock access to the pond or on pond embankments. Control undesirable vegetation growth by spraying or mowing. Control rodents as necessary. Check elevations of earthfills periodically and restored to grade and shape as necessary. Fill and reseed eroded embankment areas or repair with well graded rock riprap. Safety features such as signs and fences should be kept in good repair.

Do not dispose of animal carcasses in any settling basin or wastewater storage pond. It is against the law to do so.

Solids Storage Facility-

PRODUCTION AREA

The solids storage facility used to store solids containing manure generated by the operation. Emptying of the solids storage facility should begin in the spring and continue through the spring and summer months as weather conditions permit applying solids in accordance with the guidance given in the nutrient management section. To function properly and have the greatest management flexibility, the solids storage facility must be as empty as possible in the fall before the fall and winter rainy season begins.
Periodically inspect concrete and asphalt slabs, walls and curbs and repair or replace broken sections as needed. Cleanup any spillage of manure and organics from outside of the solids storage area and place them back in the solids storage facility.
Maintain all fences, railings, and/or warning signs to provide warning and/or prevent unauthorized human or livestock entry. Immediately repair vandalism, vehicular or livestock damage to the structure, earthen areas surrounding the structure, or any appurtenances.

Building Roofs-
Inspect building roofs annually as a minimum. Repair and/or replace all rusted sections and secure loose sections as needed. Immediately replace all broken trusses, rafters, beams, poles as needed. Immediately determining the cause and necessary modification(s) to prevent reoccurring structural failure is essential.

Composting Facility-
The composting facility is used to treat and store compost until it can be applied to the crop land fields or reused for bedding. Emptying of the compost facility should begin as soon as possible in the spring after the composting process has been completed and the compost has been allowed to complete the curing process. Emptying should continue throughout the spring and summer months applying the composted solids to the crop land fields in accordance with the guidance given in the nutrient management section. To function properly and have the greatest management flexibility, the compost facility must be as empty as possible in the fall before the rainy season begins.

The cause for any excess leachate from the composting process during the seasonal composting process performed in farm fields will be determined the operator will determine the cause of the excess leachate and take immediate corrective action such as turning the windrow pile(s) and inspecting the feedstock and compost for the presence of excess leachate.

Guidance for the composting process-
Take a representative sample of the raw compost mixture and have a laboratory determine the moisture content, pH, and the carbon and nitrogen content.
The carbon to nitrogen ratio should range between 25 and 40 to 1. Make adjustments as needed to the ingredients of the raw compost mixture as necessary to achieve a carbon to nitrogen ratio within the acceptable range.
The moisture content should be between 40 and 60 percent. Add water or drier material to adjust the moisture content. Care must be taken to see that the carbon to nitrogen ratio of the mix is still in the 25 – 40 to 1 range after adjusting the moisture content.
The pH preferably should range between 6.5 and 8 however composting may be achieved between a pH of 5.5 and 9.0.
Check pile temperature using thermometer probe on a daily basis. The pile temperature should be checked at a point one-third the distance from the outside of the pile to the center of the mass. Initially it will take approximately 2 to 3 days for the compost to get above 105 degrees F. Compost temperatures should peak between 130 and 140 degrees F in 5 to 7 days. When the temperature of the compost material falls below 110 degrees F the compost needs to be aerated by turning or other means. Failure to achieve the desired temperatures may result in the incomplete destruction of pathogens and weed seeds and can cause fly and odor problems.

Odors given off by the composting operation is a good indicator of how the compost

operation is proceeding. Foul odors may mean that the process has turned from aerobic to anaerobic. Anaerobic conditions are the result of insufficient oxygen in the compost. This may be caused by excessive moisture in the compost or the need for turning or aerating of the compost material.

For a well managed windrow or static pile composting operation, the composting time during the summer months should range from 14 days to a month. To ensure a finished compost, observe that the composted material has little or no trace of the original raw material and has little odor. The material should be black to brown in color. Particle size should be consistent and soil-like in texture.

All materials that are not considered feedstocks for the composting process (i.e. plastic ear tags, plastic gloves, etc…) are to be collected and transported to a permitted landfill by a garbage collection service or other means. It is anticipated that there will be no other material that will require offsite disposal.

Periodically inspect concrete and asphalt slabs, walls and curbs and repair or replace broken sections as needed. Cleanup any spillage of composted material from outside of the composting area and place them back in the composting facility.
Maintain all fences, railings, and/or warning signs to provide warning and/or prevent unauthorized human or livestock entry. Immediately repair vandalism, vehicular or livestock damage to the structure, earthen areas surrounding the structure, or any appurtenances.

Feedlot Pens-

Maintaining a firm, dry feedlot surface is an important factor in maintaining a good environment that promotes good animal health.
Maintain diversions and drainageways so they direct clean water runoff away from the feedlot pens and holding areas. Stormwater runoff from the feedlot pens should be directed to storage or treatment areas.
Manure shall be contained in the feedlot pens until it can be transferred to a storage facility or applied to the fields for utilization of nutrients and organics. Manure accumulations created for bedding mounds shall be managed such that manure does not create a potential pollution hazard.

Take care to maintain the compacted layer when removing excess manure from the feedlot pens.

Dikes and Berms-
Periodically check elevations of earthfills and restore to grade and shape, if necessary. All settlement or cracks in the dike should be investigated to determine the cause and immediately repaired.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization, and application of herbicides when necessary. Fertilize the established stand with at least 200 pounds of 21-0-0 per acre or equivalent annually or as needed to maintain a uniform vigorous stand. Avoid excess travel and uncontrolled grazing on any portion of the dike system that will harm or destroy vegetative cover.
Periodic mowing or controlled grazing may also be needed to control height.

Maintain installed fences to prevent unauthorized human access or uncontrolled grazing of dike surfaces. Livestock can be used to control vegetation height, providing grazing is controlled to short periods of time when damage to the dike surface and vegetation will not result.

Check all erosion control sections for accelerated weathering and displacement of materials. Replace to original shape and grade if necessary.
Immediately repair any vandalism, vehicular, or livestock damage to the dike or other appurtenance.

Eradicate or otherwise remove all rodents or burrowing animals and repair any damage

caused by their activity.

Culverts-

Culverts should be inspected at least once annually. Inspect culverts after large rainfall events to insure no damage has been done to the culvert that would prevent it from functioning as intended. Remove any debris that may affect the culverts capacity. Any damage to the culvert and surrounding area should be repaired as soon as possible.

Fences-

Do not allow livestock access to open water courses and drainageways. Provide off stream watering facilities where possible and limit access to designated watering areas.
Inspect fences periodically and repair or replace broken or decayed posts and tighten sagging wire as needed. Broken wire can be spliced or replaced. Replace broken or missing insulators on electric fences as needed and repair or replace inoperative electric fence controllers.

Insure gates and other appurtenances are in good working order. Replace or repair components as needed.

Animal Access Lanes and Walkways-

Debris and excess manure shall be removed from access lanes, walkways, and drainage areas. Good vegetative cover should be maintained on all areas adjacent to access lanes and walkways.

Irrigation Systems-

Apply irrigation water and wastewater in accordance with guidance in the irrigation water management plan in Section 3.

Maintain sprinkler irrigation systems in accordance with the manufacturer's recommendations to help ensure trouble free operation. Prevent livestock access to equipment during operation.

Clean plugged nozzles and replace if worn or defective.
Promptly repair all leaks by replacing valves, fittings, gaskets, worn or damaged parts.
Prompt repair or replacement of damaged or worn components is necessary. Check to make sure all application components i.e. water control structures, gates, valves, ditches, etc. are functional and are in good operating condition.
Maintain screening and filtering facilities.
Maintain vigorous vegetative growth where applicable.

Livestock Watering Facilities-

Check all above ground connections, valves, gates, rodent guards, inlets and outlets to make sure they are functioning properly. Check troughs and tanks for leaks or cracks and repair or replace immediately, if necessary.
Make certain the area adjacent to the trough is well protected with gravel, paving, or good cover. Be sure that the outlet pipe has a free outlet and is not causing any serious erosion problems. Check periodically to see if debris has fallen into the trough or tank which may restrict inflow or planned functions of the outflow system.
Clean the entire system periodically and remove moss, algae growth, and/or sludge. Chemicals such as copper sulfate and chlorine can be used to prevent moss and algae growth. Local rules and regulations are to be followed when using chemicals to make sure they are safe for animals.

Where necessary maintain coverings and insulation to prevent damage by freezing.
Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.
Immediately repair any vandalism, vehicular or livestock damage.

Pipelines-
Flush pipelines used for liquid waste applications with clean water following waste application, or as needed, to prevent particle buildup.
Drain the pipeline and components in areas that are subject to freezing. If parts of the pipeline cannot be drained, a non-toxic antifreeze solution may be added.
Check to make sure all valves and air vents are set at the proper operating condition so they can provide protection to the pipeline.
Inspect pipelines for signs of failure. Inspect risers and valves periodically for leaks or worn gaskets. Repair or replace pipeline, risers and valves as needed.
Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

Pumps-
Operate and maintain pumps in accordance with good judgment and manufacture's manuals and recommendations.
Drain liquid manure from pumps during cold weather to prevent freezing. If parts of the system cannot be drained, a non-toxic antifreeze solution may be added.
Inspect pumps periodically and remove debris wrapped around shafts and impellers. Maintain foot valves and check valves for proper operation.
For proper operation of electric motors and controls, maintain lubrication for all bearings, keep electric panel free from obstructions and debris. Maintain electrical safety devices, assure all electrical contacts are tight, and lock main electrical switch to "OFF" position during non-use season. Maintain adequate shade and ventilation for pump motors.
For proper operation of pumps, maintain lubrication for all bearings and pump shafts, assure belts are adjusted properly, maintain safety covering devices on open shafts and belt drives, check to make sure all safety valves and devices are set at proper operating conditions so they may provide protection to the pump and power unit. For centrifugal pumps, periodically measure tolerance between pump impeller and pump casing (i.e. wearing) and replace wear ring as needed to help restore new pump operating characteristics.

Use portable pressure gauge (preferably a liquid filled gauge) to monitor pump performance.

Operate and maintain agitators in accordance with the manufacture's manual and recommendations.
Inspect all plumbing annually as a minimum.
Replace, tighten, or repair broken or loose connections and lines as needed.

Solid/Liquid Separation Facility-
Inspect the solid/liquid separation facility daily to ensure the facility is operating properly and there has been no damage to structural components. Clean screens and outlets if they have become clogged or their capacity is not adequate for proper operation of the facility.
Prevent any spillage or leakage onto roadways when transferring solids from the solid/liquid separation facility to the solids storage area and to utilization areas.

Vegetated Treatment Areas (VTA)-
Do not apply during rainfall events that are expected to result in saturated soils or surface runoff.

Maintain the setback buffer distances described in the nutrient management section when making applications of liquids or solids containing manure.
Control undesired weed species, especially state-listed noxious weeds, and other pests

that could inhibit proper functioning of the VTA.
Take soil tests annually in the fall to insure soil nutrient concentrations are within acceptable limits. Follow guidance given in Oregon State University Extension publication EM 8832, “Post-harvest Soil Nitrate Testing for Manured Cropping Systems West of the Cascade Mountain Range”, for testing soils and determining acceptable soil nutrient concentrations.

Inspect and repair treatment areas after storm events to fill in gullies, remove flow disrupting sediment accumulation, re-seed disturbed areas, and take other measures to prevent concentrated flow.

Apply supplemental nutrients and soil amendments as needed to maintain the desired species composition and stand density of herbaceous vegetation.
Maintain or restore the treatment area as necessary by periodically grading when deposition jeopardizes its function, and then reestablishing to herbaceous vegetation.
Routinely de-thatch and/or aerate treatment areas used for treating runoff from livestock holding areas in order to promote infiltration.
Conduct maintenance activities only when the surface layer of the VTA is dry enough to prohibit compaction.

Well(s)-
Protect the area immediately surrounding the well from being damaged by agriculture machinery, vehicles, or livestock.
All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.
Do not allow any foreign debris to accumulate and maintain soil and vegetative covering in the immediate vicinity of the well.
Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.
Check metal surfaces for rust and other damage especially sections in contact with earthfill and with other materials. Repair or replace damaged section and apply paint as a protective covering.

Keep all surface water from entering or accumulating at the immediate vicinity of the well site.

Immediately repair any vandalism, vehicular, or livestock damage.

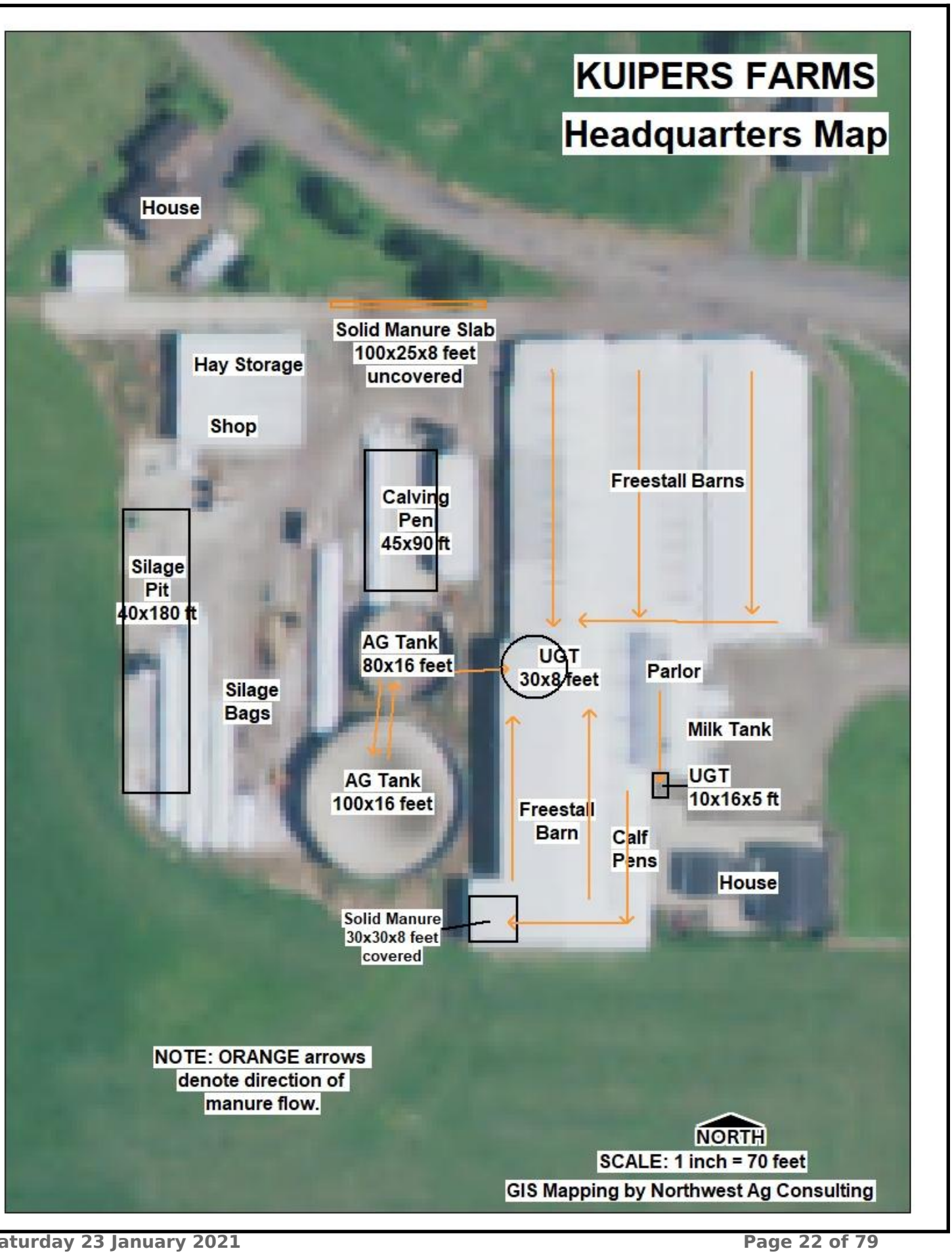
Chemical Handling Checklist-
The following measures shall be taken to prevent chemicals from contaminating process water or storm water storage and treatment systems:
1. Make sure all chemicals are stored in proper containers. Expired chemicals and empty containers are to be properly disposed of in accordance with state and federal regulations. Pesticides and associate refuse are to be disposed of in accordance with the FIFRA label.
2. Chemical storage areas are to be self-contained with no drains or other pathways that will allow spilled chemicals to exit the storage area.
3. Chemical storage areas are to be covered to prevent chemical contact with rain or snow.

4. Emergency procedures and equipment are to be in place to contain and clean up chemical spills.

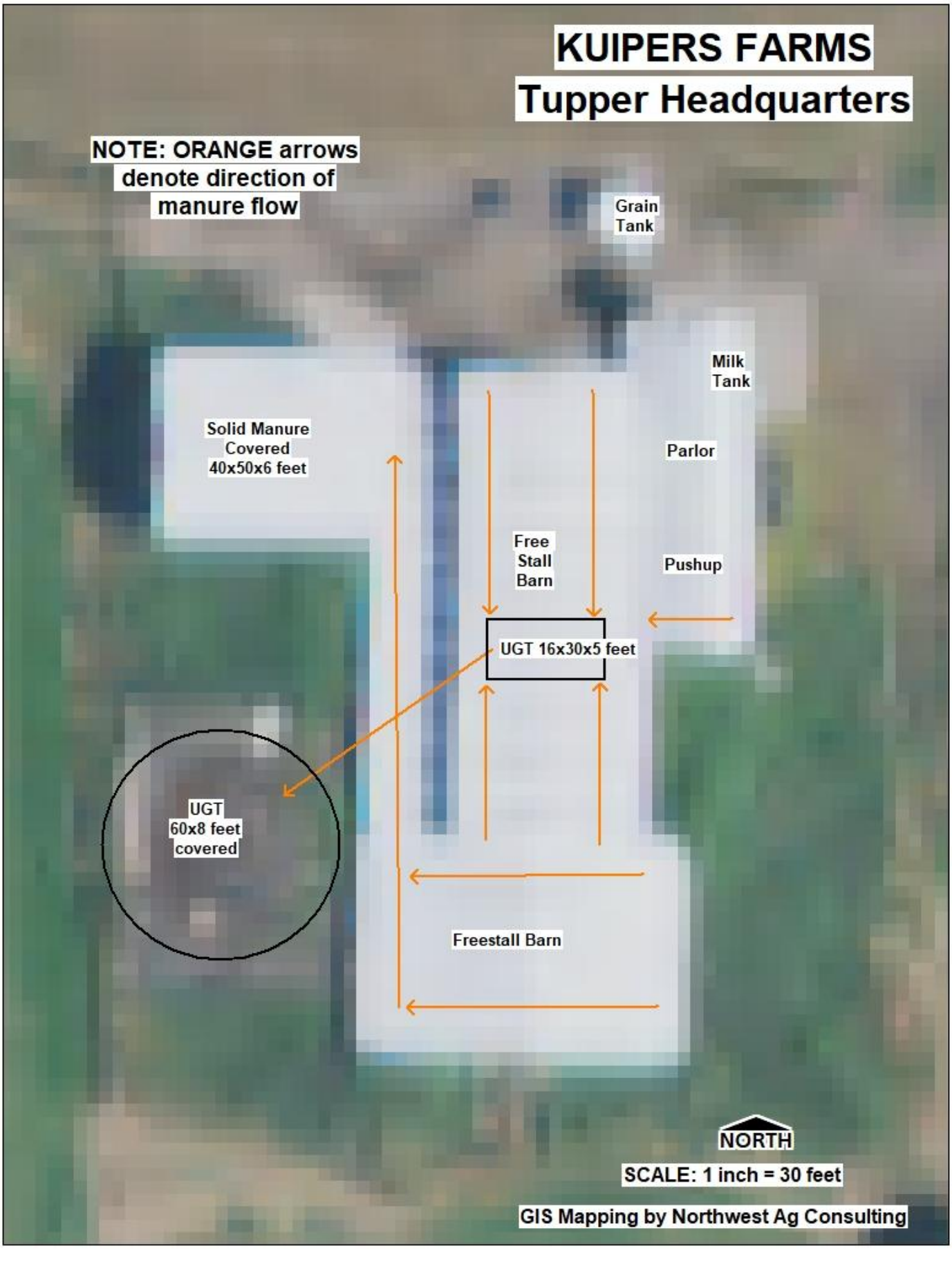
5. Chemical handling and equipment wash areas are to be designed and constructed to prevent contamination of surface waters, waste water, and storm water storage and treatment systems.

PRODUCTION AREA

Production Area Maps for Kuipers Farms LLC

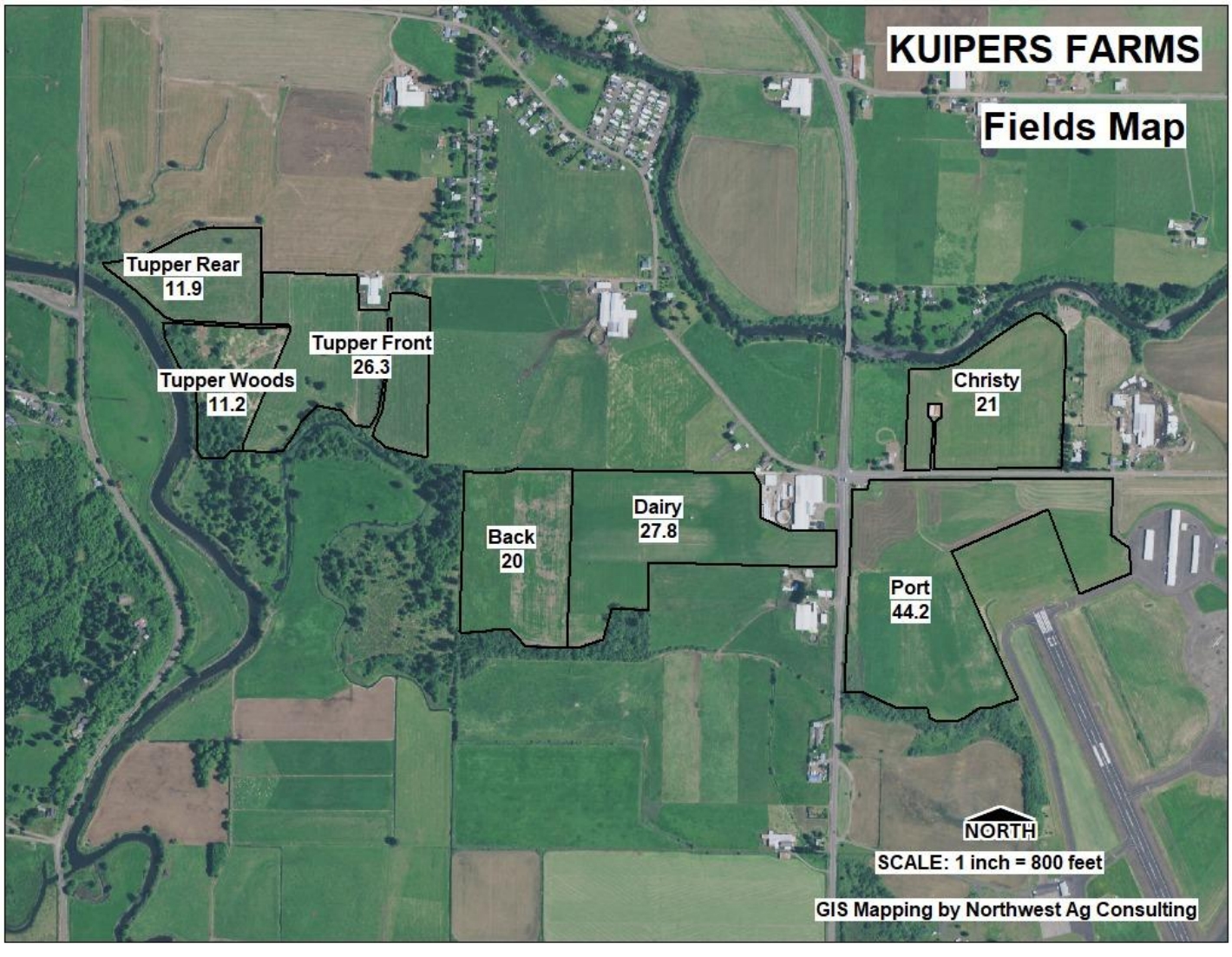


PRODUCTION AREA

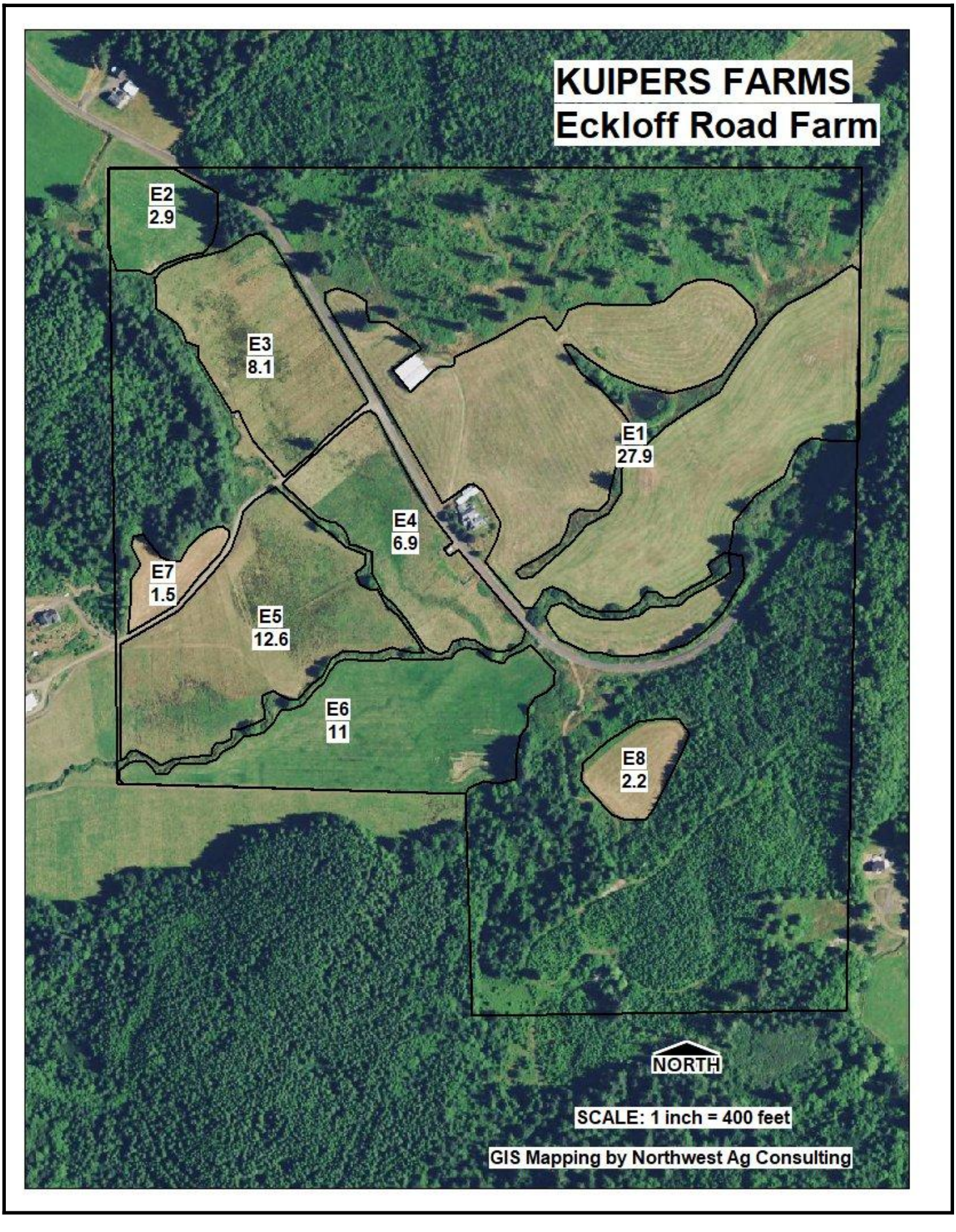


UTILIZATION AREA

Field Maps for Kuipers Farms LLC

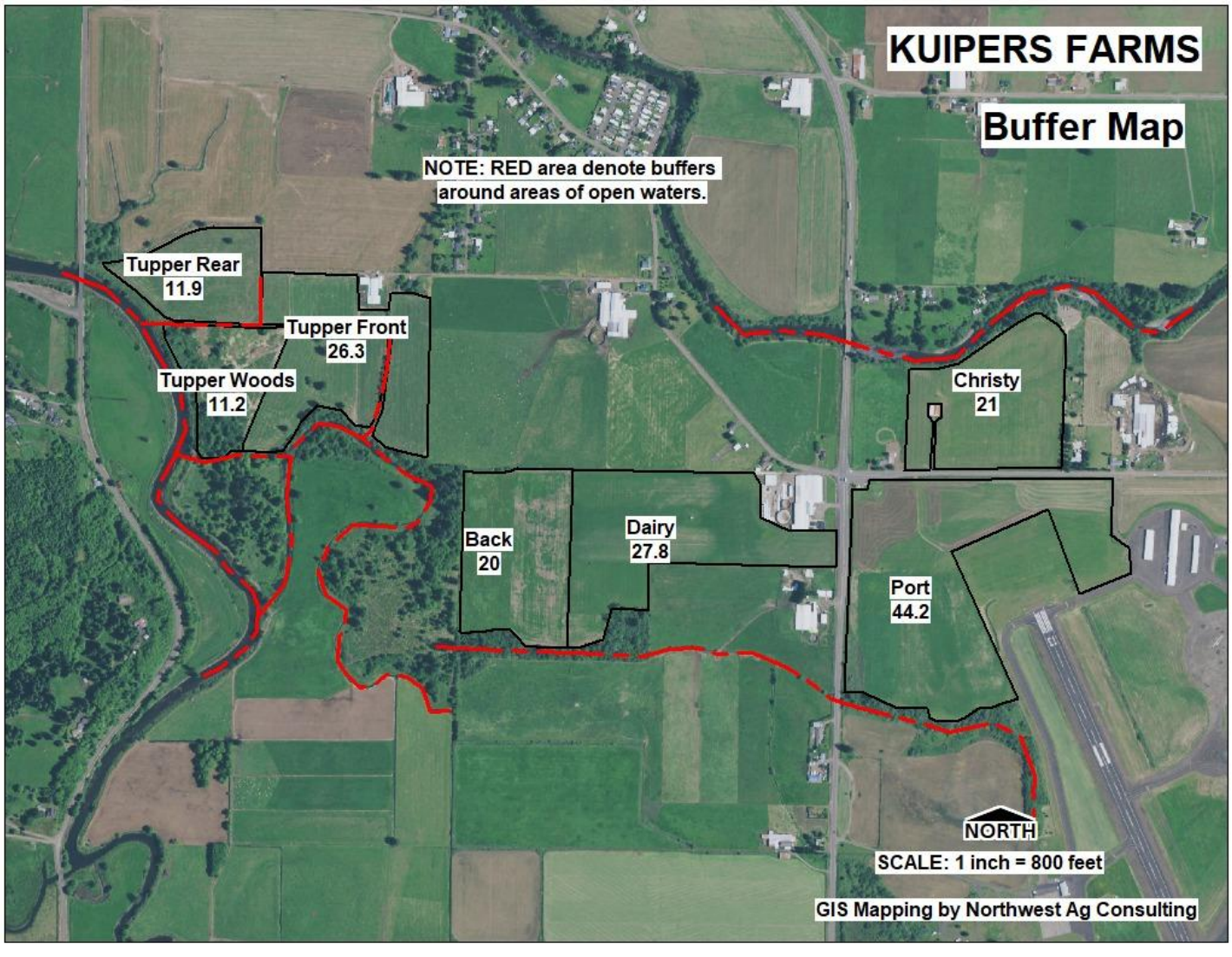


UTILIZATION AREA

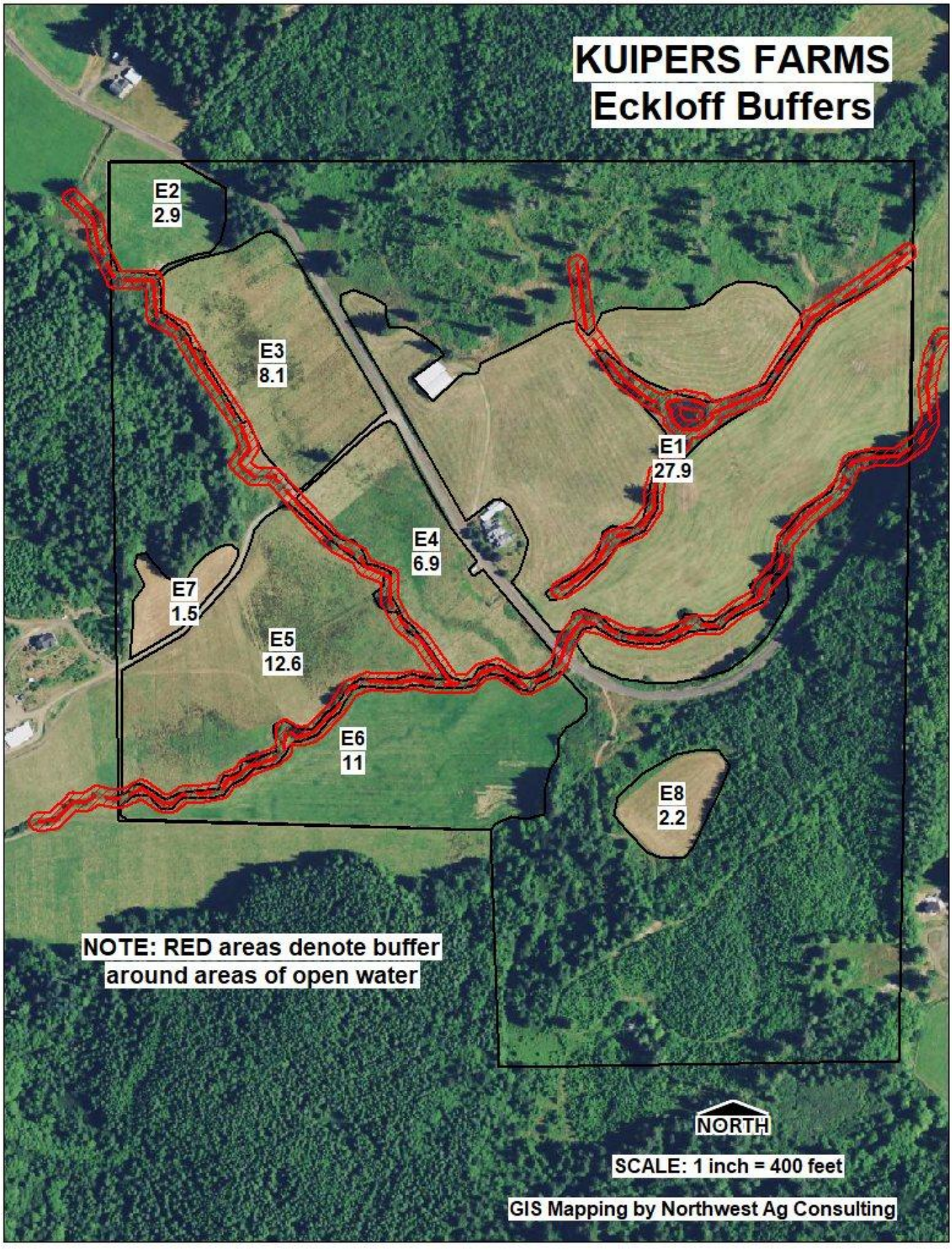


UTILIZATION AREA

Setback Maps for Kuipers Farms LLC



UTILIZATION AREA



Application Considerations

The manure and irrigation application systems will be calibrated in accordance with guidance in this section to insure the applications of manure, bedding and runoff from the waste storage facilities are in accordance with agronomic rates.

No application of wastewater or solids containing manure is to be made to the field buffer areas shown on the Setback Map in Section 3-2. Applications of wastewater and solids containing manure should be made in accordance with guidance in this section to reduce the risk of contaminated runoff to surface water sources and leaching of contaminants to ground water sources.

The phosphorus runoff rating for each of the farm fields is based on the Oregon Natural Resources Conservation Service Phosphorus Index and is shown in the table in Section 4-3. Wastewater, solids and commercial fertilizer for any field with a LOW runoff rating can be applied on a nitrogen basis. Wastewater, solids and commercial fertilizer for any field with a MEDIUM or HIGH runoff rating must be applied on a phosphorus basis. No applications of manure or commercial fertilizer containing phosphorus are to be made on a field with a ZERO OUT phosphorus runoff rating.

Manure applications may be made at any time of the year provided certain factors have been considered. However, the overriding factor one should use in considering whether or not to apply nutrients to a crop, irrespective of the nutrient source, is the agronomic need of the crop at the time of application. The following guidelines are to be considered once the decision has been made to make a manure application.

Consider using T-Sum 200 to determine when manure applications are to begin as long as you can comply with all other permit and AWMP requirements. Calculations for T-Sum 200 are outlined in OSU Extension Fertilizer Guide for Pastures (OSU FG63, 2000). T-Sum 200 is based on accumulated heat units and is an accurate guide to estimate plant activity. Research has shown that T-Sum 200 is the earliest date when plant roots begin to grow in the spring and thus are receptive to applied nutrients.

T-Sum 200 is determined by monitoring surface air temperature and summing the daily minimum and maximum air temperatures and dividing the sum by two to get the average daily air temperature then converting that to centigrade (F degrees minus 32 times 0.556). Manure applications may begin once 200 heat units have been accumulated. However, one must still apply manure at agronomic rates based on the estimated growth potential of the crop and anticipated climatic events.

Based on crop nutrient uptake patterns, manure applications should stop when the crop is done growing for the year and before the first significant rainfall event that is expected to result in saturated soils or surface runoff.

Fields that are subsurface (TILE) drained require additional precautions when manure is applied. Any pre-application tillage should leave as much residue as possible on the soil surface. Water control structures installed in subsurface drainage systems should be managed to prevent discharge of manure and wastewater during periods of application.

Be aware of the location of sensitive areas, concerns of neighbors or concerns of the public, which require special application procedures. To reduce odor problems, apply

wastewater and solids containing manure in mid-morning when temperatures are warming and air is rising rather than in the afternoon or evening when air is cooling and settling. Avoid applications during periods of fog.

Calibrate application equipment to insure uniform distribution and accurate application rates in accordance with guidance given in the Considerations for Manure Applications and with guidance on the calibration of application equipment.

Maintain setbacks for manure application from any surface waters. The management goal is not to allow manure to enter surface waters at any time. The following table shows **minimum setback requirements** for manure applications:

Manure Type	Application Equipment	Month and Setback Distance in Feet [a, b, d]											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Liquid	Big gun	100	100	100	35	35	35	35	35	35	100	100	100
Liquid	Spreader Bar	100	100	35	35	35/15[c]	15	15	15	35	100	100	100
Liquid	Tank Wagon	100	100	35	35	35/15[c]	15	15	15	35	100	100	100
Liquid	Tanker Truck	100	100	35	35	35/15[c]	15	15	15	35	100	100	100
Solid	Spreader	100	100	35	35	35/15[c]	15	15	15	35	100	100	100

Note:

a. Setbacks are the distance between open waterways and manure application area.
b. Setback requirements will generally increase for manures which are applied aerially (such as a traveling big gun) versus manures applied lower to the ground (such as a splash bar) due to potential for drift from wind or splashing.
c. This is a floating date and should be evaluated based on current weather conditions and forecast information.
d. Fifteen (15) feet is the suggested setback distance during summer months, however larger and/or smaller distances may be set depending on conversations with the ODA.

Record applications, transfers or exports of nutrients (manure and fertilizer) and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or other acceptable record keeping systems can be used to record this information.

CONSIDERATIONS FOR DRY SEASON MANURE APPLICATIONS:

Apply wastewater and solids containing manure at agronomic rates using the following guidelines:
-Consider using T-Sum 200 as a guideline to begin making manure applications.
-Do not apply to soils immediately before or during rainfall events that are expected to result in saturated soils or surface runoff.
-Apply to land being prepared for crops. Till manure into soil within 3 days of application if possible or apply to actively growing crops such as grass, clover or alfalfa after cutting.
-Maintain the setback buffer distances described in this section and shown on the Setback Map when making applications of liquids or solids containing manure.
-Record applications, transfers or exports of nutrients (manure and fertilizer) and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or other acceptable record keeping systems can be used to record this information.

CONSIDERATIONS FOR WET SEASON MANURE APPLICATIONS:

Only apply manure during this time period if the following guidelines CAN be met. Call the ODA CAFO Program at (503) 986-4700 for guidance if a manure application is needed and the following guidelines CANNOT be met:

- Apply manure only to actively growing crops such as grass, clover or alfalfa.
- Minimize application rates by using the maximum travel rates for the application equipment.
- Maintain the setback buffer distances described in this section and shown on the Setback Map when making applications of liquids or solids containing manure.
- Do not apply to soils immediately before or during rainfall events that are expected to result in saturated soils or surface runoff.
- Do not apply to saturated or flooded soils. It is recommended that application(s) be limited to soils (areas) where the flooding frequency class rating is None, Very Rare or Rare.
- Do not apply to slopes greater than 5%. See the Soil Map in Section 4-1 for the location of soil map units with slopes greater than 5%.

Applications of wastewater or solids containing manure to frozen soils should be avoided. Do the following if an application of wastewater or solids containing manure is to be made to frozen soils:
- Apply only enough wastewater or solids containing manure to address storage limitations until suitable soil conditions for application are available.
- Minimize applications to 5 wet tons per acre or less of solids containing manure and 6,788 gallons (0.25 inches) per acre or less of wastewater.
- Apply to alternating strips to reduce the risk of contaminated runoff reaching surface water sources.
- Apply to fields of established hay, pasture or fields containing at least 90% cover and are the furthest from open water sources.
- Do not apply wastewater or solids containing manure within 200 feet of surface water sources, drainageways, wells, or inlets to subsurface drainage systems.
- Runoff control systems such as earthen dikes must be in place where applications will be made to fields with slopes greater than 5%.

Record applications, transfers or exports of nutrients (manure and fertilizer) and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or other acceptable record keeping systems can be used to record this information.

Do not apply manure or commercial fertilizer to fields receiving applications unless the nutrients applied in the manure are less than the annual application of nutrients planned in the nutrient budget for the fields.

HOW TO CALIBRATE APPLICATION EQUIPMENT

Calibration of application equipment is a critical part of nutrient management. Calibration should be completed at least annually to insure manure and fertilizer will be uniformly applied. There are two basic approaches for calibrating a manure spreader – the load area and the weight area methods. The load area method is more accurate and can be used for both liquid and solid manure. The weight area method works only with solid or semi-solid manure.

UTILIZATION AREA

Irrigation System Calibration
Place 3-5 buckets throughout the irrigation spray pattern and collect samples while operating the pump at a given rpm and pressure (for a traveling gun record the travel speed also). At the end of the planned sample period measure the amount of liquid collected in inches (average the samples). The following chart shows how many gallons per acre applied per inch of liquid applied:

Inches Liquid Manure Applied	**Gallons per Acre**
0.20	5,431
0.30	8,146
0.40	10,862
0.50	13,577
0.75	20,366
1.00	27,152
1.25	33,943
1.50	40,731

Soft Hose Injection System with Irrigation Hose:
Alternative 1. Use a flow meter mounted on the injector system and calculate the distance and width to determine amount applied over a measured area. Example the flow meter measures 1,000 gallons over a distance of 600 feet and 10 feet wide.
Formula: Application Rate (7,260 gallons/acre) = (Gallons Applied (1,000 gal) X 43,560 sq. ft/acre) divided by (Distance traveled (600 ft) X Application width (10 ft))

Alternative 2. (Requires a 10-20 gallon graduated measuring container)
Step 1) In the field, measure the flow out of one injector for 5 seconds into the graduated measuring container and record gallons, repeat three (3) times and average the results.
Step 2) Multiply the average amount collected from one injector by the number of injectors (equals amount applied for the whole system for 5 seconds).
Step 3) Multiply the results of Step 2 times 12 to get gallons per minute.
Step 4) Place the injector in the soil at the planned depth and operating speed and record the distance traveled in 1 minute (average 3 different measurements).
Step 5) Determine the effective application width (number of injectors X injector spacing in feet).
Step 6) Multiply the effective width times the distance traveled in 1 minute (this gives the square feet covered in 1 minute).
Step 7) Divide the result of Step 6 by 43,560 (this gives the acres covered in 1 minute).
Step 8) Divide the results of Step 3 (gallons per minute) by the results of Step 7 (acres covered in 1 minute) - (this gives the gallons applied per acre.

For example:
Step 1) Collect an average of 6 gallons from one injector for 5 seconds.
Step 2) Applicator has 8 injectors (8 injectors X 6 gallons per injector = 48 gallons for 5 seconds)
Step 3) 48 gallons in 5 seconds X 12 = 576 gallons/minute applied
Step 4) Average distance covered in 1 minute was 250 feet
Step 5) Average width of the applicator is 12 feet.
Step 6) 12 feet wide X 250 feet long = 3000 square feet
Step 7) 3000 square feet divided by 43,560 square feet/acre = .0688 acres covered in 1 minute
Step 8) 576 gallons/minute divided by .0688 acres/minute = 8,372 gallons/acre.

Manure Spreader/Tanker Calibration

There are several methods that can be used to calibrate the application rate of a manure spreader. The two best methods are the load-area method and the weight-area method. It is desirable to repeat the calibration procedure 2 to 3 times and average the results to establish a more accurate calibration. Before calibrating a manure spreader, the spreader settings such as splash plates should be adjusted so that the spread is uniform. Most spreaders tend to deposit more manure near the middle than at the edge of the spread pattern. Overlapping can make the overall application more uniform. Calibrating application rates when overlapping is involved requires measuring the width of two spreads and dividing by two to get the effective spread width.

Calibration should take place annually or whenever manure is being applied from a different source or consistency.

Load-Area Method:

The load-area method is the most accurate and can be used for both liquid and solid manure. The load area method is a 3-step process:

Step 1) Determine the amount of manure in the spreader. The most accurate way to determine the amount of manure in a spreader is weighting the spreader when it is empty and again when it is full. For a reliable estimate of spreader capacity, weigh several representative loads (at least five) to determine the average gross weight. Subtract the empty spreader weight. Then, calculate the average net loaded weight.

Step 2) Determine the area of spread using the method at the right. Width measurements near the beginning and end of the spread pattern should be avoided because the spreader may not be operating at full capacity.

Step 3) Calculate the application rate. The application rate is calculated using the formula for either liquid or solid manure.

Formula for Solid Manure Equals Tons/Acre

(Average Loaded Weight (lbs) x 21.81) divided by (Distance Traveled (ft) x Width of Spread (ft))

Formula for Liquid Manure Equals Gal/Acre

(Tank Volume (gal) x 43,560) divided by (Distance Traveled (ft) x Width of Spread (ft))

Weight-Area Method:

The weight-area method can only be used with solid or semi-solid manure. When a scale is not available, the application rate of a box spreader can be determined by collecting manure on a tarp or piece of heavy material. The weight area method is less accurate than the load area method.

This method consists of eight steps:

Step 1) Prepare/cut three 56-inch square tarps or pieces of heavy material (this size equals 1/2,000 of an acre). The pounds of manure collected on 56 inches square equals tons applied per acre.

Step 2) Weigh one of the clean tarps and a large bucket on a platform scale. Record the weight.

Step 3) Anchor the three tarps in the field ahead of the spreader near the beginning, middle, and end of the area that will be spread with one load.

Step 4) Drive over the three tarps at a normal speed to collect a representative manure sample.

Step 5) Fold and place the first tarp into the empty bucket without spilling the manure.

Weigh the bucket, tarp, and manure. Subtract the weight of the clean tarp and bucket recorded in step 2.

Step 6) Repeat the process for each of the two remaining tarps.

Calculate the average weight (pounds) of the manure collected. This value equals tons of manure applied per acre.
Factor for converting pounds to tons and square feet to acres (21.8 = 43,560 sq ft per acre divided by 2,000 lbs/ton).
The factor for converting square feet to acres = 43,560 sq ft per acre.
Step 7) Determining Area of Spread.
The “area of spread” is the length and width of the ground covered with one load of manure. The area of spread is affected by speed and equipment settings. Spreaders discharge manure at varying rates depending on travel and PTO speed, gear box settings, and discharge openings. It is important to adjust the spreader so the pattern is as uniform as possible. Accurately measuring the length and width of this area is essential. To determine width, measure two adjacent spreads and divide by two to find the “effective” spread width. This accounts for overlap, which is often needed for a more uniform application. The length of spread is determined using the following three values:
Desired manure application rate based on soil and manure tests,
Width of the manure spread, and
Manure spreader holding capacity (weight and/or volume).
From these values, calculate the distance or lengths of spread using these formulas:
Formula: Solid Manure Equals Feet/Load
(Average Load Weight (lbs) x 21.81) divided by (Spread Width (ft) x App. Rate (tons/ac))
Formula: Liquid Manure Equals Feet/Load
(Tank Volume (gal) x 43,560) divided by (Spread Width (ft) x Desired App. Rate (gal/ac))
Step 8) Spread a load. If the distance traveled does not equal the calculated distance, adjust the speed or equipment settings.

AMOUNT OF MANURE TO APPLY FOR CROPS GROWN

The formulas for determining the total nutrient application rate per unit yield for each crop shown in the table below are as follows:

Total N to apply in pounds = N in pounds per yield unit from the table for the crop grown X Yield Units per Acre X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Total P_2O_5 to apply in pounds = P in pounds per yield unit from the table for the crop grown X Yield Units per Acre X 2.291 P_2O_5/P X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Total K_2O to apply in pounds = K in pounds per yield unit from the table for the crop grown X Yield Units per Acre X 1.205 K_2O/K X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Example- for a field with 5 tons per acre of grass/legume hay harvested at 90% dry matter:

Total N to apply in pounds per acre = (33.92 lb N / ton) X (5 tons / acre) X (90%DM / 100% DM) = 153 lbs N / acre

UTILIZATION AREA

The following tables show the crops that may be grown on this farm:

FRUIT OR VEGETABLES				**Nutrient Removal (lb/yield unit)**		
	Yield Unit	**lb/Unit**	**% DM**	**N**	**P**	**K**
Beans, dry edible	cwt	100	100	3.13	0.45	0.85
Blueberries	ton	2000	100	13.93	1.30	11.57
Caneberries	ton	2000	100	11.43	7.42	11.43
Corn, Sweet	ton	2000	100	20.67	5.60	13.66
Grapes	ton	2000	100	11.39	1.07	20.43
Mixed Vegetables & Fruit	ton	2000	100	8.33	2.08	10.20
Onions	cwt	100	100	0.18	0.04	0.13
Orchard, Fruit	ton	2000	100	13.00	2.00	16.00
Pea, edible	ton	2000	100	73.60	8.00	18.00
Potatoes	ton	2000	100	30.0	5.45	47.27
Squash	ton	2000	100	21.33	6.80	11.40

GRAIN, SEED OR OIL CROPS				**Nutrient Removal (lb/yield unit)**		
	Yield Unit	**lb/Unit**	**% DM**	**N**	**P**	**K**
Barley	bushels	48	100	0.87	0.16	0.21
Beets, sugar	ton	2000	100	4.00	0.60	2.78
Bluegrass, Seed	cwt	100	100	2.88	0.43	1.98
Canola	ton	2000	100	70.00	12.00	18.00
Corn, grain shelled	bushels	56	100	0.90	0.16	0.22
Crimson Clover seed	lb	1	100	0.05	0.01	0.02
Fescue Seed, Straw Removed	cwt	100	100	1.97	0.20	2.00
Fescue, seed (Fine or Tall)	lb	1	100	1.47	0.31	1.67
Oats, grain	bushels	32	100	0.62	0.11	0.16
Orchardgrass seed	lb	1	100	0.016	0.002	0.004
Peppermint for Oil	ton	2000	100	4.20	1.80	2.80
Peppermint for Oil, Leaves & Stems Removed	ton	2000	100	87.23	36.80	57.80
Pumpkins	ton	2000	100	4.00	1.40	6.60
Rapeseed	bushels	50	100	1.38	0.30	0.30
Red Clover seed	cwt	100	100	4.55	1.00	2.00
Ryegrass seed	cwt	100	100	1.67	0.27	1.42
Ryegrass Seed, Straw Removed	ton	2000	100	30.00	18.80	37.60
Ryegrass, Perennial seed	lb	1	100	0.02	0.002	0.004
Wheat, Soft White for grain	bushels	60	100	1.00	0.24	0.21
Wheat, Soft White, Straw Removed	ton	2000	100	43.40	8.90	20.90
Wheat, Hard Red for grain	bushels	60	100	1.60	0.37	0.31
Wheat, Hard Red, Straw Removed	ton	2000	100	53.36	10.96	23.76

UTILIZATION AREA

HAY AND PASTURE CROPS				Nutrient Removal (lb/yield unit)		
	Yield Unit	lb/Unit	% DM	N	P	K
Alfalfa, Hay	ton	2000	100	54.40	6.83	35.70
Alfalfa, Seed	cwt	100	100	6.12	0.70	2.34
Alta Fescue Hay/Pasture	ton	2000	100	32.98	6.88	37.60
Grass Legume Hay/Pasture	ton	2000	100	33.92	5.30	7.56
Meadow Fescue Hay/Pasture	ton	2000	100	41.56	8.70	47.43
Oats Hay/Pasture	ton	2000	100	26.01	10.20	14.79
Orchardgrass Hay/Pasture	ton	2000	100	53.21	8.58	18.62
Perennial Grass Hay/Pasture	ton	2000	100	58.00	8.00	40.00
Reed Canary Grass	ton	2000	100	27.00	3.57	41.57
Ryegrass Hay	ton	2000	100	33.41	5.44	28.39
Ryegrass, Perennial Pasture	ton	2000	100	58.00	8.00	48.00
Sorghum-Sudan Haylage	ton	2000	100	54.40	6.40	58.00
Tall Fescue Hay/Pasture	ton	2000	100	39.40	4.00	40.00
Vetch Hay	ton	2000	100	51.93	7.20	44.76

SILAGE AND HAYLAGE CROPS				Nutrient Removal (lb/yield unit)		
	Yield Unit	lb/Unit	% DM	N	P	K
Alfalfa/Grass Haylage	ton	2000	100	15.60	1.02	6.84
Corn for Silage	ton	2000	100	25.00	4.00	20.00
Crimson Clover forage	ton	2000	100	40.00	4.48	33.28
Field Pea, Forage	ton	2000	100	73.60	8.00	18.00
Mustard, White	ton	2000	100	38.55	0.0	0.0
Oat haylage	ton	2000	100	26.0	10.2	14.8
Oats & Peas/ Green Beans	ton	2000	100	32.03	5.58	18.65
Perennial Grass Haylage	ton	2000	100	15.00	2.40	12.78
Red Clover forage	ton	2000	100	40.00	4.41	32.98
Ryegrass Haylage	ton	2000	100	15.00	2.40	12.78
Sorghum-Sudan Haylage	ton	2000	100	16.32	1.92	17.40
Triticale Haylage	ton	2000	100	49.00	6.80	11.40
Vetch Haylage	ton	2000	100	59.67	6.57	50.00
Wheat Haylage	ton	2000	100	41.30	5.00	57.30
Wheatgrass Hay/Pasture	ton	2000	100	49.59	6.21	68.76

OTHER CROPS				Nutrient Removal (lb/yield unit)		
	Yield Unit	lb/Unit	% DM	N	P	K
Filberts	ton	2000	100	41.70	7.30	39.29
Hops, Cones	bale	200	100	9.00	0.96	5.00
Natural Area (Trees & Grass)	ton	2000	100	10.52	1.56	9.20
Nursery Stock	ton	2000	100	8.33	2.08	10.20
Poplars, Pulpwood	ton	2000	100	0.30	0.09	0.12
Hemp/Cannabis	ton	2000	100	31.09	3.37	36.23

Note: Nutrient uptake values are taken from the NRCS National Agricultural Waste Management Field Handbook and updated with more current information from the Extension Service when available. When nutrient uptake values are not available from NRCS or Extension references, then nutrient uptake data from the NRCS Plant Database or other approved data sources is used.

Nutrient Applications

Nutrient Applications Report

Kuipers Farms LLC

Tillamook

Back 20

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
02/27/2020	Big Slurry	Reel	100	50,000 Gal	61	8	43
04/16/2020	Big Slurry	Reel	100	80,000 Gal	98	13	68
06/04/2020	Big Slurry	Reel	100	100,000 Gal	104	32	100
07/09/2020	Big Slurry	Reel	100	60,000 Gal	63	19	60
10/08/2020	Big Slurry	Reel	100	100,000 Gal	104	32	100
				Back 20 Totals:	430	105	372

Christy

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
01/20/2020	Big Slurry	Reel	100	50,000 Gal	58	8	41
02/11/2020	Dry storage	8024	100	10 Loads	44	15	26
03/05/2020	Dry storage	8024	100	3 Loads	13	5	8
04/20/2020	Big Slurry	Reel	100	50,000 Gal	58	8	41
06/03/2020	Big Slurry	Reel	100	80,000 Gal	80	25	76
07/26/2020	Big Slurry	Reel	100	50,000 Gal	50	15	48
07/29/2020	Big Slurry	Balzer	100	5 Loads	15	5	14
08/20/2020	Big Slurry	Reel	100	50,000 Gal	50	15	48
12/10/2020	Big Slurry	Reel	100	40,000 Gal	40	12	38
				Christy Totals:	407	107	340

Eckloff

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
09/01/2020	Dry storage	8024	100	5 Loads	6	2	4
				Eckloff Totals:	6	2	4

Home Place

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
02/11/2020	Big Slurry	Reel	100	50,000 Gal	25	3	18
04/18/2020	Big Slurry	Reel	100	150,000 Gal	76	10	53
06/05/2020	Big Slurry	Reel	100	150,000 Gal	65	20	63
07/19/2020	Big Slurry	Reel	100	100,000 Gal	43	13	42
08/18/2020	Big Slurry	Reel	100	100,000 Gal	43	13	42
10/09/2020	Big Slurry	Reel	100	100,000 Gal	43	13	42
12/24/2020	Big Slurry	Reel	100	50,000 Gal	22	7	21
				Home Place Totals:	318	81	280

Port

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
02/10/2020	Big Slurry	Reel	100	50,000 Gal	28	4	19
02/20/2020	Big Slurry	Reel	100	50,000 Gal	28	4	19
02/21/2020	Big Slurry	Reel	100	30,000 Gal	17	2	12
03/20/2020	Big Slurry	Balzer	100	5 Loads	8	1	6
04/21/2020	Big Slurry	Balzer	100	10 Loads	17	2	12
04/26/2020	Big Slurry	Reel	100	250,000 Gal	138	18	97
04/29/2020	Dry storage	8024	100	5 Loads	10	4	6
05/20/2020	Commercial - Solids (15-10-15)		100	250 lbs/Ac	38	57	45
				Port Totals:	283	92	216

Tupper Front

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
03/19/2020	Big Slurry	Balzer	100	12 Loads	34	4	23
06/03/2020	Big Slurry	Balzer	100	20 Loads	48	15	46
08/23/2020	Tupper Tank	Reel	100	50,000 Gal	42	9	36
10/08/2020	Big Slurry	New Balzer Tank	100	20 Loads	104	32	100
				Tupper Front Totals:	227	61	205

Tupper Rear

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
03/17/2020	Tupper Tank	Balzer	100	6 Loads	32	8	30
06/03/2020	Big Slurry	Balzer	100	10 Loads	53	16	51
07/09/2020	Big Slurry	Balzer	100	30 Loads	158	49	152
08/19/2020	Big Slurry	Balzer	100	13 Loads	68	21	66
08/23/2020	Commercial - Solids (15-10-15)		100	150 lbs/Ac	22	34	27
10/08/2020	Big Slurry	New Balzer Tank	100	10 Loads	114	35	110
10/29/2020	Dry storage	8024	100	5 Loads	39	13	23
11/01/2020	Big Slurry	New Balzer Tank	100	3 Loads	34	11	33
				Tupper Rear Totals:	520	188	492

Tupper Road

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
08/23/2020	Commercial - Solids (15-10-15)		100	150 lbs/Ac	22	34	27
				Tupper Road Totals:	22	34	27

Sampling Guidance

Manure and Soil Sampling Frequency

For large concentrated animal feeding operations, sample liquids and solids containing manure during applications in early spring annually and have each sample analyzed for Total Nitrogen (TKN), Ammonium Nitrogen (NH_4-N), Phosphorus (P_2O_5) and Potassium (K_2O) plus percent moisture. Ask the lab to report results in pounds per ton for the solids containing manure and in pounds per thousand gallons for liquids containing manure. Analyses of solids and liquids containing manure should be performed by a laboratory that meets the requirements and performance standards of the Manure Testing Laboratory Certification Program (MTLCP), https://www.mda.state.mn.us/licensing/licensetypes/mapprogram.aspx.

For small and medium animal feeding operations, if no samples of liquids and solids containing manure have been taken, take a sample of liquids and solids during applications in early spring once a year for three consecutive years to develop a cumulative manure analysis history as a basis for nutrient allocation to the fields. If there is a sampling history of liquids and solids containing manure, take a sample of liquids and solids during applications in early spring once every 5 years or whenever a significant change in animal numbers or in the manure handling system occurs. Have each sample analyzed for Total Nitrogen (TKN), Ammonium Nitrogen (NH_4-N), Phosphorus (P_2O_5) and Potassium (K_2O) plus percent moisture. Ask the lab to report results in pounds per ton for the solids containing manure and in pounds per thousand gallons for liquids containing manure. Analyses of solids and liquids containing manure should be performed by a laboratory that meets the requirements and performance standards of the Manure Testing Laboratory Certification Program (MTLCP), https://www.mda.state.mn.us/licensing/licensetypes/mapprogram.aspx.

Large CAFO's are required to test a minimum of 20 percent of their fields annually which would result in all of the fields being tested once every 5 years. Small and Medium CAFO's are only required to test all of their fields once every 5 years. However, from a management standpoint, more frequent soil testing offers good information on the nutrient status of your soils.

Collect soil samples from 20 percent of the fields receiving solids or liquids containing manure **annually** in the fall after harvest or before rains begin(typically September 15-October 15) in accordance with **Pacific Northwest (PNW) Extension publication 570-E, "Monitoring Soil Nutrients Using a Management Unit Approach",** https://catalog.extension.oregonstate.edu/pnw570. Have the soil samples analyzed for Total Nitrogen (TKN) and Phosphorus (P) and ask the lab to report results in parts per million (ppm). Soil test analyses should be performed by laboratories that meet the requirements and performance standards of the North American Proficiency Testing Program (NAPT) Proficiency Assessment Program (PAP); http://www.naptprogram.org/pap/.

How to Sample Liquid Manure

Obtain a composite following one of the procedures listed below and thoroughly mix. Using a plunger, an up-and-down action works well for mixing liquid manure in a five-gallon bucket. Fill a one-quart plastic bottle not more than three-quarters full with the composite sample. Store sample in freezer if not delivered to the lab immediately.

Procedure 1. Sampling from storage- Agitate storage facility thoroughly before sampling. Collect at least five samples from the storage facility or during loading using a five-gallon bucket. Place a sub sample of the composite sample in a one-quart plastic container. Sampling a liquid manure storage facility without proper agitation (2-4 hrs. minimum) is not recommended due to nutrient stratification, which occurs in liquid systems. If manure is sampled from a lagoon that was not properly agitated, typically the nitrogen and potassium will be more concentrated in the top liquid, while the phosphorus will be more concentrated in the bottom solids.

Procedure 2. Sampling during application- Place buckets around field to catch manure from spreader or irrigation equipment. Combine and mix samples into one composite sub sample in a one-quart plastic container.

How to Sample Solid Manure

Collect a composite sample by following one of the procedures listed below. A method for mixing a composite sample is to pile the manure and then shovel from the outside to the inside of the pile until well mixed. Fill a one-gallon plastic heavy-duty zip lock bag approximately one-half full with the composite sample, squeeze out excess air, close and seal. Store sample in freezer if not delivered to the laboratory immediately.

Procedure 1. Sampling while loading - Recommended method for sampling from a stack or bedded pack. Take at least ten samples while loading several spreader loads and combine to form one composite sample. Thoroughly mix the composite sample and take an approximately one pound sub sample using a one-gallon plastic bag. Sampling directly from a stack or bedded pack is not recommended.

Procedure 2. Sampling during spreading - Spread a tarp in field and catch the manure from one pass. Sample from several locations and create a composite sample. Thoroughly mix the composite sample together and take a one-pound sub sample using a one-gallon plastic bag.

Procedure 3. Sampling daily haul - Place a five-gallon bucket under the barn cleaner 4-5 times while loading a spreader. Thoroughly mix the composite sample together and take a one-pound sub sample using a one-gallon plastic bag. Repeat sampling 2-3 times over a period of time and test separately to determine variability.

Procedure 4. Sampling poultry in-house - Collect 8-10 samples from throughout the house to the depth the litter will be removed. Samples near feeders and waterers may not be indicative of the entire house and sub samples taken near here should be proportionate to their space occupied in the whole house. Mix the samples well in a five-gallon pail and take a one-pound sub sample, place it in a one-gallon zip lock bag.

Procedure 5. Sampling stockpiled litter - Take ten sub samples from different locations around the pile at least 18 inches below the surface. Mix in a five-gallon pail and place a one-pound composite sample in a gallon zip lock bag.

Sample Identification and Delivery

Identify the sample container with information regarding the farm, animal species and date. This information should also be included on the sample information sheet along with application method, which is important in determining first year availability of nitrogen.

Keep all manure samples frozen until shipped or delivered to a laboratory. Ship early in the week (Mon.-Wed.) and avoid holidays and weekends.

How to Sample Soils

Current soil tests must be used in the development and editing of nutrient management plans. A current soil test is one that is no older than 5 years that is used to represent the nutrient status of the entire field. Soil analysis must be performed by laboratories successfully meeting the requirements and performance standards of the North American Proficiency Testing Program-Performance Assessment Program (NAPT-PAP). Results of these analysis will be used to determine application rates for manure, litter, and process wastewater. Guidance for soil sampling can be found in the **Pacific Northwest (PNW) Extension publication 570-E, "Monitoring Soil Nutrients Using a Management Unit Approach"**, https://catalog.extension.oregonstate.edu/pnw570. **Oregon State University Extension publication EC1478, "Soil Test Interpretation Guide",** https://catalog.extension.oregonstate.edu/ec1478 provides guidance on how to determine soil nutrient concentrations and how to adjust soil pH to improve nutrient availability.

Field Area. A composite soil sample should represent a uniform field area. Each area should have similar crop and fertility history. Soil characteristics (color, slope, texture, drainage) should be similar. Exclude small areas within a field that are obviously different. The field area represented by a single composite sample should represent no more than 40 irrigated acres or 100 dry land acres.

Sampling Depth. Laboratory tests are calibrated to specific depths. It is vital to collect samples from appropriate depths. Sampling depth for most soils is the rooting depth in 6-inch intervals. In Oregon, as a minimum, soil samples should be collected from the 0-12" depth. The 0-6" surface soil samples are normally used for conventional tests of organic matter, nitrogen, phosphorus, potassium, pH and salt levels. Additionally, subsurface samples from the 6-24" depth are needed to estimate nitrogen availability for crops grown in dry land areas.

Post Harvest Soil Testing for Evaluating Nutrient Applications. Refer to **Pacific Northwest (PNW) Extension publication 570-E, "Monitoring Soil Nutrients Using a Management Unit Approach"**, https://catalog.extension.oregonstate.edu/pnw570, for guidance on how to evaluate nutrient applications and crop uptake of nutrients.

Manure Tests

Nutrient Analysis Report

Kuipers Farms LLC

Tillamook

Sample Date	Storage Name	Units	Total N	P_2O_5	K_2O	NH_4-N	NO_3-N	Org N	Density Lbs/CF
05/14/2020	Tupper Tank	lbs/1000gal	20.88	6.47	20.07	9.32	0.0	11.56	62.0
05/14/2020	Dry storage	lbs/Ton	10.6	3.65	6.36	0.51	0.0	10.09	35.0
05/14/2020	Big Slurry	lbs/1000gal	20.88	6.47	20.07	9.32	0.0	11.56	62.0
01/01/2020	Tupper Tank	lbs/1000gal	22.06	4.85	19.08	10.42	0.0	11.64	62.0
01/01/2020	Tupper Solid Manure	lbs/Ton	10.6	3.65	6.36	0.51	0.0	10.09	35.0
10/29/2019	Big Slurry	lbs/1000gal	24.4	3.2	17.1	10.2	0.0	14.2	62.0
12/23/2018	Tupper Tank	lbs/1000gal	20.9	5.1	20.1	11.8	0.0	9.1	62.0

Soil Tests

Soils Testing Report

Kuipers Farms LLC

4030 Highway 101 S, Tillamook

Back 20

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/29/2020	65977		12.0	6.2	6.2	0.62	5.1		29.0		1211.0	8.8 meq	23.5 meq	0.97 meq	11.0 ppm	40.0 ppm	16.0	0.4	4.1	8.5	4.4	86.0		

Christy

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/29/2020	65977		12.0	6.2	6.3	0.38	4.2		25.0		1062.0	6.38 meq	22.8 meq	0.7 meq	6.0 ppm	27.0 ppm	11.0	0.31	1.2	6.8	3.8	72.0		

Eckloff

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
6/9/2020	58787	mean of 3	6.0	5.0	5.1	0.16	12.0		16.0		300.0	1.0 meq	1.8 meq	0.15 meq	15.0 ppm	24.0 ppm	7.0	0.22	1.3	3.0	0.2	90.0		

Home Place

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/29/2020	65977		12.0	6.2	6.2	0.62	5.1		29.0		1211.0	8.8 meq	23.5 meq	0.97 meq	11.0 ppm	40.0 ppm	16.0	0.4	4.1	8.5	4.4	86.0		

Port

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/6/2020	66138		12.0	5.8	6.0	0.94	8.9		25.0		1211.0	7.4 meq	210.5 meq	0.49 meq	88.0 ppm	21.0 ppm	17.0	0.46	2.6	13.1	3.9	101.0		

Tupper Front

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/29/2020	65977		12.0	5.3	5.8	0.54	4.3		29.0		927.0	7.5 meq	19.0 meq	0.7 meq	35.0 ppm	17.0 ppm	15.0	0.28	2.5	9.7	3.8	106.0		

Tupper Rear

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/6/2020	66138		12.0	5.3	5.4	0.5	4.3		35.0		504.0	8.5 meq	17.5 meq	0.53 meq	35.0 ppm	12.0 ppm	13.0	0.32	1.6	9.8	3.6	132.0		

Soil test analyses should be performed by laboratories that meet the requirements and performance standards of the North American Proficiency Testing Program (NAPT) Proficiency Assessment Program (PAP);
http://www.naptprogram.org/pap/

Nutrient Balances

Nutrient Balances Report

Kuipers Farms LLC

Tillamook

Field	Acres	Crop	Yield	Nutrient Uptake (lbs/ac)			Nutrient Applied (lbs/ac)			Nutrient Balance (lbs/ac)		
				N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Back 20	20.0	Grass Hay/Pasture	8 Ton	464	147	386	430	105	372	(-34)	(-42)	(-14)
Christy	21.0	Grass Hay/Pasture	8 Ton	464	147	386	407	107	340	(-57)	(-39)	(-45)
Eckloff	73.1	Grass Haylage	6 Ton	348	110	289	6	2	4	(-342)	(-108)	(-285)
Home Place	48.1	Grass Hay/Pasture	7 Ton	406	128	337	318	81	280	(-88)	(-48)	(-58)
Port	44.2	Corn, Silage / Grass Hay/Pasture	12.8 Ton	451	153	404	283	92	216	(-168)	(-62)	(-188)
Tupper Front	26.2	Grass Hay/Pasture	6 Ton	348	110	289	227	61	205	(-121)	(-49)	(-84)
Tupper Rear	11.9	Grass Hay/Pasture / Corn, Silage	14.8 Ton	567	190	500	520	188	492	(-46)	(-2)	(-9)

Transferred Nutrients

Transfers Report

Kuipers Farms LLC

Tillamook

Exported from	Date Transferre	Quantity	Analysis Available	Total N	P_2O_5	K_2O	Exported to
Big Slurry	03/11/2020	100,000 Gal	No	2,439.82	139.67	1,418.98	Blaise Bennett
	Sub Totals:	13,368 CF		2,439.82	139.67	1,418.98	

Imported from	Date Transferre	Quantity	Analysis Available	Total N	P_2O_5	K_2O	Imported to
No Imports.				0	0	0	
	Sub Totals:	CF		0	0	0	
	Totals:	13,368 CF		2,440	140	1,419	

Cropping History

Cropping Report

Kuipers Farms LLC

Tillamook

Planted	Field	Acres	Crop	Yield	Nutrient Uptake (lbs/ac) N	P_2O_5	K_2O
01/01/2020	Back 20	20.0	Grass Hay/Pasture	8 Ton	58	18	48
	Back 20 Totals:				58	18	48
01/01/2020	Christy	17.0	Grass Hay/Pasture	8 Ton	58	18	48
	Christy Totals:				58	18	48
01/01/2020	Eckloff	50.0	Grass Haylage	6 Ton	58	18	48
	Eckloff Totals:				58	18	48
01/01/2020	Home Place	45.0	Grass Hay/Pasture	7 Ton	58	18	48
	Home Place Totals:				58	18	48
01/01/2020	Port	44.2	Grass Hay/Pasture	4 Ton	58	18	48
05/15/2020	Port	48.5	Corn, Silage	25 Ton	25	9	24
	Port Totals:				83	27	72
01/01/2020	Tupper Front	26.2	Grass Hay/Pasture	6 Ton	58	18	48
	Tupper Front Totals:				58	18	48
01/01/2020	Tupper Rear	11.9	Grass Hay/Pasture	6 Ton	58	18	48
05/15/2020	Tupper Rear	11.9	Corn, Silage	25 Ton	25	9	24
	Tupper Rear Totals:				83	27	72

Irrigation Water Management

The application of Irrigation Water Management to the irrigated fields as shown on the Field Map will manage soil moisture to promote the desired crop response, optimize the available water supplies, minimize irrigation induced erosion, decrease non-point source pollution of surface and groundwater sources, manage salts in the crop root zone and manage the crop micro climate.

Permits: Under Oregon law all water is publicly owned, and anyone planning to store or divert surface or groundwater for the purpose of irrigation must obtain a permit or water right from the Oregon Water Resources Department. These permits or water rights must be obtained prior to the use of the water. It is the responsibility of the Farmer to file for the necessary permits or water rights. More information about Oregon water rights can be found at http://www.oregon.gov/owrd/Pages/wr/index.aspx.

The irrigation system used to irrigate crops should be adapted for site conditions (soil, slope, crop grown, climate, water quantity and quality, etc.) and capable of applying water and wastewater to meet the consumptive use of the crop. The following table shows the estimated Available Water Holding Capacity (AWHC) and sprinkler intake rates by soil texture that should be considered in the design of the irrigation system.1/

Symbol	Soil Texture	AWHC Range (in/in)	Sprinkler Intake Rate Range (in/hour)
COS	Coarse Sand	0.01-0.03	1.0+
S	Sand	0.01-0.03	0.5+
FS	Fine Sand	0.05-0.07	0.5+
VFS	Very Fine Sand	0.05-0.07	0.5+
LCOS	Loamy Coarse Sand	0.06-0.08	1.0+
LS	Loamy Sand	0.06-0.08	0.4-1.5
LFS	Loamy Fine Sand	0.09-0.11	0.4-1.5
LVFS	Loamy Very Fine Sand	0.10-0.12	0.3-1.25
COSL	Coarse Sandy Loam	0.10-0.12	0.3-1.25
SL	Sandy Loam	0.11-0.13	0.3-1.25
FSL	Fine Sandy Loam	0.13-0.15	0.3-1.0
VFSL	Very Fine Sandy Loam	0.15-0.17	0.3-1.0
L	Loam	0.16-0.18	0.6-0.7
SIL	Silt Loam	0.19-0.21	0.5-0.7
SI	Silt Loam	0.16-0.18	0.5-0.7
SCL	Sandy Clay Loam	0.14-0.16	0.1-0.5
CL	Clay Loam	0.19-0.21	0.1-0.5
SICL	Silty Clay Loam	0.19-0.21	0.1-0.4
SC	Sandy Clay	0.15-0.17	0.1-0.4
SIC	Silty Clay	0.15-0.17	0.1-0.2
C	Clay	0.14-0.16	0.1-0.2

1/ Values in this table are taken from the Natural Resources Conservation Service National Engineering Handbook, Part 652, Irrigation Guide and are estimates based on soil texture and should only be used where local data is unavailable.

Irrigation water management requires knowledge, skills, and desire to determine when irrigation water should be applied. The main factors influencing IWM are irrigation interval (time between irrigations), irrigation set time (time water is applied), and application rate (rate at which water is applied). These parameters define the timing and duration of irrigation and the amount of water applied. System design and maintenance are also important factors influencing irrigation water management.

UTILIZATION AREA

Guidance given in the irrigation water requirements worksheets was developed based on Oregon State University Extension Miscellaneous 8530, Oregon Crop Water Use and Irrigation Requirements publication. For additional information on irrigation water management contact a professional with the required knowledge and skill. The following average monthly evapotranspiration and precipitation graphs can be used to estimate when to irrigate and how much to apply:

UTILIZATION AREA

Irrigation Water Flows, Volumes, and Relationships

Equation 1 -

$$Q \times T = D \times A$$

wher

Q = flow rate (acre-in/hr or cfs)
T = time (hr)
D = gross depth applied (in)
A = area (acres)

Equation 2 -

$$Q = \frac{453 \times A \times}{F \times H}$$

wher

Q = flow rate (acre-in/hr or cfs)
A = area (acres)
D = gross depth applied (in)
F = irrigation period (days)
H = Hours of operation per

Water Flow

1 cubic foot per second (cfs)
= 448.8 gallons per minute
1 cfs for 1 hour = 0.99 acre-inch
1 cfs for 24 hr = 1.98 acre-ft
1,000 gpm = 2.23 cfs
1,000 gpm for 24 hr = 4.42 ac-ft
1 gpm/acre =0.053 ac-in/ac/day
1 cfs = 40 miner's inches in OR, No CA
1 cfs = 50 miner's inches in ID, WA

1 miner's inch = 11.22 gpm in OR
1 miner's inch = 9 gpm in ID, WA
1 cfs = 28.32 liters/sec
1 cubic meter/sec = 35.3 cfs
1 liter/sec = 15.85 gpm

Q x T = D x where:

Q = cfs, T = hr, D = inches depth; A =

Gpm for 5 ft/s velocity in PVC pipe:

6"	8"	10"	12"	14"
480	800	125	175	215

Water Volumes & Weights:

1 cubic foot = 7.48 gallons
= 62.4 lbs = 28.3 liters
1 acre-foot = 43,560 cubic feet
(1 acre covered 1 ft deep)
12 acre-in = 1 acre-ft = 325,829 gal
1 million gallons = 3.07 acre-ft
1 acre-ft = 1,234 cubic meters
1 cu meter = 1,000 liters = 35.3 cu ft

Pressure and Pressure Head:

1 psi = 2.31 ft of pressure head
1 atmosphere (sea level)
= 14.7 psi = 33.9 ft of head

Lengths and Areas:

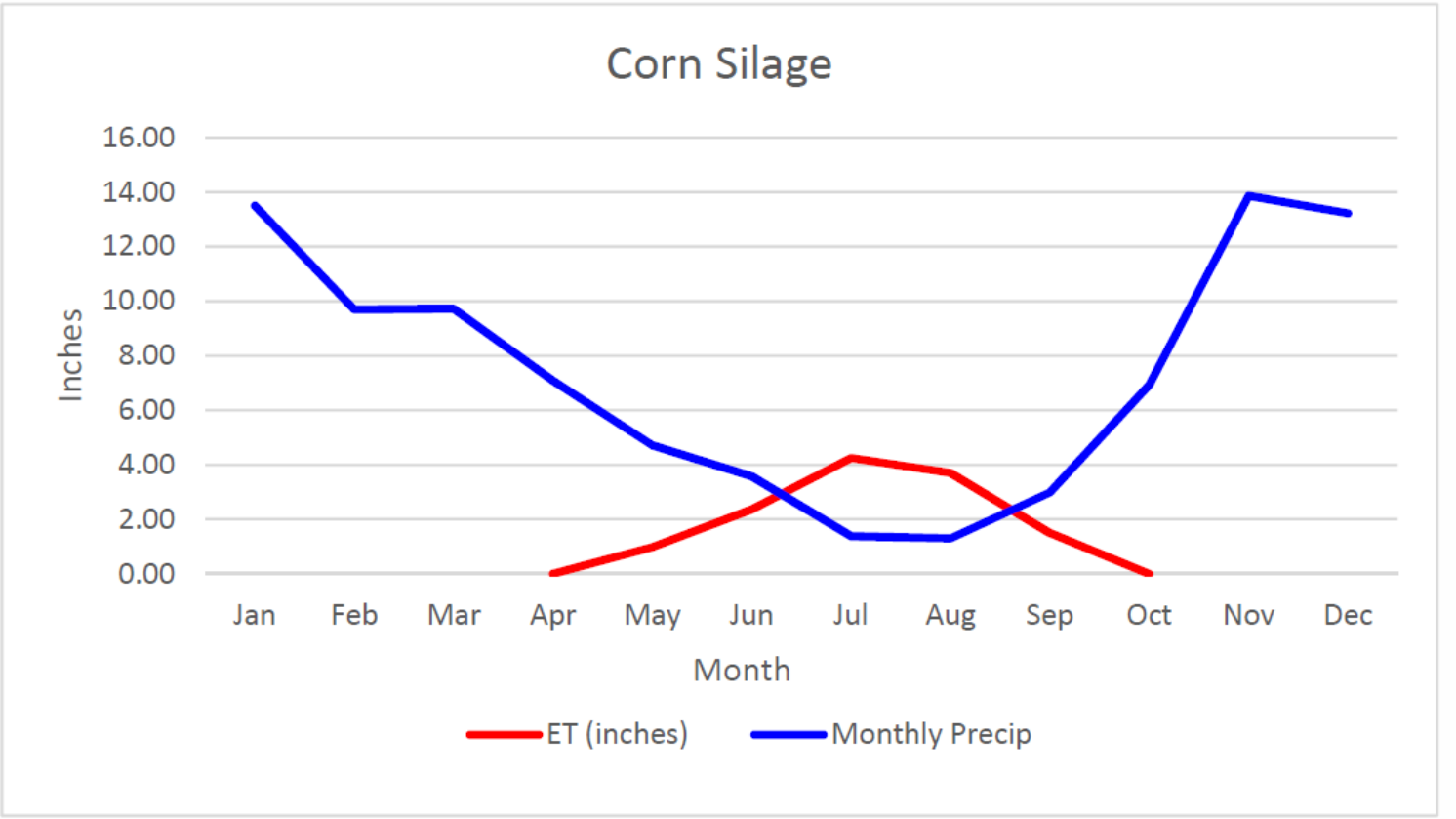
1 mile = 5,280 ft = 1.61 km
1 meter = 3.28 ft = 39.37 inches
1 acre = 43,560 square ft
1 hectare = 2.47 acres

Pump Power Requirement

$$Horsepower = \frac{Pump\ \ Head\ \ in\ \ ft\ \ x\ \ gpm}{39.6 \times \%\ Pump\ \ Efficiency}$$

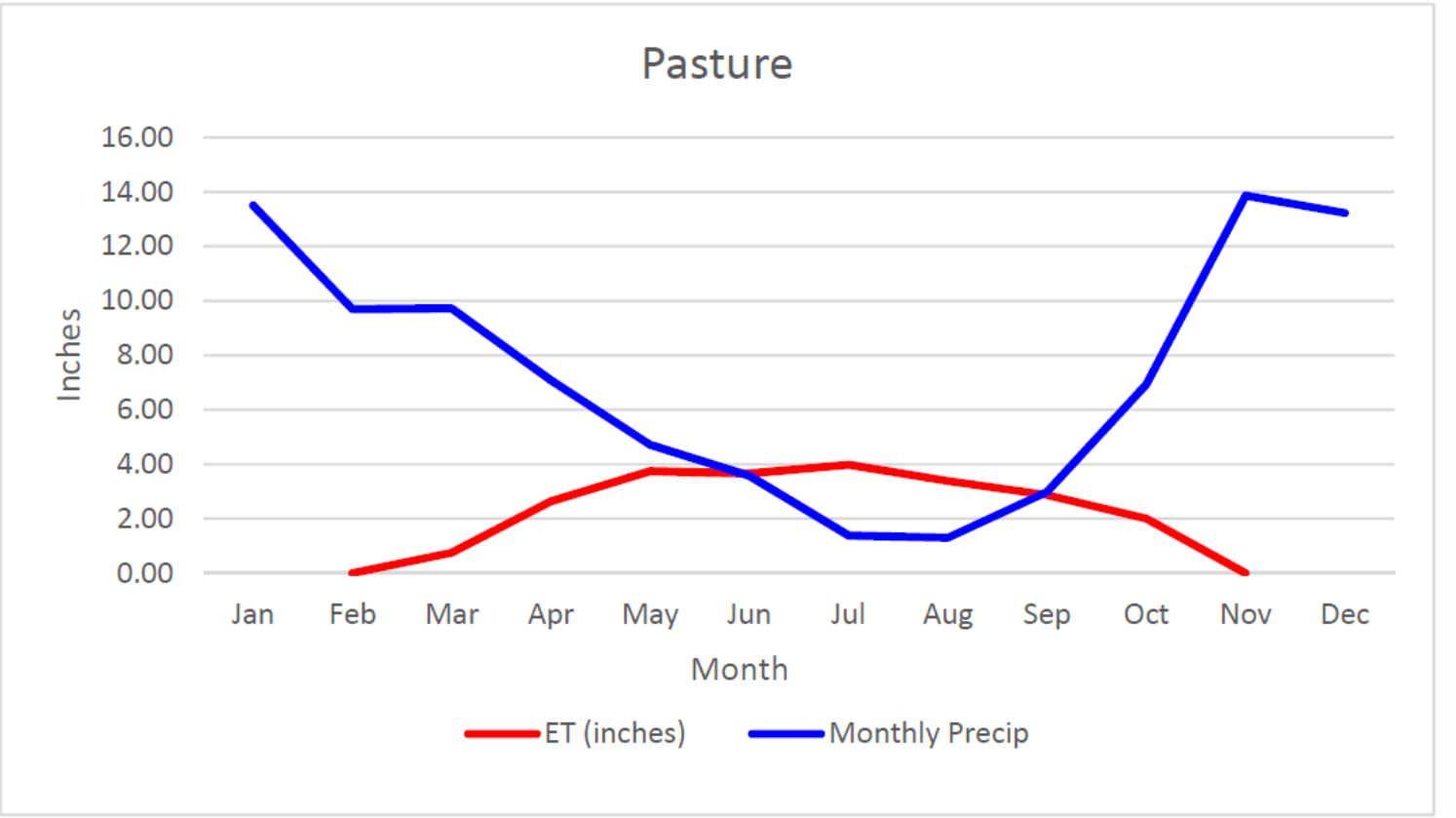
UTILIZATION AREA

Crop-	Corn Silage	
Region-	Coastal	
Total Seasonal Evapotranspiration-	12.79	Inches
Peak Evapotranspiration Rate-	0.14	Inches/Day
Maximum Allowed Depletion-	50	%
Critical Moisture Deficit Period-	Jul	



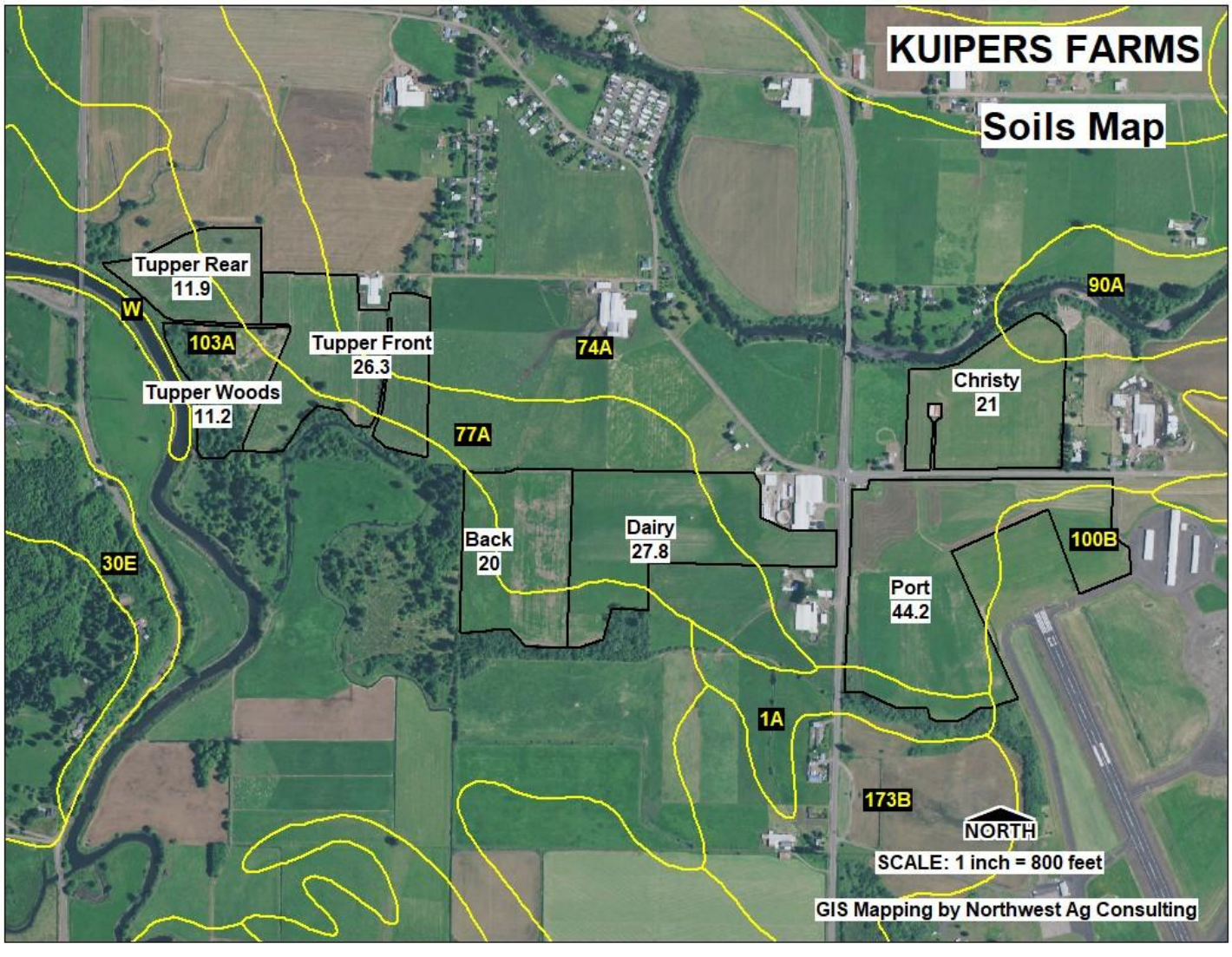
UTILIZATION AREA

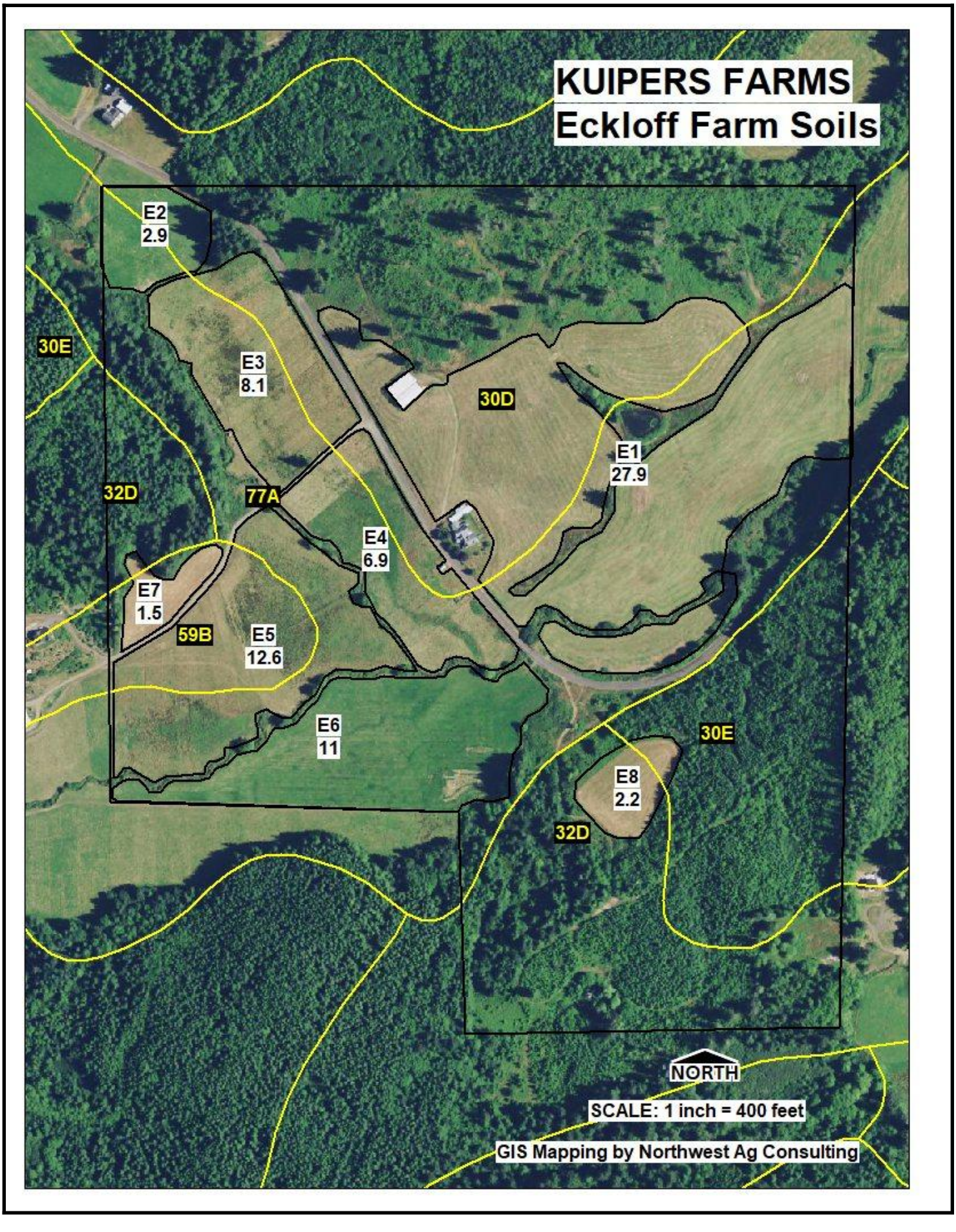
Crop-	Grass Pasture	
Region-	Coastal	
Total Seasonal Evapotranspiration-	23.04	Inches
Peak Evapotranspiration Rate-	0.13	Inches/Day
Maximum Allowed Depletion-	50	%
Critical Moisture Deficit Period-	Jul	



SOIL AND RISK

Soil Maps for Kuipers Farms LLC




KUIPERS FARMS
Eckloff Farm Soils
E2
2.9
30E
E3
8.1
30D
E1
27.9
32D
77A
E4
6.9
E7
1.5
59B
E5
12.6
E6
11
30E
E8
2.2
32D
NORTH
SCALE: 1 inch = 400 feet
GIS Mapping by Northwest Ag Consulting

Soil Reports

KUIPERS FARMS SOILS REPORT

30D -TEMPLETON SERIES
The Templeton series consists of deep, well drained soils that formed in colluvium and residuum weathered from sedimentary rocks. Templeton soils are benches, broad ridgetops, and side slopes of mountains. Slopes are 0 to 90 percent. The mean annual temperature is about 49 degrees F. and the mean annual precipitation is about 80 inches.

TAXONOMIC CLASS: Fine-silty, isotic, isomesic Andic Humudepts

TYPICAL PEDON: Templeton medial silt loam, 70 percent complex convex south-facing slope in a clear cut area. When described the soil was moist throughout. (Colors are for moist soil unless otherwise stated.)

Oi--0 to 1 inch; slightly decomposed litter of leaves, needles and twigs (1 to 4 inches thick).

A1--1 to 7 inches; very dark brown (7.5YR 2/2) medial silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine and few fine and medium roots; many very fine and few fine and medium irregular pores; 13 percent pararock fragments; strongly acid (pH 5.1); clear smooth boundary.

A2--7 to 17 inches; dark brown (7.5YR 3/2) medial silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; hard, friable, slightly sticky and slightly plastic; many very fine and few fine and medium roots; many very fine and few fine and medium irregular pores; about 10 percent pararock fragments; very strongly acid (pH 5.0); clear wavy boundary. (Combined A horizon is 10 to 20 inches thick)

Bw1--17 to 24 inches; reddish brown (5YR 4/4) silty clay loam, brown (7.5YR 5/4) dry; moderate fine and medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; common very fine to coarse roots; common very fine irregular and very fine and fine tubular pores; about 10 percent pararock fragments; very strongly acid (pH 4.9); clear wavy boundary.

Bw2--24 to 31 inches; yellowish red (5YR 5/6) silty clay loam, light brown (7.5YR 6/4) dry; weak fine and medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; common very fine to coarse roots; common very fine tubular and irregular pores; about 10 percent pararock fragments; very strongly acid (pH 4.8); clear wavy boundary. (Combined Bw horizon is 8 to 25 inches thick)

Bw3--31 to 43 inches; strong brown (7.5YR 5/6, 5/8) silty clay loam, light brown (7.5YR 6/4) dry; weak medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; few very fine, medium and coarse roots; few very fine irregular and fine and medium tubular pores; about 13 percent pararock fragments; very strongly acid (pH 4.8); clear wavy boundary. (0 to 18 inches thick)

Cr--43 inches; multicolored (5YR to 10YR hue) partially weathered fractured siltstone with few very fine and fine roots in the fractures.

TYPE LOCATION: Coos County, Oregon; about 2 miles east of Lakeside; 2,200 feet east and 1,900 feet north of southwest corner of section 16, T. 23 S., R. 12 W.

RANGE IN CHARACTERISTICS: The mean annual soil temperature is 47 to 54 degrees F. The difference between mean summer and mean winter soil temperature varies from 5 to 9 degrees F. The soil is usually moist but is dry for less than 45 consecutive days during the summer. The soil is 40 to more than 60 inches deep to weathered siltstone and sandstone. The particle-size control section has an average of 25 to 35 percent clay and less than 15 percent coarser than very fine sand.

Measured clay commonly is higher than field estimated clay. The umbric epipedon is 10 to 20 inches thick. The upper 5 to 8 inches of the epipedon has an acid-oxalate aluminum plus one-half iron of 2.0 to 3.0 percent, a moist bulk density of 0.75 to 0.90 g/cc, phosphate retention of more than 85 percent, and 15-bar moisture of more than 15 percent. The lower part to a depth of 20 inches has an acid-oxalate aluminum plus one-half iron of 1.0 to 3.0 percent and a moist bulk density of 0.80 to 1.0 g/cc. Andic soil properties do not exceed beyond 14 inches. The soil has 20 to 30 kilograms of organic carbon per square meter to a depth of 1 meter.

The A horizon has hue of 10YR to 5YR moist and dry, value of 2 or 3 moist, 3 to 5 dry, and chroma of 2 or 3 moist and dry. It has 10 to 15 percent organic matter and 0 to 15 percent subangular shaped paragravel. It is extremely acid to strongly acid.

The Bw horizon has hue of 10YR to 5YR moist and dry, value of 3 to 5 moist, 5 or 6 dry, and chroma of 4 to 8 moist and dry. Texture is silty clay loam or silt loam and has 0 to 50 percent subangular shaped pararock fragments. It is extremely acid or very strongly acid.

The Cr horizon has hue of 7.5YR or 10YR typically with segments of 5YR hue in some pedons from less decomposed parent material. It has value of 4 or 5 moist, 5 to 7 dry, and chroma of 4 to 8.

COMPETING SERIES: This is the Ecola, Knappa, and Walluski series. Ecola soils are 20 to 40 inches deep to a paralithic contact. Knappa soils have an umbric epipedon 20 to 30 inches thick, and when present, have rounded or subrounded rock or pararock fragments of alluvial origin. Walluski soils have redox depletions within a depth of 24 to 40 inches.

GEOGRAPHIC SETTING: Templeton soils are benches, broad ridgetops, and side slopes of mountains. These soils formed in colluvium and residuum weathered from sedimentary rocks. Elevations are 50 to 1,800 feet. Slopes are 0 to 90 percent. The marine climate is cool and

wet in the winter and cool and moist with a short dry season of less than 45 consecutive days during the summer. The mean annual precipitation is 60 to 110 inches. The mean annual temperature is 45 to 53 degrees F. The mean January temperature is 42 to 46 degrees F. and the mean July temperature is 58 to 62 degrees F. The frost-free season is 100 to 245 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Millicoma and Salander soils. Millicoma soils are 20 to 40 inches deep to bedrock and are loamy-skeletal. Salander soils are dominated by amorphous material. These soils are on coastal hills and mountains.

DRAINAGE AND PERMEABILITY: Well drained; moderate permeability.

USE AND VEGETATION: These soils are used for timber production, wildlife habitat, and limited use for homesites. Some areas are cleared and used for grazing. Native vegetation is Sitka spruce, western hemlock, western redcedar, Douglas-fir, red alder, salmonberry, blackberry and western swordfern.

DISTRIBUTION AND EXTENT: Western slopes of the Coast Range in Oregon; MLRA 4A. The series is extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: Coos County, Oregon, 1983.

30E -TEMPLETON-ECOLA SERIES
The Templeton-Ecola series consists of moderately deep, well drained

soils that formed in colluvium weathered from sedimentary rock. Ecola soils are on coastal hill and mountains and have slopes of 0 to 90 percent. The mean annual precipitation is about 80 inches and the mean annual temperature is about 50 degrees F.

TAXONOMIC CLASS: Fine-silty, isotic, isomesic Andic Humudepts

TYPICAL PEDON: Ecola medial silt loam, forestland. (Colors are for moist soil unless otherwise noted.)

Oi--0 to 3 inches; slightly decomposed litter of needles, twigs, moss, roots.

A--3 to 10 inches; very dark grayish brown (10YR 3/2) medial silt loam, brown (10YR 5/3) dry; strong fine granular structure; friable, slightly sticky, slightly plastic and slightly smeary; many fine, medium and coarse roots; many very fine to medium irregular pores; common fine shot; strongly acid (pH 5.2); abrupt smooth boundary. (7 to 10 inches thick)

AB--10 to 19 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; strong fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic and slightly smeary; common fine and medium roots; many very fine tubular pores; few fine and medium siltstone paragravel; strongly acid (pH 5.2); abrupt smooth boundary. (0 to 10 inches thick)

Bw--19 to 36 inches; dark yellowish brown (10YR 4/4) silty clay loam, yellowish brown (10YR 5/4) dry; moderate fine subangular blocky structure; firm, slightly sticky, moderately plastic and slightly smeary; few fine roots; many very fine tubular pores; few fine and medium siltstone paragravel; very strongly acid (pH 4.8); clear wavy boundary. (10 to 24 inches thick)

C--36 to 40 inches; dark yellowish brown (10YR 4/4) very paragravelly

silty clay loam, yellowish brown (10YR 5/6) dry; massive; firm, moderately sticky and moderately plastic; about 60 percent fine and medium siltstone paragravel; very strongly acid (pH 4.8); clear wavy boundary. (0 to 6 inches thick)

Cr--40 inches; variegated yellowish brown (10YR 5/4) and reddish brown (5YR 4/3) partially weathered siltstone.

TYPE LOCATION: Clatsop County, Oregon; at the junction of the CZ Mainline II and Lewis and Clark crossover roads; SE1/4SW1/4 section 2, T. 7 N., R. 10 W.

RANGE IN CHARACTERISTICS: The mean annual soil temperature is 50 to 55 degrees F. The difference between mean winter and mean summer soil temperature varies from 5 to 9 degrees F. The soil is usually moist and is dry for less than 45 consecutive days between 4 and 12 inches. Depth to a paralithic contact is 20 to 40 inches. The umbric epipedon is 14 to 25 inches thick. Andic properties range from 7 to 10 inches. The particle-size control section has less than 15 percent sand coarser than very fine sand. It is extremely acid to strongly acid.

The A horizon has hue of 10YR and 7.5YR, value of 2 or 3 moist, 4 or 5 dry, and chroma of 2 or 3 moist and dry. It has 0 to 15 percent pararock fragments. It has an estimated phosphate retention of more than 85 percent, acid-oxalate extractable aluminum plus one-half iron of 2.0 to 3.0 percent, 15-bar moisture of more than 15 percent (air-dried) and a moist bulk density of less than 0.90 g/cc.

The AB horizon, when present, has hue of 10YR to 7.5YR, value of 3 moist, 4 or 5 dry and chroma of 3 or 4 moist and dry. Texture is silt loam, medial silt loam, or silty clay loam and has 0 to 30 percent pararock fragments. It has 25 to 30 percent clay by field estimate, acid-oxalate extractable aluminum plus one-half iron of 1.0 to 3.0, and moist bulk density of 0.90 to 1.20.

The Bw horizon has hue of 10YR or 7.5YR, value of 3 or 4 moist, 4 or 5 dry, and chroma of 3 to 6 moist and dry. It averages 22 to 35 percent clay and 0 to 60 percent siltstone pararock fragments. It is silt loam or silty clay loam.

The C horizon, when present, averages 27 to 35 percent clay and 0 to 60 percent siltstone pararock fragments.

COMPETING SERIES: These are the Knappa, Templeton, and Walluski series. Knappa and Walluski soils are very deep to bedrock. In addition, Knappa soils have an umbric epipedon 20 to 30 inches thick, and when present, have rounded and subrounded rock and pararock fragments of alluvial origin. Templeton soils are 40 to greater than 60 inches to bedrock. Walluski soils also have redox depletions at a depth of 24 to 40 inches.

GEOGRAPHIC SETTING: Ecola soils are on ridgetops and side slopes of hills and mountains in the Coast Range. Elevation is 50 to 1,800 feet. Slopes are 0 to 90 percent. The soils formed in colluvium weathered from sedimentary bedrock. The climate is cool and wet during the winter. The mean annual precipitation of 60 to 110 inches. Many summer days have fog or low cloud cover during the mornings. The mean January temperature is 38 degrees F., and average July temperature is 59 degrees F. The mean annual temperature is 46 to 53 degrees F. The frost-free period is 100 to 245 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Astoria, Hembre, Svensen and competing Templeton soils. Astoria soils are deeper than 40 inches to a paralithic contact. Hembre soils are over a lithic contact. Svensen soils have less than 27 percent clay in the control section. All of these soils are on side slopes and ridgetops of mountains.

DRAINAGE AND PERMEABILITY: Well drained; slow to rapid runoff; moderate permeability.

USE AND VEGETATION: Primarily timber production. Also used for recreation and wildlife habitat. Native vegetation is Douglas-fir, western hemlock, Sitka spruce, red alder, salal, salmonberry, vine maple, and western swordfern.

DISTRIBUTION AND EXTENT: Northwest Oregon; MLRA 4A. The soil is inextensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: Clatsop County, Oregon, 1984.

REMARKS: Ecola soils were included in the Astoria series in old soil survey publications.

59B- CHITWOOD-KNAPPA SERIES
The Chitwood series consists of very deep, somewhat poorly drained soils on coastal marine and valley terraces. They formed in alluvium derived from sedimentary rocks. Slopes range from 0 to 15 percent. The mean annual temperature is about 52 degrees F. and the mean annual precipitation is about 70 inches.

TAXONOMIC CLASS: Fine, isotic, isomesic Aquandic Humudepts

TYPICAL PEDON: Chitwood medial silt loam-improved pasture, on a 2 percent slope at an elevation of 80 feet. (Colors are for moist soil unless otherwise noted.)

Ap--0 to 7 inches; very dark grayish brown (10YR 3/2) medial silt loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; strongly acid (pH 5.2); clear smooth boundary.

A--7 to 11 inches; very dark grayish brown (10YR 3/2) medial silt loam, grayish brown (10YR 5/2) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine and fine irregular pores; very strongly acid (pH 5.0); clear smooth boundary. (Combined thickness of the A horizon is 7 to 20 inches thick)

BA--11 to 19 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure parting to moderate very fine angular blocky; moderately hard, firm, moderately sticky and moderately plastic; common fine roots; many very fine tubular pores; few fine faint continuous very dark grayish brown (10YR 3/2) organic stains on faces of peds; few fine faint dark yellowish brown (10YR 4/4) and distinct yellowish brown (10YR 5/6) iron masses, irregular in the matrix; very strongly acid (pH 5.0); clear smooth boundary. (0 to 11 inches thick)

Bw--19 to 29 inches; dark yellowish brown (10YR 3/4) silty clay, yellowish brown (10YR 5/4) dry; moderate medium subangular blocky structure parting to weak very fine angular blocky; moderately hard, firm, moderately sticky and moderately plastic; few fine roots; few fine and common very fine tubular pores; few distinct continuous very dark grayish brown (10YR 3/2) organic stains on faces of peds and on surfaces along pores; many medium distinct strong brown (7.5YR 5/6) iron masses, irregular in the matrix, and common medium distinct grayish brown (10YR 5/2) iron depletions, irregular in the matrix; very strongly acid (pH 5.0); clear smooth boundary. (10 to 40 inches thick)

BC--29 to 60 inches; dark yellowish brown (10YR 3/4) silty clay loam, yellowish brown (10YR 5/4) dry; weak subangular blocky structure; moderately hard, firm, moderately sticky and moderately plastic; few fine roots; common very fine tubular pores; common distinct continuous very dark grayish brown (10YR 3/2) organic stains on faces of peds and on surfaces along pores; common coarse and medium prominent strong brown (7.5YR 5/8) and yellowish red (5YR 5/6) iron masses, irregular in the matrix and common coarse and medium distinct grayish brown (10YR 5/2) iron depletions, irregular in the matrix; common thin organic stains; very strongly acid (pH 4.6).

TYPE LOCATION: Tillamook County, Oregon; about 1,500 feet south and 1,000 feet east of the northwest corner of section 10, T.2S., R.9W.; USGS Tillamook topographic quadrangle; latitude 45 degrees 24 minutes 55 seconds N. and longitude 123 degrees 46 minutes 31 seconds W.; NAD 27.

RANGE IN CHARACTERISTICS: The soil is usually moist, is saturated with water extended periods during the winter, and is dry for less than 45 consecutive days between the depths of about 4 to 12 inches after the summer solstice. Redox depletions with moist chroma of 2 or less are at a depth of 18 to 24 inches and represent less than 50 percent of the matrix. The mean annual soil temperature is 50 to 54 degrees F. The difference between mean summer and mean winter soil temperature varies from 5 to 9 degrees F under canopy cover. The umbric epipedon is 10 to 20 inches thick. The upper 6 to 10 inches has an estimated Alox + Feox of 2.0 to 3.0 percent and a moist bulk density of 0.80 to 0.90 g/cc. The lower part to a depth of 20 inches, has Alox + Feox of 1.0 to 3.0 percent and a moist bulk density of 0.90 to 1.0 g/cc. Andic soil properties, when present, do not extend below a depth of 14 inches. A substratum containing paragravel, paracobbles, and parastones is below a depth of 40 inches in some pedons.

The Ap or A horizon has hue of 10YR, value of 2 or 3 moist, 3 to 5 dry, and chroma of 2 or 3 moist and dry. Texture is dominantly medial silt loam in the upper part and medial silt loam or silt loam in the lower part

with 20 to 27 percent clay by field estimate. A few areas are silty clay loam with 27 to 35 percent clay. It is extremely acid to moderately acid.

The BA horizon, when present, has hue of 10YR, value of 3 moist, 3 through 5 dry, and chroma of 3 moist and dry. Texture is silty clay loam with 30 to 37 percent clay. It is extremely acid to strongly acid

The Bw horizon has value of 3 through 6 moist, 4 through 7 dry and chroma of 2 through 4 moist and dry. Texture is silty clay or silty clay loam with 35 to 45 percent clay. It is extremely acid to strongly acid.

The BC or C horizon, when present, has hue of 10YR or 2.5Y, value of 3 through 6 moist, 4 through 7 dry, and chroma of 1 through 4 moist and 2 through 4 dry. Texture is silty clay loam or silty clay with 35 to 45 percent clay and 0 to 10 percent paragravel.

COMPETING SERIES: This is the Wishkah series. Wishkah soils have an ochric epipedon and texture control section averaging 40 to 50 percent clay.

GEOGRAPHIC SETTING: The Chitwood soils are on coastal marine and valley terraces. Slopes are 0 to 15 percent. The soils formed in mixed old fine textured alluvial deposits from sedimentary rocks. Elevations range from 20 to 400 feet. The climate is characterized by cool wet winters and cool moist summers with fog and low clouds. The mean annual precipitation is 60 to 100 inches. The average January temperature is 43 degrees F. and the average July temperature is 61 degrees F. The mean annual temperature is 48 to 53 degrees F. The frost-free season is 160 to 300 days. These soils are on the Whiskey Run geomorphic surface.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Hebo and Knappa soils. Hebo soils have aquic conditions with redox concentrations at a depth of 10 inches or less. Knappa soils are well drained and have a texture control section that averages less than 35

percent clay. Hebo soils are on concave areas of terraces and Knappa soils are on nearly level to convex areas of terraces.

DRAINAGE AND PERMEABILITY: Somewhat poorly drained; slow permeability. An apparent high water table is at its uppermost limit from November through May.

USE AND VEGETATION: The soils are used for pasture and forage crops. Native vegetation is mainly of Douglas-fir, western hemlock, western redcedar, Sitka spruce, and red alder, rose, scattered rushes and sedges, vine maple, salmonberry, western swordfern, red elderberry, and grasses.

DISTRIBUTION AND EXTENT: Coastal valley and marine terraces of Western Oregon; MLRA 4A. The series is moderately extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: Tillamook County, Oregon, 1961.

74A - NEHALEM SERIES
The Nehalem series consists of very deep, well drained soils formed in mixed alluvium. Nehalem soils are on flood plains. Slopes are 0 to 3 percent. The mean annual precipitation is about 90 inches and the mean annual temperature is about 50 degrees F.

TAXONOMIC CLASS: Fine-silty, mixed, superactive, isomesic Fluventic Humudepts

TYPICAL PEDON: Nehalem silt loam, on a 1 percent slope at an elevation of 15 feet in pasture. When described on August 1, 1995, the soil was moist throughout. (Colors are for moist soil unless otherwise noted.)

Ap--0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; moderately acid (pH 5.8); clear smooth boundary.

A--9 to 16 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; moderately acid (pH 5.8); clear smooth boundary. (Combined thickness of the A horizon is 10 to 20 inches)

Bw--16 to 48 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; moderately acid (pH 6.0); gradual smooth boundary. (14 to 40 inches thick)

BC--48 to 60 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine and medium subangular blocky structure, slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; moderately acid (pH 6.0).

TYPE LOCATION: Tillamook County, Oregon; located about 900 feet North of the Kilchis River; about 2,200 feet north and 1,700 feet west of the southeast corner of section 12, T. 1 S., R. 10 W.; USGS Tillamook topographic quadrangle (Latitude 45 degrees, 29 minutes, 55 seconds N. and Longitude 123 degrees, 50 minutes, 55 seconds W.)

RANGE IN CHARACTERISTICS: The mean annual soil temperature is

49 to 55 degrees F. The difference between the mean summer and the mean winter soil temperature varies from 5 to 9 degrees F. The soil is usually moist and is dry in all parts between depths of 4 and 12 inches for a period of less than 45 consecutive days. Faint redox concentrations are below a depth of 20 inches in some pedons. The umbric epipedon is 10 to 20 inches thick. Depth to bedrock is more than 60 inches. The particle-size control section has 18 to 35 percent clay and less than 15 percent coarser than very fine sand. Lenses of coarser textured material are in some pedons.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 moist, 4 or 5 dry, and chroma of 2 or 3 moist and dry. It has 15 to 25 percent clay.

The Bw horizon has hue of 10YR or 7.5YR, value of 3 or 4 moist, 5 or 6 dry, and chroma of 3 to 6 moist and dry. It is silt loam or silty clay loam with 18 to 35 percent clay.

The BC horizon, when present, is similar to the Bw horizon. It has 18 to 35 percent clay.

The C horizon, when present, is loam, silt loam, or silty clay loam with 18 to 35 percent clay. It has 0 to 15 percent rock fragments. In some areas, texture is very fine sandy loam or fine sandy loam below a depth of 40 inches with 12 to 20 percent clay.

COMPETING SERIES: There are no other series in this family. The Nestucca series is similar. Nestucca soils are somewhat poorly drained and have distinct or prominent redox concentrations in the subsoil.

GEOGRAPHIC SETTING: Nehalem soils are on flood plains at elevations of 10 to 750 feet. Slopes are 0 to 3 percent. The soils formed in medium and moderately fine textured mixed alluvial materials. The climate is humid, characterized by cool, wet winters and cool, moist summers with fog. The mean annual temperature is 48 to 53 degrees F.

The mean annual precipitation is 60 to 100 inches. The frost-free period is 160 to 300 days. Nehalem soils occur on the Ingram geomorphic surface.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Brenner, Coquille, Gauldy and Nestucca soils. Brenner and Coquille soils are poorly and very poorly drained respectively. Gauldy soils are coarse-loamy over sandy or sandy-skeletal. These soils are on stream terraces.

DRAINAGE AND PERMEABILITY: Well drained; moderate permeability. Nehalem soils are subject to frequent or occasional flooding for brief periods.

USE AND VEGETATION: Nehalem soils are used for hay, pasture, and silage. Native vegetation is Douglas-fir, western hemlock, Sitka spruce, red alder, vine maple, swordfern and grasses.

DISTRIBUTION AND EXTENT: Flood plains of coastal river valleys in Western Oregon and Washington; MLRA 4A. The soil is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: Astoria Area, Clatsop County, Oregon, 1942.

77A NESTUCCA-BRENNER SERIES

The Brenner series consists of very deep, poorly drained soils on flood plains. They formed in recent alluvium derived from mixed sources. Slopes are 0 to 3 percent. The mean annual precipitation is about 80

inches and the mean annual temperature is about 52 degrees F.
TAXONOMIC CLASS: Fine-silty, mixed, superactive, acid, isomesic Fluvaquentic Humaquepts
TYPICAL PEDON: Brenner silt loam - pasture, at an elevation of 12 feet. (Colors are for moist soil unless otherwise noted. When described on September 13, 1999, the soil was moist from the surface to a depth of 40 inches and wet below.)
Ap--0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; few fine distinct brown (7.5YR 4/4) iron-manganese masses on peds and in pores; moderately acid (pH 5.8); clear smooth boundary.
A--7 to 12 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; many very fine roots; many very fine tubular pores; many fine distinct brown (7.5YR 4/4) iron-manganese masses on peds and in pores; many faint dark grayish brown (10YR 4/2) iron depletions on peds; strongly acid (pH 5.5); clear smooth boundary. (Combined thickness of the A horizon is 10 to 14 inches)
Bw1--12 to 18 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; moderate medium and fine subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; many very fine roots; many very fine tubular pores; many fine and medium distinct brown (7.5YR 4/4) iron-manganese masses on peds and in pores; strongly acid (pH 5.5); clear smooth boundary.
Bw2--18 to 26 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; moderate medium subangular blocky structure; moderately hard, firm, moderately sticky and moderately plastic; few very fine roots; many very fine tubular pores; common fine and medium prominent dark reddish brown (5YR 3/4) iron-manganese masses on peds and in pores; strongly acid (pH 5.5); gradual smooth boundary. (Combined thickness of the Bw horizon is 12 to 36 inches)
BC--26 to 40 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (2.5Y 5/2) dry; weak coarse prismatic structure; hard, firm, moderately sticky and moderately plastic; few very fine roots; common fine, very fine and few medium and coarse pores; many fine and medium

prominent yellowish red (5YR 4/6) iron-manganese masses in pores; strongly acid (pH 5.5); gradual smooth boundary. (0 to 35 inches thick)
Cg1--40 to 55 inches; greenish black (10Y 2.5/1) silty clay, very dark gray (10YR 3/1) dry; massive; very hard, firm, moderately sticky and moderately plastic; common very fine tubular pores; common fine and medium prominent strong brown (7.5YR 4/6) iron-manganese masses in pores; moderately acid (pH 5.8); gradual smooth boundary.
Cg2--55 to 60 inches; dark greenish gray (10Y 3/1) silty clay, grayish brown (2.5Y 5/2) and olive gray (5Y 5/2) dry; massive; extremely hard, very firm, moderately sticky and moderately plastic; few very fine tubular pores; moderately acid (pH 5.8).
TYPE LOCATION: Tillamook County, Oregon; about 1,100 feet south and 250 feet west of the northeast corner of section 20, T. 1 S., and R. 9 W. ; USGS Tillamook topographic quadrangle; Latitude 45 degrees, 27 minutes, 38 seconds N. and Longitude 123 degrees, 49 minutes, 25 seconds W. NAD 27.
RANGE IN CHARACTERISTICS: The soil is saturated with water during the winter, and unless drained has a water table at a depth of less than 40 inches during most of the growing season. Aquic conditions with redox depletions and concentrations or masses occur at depths of less than 14 inches. The mean annual soil temperature is 49 to 54 degrees F. The difference between mean summer and mean winter soil temperature varies from 5 to 9 degrees F. The solum is extremely acid through strongly acid. The umbric epipedon is 10 to 14 inches thick. The particle-size control section averages 18 to 30 percent clay and less than 15 percent coarser than very fine sand.
The A or Ap horizon has hue of 10YR and value of 2 or 3 moist, 4 or 5 dry, and chroma of 1 or 2 moist and dry. It has faint to prominent redoximorphic features. Texture is silt loam or silty clay loam with 20 to 35 percent clay.
The Bw or Bg horizon and BC horizon, when present, has hue of 10YR or 2.5Y, value of 3, 4 or 5 moist, 5 to 7 dry, and chroma of 1 or 2 moist and dry. It has distinct to prominent redoximorphic features. Texture is silty clay loam or silt loam with 18 to 35 percent clay, but thin lenses of finer material are in some pedons.
The C or Cg horizon has hue of 10YR to 10Y, value of 2.5 to 5 moist, 3 to 7 dry, and chroma of 2 to neutral. Texture is silty clay loam or silty clay with 27 to 50 percent clay. There are few strata of coarser textures in some pedons. It is extremely acid through moderately.

COMPETING SERIES: These are the Nestucca and the similar Willanch series. Nestucca soils have aquic conditions with depletions and redox concentrations at depths of 16 to 20 inches and have an umbric epipedon 14 to 20 inches thick. Willanch soils are coarse-loamy.
GEOGRAPHIC SETTING: The Brenner soils are in swales on flood plains adjacent to stream terraces. Slopes are 0 to 3 percent. Elevations range from 10 to 700 feet. The soils formed in silty mixed recent alluvium derived from basic igneous and sedimentary rocks. Water ponds in winter after heavy rains or when streams overflow leaving thin layers of fresh alluvium on the surface. The soils are characterized by cool wet winters and cool moist summers with fog. The mean annual precipitation is 60 to 100 inches. The average January temperature is 38 to 45 degrees F. and the average July temperature is 58 to 64 degrees F. The mean annual temperature is 48 to 53 degrees F. The frost-free season is 160 to 300 days. This soil is on the Ingram geomorphic surface.
GEOGRAPHICALLY ASSOCIATED SOILS: These are the Knappa, Nehalem, and the competing Nestucca soils. Knappa and Nehalem soils are well drained. Nehalem and Nestucca soils are on flood plains. Knappa soils are on adjacent terraces.
DRAINAGE AND PERMEABILITY: Poorly drained; very slow runoff or ponded; slow permeability. The soil is frequently flooded for brief periods during the winter and are saturated with water for several months each year. An apparent high water table is at its highest level from December through April.
USE AND VEGETATION: Most of the these soils have been cleared and drained. They are used for pasture, hay and silage, and wildlife habitat. A small acreage is still in forest of dominantly red alder with rushes and sedges.
DISTRIBUTION AND EXTENT: Flood plains of coastal river valleys in Western Oregon; MLRA 4a. The series is moderately extensive.
MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon
SERIES ESTABLISHED: Clastop County (Astoria Area), Oregon, 1945.

NESTUCCA SERIES
The Nestucca series consists of very deep, somewhat poorly drained soils that formed in recent alluvium. Nestucca soils are on flood plains and have slopes of 0 to 3 percent. The average annual precipitation is

about 80 inches and the average annual temperature is about 50 degrees F.
TAXONOMIC CLASS: Fine-silty, mixed, superactive, acid, isomesic Fluvaquentic Humaquepts
TYPICAL PEDON: Nestucca silt loam - pasture, at an elevation of 35 feet. (Colors are for moist soil unless otherwise noted.)
Ap--0 to 6 inches; dark brown (10YR 3/3) silt loam, brown (10YR 4/3) dry; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; strongly acid (pH 5.2); clear smooth boundary. (5 to 10 inches thick)
A--6 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; strongly acid (pH 5.2); clear smooth boundary. (5 to 10 inches thick)
Bw--14 to 41 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; moderate fine subangular blocky structure; slightly hard, firm, moderately sticky and moderately plastic; common very fine roots; common very fine tubular pores; many medium distinct reddish brown masses of iron accumulation; very strongly acid (pH 5.0); gradual smooth boundary. (15 to 30 inches thick)
C--41 to 60 inches; dark gray (10YR 4/1) silty clay, light brownish gray (10YR 6/2) dry; massive; hard, firm, very sticky and very plastic; few roots; few very fine pores; many coarse prominent dark reddish brown masses of iron accumulation; very strongly acid (pH 4.8).
TYPE LOCATION: Tillamook County, Oregon; 0.6 mile south of the Johnson Bridge across the Trask River; about 700 feet east and 700 feet south of the northwest corner of section 3, T. 2 S., R. 9 W., USGS Tillamook topographic quadrangle; Latitude 45 degrees, 25 minutes, 36 seconds N. and Longitude 123 degrees, 46 minutes, 43 seconds W.
RANGE IN CHARACTERISTICS: The soil is saturated and has a temporary water table during the winter unless they have been artificially drained. The mean annual soil temperature is 49 to 54 degrees F. The difference between mean summer and mean winter soil temperature varies from 5 to 9 degrees F. The umbric epipedon is 14 to 20 inches thick. The particle-size control section has less than 15 percent coarser than very fine sand. It is very strongly acid or strongly acid throughout. The Ap or A horizon has value of 2 or 3 moist, 4 or 5 dry and chroma of 1 to 3 moist and dry. It is silt loam or silty clay loam and has 18 to 35

percent clay.
The Bw or Bg horizon has hue of 10YR through 5Y, value of 4 or 5 moist, 5 through 7 dry and chroma of 1 or 2 moist and dry. Moist chroma of 1 is below 30 inches. It has distinct or prominent redox concentrations. It is silt loam or silty clay loam and has 25 to 35 percent clay. The lower part of the B horizon ranges to clay loam or silty clay in some pedons. Thin lenses of coarser material are in some pedons.
The Cg horizon has hue of 10YR to 5B, value of 2.5 to 5 moist, 3 to 7 dry, and chroma of 2 to neutral moist and dry. It ranges in texture from medium to fine and is stratified in some pedons. It is silty clay, clay loam, or loam. It has distinct or prominent redox concentrations.
COMPETING SERIES: This is the Brenner series. Brenner soils are poorly drained and have an umbric epipedon 10 to 14 inches thick.
GEOGRAPHIC SETTING: Nestucca soils are on flood plains. Slopes are 0 to 3 percent. Elevations range from 10 to 750 feet. The soils formed in mixed recent alluvial. The soils are characterized by cool wet winters and cool moist summers with fog. The average annual precipitation is 60 to 100 inches. The average January temperature is 42 degrees F., the average July temperature is 60 degrees F., the average annual temperature is 48 to 53 degrees F. The frost-free season is 160 to 300 days. This soil is on the Ingram geomorphic surface.
GEOGRAPHICALLY ASSOCIATED SOILS: These are the Knappa, Nehalem, Willanch, and the competing Brenner soils. Knappa soils are well drained, lack redox concentrations and are on adjacent terraces. Nehalem soils are well and moderately well drained and lack redox concentrations above a depth of 20 inches. Nehalem, Brenner, and Willanch soils are on flood plains. Knappa soils are on stream terraces.
DRAINAGE AND PERMEABILITY: Somewhat poorly drained; slow permeability. These soils are subject to frequent periods of flooding for brief durations from November through April. An apparent high water table is at its highest level from December through April.
USE AND VEGETATION: The soils are used for pasture and forage crops. Native vegetation is mainly red alder, western hemlock, western redcedar and Sitka spruce with an understory of skunkcabbage, willow, rush, and sedge.
DISTRIBUTION AND EXTENT: Coastal river valleys in western Oregon; MLRA 1. The series is moderately extensive.
MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: Tillamook County, Oregon, 1961.

103A - COQUILLE SERIES

The Coquille series consists of very deep, very poorly drained soils that formed in mixed alluvium along tidal influenced flood plains. Slopes are 0 to 1 percent. The mean annual temperature is about 51 degrees F. and the mean annual precipitation is about 80 inches.

TAXONOMIC CLASS: Fine-silty, mixed, superactive, nonacid, isomesic Fluvaquentic Endoaquepts

TYPICAL PEDON: Coquille silt loam, native vegetation. (Colors are for moist soil unless otherwise noted.)

A--0 to 6 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine irregular pores; moderately acid (pH 5.8); clear smooth boundary. (4 to 7 inches thick)

Bw--6 to 16 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; common very fine roots; many very fine tubular pores; many very fine distinct dark yellowish brown (10YR 4/6) redox concentrations; moderately acid (pH 6.0); clear smooth boundary. (8 to 20 inches thick)

C2--16 to 30 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; many very fine and fine, prominent strong brown (7.5YR 5/6) redox concentrations; moderately acid (pH 6.0); clear smooth boundary. (8 to 30 inches thick)

2Cg--30 to 60 inches; dark gray (5Y 4/1) silt loam, light brownish gray (2.5Y 6/2) dry; massive; slightly hard, friable, slightly sticky and slightly plastic and very fluid; common very fine roots; many very fine tubular pores; slightly acid (pH 6.4).

TYPE LOCATION: Clatsop County, Oregon; about 175 feet N.E. of boat ramp slough; SE1/4SW1/4NW1/4 section 13, T. 8 N., R. 9 W.

RANGE IN CHARACTERISTICS: The soil has a permanent high water table at or near the surface and fluctuates with the tides unless diked and drained. Extreme high tides and high tides along with peak freshwater flows inundate the soil unless protected by dikes or levees. The mean annual soil temperature is 47 to 54 degrees F. The difference between mean summer and mean winter soil temperature varies from 5 to 9 degrees F. Depth to the massive dark gray 2Cg horizon is 24 to 50 inches. The particle-size control section averages 20 to 35 percent clay and less than 15 percent coarser than very fine sand. Under natural conditions soil pH is moderately acid to neutral. When diked and drained soil pH is extremely acid to very strongly acid, but may be strongly acid to moderately acid below 40 inches.

The A horizon has hue of 2.5Y or 10YR, value of 3 or 4 moist, 5 or 6 dry and chroma of 1 or 3. It is silt loam or silty clay loam and has 20 to 30 percent clay.

The C horizon has hue of 10YR, 2.5Y or 5Y, value of 3 or 4 moist, 6 or 7 dry and chroma of 2. It is silt loam or silty clay loam and has 20 to 35 percent clay. In some pedons it has thin lenses of fibrous peat less than 4 inches thick or has thin sand layers. It has common or many distinct or prominent redox concentrations with 10YR to 5YR hue.

The 2C or 2Cg horizon has hue of 2.5Y to 5BG, value of 2.5, 3 or 4 moist, 6 or 7 dry and chroma of 1 or less moist and 2 or less dry. It

consists of bay sediments stratified with medium to fine textured materials and thin fine lenses of peat and coarse textured materials. Some pedons have fine sand substratums below 40 inches. It is loam, silty clay loam, silty clay or clay with 25 to 65 percent clay.

COMPETING SERIES: There are no competing series.

GEOGRAPHIC SETTING: Coquille soils have formed in slightly higher areas of tide influenced flood plains along bays and streams that flow into the ocean. The soils formed in recent alluvium over massive bay sediments. Slopes are 0 to 1 percent. They are at elevations of 0 to 20 feet and are subject to tidal and freshwater overflow unless protected by dikes or levees. The climate is characterized by cool moist summers and cool wet winters. The mean annual precipitation is 60 to 120 inches. The average July temperature is about 59 degrees F. the average January temperature is about 38 degrees F. The mean annual air temperature is 45 to 54 degrees F. The frost-free season is 180 to 245 days. The soils are on the Ingram geomorphic surface.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Brallier, Brenner, Clatsop, Nehalem and Nestucca soils. Brallier soils are Histosols. Brenner, Nehalem and Nestucca soils have umbric epipedons and are on flood plains. Clatsop soils have a histic epipedon.

DRAINAGE AND PERMEABILITY: Very poorly drained; very slow runoff or ponded; slow permeability. Subject to tidal and freshwater overflow unless protected by dikes or levees.

USE AND VEGETATION: Native vegetation consists primarily of willow, salmonberry, tussocks, tufted hairgrass, Oregon gumweed, Douglas aster, saltgress, seaside plaintain and pickleweed.. Where protected by dikes or levees and drained, permanent pasture is the major use. In the unprotected area, Coquille soils are important for wetland wildlife habitat.

DISTRIBUTION AND EXTENT: Tide influenced areas of western Oregon, California and Washington; MLRA 4A and 4B. The series is not extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: Marshfield Area, Oregon, 1909.

Phosphorus Index Report

Kuipers Farms LLC - 2020

Tillamook

Field	Acres	Soil	Soil Test Date	Bray P (ppm)	Olsen (ppm)	K (ppm)	pH	TFS	SFS	Score	Rating
Tupper Front	26.2	77A, Nestucca	09/29/2020	29.0		927.0	5.3	5.0	9.211	14.21	Low
Eckloff	73.1	77A, Nestucca	06/09/2020	16.0		300.0	5.0	5.0	8.043	13.04	Low
Tupper Rear	11.9	103A, Coquille	10/06/2020	35.0		504.0	5.3	4.0	19.37	23.37	Low
Home Place	48.1	77A, Nestucca	09/29/2020	29.0		1211.0	6.2	5.0	9.611	14.61	Low
Back 20	20.0	103A, Coquille	09/29/2020	29.0		1211.0	6.2	4.0	10.09	14.1	Low
Christy	21.0	74A, Nehalem	09/29/2020	25.0		1062.0	6.2	4.75	10.14	14.9	Low
Port	44.2	74A, Nehalem	10/06/2020	25.0		1211.0	5.8	4.0	17.18	21.19	Low

PI Interpretations

P-Index Rating	Interpretation for Oregon	Recommended Nutrient Limitation
West PI Score<=25 or East PI Score<=100	The site has a LOW potential for P movement from the site. If farming practices are maintained at current levels, the probability of an adverse impact to surface water resources from P losses from this site are low.Phosphorus can be applied at rates greater than crop requirement	Nitrogen
West PI Score 25.1 to 50 or East PI Score 100.1 to 400	The site has a MEDIUM potential for P movement from the site. The probability for an adverse impact to surface water resources is greater than that from a LOW vulnerability rated site. Some remedial action should be taken to lessen the probability of P movement. Phosphorus can be applied not to exceed the crop requirement rate for phosphorus.	Phosphorus
West PI Score 50.1 to 75 or East PI Score 400.1 to 600	The site has a HIGH potential for P movement from the site. There is a high probability for an adverse impact to surface water resources unless action is taken to reduce the risk of P movement and probable water quality degradation. Phosphorus can be applied not to exceed the crop removal rate of phosphorus if the following requirements are met: A soil phosphorus drawdown strategy has been implemented, and a site assessment for nutrients and soil loss has been conducted to determine if mitigation practices are required to protect water quality.	Phosphorus
West PI Score >75 or East PI Score >600	ZERO OUT- The environmental threshold above which the risk of P loss from a field is too great to warrant the application of phosphorus for plant production.	No Manure

SUPPLEMENTAL

CAFO NPDES General Permit #01-2016
Issuance Date: March 31, 2016
Effective Date: April 20, 2016
Expiration Date: February 28, 2021

OREGON CONFINED ANIMAL FEEDING OPERATION NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT NUMBER 01-2016

Oregon Department of Agriculture

State of Oregon
Department of Agriculture
Confined Animal Feeding Operation Program
and
Department of Environmental Quality
Water Quality Division

DEQ
State of Oregon Department of Environmental Quality

In compliance with the provisions of Oregon Revised Statutes (ORS) Chapter 468B,
Oregon Administrative Rules (OAR) Chapter 340, Divisions 40, 45 and 51 and Chapter 603, Division 74,
the Federal Water Pollution Control Act as amended (The Clean Water Act),
Title 33 United States Code, Section 1251 et seq., and
the National Pollutant Discharge Elimination System (NPDES) program.

Until this permit expires or is modified or revoked, permit registrants who have properly obtained coverage under this permit are authorized to discharge to waters of the state in accordance with the special and general conditions that follow.

Ray Jaindl, Director
Natural Resources and Pesticides
Oregon Department of Agriculture

Lydia Emer
Operations Division Administrator
Oregon Department of Environmental Quality

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Special Conditions

General Conditions

SPECIAL CONDITIONS

DEFINITIONS

1. "25-year, 24-hour rainfall event" means an event with a probable recurrence interval of once in twenty-five years as defined by the National Weather Service in Technical Paper Number 40, "Rainfall Frequency Atlas of the United States," May 1961, or equivalent regional or state rainfall probability information developed from this source.
2. "40 CFR" means Title 40 of the Code of Federal Regulations (2014).
3. "Agency" means Oregon Department of Environmental Quality or Oregon Department of Agriculture.
4. "Agricultural stormwater" is defined at 40 CFR § 122.23(e).
5. "Animal waste management plan" or "AWMP" or "waste management plan" means a written document containing the minimum elements necessary to manage manure, litter, and process wastewater from operations covered by this permit in accordance with the terms and conditions of this permit.
6. "Agronomic application rate" means the rate or amount of nutrients applied to the soil for utilization by growing or planned crops such that the crops remove the same or greater amount of nutrients provided by the agronomic application.
7. "Bedding" means any absorbent material that is used to provide animal cleanliness and comfort in a confinement system. Bedding materials include but are not limited to: straw; sawdust; wood shavings; grass seed cleanings; recycled, composted, or dried manure solids; and recycled paper products. Bedding that comes into contact with animals, manure, litter, or process wastewater is determined to be manure, litter, or process wastewater for purposes of this permit.
8. "Confined animal feeding operation" or "CAFO" as defined in OAR 603-074-0010(3) and OAR 340-051-0010(2) means:
   (a) The concentrated confined feeding or holding of animals or poultry, including but not limited to horse, cattle, sheep, or swine feeding areas, dairy confinement areas, slaughterhouse or shipping terminal holding pens, poultry and egg production facilities and fur farms:
      (i) In buildings or in pens or lots where the surface has been prepared with concrete, rock or fibrous material to support animals in wet weather; or
      (ii) That have wastewater treatment works; or
      (iii) That discharge any wastes into waters of the state; or
   (b) An animal feeding operation that is subject to regulation as a concentrated animal feeding operation pursuant to 40 CFR § 122.23.
9. "Director" means the director of the State of Oregon Department of Environmental Quality or director of the State of Oregon Department of Agriculture or their authorized designee(s).
10. "Discharge" when used without qualification means the "discharge of a pollutant." "Discharge of a pollutant" is defined at 40 CFR § 122.2.
11. "Dry waste" means any solid manure, litter, bedding, or waste feed that cannot be transferred or applied with a pump or pipe system. Precipitation that comes into contact with dry waste does not change dry waste into wet waste. Dry waste may contain urine, manure, leachate or incidental process wastewater that has been absorbed into the feces, and used bedding materials in amounts that allow the waste to retain the dry characteristic so that the material cannot be transferred or applied with a pump or through a pipe.
12. "Dry waste treatment works" means any plant or other works used for the purpose of treating, stabilizing or holding wastes as a dry, solid substance. Dry waste treatment works for purposes of this permit do not utilize pumps or pipes to transfer or apply dry waste and typically do not need any added water or liquid to transfer or apply dry waste. Dry waste treatment works include but are not limited to manure piles and covered dry manure stack storage facilities.
13. "Dry-weather discharge" means a discharge of manure, litter or process wastewater from a land application area that is not defined as Agricultural Stormwater (40 CFR 122.23(e)) and where the land application of manure, litter, or process wastewater has not met all the site-specific nutrient management practices contained in the department-approved Animal Waste Management Plan and specified in 40 CFR 122.42(e)(1)(vi)-(xi). Dry weather discharges include but are not limited to: discharges through tile drains, discharges combined with irrigation water, infiltration of nutrients below the crop root zone, discharges due to failure of manure application or irrigation equipment.
14. "Frozen soil" means soil that has a soil temperature of 32° F (or 0° C) or less in any three (3) continuous inches of the top 12 inches of soil.

15. "Groundwater" means water in a saturated zone or stratum beneath the surface of land or below a surface water body.
16. "Manure" means solids or liquids excreted from an animal or other material (for example, bedding, compost, litter, feed waste, silage leachate, raw materials such as feed or silage) that comes into contact with solid or liquid excreted from an animal .
17. "OAR" means Oregon Administrative Rule.
18. "ORS" means Oregon Revised Statute.
19. "Overflow" means the discharge of manure or process wastewater resulting from the filling of wastewater or manure storage structures beyond the point at which no more manure, process wastewater, or stormwater can be contained by the structure.
20. "Person" is defined at 40 CFR § 122.2.
21. "Point source" is defined at 40 CFR § 122.2.
22. "Pollutant" is defined at 40 CFR § 122.2.
23. "Pollution" or "water pollution" is defined at ORS 468B.005(5).
24. "Process wastewater" or "process wastes" means water directly or indirectly used in the operation of the CAFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning or flushing pens, barns, manure pits, or other CAFO facilities; direct contact swimming, washing, or spray cooling of animals; or dust control. Process wastewater or process wastes also includes any water that comes into contact with any raw materials, products, or byproducts including manure, litter, feed, milk, eggs, or bedding. OAR 340-051-0010(5) and OAR 603-074-0010(17)
25. "Production area" means that part of a CAFO that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas. The animal confinement area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milkrooms, milking centers, cowyards, barnyards, medication pens, walkers, animal walkways, and stables. The manure storage area includes but is not limited to lagoons, runoff ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles. The raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials. The waste containment areas include but are not limited to settling basins, and areas within berms and diversions that separate uncontaminated stormwater. Also included in the definition of production area is any egg washing or egg processing facility, and any area used in the storage, handling, treatment, or disposal of animal mortalities. OAR 340-051-0010(6) and OAR 603-074-0010(18)
26. Quantitation Limits (QLs) – The QL is the minimum level, concentration or quantity of a target analyte that can be reported with a specified degree of confidence. It is the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration for the analyte. It is normally equivalent to the concentration of the lowest calibration standard adjusted for sample weights, volumes, preparation and cleanup procedures employed. The QL as reported by a laboratory is also sometimes referred to as the Method Reporting Limit (MRL) or Limit of Quantitation (LOQ).
27. "Saturated soil" means soil with all available pore space filled that has reached its maximum retentive capacity as defined in "Qualitative Description of Soil Wetness" (Brady, N. and Weil, R., p. 201, 2007).
28. "Setback" as defined at 40 CFR §412.4(b)(1) means a specified distance from surface water or potential conduits to surface water where manure, litter, and process wastewater may not be land applied. Examples of conduits to surface water include but are not limited to: Open tile line intake structures, sinkholes, and agricultural well heads.
29. "Treatment works" means any plant or other works used for the purpose of treating, stabilizing or holding wastes. ORS 468B.005(8)

30. "Vegetative buffer" as defined at 40 CFR §412.4(b)(2) means a narrow, permanent strip of dense perennial vegetation established parallel to the contours of and perpendicular to the dominant slope of the field for the purposes of slowing water runoff, enhancing water infiltration, and minimizing the risk of any potential nutrients or pollutants from leaving the field and reaching surface water.

31. "Waste storage facilities" means the physical system used for the isolation and retention of process wastes on the confined animal feeding operation until their ultimate utilization.

32. "Wastes" is defined at ORS 468B.005(9).

33. "Water" or "waters of the state" is defined at ORS 468B.005(10).

34. "Waters of the U.S." is defined at 40 CFR § 122.2.

35. "Wet waste" means any liquid manure, contaminated stormwater, process wastewater, liquid feed waste and silage or manure leachate. Wet waste may include solid material particles that are suspended or dissolved in the liquid.

36. "Wet waste treatment works" means any plant or other works used for the purpose of treating, stabilizing or holding wet wastes. .Wet waste treatment works for purposes of this permit include, but are not limited to: tanks or lagoons to store wet waste; pumps, pipes, curbs, gutters, and collection sumps to direct, collect, transfer, or apply wet wastes; and any system that separates dry waste from wet waste.

S1. PERMIT COVERAGE

S1.A. When is a permit required and which CAFOs are covered by this permit?

1. Any person who owns or operates a confined animal feeding operation (CAFO) that discharges to surface water of the state is required to obtain NPDES permit coverage. NPDES General Permit #01 provides coverage for the types of CAFOs listed in Table 1 below that discharge to surface water of the state. This includes concentrated animal feeding operations defined at 40 CFR § 122.23 that discharge to waters of the U.S.

2. Any person not wishing to be covered by this permit may apply for an NPDES individual permit in accordance with OAR 340-045-0030. In addition, the director may require coverage under an NPDES individual permit pursuant to the provisions in OAR 340-045-0033 and OAR 603-074-0012.

S1.B. Can I elect coverage under this permit even if my CAFO does not discharge to surface water?
Any person who owns or operates a CAFO that does not discharge to surface water of the state may voluntarily elect to be covered under this permit. Any person making such an election is subject to all applicable requirements of this permit.

Table 1: Classification of CAFOs that require coverage by NPDES General Permit #01

Type of CAFO discharging to surface water of the state	Small	Medium	Large
mature dairy cows[1]	<200	200-699	≥700
veal calves	<300	300-999	≥1,000
cattle[2]	<300	300-999	≥1,000
swine ≥ 55 lbs	<750	750-2,499	≥2,500
swine < 55 lbs	<3,000	3,000-9,999	≥10,000
horses	<150	150-499	≥500
sheep or lambs	<3,000	3,000-9,999	≥10,000
turkeys	<16,500	16,500-54,999	≥55,000
chickens, including laying hens or broilers w/wet waste system	<9,000	9,000-29,999	≥30,000
laying hens w/dry waste system	<25,000	25,000-81,999	≥82,000
broiler chickens w/dry waste system	<37,500	37,500-124,999	≥125,000
ducks w/other than wet waste system	<10,000	10,000-29,999	≥30,000
ducks w/wet waste system	<1,500	1,500-4,999	≥5,000
other animal type[3]	Designated by director.	Designated by director.	Designated by director.

[1] Whether milked or dry.
[2] Other than mature dairy cows or veal calves; cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs.
[3] To determine the number of animals that require permit coverage, ODA will compare the operation to the most similar animal type in the table.

S1.C. How do I apply for permit coverage?

1. New Application
   To obtain permit coverage for the first time, a person must submit to ODA an ODA *Application to Register* (*ATR*), Land Use Compatibility Statement (LUCS), Animal Waste Management Plan (AWMP), and application fee. The application, LUCS, AWMP, and fee must be submitted to ODA at least 180 days prior to the time permit coverage is needed or as specified by ODA in writing. For information on AWMP requirements, see S3, p. 13.

2. Renewal of Permit Coverage
   To renew permit coverage, the permit registrant must submit an ODA renewal application at least 180 days before the expiration date of this permit or as specified by ODA in the renewal notice but no later than the expiration date of this permit. Applicants must certify on their renewal application whether an AWMP is new, updated or current and on file. New and updated animal waste management plans must be submitted with the application.

3. Notification of Permit Coverage
   ODA will review the application and notify the applicant in writing when permit coverage is approved or denied. Permit coverage does not begin until written notice is issued by ODA to the applicant. Written notification will include a *Notice of Registration* that will include the following information:
   (a) The owner and operator's legal name;
   (b) Facility name and location;
   (c) Contact information, including mailing address and telephone number;
   (d) Effective date of permit coverage;
   (e) Maximum number of animals allowed at the facility; and
   (f) Regulatory status of the operation. ODA will use the following classifications for regulatory status:
      (i) *Large concentrated animal feeding operation* as defined in 40 CFR § 122.23(b)(4);
      (ii) *Medium concentrated animal feeding operation* as defined in 40 CFR § 122.23(b)(6);
      (iii) *Small concentrated animal feeding operation* as defined in 40 CFR § 122.23(b)(9) and designated by the director pursuant to OAR 603-074-0012;
      (iv) *Elective large, medium, or small CAFO* sized according to Table 1, p. 6.

S1.D. How do I transfer permit coverage to a new owner or operator?

The permit registrant must complete an ODA transfer form and submit it to ODA for approval at least 30 days before transfer of the CAFO is scheduled to occur or as specified by ODA. The form must be signed by the previous owner or operator as well as the new owner or operator. ODA will respond to the request for transfer by conducting a site inspection and a review of the permit file. ODA will notify the permit registrant and transferee in writing of transfer of coverage under this permit or deny the request with an explanation of why the request was denied.

S1.E. What activities are covered by this permit?

1. This permit covers the discharge of pollutants resulting from processes, wastes, and operations that are properly identified by the registrant through its AWMP approved by ODA.

2. This permit does not cover disposal of human wastes or treatment works that mix human and animal wastes. Any person owning or operating such a system must apply to DEQ for coverage under an individual or general permit issued pursuant to ORS 468B.050. This general permit may be used in addition to an individual or general permit issued by DEQ pursuant to ORS 468B.050 that covers some other type of wastewater at this same facility, for example, septic system wastewater.

3. Pursuant to 40 CFR § 122.23(e), precipitation-related discharges that qualify as agricultural stormwater discharges from land application areas are not subject to NPDES permit requirements. For discharges from the land application area to meet the definition of agricultural stormwater, manure and wastewater must be applied in accordance with site specific practices listed in the ODA-approved AWMP that ensure appropriate agricultural utilization of nutrients.

S1.F. How do I cancel permit coverage?

1. ODA will cancel coverage under this permit upon issuance of an appropriate individual permit by ODA and DEQ or coverage under WPCF General Permit #01 is granted by ODA.

2. Any permit registrant may request in writing to ODA that coverage under this permit be cancelled if any one of the following applies:
   (a) Conditions or standards have changed so that the CAFO no longer qualifies for or is required to have coverage under this permit.
   (b) The permit registrant no longer has animals on site and all waste storage and control facilities have been cleaned and re-purposed or decommissioned in accordance with the following requirements:
      (i) Cleaning/Re-purposing Requirements
         (1) All liquid and solid manure, litter and process wastewater must be removed from the structure(s) and either land applied according to the ODA-approved AWMP or exported according to S2.K, p. 12.
         (2) All liquid storage facilities that could fill with rain water must be flushed with clean water, the flush water land applied or exported according to S2.K, p. 12 and the remaining liquid in the structure tested to confirm the *E. coli* level is at or below the water quality standard of 406 Colony Forming Units/100ml of sample.
         (3) All liquid transfer systems are cleaned and modified so that they are not a conduit for any pollutant to enter surface water or groundwater.
      (ii) Decommissioning Requirements
         (1) All liquid and solid manure, litter and process wastewater must be removed from the structure(s) and either land applied according to the approved AWMP or exported according to S2.K, p. 12.
         (2) If the structure has a synthetic liner, the liner must be removed and disposed or recycled in a lawful manner.
         (3) After completion of [(ii)(*1*)] above, any earthen structure must be filled with soil and returned to the grade matching the surrounding area. All soil fill and remaining exposed soil must be seeded to site-appropriate grass or ground cover to prevent erosion.

3. The permit registrant must also certify that it will not commence operation of a regulated CAFO at the same location until the appropriate NPDES or WPCF permit coverage has been obtained.

4. ODA will respond to the request for cancellation by conducting a site inspection and a review of the permit file. ODA will notify the permit registrant in writing of termination of coverage under this permit or deny the request with an explanation of why the request was denied.

S1.G. Will my information be kept confidential?

Information, including the name and address of an NPDES permit applicant or permit registrant, NPDES permit applications (for example, ODA *ATRs*) and their attachments (for example, AWMPs), NPDES permits, and NPDES permit discharge data cannot be kept confidential pursuant to 40 CFR § 122.7(b) and (c), ORS 468.095(1), and ORS 192.410 to 192.505. The applicant or permittee may request that director classify other records as confidential upon a proper showing that the record is a trade secret pursuant to ORS 468.095(2).

S1.H. What are the public notice and participation requirements of this permit?

1. Prior to approving new permit coverage, renewing permit coverage, or approving proposed substantial changes to an AWMP, ODA will provide public notice and participation as detailed in Table 2, p. 9.

2. ODA may batch multiple notices as regionally appropriate.

3. Application and permit documents (for example, Application to Register, renewal application, AWMP, Land Use Compatibility Statement) will be available for public review at ODA headquarters and appropriate field offices. If available, electronic copies of documents will be provided upon request.

4. ODA will schedule public hearings if written requests for public hearing are received during the comment period from at least 10 persons or from an organization or organizations representing at least ten persons. If a hearing is scheduled, ODA will provide at least 30 days notice before the hearing is held. The public comment period will remain open for additional comments for at least seven (7) days after the public hearing.

S1.I. **Table 2: NPDES Public Notice Requirements**

	New Application	Renewal Application	AWMP Changes
Permit Action	(a) Receipt of ODA *ATR* (*Application to Register*) for existing operation not currently under an NPDES permit or new proposed operation	(b) Receipt of renewal application	(c) Receipt of proposed substantial change to CAFO's AWMP (See S3.D, p. 14)
Public Participation Process	(i) Public notice of a comment period of at least 35 days provided as follows: • Published in regional newspaper; • Posted on ODA and DEQ websites; and • Emailed to interested persons list maintained by ODA. (ii) Opportunity for public hearing. See S1.H.4. (iii) A written response to relevant comments will be developed by ODA and made available to interested persons.	(i) Public notice of a comment period of at least 35 days provided as follows: • Posted on ODA and DEQ websites; and • Emailed to interested persons list maintained by ODA. (ii) Opportunity for public hearing. See S1.H.4. (iii) A written response to relevant comments will be developed by ODA and made available to interested persons.	(i) Public notice of a comment period of at least 35 days provided as follows: • Posted on ODA and DEQ websites; and • Emailed to interested persons list maintained by ODA. (ii) Opportunity for public hearing. See S1.H.4. (iii) A written response to relevant comments will be developed by ODA and made available to interested persons.
Contents of Public Notice	• Name of operation • Name of operator or owner if different than operator, mailing address, and telephone number • Physical address of operation • Type of operation • Number of animals proposed • Land Use Compatibility Statement (LUCS) • Summary of AWMP	• Name of operation • City, county, and zip code • Permit registration number • Type of operation	• Name of operation • City, county, and zip code • Permit registration number • Type of operation • Overview of proposed substantial change

S2. DISCHARGE LIMITATIONS AND OPERATING REQUIREMENTS

S2.A. Prohibitions and Discharge Limitations

1. The permit registrant must not discharge manure, litter, or process wastewater to surface water and groundwater of the state except as allowed in S2.B and S2.C and provided these surface water discharges do not exceed the following effluent limits.
   (a) *E. coli* must not exeed zero organisms/100 mL or quantitation limit of 2 Colony Forming Units/100 mL or 0.0 most probable number/100 mL;
   (b) Nitrate plus Nitrite Nitrogen (NO_3+$N0_2$) must not exceed zero mg/L or quantitation limit of 0.1 mg/L;
   (c) Total Phosphorus (P) must not exceed zero mg/L or quantitation limit of 0.1 mg/L.

   Types of discharge that are prohibited include but are not limited to: contaminated runoff from confinement or waste accumulation areas; overflow or discharges from waste storage facilities; discharges due to improper land application activities from seepage below the root zone, surface drainages or field tile outlets; dry-weather discharges, discharges due to equipment failure; leakage or seepage from facilities in the production area in excess of approved designs; and discharges to underground injection control (UIC) systems.

2. Compliance with the effluent limits above must be determined by laboratory test results of a representative grab sample of the discharge taken at the time of occurrence. If a grab sample is not taken, then the permit registrant is in violation of the effluent limits.

S2.B. Production Area Limitations

1. For all CAFOs (except swine, poultry, and veal *large* CAFOs, the construction of which commenced after April 14, 2003):
   The permit registrant must not discharge manure, litter, or process wastewater to surface water of the state from the production area, except when:
   (a) Rainfall events cause an overflow of waste management and storage facilities designed, constructed, operated, and maintained to contain all manure, litter, and process wastewater, including the runoff and direct precipitation, from a 25-year, 24-hour rainfall event; and
   (b) The production area is operated in accordance with the applicable inspection, maintenance, recordkeeping, and reporting requirements of this permit.

2. For swine, poultry, and veal *large* CAFOs the construction of which commenced after April 14, 2003:
   The permit registrant must not discharge manure, litter, or process wastewater from the production area to surface water of the state.

3. The permit registrant must properly land apply manure, litter, and wastewater from the production area in a manner consistent with S2.C. All other authorized discharges from the production area must be managed to minimize impacts on surface water and groundwater of the state and meet the effluent limits in S2.A above.

4. The permit registrant must not exceed the seepage design rates approved by ODA for waste storage or animal confinement facilities in the production area and seepage to groundwater from these facilities must not violate state groundwater quality protection standards.

5. ODA will inform a permit registrant if any additional limits or controls are necessary to be consistent with the wasteload allocations in an EPA-approved or issued Total Maximum Daily Load for NPDES permit coverage or if coverage to an individual NPDES is necessary.

S2.C. Land Application Limitations

1. To prevent discharges to waters of the state, the permit registrant must apply manure, litter, or process wastewater to land application areas at agronomic rates in accordance with the permit registrant's ODA-approved AWMP. Land application areas include land under the control of the permit registrant, to which manure, litter, or process wastewater from the production area is or may be applied.

2. The permit registrant's discharges to groundwater due to seepage below the root zone of the crop or by other means must not violate state groundwater quality protection standards.

3. The permit registrant is allowed to apply manure, litter, or process wastewater to frozen soil provided:
   (a) The AWMP addresses such applications [see S3.C.2(k), p. 14];
   (b) The application does not result in a discharge to surface water or groundwater, except as allowed in S2.B and S2.C; and
   (c) Land applications do not cause or contribute to a violation of state water quality standards.

4. The permit registrant must not apply manure, litter, or process wastewater to saturated soils immediately before or during rainfall events that are expected to result in surface runoff. If the permit registrant makes such an application because it is a desired alternative to allowing waste storage or treatment works to overflow (for example, land application to saturated soils to pond wastewater onsite provides for greater protection of surface water than a direct overflow of a waste storage tank to surface water), the application will be considered a violation of this permit.

5. ODA will inform a permit registrant if any additional limits or controls are necessary to be consistent with the wasteload allocations in an EPA-approved or issued Total Maximum Daily Load for NPDES permit coverage or if coverage to an individual NPDES is necessary.

S2.D. Direct Access by Animals to Surface Water of the State in the Production Area Prohibited

The permit registrant must prevent direct animal contact with surface water of the state in the production area of its CAFO. Direct animal contact means any situation where animals in the production area have free access and are allowed to loiter or drop waste in surface water. Direct contact with surface water of the state by animals on pasture or rangeland is not, by itself, a violation of this permit.

S2.E. Waste Storage Facilities

1. The permit registrant must provide adequate storage capacity for solid and liquid wastes at all times so that land application occurs only during periods when soil and weather conditions allow for agronomic application and are in compliance with the Land Application Limitations in S2.C, p. 10 of this permit.

2. The permit registrant must site, design, construct, operate, and maintain all waste storage facilities to contain all manure, litter, process wastewater, and stormwater runoff and direct precipitation from a 25-year, 24-hour rainfall event for the storage period established in the ODA-approved AWMP. New and modified construction of waste facilities must be approved in advance and prior to construction by ODA in conformance with ORS 468B.055 and OARs 340-051 and 603-074.

3. Permit registrants with a *large* CAFO must also have depth markers in all surface liquid impoundments (for example, lagoons, ponds, tanks) designed to clearly indicate the:
   (a) Maximum design volume,
   (b) Minimum capacity necessary to contain the 25-year, 24-hour rainfall event, including additional freeboard requirements, and
   (c) Depth of manure and process wastewater.

S2.F. Prevention of System Overloading

1. The permit registrant may not increase the number of animals over 10% or 25 animals, whichever is greater, of the maximum number assigned by ODA in the *Notice of Registration and General Permit Summary* until an updated plan is approved in writing by ODA (see S3.B AWMP Submittal, p. 13, and S3.D Requirements for AWMP Updates and Changes, p. 14).

2. The permit registrant must ensure that animal numbers do not exceed the capacity of the waste storage facilities described in the ODA-approved AWMP.

S2.G. Handling of Animal Mortalities

The permit registrant must not dispose of animal mortalities in liquid manure or treatment works. Animal mortality composting is allowed and must be described in the Animal Waste Management Plan. The permit registrant must handle animal mortalities in such a way as to prevent discharge of pollutants to waters of the state (surface water and groundwater).

S2.H. Proper Operation and Maintenance

The permit registrant must at all times properly operate and maintain all facilities and systems used for process wastewater collection, storage and utilization, and correct any deficiencies found as soon as possible.

S2.I. Maintaining Compliance if System Fails

The permit registrant must control all applications and discharges upon reduction, loss, or failure of the waste storage or utilization facilities until the facilities are restored or an alternative method of storage or utilization is provided. This requirement also applies when the primary source of power is reduced, lost, or fails.

S2.J. Setback Requirement

The permit registrant must develop and maintain setbacks or vegetated buffers when manure, litter, or process wastewater application occur adjacent to any surface water, open tile intake structures, sinkholes, well heads, or other conduits to surface water or groundwater. The permit registrant must also include descriptions of setbacks, vegetated buffers, and/or equivalent measures in its AWMP. Compliant setbacks, vegetated buffers, or equivalent measures include the following:

1. 100 ft. setbacks (non-vegetated, non-managed buffers).
2. 35 ft. vegetated, managed buffers.
3. If approved by ODA, variable-width, seasonal setbacks determined by the type of manure, litter or process wastewater and application method used.
4. If approved by ODA, a demonstration that a setback or vegetated buffer is not necessary or may be reduced in size because implementation of alternative conservation practices or field-specific conditions will provide equivalent or better environmental protection than [1., 2. and 3.] above.

S2.K. Manure, Litter, or Process Wastewater Transfers

1. The permit registrant retains responsibility of the manure, litter, or process wastewater until the transfer or export is completed with the required documentation.

2. The permit registrant must maintain manure, litter, or process wastewater transfer or export records as required by S4.C.2(d), p. 19.

3. Prior to transferring manure, litter, or process wastewater to other persons, the permit registrant with a *large* CAFO must provide the recipient of manure, litter, or process wastewater with a manure nutrient analysis conducted within the previous 12 months.

S2.L. Proper Disposal of Other Wastes

The permit registrant must dispose of any chemicals or other wastes in accordance with applicable state regulation. The permit registrant must manage chemicals and wastes to prevent their disposal in any manure, litter, process wastewater, or stormwater storage or treatment system unless specifically designed to treat these wastes and the wastes and treatment systems are identified in the AWMP. The permit registrant must not dispose of chemicals or other wastes to any system used for the control of uncontaminated stormwater.

S3. ANIMAL WASTE MANAGEMENT PLAN

S3.A. Animal Waste Management Plan (AWMP) Implementation and Compliance

1. Upon registration to this permit, the permit registrant must implement its current ODA-approved AWMP developed for its CAFO.

2. The permit registrant's ODA-approved AWMP is incorporated into this permit by reference. The permit registrant must comply with all terms and conditions of its ODA-approved AWMP. Failure to comply with the ODA-approved AWMP constitutes a violation of the terms and conditions of this permit.

S3.B. AWMP Submittal and Public Notice

1. The applicant applying for permit coverage for the first time must submit its AWMP with the ATR to ODA for review and approval according to the schedule provided in S1.C, p. 7.

2. The existing permit registrant with coverage under NPDES General Permit #01 or another permit may submit its AWMP previously approved by ODA with the *Application to Register or Renewal Application* for review and approval according to the requirements in S1.C, p.7

3. AWMPs are subject to public notice requirements detailed in S1.H, p. 8.

S3.C. AWMP Elements

1. The permit registrant must ensure that its AWMP is adequate for the proposed or existing population of animals, reflective of the proposed or existing facility operation, and prepared in accordance with the terms and conditions of this permit, OAR 340-051, and OAR 603-074.

2. The AWMP must to the extent applicable include the following:
   (a) Procedures to ensure collection, handling, and storage of contaminated stormwater runoff from the production area, manure, litter, and process wastewater in compliance with the requirements of S2. Discharge Limitation and Operating Requirements. Calculations used to determine that storage capacity exists must be provided, including a demonstration that facilities are at least designed and constructed to contain all manure, litter, process wastewater, and stormwater runoff and direct precipitation from a 25-year, 24-hour rainfall event.
   (b) Procedures to ensure proper operation and maintenance of the storage facilities.
   (c) Procedures for proper management of animal mortalities. The procedures must ensure that animal mortalities are disposed of legally and are not disposed of in any storage or treatment system that is not specifically designed to treat animal mortalities.
   (d) Procedures to ensure that clean water is diverted, as appropriate, from the production area.
   (e) Procedures to prevent direct contact of confined animals with surface water.
   (f) Identification of appropriate site-specific conservation practices to be implemented, including buffers, setback areas, or equivalent practices, to control runoff of pollutants to surface water and groundwater.
   (g) Protocols to land apply manure, litter, or process wastewater in accordance with site-specific nutrient management practices that ensure: 1) appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater, and 2) application of nutrient at rates not to exceed the maximum agronomic application rate included in the ODA-approved AWMP. The protocols must include the following:
      (i) The NRCS Phosphorous Index, USDA/NRCS Oregon Agronomy Technical Note #26, revised October 2008 or equivalent calculation must be completed for all fields or management units that receive manure, litter or process wastewater to determine if nitrogen or phosphorous is the most limiting nutrient. The maximum nutrient application rate must be calculated for the most limiting nutrient and must account for all other nitrogen and phosphorus sources.
      (ii) Expected crop yields.
      (iii) Calculations showing the total nitrogen and phosphorus to be applied annually to each field from manure, litter, process wastewater, and other sources.
      (iv) Annual manure application rates and an explanation of the basis for determining these rates. For *large* CAFOs, these rates must be based on actual test data. For other operations, data or "book values" from established reference sources (for example, Oregon Animal Waste Management program) may be used instead of actual testing.
      (v) Method(s) used to apply manure, litter, or process wastewater

(vi) Timing of manure, litter, and process wastewater applications.

(h) For all operations, protocols for soil testing. For *large* CAFOs, protocols for testing of manure, litter, and process wastewater. For other operations that are not required to test manure, litter, or process wastewater, test protocols are not required but the references that are used to characterize manure, litter, or process wastewater must be included.

(i) If applicable, an Agricultural Compost Management Plan must be included as required by OAR 340-096 for composting activities.

(j) If applicable, a Solid Waste Conversion Technology Plan must be included as required by OAR 340-096.

(k) Frozen soil application procedures if applications of manure, litter, or process wastewater will be made to frozen soil. At a minimum, the following must be included:
   (i) Description of the potential receiving field(s), estimates of waste amounts and types, and estimated timing of applications.
   (ii) Aerial photo(s) identifying all areas and surface water bodies within 1,000 ft. of the boundaries of the receiving field(s).
   (iii) Soil map(s) identifying soil types for receiving field(s).
   (iv) Topographic map(s) for receiving field(s).
   (v) Description of the structural practices in place to ensure that no discharges to surface water occur during application and after the soil thaws.
   (vi) Description of the method used to determine when soil is frozen and management practices to be followed when planning an application and during and after an application to frozen soil.
   (vii) Description of monitoring and reporting requirements to ensure that the permit registrant is in compliance with frozen soil application procedures.
   (viii) Procedures for transfer or export of manure, litter, or process wastewater.
   (ix) Identification of specific records that will be maintained to document the implementation and management of the minimum elements described above.

S3.D. Requirements for AWMP Updates and Changes

(See Table 3, p.16, for an overview of the following requirements.)

1. Requirements for *small or medium* CAFOs electing permit coverage (see Table 3, p. 16, for an overview)

   (a) *Substantial changes.* The permit registrant must submit any proposal to make substantial changes to its AWMP to ODA for approval at least 45 days in advance of implementation of the proposed changes. ODA will public notice the proposal as described in S1.H, p. 8. ODA will notify the permit registrant of its final decision concerning the proposed changes after the public notice period ends. The permit registrant must not implement a proposed change until ODA has approved it. The following types of changes to an AWMP are considered substantial:
      (i) A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWMP.
      (ii) An increase in maximum allowed animal numbers such that the operation becomes defined as a *large* CAFO.

   (b) *Non-substantial changes.* Public notice of non-substantial changes (described below) to an AWMP is not required; however, the permit registrant must submit its proposal to make such a change to ODA for approval at least 45 days in advance of implementation of the proposed change unless a different timeframe is allowed by ODA. ODA will notify the permit registrant of its final decision concerning the proposed change after reviewing the proposal. The permit registrant must not implement a proposed change until ODA has approved it. The following changes to an AWMP are considered non-substantial provided they do not result in a substantial modification listed in paragraph (a) above:
      (i) An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers provided the increase does not change the operation into a *large* CAFO.
      (ii) When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWMP.

2. Requirements for all other CAFOs (see Table 3, p. 16, for an overview)
   (a) *Substantial changes.* The permit registrant must submit any proposal to make substantial changes to its AWMP to ODA for approval at least 60 days in advance of the proposed changes. ODA will provide public notice on the proposal as described in S1.H, p. 8. ODA will notify the permit registrant of its final decision concerning the proposed changes after the public notice period ends. The permit registrant must not implement a proposed change until ODA has approved it. The following types of changes to an AWMP are considered substantial:
      (i) Addition of new land application areas not previously included in the AWMP, unless the land application area is covered by an existing AWMP that has already been incorporated into an existing NPDES permit and the application of manure, litter, or process wastewater on the newly added land application area is in accordance with that existing NPDES permit.
      (ii) Any changes to the field-specific maximum annual rates for land application.
      (iii) Any changes to the maximum amounts of nitrogen and phosphorus derived from all sources for each crop.
      (iv) Addition of any crop or other uses not included in the AWMP and corresponding field-specific rates of application.
      (v) A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWMP.
      (vi) Any changes that are likely to increase the risk of pollutant transport to surface water or groundwater.

   (b) *Non-substantial changes.* The permit registrant must submit any proposal to make non-substantial changes to its AWMP to ODA for approval at least 60 days in advance of the proposed changes unless a different timeframe is allowed by ODA. A proposal for a non-substantial change is not subject to public notice. ODA will notify the permit registrant of its final decision concerning the proposed changes after reviewing the proposal. The permit registrant must not implement a proposed change until ODA has approved it. The following types of changes to an AWMP are considered non-substantial provided they do not result in a substantial modification listed in paragraph (a) above:
      (i) An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers.
      (ii) When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWMP.

Table 3: Overview of Requirements for Proposed Changes to AWMPs

	Small or Medium CAFO Electing Coverage		All Other CAFOs	
	Substantial Change	***Non-Substantial Change***	***Substantial Change***	***Non-Substantial Change***
Description of proposed change	1. A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWMP. 2. An increase in maximum allowed animal numbers such that the operation becomes defined as a large CAFO.	The following are considered non-substantial provided they do not result in a substantial change: 1. An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers. 2. When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWMP.	1. Addition of new land application areas not previously included in the AWMP, unless the land application area is covered by an existing AWMP that has already been incorporated into an existing NPDES permit and the application of manure, litter, or process wastewater on the newly added land application area is in accordance with that existing NPDES permit. 2. Any changes to the field-specific maximum annual rates for land application. 3. Any changes to the maximum amounts of nitrogen and phosphorus derived from all sources for each crop. 4. Addition of any crop or other uses not included in the AWMP and corresponding field-specific rates of application. 5. A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWMP. 6. Any changes that are likely to increase the risk of nitrogen and phosphorus transport to surface water or groundwater.	The following are considered non-substantial provided they do not result in a substantial change: 1. An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers. 2. When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWMP.
Timeline to submit proposal to ODA	Submit at least 45 days in advance of proposed change(s).	Submit at least 45 days in advance of proposed change(s) unless a different timeframe allowed by ODA.	Submit at least 60 days in advance of proposed change(s).	Submit at least 60 days in advance of proposed change(s) unless a different timeframe is allowed by ODA.
Public notice process	ODA will public notice as described in S1.H, p. 8.	Not required.	ODA will public notice as described in S1.H, p. 8.	Not required.
ODA approval	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after the public notice period ends.	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after reviewing the proposal.	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after the public notice period ends.	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after reviewing the proposal.

S4. MONITORING, INSPECTION, RECORDKEEPING, AND REPORTING REQUIREMENTS

S4.A. Monitoring Requirements

1. Prohibited Discharges

If a prohibited discharge to surface water or groundwater that is not allowed by S2.B or S2.C, p. 10 occurs, the permit registrant must record the following information and notify ODA within 24 hours (see S4.D, p. 19 for written reporting requirements):

(a) A description and cause of the discharge;
(b) The period of discharge including exact date(s), time(s), and duration of discharge;
(c) An estimate of discharge volume;
(d) Name or location of receiving water;
(e) If a grab sample was taken of the discharge;
(f) Corrective steps taken, if appropriate, to reduce, eliminate, or prevent reoccurrence of the discharge;
(g) For any unauthorized discharge that may have come in contact with a drinking water intake, confirmation that Oregon Emergency Response System (OERS) was notified.

2. Soil, Manure, Litter, and Process Wastewater Monitoring for *Large* CAFOs

The permit registrant with a *large* CAFO must conduct the following sampling and analysis:

Sample Type	Analytical Parameter	Minimum Frequency	Sample Method
• Liquid manure • Process wastewater (if handled separately from liquid manure) • Solid manure	Total nitrogen Total phosphorus	Annually	Sample according to guidance contained in PNW 0533 and PNW 505.
Exported manure, litter, and process wastewater	Total nitrogen Total phosphorus	Annually	Sample according to guidance contained in PNW 0533 and PNW 505.
Soil from land application area(s)	Total nitrogen Total phosphorus Nitrate-nitrogen	Annually on a minimum of 20% of the fields or management units that receive manure, litter or process wastewater applications each year. All fields or management units must be sampled at least once every 5 years.	Sample according to guidance contained in PNW 570-E, EM 8832-E for post-harvest nitrate-nitrogen
Grab sample of effluent discharge from production or land application area	*E. coli*, Nitrate plus Nitrite Nitrogen (NO_3+$N0_2$), Total Phosphorus (P)	Upon occurrence see S2.A.2, p.10.	Grab sample analyzed using test methods in 40 CFR Part 136

3. Soil, Manure, Litter, and Process Wastewater Monitoring for all Other Operations

The permit registrant must conduct the following sampling and analysis:

Sample Type	Analytical Parameter	Minimum Frequency	Sample Method
Soil from land application area(s)	Total nitrogen Total phosphorus	Once every 5 years from all fields or management units where manure, litter, or	Sample according to guidance contained in PNW 570-E, EM

		process wastewater is applied.	8832-E.
Grab sample of effluent discharge from production or land application area	*E. coli*, Nitrate plus Nitrite Nitrogen (NO_3+NO_2), Total Phosphorus (P)	Upon occurance see S2.A.2, p.10.	Grab Sample analyzed using test methods in 40 CFR Part 136

S4.B. Inspection Requirements

1. The permit registrant must conduct the following inspections:

Item	Large CAFO	All Other Operations
(a) Stormwater diversion devices, runoff diversion structures, animal waste storage structures, and devices channeling contaminated stormwater to wastewater and manure storage and containment structures	Weekly and record results	At least once every six months
(b) Water lines, including drinking water or cooling water lines	Daily and record results	At least once every six months
(c) Equipment used for land application of manure, litter, or process wastewater	Daily when equipment is in use and record results	At least once every six months when equipment is in use
(d) Liquid impoundments for manure and process wastewater	Weekly and record depth of manure and process wastewater according to depth marker required by S2.E.3, p. 11	At least once every six months

2. The permit registrant must correct any deficiencies found as a result of these inspections as soon as possible. The permit registrant with a *large* CAFO must record any actions taken to correct these deficiencies and, if deficiencies are not corrected within 30 days, provide an explanation of the factors preventing immediate correction.

S4.C. Recordkeeping and Availability Requirements

1. The permit registrant must maintain all information required by this permit at the facility for at least five (5) years and make this information available to ODA upon request.

2. Upon obtaining permit coverage, the permit registrant must record the following information:

Item or Parameter	Large CAFO	All Other Operations
(a) Date, amount, and nutrient loading of manure, litter, or process wastewater applied to each field.	Required	Required
(b) Weather conditions at the time of application and 24 hours before and after application.	Required	Not required
(c) Total amount of nitrogen and phosphorus actually applied annually to each field, including documentation of calculations of the total amount applied.	Required	Required

Item or Parameter	Large CAFO	All Other Operations
(d) Total amount of manure or wastewater transferred or exported to other persons.	Required. Also include: (i) Date and amount of each transfer or export (ii) Name and address of each recipient (iii) Copy of the manure nutrient analysis conducted provided to the recipient (See S2.K.3, p. 12)	Required
(e) Description of actions taken to correct deficiencies discovered during inspections.	Required (See S4.B.2, p. 18)	Not required

S4.D. Reporting Requirements

1. Reporting to ODA and Oregon Emergency Response System (OERS)
   (a) If a discharge to surface water or groundwater occurs that is not allowed by S2.B and S2.C, p. 10, the permit registrant must notify ODA within 24 hours of the discharge. The permit registrant must submit a written report within five (5) days to ODA. The information to be submitted is listed in the monitoring requirements (See S4.A, p. 17) of this permit.
   (b) The permit registrant must notify ODA within 24 hours of becoming aware of any significant physical failure at any time of treatment works required under this permit.
   (c) The permit registrant must notify ODA within 24 hours of any permit noncompliance that may endanger health or the environment as described in G13.6, p. 23.
   (d) In addition to complying with [1.(c)] above, the permit registrant must notify Oregon Emergency Response System (OERS) of any unauthorized discharge that may come in contact with a surface water or groundwater drinking water system intake within 24 hours. Notification must be made by calling OERS at 1-800-452-0311

2. Reporting of Monitoring Results of a prohibited effluent discharge
   (a) The permit registrant must submit monitoring information for an effluent grab sample no later than one month from the date the sample was taken unless a different schedule is established by an administrative order as described in S4.E, p. 20.
   (b) Reporting of monitoring information must include:
      (i) The date, exact place, and time of sampling or measurements;
      (ii) The individual(s) who performed the sampling or measurements;
      (iii) The date(s) analyses were performed;
      (iv) The individual(s) who performed the analyses;
      (v) The analytical techniques or methods used; and
      (vi) The results of such analyses that includes the sample result and quantitation limit of the analysis.

3. Annual Report
   (a) The permit registrant must submit an annual report to ODA by March 15 of each year. The annual report must include the following for the previous calendar year :
      (i) Maximum number and type of animals approved by ODA in the permittee's *Notice of Registration*, whether in open confinement or housed under roof (for example, beef cattle, broilers, layers, swine weighing 55 pounds or more, swine weighing less than 55 pounds, mature dairy cows, dairy heifers, veal calves, sheep and lambs, horses, ducks, turkeys, other).
      (ii) Actual number of animals by type averaged over the year.
      (iii) Estimated amount of total manure, bedding, litter, process wastewater, and other material that comes in contact with manure generated (tons, gallons, cubic feet, or cubic yards).
      (iv) Estimated amount of total manure, bedding, litter, process wastewater, and other material that comes in contact with manure transferred to other persons by the permittee (tons, gallons, cubic feet, or cubic yards).
      (v) Estimated amount of manure, bedding, litter, process wastewater, and other material that comes in contact with manure applied to land by the permittee (tons, gallons, cubic feet, or cubic yards).
      (vi) Total number of acres for land application covered by the AWMP developed in accordance with

the terms of this permit.

(vii) Total number of acres under control of the permittee that were used for land application of manure, litter, and process wastewater in the previous 12 months.

(viii) Summary of all manure, litter, and process wastewater discharges from the production area that have occurred, including date, time and approximate volume.

(ix) A statement indicating whether the AWMP was developed or approved by a certified waste management planner.

(x) Any Concentrated Animal Feeding Operation that discharges to surface waters must also report the following items (xi) through (xvi). (40 CFR 122.42(e)(4)(viii)

(xi) Actual crop(s) planted and actual yield(s) for each field.

(xii) Actual nitrogen and phosphorus content of the manure, litter, and process wastewater.

(xiii) Data used and results of calculations based on protocol in the ODA-approved AWMP.

(xiv) Amount of manure, litter, and process wastewater applied to each field during the previous 12 months.

(xv) Results of soil testing for nitrogen and phosphorus if testing was performed.

(xvi) Amount of any supplemental fertilizer applied.

(b) The annual report must be signed and certified by the permittee or permittee's authorized representative with the following statement: "I certify, under penalty of law, that this document and all attachments were prepared under my direct supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

S4.E. Additional Monitoring

1. ODA may establish specific monitoring requirements in addition to those contained in this permit by administrative order. An administrative order is an agency action expressed in writing directed to a named person or named persons (ORS 183.310).

2. If a permittee experiences two or more discharges within a 24-month period that are not associated with a 25-year, 24-hour or greater rainfall event, ODA may require surface water and/or groundwater quality monitoring or transfer the permittee to an individual permit. Monitoring for the following parameters may be required: bacteria, total suspended solids, total kjeldahl nitrogen, biochemical oxygen demand, and other nutrient indicators. If ODA waives the additional monitoring requirements because such monitoring would be impracticable or not likely to produce useful information, ODA will set out the basis for the decision in writing and make the decision available to interested persons.

GENERAL CONDITIONS

The general conditions in this schedule apply only to the extent they do not conflict with the requirements contained in special conditions S1 through S4. If the permit requirements in special conditions S1 through S4 conflict with these general conditions, the permit requirements in special conditions S1 through S4 will control.

G1. Compliance with other laws and statutes
Nothing in the permit will be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G2. Duty to comply [40 CFR § 122.41(a)]
The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

1. The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
2. The Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation. The Clean Water Act provides that any person who *negligently* violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who *knowingly* violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.
3. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

G3. Duty to reapply [40 CFR § 122.41(b)]
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.

G4. Need to halt or reduce activity not a defense [40 CFR § 122.41(c)]
It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

G5. Duty to mitigate [40 CFR § 122.41(d)]
The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

G6. Proper operation and maintenance [40 CFR § 122.41(e)]
The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

G7. Permit actions
1. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. [40 CFR § 122.41(f)]
2. After notice, registration under this permit may be modified or revoked as it applies to any person for cause as follows:
   (a) Violation of any terms or conditions of the permit,
   (b) Failure of the permittee to disclose fully all relevant facts, or misrepresentations of any relevant facts by the permittee during the permit issuance process and during the life of the permit;
   (c) Failure to pay permit fees required by Oregon Administrative Rule when due;
   (d) Information indicating that the permitted operation poses a threat to human health or welfare;
   (e) A change in ownership or control of the operation, or
   (f) Other causes listed in 40 CFR § 122.62 and 122.63.
3. Modification or revocation of coverage under this permit as it applies to any person may be initiated by ODA.
4. Issuance of coverage under an individual permit may be initiated by ODA in accordance with S1.A.2.

G8. Property rights [40 CFR § 122.41(g)]
This permit does not convey any property rights of any sort, or any exclusive privilege.

G9. Duty to provide information [40 CFR § 122.41(h)]
The permittee shall furnish to the director, within a reasonable time, any information which the director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the director, upon request, copies of records required to be kept by this permit.

G10. Inspection and entry [40 CFR § 122.41(i)]
The permittee shall allow the director or an agency authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:
1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act or state law, any substances or parameters at any location.

G11. Monitoring and records [40 CFR § 122.41(j)]
1. Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity.
2. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which must be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a

period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the director at any time.

3. Records of monitoring information must include:
   (a) The date, exact place, and time of sampling or measurements;
   (b) The individual(s) who performed the sampling or measurements;
   (c) The date(s) analyses were performed;
   (d) The individual(s) who performed the analyses;
   (e) The analytical techniques or methods used; and
   (f) The results of such analyses.
4. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136 unless another method is required under 40 CFR subchapters N or O.
5. The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

G12. Signatory requirement [40 CFR § 122.21(k)]

1. All applications, reports, or information submitted to the director shall be signed and certified. (See § 122.22)
2. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

G13. Additional reporting requirements [40 CFR § 122.41(l)]

1. *Planned changes.* The permittee shall give notice to the director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:
   (a) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in § 122.29(b); or
   (b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under § 122.42(a)(1).
   (c) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan;
2. *Anticipated noncompliance.* The permittee shall give advance notice to the director of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.
3. *Transfers.* This permit is not transferable to any person except after notice to the director. The director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act. (See § 122.61; in some cases, modification or revocation and reissuance is mandatory.)
4. *Monitoring reports.* Monitoring results must be reported at the intervals specified elsewhere in this permit.
   (a) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the director for reporting results of monitoring of sludge use or disposal practices.
   (b) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136, or another method required for an industry-specific waste stream under 40 CFR subchapters N or O, the results of such monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the director.
   (c) Calculations for all limitations that require averaging of measurements must utilize an arithmetic mean unless otherwise specified by the director in the permit.
5. *Compliance schedules.* Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date.
6. *Twenty-four hour reporting.*
   (a) The permittee shall report any noncompliance that may endanger health or the environment. Any information must be provided orally within 24 hours from the time the permittee becomes aware of the

circumstances. A written submission must also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(b) The following must be included as information that must be reported within 24 hours under this paragraph.
   (i) Any unanticipated bypass that exceeds any effluent limitation in the permit. (See § 122.41(g) or G14, p. 24.)
   (ii) Any upset which exceeds any effluent limitation in the permit. (See § 122.41(n) or G15, p. 24.)
   (iii) Violation of a maximum daily discharge limitation for any of the pollutants listed by the director in the permit to be reported within 24 hours. (See § 122.44(g).)

(c) The director may waive the written report on a case-by-case basis for reports under G13.6(b) of this section if the oral report has been received within 24 hours.

7. *Other noncompliance.* The permittee shall report all instances of noncompliance not reported under G13.4, 5, and 6 of this section, at the time monitoring reports are submitted. The reports must contain the information listed in G13.6 of this section.
8. *Other information.* Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the director, it shall promptly submit such facts or information.

G14. Bypass [40 CFR § 122.41(m)]

1. *Definitions.*
   (a) *Bypass* means the intentional diversion of waste streams from any portion of a treatment facility.
   (b) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
2. *Bypass not exceeding limitations.* The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of G14.3 and 4 of this section.
3. *Notice*
   (a) *Anticipated bypass.* If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
   (b) *Unanticipated bypass.* The permittee shall submit notice of an unanticipated bypass as required in G13.6 of this section (24-hour notice).
4. *Prohibition of bypass.*
   (a) Bypass is prohibited, and the director may take enforcement action against a permittee for bypass, unless:
      (i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
      (ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
      (iii) The permittee submitted notices as required under G14.3 of this section.
   (b) The director may approve an anticipated bypass, after considering its adverse effects, if the director determines that it will meet the three conditions listed above in G14.4(a) of this section.

G15. Upset [40 CFR § 122.41(n)]

1. *Definition. Upset* means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
2. *Effect of an upset.* An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of G15.3 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

3. *Conditions necessary for a demonstration of upset.* A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
   (a) An upset occurred and that the permittee can identify the cause(s) of the upset;
   (b) The permitted facility was at the time being properly operated; and
   (c) The permittee submitted notice of the upset as required in G13.6(b)(ii) of this section (24 hour notice).
   (d) The permittee complied with any remedial measures required under G5 of this section.
4. *Burden of proof.* In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.