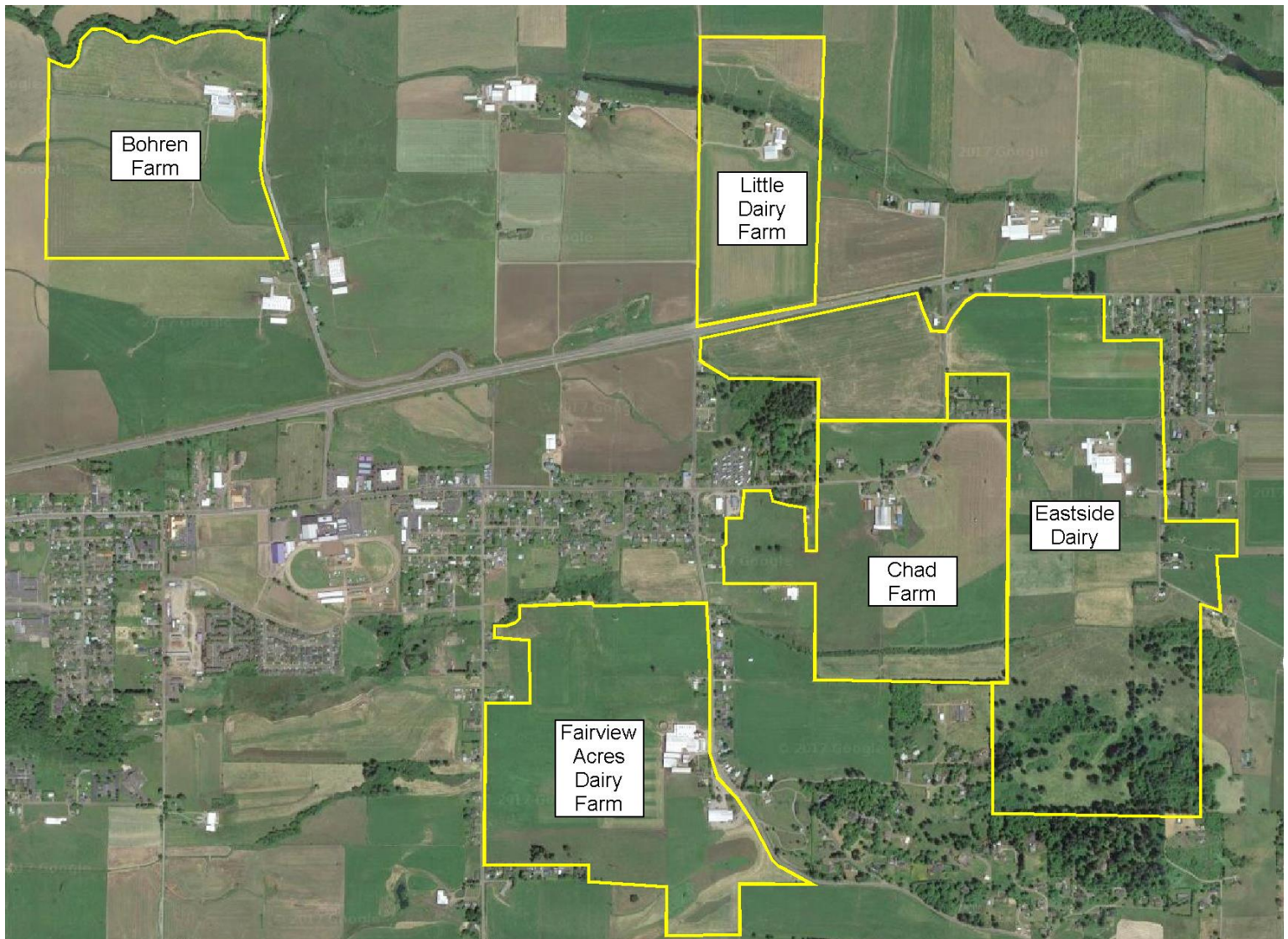


Animal Waste Management Plan for Fairview Acres Dairy Farm

c/o Richard Obrist
7615 Trask River Road
Tillamook, OR 97141
(503) 801-3231



Prepared by:
Tom Thomson
Northwest Ag Consulting
Dallas, OR
(503) 510-3883

**Fairview
Acres
Dairy
Farm**

2018

**Animal Waste
Management Plan**

**Fairview
Acres
Dairy
Farm**

2018

**Animal Waste
Management Plan**

TABLE OF CONTENTS

SECTION 1 – GENERAL INFORMATION

• Signature Page	1-1
• Background and Site Information	1-3
• Manure Storage and Nutrient Balance Summary	1-9
• Emergency Response Plan	1-10
• Farm Location Map	1-11
• Farm Topography Map	1-12

SECTION 2 – PRODUCTION AREA

• Number of Animals	2-1
• Animal Mortality Management	2-1
• Collection of Manure, Process Water and Runoff	2-1
• Treatment Facilities	2-1
• Storage Facilities	2-2
• Transfer of Manure, Process Water and Runoff	2-2
• Operation and Maintenance Considerations	2-3
• Production Area Map(s)	2-8

SECTION 3 – UTILIZATION AREA

• Cropping System	3-1
• Field Map(s)	3-3
• Application	3-5
• General Considerations for Making Manure Applications	3-5
• Setback Requirements	3-6
• Considerations for Dry Season Manure Applications	3-6
• Setback Map(s)	3-9
• Considerations for Wet Season Manure Applications	3-11
• Manure and Soil Sampling Frequency	3-12
• How to Sample Liquid Manure	3-12
• How to Sample Solid Manure	3-12
• Manure Tests	3-15
• How to Sample Soils	3-16
• Soil Tests	3-18
• How to Calibrate Application Equipment	3-20
• Amount of Manure to Apply for Crops Grown	3-24
• Irrigation Water Management	3-33

SECTION 4 – SOIL AND RISK ASSESSMENT

• Soil Map(s)	4-1
• Soil Reports	4-4
• Predicted Soil Erosion	4-25
• Phosphorus Index	4-34

TABLE OF CONTENTS

SECTION 5 – REFERENCES

- Publications and Software 5-1
- ORAWM Workbook 5-3
- Request for Oregon CAFO Permit Modification 5-13
- Notice of Registration and Oregon CAFO General Permit Summary 5-15
- Oregon Confined Animal Feeding Operation General Permit Number 1 5-19

GENERAL INFORMATION

Oregon Department of Agriculture CAFO Division Animal Waste Management Plan Signature Sheet	ODA USE ONLY MA# _____ AWMP# _____ Approved Date _____ Received Date _____
Facility Name: <u>Fairview Acres Dairy Farm</u>	
Facility Address: <u>7615 Trask River Road</u> <u>Tillamook, OR 97141</u>	
Operated by: <u>Richard Obrist</u>	
Mailing Address: <u>7615 Trask River Road</u> <u>Tillamook, OR 97141</u>	
<i>Complete if different than the Operator</i> Owned by: <u>Richard Obrist</u>	
Mailing Address: <u>7615 Trask River Road</u> <u>Tillamook, OR 97141</u>	
☐ As the Operator of <u>Fairview Acres Dairy Farm</u> , I agree to manage this facility in accordance with the existing Animal Waste Management Plan (AWMP) # _____ on file with ODA and maintain those practices as described in the plan. This signed AWMP is incorporated into the CAFO NPDES General Permit by reference (Permit Condition S3.A.2.). ☐ If changes are made to the animal population, facilities and/or management of the CAFO, a new AWMP must be submitted to ODA for approval at least 45 days before the modification is implemented unless a different schedule is allowed by ODA in writing (Permit Condition S3.D.1 and 2).	
Operator's Signature	Date
Operator's Name (Please Print) Richard Obrist	

GENERAL INFORMATION

GENERAL INFORMATION

Animal Feeding Operation: Large Concentrated CAFO

Type & Size: Dairy: 2,374 animals

Latitude/Longitude: Fairview Acres Dairy Farm- N45.45022⁰, W123.79274⁰
 Bohren Farm- N45.4688⁰, W123.8114⁰
 Little Dairy Farm- N45.4669⁰, W123.7900⁰
 Chad Acres Farm- N45.45692⁰, W123.78513⁰
 Eastside Dairy- N45.45824⁰, W123.77762⁰

BACKGROUND AND SITE INFORMATION

Fairview Acres Dairy Farm is located about three miles southeast of Tillamook, OR at 7615 Trask River Road. The dairy is currently permitted for a total of 1,924 animals at 4 facilities:

Fairview Acres Dairy Farm – 900 animals

Bohren Farm – 275 animals

Little Dairy Farm – 296 animals

Chad Acres Farm – 453 animals

And seeks to add the following facility:

Eastside Dairy – 450 animals

Facility	Acres	Milkers	Dry Cows	Heifers	Calves	Total Animals
Fairview Acres Dairy Farm	147.5	700	100	50	50	900
Bohren Farm	107.5	0	150	75	75	300
Little Dairy Farm	81.5	165	0	65	64	294
Chad Acres Farm	178.0	0	0	215	215	430
Eastside Dairy	206.7	350	0	100	0	450
Other Owned Acres	43.8	0	0	0	0	0
Leased Acres	203.9	0	0	0	0	0
Export Acres	313.1	0	0	0	0	0
Totals-	1282.0	1215	250	505	404	2,374

A request for the addition of the East Side Dairy to the current permit for Fairview Acres Dairy Farm is located at the beginning of Section 5.

As noted above, the operation will consist of five facilities which will be used, in conjunction with one another to best manage the cows housing needs at various growth stages and the fields at those facilities for maximizing forage composition and yield. The Coastal climate allows for a base forage production level of approximately 6 tons/acre of DM per year based on minimal management. With an intensive level of management, the fields may produce as much as 8-10 ton/acre DM annually. However, this is only an estimate and depends upon intensive management coupled with favorable weather conditions.

GENERAL INFORMATION

Other Owned and Leased Acres

These fields are owned and/or leased by Fairview Acres Farms for the purpose of manure application and cropping. The fields are not part of any one of the five facilities and are located as shown on the fields map. Manure is applied to these fields by tank wagon or solids spreader at agronomic rates.

Export Acres

The dairy has an additional 313.1 acres of ground to which manure is exported as needed to maintain nutrient balance on the owned and leased acres. These acres are not managed nor controlled by Fairview Acres Dairy and the amount of acres may vary from year to year.

Fairview Acres Dairy Farm

Fairview Acres Dairy Farm is the main dairy which is owned and operated by the Obrist family. The milk cows, dry cows and younger heifers are grazed throughout the year based on weather conditions, livestock health, economic conditions, and forage production during the year.

Manure, bedding and wasted feed collected on the alleyways of the livestock barns for Fairview Acres Dairy Farm are scraped to an underground liquid collection tank shown on the Production Area Map for the dairy on page 2-8. Some of the manure, bedding and wasted feed collected in the livestock barns is collected and directly transferred to the solids storage areas. All livestock barns are guttered, down-spouted and outletted in an area free of manure. Wastewater from the holding pen and milking facility is transferred to the underground liquid collection tank by gravity flow through underground pipelines. Any rainfall runoff from paved areas containing manure and the solids storage area drain to the underground collection tank. Wastewater stored in the underground collection tank it is pumped through a pipeline to the large storage tank. The solids containing manure, bedding and wasted feed removed from the livestock barns are stored in a roofed solids storage barn shown on the Production Area Map for the dairy on page 2-8. Solids stored in the solids storage barn and wastewater stored in the large storage tank are applied to the hay and pasture land fields during the spring and summer months to utilize the nutrients and organics for forage production. Wastewater is applied using a liquid tank wagon and traveling big gun sprinkler system and the solids are applied using a tractor pulled solids spreader.

The dairy also exports about 40% of its generated liquid waste to Farm Power Tillamook digester and an equal amount is returned to the dairy from FPT less some amount of retained manure solids that was removed from the manure.

Fairview Acres Dairy Farm owns 147.5 contiguous acres for the dairy farm facilities described above and the hay and pasture land fields used to produce forage for the dairy livestock. These acres consist of 12 acres for the dairy farm facilities, shops and houses and 147.5 acres of irrigated hay and pasture land used to produce forage for the dairy livestock. The crop rotation for the Fairview Acres Dairy Farm consists of perennial grass pastures that are harvested by grazing livestock and for hay.

GENERAL INFORMATION

Bohren Farm

The Bohren farm is owned by Fairview Acres Dairy Farms, Inc. and is operated by Ryan Obrist. This facility is a satellite dairy of Fairview Acres Dairy Farm that is located at 440 Wilson Loop Rd. near Tillamook Oregon. Dry cows and younger heifers are grazed throughout the year based on weather conditions, livestock health, economic conditions, and forage production during the year.

Manure, bedding and wasted feed are collected using a dry scraping method where solids are scraped to the solid storage area. Leachate from this solid storage area flows into the nearby underground collection tank. Solids are stored in one of three solid storage barns shown on the Production Area Map for the dairy on page 2-8. The third storage unit is used only when necessary as it doubles as a forage and bedding storage area. All livestock barns are guttered, down-spouted and outletted in an area free of manure. Wastewater from the holding pen and milking facility is transferred to the underground liquid collection tank by gravity flow through underground pipelines. Any rainfall runoff from paved areas containing manure and the solids storage area drain to the underground collection tank. Wastewater stored in the underground collection tank is pumped through a pipeline to one of four wastewater storage tanks shown on the Production Area Map for the dairy on page 2-8. Wastewater is stored in the four wastewater storage tanks until it can be applied to the hay and pasture fields. Solids stored in the solids storage barns and wastewater stored in the wastewater storage tank are applied to the hay and pasture land fields during the spring and summer months to utilize the nutrients and organics. Wastewater is applied either via tank wagon or big gun traveler. Solids are applied using a tractor drawn solid manure spreader.

Bohren Farm has 107.5 contiguous acres for the dairy farm facilities described above and the hay and pasture land fields used to produce forage for the dairy livestock. These acres consist of 5 acres for the dairy farm facilities, shops and houses and 107.5 acres of irrigated hay and pasture land used to produce forage for the dairy livestock. The crop rotation for the Bohren Farm consists of perennial grass pastures that are harvested by grazing livestock and for hay.

Little Dairy Farm

The Little Dairy Farm is owned by Fairview Acres Dairy Farms, Inc. and is operated by Chris Obrist. This facility is a satellite dairy of Fairview Acres Dairy Farm that is located at 1375 Olson Road N. near Tillamook Oregon. The milk cows, dry cows and younger heifers are grazed throughout the year based on weather conditions, livestock health, economic conditions, and forage production during the year. After weaning heifer calves are moved off the farm to be raised. They are either sold out right from the off farm facility or brought back as springing heifers later. Dry cows are moved off farm and housed at another facility.

Manure, bedding and wasted feed are collected using a dry scraping method where solids are scraped to the solid storage area. Leachate from this solid storage area flows into the nearby underground collection tank. Solids are stored in two solid storage barns shown on the Production Area Map for the dairy on page 2-8. All livestock barns are guttered, down-spouted and outletted in an area free of manure. Wastewater from the

GENERAL INFORMATION

holding pen and milking facility is transferred to the underground liquid collection tank by gravity flow through underground pipelines. Any rainfall runoff from paved areas containing manure and the solids storage area drain to the underground collection tank. Wastewater stored in the underground collection tank it is pumped through a pipeline to one of two wastewater storage tanks shown on the Production Area Map for the dairy on page 2-8. Wastewater is stored in the two wastewater storage tanks until it can be applied to the hay and pasture fields. Solids stored in the solids storage barn and wastewater stored in the wastewater storage tank are applied to the hay and pasture land fields during the spring and summer months to utilize the nutrients and organics. Wastewater is applied either via tank wagon or big gun traveler. Solids are applied using a solid manure spreader.

The dairy also exports about 100% of its generated liquid waste to Farm Power Tillamook digester and an equal amount is returned to the dairy from FPT less some amount of retained manure solids that was removed from the manure.

The Little Dairy Farm has 81.5 contiguous acres for the dairy farm facilities described above and the hay and pasture land fields used to produce forage for the dairy livestock. These acres consist of 4.6 acres for the dairy farm facilities, shops and houses and 81.5 acres of irrigated hay and pasture land used to produce forage for the dairy livestock. The remaining 1.3 acres are considered wildlife acres and do not receive applications of wastewater or solids containing manure. The crop rotation for the Little Dairy Farm consists of continuous perennial grass pastures that are harvested by grazing livestock and for hay.

Chad Acres Farm

The Chad Acres Farm is owned by Fairview Acres Dairy Farms, Inc. and is a satellite dairy of Fairview Acres Dairy Farm that is located at 7765 Fairview Road near Tillamook Oregon. This farm is used to house and care for the dry cows, heifers and calves as replacement livestock for the other dairy farms owned by Fairview Acres Dairy Farms, Inc. The dry cows and heifers are grazed throughout the year based on weather conditions, livestock health, economic conditions, and forage production during the year.

Manure, bedding and wasted feed are collected using a dry scraping method where solids are scraped to the solid storage area. Leachate from this solid storage area flows into the nearby underground collection tank. Solids are stored in two solid storage barns shown on the Production Area Map for the dairy on page 2-8. All livestock barns are guttered, down-spouted and outletted in an area free of manure. Any rainfall runoff from paved areas containing manure and the solids storage area drain to the underground collection tank. Wastewater stored in the underground collection tank it is pumped through a pipeline to a wastewater storage tank shown on the Production Area Map for the farm on page 2-8. Wastewater is stored in the wastewater storage tank until it is applied to the hay and pasture fields. Solids stored in the solids storage barn and wastewater stored in the wastewater storage tank are applied to the hay and pasture land fields during the spring and summer months to utilize the nutrients and organics.

GENERAL INFORMATION

Wastewater is applied either via a tank wagon or big gun traveler. Solids are applied using a tractor drawn solid manure spreader.

Chad Acres Farm has 178.0 contiguous acres for the dairy farm facilities described above and the hay and pasture land fields used to produce forage for the dairy livestock. These acres consist of 5.4 acres for the dairy farm facilities, shops, and houses and 178.0 acres of irrigated hay and pasture land used to produce forage for the dairy livestock. The crop rotation for the Chad Acres Farm consists of perennial grass pastures that are harvested by grazing livestock and for hay.

Eastside Dairy

The East Side Dairy is owned by Fairview Acres Dairy Farms, Inc. and is a satellite dairy of Fairview Acres Dairy Farm that is located at 8685 Hughey Lane near Tillamook Oregon. This farm is used to house and care for milking cows and heifers. The cows and heifers are grazed throughout the year based on weather conditions, livestock health, economic conditions, and forage production during the year.

Depending upon which barn is considered, the manure, bedding and wasted feed may be either flushed with water to a common underground reception tank or scraped to the solid storage area. Leachate from the solid storage area flows into the nearby underground collection tank. Solids are stored in solid storage barn shown on the Production Area Map for the dairy on page 2-8. All livestock barns are guttered, down-spouted and outletted in an area free of manure. Any rainfall runoff from paved areas containing manure and the solids storage area drain to the underground collection tank. Wastewater stored in the underground collection tank is pumped the aboveground metal tank and/or the associated underground concrete tank as shown on the Production Area Map for the farm on page 2-8. Wastewater is stored in the wastewater storage tank until it is applied to the hay and pasture fields. There is a buried mainline from the underground concrete tank through the fields to Chad Acres that allows excess liquid manure to be stored at the Chad Acres above ground tank. Solids stored in the solids storage barn and wastewater stored in the wastewater storage tank are applied to the hay and pasture land fields during the spring and summer months to utilize the nutrients and organics. Wastewater is applied either via a tank wagon or big gun traveler. Solids are applied with a solid manure spreader.

East Side Dairy has 206.7 acres for the dairy farm facilities described above and the hay and pasture land fields used to produce forage for the dairy livestock. The crop rotation consists of perennial grass pastures that are harvested by grazing livestock and for hay, baleage, or silage.

Irrigation Water Management

Fields are irrigated as needed based on the amount of wastewater used and the season. The traveling big gun are used for freshwater irrigations:

GENERAL INFORMATION

Animal Mortality Management

Animal mortalities are disposed of by an animal removal service that is available to members of Tillamook County Creamery Association.

Nutrient Management

The soil concentration of phosphorus ranges from low to high in the Fairview Acres Dairy Farm hay and pasture land fields. Applications of wastewater and solids containing manure are planned on a nitrogen basis on all fields and the soil phosphorus concentrations will be monitored using soil tests. It is estimated that the dairy does not produce enough manure to meet the nutrient demand for the hay and pasture land fields. Supplemental nutrient applications to the crop, hay and pasture land fields should be based on soil tests and fertilizer guides to prevent excess soil nutrient concentrations.

GENERAL INFORMATION

MANURE STORAGE AND NUTRIENT BALANCE SUMMARY

Manure Storage-

Storage Type:	Capacity	Estimated Storage Period
Wastewater Storage Tanks-	304,656 CF	75 Days
Solids Storage Barns-	145,184 CF	103 Days

Nutrient Balance-

Nutrients Generated:	N Generated (lbs) after Losses	P ₂ O ₅ Generated (lbs) after Losses
Solid Manure-	112,197 lbs	114,458 lbs
Liquid Manure-	73,974 lbs	42,198 lbs
Pasture Manure-	90,914 lbs	50,678 lbs
Total-	277,085 lbs	207,334 lbs

Exported Nutrients:	N Exported (lbs) after Losses	P ₂ O ₅ Exported (lbs) after Losses
Solid Manure-	44,957 lbs	26,325 lbs
Liquid Manure-	27,665 lbs	9,706 lbs
Pasture Manure-	30,000 lbs	11,656 lbs
Total-	102,622 lbs	47,687 lbs

Crop Nutrient Removal:	N Utilized (lbs)	P ₂ O ₅ Utilized (lbs)
Total-	431,107 lbs	140,979 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)-	277,085 lbs	431,107 lbs	-154,022 lbs
Phosphate (P ₂ O ₅)-	207,334 lbs	140,979 lbs	66,355 lbs

System Losses:	Nutrients Generated (lbs)	Nutrients Remaining after Losses (lbs)	Nutrients Lost in System (lbs)
Nitrogen (N)-	562,889 lbs	277,085 lbs	285,804 lbs
Phosphate (P ₂ O ₅)-	227,498 lbs	207,334 lbs	20,164 lbs

GENERAL INFORMATION

EMERGENCY RESPONSE PLAN

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

Implement the following first containment steps:

- a. Stop all other activities to address the spill.
- b. Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
- c. Call for help and excavator if needed.
- d. Complete the clean-up and repair the necessary components.
- e. 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:

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

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

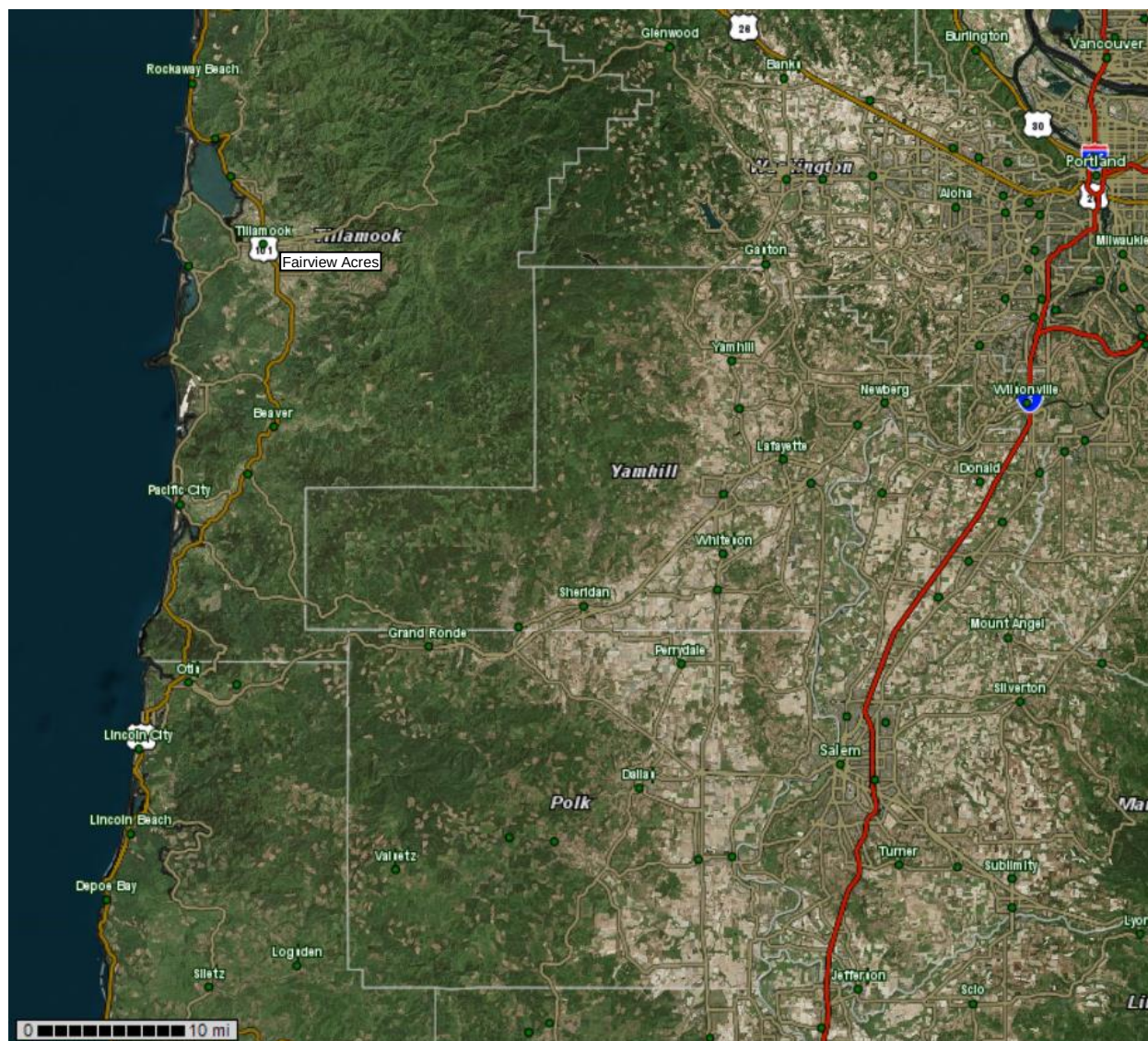
Organization	Phone Number
Oregon Dept. of Agriculture Natural Resources Division 635 Capitol St., N.E. Salem, OR 97301-2532	(503) 986-4700 TTD (503) 986-4762
Oregon Emergency Response (System OERS)	(800) 452-0311
County Environmental Health Department	(503) 842-3943
County Roads Department	

Be prepared to provide the following information:

- a. Your name and contact information.
- b. Farm location (driving directions) and other pertinent information.
- c. Description of emergency.
- d. Estimate of the amounts, area covered, and distance traveled.
- e. Whether manure has reached surface waters or major field drains.
- f. Whether there is any obvious damage: employee injury, fish kill, or property damage.
- g. Current status of containment efforts.

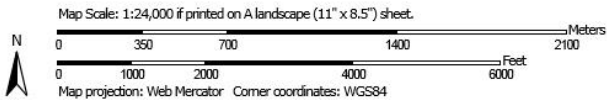
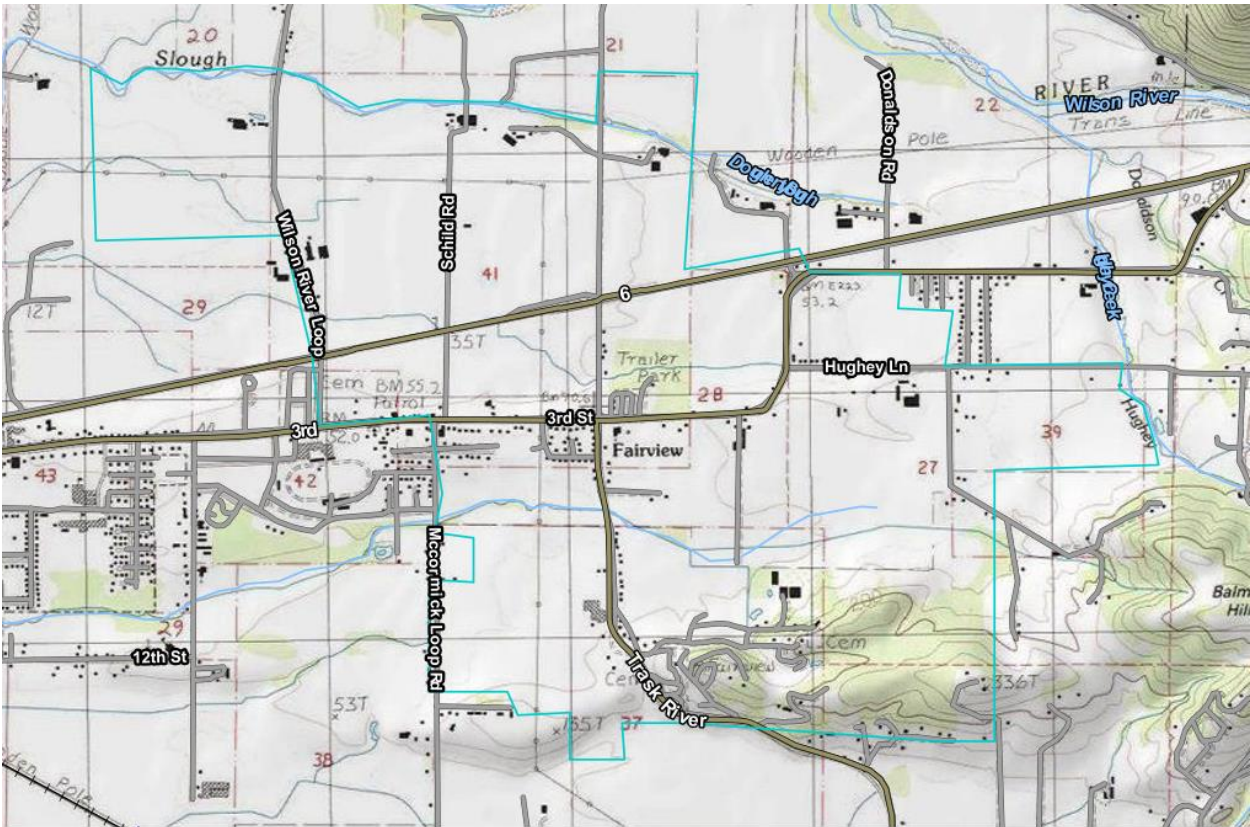
GENERAL INFORMATION

LOCATION MAP FOR FAIRVIEW ACRES DAIRY FARM



GENERAL INFORMATION

TOPOGRAPHY MAP FOR FAIRVIEW ACRES DAIRY FARM



PRODUCTION AREA

ANIMAL NUMBERS

Fairview Acres Dairy Farm is currently permitted for 1,924 animals. The maximum number of animals planned for this dairy is 2,374 consisting of 1,588 milking and dry cows and 786 heifers and calves. A request to increase animal numbers is located in Section 5.

This plan was written based on 2,374 animals and land base described herein.

ANIMAL MORTALITY MANAGEMENT

Currently animal mortalities for the Fairview Acres Dairy Farm are being disposed of by a service provided by the Tillamook Creamery Association. Other methods of dealing with mortalities may be employed by Fairview Acres Dairy Farm as needed.

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.

COLLECTION OF MANURE, PROCESS WATER AND RUNOFF

Manure, bedding and wasted feed is collected in the barns. The estimated volume of Manure bedding and wasted feed that will be collected annually was generated using the ORAWM workbook located in Section 5.

Leachate and rainfall runoff from the silage and solids storage areas is directed to catch basins that drain to wastewater collection facilities via underground pipelines. The estimated volumes of leachate and rainfall runoff from the silage and solid storage areas that will be collected annually were generated using the ORAWM workbook located in Section 5.

Rainfall runoff from paved and unpaved areas that comes into contact with animal manure is directed to catch basins that drain to the wastewater collection facilities. The estimated volume of rainfall runoff that will be collected annually was generated using the ORAWM workbook located in in Section 5. All rainfall runoff from roofs is collected using gutters and downspouts and directed to drainage ditches using underground pipelines.

All process water generated from the Fairview Acres Dairy Farm facilities is directed to catch basins that drain to wastewater collection facilities. The estimated volume of process water that will be collected annually was generated using the ORAWM workbook located in Section 5.

PRODUCTION AREA

TREATMENT FACILITIES

A dry scrape system is used to separate solids from liquids containing manure, wasted feed and bedding. Some of the separated solids are composted and recycled for bedding.

STORAGE FACILITIES

Collection and storage facilities for wastewater and solids containing manure, wasted feed and bedding are shown on the Production Area Maps on page 2-8.

Capacities and estimate volumes to store for the storage facilities can be found on the storage worksheet in the ORAWM workbook located in Section 5.

TRANSFER OF MANURE, PROCESS WATER AND RUNOFF

Wastewater, manure, bedding and wasted feed from the livestock barns is directed to the wastewater and solids collection facilities. Wastewater and solids from the collection facilities are directed to the wastewater and solids storage facilities shown on the Production Area Maps on page 2-8.

Wastewater stored in the wastewater storage facilities is pumped through pipelines or transported by tank wagon to the hay and pasture land fields to be utilized as a source of nutrients. Traveling big gun irrigation systems and tractor pulled tank wagons are used to apply the wastewater to the hay and pasture land fields.

Solids stored in the solids storage facilities are hauled to the hay and pasture land fields and applied using a tractor pulled solids spreader to be utilized as a source of nutrients.

PRODUCTION AREA

OPERATION AND MAINTENANCE CONSIDERATIONS

WASTEWATER COLLECTION AND STORAGE TANKS-

The wastewater collection and storage tanks shown on the Production Area Map on page 2-8 are used to store wastewater containing manure generated by the Fairview Acres Dairy Farm. The storage capacity and estimated storage period for the wastewater collection and storage tanks are shown on the ORAWM workbook storage worksheet located in Section 5. Emptying of the wastewater collection and storage tanks 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 Section 3, Utilization Area. To function properly and have the greatest management flexibility, the wastewater collection and storage tanks 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 collection and storage tanks must be removed to maintain design capacity and applied to land application areas in accordance with guidance given in Section 3, Utilization Area.

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 1 foot 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 collection and 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 Section 3, Utilization Area, when applying wastewater to fields.

Do not dispose of animal carcasses in any wastewater collection and storage tanks. 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.

PRODUCTION AREA

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.

SOLIDS STORAGE FACILITIES-

The solids storage facilities shown on the Production Area Map on page 2-8 are used to store solids containing manure generated by the Fairview Acres Dairy Farm. The storage capacity and estimated storage period for the solids storage facilities are shown on the ORAWM workbook storage worksheet located in Section 5. Emptying of the solids storage facilities 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 Section 3, Utilization Area. To function properly and have the greatest management flexibility, the solids storage facilities 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 facilities.

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.

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.

PRODUCTION AREA

IRRIGATION SYSTEMS-

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.

PRODUCTION AREA

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.

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.

PRODUCTION AREA

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 MAP FOR FAIRVIEW ACRES DAIRY FARM



PRODUCTION AREA

PRODUCTION AREA MAP FOR BOHERN FARM



PRODUCTION AREA

PRODUCTION AREA MAP FOR LITTLE DAIRY FARM



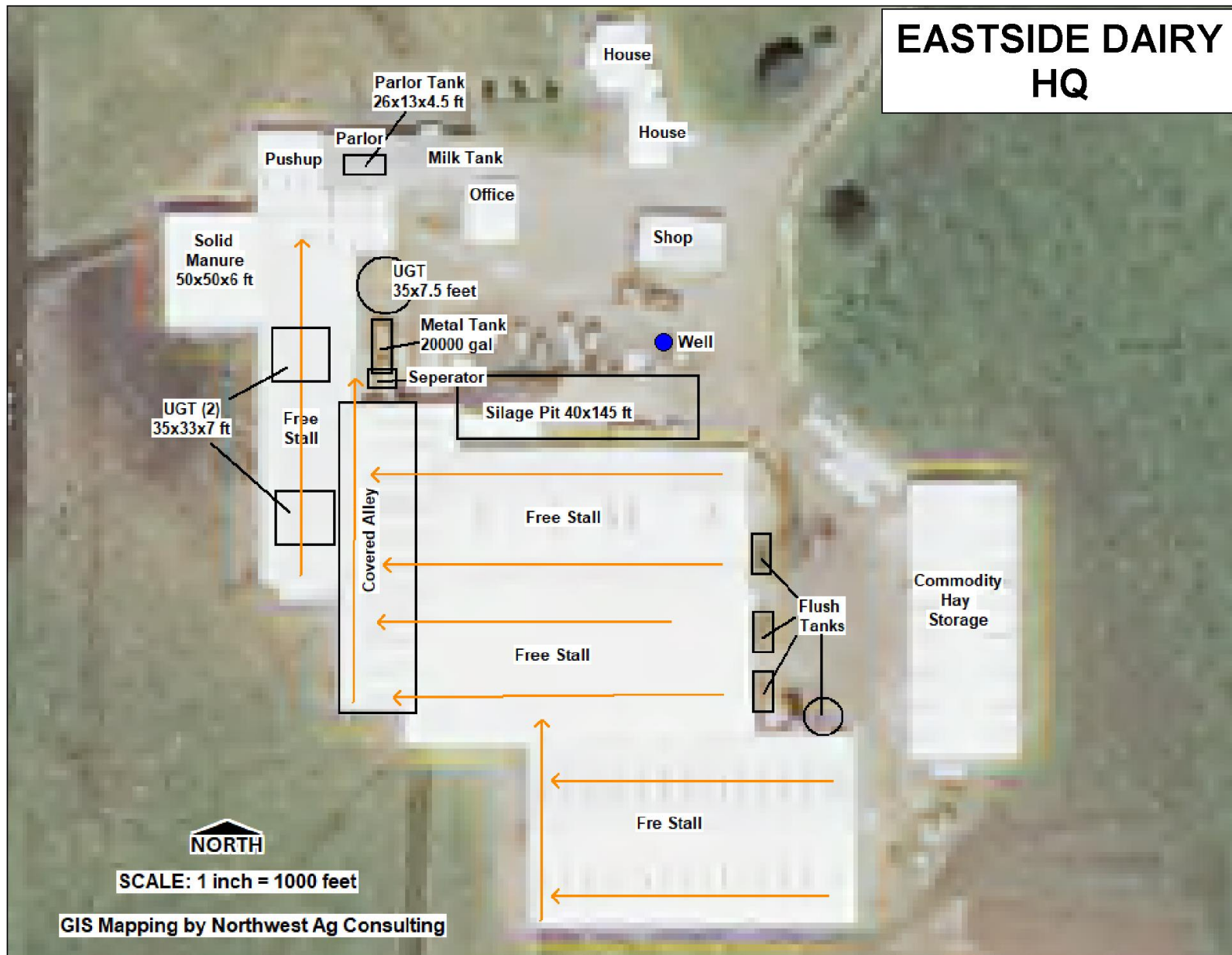
PRODUCTION AREA

PRODUCTION AREA MAP FOR CHAD ACRES FARM



PRODUCTION AREA

PRODUCTION AREA MAP FOR EASTSIDE DAIRY



UTILIZATION AREA

CROPPING SYSTEM

The acres of crop land area available for utilization of the nutrients and organics contained in the wastewater and solids produced from the Fairview Acres Dairy Farm is shown on the utilization worksheet in ORAWM located in Section 5. Yield data and nutrient utilization rates for the crops grown are also shown on the inventory worksheet in ORAWM located in Section 5.

Irrigated and nonirrigated crop yield data from the Tillamook County Soil Survey referenced in Section 5 indicates the yield data used in developing this plan is within the range of the given crop yields for well managed fields.

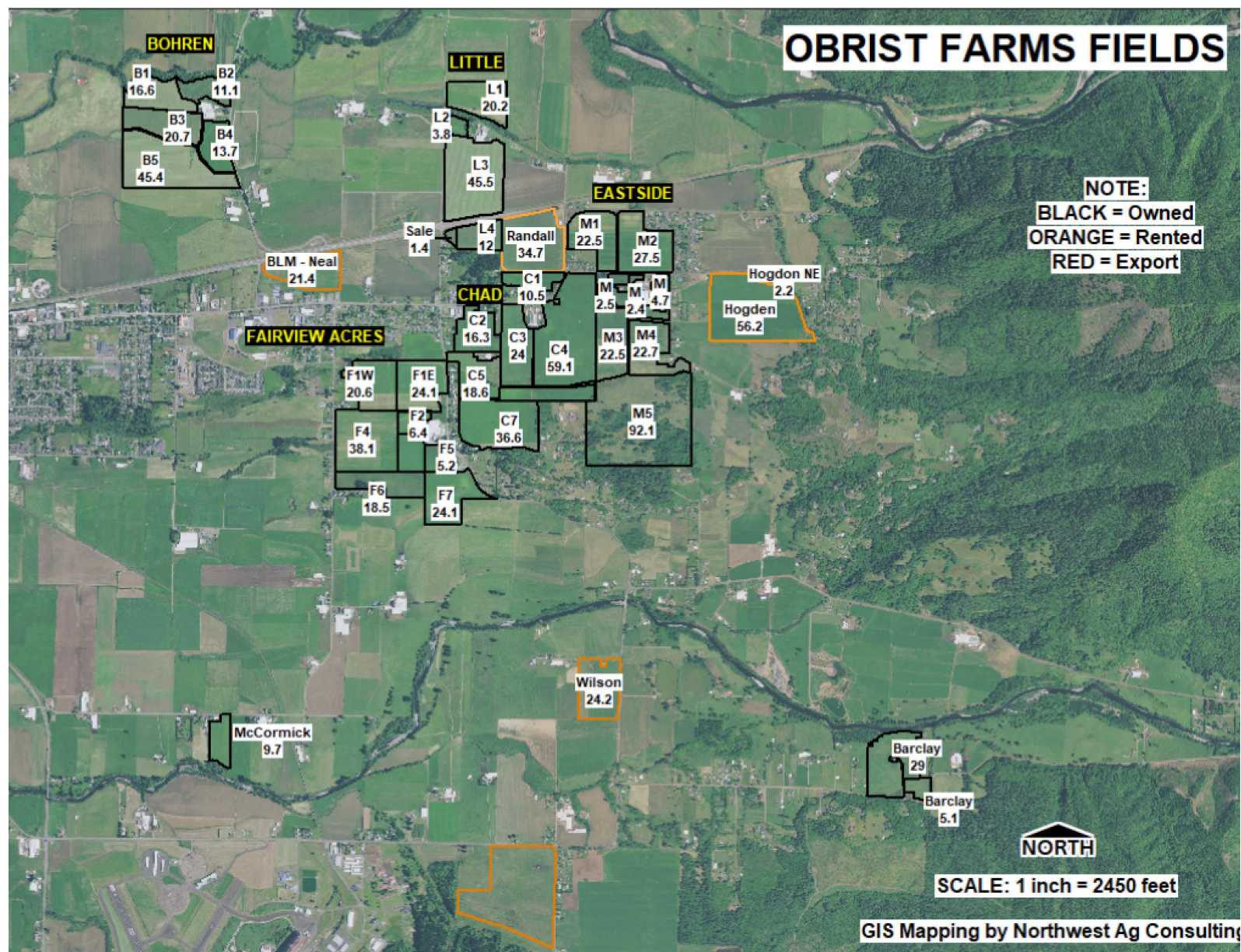
Traveling big gun irrigation systems are used to irrigate and apply wastewater containing manure and other organics produced from the Fairview Acres Dairy Farm to the crop land fields. These systems use single large sprinkler nozzles usually mounted on a cart with wheels that is attached to a high density polyethylene pipeline that is rolled up on a large reel that provides a constant travel speed for the sprinkler. These systems apply water depending on the nozzle size, operating pressure and travel used and have an efficiency of 65 to 75 percent. Traveling big gun sprinkler systems must be well managed to prevent excess percolation, surface runoff, wind drift and evaporation losses.

Other types of irrigation systems will be used to irrigate the crops that must be well managed to prevent excess percolation, surface runoff and erosion, wind drift and evaporation losses.

The amount of irrigation water to apply based on the net irrigation requirements for the crop being grown can be found in the tables starting on page 3-**Error! Bookmark not defined.**

UTILIZATION AREA

FIELD MAP(S)



UTILIZATION AREA

APPLICATION

The manure and irrigation application systems will be calibrated in accordance with guidance starting on page 3-5 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 setback areas shown on the Setback Map on page 3-9. Applications of wastewater and solids containing manure should be made in accordance with guidance starting on page 3-5 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 Western Oregon Phosphorus Index and is shown in the table on page 4-34. Wastewater, solids and commercial fertilizer for any field with a high runoff rating must be applied on a phosphorus basis. Wastewater, solids and commercial fertilizer for any field with a low or medium runoff rating can be applied on a nitrogen basis. No applications manure or commercial fertilizer containing phosphorus are to be made on a field with a very high phosphorus runoff rating.

GENERAL CONSIDERATIONS FOR MAKING MANURE APPLICATIONS

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.

Surface air temperature is monitored and the daily minimum and maximum air temperatures are summed and divided by two to get the average daily air temperature then converted to centigrade ($F \text{ degrees minus } 32 \text{ times } 0.556$).

Manure applications may begin once 200 heat units have been accumulated. The average date of T-Sum 200 for Fairview Acres Dairy Farm is January 30th for the 30 year average from 1981-2010. 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.

UTILIZATION AREA

- **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 starting on page 3-6. Refer to page 3-20 for 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	Season	
		Wet	Dry
Liquid	Big Gun Traveler or Dragline	70 feet	35 feet
Liquid	Honey Wagon	70 feet	10 feet
Solid	Spreader	70 feet	10 feet

Note:

- Setbacks are the distance between open waterways and manure application area.
 - 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.
- **Record applications, transfers or exports of nutrients (manure and fertilizer)** and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or the tools and forms referenced in Section 5 may be used to record this information.

UTILIZATION AREA

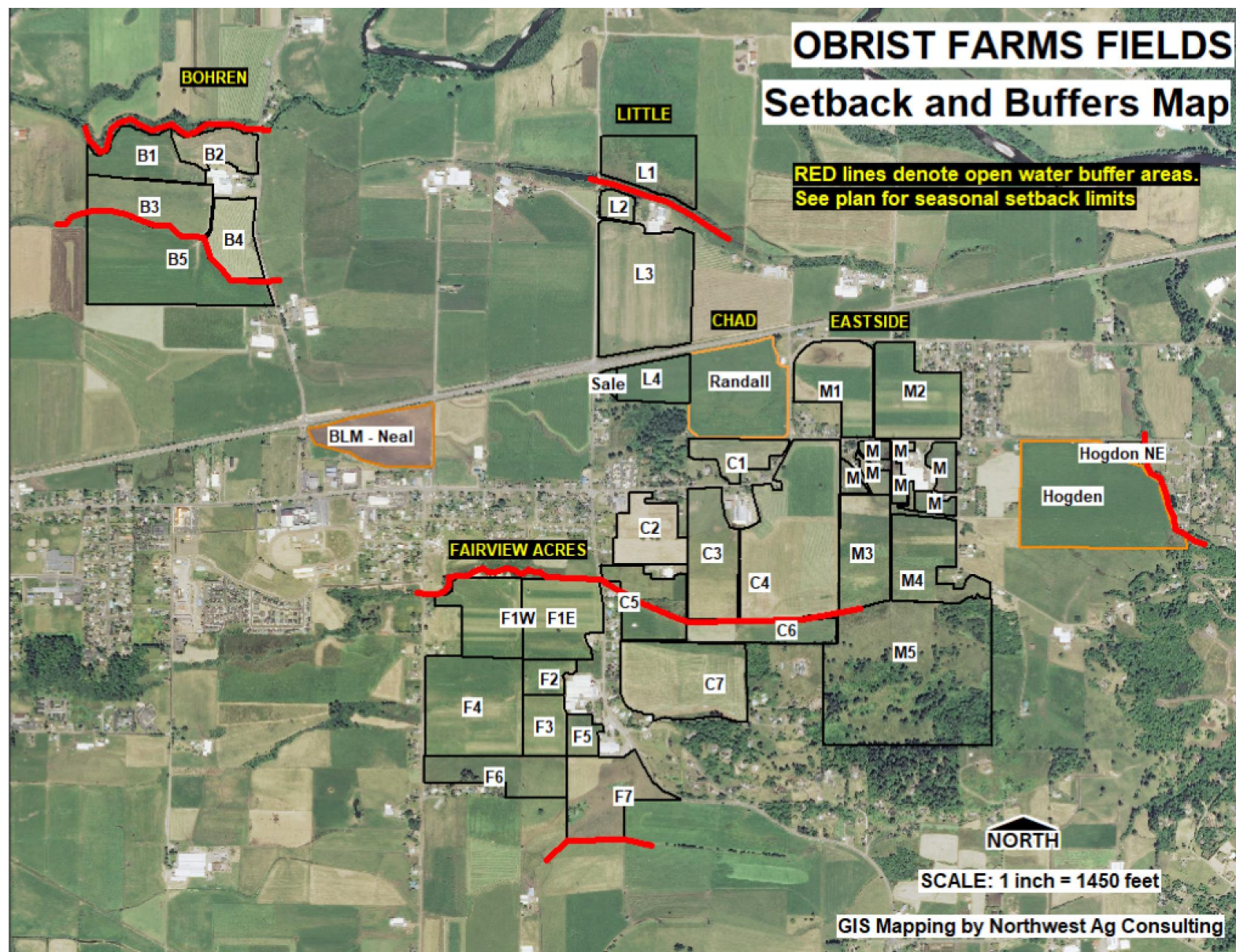
CONSIDERATIONS FOR DRY SEASON MANURE APPLICATIONS:

Apply wastewater and solids containing manure at **agronomic rates** shown on the table on page 3-24 using the following guidelines:

- Consider making manure applications once 200 heat units (T-Sum 200) have been accumulated. The average date of T-Sum 200 for Fairview Acres Dairy Farm is January 30th for the 30 year average from 1981-2010.
- 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.
- ***Do not apply*** during rainfall events that are expected to result in saturated soils or surface runoff.
- ***Maintain the setback distances*** described on page 3-6 and shown on the Setback Map on page 3-9 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 the tools and forms referenced in Section 5 may be used to record this information.

UTILIZATION AREA

SETBACK MAP(S) FOR FAIRVIEW ACRES DAIRY FARM



UTILIZATION AREA

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 CAN NOT 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 distances** described in the table on page 3-6 and shown on the Setback Map on page 3-9 when making applications of liquids or solids containing manure.
- **Do not apply** 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 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 the tools and forms referenced in Section 5 may 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.

UTILIZATION AREA

MANURE AND SOIL SAMPLING FREQUENCY

Sample liquids and solids containing manure during applications in early spring **annually** and have each sample analyzed for Total Nitrogen (TKN), Ammonium Nitrogen (NH₄-N), Phosphorus (P) and Potassium (K) 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), <http://www.mda.state.mn.us/licensing/pestfert/manurelabs.htm>.

Collect soil samples from all fields receiving solids or liquids containing manure **within a 5 year period** in the fall (September 15-October 15) in accordance with **Pacific Northwest (PNW) Extension publication 570-E, “Monitoring Soil Nutrients Using a Management Unit Approach”** referenced in Section 5. 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.

UTILIZATION AREA

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.

UTILIZATION AREA

MANURE TESTS

Fairview Acres Dairy Farm

LIQUID MANURE ANALYSIS

Testing performed by AgSource Labs, Umatilla, Oregon

Report	Date	Sample I.D.	Lbs/1,000 gallons				%	%
			Total N	P ₂ O ₅	K ₂ O	NH ₄ -N	Moisture	Solids
M7373-9014	06/02/2017	CHAD TANK	7.83	3.894	12.54	3.33	97.81	2.19
M7373-9015	06/03/2017	FAIRVIEW TANK	27.16	6.165	12.44	7.66	96.84	3.16
M7373-9016	06/04/2017	LITTLE TANK	10.66	2.195	11.04	8.08	98.33	1.67
M7373-9017	06/05/2017	BOHREN TANK	19.91	10.746	31.51	8.58	93.4	6.6
M3928-5615	09/17/2014	EASTSIDE TANK	7.41	2.481	12.04	3.58	98.27	1.73
Average-			14.60	5.096	15.91	6.25	96.93	3.07

Fairview Acres Dairy Farm

SOLID MANURE ANALYSIS

Testing performed by AgSource Labs, Umatilla, Oregon

Report	Date	Sample I.D.	Lbs/Ton				%	%
			Total N	P ₂ O ₅	K ₂ O	NH ₄ -N	Moisture	Solids
M7377-9026	6/2/2017	BOHREN SOLIDS	11.32	8.524	16.840	2.40	79.23	20.77
M7377-9027	6/2/2017	CHAD SOLIDS	11.60	6.370	17.997	2.40	79.52	20.48
M7377-9025	6/2/2017	FAIRVIEW SOLIDS	7.02	4.766	8.883	2.64	85.19	14.81
M7377-9028	6/2/2017	LITTLE SOLIDS	38.00	15.123	32.524	3.88	23.00	77.00
M3763-5219	8/13/2014	EASTSIDE	10.58	2.933	10.311	1.220	77.49	22.51
Average-			15.70	7.54	17.31	2.51	68.89	31.11

Manure analyses should be performed by a laboratory that meets the requirements and performance standards of the Manure Testing Laboratory Certification Program (MTLCP), <http://www.mda.state.mn.us/licensing/pestfert/manurelabs.htm>.

Manure should be analyzed annually for a minimum of three (3) consecutive years to develop a cumulative manure analysis history as a basis for nutrient allocation to the fields.

UTILIZATION AREA

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". Oregon State university Extension publication EC1478, "Soil Test interpretation Guide" 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.

UTILIZATION AREA

SOIL TESTS

Fairview Acres Dairy Farm

SOIL TEST RESULTS

Testing performed by AgSource Labs, Umatilla, Oregon

Report	Test Date	Field	Depth	NO ₃ -N	NH ₄ -N	P	K	Ca	Mg	Cu	pH	SMP	OM
Report #				ppm	ppm	ppm	ppm	meq	meq	ppm			%
2016													
S2690	10/14/2016	F1E-F2	6"	45	17	34	708	16.6	6.8	11.1	5.7	5.8	22.6
S2691	10/14/2016	F4	6"	14	48	64	785	16.3	7.6	15.5	5.8	5.8	27.1
S2690	10/14/2016	B4	6"	26	10	24	643	25.0	8.6	6.9	5.5	5.6	7.4
S2690	10/14/2016	B5	6"	30	15	19	770	19.4	7.4	5.4	5.5	5.5	19.9
S2690	10/14/2016	C7	6"	20	22	12	457	8.1	4.7	4.7	5.1	5.3	21.8
S2690	10/14/2016	L3	6"	58	24	18	1395	16.0	8.4	10.2	5.9	5.9	47.6
2015													
S8365	09/22/2015	B2	6"	30	8	36	603	23	7.0	3.6	5.5	5.8	6.1
S8365	09/22/2015	B3	6"	22	15	67	1605	24	8.1	4.7	5.9	5.8	7.8
S8365	09/22/2015	B4	6"	17	15	36	878	23	8	4.4	5.7	5.6	7.6
S8365	09/22/2015	C1	6"	20	25	4	445	8	3.5	2.8	5.5	5.2	17.4
S8365	09/22/2015	C3	6"	42	28	9	931	8	3.8	1.3	5.4	5.1	15.5
S8365	09/22/2015	C5	6"	12	27	9	346	3	1.9	0.8	5.4	4.8	14.3
S8365	09/22/2015	C7	6"	17	19	12	436	6	3.4	1.8	5.3	5.0	11.3
S8365	09/22/2015	F1W	6"	24	32	82	772	14	6.1	10.5	5.2	5.7	11.4
S8365	09/22/2015	F3	6"	32	31	86	838	16	6.8	9.8	5.8	5.7	12.9
S8365	09/22/2015	F6	6"	37	21	34	748	11	5.3	3.2	5.4	5.4	13.5
S8365	09/22/2015	F8	6"	23	22	12	570	6	3.5	1.9	5.1	5.2	11.7
S8365	09/22/2015	HOGDEN N	6"	33	22	13	559	13	5.9	2.5	5.9	5.4	14.9
S8365	09/22/2015	L1	6"	18	24	15	363	24	8.1	6.2	5.4	5.6	8.8
S8631	10/13/2015	Randall	6"	112	33	12	376	8.3	4.0	2.1	4.8	5.0	17.4
2014													
S4583	10/29/2014	HOGDEN N	6"	36	26	34	609	15	5.8	5.6	5.7	5.5	23.9
S4583	10/29/2014	HOGDEN S	6"	44	32	22	808	11	4.6	5.7	5.5	5.4	22.1
S4661	11/13/2014	B1-2	12"	12	15	28	600	18	5.1	5.5	6.0	5.9	6.8
S4661	11/13/2014	B5-6	12"	9	48	20	663	15	4.8	4.0	5.9	5.6	10.8
S4661	11/13/2014	C3	12"	17	49	16	691	9	3.5	2.0	5.7	5.5	22.6

UTILIZATION AREA

Fairview Acres Dairy Farm

SOIL TEST RESULTS

Testing performed by AgSource Labs, Umatilla, Oregon

Report	Test Date	Field	Depth	NO ₃ -N	NH ₄ -N	P	K	Ca	Mg	Cu	pH	SMP	OM
Report #				ppm	ppm	ppm	ppm	meq	meq	ppm			%
S4661	11/13/2014	C4-C5	12"	25	32	42	928	15	5.1	13.7	5.9	5.6	12.0
S4661	11/13/2014	L3	12"	12	24	56	18	941	12	7.6	5.0	6.1	21.6
S4679	11/21/2014	1-3-5	6"	40	39	54	655	19	5.2	12.0	5.8	5.8	18.5
S4679	11/21/2014	6-7-8	6"	40	38	83	720	20	5.8	16.5	5.8	5.8	18.6
S4393	10/09/2014	M1	6"	16	32	36	964	9.0	5.0	2.2	5.6	5.5	16.0
S4393	10/09/2014	M2	6"	30	49	67	747	13.5	6.0	3.7	5.8	5.8	16.2
S4393	10/09/2014	M3	6"	39	35	31	1114	8.5	4.5	1.5	5.4	5.3	24.5
S4393	10/09/2014	M4	6"	37	30	60	1019	11.1	5.0	2.0	5.6	5.5	25.4
S4393	10/09/2014	M5	6"	12	34	55	937	6.9	3.0	0.8	5.3	5.3	15.9
S4393	10/09/2014	MBW	6"	63	32	65	1059	11.2	5.0	2.1	5.5	5.4	27.4
S4393	10/09/2014	MBE	6"	31	41	24	710	8.4	3.1	1.9	5.6	5.4	31.6
S4393	10/09/2014	Blake	6"	5	34	8	425	4.8	3.0	0.5	5.3	5.1	31.3

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/>.

UTILIZATION AREA

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.

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 via Irrigation:	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	27,154
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).

UTILIZATION AREA

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.

UTILIZATION AREA

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.

UTILIZATION AREA

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 ($21.8 = 43,560 \text{ sq ft per acre divided by } 2,000 \text{ lbs/ton}$).

The factor for converting square feet to acres = $43,560 \text{ sq ft per acre}$.

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:

1. Desired manure application rate based on soil and manure tests,
2. Width of the manure spread, and
3. 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.

UTILIZATION AREA

AMOUNT OF MANURE TO APPLY FOR CROPS GROWN

The timing and frequency of applications of wastewater and solids containing manure for utilization by crops shown in the table below are based on information provided in Oregon State University Extension publications listed in Section 5.

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 percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

Total P₂O₅ to apply in pounds = P in pounds per yield unit from the table for the crop grown X 2.291 P₂O₅/P X percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

Total K₂O to apply in pounds = K in pounds per yield unit from the table for the crop grown X 1.205 K₂O/K X percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

The following table shows the crops that may be grown on this farm:

FRUIT OR VEGETABLES	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Beans, dry edible	cwt	100	100	3.13	0.45	0.85
Blueberries	ton	2000	100	2.14	0.20	3.54
Caneberries	ton	2000	100	11.43	7.42	11.43
Corn, Sweet	ton	2000	100	17.80	4.8	11.6
Mixed Vegetables & Fruit	ton	2000	100	8.33	2.08	10.20
Onions	cwt	100	100	0.30	0.06	0.22
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	6.60	1.20	10.33

UTILIZATION AREA

GRAIN, SEED OR OIL CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Barley	bushels	48	100	0.87	0.16	0.21
Beets, sugar	ton	2000	100	4.00	0.60	2.78
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	10.03	1.08	8.33
Fescue, seed (Fine or Tall)	lb	1	100	0.02	0.00	0.00
Grass Seed	cwt	100	100	1.60	0.20	0.40
Grass Seed, Straw Removed	ton	2000	100	33.90	5.50	34.40
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 and Stems Removed	ton	2000	100	87.2	36.8	57.8
Pumpkins	ton	2000	100	4.00	1.40	6.60
Red Clover seed	lb	1	100	0.05	0.01	0.02
Ryegrass Seed	cwt	100	100	1.60	0.20	0.40
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, Soft White Straw Removed	ton	2000	100	83.40	17.10	37.10

UTILIZATION AREA

HAY AND PASTURE CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Alfalfa, Hay	ton	2000	100	64.00	8.00	42.00
Alta Fescue Hay/Pasture	ton	2000	100	33.00	6.90	37.60
Grass Legume Hay/Pasture	ton	2000	100	33.90	5.50	34.40
Meadow Fescue Hay/Pasture	ton	2000	100	41.60	8.80	47.40
Oats Hay/Pasture	ton	2000	100	60.00	10.20	14.80
Orchardgrass Hay/Pasture	ton	2000	100	53.20	8.60	18.60
Perennial Hay/Pasture (Low Intensity)	ton	2000	100	32.00	6.00	38.00
Perennial Hay/Pasture (Low-Med Intensity)	ton	2000	100	38.00	6.00	38.00
Perennial Hay/Pasture (Medium Intensity)	ton	2000	100	48.00	7.00	38.00
Perennial Hay/Pasture (Med- High Intensity)	ton	2000	100	58.00	8.00	40.00
Perennial Hay/Pasture (High Intensity)	ton	2000	100	64.00	8.00	40.00
Ryegrass Hay	ton	2000	100	33.40	5.40	28.40
Ryegrass, Perennial Pasture	ton	2000	100	58.00	8.00	48.00
Tall Fescue Hay/Pasture	ton	2000	100	39.40	4.00	40.00

SILAGE AND HAYLAGE CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Corn for Silage	ton	2000	100	7.50	1.20	6.00
Crimson Clover forage	ton	2000	100	40.00	4.41	32.98
Field Pea, Forage	ton	2000	100	73.60	8.00	18.00
Oat haylage	ton	2000	100	60.00	10.20	14.80
Oats & Peas/ Green Beans	ton	2000	100	32.03	5.58	18.65
Red Clover forage	ton	2000	100	40.00	4.41	32.98
Ryegrass Haylage	ton	2000	100	50.00	8.00	42.67
Sorghum-Sudan Haylage	ton	2000	100	54.33	6.33	58.00
Triticale Haylage	ton	2000	100	49.00	6.80	11.40
Wheatgrass Hay/Pasture	ton	2000	100	28.40	5.40	53.60

UTILIZATION AREA

OTHER CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Hops, Cones	bale	200	100	9.00	0.96	5.00
Natural Area (Trees and Grass)	ton	2000	100	10.52	1.56	9.20
Nursery Stock	ton	2000	100	8.33	2.08	10.20

UTILIZATION AREA

FAIRVIEW ACRES DAIRY FARM SOLIDS APPLICATION CHART				
MANURE ANALYSIS (As received lb/ton)				
Test Date: 06/02/17		Total N	P ₂ O ₅	K ₂ O
Source: Solids Stack		7.02	4.77	8.88
Manure Nutrient Content				
Manure Applied	Thickness to apply	Total N	P ₂ O ₅	K ₂ O
(Tons/Ac)	(inches/Ac)	(lb/A)	(lb/A)	(lb/A)
1.00	0.013	7	5	9
1.50	0.020	11	7	13
2.00	0.026	14	10	18
2.50	0.033	18	12	22
3.00	0.039	21	14	27
3.50	0.046	25	17	31
4.00	0.052	28	19	36
4.50	0.059	32	21	40
5.00	0.066	35	24	44
5.50	0.072	39	26	49
6.00	0.079	42	29	53
6.50	0.085	46	31	58
7.00	0.092	49	33	62
7.50	0.098	53	36	67
8.00	0.105	56	38	71
8.50	0.111	60	41	76
9.00	0.118	63	43	80
9.50	0.124	67	45	84
10.00	0.131	70	48	89
10.50	0.138	74	50	93

FAIRVIEW ACRES DAIRY FARM WASTEWATER APPLICATION CHART				
MANURE ANALYSIS (As received lb/1000 gal)				
Test Date: 06/02/17		Total N	P ₂ O ₅	K ₂ O
Source: Tank		27.16	6.17	12.44
Manure Nutrient Content				
Manure Applied	Thickness to apply	Total N	P ₂ O ₅	K ₂ O
(Gallons/Ac)	(inches/Ac)	(lb/A)	(lb/A)	(lb/A)
2,715	0.10	74	17	34
5,431	0.20	148	33	68
8,146	0.30	221	50	101
10,862	0.40	295	67	135
13,577	0.50	369	84	169
16,292	0.60	443	100	203
19,008	0.70	516	117	236
21,723	0.80	590	134	270
24,439	0.90	664	151	304
27,154	1.00	738	167	338
29,869	1.10	811	184	372
32,585	1.20	885	201	405
35,300	1.30	959	218	439
38,016	1.40	1033	234	473
40,731	1.50	1106	251	507
43,446	1.60	1180	268	540
46,162	1.70	1254	285	574
48,877	1.80	1328	301	608
51,593	1.90	1401	318	642
54,308	2.00	1475	335	676

UTILIZATION AREA

CHAD FARM SOLIDS APPLICATION CHART				
MANURE ANALYSIS (As received lb/ton)				
Test Date: 06/02/17		Total N	P ₂ O ₅	K ₂ O
Source: Solids Stack		11.16	6.37	17.84
Manure Nutrient Content				
Manure Applied	Thickness to apply	Total N	P ₂ O ₅	K ₂ O
(Tons/Ac)	(inches/Ac)	(lb/A)	(lb/A)	(lb/A)
1.00	0.013	11	6	18
1.50	0.020	17	10	27
2.00	0.026	22	13	36
2.50	0.033	28	16	45
3.00	0.039	33	19	54
3.50	0.046	39	22	62
4.00	0.052	45	25	71
4.50	0.059	50	29	80
5.00	0.066	56	32	89
5.50	0.072	61	35	98
6.00	0.079	67	38	107
6.50	0.085	73	41	116
7.00	0.092	78	45	125
7.50	0.098	84	48	134
8.00	0.105	89	51	143
8.50	0.111	95	54	152
9.00	0.118	100	57	161
9.50	0.124	106	61	169
10.00	0.131	112	64	178
10.50	0.138	117	67	187

CHAD FARM WASTEWATER APPLICATION CHART				
MANURE ANALYSIS (As received lb/1000 gal)				
Test Date: 06/02/17		Total N	P ₂ O ₅	K ₂ O
Source: Tank		7.83	3.89	12.54
Manure Nutrient Content				
Manure Applied	Thickness to apply	Total N	P ₂ O ₅	K ₂ O
(Gallons/Ac)	(inches/Ac)	(lb/A)	(lb/A)	(lb/A)
2,715	0.10	21	11	34
5,431	0.20	43	21	68
8,146	0.30	64	32	102
10,862	0.40	85	42	136
13,577	0.50	106	53	170
16,292	0.60	128	63	204
19,008	0.70	149	74	238
21,723	0.80	170	85	272
24,439	0.90	191	95	306
27,154	1.00	213	106	341
29,869	1.10	234	116	375
32,585	1.20	255	127	409
35,300	1.30	276	137	443
38,016	1.40	298	148	477
40,731	1.50	319	159	511
43,446	1.60	340	169	545
46,162	1.70	361	180	579
48,877	1.80	383	190	613
51,593	1.90	404	201	647
54,308	2.00	425	211	681

UTILIZATION AREA

BOHERN FARM SOLIDS APPLICATION CHART				
MANURE ANALYSIS (As received lb/ton) Total N P₂O₅ K₂O Test Date: 06/02/17 Source: Solids Stack 11.32 8.52 16.84				
Manure Nutrient Content Manure Applied Thickness to apply Total N P₂O₅ K₂O (Tons/Ac) (inches/Ac) (lb/A) (lb/A) (lb/A)				
1.00	0.013	11	9	17
1.50	0.020	17	13	25
2.00	0.026	23	17	34
2.50	0.033	28	21	42
3.00	0.039	34	26	51
3.50	0.046	40	30	59
4.00	0.052	45	34	67
4.50	0.059	51	38	76
5.00	0.066	57	43	84
5.50	0.072	62	47	93
6.00	0.079	68	51	101
6.50	0.085	74	55	109
7.00	0.092	79	60	118
7.50	0.098	85	64	126
8.00	0.105	91	68	135
8.50	0.111	96	72	143
9.00	0.118	102	77	152
9.50	0.124	108	81	160
10.00	0.131	113	85	168
10.50	0.138	119	90	177

BOHERN FARM WASTEWATER APPLICATION CHART				
MANURE ANALYSIS (As received lb/1000 gal) Total N P₂O₅ K₂O Test Date: 06/05/17 Source: Tank 19.91 10.75 31.51				
Manure Nutrient Content Manure Applied Thickness to apply Total N P₂O₅ K₂O (Gallons/Ac) (inches/Ac) (lb/A) (lb/A) (lb/A)				
2,715	0.10	54	29	86
5,431	0.20	108	58	171
8,146	0.30	162	88	257
10,862	0.40	216	117	342
13,577	0.50	270	146	428
16,292	0.60	324	175	513
19,008	0.70	378	204	599
21,723	0.80	433	233	684
24,439	0.90	487	263	770
27,154	1.00	541	292	856
29,869	1.10	595	321	941
32,585	1.20	649	350	1027
35,300	1.30	703	379	1112
38,016	1.40	757	409	1198
40,731	1.50	811	438	1283
43,446	1.60	865	467	1369
46,162	1.70	919	496	1455
48,877	1.80	973	525	1540
51,593	1.90	1027	554	1626
54,308	2.00	1081	584	1711

UTILIZATION AREA

LITTLE DAIRY FARM SOLIDS APPLICATION CHART				
MANURE ANALYSIS (As received lb/ton)				
Test Date: <u>06/02/17</u>		Total N	P ₂ O ₅	K ₂ O
Source: <u>Solids Stack</u>		38.00	15.12	32.52
Manure Nutrient Content				
Manure Applied	Thickness to apply	Total N	P ₂ O ₅	K ₂ O
(Tons/Ac)	(inches/Ac)	(lb/A)	(lb/A)	(lb/A)
1.00	0.013	38	15	33
1.50	0.020	57	23	49
2.00	0.026	76	30	65
2.50	0.033	95	38	81
3.00	0.039	114	45	98
3.50	0.046	133	53	114
4.00	0.052	152	60	130
4.50	0.059	171	68	146
5.00	0.066	190	76	163
5.50	0.072	209	83	179
6.00	0.079	228	91	195
6.50	0.085	247	98	211
7.00	0.092	266	106	228
7.50	0.098	285	113	244
8.00	0.105	304	121	260
8.50	0.111	323	129	276
9.00	0.118	342	136	293
9.50	0.124	361	144	309
10.00	0.131	380	151	325
10.50	0.138	399	159	342

LITTLE DAIRY FARM WASTEWATER APPLICATION CHART				
MANURE ANALYSIS (As received lb/1000 gal)				
Test Date: <u>04/01/17</u>		Total N	P ₂ O ₅	K ₂ O
Source: <u>Tank</u>		10.66	2.20	11.04
Manure Nutrient Content				
Manure Applied	Thickness to apply	Total N	P ₂ O ₅	K ₂ O
(Gallons/Ac)	(inches/Ac)	(lb/A)	(lb/A)	(lb/A)
2,715	0.10	29	6	30
5,431	0.20	58	12	60
8,146	0.30	87	18	90
10,862	0.40	116	24	120
13,577	0.50	145	30	150
16,292	0.60	174	36	180
19,008	0.70	203	42	210
21,723	0.80	232	48	240
24,439	0.90	261	54	270
27,154	1.00	289	60	300
29,869	1.10	318	66	330
32,585	1.20	347	72	360
35,300	1.30	376	77	390
38,016	1.40	405	83	420
40,731	1.50	434	89	450
43,446	1.60	463	95	480
46,162	1.70	492	101	510
48,877	1.80	521	107	540
51,593	1.90	550	113	570
54,308	2.00	579	119	600

UTILIZATION AREA

EASTSIDE DAIRY SOLIDS APPLICATION CHART				
MANURE ANALYSIS (As received lb/ton)				
		Total N	P ₂ O ₅	K ₂ O
Test Date: 08/13/14		10.58	2.93	10.31
Source: Solids Stack				
Manure Nutrient Content				
Manure Applied	Thickness to apply	Total N	P ₂ O ₅	K ₂ O
(Tons/Ac)	(inches/Ac)	(lb/A)	(lb/A)	(lb/A)
1.00	0.013	11	3	10
1.50	0.020	16	4	15
2.00	0.026	21	6	21
2.50	0.033	26	7	26
3.00	0.039	32	9	31
3.50	0.046	37	10	36
4.00	0.052	42	12	41
4.50	0.059	48	13	46
5.00	0.066	53	15	52
5.50	0.072	58	16	57
6.00	0.079	63	18	62
6.50	0.085	69	19	67
7.00	0.092	74	21	72
7.50	0.098	79	22	77
8.00	0.105	85	23	82
8.50	0.111	90	25	88
9.00	0.118	95	26	93
9.50	0.124	101	28	98
10.00	0.131	106	29	103
10.50	0.138	111	31	108

EASTSIDE DAIRY WASTEWATER APPLICATION CHART				
MANURE ANALYSIS (As received lb/1000 gal)				
		Total N	P ₂ O ₅	K ₂ O
Test Date: 09/17/14		7.41	2.48	12.04
Source: Tank				
Manure Nutrient Content				
Manure Applied	Thickness to apply	Total N	P ₂ O ₅	K ₂ O
(Gallons/Ac)	(inches/Ac)	(lb/A)	(lb/A)	(lb/A)
2,715	0.10	20	7	33
5,431	0.20	40	13	65
8,146	0.30	60	20	98
10,862	0.40	80	27	131
13,577	0.50	101	34	163
16,292	0.60	121	40	196
19,008	0.70	141	47	229
21,723	0.80	161	54	262
24,439	0.90	181	61	294
27,154	1.00	201	67	327
29,869	1.10	221	74	360
32,585	1.20	241	81	392
35,300	1.30	262	88	425
38,016	1.40	282	94	458
40,731	1.50	302	101	490
43,446	1.60	322	108	523
46,162	1.70	342	115	556
48,877	1.80	362	121	588
51,593	1.90	382	128	621
54,308	2.00	402	135	654

UTILIZATION AREA

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	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.

UTILIZATION AREA

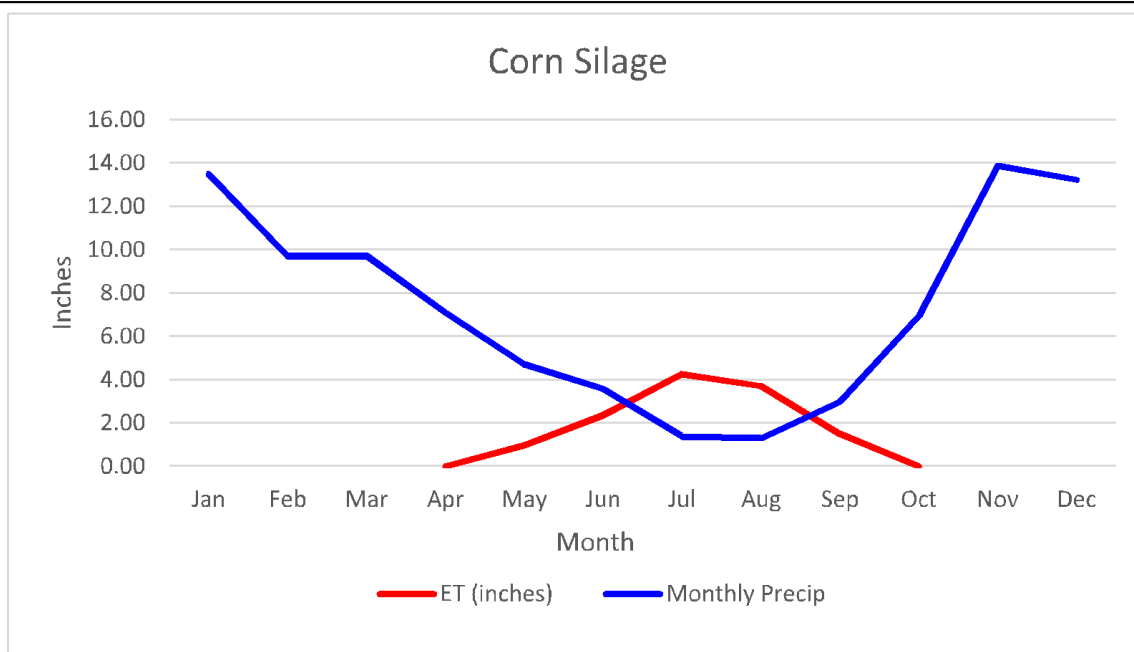
Irrigation water management requires knowledge, skills, and desire to determine when irrigation water should be applied. The main factors influencing IWM are **irrigation interval** (time between irrigations), **irrigation set time** (time water is applied), and **application rate** (rate at which water 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.

Guidance for irrigation water requirements for crops are given in the following worksheets^{2/}:

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



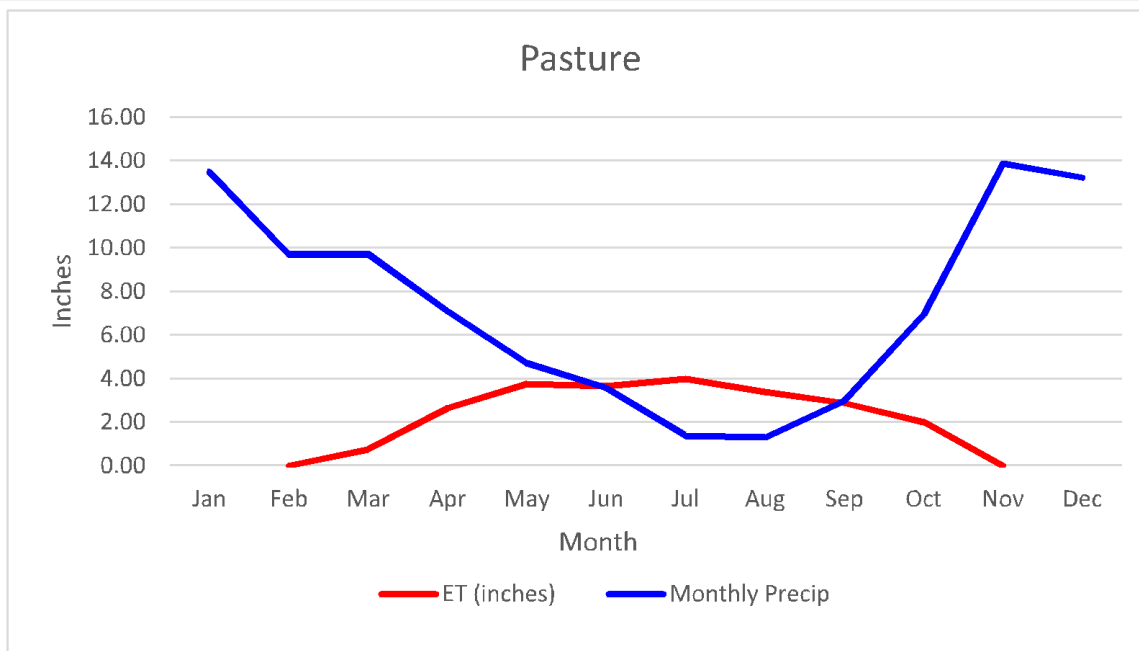
^{2/} Guidance given in the irrigation water requirements worksheets was developed based on Oregon State University Extension Miscellaneous 8530, Oregon Crop Water Use and Irrigation Requirements publication. For additional information on irrigation water management contact a professional with the required knowledge and skill.

UTILIZATION AREA

Crop- Pasture

Region- Coastal

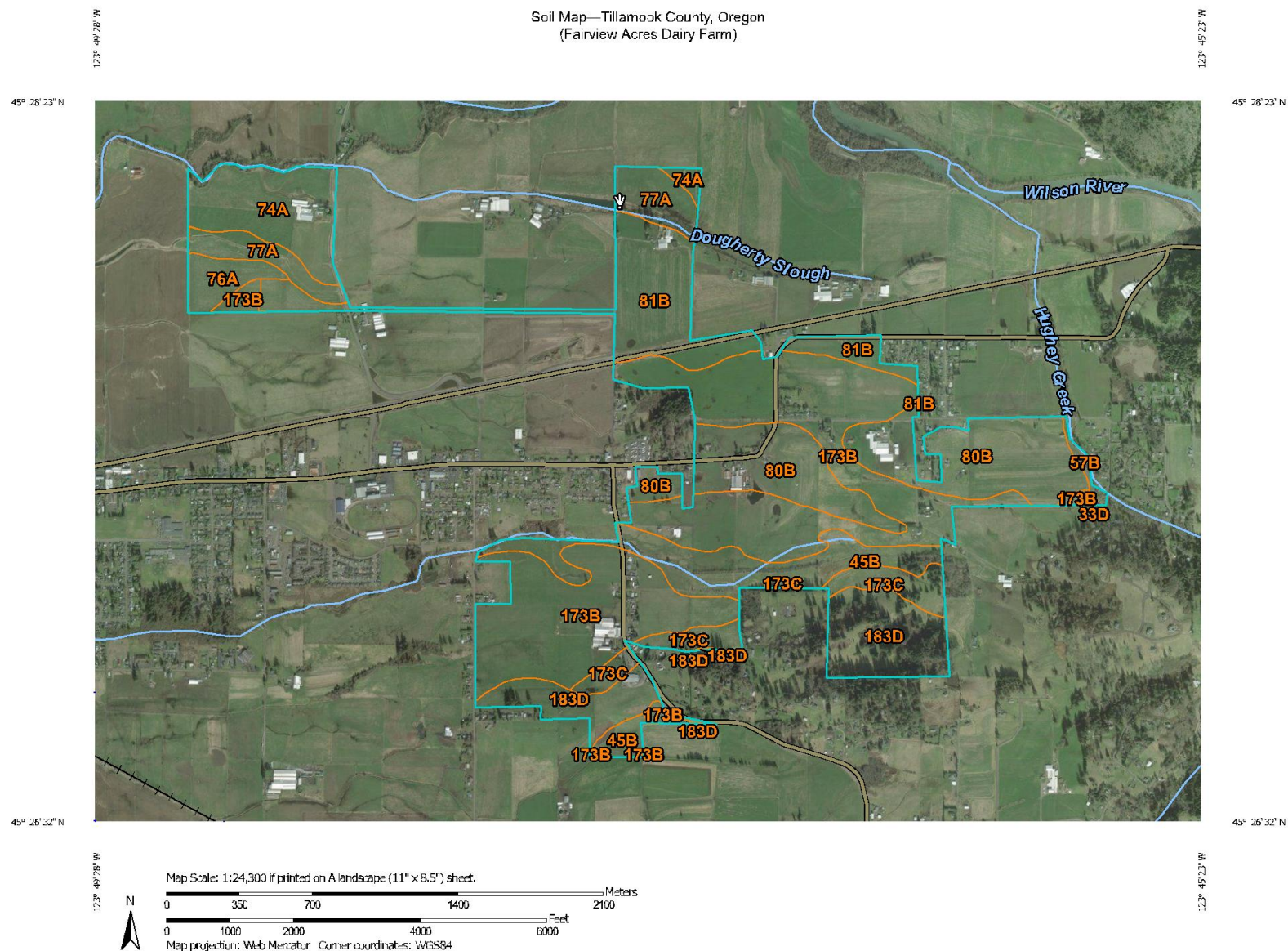
Total Seasonal Evapotranspiration-	23.04 Inches
Peak Evapotranspiration Rate-	0.13 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jul



SOIL AND RISK ASSESSMENT

SOIL MAP(S)

Soil Map—Tillamook County, Oregon
(Fairview Acres Dairy Farm)



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 1 of 3

SOIL AND RISK ASSESSMENT

Soil Map—Tillamook County, Oregon
(Fairview Acres Dairy Farm)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Tillamook County, Oregon

Survey Area Data: Version 9, Sep 19, 2017

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

Date(s) aerial images were photographed: Dec 31, 2009—Feb 12, 2017

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



Natural Resources
Conservation Service

Fairview Acres Dairy Farm AWMP

Web Soil Survey
National Cooperative Soil Survey
Page 4-2

12/22/2017
Page 2 of 3

SOIL AND RISK ASSESSMENT

Soil Map—Tillamook County, Oregon

Fairview Acres Dairy Farm

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
33D	Tolovana medial silt loam, 5 to 30 percent slopes	0.1	0.0%
45B	Hebo silty clay loam, 0 to 5 percent slopes	80.2	8.5%
57B	Conderbridge gravelly medial loam, 0 to 7 percent slopes	4.4	0.5%
74A	Nehalem silt loam, 0 to 3 percent slopes	70.2	7.5%
76A	Nestucca silt loam, 0 to 3 percent slopes	18.9	2.0%
77A	Nestucca-Brenner silt loams, 0 to 3 percent slopes	44.9	4.8%
80B	Quillamook medial silt loam, 0 to 7 percent slopes	158.5	16.9%
81B	Quillamook complex, 0 to 7 percent slopes	100.8	10.7%
173B	Tillamook-Ginger medial silt loams, 0 to 7 percent slopes	333.2	35.4%
173C	Tillamook-Ginger medial silt loams, 3 to 15 percent slopes	40.0	4.3%
183D	Winema-Fendall medial silt loams, 5 to 30 percent slopes	89.2	9.5%
Totals for Area of Interest		940.4	100.0%



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 3 of 3

SOIL AND RISK ASSESSMENT

SOIL REPORTS

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Map Unit Description

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

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

SOIL AND RISK ASSESSMENT

Map Unit Description—Tillamook County, Oregon

Fairview Acres Dairy Farm

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

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

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

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

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

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

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Tillamook County, Oregon

33D—Tolovana medial silt loam, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: 12fqj

Elevation: 50 to 1,800 feet



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 2 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Mean annual precipitation: 80 to 110 inches
 Mean annual air temperature: 46 to 52 degrees F
 Frost-free period: 120 to 210 days
 Farmland classification: Not prime farmland

Map Unit Composition

Tolovana and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tolovana

Setting

Landform: Mountain slopes, hillslopes
Landform position (two-dimensional): Summit, footslope, toeslope
Landform position (three-dimensional): Mountainbase, mountaintop, base slope, interfluvium
Down-slope shape: Concave, linear, convex
Across-slope shape: Linear, convex, concave
Parent material: Colluvium and residuum derived from tuffaceous sedimentary rock

Typical profile

O_i - 0 to 1 inches: slightly decomposed plant material
A₁ - 1 to 6 inches: medial silt loam
A₂ - 6 to 9 inches: medial silt loam
A₃ - 9 to 20 inches: medial silt loam
2Bw₁ - 20 to 27 inches: silty clay loam
2Bw₂ - 27 to 38 inches: silty clay loam
2Bw₃ - 38 to 48 inches: paragravelly clay loam
2BC - 48 to 60 inches: very paragravelly clay loam

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 15.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Other vegetative classification: Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 3 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description—Tillamook County, Oregon

Fairview Acres Dairy Farm

45B—Hebo silty clay loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: sws1
Elevation: 20 to 300 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hebo and similar soils: 80 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hebo

Setting

Landform: Depressions on stream terraces, drainageways on fluviomarine terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or fluviomarine deposits derived from sedimentary rock

Typical profile

Ap - 0 to 4 inches: silty clay loam
BA - 4 to 10 inches: silty clay
Bg1 - 10 to 18 inches: clay
Bg2 - 18 to 26 inches: clay
BCg - 26 to 35 inches: silty clay
2Cg - 35 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 4 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Other vegetative classification: Poorly Drained (G004AY018OR), Sitka spruce/salmonberry-wet (903)



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 4 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Hydric soil rating: Yes

Minor Components

Aquepts

Percent of map unit: 5 percent

Landform: Drainageways on fluviomarine terraces

Hydric soil rating: Yes

Croquib

Percent of map unit: 5 percent

Landform: Stream terraces

Other vegetative classification: Poorly Drained (G004AY018OR)

Hydric soil rating: Yes

57B—Condorbridge gravelly medial loam, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 12fqm

Elevation: 20 to 200 feet

Mean annual precipitation: 80 to 100 inches

Mean annual air temperature: 49 to 52 degrees F

Frost-free period: 160 to 260 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Condorbridge and similar soils: 85 percent

Minor components: 5 percent

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

Description of Condorbridge

Setting

Landform: Alluvial fans

Landform position (three-dimensional): Tread

Down-slope shape: Linear, concave

Across-slope shape: Linear

Parent material: Alluvium and/or debris flow deposits derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 5 inches: gravelly medial loam

A - 5 to 12 inches: gravelly medial loam

BA - 12 to 26 inches: gravelly loam

Bw1 - 26 to 35 inches: paragravelly clay loam

Bw2 - 35 to 53 inches: paragravelly clay loam

Bw3 - 53 to 60 inches: paragravelly clay loam

Properties and qualities

Slope: 0 to 7 percent

Depth to restrictive feature: More than 80 inches



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 5 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description—Tillamook County, Oregon

Fairview Acres Dairy Farm

Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 13.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Well Drained <15% Slopes
 (G004AY014OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Hebo

Percent of map unit: 5 percent
Landform: Depressions on stream terraces
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

74A—Nehalem silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 27z5
Elevation: 10 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nehalem, occasional flooding, and similar soils: 80 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nehalem, Occasional Flooding

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 9 inches: silt loam
A - 9 to 16 inches: silt loam



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 6 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description—Tillamook County, Oregon

Fairview Acres Dairy Farm

*Bw - 16 to 48 inches: silt loam**BC - 48 to 60 inches: silt loam***Properties and qualities***Slope: 0 to 3 percent**Depth to restrictive feature: More than 80 inches**Natural drainage class: Well drained**Capacity of the most limiting layer to transmit water (Ksat):**Moderately high to high (0.20 to 1.98 in/hr)**Depth to water table: More than 80 inches**Frequency of flooding: Occasional**Frequency of ponding: None**Available water storage in profile: High (about 11.6 inches)***Interpretive groups***Land capability classification (irrigated): 2w**Land capability classification (nonirrigated): 2w**Hydrologic Soil Group: B**Other vegetative classification: Well Drained <15% Slopes**(G004AY014OR), Sitka spruce/salmonberry-wet (903)**Hydric soil rating: No***Minor Components****Brenner***Percent of map unit: 3 percent**Landform: Depressions on flood plains**Other vegetative classification: Poorly Drained (G004AY018OR)**Hydric soil rating: Yes***76A—Nestucca silt loam, 0 to 3 percent slopes****Map Unit Setting***National map unit symbol: 27z7**Elevation: 10 to 200 feet**Mean annual precipitation: 80 to 100 inches**Mean annual air temperature: 49 to 52 degrees F**Frost-free period: 160 to 260 days**Farmland classification: Farmland of statewide importance***Map Unit Composition***Nestucca and similar soils: 90 percent**Minor components: 5 percent**Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Nestucca****Setting***Landform: Flood plains**Landform position (three-dimensional): Tread**Down-slope shape: Linear**Across-slope shape: Linear*

Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 7 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 14 inches: silt loam
Bw - 14 to 41 inches: silty clay loam
C - 41 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 14 to 41 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Other vegetative classification: Somewhat Poorly Drained
 (G004AY017OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Brenner

Percent of map unit: 5 percent
Landform: Depressions on flood plains
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

77A—Nestucca-Brenner silt loams, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 27wj
Elevation: 10 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nestucca and similar soils: 55 percent
Brenner and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 8 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Description of Nestucca

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 14 inches: silt loam
Bw - 14 to 41 inches: silty clay loam
C - 41 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 14 to 41 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Other vegetative classification: Somewhat Poorly Drained
 (G004AY017OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Description of Brenner

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 12 inches: silty clay loam
Bw1 - 12 to 18 inches: silty clay loam
Bw2 - 18 to 26 inches: silty clay loam
BC - 26 to 40 inches: silty clay loam
Cg1 - 40 to 55 inches: silty clay
Cg2 - 55 to 60 inches: silty clay



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 9 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description—Tillamook County, Oregon

Fairview Acres Dairy Farm

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 0 to 7 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Other vegetative classification: Poorly Drained (G004AY018OR),
 Sitka spruce/salmonberry-wet (903)
Hydric soil rating: Yes

80B—Quillamook medial silt loam, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 27z8
Elevation: 20 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Quillamook and similar soils: 80 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Quillamook

Setting

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

Typical profile

Ap - 0 to 8 inches: medial silt loam
A1 - 8 to 17 inches: medial silt loam
A2 - 17 to 28 inches: medial silt loam
Bw1 - 28 to 47 inches: medial silty clay loam
Bw2 - 47 to 60 inches: medial silty clay loam



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 10 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description—Tillamook County, Oregon

Fairview Acres Dairy Farm

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 19.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Well Drained <15% Slopes
 (G004AY014OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Hebo

Percent of map unit: 3 percent
Landform: Depressions on stream terraces
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

81B—Quillamook complex, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 27z9
Elevation: 20 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Quillamook, gravelly substratum, and similar soils: 60 percent
Quillamook and similar soils: 25 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Quillamook, Gravelly Substratum

Setting

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



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 11 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Parent material: Silty alluvium overlying sandy and gravelly alluvium derived from igneous rock

Typical profile

Ap - 0 to 9 inches: medial silt loam
A1 - 9 to 19 inches: medial silt loam
A2 - 19 to 27 inches: medial silt loam
Bw1 - 27 to 39 inches: medial silt loam
Bw2 - 39 to 47 inches: medial silt loam
2C - 47 to 60 inches: extremely gravelly loamy coarse sand

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: 40 to 60 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 15.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Description of Quillamook

Setting

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

Typical profile

Ap - 0 to 8 inches: medial silt loam
A1 - 8 to 17 inches: medial silt loam
A2 - 17 to 28 inches: medial silt loam
Bw1 - 28 to 47 inches: medial silty clay loam
Bw2 - 47 to 60 inches: medial silty clay loam

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 12 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description—Tillamook County, Oregon

Fairview Acres Dairy Farm

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 19.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Well Drained <15% Slopes
 (G004AY014OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Hebo

Percent of map unit: 2 percent
Landform: Depressions on stream terraces
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

94B—Ginger-Quillamook-Urban land complex, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 12gz2
Elevation: 20 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Ginger and similar soils: 35 percent
Quillamook and similar soils: 30 percent
Urban land: 30 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ginger

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 8 inches: medial silt loam
A - 8 to 17 inches: medial silt loam
2BA - 17 to 20 inches: silty clay loam



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 13 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

2Bg1 - 20 to 28 inches: silty clay
 2Bg2 - 28 to 38 inches: silty clay
 2Bg3 - 38 to 52 inches: silty clay
 3C - 52 to 60 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: 40 to 60 inches to strongly contrasting textural stratification
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 17 to 20 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 12.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained (G004AY017OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Quillamook

Setting

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

Typical profile

Ap - 0 to 8 inches: medial silt loam
A1 - 8 to 17 inches: medial silt loam
A2 - 17 to 28 inches: medial silt loam
Bw1 - 28 to 47 inches: medial silty clay loam
Bw2 - 47 to 60 inches: medial silty clay loam

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 14 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description—Tillamook County, Oregon

Fairview Acres Dairy Farm

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 19.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Well Drained <15% Slopes
 (G004AY014OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Hebo

Percent of map unit: 2 percent
Landform: Depressions on stream terraces
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

173B—Tillamook-Ginger medial silt loams, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 27zg
Elevation: 20 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Tillamook and similar soils: 45 percent
Ginger and similar soils: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tillamook

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 8 inches: medial silt loam
A1 - 8 to 20 inches: medial silt loam
A2 - 20 to 25 inches: medial silt loam



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 15 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

*2Bw1 - 25 to 35 inches: silty clay loam**2Bw2 - 35 to 52 inches: silty clay loam**2BC - 52 to 60 inches: silty clay loam***Properties and qualities***Slope: 0 to 7 percent**Depth to restrictive feature: More than 80 inches**Natural drainage class: Moderately well drained**Capacity of the most limiting layer to transmit water (Ksat):**Moderately high (0.20 to 0.57 in/hr)**Depth to water table: About 25 to 35 inches**Frequency of flooding: None**Frequency of ponding: None**Available water storage in profile: Very high (about 17.0 inches)***Interpretive groups***Land capability classification (irrigated): 3e**Land capability classification (nonirrigated): 2e**Hydrologic Soil Group: C**Other vegetative classification: Moderately Well Drained <15%**Slopes (G004AY016OR), Sitka spruce/salmonberry-wet (903)**Hydric soil rating: No***Description of Ginger****Setting***Landform: Stream terraces**Landform position (three-dimensional): Tread**Down-slope shape: Concave**Across-slope shape: Linear**Parent material: Alluvium derived from igneous and sedimentary rock***Typical profile***Ap - 0 to 8 inches: medial silt loam**A - 8 to 17 inches: medial silt loam**2BA - 17 to 20 inches: silty clay loam**2Bg1 - 20 to 28 inches: silty clay**2Bg2 - 28 to 38 inches: silty clay**2Bg3 - 38 to 52 inches: silty clay**3C - 52 to 60 inches: extremely gravelly sandy loam***Properties and qualities***Slope: 0 to 7 percent**Depth to restrictive feature: 40 to 60 inches to strongly contrasting textural stratification**Natural drainage class: Somewhat poorly drained**Capacity of the most limiting layer to transmit water (Ksat):**Moderately low to moderately high (0.06 to 0.20 in/hr)**Depth to water table: About 17 to 20 inches**Frequency of flooding: None**Frequency of ponding: None**Available water storage in profile: Very high (about 12.5 inches)*

Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 16 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained
(G004AY017OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Hebo

Percent of map unit: 5 percent
Landform: Depressions on stream terraces
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

173C—Tillamook-Ginger medial silt loams, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 12gzd
Elevation: 20 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Tillamook and similar soils: 45 percent
Ginger and similar soils: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tillamook

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 8 inches: medial silt loam
A1 - 8 to 20 inches: medial silt loam
A2 - 20 to 25 inches: medial silt loam
2Bw1 - 25 to 35 inches: silty clay loam
2Bw2 - 35 to 52 inches: silty clay loam
2BC - 52 to 60 inches: silty clay loam



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 17 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 25 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 17.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Moderately Well Drained <15%
 Slopes (G004AY016OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Description of Ginger

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 8 inches: medial silt loam
A - 8 to 17 inches: medial silt loam
2BA - 17 to 20 inches: silty clay loam
2Bg1 - 20 to 28 inches: silty clay
2Bg2 - 28 to 38 inches: silty clay
2Bg3 - 38 to 52 inches: silty clay
3C - 52 to 60 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 40 to 60 inches to strongly contrasting textural stratification
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 17 to 20 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 12.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 18 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained
 (G004AY017OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Hebo

Percent of map unit: 5 percent
Landform: Depressions on stream terraces
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

183D—Winema-Fendall medial silt loams, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: swsh
Elevation: 50 to 500 feet
Mean annual precipitation: 80 to 110 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 120 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Winema and similar soils: 55 percent
Fendall and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Winema

Setting

Landform: Hillslopes
Landform position (two-dimensional): Toeslope, summit
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Colluvium and residuum derived from sedimentary rock

Typical profile

Ap - 0 to 10 inches: medial silt loam
A - 10 to 21 inches: medial silt loam
2BA - 21 to 28 inches: silty clay loam
2Bw - 28 to 42 inches: silty clay
2C - 42 to 60 inches: very paragravelly silty clay

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 19 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very high (about 14.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Other vegetative classification: Well Drained >15% Slopes
(G004AY013OR), Sitka spruce/salmonberry-wet (903)

Hydric soil rating: No

Description of Fendall

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Interfluvial, nose slope, crest

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Parent material: Colluvium and residuum derived from sedimentary rock

Typical profile

Ap - 0 to 8 inches: medial silt loam

A - 8 to 13 inches: silt loam

Bw1 - 13 to 17 inches: silty clay loam

Bw2 - 17 to 27 inches: paragravelly silty clay loam

BC - 27 to 34 inches: very paragravelly silty clay loam

2Cr - 34 to 44 inches: weathered bedrock

Properties and qualities

Slope: 5 to 30 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Other vegetative classification: Well Drained >15% Slopes
(G004AY013OR), Sitka spruce/salmonberry-wet (903)



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 20 of 21

SOIL AND RISK ASSESSMENT

Map Unit Description---Tillamook County, Oregon

Fairview Acres Dairy Farm

Hydric soil rating: No

Data Source Information

Soil Survey Area: Tillamook County, Oregon
Survey Area Data: Version 9, Sep 19, 2017



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2017
Page 21 of 21

SOIL AND RISK ASSESSMENT

PREDICTED SOIL EROSION



RUSLE2 Worksheet Erosion Calculation Record

Info:

<i>Owner name</i>	<i>Tract #</i>	<i>Field name</i>
Fairview Acres Dairy	NA	B1-B4

<i>Location</i>	<i>Soil</i>	<i>T value, t/ac/yr</i>	<i>Slope length (horiz), ft</i>	<i>Avg. slope steepness, %</i>
Oregon\Tillamook County\OR_Tillamook_R80-90	74A Nehalem silt loam, 0 to 3 percent slopes\Nehalem silt loam 80%	5.0	900	3.0

Alternatives:

<i>Description</i>	<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>	<i>Wind & irrigation- induced erosion for SCI, t/ac/yr</i>	<i>Equiv. diesel use, gal/ac</i>	<i>Energy use, BTU/ac</i>	<i>Fuel cost, US\$/ac</i>
Erosion on Pasture	a. Single Year/Single Crop Templates\Pasture, yr1 fall plant; manure appl., Z71	a. rows up-and- down hill	(none)	(none)	1.5	0.90	94.9	0	15	2000000	43.8

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT



RUSLE2 Worksheet Erosion Calculation Record

Info:

<i>Owner name</i>	<i>Tract #</i>	<i>Field name</i>
Fairview Acres Dairy	NA	B5

<i>Location</i>	<i>Soil</i>	<i>T value, t/ac/yr</i>	<i>Slope length (horiz), ft</i>	<i>Avg. slope steepness, %</i>
Oregon\Tillamook County\OR Tillamook_R80-90	76A Nestucca silt loam, 0 to 3 percent slopes\Nestucca silt loam 90%	5.0	900	3.0

Alternatives:

<i>Description</i>	<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>	<i>Wind & irrigation- induced erosion for SCI, t/ac/yr</i>	<i>Equiv. diesel use, gal/ac</i>	<i>Energy use, BTU/ac</i>	<i>Fuel cost, US\$/ac</i>
Erosion on Pasture	a. Single Year/Single Crop Templates\Pasture, yr1 fall plant; manure appl., Z71	a. rows up-and- down hill	(none)	(none)	1.2	0.93	94.9	0	15	2000000	43.8

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT



RUSLE2 Worksheet Erosion Calculation Record

Info:

<i>Owner name</i>	<i>Tract #</i>	<i>Field name</i>
Fairview Acres Dairy	NA	C1, MBE, Hogden

<i>Location</i>	<i>Soil</i>	<i>T value, t/ac/yr</i>	<i>Slope length (horiz), ft</i>	<i>Avg. slope steepness, %</i>
Oregon\Tillamook County\OR Tillamook R80-90	80B Quillamook medial silt loam, 0 to 7 percent slopes\Quillamook medial silt loam 80%	5.0	800	7.0

Alternatives:

<i>Description</i>	<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>	<i>Wind & irrigation- induced erosion for SCI, t/ac/yr</i>	<i>Equiv. diesel use, gal/ac</i>	<i>Energy use, BTU/ac</i>	<i>Fuel cost, US\$/ac</i>
Erosion on Pasture	a. Single Year/Single Crop Templates\Pasture, yr1 fall plant; manure appl., Z71	a. rows up-and- down hill	(none)	(none)	3.9	0.71	94.9	0	15	2000000	43.8

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT



RUSLE2 Worksheet Erosion Calculation Record

Info:

<i>Owner name</i>	<i>Tract #</i>	<i>Field name</i>
Fairview Acres Dairy	NA	C4, C5

<i>Location</i>	<i>Soil</i>	<i>T value, t/ac/yr</i>	<i>Slope length (horiz), ft</i>	<i>Avg. slope steepness, %</i>
Oregon\Tillamook County\OR_Tillamook_R80-90	45B Hebo silty clay loam, 0 to 5 percent slopes	5.0	900	5.0

Alternatives:

<i>Description</i>	<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>	<i>Wind & irrigation- induced erosion for SCI, t/ac/yr</i>	<i>Equiv. diesel use, gal/ac</i>	<i>Energy use, BTU/ac</i>	<i>Fuel cost, US\$/ac</i>
Erosion on Pasture	a. Single Year/Single Crop Templates\Pasture, yr1 fall plant; manure appl., Z71	a. rows up-and- down hill	(none)	(none)	2.6	1.1	94.9	0	18	2500000	54.7

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT



RUSLE2 Worksheet Erosion Calculation Record

Info:

<i>Owner name</i>	<i>Tract #</i>	<i>Field name</i>
Fairview Acres Dairy	NA	F1W, F1E-F4, C1, C2, C3, C6, C7, MBW, M1, M2, M3, M4, Blake, Randall

<i>Location</i>	<i>Soil</i>	<i>T value, t/ac/yr</i>	<i>Slope length (horiz), ft</i>	<i>Avg. slope steepness, %</i>
Oregon\Tillamook County\OR_Tillamook_R80-90	173B Tillamook-Ginger medial silt loams, 0 to 7 percent slopes\Tillamook medial silt loam 45%	5.0	800	7.0

Alternatives:

<i>Description</i>	<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>	<i>Wind & irrigation- induced erosion for SCI, t/ac/yr</i>	<i>Equiv. diesel use, gal/ac</i>	<i>Energy use, BTU/ac</i>	<i>Fuel cost, US\$/ac</i>
Erosion on Pasture	a. Single Year/Single Crop Templates\Pasture, yr1 fall plant; manure appl., Z71	a. rows up-and- down hill	(none)	(none)	4.2	0.69	94.9	0	15	2000000	43.8

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT



RUSLE2 Worksheet Erosion Calculation Record

Info:

<i>Owner name</i>	<i>Tract #</i>	<i>Field name</i>
Fairview Acres Dairy	NA	F5

<i>Location</i>	<i>Soil</i>	<i>T value, t/ac/yr</i>	<i>Slope length (horiz), ft</i>	<i>Avg. slope steepness, %</i>
Oregon\Tillamook County\OR Tillamook_R80-90	173C Tillamook-Ginger medial silt loams, 3 to 15 percent slopes\Tillamook medial silt loam 45%	5.0	800	7.0

Alternatives:

<i>Description</i>	<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>	<i>Wind & irrigation- induced erosion for SCI, t/ac/yr</i>	<i>Equiv. diesel use, gal/ac</i>	<i>Energy use, BTU/ac</i>	<i>Fuel cost, US\$/ac</i>
Erosion on Pasture	a.Single Year/Single Crop Templates\Pasture, yr1 fall plant; manure appl., Z71	a. rows up-and- down hill	(none)	(none)	4.2	0.69	94.9	0	15	2000000	43.8

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT



RUSLE2 Worksheet Erosion Calculation Record

Info:

<i>Owner name</i>	<i>Tract #</i>	<i>Field name</i>
Fairview Acres Dairy	NA	F6, F7, M5

<i>Location</i>	<i>Soil</i>	<i>T value, t/ac/yr</i>	<i>Slope length (horiz), ft</i>	<i>Avg. slope steepness, %</i>
Oregon\Tillamook County\OR_Tillamook_R80-90	183D Winema-Fendall medial silt loams, 5 to 30 percent slopes\Winema medial silt loam 55%	5.0	500	12

Alternatives:

<i>Description</i>	<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>	<i>Wind & irrigation- induced erosion for SCI, t/ac/yr</i>	<i>Equiv. diesel use, gal/ac</i>	<i>Energy use, BTU/ac</i>	<i>Fuel cost, US\$/ac</i>
Erosion on Pasture	a.Single Year/Single Crop Templates\Pasture, yr1 fall plant; manure appl., Z71	a. rows up-and- down hill	(none)	(none)	5.0	0.62	94.9	0	15	2000000	43.8

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT



RUSLE2 Worksheet Erosion Calculation Record

Info:

<i>Owner name</i>	<i>Tract #</i>	<i>Field name</i>
Fairview Acres Dairy	NA	L1

<i>Location</i>	<i>Soil</i>	<i>T value, t/ac/yr</i>	<i>Slope length (horiz), ft</i>	<i>Avg. slope steepness, %</i>
Oregon\Tillamook County\OR_Tillamook_R80-90	77A Nestucca-Brenner silt loams, 0 to 3 percent slopes\Nestucca silt loam 55%	5.0	900	3.0

Alternatives:

<i>Description</i>	<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>	<i>Wind & irrigation- induced erosion for SCI, t/ac/yr</i>	<i>Equiv. diesel use, gal/ac</i>	<i>Energy use, BTU/ac</i>	<i>Fuel cost, US\$/ac</i>
Erosion on Pasture	a.Single Year/Single Crop Templates\Pasture, yr1 fall plant; manure appl., Z71	a. rows up-and- down hill	(none)	(none)	1.2	0.93	94.9	0	15	2000000	43.8

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT



RUSLE2 Worksheet Erosion Calculation Record

Info:

<i>Owner name</i>	<i>Tract #</i>	<i>Field name</i>
Fairview Acres Dairy	NA	L2, L3

<i>Location</i>	<i>Soil</i>	<i>T value, t/ac/yr</i>	<i>Slope length (horiz), ft</i>	<i>Avg. slope steepness, %</i>
Oregon\Tillamook County\OR_Tillamook_R80-90	81B Quillamook complex, 0 to 7 percent slopes\Quillamook medial silt loam 60%	4.0	800	7.0

Alternatives:

<i>Description</i>	<i>Management</i>	<i>Contouring</i>	<i>Strips / barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Cons. plan. soil loss</i>	<i>Soil conditioning index (SCI)</i>	<i>STIR value</i>	<i>Wind & irrigation- induced erosion for SCI, t/ac/yr</i>	<i>Equiv. diesel use, gal/ac</i>	<i>Energy use, BTU/ac</i>	<i>Fuel cost, US\$/ac</i>
Erosion on Pasture	a.Single Year/Single Crop Templates\Pasture, yr1 fall plant; manure appl., Z71	a. rows up-and- down hill	(none)	(none)	4.1	0.69	94.9	0	15	2000000	43.8

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT

OREGON PHOSPHORUS INDEX (WEST)

FIELD SUMMARY & WESTERN OREGON P INDEX

Enter data in gray cells and select best choice from drop down menus.
Cells with blue font are completed automatically.

Grower: Fairview Acres Dairy Farm
Application Plan by: Tom Thomson, NW Agricultural Engineering
Date: April 5, 2018

	F1W	F1E	F2	F3	F4	F5	F6	F7
Field Acres	20.7	24.1	6.5	10.5	38.1	5.2	17.7	24.1
Soil	173B, Tillamook	173B, Tillamook	173B, Tillamook	173B, Tillamook	173B, Tillamook	173B, Tillamook	183D, Winema	183D, Winema
Soil test date	September 22, 2015	October 14, 2016	October 14, 2016	September 22, 2015	October 14, 2016	November 21, 2014	September 22, 2015	September 22, 2015
Bray 1 P (ppm)	82	34	34	86	64	54	34	12
Acetate K (ppm)	772	708	708	838	785	655	748	570
pH	5.2	5.7	5.7	5.8	5.8	5.8	5.4	5.1
SMP	5.7	5.8	5.8	5.7	5.8	5.8	5.4	5.2
TRANSPORT FACTORS								
Sheet & rill erosion (tons/ac-yr)	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6
Irrigation erosion (tons/ac-yr)	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff
Runoff Class	low	low	low	low	low	low	high	high
Flooding Frequency	none	none	none	none	none	none	none	none
Distance to stream (ft)	<100 ft	<100 ft	>500 ft	>500 ft	>500 ft	>500 ft	>500 ft	>500 ft
Buffers	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.
Drainage	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles
SOURCE FACTORS								
Commercial P2O5 rate (lbs/ac)	0	0	0	0	0	0	0	0
Commercial P2O5 method	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Commercial P2O5 timing	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Organic P2O5 rate (lbs/ac)	169	169	169	169	169	169	169	169
Organic P2O5 method	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days
Organic P2O5 timing	All months possible	All months possible	All months possible	All months possible	All months possible	All months possible	All months possible	All months possible
SCORE								
P RUNOFF RISK RATING	20.3 Low	16.1 Low	16.1 Low	20.7 Low	18.5 Low	17.5 Low	19.1 Low	19.1 Low

COMMENTS

SOIL AND RISK ASSESSMENT

FIELD SUMMARY & WESTERN OREGON P INDEX

Enter data in gray cells and select best choice from drop down menus.
Cells with blue font are completed automatically.

Grower: Fairview Acres Dairy Farm, Bohern Farm
Application Plan by: Tom Thomson, NW Agricultural Engineering
Date: April 5, 2018

Field Acres	B1 7.1	B2 9.7	B3 10.8	B4 20.9	B5 36.2			
Soil	74A, Nehalem ▼	74A, Nehalem ▼	74A, Nehalem ▼	74A, Nehalem ▼	74A, Nehalem ▼	TILLAMOOK COUNTY ▼	TILLAMOOK COUNTY ▼	TILLAMOOK COUNTY ▼
Soil test date	November 13, 2014	September 22, 2015	September 22, 2015	September 22, 2015	October 14, 2016			
Bray 1 P (ppm)	28	36	67	36	19			
Acetate K (ppm)	600	603	1,605	878	770			
pH	6.0	5.5	5.9	5.7	5.5			
SMP	5.9	5.8	5.8	5.6	5.5			
TRANSPORT FACTORS								
Sheet & rill erosion (tons/ac-yr)	1-3 ▼	1-3 ▼	1-3 ▼	1-3 ▼	1-3 ▼	<1 ▼	<1 ▼	<1 ▼
Irrigation erosion (tons/ac-yr)	no irrig. runoff ▼	no irrig. runoff ▼	no irrig. runoff ▼	no irrig. runoff ▼	no irrig. runoff ▼	not irrigated ▼	not irrigated ▼	not irrigated ▼
Runoff Class	low	low	low	low	low	none	none	none
Flooding Frequency	occasional	occasional	occasional	occasional	occasional	none	none	none
Distance to stream (ft)	<100 ft ▼	<100 ft ▼	<100 ft ▼	<100 ft ▼	<100 ft ▼	>500 ft ▼	>500 ft ▼	>500 ft ▼
Buffers	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼
Drainage	no tiles ▼	no tiles ▼	no tiles ▼	no tiles ▼	no tiles ▼	no tiles ▼	no tiles ▼	no tiles ▼
SOURCE FACTORS								
Commercial P2O5 rate (lbs/ac)	0	0	0	0	0	0	0	0
Commercial P2O5 method	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼
Commercial P2O5 timing	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼
Organic P2O5 rate (lbs/ac)	174	174	174	174	174	0	0	0
Organic P2O5 method	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼	None applied ▼	None applied ▼	None applied ▼
Organic P2O5 timing	All months possible ▼	All months possible ▼	All months possible ▼	All months possible ▼	All months possible ▼	None applied ▼	None applied ▼	None applied ▼
SCORE	16.2	16.2	18.9	16.2	16.2	0.0	0.0	0.0
P RUNOFF RISK RATING	Low	Low	Low	Low	Low	Low	Low	Low

COMMENTS

SOIL AND RISK ASSESSMENT

FIELD SUMMARY & WESTERN OREGON P INDEX

Enter data in gray cells and select best choice from drop down menus.
Cells with blue font are completed automatically.

Grower:

Application Plan by:

Date:

Fairview Acres Dairy Farm, Little Dairy Farm

Tom Thomson, NW Agricultural Engineering

April 5, 2018

Field Acres	L1 17.8	L2 3.8	L3 45.5					
Soil	77A, Nestucca	81B, Quillamook	81B, Quillamook	TILLAMOOK COUNTY	TILLAMOOK COUNTY	TILLAMOOK COUNTY	TILLAMOOK COUNTY	TILLAMOOK COUNTY
Soil test date	September 22, 2015	November 13, 2014	October 14, 2016					
Bray 1 P (ppm)	15	18	18					
Acetate K (ppm)	363	941	1,395					
pH	5.4	6.1	5.9					
SMP	5.6	5.7	5.9					
TRANSPORT FACTORS								
Sheet & rill erosion (tons/ac-yr)	1-3	4-6	4-6	<1	<1	<1	<1	<1
Irrigation erosion (tons/ac-yr)	no irrig. runoff	no irrig. runoff	no irrig. runoff	not irrigated	not irrigated	not irrigated	not irrigated	not irrigated
Runoff Class	medium	low	low	none	none	none	none	none
Flooding Frequency	frequent	none	none	none	none	none	none	none
Distance to stream (ft)	<100 ft	<100 ft	200-299 ft	>500 ft	>500 ft	>500 ft	>500 ft	>500 ft
Buffers	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.
Drainage	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles
SOURCE FACTORS								
Commercial P2O5 rate (lbs/ac)	0	0	0	0	0	0	0	0
Commercial P2O5 method	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Commercial P2O5 timing	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Organic P2O5 rate (lbs/ac)	153	153	153	0	0	0	0	0
Organic P2O5 method	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	None applied	None applied	None applied	None applied	None applied
Organic P2O5 timing	All months possible	All months possible	All months possible	None applied	None applied	None applied	None applied	None applied
SCORE	18.3	15.8	15.8	0.0	0.0	0.0	0.0	0.0
P RUNOFF RISK RATING	Low	Low	Low	Low	Low	Low	Low	Low

COMMENTS

SOIL AND RISK ASSESSMENT

FIELD SUMMARY & WESTERN OREGON P INDEX

Enter data in gray cells and select best choice from drop down menus.
Cells with blue font are completed automatically.

Grower: Fairview Acres Dairy Farm, Chad Acres Farm
Application Plan by: Tom Thomson, NW Agricultural Engineering
Date: April 5, 2018

Field Acres	C1	C2	C3	C4	C5	C6	C7	
80B, Quillamook	10.5	16.5	24.3	59.1	18.9	13.3	33.5	
Soil test date	September 22, 2015	November 13, 2014	September 22, 2015	November 13, 2014	September 22, 2015	November 13, 2014	October 14, 2016	
Bray 1 P (ppm)	4	16	9	42	9	42	12	
Acetate K (ppm)	445	691	931	928	346	928	457	
pH	5.5	5.7	5.4	5.9	5.4	5.9	5.1	
SMP	5.2	5.5	5.1	5.6	4.8	5.6	5.3	
TRANSPORT FACTORS								
Sheet & rill erosion (tons/ac-yr)	4-6	4-6	4-6	4-6	1-3	1-3	4-6	<1
Irrigation erosion (tons/ac-yr)	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	not irrigated
Runoff Class	low	low	low	low	medium	medium	low	none
Flooding Frequency	none	none	none	none	none	none	none	none
Distance to stream (ft)	> 500 ft	<100 ft	<100 ft	<100 ft	<100 ft	<100 ft	200-299 ft	>500 ft
Buffers	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.
Drainage	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles
SOURCE FACTORS								
Commercial P2O5 rate (lbs/ac)	0	0	0	0	0	0	0	0
Commercial P2O5 method	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Commercial P2O5 timing	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Organic P2O5 rate (lbs/ac)	175	175	175	175	175	175	0	0
Organic P2O5 method	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	None applied
Organic P2O5 timing	All months possible	All months possible	All months possible	All months possible	All months possible	All months possible	All months possible	None applied
SCORE								
P RUNOFF RISK RATING	16.3	16.3	16.3	16.5	15.8	16.0	12.8	0.0
	Low	Low	Low	Low	Low	Low	Low	Low

COMMENTS

SOIL AND RISK ASSESSMENT

FIELD SUMMARY & WESTERN OREGON P INDEX

Enter data in gray cells and select best choice from drop down menus.
Cells with blue font are completed automatically.

Grower:	Fairview Acres Dairy Farm, Eastside Dairy Farm
Application Plan by:	Tom Thomson, NW Agricultural Engineering
Date:	April 5, 2018

Field Acres	Randall 48.1	M1 22.5	M2 27.5	MBW 12.2	MBE 8.5	M3 22.5	M4 23.3	M5 92.1
Soil	173B, Tillamook ▼	173B, Tillamook ▼	173B, Tillamook ▼	173C, Tillamook ▼	80B, Quillamook ▼	173B, Tillamook ▼	173B, Tillamook ▼	183D, Winema ▼
Soil test date	October 14, 2015	October 9, 2014	October 9, 2014	October 9, 2014	October 9, 2014	October 9, 2014	October 9, 2014	October 9, 2014
Bray 1 P (ppm)	12	36	67	65	24	31	60	55
Acetate K (ppm)	376	964	747	1,059	710	1,114	1,019	937
pH	4.8	5.6	5.8	5.5	5.6	5.4	5.6	5.3
SMP	5	5.5	5.8	5.4	5.4	5.3	5.5	5.3
TRANSPORT FACTORS								
Sheet & rill erosion (tons/ac-yr)	4-6 ▼	4-6 ▼	4-6 ▼	4-6 ▼	4-6 ▼	4-6 ▼	4-6 ▼	4-6 ▼
Irrigation erosion (tons/ac-yr)	no irrig. runoff ▼	no irrig. runoff ▼	no irrig. runoff ▼	no irrig. runoff ▼	no irrig. runoff ▼	no irrig. runoff ▼	no irrig. runoff ▼	no irrig. runoff ▼
Runoff Class	low	low	low	low	low	low	low	high
Flooding Frequency	none	none	none	none	none	none	none	none
Distance to stream (ft)	<100 ft ▼	300-500 ft ▼	>500 ft ▼	<100 ft ▼	<100 ft ▼	<100 ft ▼	<100 ft ▼	<100 ft ▼
Buffers	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼	> 30 ft or NRCS spec. ▼
Drainage	no tiles ▼	no tiles ▼	no tiles ▼	no tiles ▼	no tiles ▼	no tiles ▼	no tiles ▼	no tiles ▼
SOURCE FACTORS								
Commercial P2O5 rate (lbs/ac)	0	0	0	0	0	0	0	0
Commercial P2O5 method	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼
Commercial P2O5 timing	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼	None applied ▼
Organic P2O5 rate (lbs/ac)	171	171	171	171	171	171	171	171
Organic P2O5 method	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼	Not incorp. in 5 days ▼
Organic P2O5 timing	All months possible ▼	All months possible ▼	All months possible ▼	All months possible ▼	All months possible ▼	All months possible ▼	All months possible ▼	All months possible ▼
SCORE	16.2	16.2	18.9	18.7	16.2	16.2	18.2	20.7
P RUNOFF RISK RATING	Low	Low	Low	Low	Low	Low	Low	Low

COMMENTS

SOIL AND RISK ASSESSMENT

FIELD SUMMARY & WESTERN OREGON P INDEX

Enter data in gray cells and select best choice from drop down menus.
Cells with blue font are completed automatically.

Grower:

Application Plan by:

Date:

Fairview Acres Dairy Farm, Eastside Dairy Farm

Tom Thomson, NW Agricultural Engineering

April 5, 2018

Field Acres	Hogden 66.5	Blake 10.1						
Soil	173B, Tillamook	173B, Tillamook	TILLAMOOK COUNTY	TILLAMOOK COUNTY	TILLAMOOK COUNTY	TILLAMOOK COUNTY	TILLAMOOK COUNTY	TILLAMOOK COUNTY
Soil test date	October 29, 2014	October 9, 2014						
Bray 1 P (ppm)	34	8						
Acetate K (ppm)	609	425						
pH	5.5	5.3						
SMP	5.4	5.1						
TRANSPORT FACTORS								
Sheet & rill erosion (tons/ac-yr)	4-6	4-6	<1	<1	<1	<1	<1	<1
Irrigation erosion (tons/ac-yr)	no irrig. runoff	no irrig. runoff	no irrig. runoff	not irrigated	not irrigated	not irrigated	not irrigated	not irrigated
Runoff Class	low	low	none	none	none	none	none	none
Flooding Frequency	none	none	none	none	none	none	none	none
Distance to stream (ft)	<100 ft	<100 ft	>500 ft	>500 ft	>500 ft	>500 ft	>500 ft	>500 ft
Buffers	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.
Drainage	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles
SOURCE FACTORS								
Commercial P2O5 rate (lbs/ac)	0	0	0	0	0	0	0	0
Commercial P2O5 method	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Commercial P2O5 timing	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Organic P2O5 rate (lbs/ac)	142	142	0	0	0	0	0	0
Organic P2O5 method	Not incorp. in 5 days	Not incorp. in 5 days	None applied	None applied	None applied	None applied	None applied	None applied
Organic P2O5 timing	All months possible	All months possible	None applied	None applied	None applied	None applied	None applied	None applied
SCORE								
P RUNOFF RISK RATING	15.6 Low	15.6 Low	0.8 Low	0.0 Low	0.0 Low	0.0 Low	0.0 Low	0.0 Low

COMMENTS

SOIL AND RISK ASSESSMENT

SOIL AND RISK ASSESSMENT

Oregon Phosphorus Index Risk Interpretation

P Index rating	Interpretation	Recommended Nutrient Limitation
West PI Score ≤ 25 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 25.1-50 East PI Score 100.1-400	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.	Phosphorus
West PI Score > 50.1-75 East PI Score > 400.1-600	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 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 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 P for plant production.	No manure

REFERENCES

PUBLICATIONS AND SOFTWARE

Crop Fertilizer Recommendations

Nutrient Requirements for Dairy Cattle 7th Ed, 2001 Natl. Research Council
<http://www.nap.edu/openbook.php?isbn=0309069971>

OSU EM8978-E, June 2009 (w. of Cascades); PNW615, 2010 (e. of Cascades)
<http://extension.oregonstate.edu/catalog/details.php?sortnum=0134&name=Fertilizer+Guides>

Extension Service Publications

Field Corn, Eastern Oregon-East of the Cascades, FG 71, January 2000
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20643/fg71-e.pdf>

Nitrogen Uptake and Utilization by Pacific Northwest Crops, PNW 513, December 1999
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20719/pnw513.pdf>

Manure Application Rates for Forage Production, OSU EM 8585-E, July 2007
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20536/em8585-e.pdf>

Monitoring Soil Nutrients Using a Management Unit Approach, PNW 570-E, October 2003,
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20762/pnw570-e.pdf>

Post-Harvest Soil Nitrate Testing for Manured Croppings Systems, EM 8832-E, May 2003,
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20221/em8832-e.pdf>

Silage Corn, Western Oregon, EM 8978-E, June 2009
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20610/em8978-e.pdf>

Soil Test Interpretation Guide, OSU EC 1478, August 1999
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/22023/ec1478.pdf>

Feed Management

Feed Management, A tool for balancing nutrients on dairies and other livestock operations, EM 8913-E, July 2006
<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20501/em8913-e.pdf>

Manure Application Setback Features/Distances

CAFO General Permit #1
http://oregon.gov/ODA/NRD/docs/pdf/cafo_gnlpmt.pdf

Manure Nutrient Availability

Waste Utilization Jobsheet 633 OR-JS, Oregon USDA-NRCS, May 2003
<http://efotg.sc.egov.usda.gov/references/public/OR/633js042707.pdf>

REFERENCES

Phosphorus Assessment

Interim Agronomy Technical Note No. 26: The Phosphorus Index, Oregon NRCS, June 2013
<https://efotg.sc.egov.usda.gov/treemenu.aspx#>

Agricultural Phosphorus Management Using the Oregon/Washington Phosphorus Indexes
<http://eesc.orst.edu/agcomwebfile/edmat/em8848-e.pdf>

Practice Standards

Oregon NRCS Nutrient Management Standard (590), May 2008
<https://efotg.sc.egov.usda.gov/treemenu.aspx#>

Record Keeping

Online Decision making And Record Keeping, October 2015
<http://www.odark.org>

Oregon ODA CAFO Recordkeeping Calendar, January 2015
<http://www.oregon.gov/ODA/NRD/pages/cafoprodocs.aspx>

Water Quality/Quantity

Oregon NRCS Water Quality Technical Note No. 1: Water Quality Indicator Tools, October 2000,
ftp://ftp-fc.sc.egov.usda.gov/OR/Technical_Notes/Water%20Quality/WaterQual01.pdf

Software

Revised Universal Soil Loss Equation, RUSLE2 version 1.26.6.4, October 2006
http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm

Oregon Animal Waste Management Planning Tool, ORAWMv5.2, July 2016
<http://www.oregon.gov/ODA/NRD/pages/cafoprodocs.aspx>

Online Decision making And Record Keeping, October 2015
<http://www.odark.org>

REFERENCES

ORAWM WORKBOOK

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

4/5/2018

Version 5.2

CLIENT: **Fairview Acres Dairy Farm**
 ASSISTED BY: **Tom Thomson, NW Agricultural Consulting**

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

ANIMAL INVENTORY

Type of Animal	Number of Animals	Average Weight (lbs.)	Animal Units (1,000 lb.)	Milk Production in Pounds/Cow/Day=						85	Manure CF/D/AU	Annual					
				Nutrient Production									Days Confined	Days Grazed	Days Off Farm		
				(lbs./day/1000 lb. Animal Unit)			(lbs./day)										
				N	P	K	N	P	K								
MILKER (Holstein)	1,215	1,300	1,579.5	0.73	0.13	0.34	1153.04	203.12	532.92	1.81	289	76	0				
MILKER (DRY)	250	1,400	350.0	0.30	0.04	0.10	105.00	14.70	35.00	0.92	189	176	0				
HEIFERS (12-24 Months)	505	970	489.9	0.27	0.05	0.12	130.30	22.29	58.78	0.90	189	176	0				
CALVES (1-12 Months)	404	150	60.6	0.42	0.05	0.11	25.45	3.27	6.67	1.34	305	60	0				
Totals/Averages-	2,374	955	2,480.0	0.57	0.10	0.26	1,413.8	243.4	633.4	1.5							

GRAZING PERIOD

Type of Animal	Percent of Month and Number of Animals Grazing												
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AU-YR.
MILKER (Holstein)	33% 1215	0% 1215	0% 1215	0% 1215	0% 1215	17% 1215	33% 1215	33% 1215	33% 1215	33% 1215	33% 1215	33% 1215	3,917
MILKER (DRY)	75% 250	0% 250	0% 250	0% 250	0% 250	50% 250	75% 250	75% 250	75% 250	75% 250	75% 250	75% 250	2,013
HEIFERS (12-24 Months)	75% 505	0% 505	0% 505	0% 505	0% 505	50% 505	75% 505	75% 505	75% 505	75% 505	75% 505	75% 505	2,817
CALVES (1-12 Months)	25% 404	0% 404	0% 404	0% 404	0% 404	20% 404	25% 404	25% 404	25% 404	25% 404	25% 404	25% 404	118
													0
													0
													0
													0
													0
													0
													0
													0
Total AUM's Available>	0	0	0	0	0	0	0	0	0	0	0	0	0
Total AUM's Needed>>>	1,166	0	0	0	0	701	1,166	1,166	1,166	1,166	1,166	1,166	8,864
Total AUM's>>>>>>>>>>>>	-1,166	0	0	0	0	-701	-1,166	-1,166	-1,166	-1,166	-1,166	-1,166	-8,864

4/5/2018

Version 5.2

CLIENT: **Fairview Acres Dairy Farm**

ASSISTED BY: **Tom Thomson, NW Agricultural Consulting**

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

TILLAMOOK 1 W

WEATHER STATION		RED ROCK #1		
Month	25Yr-24Hr	6.00	Lot Runoff Factors as a Percent of Monthly Precipitation	
	RCN=	95.00		
	Average Monthly Inches		Paved	Unpaved
October	7.16	1.42	100%	20%
November	13.71	0.75	100%	25%
December	13.94	0.60	100%	25%
January	13.09	0.48	100%	25%
February	10.79	0.78	100%	25%
March	9.90	1.26	100%	15%
April	6.81	1.90	100%	15%
May	4.84	3.22	100%	10%
June	3.41	3.40	100%	10%
July	1.64	3.91	100%	0%
August	1.42	3.52	100%	10%
September	3.68	2.54	100%	15%
Annual	90.39	23.78		

[illegible]

WATER USE AND WASHES LIQUID STORAGE FACILITY					
Type of Water Use	Number of Animals	Number of Washes per Day	Gallons of Water Used per Wash-Day	Total Water Use per Day, Gallons	Total Water Use per Day, Cubic Feet
Animal Washwater	1215	2	2.00	4860	649.7
Equipment Wash		2	1000.00	2000	267.4
Flushwater		0	0.00	0	0.0
Miscellaneous		2	50.00	100	13.4
Total				6960	930.5

Field Number	Acres	Crop	Percent Dry Matter (DM)	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre		
						Nitrogen N	Phosphorous P ₂ O ₅	Potassium K ₂ O
Fairview Acres	147.5	Grass Hay/Pasture	▼ 100%	Ton	6.00	348	110	289
Bohren Farm	107.5	Grass Hay/Pasture	▼ 100%	Ton	6.00	348	110	289
Little Dairy	81.5	Grass Hay/Pasture	▼ 100%	Ton	6.00	348	110	289
Chad Acres	178.0	Grass Hay/Pasture	▼ 100%	Ton	6.00	348	110	289
Eastside Dairy	206.7	Grass Hay/Pasture	▼ 100%	Ton	6.00	348	110	289
Other Owned	43.8	Grass Hay/Pasture	▼ 100%	Ton	6.00	348	110	289
Leased	203.9	Grass Hay/Pasture	▼ 100%	Ton	6.00	348	110	289
			▼					
			▼					
			▼					
Off Farm	313.1	Grass Haylage	▼ 100%	Ton	6.00	300	110	308
Total Acres-	1,282.0							

4/5/2018

Version 5.2

CLIENT: **Fairview Acres Dairy Farm**

ASSISTED BY: **Tom Thomson, NW Agricultural Consulting**

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

[illegible][illegible]

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM) Version 5.2

4/5/2018

CLIENT: **Fairview Acres Dairy Farm**
ASSISTED BY: **Tom Thomson, NW Agricultural Consulting**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

Month	Runoff in Cubic Feet				Facility Water Use Cubic Feet	Manure		Bedding		Solids Separated		Solids in Liquids		Total Solids	Total Liquids
	Roof Area Square Feet 0	Paved Slab Area Square Feet 5,600	Unpaved Lot Area Square Feet 0	Silage Pit Surface Area, SF 0		Solids Cubic Feet	Liquids Cubic Feet	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Cubic Feet
October	0	3,341	0	0	28,845	8,609	58,636	18,249	50,292	50,736	1,826,483	34,758	1,251,294	50,736	66,944
November	0	6,398	0	0	27,914	14,374	96,810	34,280	103,779	83,040	2,989,442	62,424	2,247,262	83,040	96,736
December	0	6,505	0	0	28,845	14,853	100,037	35,423	107,238	85,808	3,089,090	64,505	2,322,171	85,808	99,855
January	0	6,109	0	0	28,845	14,853	100,037	35,423	107,238	85,808	3,089,090	64,505	2,322,171	85,808	99,458
February	0	5,035	0	0	26,053	13,416	90,356	31,995	96,860	77,504	2,790,146	58,262	2,097,444	77,504	89,351
March	0	4,620	0	0	28,845	11,248	76,231	23,347	67,709	63,934	2,301,640	46,892	1,688,104	63,934	80,357
April	0	3,178	0	0	27,914	8,331	56,744	17,660	48,670	49,099	1,767,565	33,637	1,210,929	49,099	64,729
May	0	2,259	0	0	28,845	8,609	58,636	18,249	50,292	50,736	1,826,483	34,758	1,251,294	50,736	65,862
June	0	1,591	0	0	27,914	8,331	56,744	17,660	48,670	49,099	1,767,565	33,637	1,210,929	49,099	63,143
July	0	765	0	0	28,845	8,609	58,636	18,249	50,292	50,736	1,826,483	34,758	1,251,294	50,736	64,368
August	0	663	0	0	28,845	8,609	58,636	18,249	50,292	50,736	1,826,483	34,758	1,251,294	50,736	64,266
September	0	1,717	0	0	27,914	8,331	56,744	17,660	48,670	49,099	1,767,565	33,637	1,210,929	49,099	63,269
Annual	0	42,182	0	0	339,626	128,174	868,248	286,444	830,001	746,334	26,868,035	536,531	19,315,114	746,334	918,339
Annual Gallons	0	315,521	0	0	2,540,400	958,740	6,494,493	2,142,599		5,582,581		4,013,251		5,582,581	6,869,173

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from LIQUIDS			Pounds/Day of Nutrients from SOLIDS			Pounds/Day of Nutrients from GRAZING			Grazing Manure	Confined Manure
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	Gallons/Yr	Cubic Feet/Yr
MILKER (Holstein)	524.39	153.45	452.17	763.93	381.49	749.48	1,153.04	465.36	642.17	1,624,666	827,448
MILKER (DRY)	47.75	11.11	29.70	69.57	27.61	49.22	105.00	33.68	42.18	423,907	60,858
HEIFERS (12-24 Months)	59.26	16.84	49.87	86.33	41.86	82.67	130.30	51.06	70.83	580,390	83,323
CALVES (1-12 Months)	0.00	0.00	0.00	33.73	12.29	18.75	25.45	7.50	8.03	36,262	24,792
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
Total-										2,665,224	996,421

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM) Version 5.2

4/5/2018

CLIENT: Fairview Acres Dairy Farm
ASSISTED BY: Tom Thomson, NW Agricultural Consulting

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			Total Pounds of Nutrients from ALL SOURCES		
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
October	11,721	3,404	10,008	17,859	8,748	17,025	17,464	6,789	9,259	47,044	18,940	36,292
November	18,942	5,442	15,952	28,606	13,898	27,004	0	0	0	47,549	19,339	42,956
December	19,574	5,623	16,484	29,560	14,361	27,904	0	0	0	49,134	19,984	44,388
January	19,574	5,623	16,484	29,560	14,361	27,904	0	0	0	49,134	19,984	44,388
February	17,679	5,079	14,889	26,699	12,971	25,204	0	0	0	44,379	18,050	40,092
March	15,151	4,381	12,868	22,909	11,197	21,794	9,881	3,812	5,186	47,941	19,391	39,847
April	11,343	3,294	9,685	17,283	8,466	16,476	16,900	6,570	8,960	45,526	18,329	35,122
May	11,721	3,404	10,008	17,859	8,748	17,025	17,464	6,789	9,259	47,044	18,940	36,292
June	11,343	3,294	9,685	17,283	8,466	16,476	16,900	6,570	8,960	45,526	18,329	35,122
July	11,721	3,404	10,008	17,859	8,748	17,025	17,464	6,789	9,259	47,044	18,940	36,292
August	11,721	3,404	10,008	17,859	8,748	17,025	17,464	6,789	9,259	47,044	18,940	36,292
September	11,343	3,294	9,685	17,283	8,466	16,476	16,900	6,570	8,960	45,526	18,329	35,122
Annual	171,833	49,645	145,766	260,620	127,175	247,335	130,436	50,678	69,103	562,889	227,498	462,205

MONTHLY IMPORTS INTO STORAGE FACILITIES

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

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM) Version 5.2

4/5/2018

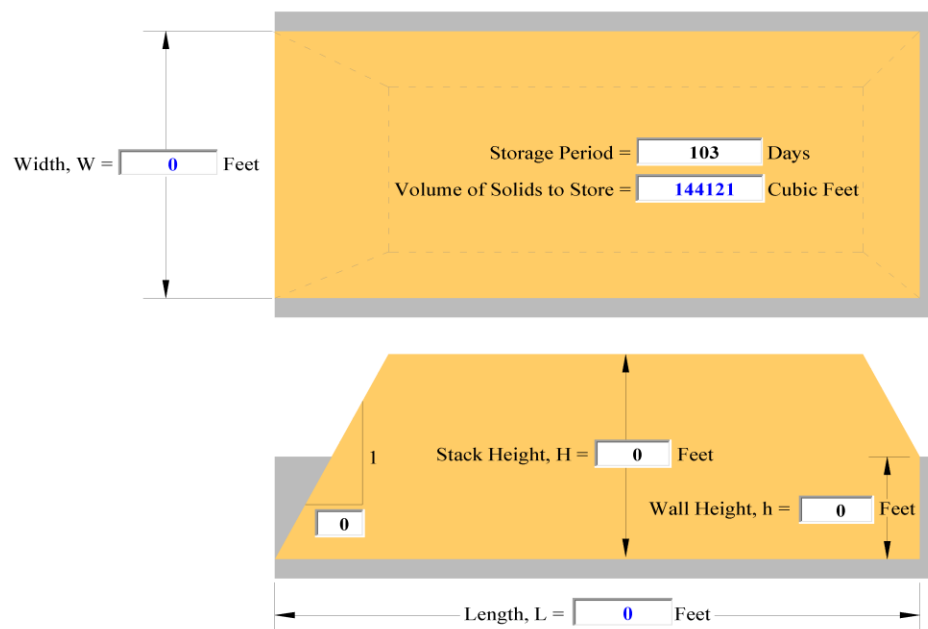
CLIENT: Fairview Acres Dairy Farm
ASSISTED BY: Tom Thomson, NW Agricultural Consulting

ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

SOLIDS STACKING FACILITY

VOLUME OF MONTHLY SOLIDS STACKED IN FACILITY

Solids Storage Facility Parameters	Value	Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Solids to Store Tons	Normal Runoff CF
Storage Period, Days=	103	October	31	34,567	16,169	25,368	913	0
Stacking Width, W in Feet=	0	November	30	56,810	26,230	41,520	1,495	0
Stacking Height, H in Feet=	0.00	December	31	58,704	27,104	42,904	1,545	0
Wall Height, h in Feet=	0.00	January	31	58,704	27,104	42,904	1,545	0
Stack Side Slope (X:1)=	0.00	February	28	53,023	24,481	38,752	1,395	0
Existing Storage, Cubic Feet=	145,184	March	31	44,746	19,188	31,967	1,151	0
Surface Area of Existing Storage, SF=	0	April	30	33,451	15,648	24,550	884	0
25 Year-24 Hour Storm Runoff, CF=	0	May	31	34,567	16,169	25,368	913	0
Volume Needed, Cubic Feet=	144,121	June	30	33,451	15,648	24,550	884	0
Design Volume, Cubic Feet=	0	July	31	34,567	16,169	25,368	913	0
Is Facility Covered? NO	▼	August	31	34,567	16,169	25,368	913	0
Volume Reduction Factor=	0.50	September	30	33,451	15,648	24,550	884	0
		Annual	365	510,607	235,728	373,167	13,434	0



REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.2

4/5/2018

CLIENT: Fairview Acres Dairy Farm

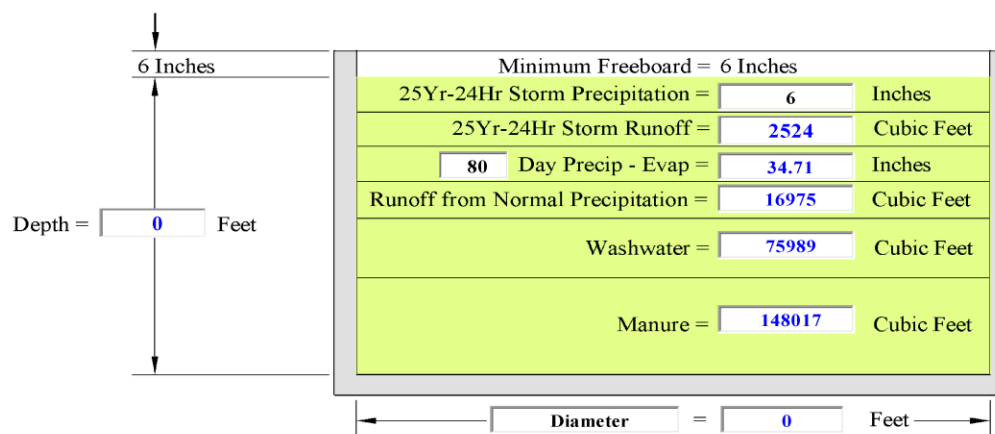
ASSISTED BY: Tom Thomson, NW Agricultural Consulting

ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

TANK

MONTHLY INFLOWS INTO TANK

Tank Parameters	Value	Month	Number of days	Rain-Evap on Tank CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Solids CF	Imported Liquids CF	Waste to Store CF	Waste to Store Gallons
Storage Period, Days=	80	October	31	0	5,405	3,341	28,845	34,758	0	72,349	541,209
Tank Diameter, Feet=	0	November	30	0	12,203	6,398	27,914	62,424	0	108,939	814,923
		December	31	0	12,561	6,505	28,845	64,505	0	112,416	840,928
Existing Storage, Cubic Feet=	304,656	January	31	0	11,873	6,109	28,845	64,505	0	111,332	832,819
Surface Area of Existing Storage, SF=	11,299	February	28	0	9,425	5,035	26,053	58,262	0	98,776	738,899
25 Year-24 Hour Storm Runoff, CF=	2,524	March	31	0	8,135	4,620	28,845	46,892	0	88,492	661,966
Volume Needed, Cubic Feet=	303,749	April	30	0	4,623	3,178	27,914	33,637	0	69,353	518,793
Design Volume, Cubic Feet=	0	May	31	0	1,525	2,259	28,845	34,758	0	67,387	504,091
Is Tank Covered? NO	▼	June	30	0	9	1,591	27,914	33,637	0	63,152	472,411
Tank Dimensions? Circular	▼	July	31	0	-2,137	765	28,845	34,758	0	62,231	465,520
		August	31	0	-1,977	663	28,845	34,758	0	62,288	465,950
		September	30	0	1,073	1,717	27,914	33,637	0	64,342	481,312
		Annual	365	0	62,719	42,182	339,626	536,531	0	981,057	7,338,820



REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM) Version 5.2

4/5/2018

CLIENT: Fairview Acres Dairy Farm
ASSISTED BY: Tom Thomson, NW Agricultural Consulting

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
	Type of Storage Facility	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Liquids	Tank Manure Analysis	171,833	49,645	145,766	70%	85%	85%	120,283	42,198	123,901
Solids	Solids Storage Manure Analysis	260,620	127,175	247,335	75%	90%	90%	195,465	114,458	222,602
Grazing	NONE	130,436	50,678	69,103	100%	100%	100%	130,436	50,678	69,103

NUTRIENTS AVAILABLE AFTER APPLICATION

Nutrient Source	Type of Application System	Pounds of Nutrients Available			Percent Nutrients Retained After Application			Pounds of Nutrients Retained After Application		
		N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Liquids	Sprinkling	120,283	42,198	123,901	75%	100%	100%	90,212	42,198	123,901
Solids	Broadcast (Incorporated 7 or more days after application)	195,465	114,458	222,602	70%	100%	100%	136,825	114,458	222,602
Grazing	Grazing	130,436	50,678	69,103	85%	100%	100%	110,871	50,678	69,103

NUTRIENTS AVAILABLE AFTER DENTRIFICATION

Nutrient Source	Location	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
	Coast	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Liquids	Moderately Well Drained	90,212	42,198	123,901	82%	100%	100%	73,974	42,198	123,901
Solids	Moderately Well Drained	136,825	114,458	222,602	82%	100%	100%	112,197	114,458	222,602
Grazing	Moderately Well Drained	110,871	50,678	69,103	82%	100%	100%	90,914	50,678	69,103
TOTAL-								277,085	207,334	415,808

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM) Version 5.2

4/5/2018

CLIENT: Fairview Acres Dairy Farm
ASSISTED BY: Tom Thomson, NW Agricultural Consulting

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

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

NITROGEN, N

Field Number	Acres	Crop	LIQUIDS			SOLIDS			GRAZING		
			Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients
Fairview Acres	147.5	Grass Hay/Pasture	12%	8,877	26	12%	13,464	39	12%	10,910	31
Bohren Farm	107.5	Grass Hay/Pasture	9%	6,658	19	9%	10,098	29	9%	8,182	24
Little Dairy	81.5	Grass Hay/Pasture	6%	4,438	13	6%	6,732	19	6%	5,455	16
Chad Acres	178.0	Grass Hay/Pasture	15%	11,096	32	15%	16,830	48	15%	13,637	39
Eastside Dairy	206.7	Grass Hay/Pasture	17%	12,576	36	17%	19,073	55	17%	15,455	44
Other Owned	43.8	Grass Hay/Pasture	3%	2,219	6	3%	3,366	10	3%	2,727	8
Leased	203.9	Grass Hay/Pasture	15%	11,096	32	15%	16,830	48	15%	13,637	39
Off Farm	313.1	Grass Haylage	23%	27,665	92	23%	44,957	150	23%	30,000	100
TOTALS	1282		100%	84,625	256	100%	131,348	398	100%	100,004	301

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED			- NUTRIENTS REMOVED			= NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P ₂ O ₅ Lbs/Acre	Potassium, K ₂ O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P ₂ O ₅ Lbs/Acre	Potassium, K ₂ O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P ₂ O ₅ Lbs/Acre	Potassium, K ₂ O Lbs/Acre
Fairview Acres	147.5	Grass Hay/Pasture	225	169	338	348	110	289	-123	59	49
Bohren Farm	107.5	Grass Hay/Pasture	232	174	348	348	110	289	-116	64	59
Little Dairy	81.5	Grass Hay/Pasture	204	153	306	348	110	289	-144	43	17
Chad Acres	178.0	Grass Hay/Pasture	233	175	350	348	110	289	-115	65	61
Eastside Dairy	206.7	Grass Hay/Pasture	228	171	342	348	110	289	-120	61	53
Other Owned	43.8	Grass Hay/Pasture	190	142	285	348	110	289	-158	32	-5
Leased	203.9	Grass Hay/Pasture	204	153	306	348	110	289	-144	43	17
Off Farm	313.1	Grass Haylage	328	152	305	300	110	308	28	42	-3