DISCOVERY FARMS MINNESOTA

2012 WATER YEAR MONITORING RESULTS

October 1, 2011 – September 30, 2012

MINNESOTA DEPARTMENT OF AGRICULTURE

Summer 2013

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Acronyms and Abbreviations

BE1-F	Blue Earth County 1 surface flume monitoring station
BE1-T	Blue Earth County 1 subsurface tile monitoring station
BE2-F	Blue Earth County 2 surface flume monitoring station
BE2-T	Blue Earth County 2 subsurface tile monitoring station
CH1	Chisago County surface flume monitoring station
CSG	Crest stage gage
CST	Central standard time
DFM	Discovery Farms Minnesota
DOP	Dissolved (soluble) orthophosphorus
DO1	Dodge County Discovery Farm
FTS	Forest Technology Systems
GO1	Goodhue County monitoring station
MAWRC	Minnesota Agricultural Water Resources Center
MDA	Minnesota Department of Agriculture
MVTL	Minnesota Valley Testing Laboratory
NOAA	National Oceanic and Atmospheric Administration
NO_2+NO_3-N	Nitrate + nitrite nitrogen
NOHRSC	National Operational Hydrologic Remote Sensing Center
NO1	Norman County Discovery Farm
RE1	Renville County Discovery Farm
ST1-F	Stearns County surface flume monitoring station
ST1-T	Stearns County subsurface tile monitoring station
SWCD	Soil and Water Conservation District
TKN	Total kjeldahl nitrogen
TN	Total nitrogen (NO_2+NO_3-N + TKN)
TP	Total phosphorus
TSS	Total suspended solids
WY	Water year (October to September of following year)
WI1	Wilkin County Discovery Farm
WR1	Wright County Discovery Farm

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SECTION 1: INTRODUCTION

This report provides an extensive review of the water quality monitoring data collected by the Minnesota Discovery Farms program during the 2012 water year (October 1, 2011 through September 30, 2012). The report also references and contrasts the previous year(s) data when available. A complimentary summary report developed by the Minnesota Agricultural Water Resources Center (MAWRC) for the 2012 water year is also available at http://www.discoveryfarmsmn.org

1.1 Program Overview and History

In July of 2008, the University of Minnesota Water Resources Center and University of Minnesota Extension completed a feasibility study of an on-farm water quality program in Minnesota funded by the Minnesota Department of Agriculture's (MDA) Clean Water Legacy Act appropriation. The feasibility study addressed several key areas including: an extensive review of Midwestern water quality demonstrations; an assessment of existing field and watershed scale projects in Minnesota; stakeholder input; network structure and mission; education and outreach; research; funding opportunities; and design recommendations and cost analysis. As part of the study, the concept was shared with stakeholders across the state and there was generally strong support for an on-farm water quality monitoring network.

In the fall of 2009, the MAWRC launched the Discovery Farms Minnesota (DFM) program with support and assistance from the 15 farm organizations that comprise the MAWRC, MDA, and University of Minnesota Extension. The program is largely based on the Wisconsin Discovery Farms model.

In order for the DFM program to be successful, financial and technical support is contributed by a number of different entities including farmers, farm organizations, and various government agencies.

1.1.1 Goals and Objectives

Discovery Farms Minnesota is a producer led effort, organized and established for the purpose of gathering field-scale information to accurately quantify the impact of a variety of farming enterprises across Minnesota on water quality. The mission of the program is to collect water quality information under real-world conditions and to organize practical, credible, and site-specific information which will stimulate farm management decisions supported by a better understanding of the relationships between land management and water quality.

The goals of the Discovery Farms Minnesota program include:

- Increase understanding of the relationship between agricultural practices and soil and water quality.
- Better identify management practices that will improve farm profitability and environmental performance.

- Provide science-based information on agricultural production and natural resource management.

1.2 Partnerships

Steering Committee

The DFM program is conducted through a partnership of the MAWRC, MDA, farm cooperators and local monitoring partners. DFM emphasizes farmer input and direction and program activities are guided by a Steering Committee which provides oversight, direction, and assistance as requested or needed. The Steering Committee consists of representatives of: 1) farm or commodity organizations, 2) public agencies and institutions, and 3) conservation organizations. Personnel from public agencies and institutions are considered to be non-voting advisors. The Steering Committee is responsible for:

- Providing overall direction to DFM.
- Ensuring that DFM remains a producer led program.
- Assisting in identification of issues and overseeing program planning to ensure that DFM continues to focus on challenges that face Minnesota producers.
- Review and selection of new farms into the program.

In 2012, the DFM Steering Committee consisted of fifteen members. Organizations represented on the DFM Steering Committee are included in **Table 1**.

Table 1: Voting and non-voting member organizations for the DFM Steering Committee.

DISCOVERY FARM MINNESOTA **Steering Committee Members**
Voting Members
Minnesota Soybean Growers Association
Minnesota Corn Growers Association
Minnesota Farm Bureau
Minnesota Farmers Union
Minnesota Turkey Growers Association
Minnesota Pork Producers
Broiler and Egg Association of Minnesota
Minnesota Milk Producers Association
Irrigators Association of Minnesota
Minnesota State Cattlemen's Association
The Nature Conservancy
Non-Voting Advisors
Minnesota Department of Agriculture
Natural Resources Conservation Service (USDA)
Stearns County Soil and Water Conservation District
University of Minnesota - Extension

Farm Cooperators

Farm cooperators provide the critical link in the DFM research and outreach program. Knowledge and understanding of their farming system and local landscape is essential in understanding the collected water quality data. Farmers participating in the DFM program work closely with a number of partners to examine their existing farming system. From there, they explore and implement changes, if needed, designed to reduce or eliminate adverse environmental impacts. Participating farmers provide access to the site and keep and provide detailed records on practices that occur in the monitored area. Visits, tours, and field days are often held at participating farms throughout the duration of their involvement in the DFM program.

Cooperating farmers do not assist with sample collection or troubleshooting of the monitoring equipment. The extent of involvement of the participating producers is in providing the farm management information, anecdotal information (unusual occurrences), and assistance in the overall management and operation of the program.

Partners

There are multiple partners involved in the operation of the DFM program including research, data collection, outreach, and educational activities. The roles and responsibilities of the key partners will continue to evolve as the DFM program grows. The current roles and responsibilities of the key partners are summarized below.

Minnesota Agricultural Water Resources Center (MAWRC)

The primary responsibility of MAWRC for the DFM program is to coordinate overall program operations to ensure program goals are met. The MAWRC also identifies potential cooperators through an application process and identifies priorities for agricultural systems and/or area of the state to be assessed. More specifically MAWRC is responsible for the following activities:

- Organize the data collection, educational, and outreach activities of DFM.
- Coordinate contracts and agreements with local partners and farmer cooperation.
- Collect and store farm management and site specific data.
- Organize and secure funding for the DFM program.

Minnesota Department of Agriculture (MDA)

The primary responsibility of MDA for the DFM program is to assist with the establishment and operation of monitoring systems that will provide high-quality, water-quantity and water-quality data from agricultural systems and operations identified by the MAWRC. More specifically, MDA will be responsible for the following activities:

- The selection of the appropriate monitoring equipment and associated platforms such as data storage, communication, power supply, and sample collection.
- Identification of appropriate locations for monitoring equipment within a selected farm.

- Installation of monitoring equipment.
- Development of procedures for site maintenance, sample collection, processing, and analysis.
- Quantification of annual and event specific runoff volumes, sediment, nutrient and other selected constituent loads, flow-weighted mean concentrations, and other meaningful water quality statistics and associated information.
- Ensure data integrity, accuracy and transparency.
- Ensure that all data are captured and archived in MDA databases and published annually.
- Aid in the scientific interpretation of the results.
- Train local partners on sampling procedures.

Local Partners: Chisago County Soil and Water Conservation District (SWCD), Dodge County SWCD, Goodhue County SWCD, Hawk Creek Watershed Project, Mahnomen County SWCD, Norman County SWCD, Stearns County SWCD, Sauk River Watershed District, Wilkin County SWCD and Wright County SWCD.

- Provide routine sample collection as needed and maintenance at Core Farms.
- Assist with local meetings (field days etc.) and other outreach activities.

1.3 Discovery Farms

Seven core farm monitoring sites and one special project farm (Figure 1) were monitored during the entire 2012 Water Year (WY), October 1, 2011 through September 30, 2012. The special project site, KA1, is located in Kandiyohi County and is monitored by the University of Minnesota. MDA is not responsible for this site and information regarding this farm is not included in this report. For more information regarding KA1, refer to staff at MAWRC (www.mawrc.org). Table 2 provides descriptive information for each participating farm.

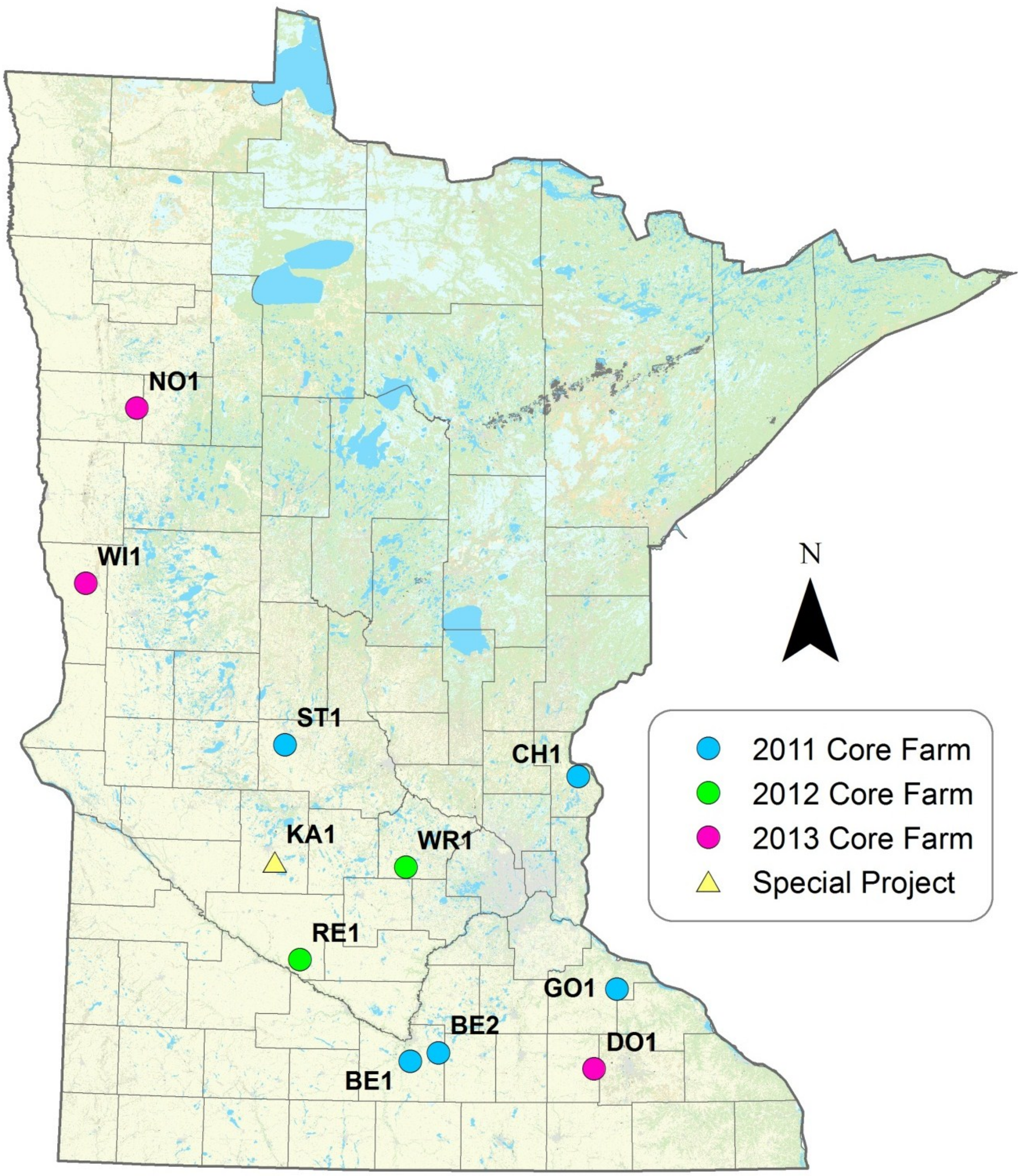

Figure 1: Distribution of Discovery Farms across the state of Minnesota.
Note: KA1 is a special project site administered through a research grant with the University of Minnesota. MDA does not manage data at this site.

Table 2: Operational Discovery Farms during WY2012 (October 2011 - September 2012).

Discovery Farm ID	County	Farm Type	Minor Watershed	Major Basin	Nearest Town	Drainage Area (acres)	Dominant Soil Type	Station Type	Crop Rotation
BE1	Blue Earth	Swine and Grain	Le Sueur	Minnesota	Mankato	14.3 S* 26.2 T**	Poorly drained silty clay loam	Edge-of-Field & Subsurface Tile	Corn-Soybean
BE2	Blue Earth	Grain	Le Sueur	Minnesota	St. Clair	14.2 S 14.2 T	Very poorly drained muck/clay loam	Edge-of-Field & Subsurface Tile	Corn-Soybean
CH1	Chisago	Grain	Sunrise	St. Croix	North Branch	6.1 S	Well drained loam soils	Edge-of-Field	Corn-Soybean
GO1	Goodhue	Beef-Swine	Wells Creek	Lower Mississippi	Goodhue	6.3 S	Well drained silty loam	Edge-of-Field	Corn-Alfalfa
RE1	Renville	Grain	Middle Minnesota	Minnesota	Fairfax	81.0 T	Poorly drained clay loam soils	Subsurface Tile w/surface inlets	Corn-Soybean
ST1	Stearns	Dairy	Sauk River	Upper Mississippi	Sauk Centre	28.2 S 24.2 T	Poorly drained loam soils	Edge-of-Field & Subsurface Tile	Corn-Alfalfa
WR1	Wright	Dairy	North Fork Crow	Upper Mississippi	Howard Lake	23.9 S 23.9 T	Loam and clay loam soils	Edge-of-Field & Subsurface Tile	Corn-Alfalfa

*S = surface watershed | **T = subsurface tile watershed

SECTION 2: OVERVIEW OF REPORT

The data presented in this report are generated from edge-of-field monitoring sites across several different agricultural areas of Minnesota. These areas represent diverse landscapes with selected farms that have soil and agricultural land management techniques typical for the region. Previous research, including that of Wisconsin Discovery Farms program has shown that runoff losses and climatic conditions can vary greatly from year to year (Stuntebeck et al., 2011; http://pubs.usgs.gov/sir/2011/5008/). The results presented in this report represent up to two years of data. Comparisons across years should be done so with caution as WY2011 was only a partial year (with the exception of GO1).

Section three of this report provides a description of the methods used for monitoring water quality from surface and subsurface (tile) sites. Although there may be slight differences in instrumentation and programming for select sites, DFM strives to collect, analyze and interpret data from each of the sites in a consistent fashion to ensure comparability. Where slightly different equipment or techniques are used it is generally noted in the individual site results.

Section four provides an overview of each Discovery Farm in operation for the 2012 water year, including the results of precipitation, runoff and water quality monitoring. Water quality results have been combined with flow data to calculate constituent loads, yields and flow-weighted mean concentrations (FWMC). All data analysis for load calculation follows the standard operating procedures outlined in MDA's Loading Guidelines document (available upon request).

Runoff, yield and FWMC must all be considered when interpreting the data collected by DFM. A high FWMC, but low runoff, may equate to a low yield. Conversely, a low FWMC, but high runoff value, can result in high yields. Yield is important for understanding how sediment and nutrient losses compare across different landscapes and farm operations during a given year or season. FWMC is useful in providing context with sediment and nutrients levels found in rivers and lakes as well as comparing data from multiple years and sites. It must be noted, however, that the sediment and nutrient losses calculated for edge-of-field sites are often not the same as what is delivered to surface waters. Delivery will be different for each site and is dependent on proximity to surface water and landscape characteristics. Sites that drain directly to a stream, ditch or lake will have the highest potential for delivery.

All data (water quality, water quantity and precipitation) collected by MDA from Discovery Farms monitoring stations are public data, and are available upon request. Farm management data collected by MAWRC is private but can be requested from http://www.mawrc.org.

Summary data provided in the remainder of this report includes:

Runoff

Runoff is defined as the total volume of water that leaves an area divided by the total watershed area. Runoff in this report is presented in inches and is reported to the nearest hundredth of an inch. Conceptually, one inch of runoff, would equate to one inch of water spread across the surface of the watershed. Runoff is often compared to precipitation as a percentage or runoff ratio. Runoff is useful when comparing sites with different watershed areas as it normalizes the total volume for area. Runoff as used in this report also describes the water movement from subsurface tile systems and is synonymous with drainage.

Precipitation

Each Discovery Farm is equipped with an electronic tipping bucket rain gage that measures rainfall at one minute intervals and outputs at one minute, 15 minute and daily totals. The rain gages used are not heated and therefore winter precipitation measurements are not considered accurate. Daily precipitation totals during the winter (typically November through March) are taken from the nearest National Weather Service network rain gage. For this report, precipitation totals are reported to the nearest hundredth of an inch.

Frozen versus Non-frozen Runoff

Frozen and Non-Frozen runoff terms are used to describe the percentage of flow that occurred when frost was present in the soil versus the percentage of flow that occurred when frost was not present. Frozen conditions are considered present any time the soil temperature probe at the site reads less than 0.0 degrees Celsius at any depth (measured at 5, 10, 30 and 60 cm depths). Frozen conditions will typically occur from December through March but can persist in November and early April as well.

Load

Load is defined as the total mass of the constituent (sediment, phosphorus, nitrogen) that moves from the site in water, over a predetermined period of time. In this report, load is presented in pounds (lbs) and is reported to the nearest tenth of a pound.

Yield

Yield is defined as the total load (mass over a predetermined period of time) divided by the area of the watershed. Yield is useful when comparing different size watersheds, as it normalizes results based on area. In this report, yield is presented as pounds per acre (lbs/acre) and is reported to the nearest tenth. Yields of less than 0.05 lbs/acre will be reported as <0.0 lbs/acre.

FWMC

Flow-weighted mean concentration (FWMC) is defined as the total load divided by the total water volume. FWMC is useful as it represents the average constituent concentration of all the water that drained from the watershed during the monitoring period. In this report, FWMC is presented as milligrams per liter (mg/L) and values are reported with significant digits that are consistent with results received by the laboratory. Total suspended solid (TSS) results are presented to the nearest whole number. Ammonia (NH_3) and total kjeldahl nitrogen (TKN) are presented to the nearest tenth. Total nitrogen (TN) and nitrate+nitrite nitrogen (NO_2+NO_3-N) are presented to the nearest hundredths. Total phosphorus (TP) and Dissolved orthophosphorus (DOP) are presented to the nearest thousandths.

Measured Constituents

Total Suspended Solids: TSS refers to suspended material within the water column, including both organic and inorganic (mineral) fractions. Agricultural runoff is dominated by the inorganic fraction (clay, silt and sand). High TSS levels can impact streams by smothering fish eggs, aquatic insects and suffocating newly-hatched insect larvae. Suspended solids can harm fish directly by clogging gills and reducing growth rates. Elevated TSS can also be a significant source of phosphorus as discussed below.

Total Phosphorus: TP refers to the combined total of two different forms of phosphorus: particulate phosphorus and dissolved phosphorus. The particulate form is bound to soil particles and the dissolved form is soluble in water. Particulate phosphorus is usually considered to be the dominant species of phosphorus transported in runoff from agricultural areas, unless manure application is present and sediment losses are low. Dissolved phosphorus levels can sometimes be related to soil test levels of phosphorus, fertilizer and manure application, plants, and crop residue. Excessive phosphorus in fresh water lakes and rivers can cause water quality deterioration by accelerating the growth of algae and other aquatic plants. Dissolved phosphorus can be particularly concerning for lakes and rivers because it is generally considered to be readily bio-available to aquatic plants and algae.

Total Nitrogen: TN refers to the combined total of nitrate-nitrogen, ammonia-nitrogen and organic nitrogen. Organic nitrogen can be attached to soil particles, found in manure, or be associated with plants and plant residue. Nitrate-nitrogen can be associated with manure, fertilizer, atmospheric, and soil-available nitrogen because it is a stable breakdown product of biological processes. Ammonia-nitrogen can be linked to manure, fertilizer, soil and atmospheric nitrogen. Excessive nitrogen in water bodies can cause water quality deterioration by accelerating the growth of algae and other aquatic plants. The excessive loss of nitrate-nitrogen to groundwater can potentially pose health concerns for humans and animals and excessive amounts of ammonia can be potentially toxic to fish and other aquatic organisms. Recent research also suggests potentially toxic impacts associated with nitrate-nitrogen in aquatic systems.

SECTION 3: METHODOLOGY

This section provides a brief overview of the equipment and sampling procedures used at each of the DFM monitoring stations. To ensure consistency, all stations are generally instrumented with the same equipment and involve essentially identical monitoring procedures. For more detail regarding equipment, methodology in sample collection, load calculations and analysis of the data; please refer to the DFM Standard Operating Procedures Manual available from http://www.discoveryfarmsmn.org.

Equipment Configuration

Sites are typically controlled by a single datalogger that is programmed to collect flow-based composite samples at a predetermined frequency that is site specific. Site data is measured on a one minute basis and is compiled every 15 minutes as a mean or total value. During storm flow events, site data is collected and retained as output every minute for greater data resolution during events. Overland monitoring station setups consist of a standard H flume, automated sampler, datalogger, tipping bucket rain gage, temperature/humidity sensor, bubbler stage sensor, backup ultrasonic stage sensor, soil moisture probe, soil temperature probes, 12 volt marine batteries and solar panels. Farms where subsurface tile is also monitored have an additional automated sampler and either a submersible pressure transducer or area velocity flow meter. When site conditions allow, Agri Drain tile control structures are installed to allow for access to the tile drainage for flow monitoring and sample collection. Remote communication is established utilizing cellular modems and the data is downloaded on an hourly basis.

Overland Flow Monitoring

Surface flow is monitored by installing an earthen berm, plywood wingwall and standard fiberglass H flume. Water level is monitored in the H flume with a Hach OTT bubbler and APG ultrasonic transducer. The stage values are recorded by a FTS H2 datalogger at one minute intervals and converted to flow based on an H flume rating equation provided by the manufacturer.

Subsurface Tile Flow Monitoring

Subsurface tile sites are instrumented with an area velocity flow meter. These meters measure the level and velocity of water through the tile. Two stop logs, at a total height of 12 inches are installed within the Agri Drain structure in order to fully submerge the inlet tile. To calculate flow, the velocity through the pipe is multiplied by the area of the submerged tile.

A second method to calculate flow involves measuring the level of water over the upper-most Agri Drain stop log with a submersible pressure transducer, bubbler or ultrasonic level measurement device. Flow is then calculated by inputting the level (or height of water) into a rating equation developed by Dr. Richard Cooke, Associate Professor of Agriculture Engineering at the University of Illinois. This second flow calculation method is used when the tile is not in a state of surcharge flow or backwater conditions. Subsurface flow is recorded by the datalogger at 15 minute intervals.

Sample Collection

Water quality samples are collected using ISCO 6712 autosamplers. The autosamplers are controlled by the datalogger collecting equal-flow increment (EFI) composite samples into four polyethylene one gallon bottles. Once the water in the flume or Agri Drain structure reaches a predetermined level the datalogger begins accumulating the flow. When the flow accumulates to a site specific threshold the datalogger triggers the autosampler to collect 125 mL into the one gallon bottle. Each one gallon bottle is considered a flow-composite sample with 24 pulses totaling three liters (0.80 gallons). Sampling continues until the fourth bottle is full or flow subsides.

A two-part sampling program was implemented in late 2012. Bottles one, two and three fill at a predetermined rate, while bottle four only samples every fifth pulse. This slows down the sample collection for bottle four and allows for capturing the larger magnitude runoff events without filling up the sampler too quickly.

Samples are collected by the local monitoring partner as soon as possible after each runoff event. Upon collection, samples are shipped on ice to Minnesota Valley Testing Laboratory (MVTL) in New Ulm, Minnesota. MVTL is used for all sites to maintain consistency in laboratory analysis. Samples are analyzed for Total Suspended Solids (TSS), Total Phosphorus (TP), Dissolved Orthophosphorus (DOP), Nitrate+Nitrite (NO_2+NO_3-N), Total Kjeldahl Nitrogen (TKN), Ammonia-N (NH_3) and Chloride (Cl-).

SECTION 4: RESULTS

This section begins with a summary of the precipitation, runoff, constituent yields and flow-weighted mean concentrations for all seven monitoring stations for WY2012. Site codes are presented in Figure 1 and Table 2 above. Starting with section 4.1 below, site specific summaries are provided for each farm that includes a description of the field that is monitored, farming practice information and precipitation, runoff and water quality summaries for WY's 2011 and 2012. It is important keep the following in mind when reviewing the results presented in this report:

- WY2012 saw numerous precipitation deficits compared with the 30-year normal.
- Timing, intensity and duration of precipitation events is highly variable by year, indicating that constituent loading can also be highly variable.
- Caution must be exercised when comparing data between specific farms in this report as they differ by regions, soils, management and climactic variables. After a few consecutive years of data collection, ranges of constituent losses will be available for each site and regionally.

With the exception of WR1, all DFM sites had lower than normal precipitation totals for the WY2012 (Figure 2). The range of precipitation for WY2012 was 21.31 inches at RE1 to 34.58 inches at WR1.

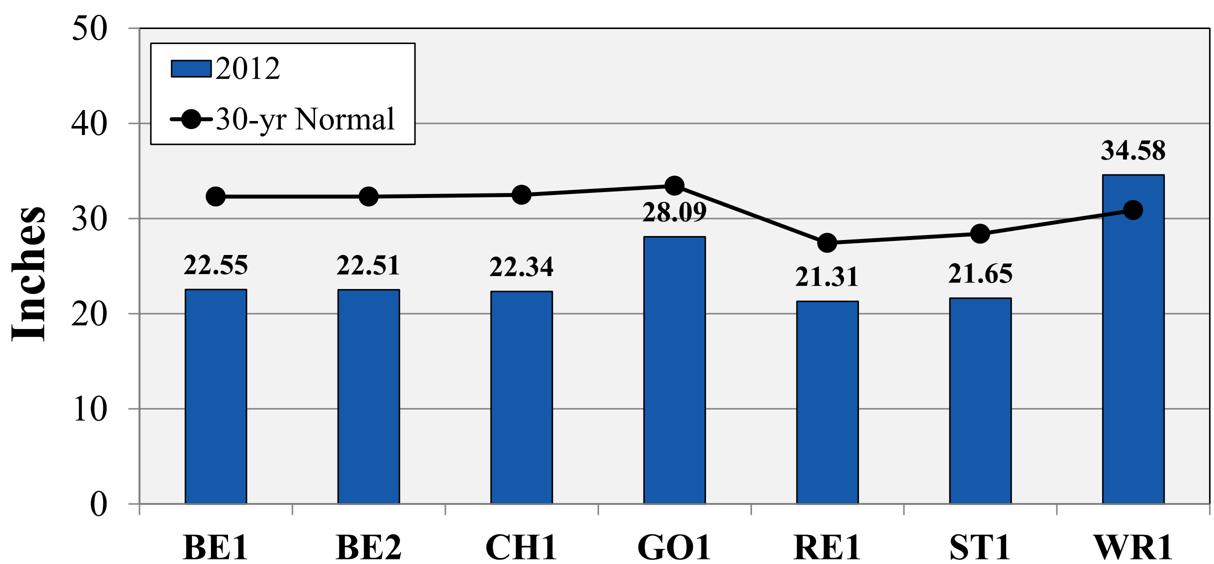

Figure 2: Annual precipitation total by site compared with the 30-year normal value (1981-2010).

Figure 3 presents monthly precipitation totals for each site during WY2012. It is notable that while several sites were under the 30-year normal for annual precipitation, considerable precipitation did occur during late spring and early summer before the crop canopy was fully developed. Most of the sites had above average precipitation in May, around the time of tillage and crop planting, when soil was vulnerable to erosion.

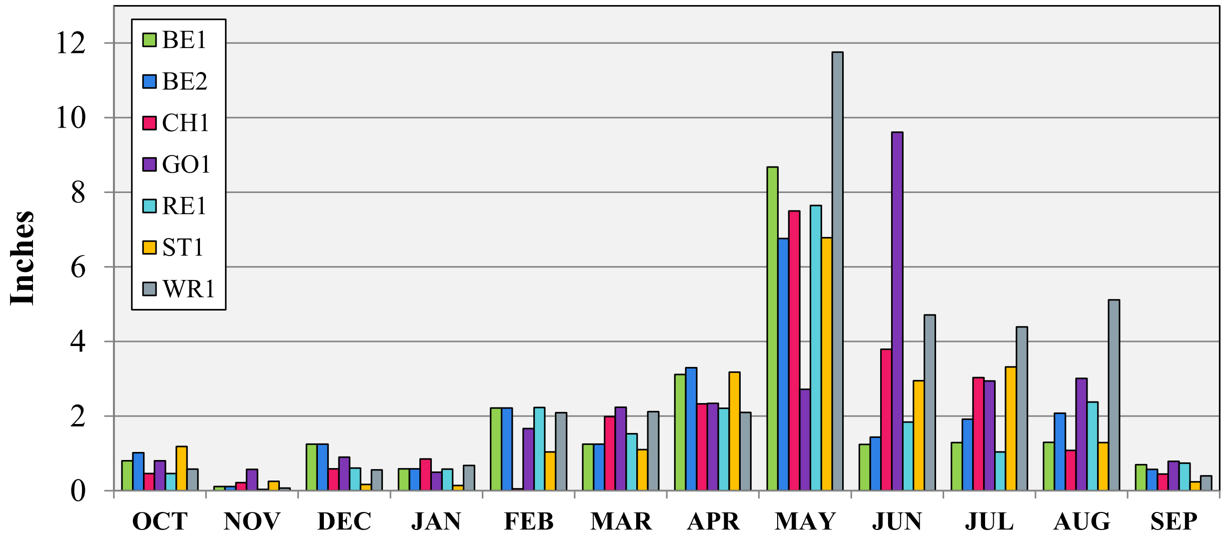

Figure 3: Monthly precipitation by site for WY2012.

WY2012 runoff totals for surface runoff and subsurface tile drainage are presented in Figure 4. Surface runoff sites ranged from 0.42 to 4.90 inches, while subsurface tile drainage ranged from 0.90 to 4.82 inches.

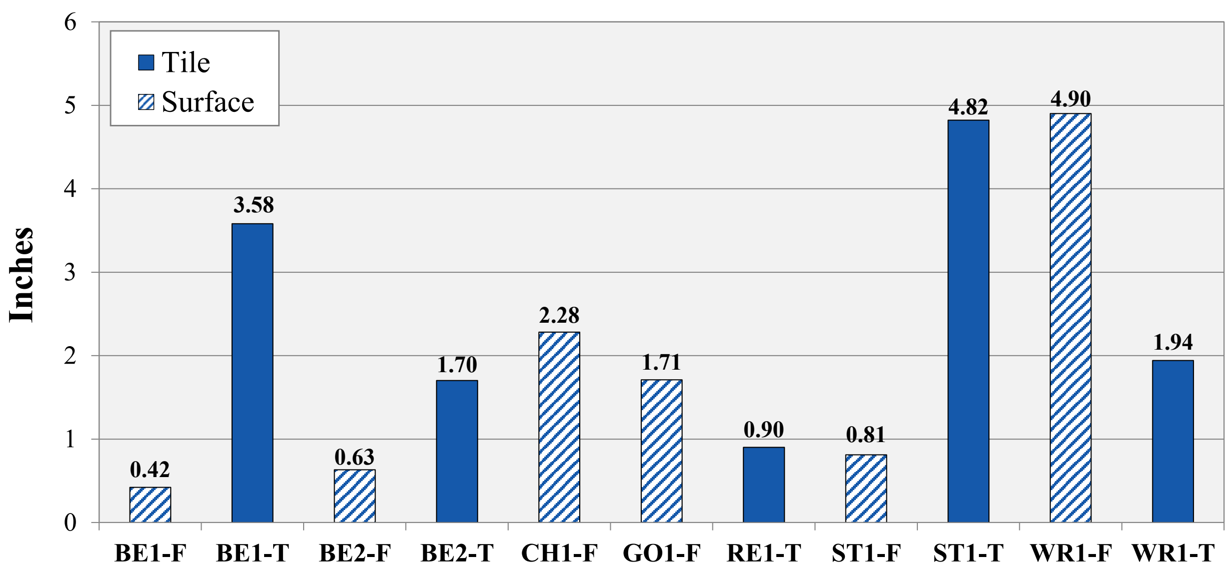

Figure 4: Annual runoff total by site for WY2012.

Figure 5 provides the range for TSS yield during WY2012. TSS yield ranged from 21.9 to 2,366.9 lbs/acre from the surface runoff sites. Subsurface tile drainage sites had TSS yields that ranged from 7.9 to 108.9 lbs/acre.

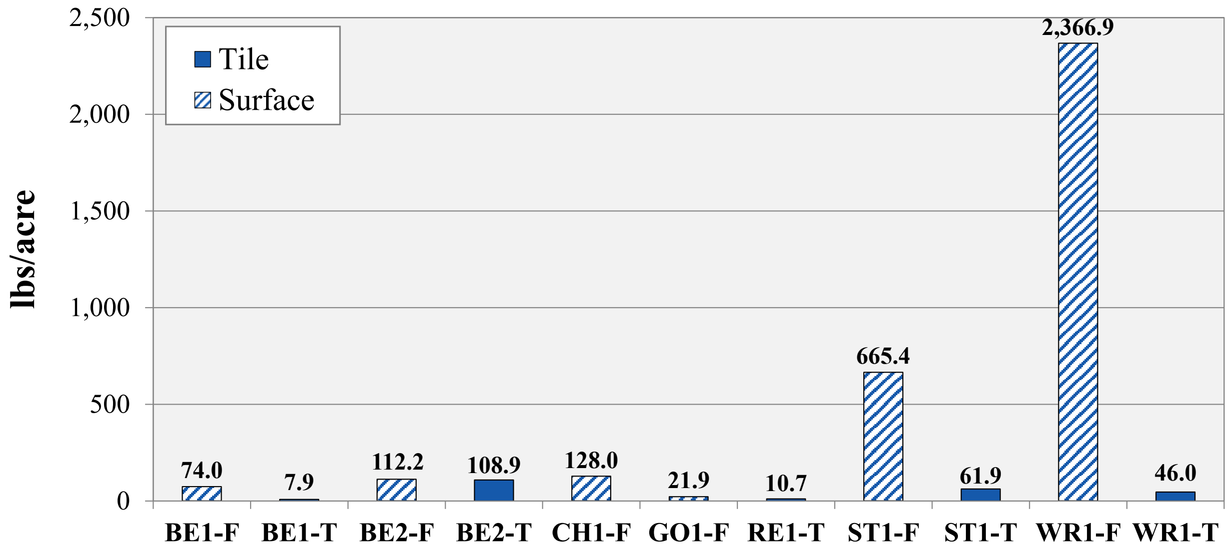

Figure 5: TSS yield by site for WY2012.

Figure 6 presents the range in TSS FWMC during WY2012. TSS FWMC from the surface runoff sites ranged from 57 to 3,620 mg/L. Subsurface tile drainage sites had TSS FWMC's that ranged from 10 to 283 mg/L.

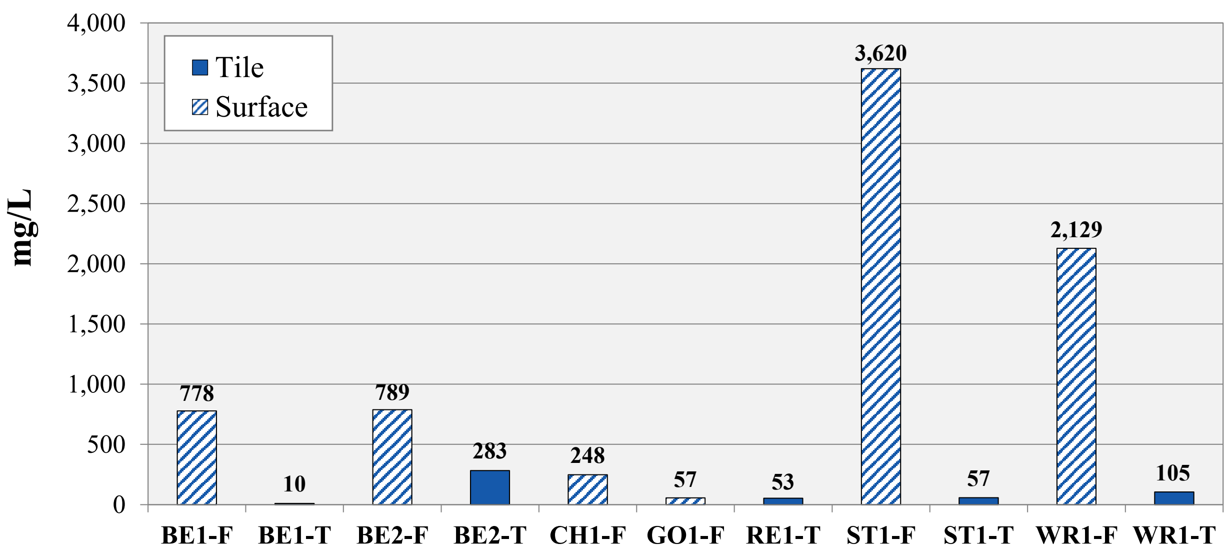

Figure 6: TSS FWMC by site for WY2012.

Figure 7 provides the TP ranges by site for WY2012. TP yield ranged from 0.1 to 3.1 lbs/acre from the surface runoff sites. Subsurface tile drainage sites had TP yields that ranged from <0.0 to 0.2 lbs/acre.

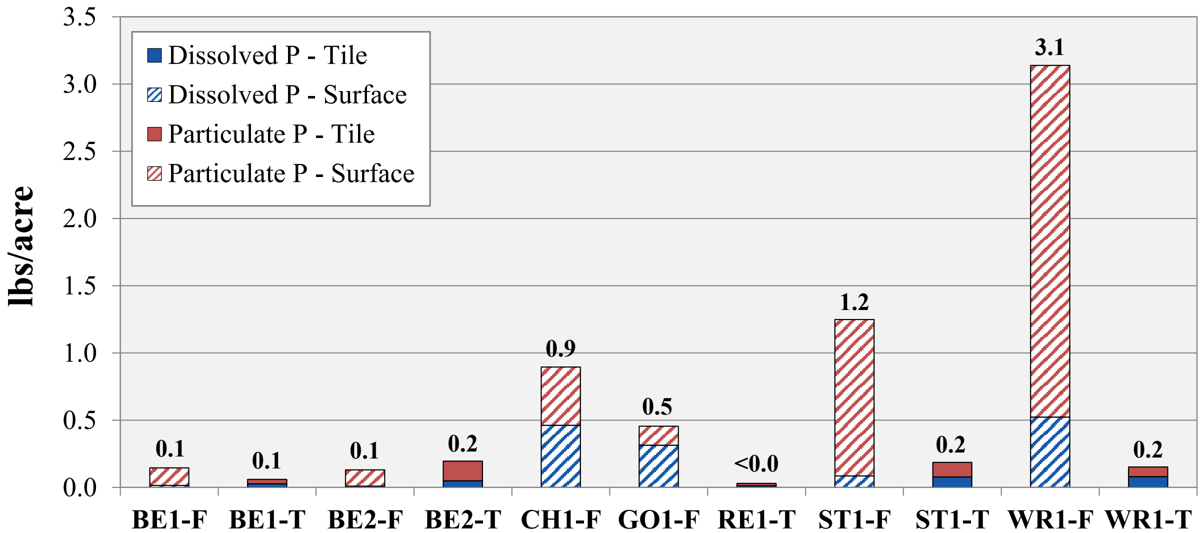

Figure 7: TP yield by site for WY2012, showing breakdown of particulate P versus dissolved P.

Figure 8 presents the range in TP FWMC during WY2012. TP FWMC from the surface runoff sites ranged from 0.924 to 6.797 mg/L. Subsurface tile drainage sites had TP FWMC's that ranged from 0.074 to 0.510 mg/L.

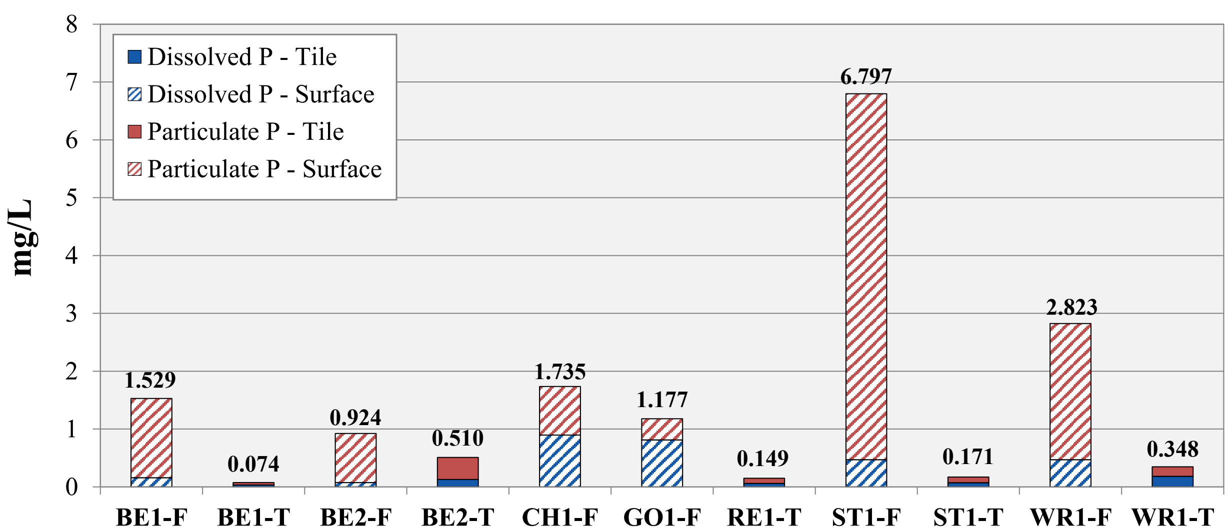

Figure 8: TP FWMC's by site for WY2012, showing the breakdown of particulate P versus dissolved P.

Figure 9 provides the TN ranges by site for WY2012. TN yield ranged from 0.8 to 17.1 lbs/acre from the surface runoff sites. Subsurface tile drainage sites had TN yields that ranged from 3.4 to 36.9 lbs/acre.

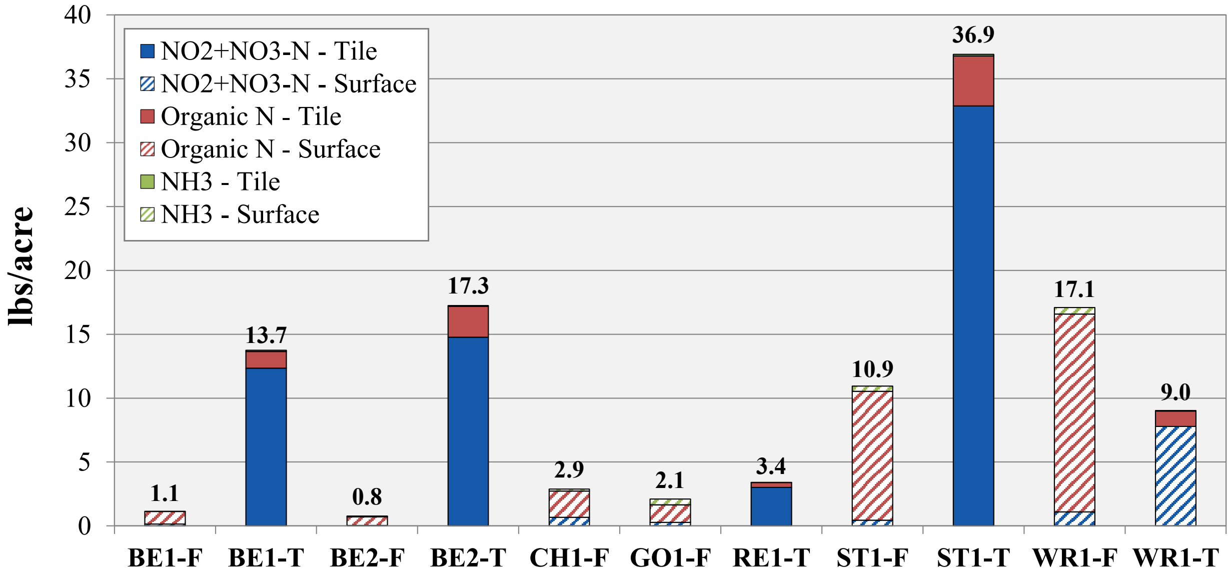

Figure 9: TN yield by site for WY2012.

Figure 10 provides the TN range by site for WY2012. TN FWMC ranged from 5.42 to 59.51 lbs/acre from the surface runoff sites. Subsurface tile drainage sites had TN yields that ranged from 16.95 to 44.88 lbs/acre.

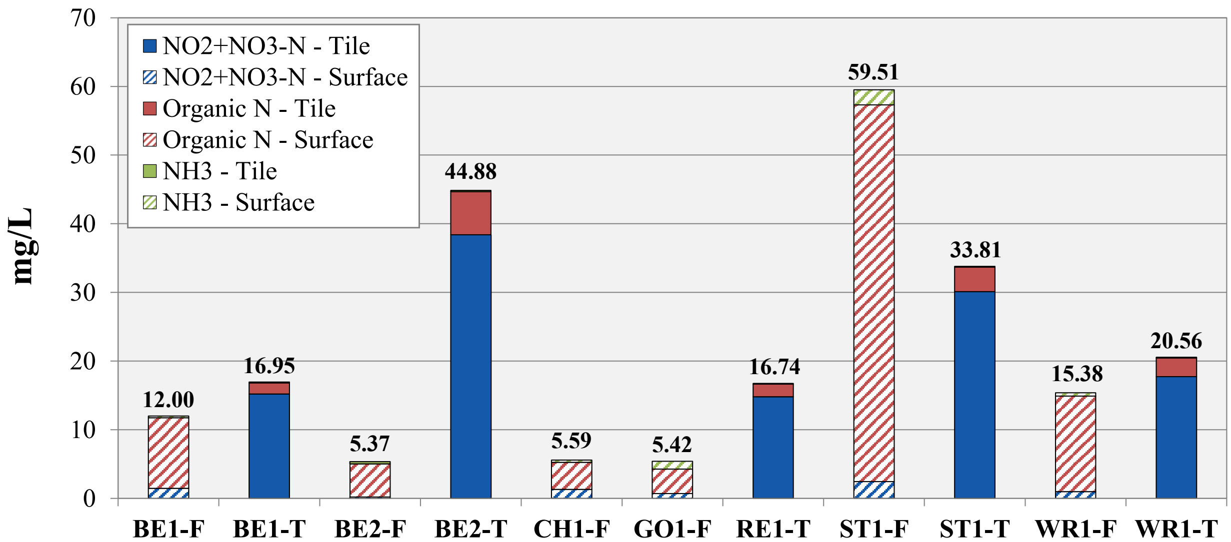

Figure 10: TN FWMC's by site for WY2012.

An overview of available results (WY2011 and WY2012) at each site for load, runoff, rainfall, yield and FWMC are presented in Table 3 through Table 6. Appendix 1 and 2 show results by month and event.

2012 was the second year of monitoring at five farms; BE1, BE2, CH1, GO1 and ST1. All data (except for at GO1) in WY2011 was only a partial year. In addition, WY2012 was the first year of monitoring at both RE1 and WR1.

Table 3: Summary of available DFM data, October 2010 - September 2012. Note: values in red indicate a partial year of data.

Site ID	County	Watershed acres	Water Year	Monitoring Period	Samples #	Volume ft^3	Runoff inches	Rainfall inches
BE1-F	Blue Earth	14.3	WY2011	6/1/11-9/30/11	13	23,640	0.46	11.09
			WY2012	10/1/11-9/30/12	7	21,773	0.42	22.55
BE1-T	Blue Earth	26.2	WY2011	3/1/11-9/30/11	34	1,053,976	11.08	21.12
			WY2012	10/1/11-9/30/12	12	340,242	3.58	22.55
BE2-F	Blue Earth	14.2	WY2011	4/1/11-9/30/11	5	-	-	17.72
			WY2012	10/1/11-9/30/12	3	32,367	0.63	22.51
BE2-T	Blue Earth	14.2	WY2011	7/8/11-9/30/11	4	115,871	2.25	6.75
			WY2012	10/1/11-9/30/12	7	87,416	1.70	22.51
CH1-F	Chisago	6.1	WY2011	3/1/11-9/30/11	14	92,913	4.20	18.72
			WY2012	10/1/11-9/30/12	15	50,409	2.28	22.34
GO1-F	Goodhue	6.3	WY2011	10/1/10-9/30/11	22	98,637	4.31	27.23
			WY2012	10/1/11-9/30/12	14	39,091	1.71	28.09
RE1-T	Renville	81.0	WY2012	10/1/11-9/30/12	17	263,857	0.90	21.31
ST1-F	Stearns	28.2	WY2011	3/1/11-9/30/11	27	418,492	4.09	24.96
			WY2012	10/1/11-9/30/12	15	83,009	0.81	21.65
ST1-T	Stearns	24.2	WY2011	2/17/11-9/30/11	34	2,367,194	-	25.50
			WY2012	10/1/11-9/30/12	20	422,988	4.82	21.65
WR1-F	Wright	23.9	WY2012	10/1/11-9/30/12	31	425,425	4.90	34.58
WR1-T	Wright	23.9	WY2012	10/1/11-9/30/12	30	167,991	1.94	34.58

Table 4: Summary of available DFM Load data (pounds), October 2010 – September 2012. Note: values in red indicate a partial year of data.

LOAD (lbs)									
Site ID	Water	TSS	TP	DOP	TN	NO_2+NO_3-N	Ammonia	TKN	Chloride
BE1-F	WY2011	1,301.7	2.1	0.6	12.5	6.2	0.1	6.3	14.5
	WY2012	1,058.4	2.1	0.2	16.3	2.0	0.3	14.3	54.3
BE1-T	WY2011	139.0	3.7	2.3	1,123.7	1,066.9	6.3	56.9	1,155.9
	WY2012	206.6	1.6	0.7	360.0	323.4	2.4	36.7	290.7
BE2-F	WY2011	-	-	-	-	-	-	-	-
	WY2012	1,593.9	1.9	0.1	10.9	0.4	0.7	10.4	43.3
BE2-T	WY2011	318.3	1.6	0.5	142.5	121.9	0.6	20.5	54.1
	WY2012	1,546.0	2.8	0.7	245.0	209.7	1.0	35.3	95.0
CH1-F	WY2011	500.0	7.6	4.0	23.9	3.3	2.8	20.6	24.6
	WY2012	780.8	5.5	2.8	17.6	4.1	1.0	13.5	43.5
GO1-F	WY2011	297.2	4.0	1.2	54.7	3.2	23.3	51.5	30.8
	WY2012	138.2	2.9	2.0	13.2	1.8	2.8	11.5	13.0
RE1-T	WY2012	867.4	2.5	1.0	275.9	244.1	1.4	31.8	296.6
ST1-F	WY2011	11,154.7	24.3	11.7	166.3	74.6	3.5	91.7	136.7
	WY2012	18,765.4	35.2	2.4	308.5	12.7	11.4	295.8	130.7
ST1-T	WY2011	-	-	-	-	-	-	-	-
	WY2012	1,497.3	4.5	1.9	893.1	795.6	2.9	97.6	1,501.6
WR1-F	WY2012	56,570.0	75.0	12.5	408.6	26.1	12.3	382.5	373.8
WR1-T	WY2012	1,098.6	3.6	1.9	215.7	186.1	0.9	29.6	584.7

Table 5: Summary of available DFM Yield data (lbs/acre), October 2010 – September 2012. Note: values in red indicate a partial year of data.

YIELD (lbs/acre)									
Site ID	Water	TSS	TP	DOP	TN	NO_2+NO_3-N	Ammonia	TKN	Chloride
BE1-F	WY2011	91.0	0.1	0.0	0.9	0.4	0.0	0.4	1.0
	WY2012	74.0	0.1	0.0	1.1	0.1	0.0	1.0	3.8
BE1-T	WY2011	5.3	0.1	0.1	42.9	40.7	0.2	2.2	44.1
	WY2012	7.9	0.1	0.0	13.7	12.3	0.1	1.4	11.1
BE2-F	WY2011	-	-	-	-	-	-	-	-
	WY2012	112.2	0.1	0.0	0.8	0.0	0.0	0.7	3.0
BE2-T	WY2011	22.4	0.1	0.0	10.0	8.6	0.0	1.4	3.8
	WY2012	108.9	0.2	0.0	17.3	14.8	0.1	2.5	6.7
CH1-F	WY2011	82.0	1.2	0.7	3.9	0.5	0.5	3.4	4.0
	WY2012	128.0	0.9	0.5	2.9	0.7	0.2	2.2	7.1
GO1-F	WY2011	47.2	0.6	0.2	8.7	0.5	3.7	8.2	4.9
	WY2012	21.9	0.5	0.3	2.1	0.3	0.4	1.8	2.1
RE1-T	WY2012	10.7	0.0	0.0	3.4	3.0	0.0	0.4	3.7
ST1-F	WY2011	395.6	0.9	0.4	5.9	2.6	0.1	3.3	4.8
	WY2012	665.4	1.2	0.1	10.9	0.5	0.4	10.5	4.6
ST1-T	WY2011	-	-	-	-	-	-	-	-
	WY2012	61.9	0.2	0.1	36.9	32.9	0.1	4.0	62.0
WR1-F	WY2012	2,366.9	3.1	0.5	17.1	1.1	0.5	16.0	15.6
WR1-T	WY2012	46.0	0.2	0.1	9.0	7.8	0.0	1.2	24.5

Table 6: Summary of available DFM Flow-weighted Mean Concentration data (mg/L), October 2010 – September 2012. Note: values in red indicate a partial year of data.

Flow-weighted Mean Concentration (mg/L)									
Site ID	Water	TSS	TP	DOP	TN	NO_2+NO_3-N	Ammonia	TKN	Chloride
BE1-F	WY2011	882	1.39	0.43	8.47	4.22	0.09	4.3	9.8
	WY2012	778	1.53	0.16	12.00	1.48	0.25	10.5	39.9
BE1-T	WY2011	2	0.06	0.03	17.07	16.21	0.10	0.9	17.6
	WY2012	10	0.07	0.03	16.95	15.22	0.11	1.7	13.7
BE2-F	WY2011	-	-	-	-	-	-	-	-
	WY2012	789	0.92	0.07	5.37	0.22	0.35	5.2	21.4
BE2-T	WY2011	44	0.21	0.06	19.69	16.85	0.08	2.8	7.5
	WY2012	283	0.51	0.13	44.88	38.41	0.19	6.5	17.4
CH1-F	WY2011	86	1.31	0.68	4.12	0.56	0.49	3.6	4.2
	WY2012	248	1.74	0.90	5.59	1.31	0.32	4.3	13.8
GO1-F	WY2011	48	0.65	0.20	8.88	0.52	3.78	8.4	5.0
	WY2012	57	1.18	0.81	5.42	0.72	1.15	4.7	5.3
RE1-T	WY2012	53	0.15	0.06	16.74	14.81	0.08	1.9	18.0
ST1-F	WY2011	427	0.93	0.45	6.36	2.85	0.13	3.5	5.2
	WY2012	3,620	6.80	0.47	59.51	2.45	2.20	57.1	25.2
ST1-T	WY2011	-	-	-	-	-	-	-	-
	WY2012	57	0.17	0.07	33.81	30.12	0.11	3.7	56.8
WR1-F	WY2012	2,129	2.82	0.47	15.38	0.98	0.46	14.4	14.1
WR1-T	WY2012	105	0.35	0.18	20.56	17.74	0.09	2.8	55.7

4.1 BE1

4.1.1 Farm Overview

BE1 is a swine finishing and grain (corn/soybean) operation located in Blue Earth County, south of Mankato, Minnesota. Located in the Western Corn Belt Plains eco-region, the landscape is relatively flat in the upland with steeper slopes near the rivers that drain into the Minnesota River valley. The farm is located in the Big Cobb River Watershed, a tributary to the Le Sueur River Watershed and is within the Minnesota River Basin.

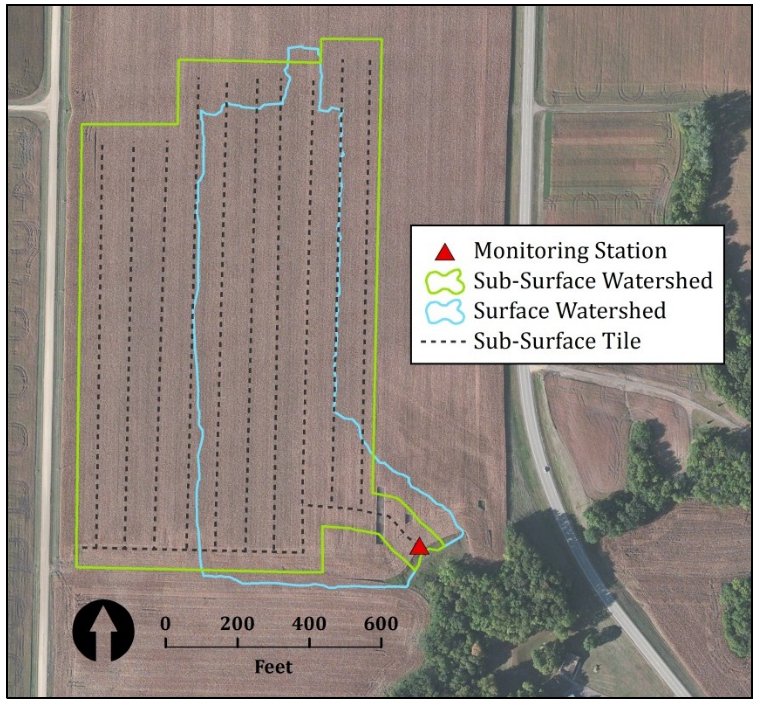

Figure 11: BE1 map of monitored subsurface and surface runoff watersheds.

The site selected for monitoring (Figure 11) provides an edge-of-field surface and subsurface runoff evaluation in a corn-soybean crop rotation, conventional tillage, with liquid swine manure application. The monitored area for the surface and subsurface tile drainage is 14.3 and 26.2 acres, respectively. The subsurface tile watershed has pattern tile at 80 foot spacing, with no open intakes. The monitored field has poorly drained silty clay loam soils and an average slope of approximately 1.5 percent. Swine manure was injected in fall 2010 (no manure was applied in WY2012), tillage occurred just prior to planting soybeans in May 2012, and soybeans were harvested in September 2012.

BE1 was adopted by DFM in spring 2011 following the conclusion of a tile drainage study (2008-2010) conducted by the Water Resources Center at Minnesota State University, Mankato. Results from the Water Resources Center tile drainage study can be found online at http://mrbdc.mnsu.edu/sites/mrbdc.mnsu.edu/files/public/org/tile/index.html.

The surface runoff and subsurface tile were monitored during the entire WY2012. Modifications were made to the instrumentation setup in November 2011 to match the configuration at the other DFM monitoring stations. These modifications included the reinstallation of the flume with a new wingwall and earthen berm. (Figure 12 and Figure 13) In addition, several instruments were added at the site including; a new shelter, FTS Axiom H2 datalogger, FTS temp/humidity probe, FTS tipping bucket rain gage, Verizon cellular modem, STX soil temperature probe, Campbell Scientific soil moisture probe, OTT cbs bubbler, APG ultrasonic transducer, 15 watt solar panel (later replaced with a 60 watt panel), manual rain gage and Wingscapes time lapse camera. The subsurface tile monitoring configuration remained the same as that used in WY2011 (ISCO 750 area velocity probe inserted into the tile outlet with a spring clamp). No Agri Drain structure was installed at the site due to the depth of the tile and the presence of an existing drop structure that allowed for tile access.

Figure 12: Flume/wingwall configuration prior to November 2, 2011.

Figure 13: Flume/wingwall configuration, installed November 2, 2011.

4.1.2 BE1 Precipitation

- Total measured precipitation for WY2012 was 22.55 inches, which was 9.75 inches below the 30-year normal (1981-2010) of 32.30 inches.
- All winter months except for February were at or below normal precipitation, resulting in a minimal snowpack.
- The only month with significantly above average precipitation was May, with 8.68 inches as compared with the normal of 3.45 inches.
- June through September was very dry, with a combined deficit of 12.27 inches below normal.
- The largest precipitation events were on February 28, with 1.54 inches and May 26, with 1.52 inches.

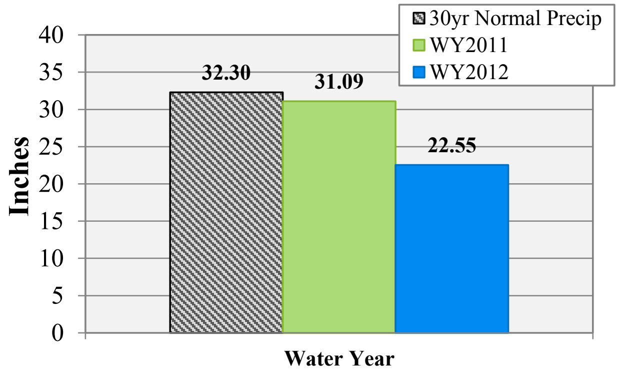

Figure 14: BE1 annual water year observed precipitation versus the 30-year normal precipitation.

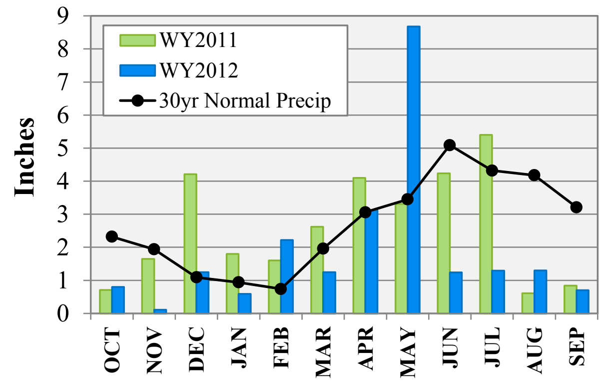

Figure 15: BE1 monthly observed precipitation versus the 30-year normal precipitation.

4.1.3 BE1 Runoff

Subsurface Tile Drainage:

- The total subsurface tile drainage was 3.58 inches for WY2012.
- Greater than 99 percent of the subsurface drainage occurred during "non-frozen" conditions.
- Six precipitation-driven runoff events occurred all in the month of May which totaled 1.92 inches (54 percent) of the annual runoff for WY2012.
- Base flow accounted for 1.65 inches of runoff (46 percent), and a very minor amount of snowmelt or frozen soil runoff (<0.00 inches, <0 percent) occurred from February 28 to March 2 following a rain on frozen soil event.
- The largest runoff event occurred on May 26 when 1.52 inches of rain in less than two hours resulted in 0.67 inches of runoff (19 percent).
- The subsurface tile stopped flowing on August 24, and did not flow again for the remainder of WY2012.
- Subsurface tile drainage occurred for a combined total of 118.9 days and flow was present on 123 out of the 365 days monitored.
- The subsurface tile drainage to precipitation ratio was 16 percent.

Surface Runoff:

- The total surface runoff was 0.42 inches for WY2012.
- 93 percent of the surface runoff occurred on "non-frozen" soil.
- Seven precipitation-driven runoff events occurred; one at the end of February following rain over frozen soil and the rest were in May. No runoff occurred after May 31, 2012.
- The largest single runoff event was on May 26 when 1.52 inches of precipitation in less than two hours resulted in 0.26 inches of runoff (62 percent).
- Surface runoff occurred for a combined total of 6.4 days. Runoff was present during 13 of the 365 days monitored.
- The surface runoff to precipitation ratio was two percent.

IMPORTANT: WY2011 subsurface tile data represents a partial year (March 1 – September 30, 2011, seven months). WY2011 surface data also represents only a partial year (June 1 – September 30, 2011, four months). WY2012 data for the subsurface tile and surface is complete (October 1, 2011 – September 30, 2012).

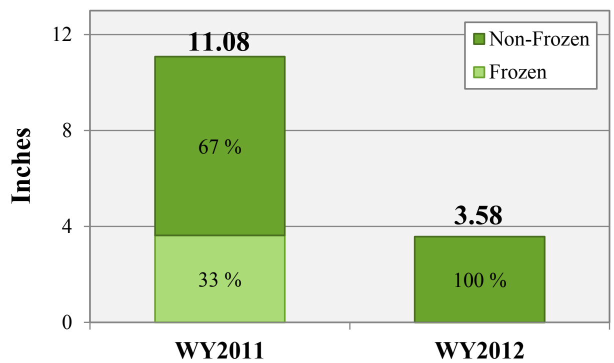

Figure 16: BE1 subsurface tile frozen versus non-frozen annual runoff.

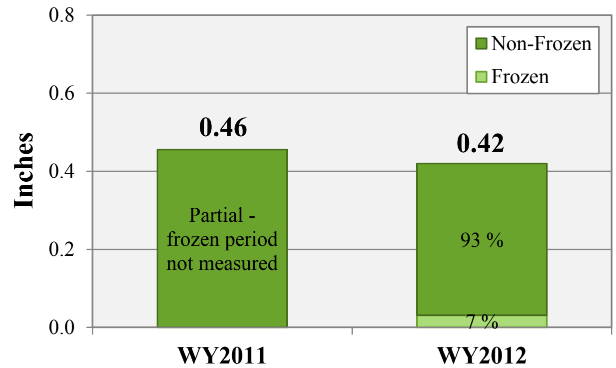

Figure 17: BE1 surface frozen versus non-frozen annual runoff.

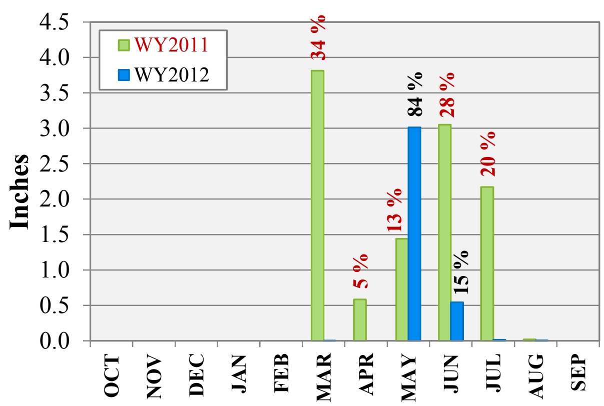

Figure 18: BE1 subsurface tile monthly runoff.

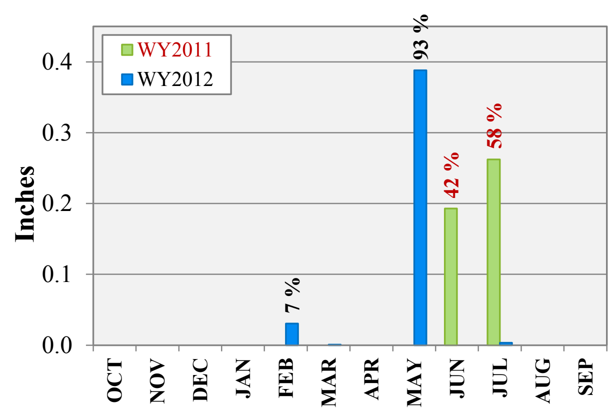

Figure 19: BE1 surface monthly runoff.

4.1.4 BE1 Loads, Yields and Flow-weighted Mean Concentrations

Subsurface Tile:

- Twelve subsurface tile samples were collected in WY2012.
- Greater than 99 percent of all constituent loading occurred during non-frozen soil conditions.
- 56 percent of the TP load was in the particulate form.
- The TN breakdown was 10 percent organic, less than one percent NH_3 and 90 percent NO_2+NO_3-N.
- Base flow accounted for 46 percent of the total subsurface tile runoff and 33, 23 and 48 percent of the TSS, TP and TN loads, respectively.

- The largest subsurface tile loading event occurred on May 26 and accounted for 19 percent of the total runoff and 35, 29 and 17 percent of the TSS, TP, and TN loads, respectively.

Surface Runoff:

- Six surface samples were collected in WY2012.
- Loading from surface runoff over "non-frozen" soil accounted for between 98-99 percent of the TSS, TP and TN loads.
- 90 percent of the surface TP load was in the particulate form.
- The TN breakdown was 86 percent organic, two percent NH_3 and 12 percent NO_2+NO_3-N.
- The largest surface loading event occurred on May 26 and accounted for 62 percent of the total runoff and 68, 80 and 80 percent of the TSS, TP and TN loads, respectively.

IMPORTANT: WY2011 subsurface tile data represents a partial year (March 1 – September 30, 2011, seven months). WY2011 surface data also represents only a partial year (June 1 – September 30, 2011, four months). WY2012 data for the subsurface tile and surface is complete (October 1, 2011 – September 30, 2012).

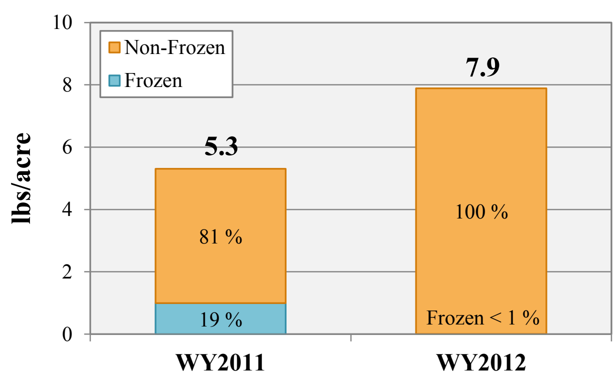

Figure 20: BE1 subsurface tile TSS yield.

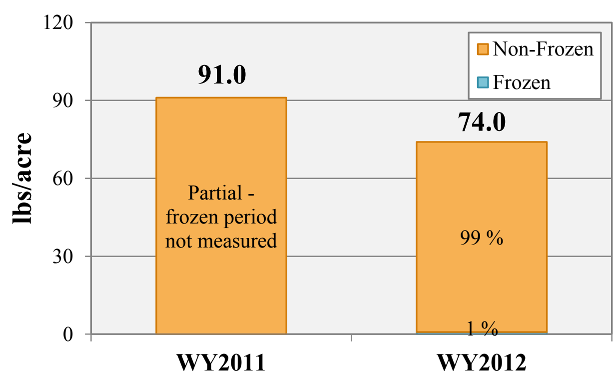

Figure 21: BE1 surface TSS yield.

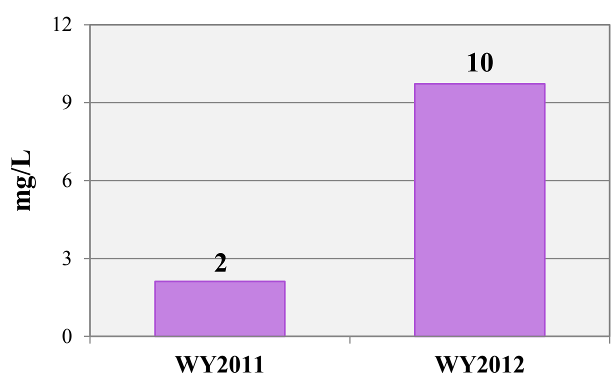

Figure 22: BE1 subsurface tile TSS FWMC.

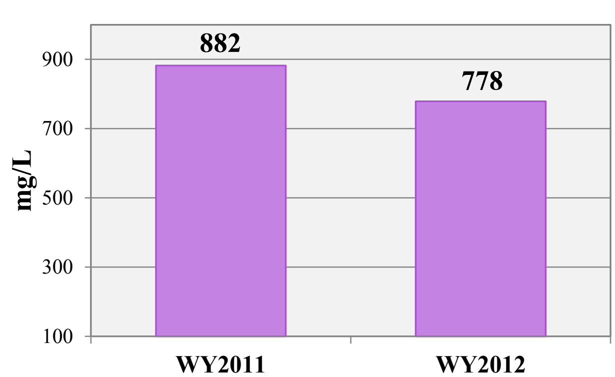

Figure 23: BE1 surface TSS FWMC.

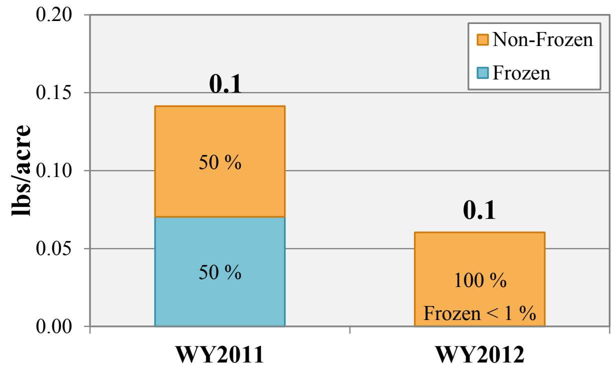

Figure 24: BE1 subsurface tile TP yield.

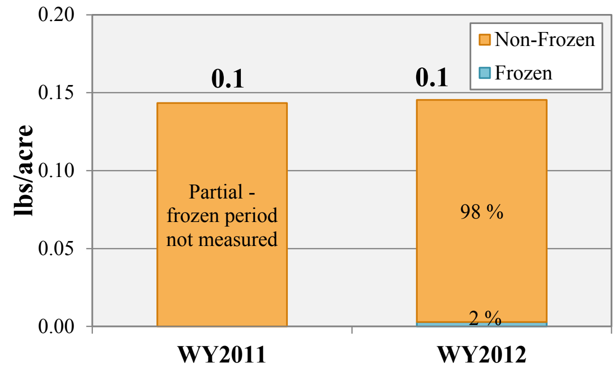

Figure 25: BE1 surface TP yield.

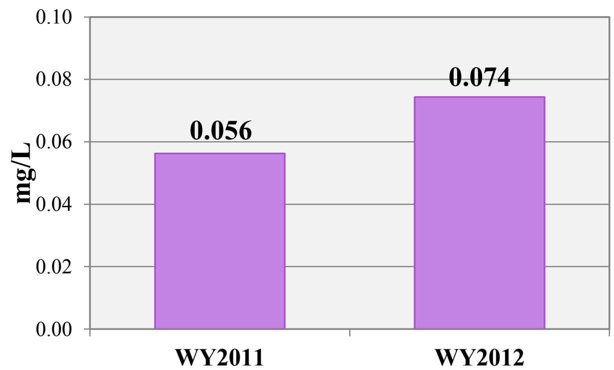

Figure 26: BE1 subsurface tile TP FWMC.

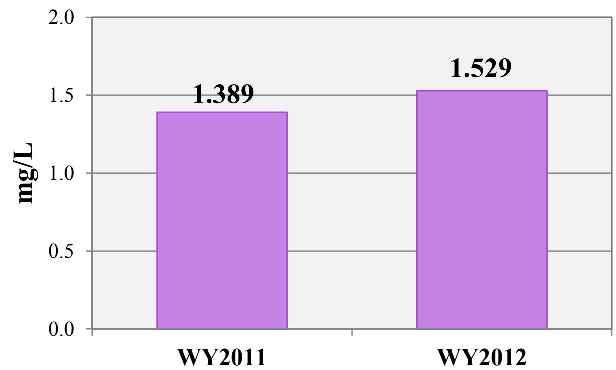

Figure 27: BE1 surface TP FWMC.

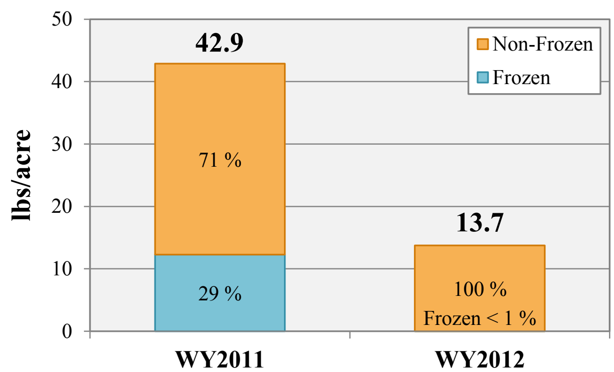

Figure 28: BE1 subsurface tile TN yield.

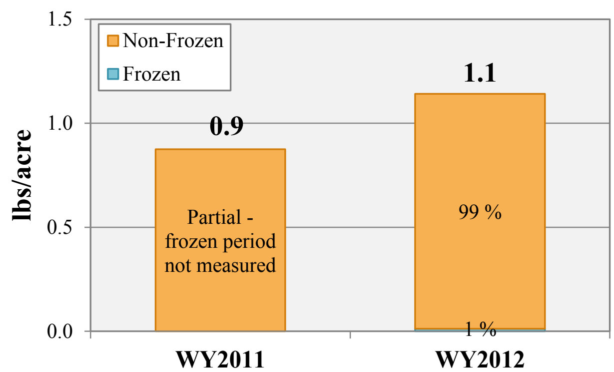

Figure 29: BE1 surface TN yield.

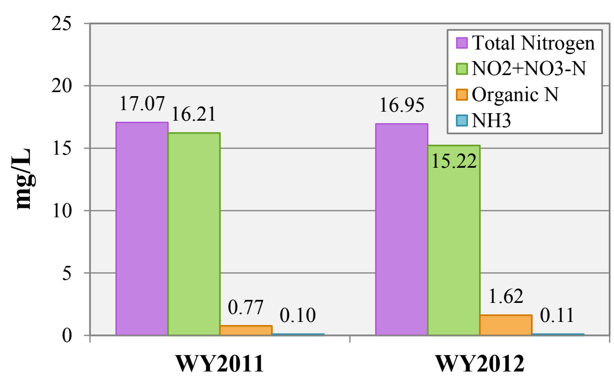

Figure 30: BE1 subsurface tile nitrogen FWMCs.

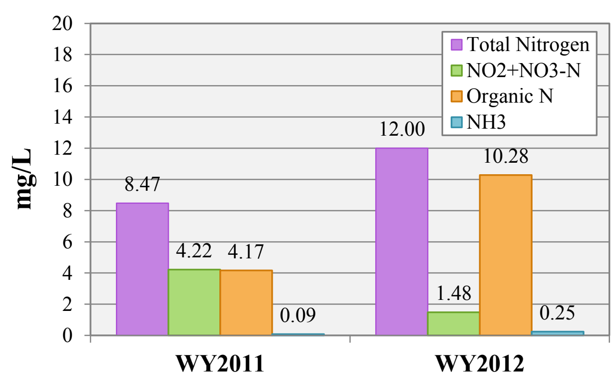

Figure 31: BE1 surface nitrogen FWMCs.

4.2 BE2

4.2.1 Farm Overview

BE2 is a grain operation located in Blue Earth County, near St. Clair, Minnesota. Located in the Western Corn Belt Plains eco-region, the farm is surrounded by a flat to rolling landscape. Runoff from BE2 drains directly to an adjacent county ditch. The farm is located in the Le Sueur River Watershed.

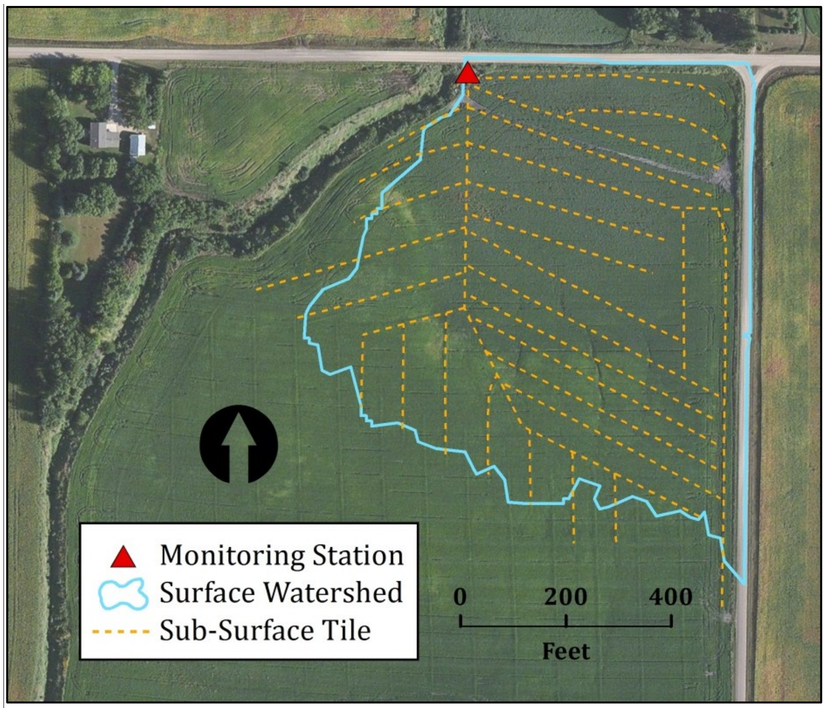

Figure 32: BE2 monitored area showing surface and subsurface tile contributing areas.

The site selected for monitoring (Figure 32) provides an edge-of-field surface and subsurface runoff evaluation of a 14.2 acre field in a corn-soybean crop rotation with conventional tillage. The monitored field has poorly drained muck and clay loam soils and an average slope of approximately six percent. The field was disked in fall of 2010, field cultivation occurred shortly prior to planting soybeans in May 2011, and soybeans were harvested in October 2011. In WY2012, field cultivation occurred prior to planting soybean in May, and soybean was harvested in October.

Subsurface tile drainage and surface runoff were monitored using the same equipment configurations as in WY2011.

The DFM steering committee elected to discontinue BE2 after WY2012 due to concerns of surface runoff from a neighboring field spilling into the BE2 watershed during large precipitation events. One of these large events resulted in flooding of the flume and monitoring station area (Figure 26) in July 2011, which resulted in inaccurate flow measurements and contaminated data. While there was no contamination from the neighboring field or flooding of the station in WY2012, there were also no major runoff events due to the dry conditions.

Figure 33: BE2 flooded monitoring station, July 15, 2011.

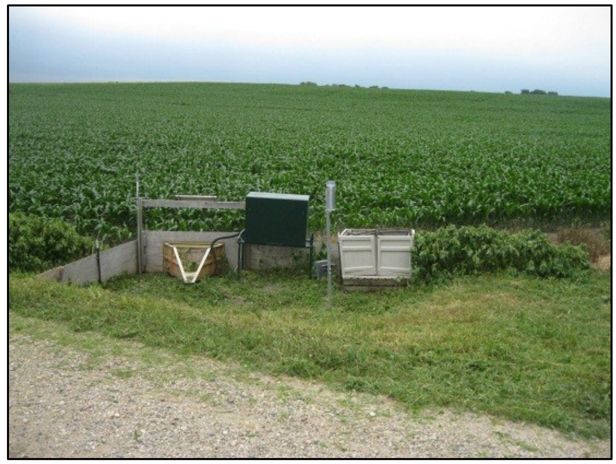

Figure 34: BE2 field and monitoring station, June 8, 2012.

4.2.2 BE2 Precipitation

- The electronic rain gage at the station operated intermittently, so precipitation data was taken from North Mankato, MN (#216008) for the months of November through March and from a nearby volunteer SWCD rain gage (7 107N 25W 5 SWCD), located two miles from the site for the rest of the year.
- Total measured precipitation for WY2012 was 22.51 inches, which was 9.79 inches below the 30-year normal (1981-2010) of 32.30 inches.
- All winter months except for February were at or below normal precipitation, resulting in a minimal snowpack.
- The only month with significantly above average precipitation was May, with 6.76 inches as compared with the normal of 3.45 inches.
- The months of June through September were very dry, with a combined deficit of 10.79 inches below normal.

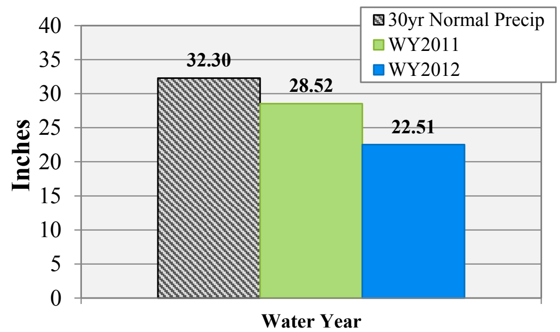

Figure 35: BE2 annual observed precipitation versus the 30-year normal precipitation.

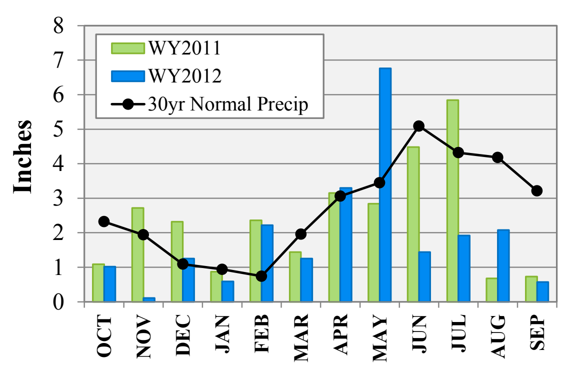

Figure 36: BE2 monthly observed precipitation versus the 30-year normal precipitation.

4.2.3 BE2 Runoff

Subsurface Tile Drainage:

- The total subsurface tile drainage was 1.70 inches for WY2012.
- 76 percent of the runoff occurred during the "non-frozen" soil period.
- Seven precipitation-driven runoff events occurred in May, totaling 1.29 inches (76 percent) of the annual runoff for WY2012.
- Base flow accounted for 0.41 inches of runoff (24 percent).
- The largest runoff event was on February 28-29 when 1.99 inches of rain fell on frozen soil which resulted in 0.41 inches of subsurface tile drainage (24 percent).
- The subsurface tile had no flow from October 1, 2011 to February 28, 2012, March 1 to April 15, 2012 and from July 9 to September 30, 2012.
- Subsurface tile drainage occurred for a combined total of 75.0 days and runoff was present on 90 out of the 365 days monitored.
- The subsurface tile drainage to precipitation ratio was eight percent.

Surface Runoff:

- The total surface runoff was 0.63 inches for WY2012.
- 33 percent of the surface runoff occurred on "non-frozen" soil.
- Four precipitation-driven runoff events occurred; one at the end of February following rain on frozen soil and the rest were in May. No runoff occurred after May 26, 2012.
- The largest surface runoff event occurred on February 28-29, when 1.99 inches of precipitation fell on frozen soil and produced 0.42 inches of surface runoff (67 percent).
- Surface runoff occurred for a combined total of 1.2 days and runoff was present on five of the 365 days monitored.
- The surface runoff to precipitation ratio was three percent.

IMPORTANT: WY2011 subsurface tile data represents a partial year (July 8 – September 30, 2011, about 2.7 months). WY2011 surface data is not available due to flooding in the lower portion of the field during the only measured event. WY2012 data for the subsurface tile and surface is complete (October 1, 2011 – September 30, 2012).

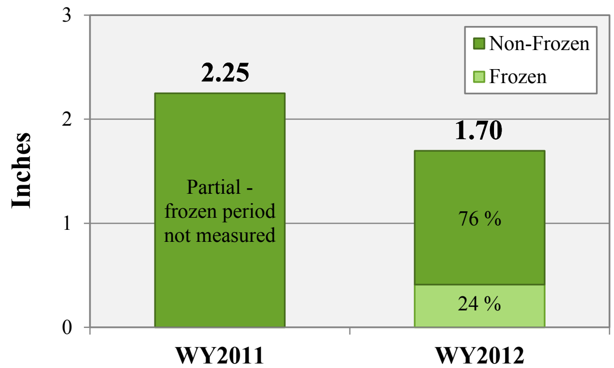

Figure 37: BE2 subsurface tile frozen versus non-frozen annual runoff.

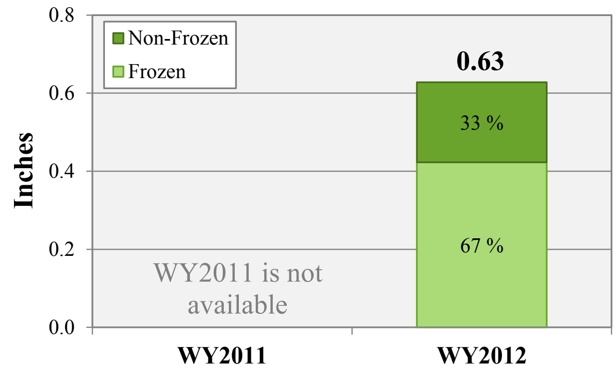

Figure 38: BE2 surface frozen versus non-frozen annual runoff.

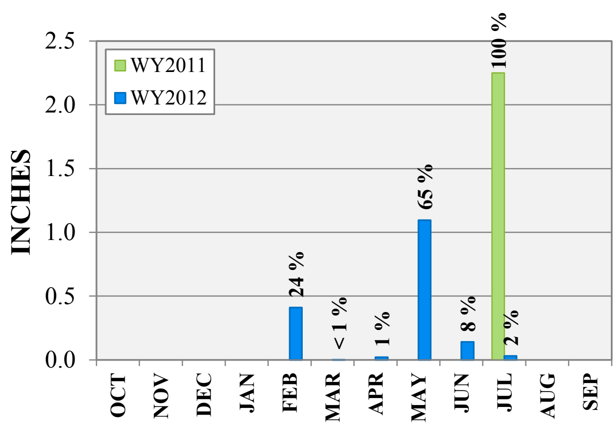

Figure 39: BE2 subsurface tile monthly runoff.

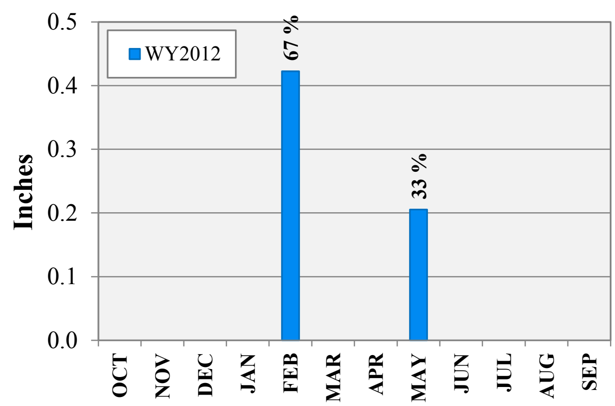

Figure 40: BE2 surface monthly runoff.

4.2.4 BE2 Loads, Yields and Flow-weighted Mean Concentrations

Subsurface Tile:

- Six subsurface tile samples were collected in WY2012, with seven defined runoff events.
- The percentage of loading from "non-frozen" soil conditions was 85, 66, and 88 percent for TSS, TP and TN, respectively.
- 75 percent of the TP load was in the particulate form.
- The TN breakdown was 14 percent organic, less than one percent NH_3 and 86 percent NO_2+NO_3-N.

- Base flow accounted for 24 percent of the total subsurface tile runoff and three, eight and 26 percent of the TSS, TP and TN loads, respectively.
- The largest subsurface tile loading event occurred on May 26 and accounted for 19 percent of the total runoff and 35, 29 and 17 percent of the TSS, TP, and TN loads, respectively.
- The February 28 event had the highest TP losses (34 percent), and base flow saw the highest TN losses (26 percent) for WY2012.

Surface Runoff:

- Two surface samples were collected in WY2012, with four defined surface runoff events.
- The largest surface runoff event, on February 28, was not sampled due to a frozen sampler line. This event represented two-thirds of the WY2012 runoff. Thus, surface runoff loads and yields for WY2012 are significantly underestimated and percentages presented only account for available data. Frozen versus non-frozen load percentages cannot be calculated.
- 92 percent of the surface TP load was in the particulate form.
- The TN breakdown was 90 percent organic, six percent NH_3 and four percent NO_2+NO_3-N.
- The largest surface loading event for TSS occurred on May 5 and resulted in a loss of 49 percent of the TSS load.

IMPORTANT: WY2011 subsurface tile data represents a partial year (July 8 – September 30, 2011, about 2.7 months). WY2011 surface data is not available due to flooding in the lower portion of the field during the only measured event. WY2012 data for the subsurface tile and surface is complete (October 1, 2011 – September 30, 2012).

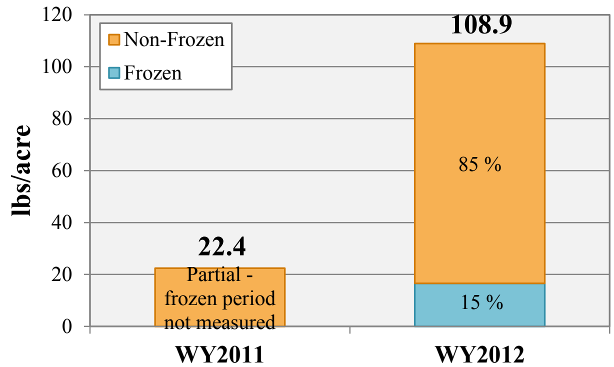

Figure 41: BE2 subsurface tile TSS yield.

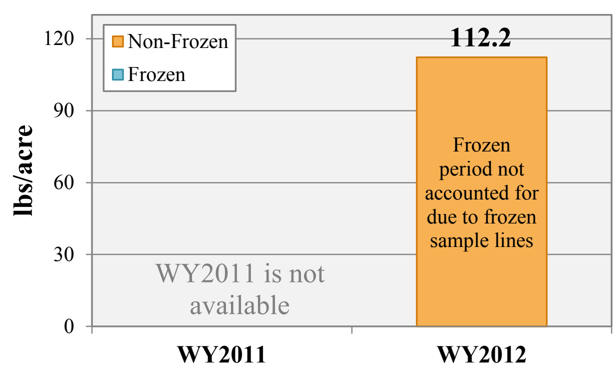

Figure 42: BE2 surface TSS yield.

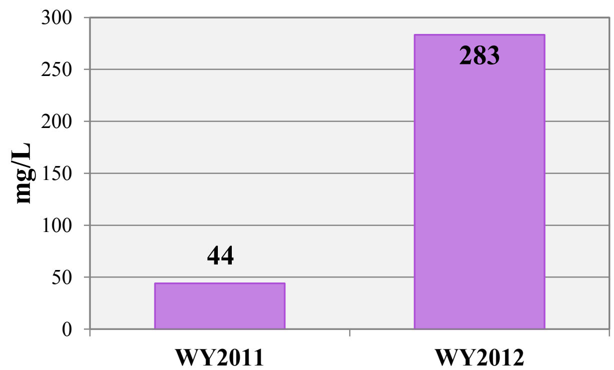

Figure 43: BE2 subsurface tile TSS FWMC.

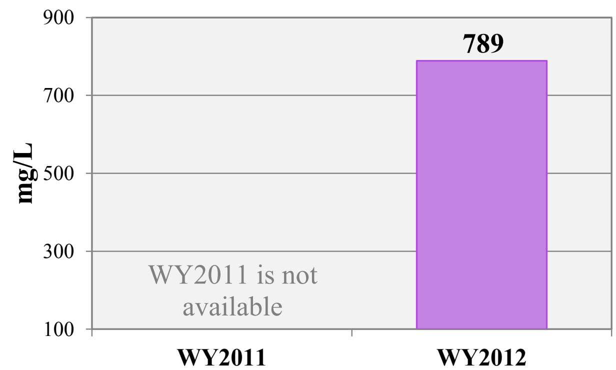

Figure 44: BE2 surface TSS FWMC.

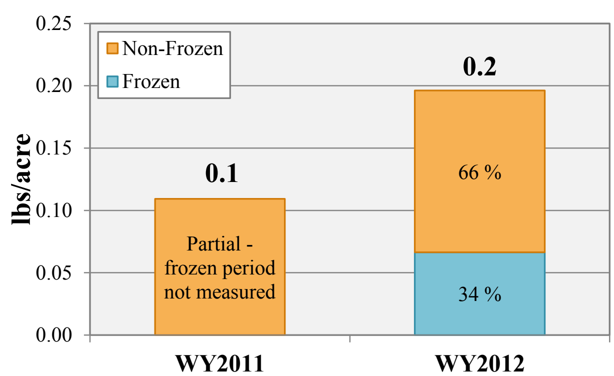

Figure 45: BE2 subsurface tile TP yield.

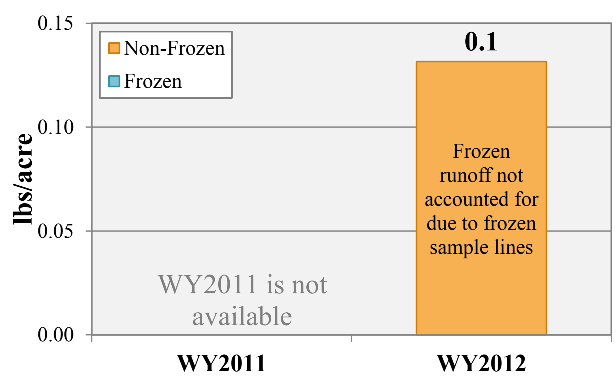

Figure 46: BE2 surface TP yield.

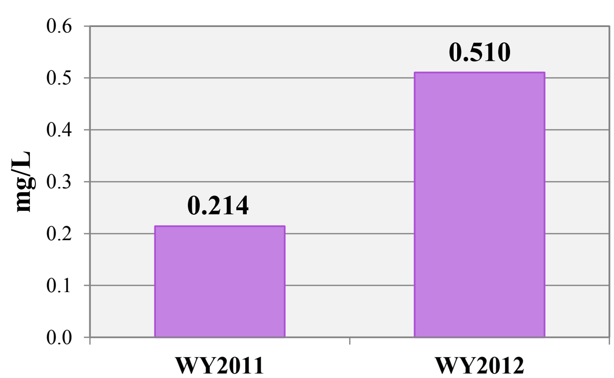

Figure 47: BE2 subsurface tile TP FWMC.

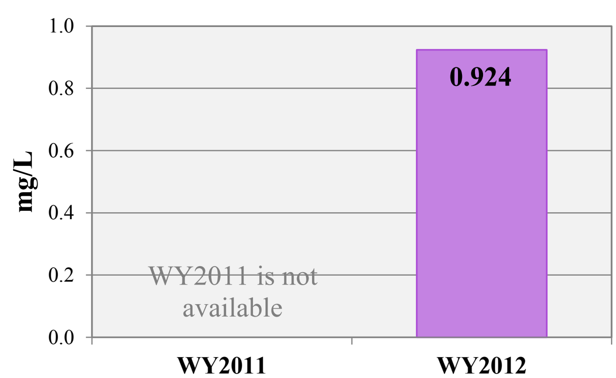

Figure 48: BE2 surface TP FWMC.

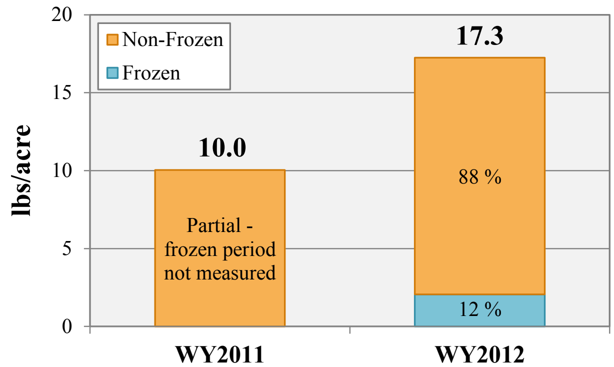

Figure 49: BE2 subsurface tile TN yield.

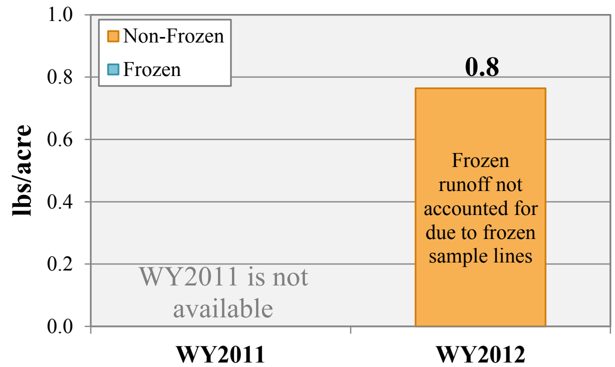

Figure 50: BE2 surface TN yield.

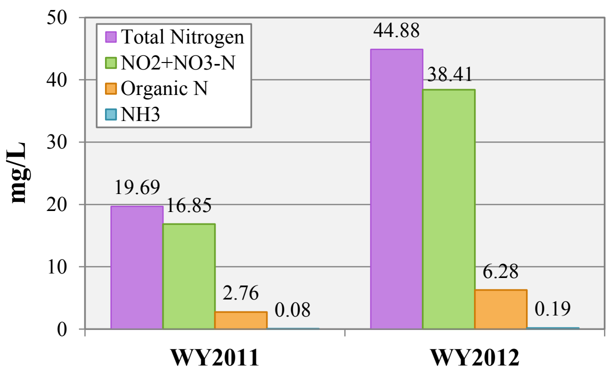

Figure 51: BE2 subsurface tile nitrogen FWMCs.

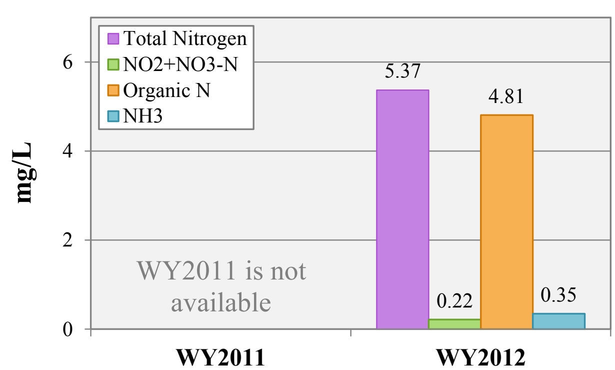

Figure 52: BE2 surface nitrogen FWMCs.

4.3 CH1

4.3.1 Farm Overview

CH1 is located in Chisago County east of North Branch, Minnesota and is a grain operation producing mostly corn and soybeans with a small amount of vegetables that are sold locally. The farm has been operated by the same family since the mid-1970s. Approximately 700 acres of corn and 700 acres of soybeans are grown each season utilizing a reduced-till planting system. Located in the North Central Hardwoods Forest eco-region, the landscape is dominated by rolling plains with a mix of woodlands, row crops and pastures. The farm is situated within the Sunrise River Watershed which is located within the St. Croix River Basin.

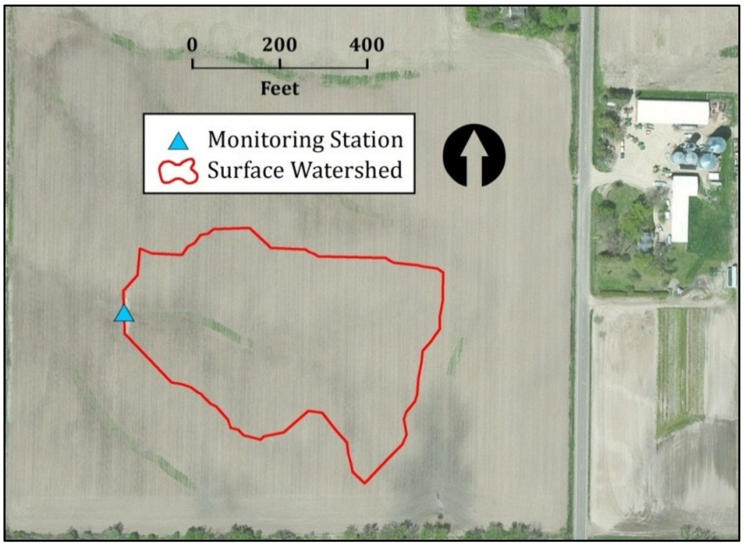

Figure 53: CH1 surface watershed boundary.

Figure 54: CH1 monitoring station, January 11, 2012.

Figure 55: CH1 flume during small runoff event, May 24, 2012.

The 6.1 acre watershed selected for monitoring is in a corn-soybean rotation and a modified no-till management system (Figure 53). Subsurface tile drainage does not exist within this field; therefore, only surface runoff is being monitored. The flume and equipment were installed (spring 2010) on the downstream edge of a grassed waterway. Soil within the monitored watershed is classified as a well-drained Cushing loam. Corn was planted for the 2011 monitoring season. Banded applications of phosphorus and potassium occurred prior to planting and split applications of nitrogen and sulfur occurred after planting. In WY2012, soybeans were planted in May and harvested in October.

4.3.2 CH1 Precipitation

- Total measured precipitation for WY2012 was 22.34 inches, which was 10.15 inches below the 30-year normal (1981-2010) of 32.49 inches.
- Most winter months were at or below normal precipitation, resulting in a minimal snowpack.
- Snow depth at nearby Wild River State Park during the only period of snowmelt runoff (March 6 through 11) was in the range of two to five inches.
- The only month with significant above average precipitation was May, with 7.50 inches as compared with the normal of 3.60 inches.
- The largest single precipitation event of WY2012 was 1.79 inches on May 24.

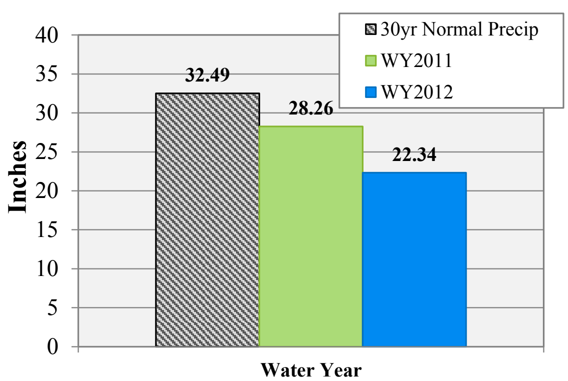

Figure 56: CH1 annual water year observed precipitation versus the 30-year normal precipitation.

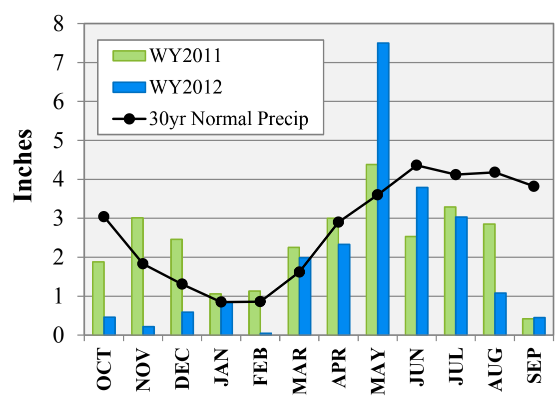

Figure 57: CH1 monthly observed precipitation versus the 30-year normal precipitation.

4.3.3 CH1 Runoff

- Total surface runoff for WY2012 was 2.28 inches.
- 43 percent of the annual runoff was during the “frozen” soil period (March 7, 8, 10 and 11).
- From May 1 through July 18 there were 13 surface runoff events.

- The majority of runoff occurred during three events: May 23 with 0.64 inches (28 percent), May 27 with 0.20 inches (nine percent) and June 17 with 0.30 inches (13 percent).
- The remaining ten events accounted for 0.16 inches runoff. No runoff occurred after July 18, 2012.
- Surface runoff occurred for a combined total of 10.4 days and runoff was present on 24 of the 365 days monitored.
- The surface runoff to precipitation ratio was 10 percent.

IMPORTANT: WY2011 data represents a partial year (March 1 – September 30, 2011, seven months). WY2012 data is complete (October 1, 2011 – September 30, 2012).

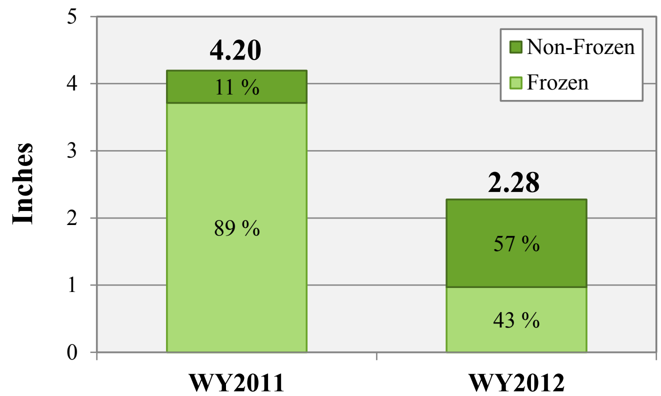

Figure 58: CH1 frozen versus non-frozen annual runoff.

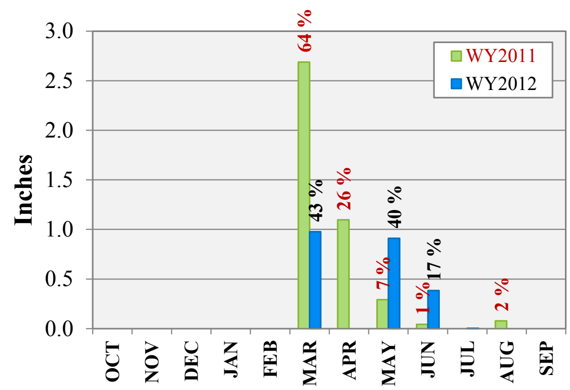

Figure 59: CH1 monthly runoff.

4.3.4 CH1 Loads, Yields and Flow-weighted Mean Concentrations

- Twelve surface runoff samples were collected in WY2012.
- The "frozen" soil period in early March accounted for three, 44 and 62 percent of the TSS, TP and TN loads, respectively.
- 48 percent of the TP load was in the particulate form.
- The TN breakdown was 71 percent organic, six percent NH_3 and 23 percent NO_2+NO_3-N.
- The May 23 event accounted for 28 percent of the runoff and 29, 30 and 16 percent of the TSS, TP and TN loads, respectively.

IMPORTANT: WY2011 data represents a partial year (March 1 – September 30, 2011, seven months). WY2012 data is complete (October 1, 2011 – September 30, 2012).

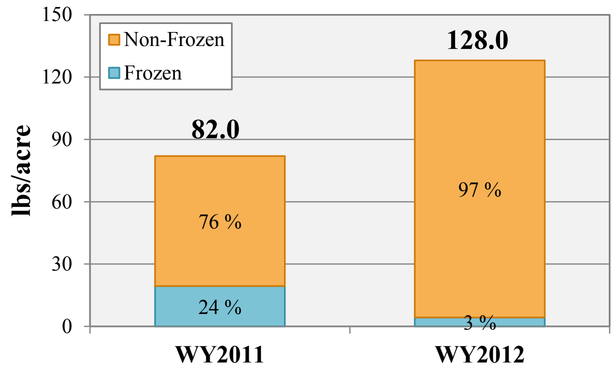

Figure 60: CH1 surface TSS yield.

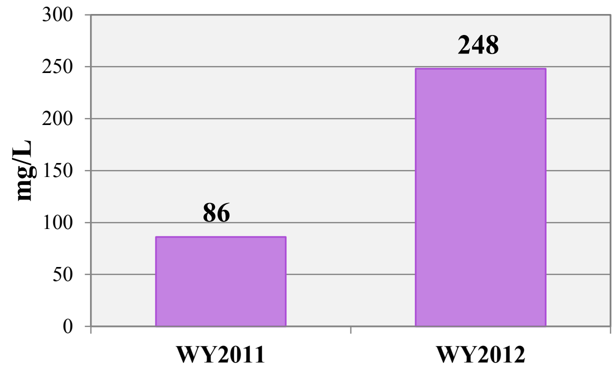

Figure 61: CH1 surface TSS FWMC.

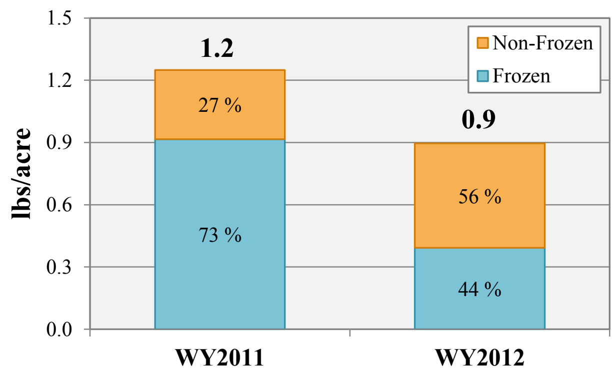

Figure 62: CH1 surface TP yield.

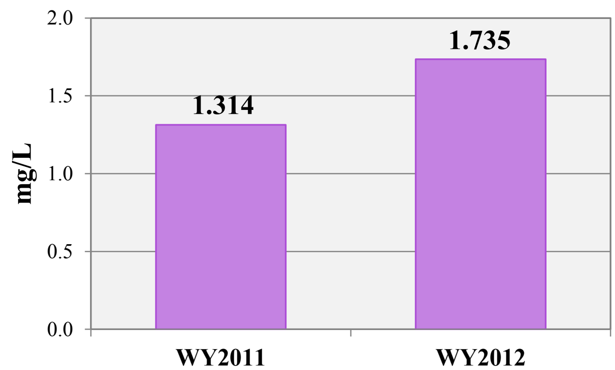

Figure 63: CH1 surface TP FWMC.

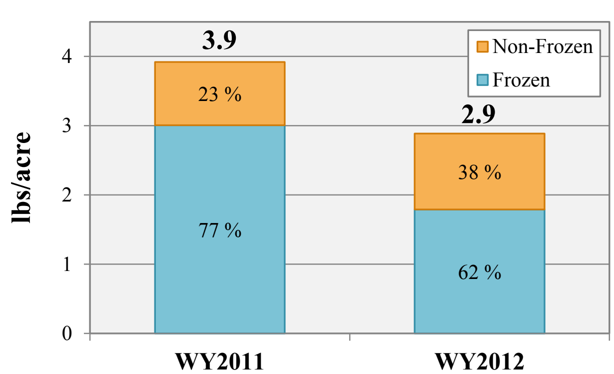

Figure 64: CH1 surface TN yield.

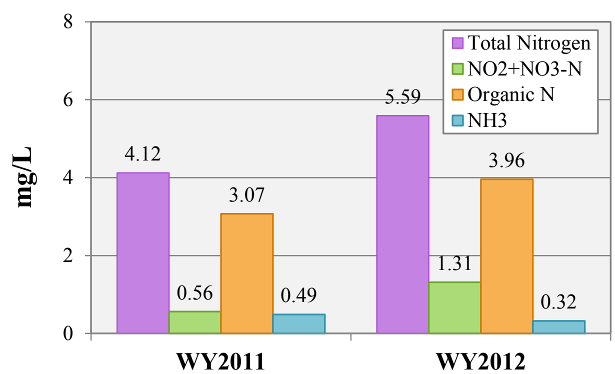

Figure 65: CH1 surface nitrogen FWMCs.

4.4 GO1

4.4.1 Farm Overview

GO1 is a beef cow-calf and swine farrow-to-wean livestock operation located in Goodhue County, near Goodhue, Minnesota. The farm manages approximately 190 acres of crops with the typical crop rotation consisting of three years of alfalfa followed by two years of corn.

The farm is located in the southeastern non-glaciated eco-region of Minnesota. The region is characterized by broad, rolling ridges and narrow valleys cut by one of the regions numerous rivers and streams. The farm is located on the upper portion of the Wells Creek Watershed, approximately 12 miles from Lake Pepin and the Mississippi River.

The site selected for monitoring (Figure 66 through Figure 68) provides edge-of-field surface runoff evaluation of a 6.3 acre watershed with an alfalfa-corn rotation and swine manure application. The monitored field has well-drained silt loam soils and an average slope of 6.7 percent. In WY2011, the field was in the second year of alfalfa, with three cuttings of hay and no manure application. In WY2012 the field entered into a third consecutive year of alfalfa.

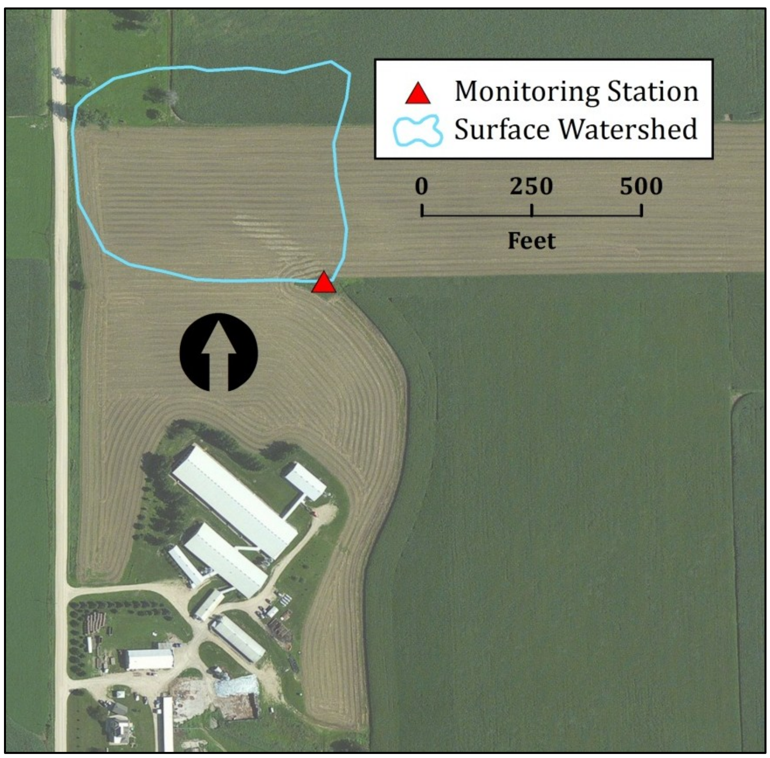

Figure 66: GO1 6.3 acre surface watershed.

Figure 67: GO1 monitoring location during runoff, February 29, 2012.

Figure 68: GO1 monitoring station, February 7, 2012.

GO1 was instrumented in the fall of 2010. The equipment configuration remained the same as in WY2011. GO1 is the only site with two complete years of data.

4.4.2 GO1 Precipitation

- Total measured precipitation for WY2012 was 28.09 inches, which was 5.34 inches below the 30-year normal (1981-2010) of 33.43 inches.
- All months, except for February and June, were less than the 30-year normal for precipitation.
- Five months, October through January, and September, had less than one inch precipitation.
- June was the wettest month with 9.61 inches, as compared with the normal of 4.34 inches.
- The largest precipitation event occurred on June 14 when 4.44 inches fell in 4.5 hours.

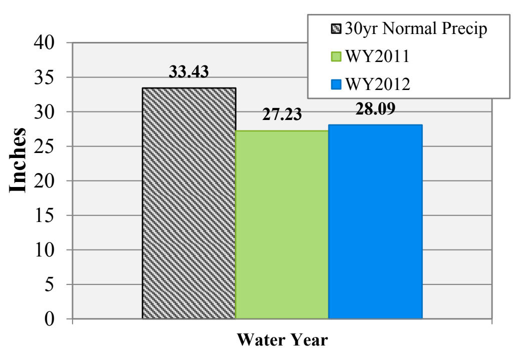

Figure 69: GO1 annual precipitation versus the 30-year normal precipitation.

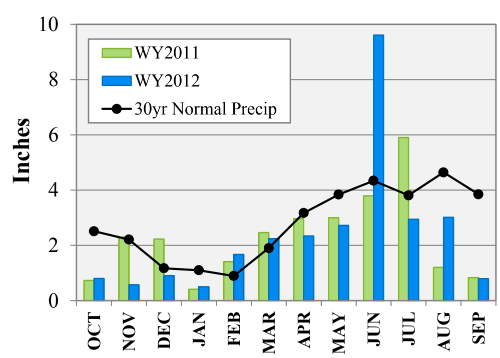

Figure 70: GO1 observed monthly precipitation total versus the 30-year normal precipitation.

4.4.3 GO1 Runoff

- Total surface runoff for WY2012 was 1.71 inches.
- 79 percent of the annual runoff was during the “frozen” soil period. Ten small runoff events over frozen soil occurred from January 31 to February 22 (combined total of less than 10 percent).
- The largest event occurred following a rain over frozen soil event February 28 that accounted for 58 percent of the total runoff for the year, followed by two smaller events on March 1 (10 percent) and March 2 (one percent).
- No runoff occurred during the entire month of May, which was the highest precipitation month for every other Discovery Farm in WY2012.
- Three runoff events occurred in the month of June: June 14 (12 percent), June 17 (seven percent) and June 20 (two percent). No runoff occurred after July 20, 2012.
- Surface runoff occurred for a combined total of 5.9 days and runoff was present on 17 of the 365 days monitored.
- The surface runoff to precipitation ratio was six percent.

IMPORTANT: WY2011 and WY2012 data represent complete water years (WY2011: October 1, 2010 – September 30, 2011, WY2012: October 1, 2011 – September 30, 2012).

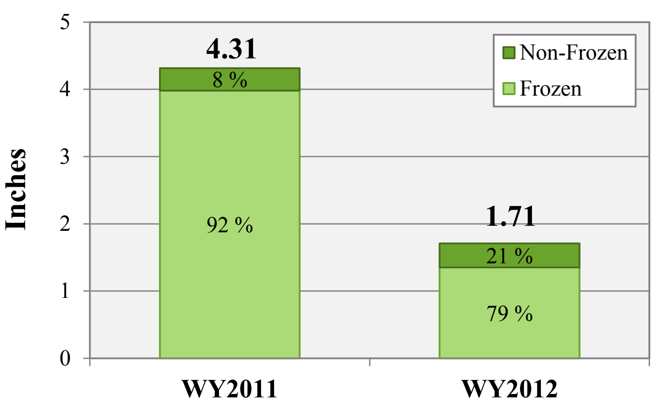

Figure 71: GO1 surface frozen versus non-frozen annual runoff.

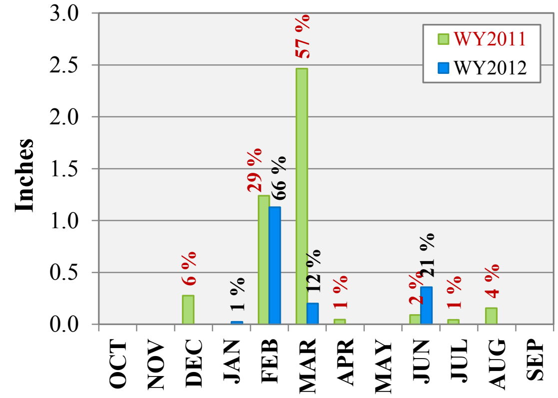

Figure 72: GO1 monthly runoff.

4.4.4 GO1 Loads, Yields, Flow-weighted Mean Concentrations

- Twelve surface runoff samples were collected in WY2012.
- Runoff over “frozen” soil accounted for 31, 85 and 90 percent of the TSS, TP and TN loads, respectively.
- 31 percent of the TP load was in the particulate form.
- The TN breakdown was 66 percent organic, 21 percent NH_3 and 13 percent NO_2+NO_3-N.
- The February 28 event accounted for 58 percent of the runoff and 12, 59 and 65 percent of the TSS, TP and TN loads, respectively.

- The June 14 and 17 events combined accounted for 67 percent of the TSS load, but only 19 percent of the runoff.

IMPORTANT: WY2011 and WY2012 data represent complete water years (WY2011: October 1, 2010 – September 30, 2011, WY2012: October 1, 2011 – September 30, 2012).

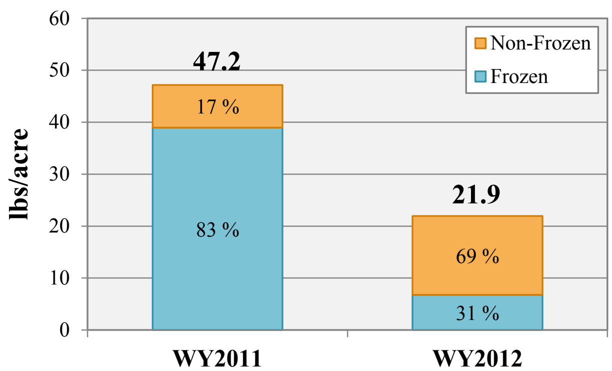

Figure 73: GO1 surface TSS yield.

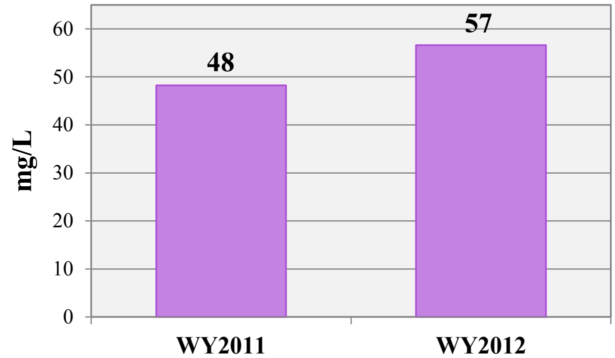

Figure 74: GO1 surface TSS FWMC.

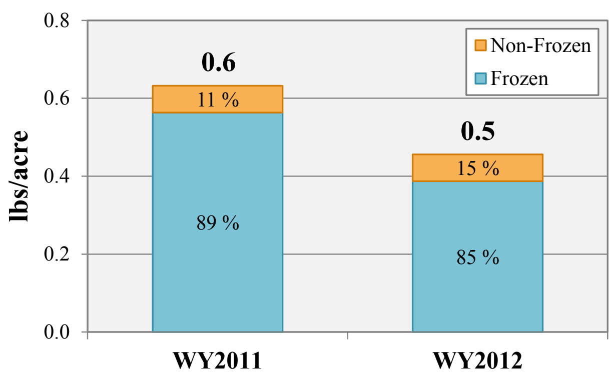

Figure 75: GO1 surface TP yield.

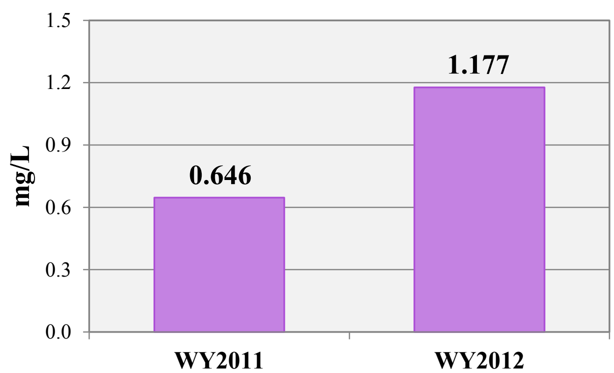

Figure 76: GO1 surface TP FWMC.

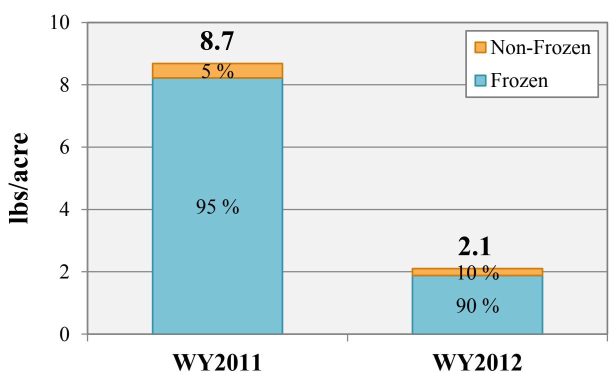

Figure 77: GO1 surface TN yield.

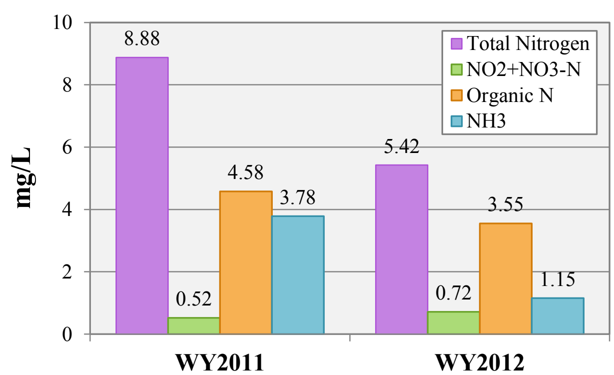

Figure 78: GO1 surface nitrogen FWMCs.

4.5 ST1

4.5.1 Farm Overview

ST1 is a 175 cow dairy located in Stearns County, near Sauk Centre, Minnesota. Feed for the dairy cattle are grown on 360 acres. Typical cropping rotation at the farm is four years of alfalfa followed by four years of corn. Approximately 60 percent of the tillable acres are tile drained to improve crop productivity. Liquid manure from a manure storage basin is injected in the fall or spring to the cropped acres that will be planted to corn. Pen pack manure from the barn and calf area is surface applied where needed and incorporated into the soil profile within 24 hours.

The farm is located in the north central hardwood forest eco-region of Minnesota. The region is characterized by rolling plains with a mix of woodlands, row crops and pasture. ST1 is located in the Upper Sauk River Watershed, approximately four miles from the Sauk River.

The site selected for monitoring provides an edge-of-field surface and subsurface runoff evaluation of a field with an alfalfa-corn rotation and dairy manure application. Surface water runoff is monitored from a 28.2 acre watershed with a subsurface tile watershed of 24.2 acres (Figure 79). The monitored field has poorly drained loam soils and average slope of approximately three percent. In WY2011 and WY2012, the field was tilled with a chisel plow in the fall and manure was injected in April prior to planting of corn and corn was harvested as silage in September.

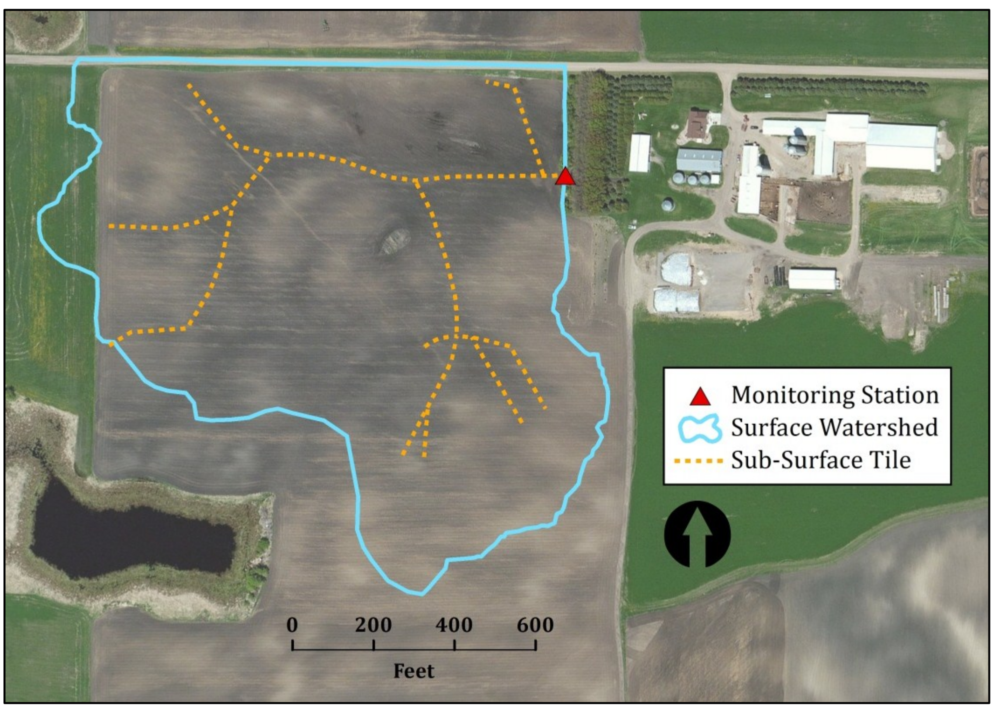

Figure 79: ST1 monitored watershed extent with subsurface tile.

Figure 80: ST1 monitoring station, May 2012.

Figure 81: ST1 flume, August 2012.

4.5.2 ST1 Precipitation

- Total measured precipitation for WY2012 was 21.65 inches, which was 6.74 inches below the 30-year normal (1981-2010) of 28.39 inches.
- All months, except for February, April and May, were less than the 30-year normal for precipitation.
- October 2011 – January 2012 had a precipitation deficit of 3.74 inches and June through September 2012 had a deficit of 6.96 inches below the 30-year normal.
- Due to below normal precipitation, the snowpack was very minimal. According to NOAA NOHRSC, on March 9 the snow water equivalent at Long Prairie, MN (#LNGM5, located 16 miles NNE of Sauk Centre, MN) was 0.00 inches.
- May was by far the wettest month with 6.78 inches of precipitation versus the 30-year normal of 3.26 inches.
- The largest precipitation event occurred on July 24 when 1.44 inches fell in just over six hours; however, no runoff was produced. The largest precipitation event that resulted in runoff was on May 18 when 1.10 inches of rain fell in six hours.

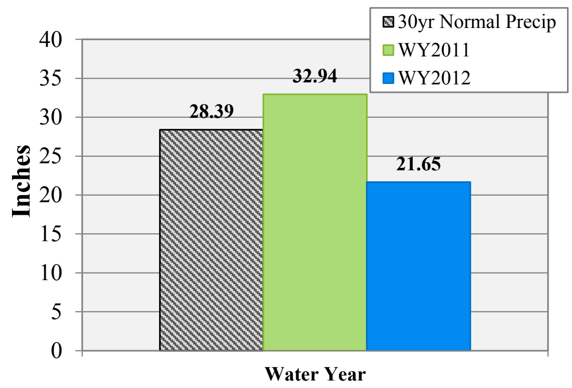

Figure 82: ST1 observed total precipitation versus the 30-year normal precipitation.

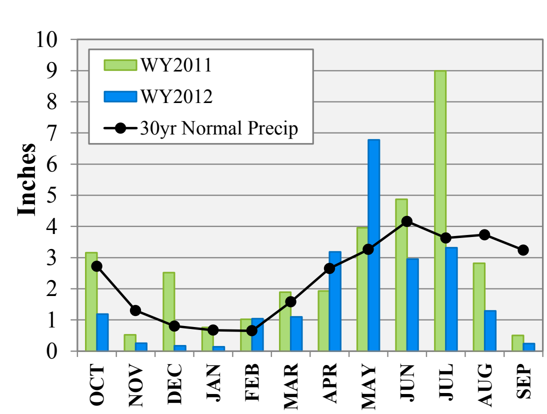

Figure 83: ST1 observed monthly precipitation total versus the 30-year normal precipitation.

4.5.3 ST1 Runoff

Subsurface Tile Drainage:

- The total subsurface tile drainage was 4.82 inches for WY2012.
- Eighteen percent of the annual runoff was during the "frozen" soil period.
- Ten precipitation-driven runoff events occurred in May and June which totaled 11 percent (0.55 inches) of the runoff for WY2012.
- Base flow accounted for 4.27 inches of runoff (89 percent) in WY2012.
- The largest runoff event occurred on May 26 when 1.03 inches of rain in 16 hours led to two events which totaled 0.15 inches of runoff (three percent).
- The subsurface tile stopped flowing on August 22, and did not flow again for the remainder of WY2012.
- Subsurface tile drainage occurred for a combined total of 326.4 days.
- The subsurface tile drainage to precipitation ratio was 22 percent.

Surface Runoff:

- The total surface runoff was 0.81 inches for WY2012.
- All surface runoff in WY2012 occurred over "non-frozen" soil.
- Fourteen precipitation-driven runoff events occurred; all in May and June 2012. No runoff occurred after June 20.
- The largest single runoff event was on May 1 when 0.81 inches of precipitation resulted in 0.24 inches of runoff (30 percent).
- Surface runoff occurred for a combined total of 2.9 days. Runoff was present on 16 of the 365 days monitored.
- The surface runoff to precipitation ratio was four percent.

IMPORTANT: WY2011 data represents a partial year (March 1 – September 30, 2011, seven months). WY2011 subsurface tile data is not presented due to an unknown watershed contributing area. WY2012 data is complete (October 1, 2011 – September 30, 2012).

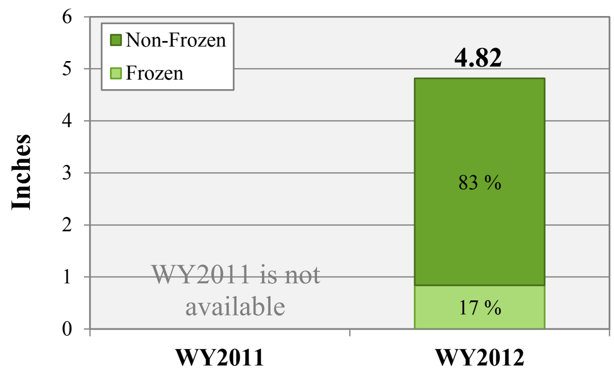

Figure 84: ST1 subsurface tile frozen versus non-frozen annual runoff.

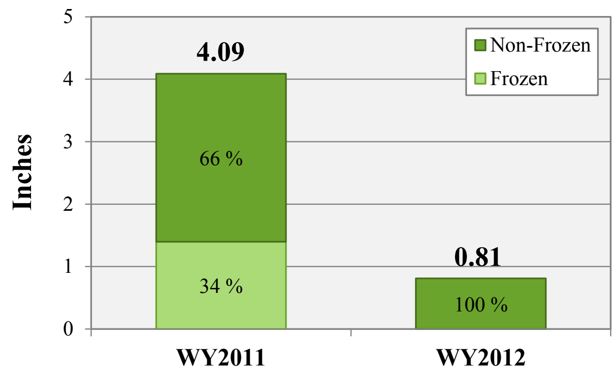

Figure 85: ST1 surface frozen versus non-frozen annual runoff.

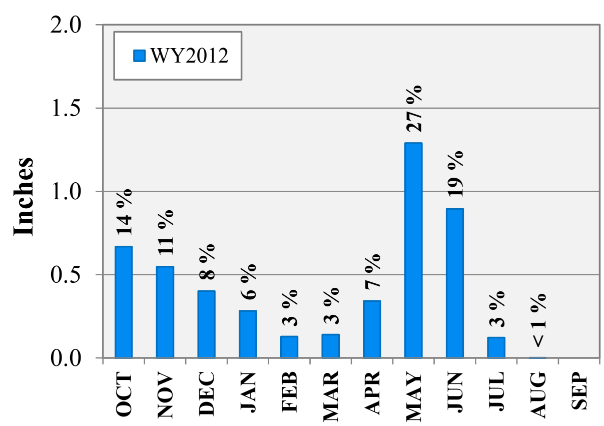

Figure 86: ST1 subsurface tile monthly runoff.

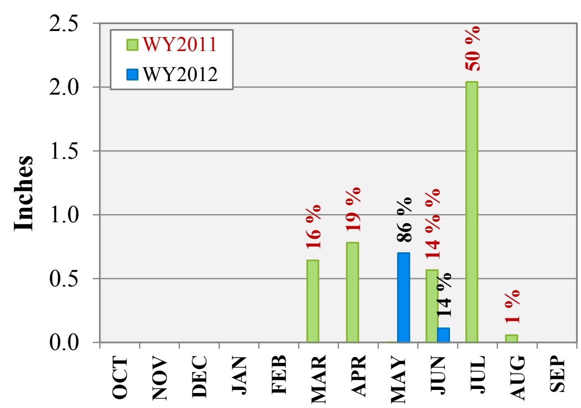

Figure 87: ST1 surface monthly runoff.

4.5.4 ST1 Loads, Yields and Flow-weighted Mean Concentrations

Subsurface Tile:

- 18 subsurface tile samples were collected in WY2012.
- Runoff over "frozen" soil accounted for five, seven and 18 percent of the TSS, TP and TN loads, respectively.
- 59 percent of the TP load was in the particulate form.
- The TN breakdown was 11 percent organic, less than one percent NH_3 and 89 percent NO_2+NO_3-N.
- Base flow accounted for 89 percent of the total runoff and 29, 51 and 89 percent of the TSS, TP and TN loads, respectively.

Surface Runoff:

- 13 surface samples were collected in WY2012.
- All surface loading occurred during the non-frozen soil period in WY2012.
- 93 percent of the TP load was in the particulate form.
- The TN breakdown was 92 percent organic, four percent NH_3 and four percent NO_2+NO_3-N.
- The May 1 event accounted for 30 percent of the total runoff, and 26, 51 and 47 percent of the TSS, TP and TN loads, respectively. Similarly, the May 18 event consisted of 21, 54, 20 and 27 percent of the total runoff, TSS, TP and TN loads, respectively.

IMPORTANT: WY2011 data represents a partial year (March 1 – September 30, 2011, seven months). WY2011 subsurface tile data is not presented due to an unknown watershed contributing area. WY2012 data is complete (October 1, 2011 – September 30, 2012).

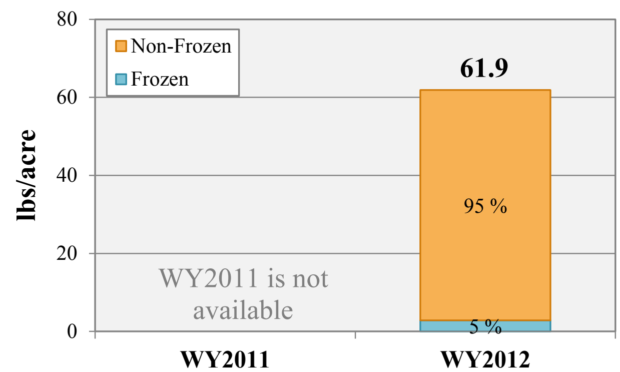

Figure 88: ST1 subsurface tile TSS yield.

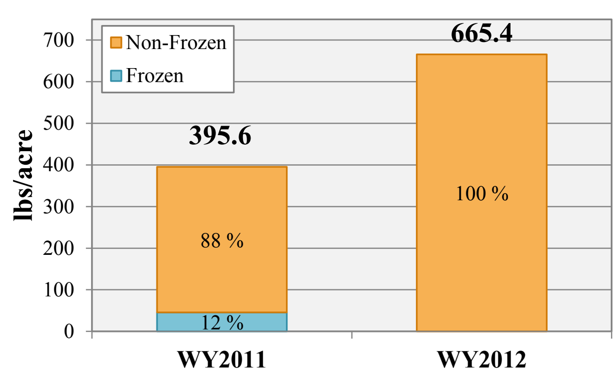

Figure 89: ST1 surface TSS yield.

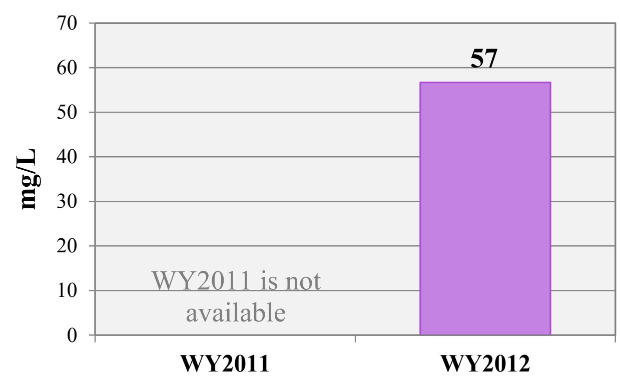

Figure 90: ST1 subsurface tile TSS FWMC.

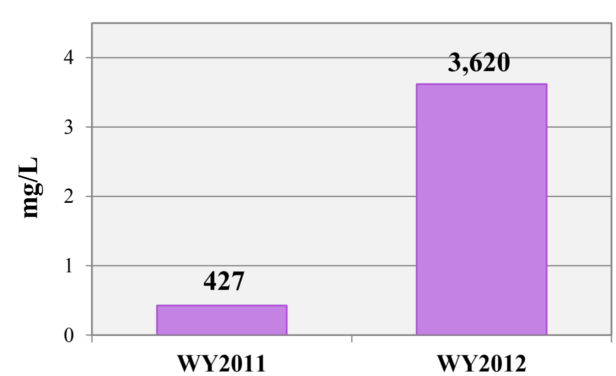

Figure 91: ST1 surface TSS FWMC.

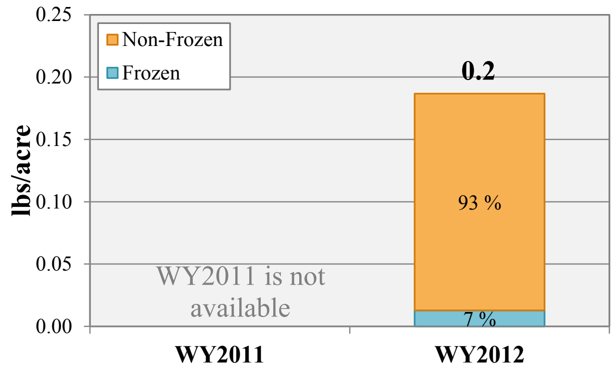

Figure 92: ST1 subsurface tile TP yield.

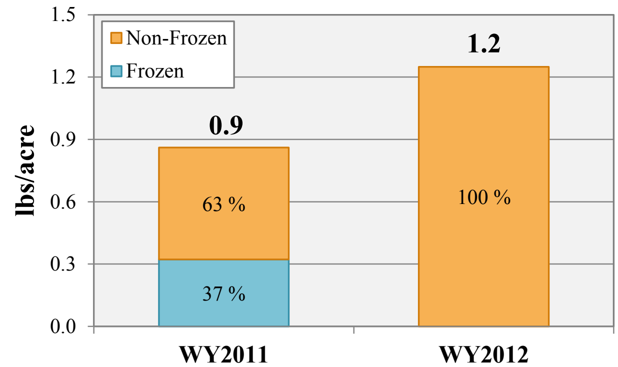

Figure 93: ST1 surface TP yield.

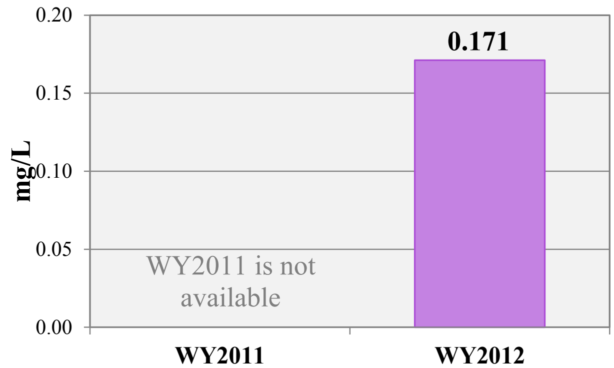

Figure 94: ST1 subsurface tile TP FWMC.

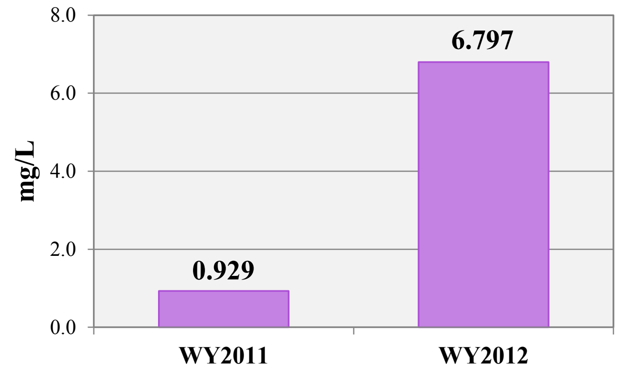

Figure 95: ST1 surface TP FWMC.

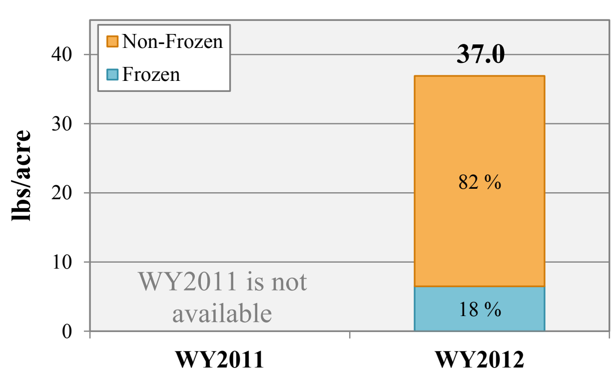

Figure 96: ST1 subsurface tile TN yield.

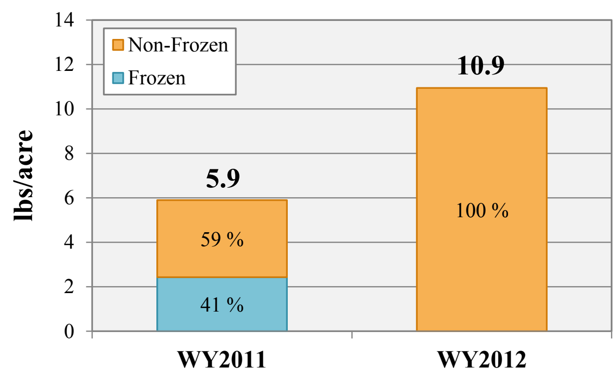

Figure 97: ST1 surface TN yield.

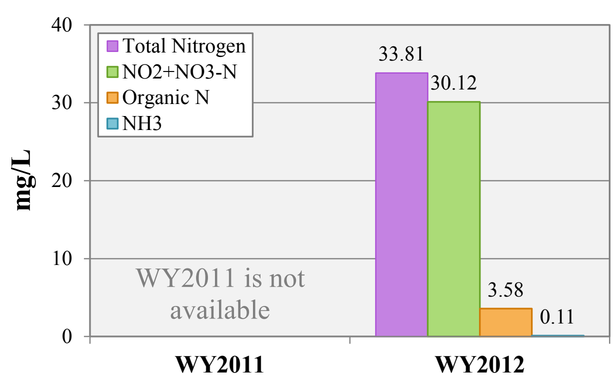

Figure 98: ST1 subsurface tile nitrogen FWMCs.

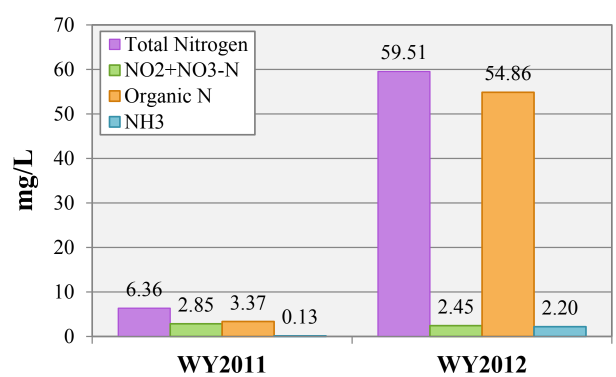

Figure 99: ST1 surface nitrogen FWMCs.

4.6 WR1

4.6.1 Farm Overview

WR1 is a dairy farm located in east-central Minnesota south of Howard Lake, in Wright County. Located in the Central Hardwood Forest eco-region, the region is characterized by rolling plains with a mix of row crops, pastures and woodlands. The operation is located in the North Fork of the Crow River Watershed.

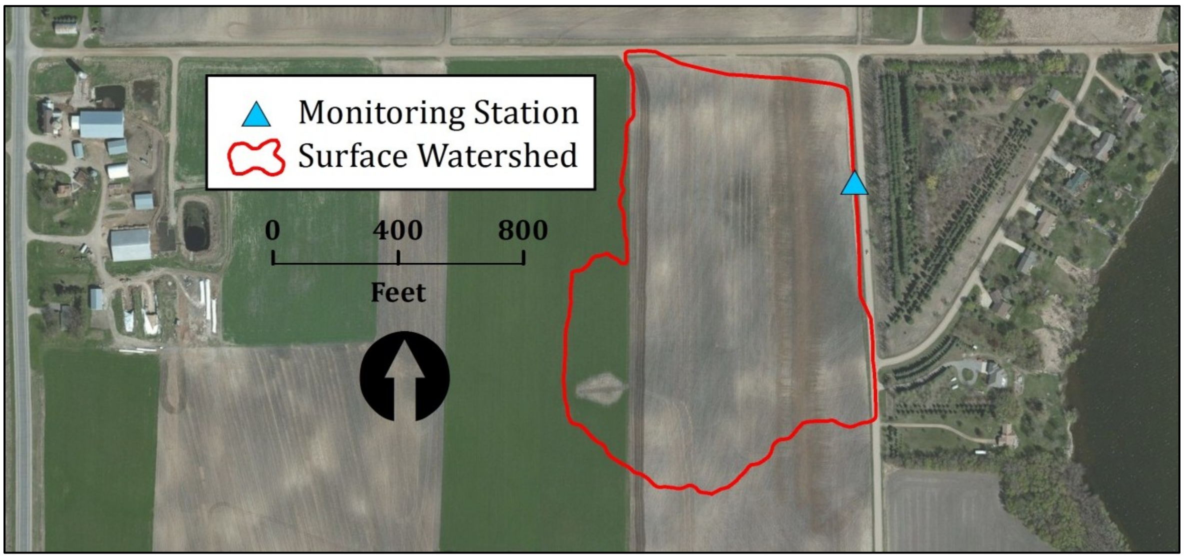

Figure 100: WR1 23.9 acre surface watershed and location of monitoring location.

The site selected for monitoring (Figure 100) provides an edge-of-field surface and subsurface water quality evaluation of a 23.9 acre watershed in a corn-alfalfa crop rotation with dairy manure application. The monitored field has a mix of well drained loam and poorly drained clay loam soils and average slope of five percent. Internal drainage is medium and permeability is moderate. The field has random cement subsurface tile. An inventory of the tile locations within the field has yet to be conducted.

In WY2012, dairy manure was incorporated in the fall and corn was planted in April and harvested as silage in August.

Equipment installation for monitoring the subsurface drainage and surface runoff was completed in November 2011. A 2.5 foot flume was installed at the field edge to monitor the surface runoff. A shelter was installed and the site was equipped with a Forest Technology Systems (FTS) H2 axiom datalogger, FTS tipping bucket rain gage, FTS air temperature and humidity sensor, OTT CBS high accuracy bubbler, APG ultrasonic transducer, Campbell Scientific CS650 soil moisture probe, Microcom STX depth integrated soil temperature probe and ISCO 6712 portable automated sampler.

To monitor the subsurface tile runoff, a four foot Agri Drain structure was installed and instrumented with an APG ultrasonic transducer and ISCO 6712 portable automated sampler. Subsurface tile runoff was calculated by using a weir equation that had been developed for the Agri Drain structure.

Figure 101: WR1 surface runoff through the flume on May 24, 2012.

Figure 102: WR1 surface runoff from the field to the flume on May 24, 2012.

Figure 103: WR1 flume and equipment configuration, July 12, 2012.

4.6.2 WR1 Precipitation

- Total measured precipitation for WY2012 was 34.58 inches, which was 3.72 inches above the 30-year normal (1981-2010) of 30.86 inches for the nearest station (Lester Prairie, MN #214692).
- WR1 was the only Discovery Farm in WY2012 to have above-normal precipitation.
- October through December 2011 had a combined precipitation deficit of 3.71 inches. September 2012 was also well below the normal with only 0.40 inches of measured precipitation for the entire month compared with the normal of 3.55 inches.
- Due to below normal fall precipitation, the snowpack on the field was minimal. According to NOAA NOHRSC, on March 4 the snow water equivalent at Watertown, MN (#8813S_MADIS, located 12.8 miles ESE of Howard Lake, MN) was 1.36 inches.

- May 2012 was significantly above the 30-year normal with 11.76 inches measured, compared with a normal of only 3.55 inches.
- May had six different 24-hour periods with an excess of 1.30 inches of rain.
- The largest precipitation event occurred on August 23 when 3.37 inches of rain fell in just under 20 hours.

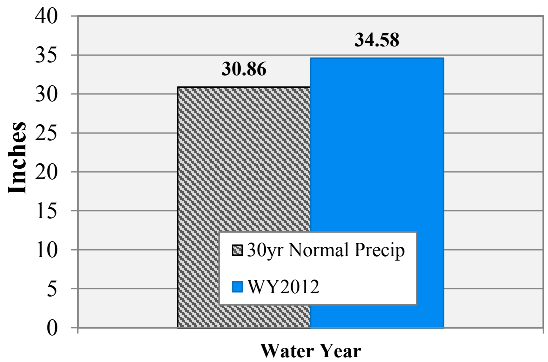

Figure 104: WR1 observed annual precipitation versus the 30-year normal precipitation.

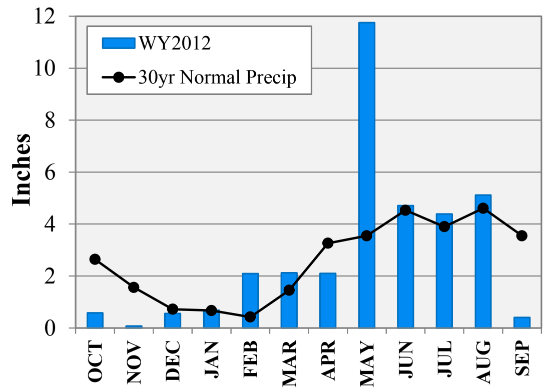

Figure 105: WR1 observed monthly precipitation versus the 30-year normal monthly precipitation.

4.6.3 WR1 Runoff

Subsurface Tile Drainage:

- The total subsurface tile drainage was 1.94 inches for WY2012.
- All subsurface tile drainage in WY2012 was during the non-frozen soil period.
- 13 precipitation-driven runoff events occurred from late March to late August which totaled 63 percent (1.23 inches) of the runoff for WY2012.
- Base flow accounted for 0.71 inches of runoff (37 percent).
- The largest runoff event occurred on May 23 when 4.13 inches of rain over 48 hours produced 0.30 inches of runoff (15 percent).
- The subsurface tile did not begin to flow until March 23 and had no flow numerous times between precipitation events. No flow was detected for the following periods: March 25–April 18, April 19–May 1, June 7–June 14, June 26-August 23 and from August 24-September 30.
- Subsurface tile drainage occurred for a combined total of 52.5 days and runoff was present on 58 out of 365 days monitored.
- The subsurface tile drainage to precipitation ratio was six percent.

Surface Runoff:

- The total surface runoff was 4.90 inches for WY2012.
- Less than one percent of runoff occurred during frozen soil conditions.

- 20 precipitation-driven runoff events occurred: March (two), April (two), May (eight), June (five), July (two) and August (one).
- The largest single runoff event was on May 23 when 4.13 inches of precipitation over 48 hours resulted in 1.55 inches of runoff (32 percent).
- Another May 27 event resulted in 1.22 inches (25 percent) of runoff when 1.95 inches fell just over eight hours.
- Surface runoff occurred for a combined total of 9.11 days. Runoff was present on 28 of the 365 days monitored.
- The surface runoff to precipitation ratio was 14 percent.

IMPORTANT: WY2012 data is complete (October 1, 2011 – September 30, 2012).

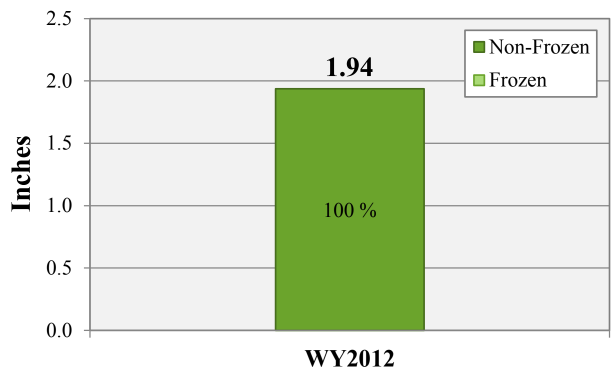

Figure 106: WR1 subsurface tile frozen versus non-frozen annual runoff.

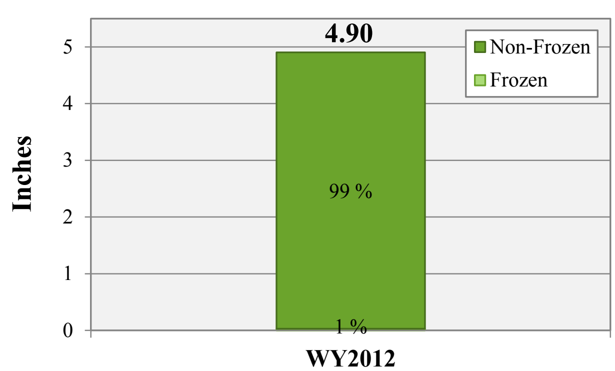

Figure 107: WR1 surface frozen versus non-frozen annual runoff.

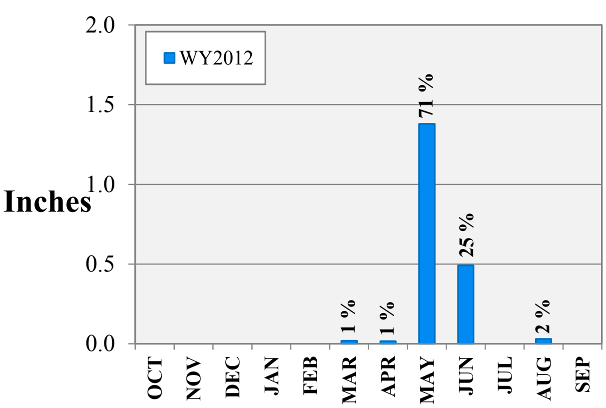

Figure 108: WR1 subsurface tile monthly runoff.

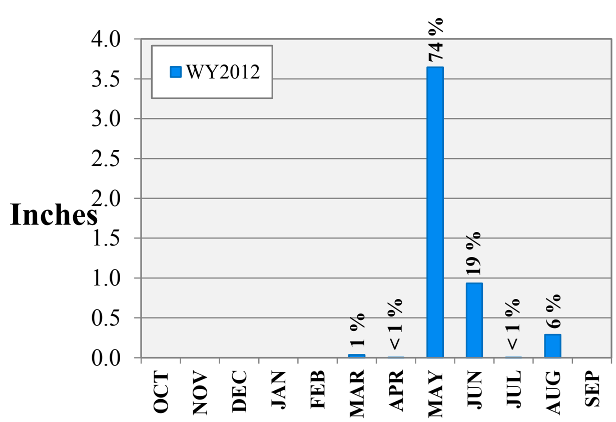

Figure 109: WR1 surface monthly runoff.

4.6.4 WR1 Loads, Yield and Flow-weighted Mean Concentrations

Subsurface Tile:

- 27 subsurface tile samples were collected in WY2012.
- All subsurface tile loading in WY2012 occurred during non-frozen soil conditions.
- 48 percent of the TP load was in the particulate form.
- The TN breakdown was 13 percent organic, <1 percent NH_3 and 86 percent NO_2+NO_3-N.
- Base flow accounted for 36 percent of the total subsurface tile runoff and 20, 30 and 35 percent of the TSS, TP and TN loads, respectively.
- The single largest subsurface tile loading event occurred from the May 23 event and accounted for 15 percent of the total runoff and 16, 15 and 18 percent of the TSS, TP, and TN loads, respectively.

Surface Runoff:

- 27 surface samples were collected in WY2012.
- Loading from surface runoff over "frozen" soil accounted for less than one percent each of the TSS, TP and TN loads.
- 83 percent of the surface TP load was in the particulate form.
- The TN breakdown was 91 percent organic, three percent NH_3 and six percent NO_2+NO_3-N.
- The single largest surface loading occurred from the May 23 event and accounted for 32 percent of the total runoff and 32, 34 and 35 percent of the TSS, TP and TN loads, respectively. Similarly, the May 27 event accounted for 25 percent of the total runoff and 32, 21 and 17 percent of the TSS, TP, and TN loads, respectively.

IMPORTANT: WY2012 data is complete (October 1, 2011 – September 30, 2012).

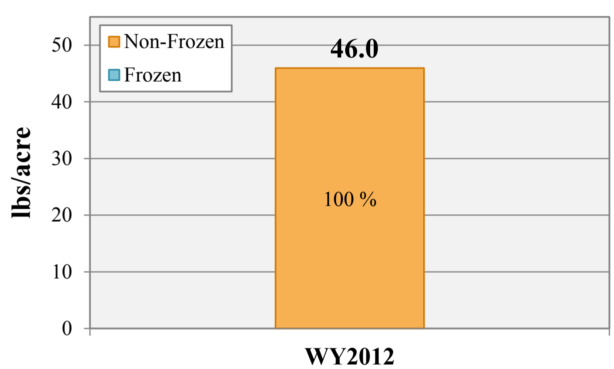

Figure 110: WR1 subsurface tile TSS yield.

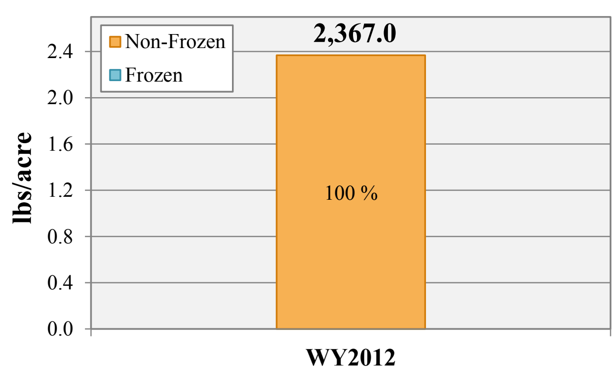

Figure 111: WR1 surface TSS yield.

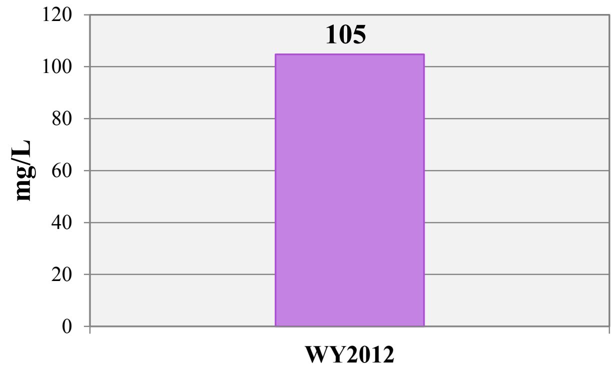

Figure 112: WR1 subsurface tile TSS FWMC.

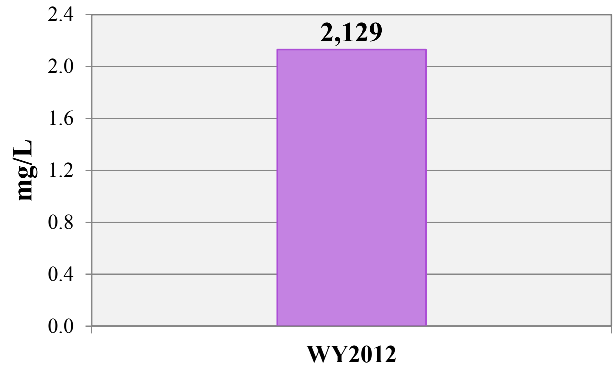

Figure 113: WR1 surface TSS FWMC.

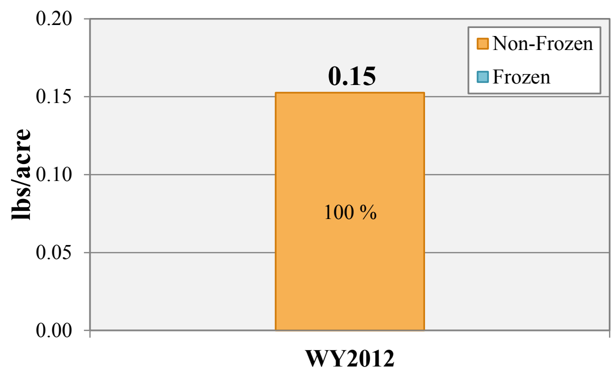

Figure 114: WR1 subsurface tile TP yield.

Figure 115: WR1 surface TP yield.

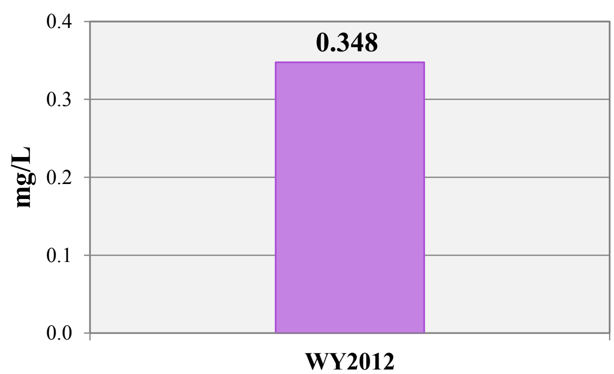

Figure 116: WR1 subsurface tile TP FWMC.

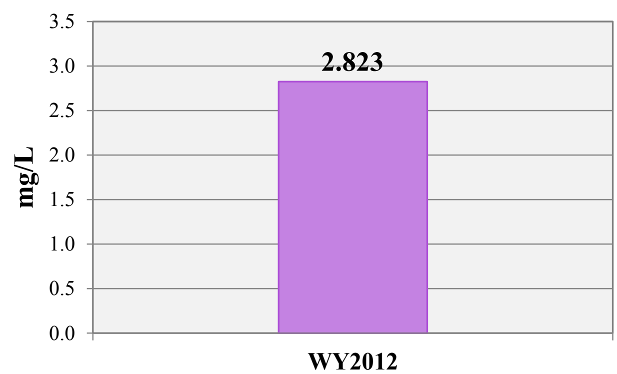

Figure 117: WR1 surface TP FWMC.

Figure 118: WR1 subsurface tile TN yield.

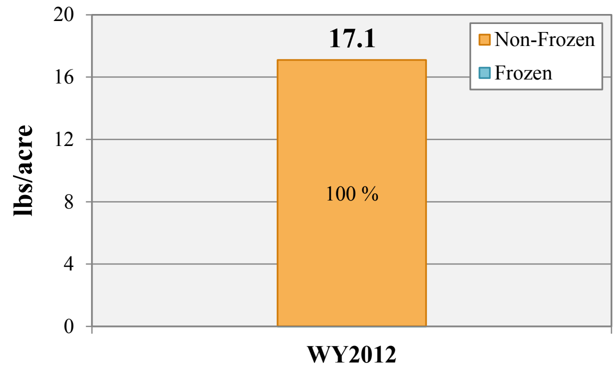

Figure 119: WR1 surface TN yield

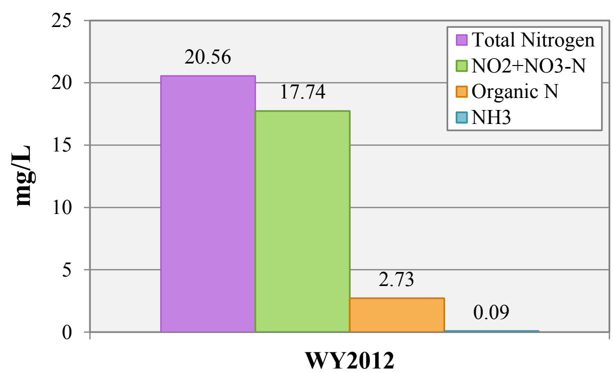

Figure 120: WR1 subsurface tile nitrogen FWMCs.

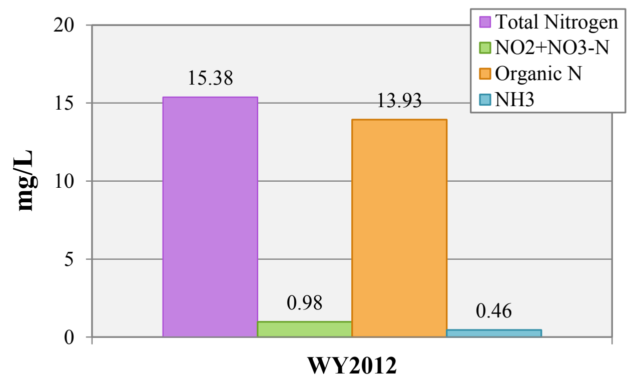

Figure 121: WR1 surface nitrogen FWMCs.

4.7 RE1

4.7.1 Farm Overview

RE1 is a grain operation located in southwestern Renville County, near Fairfax, Minnesota. Located in the Western Corn Belt Plains eco-region, the region is characterized by small streams that drain directly into the Minnesota River. The farm is located in the Middle Minnesota River Watershed. Water leaving the farm drains directly to a county ditch, then into Fort Ridgely Creek and finally into the Minnesota River.

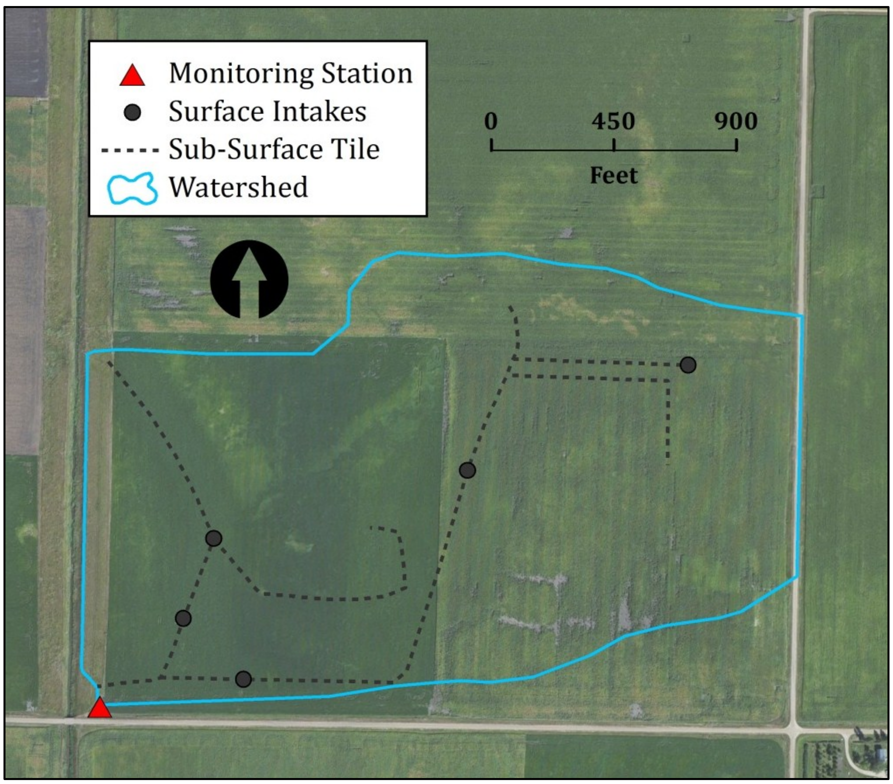

Figure 122: RE1 monitored watershed with location of subsurface tile and open intakes.

The site selected for monitoring (Figure 122) provides an edge-of-field water quality evaluation of an 81.0 acre field in a corn-soybean crop rotation with conventional tillage and commercial fertilizer application. On a typical year, the watershed will consist of approximately half corn and half soybeans. The field has an average slope of 2.8 percent. The monitored field has cement subsurface tile which was installed in the 1960's in a "turkey foot" configuration with five open intakes/surface inlets. There is no surface water outlet from the field; all surface water runoff enters the subsurface tile system through the open intakes. Soils on this farm are representative of the highly productive soils of central Minnesota. There are three major soil associations in the field where monitoring occurs, Canisteo-Glencoe, Webster and Nicollet. These soils have a clay loam texture in the surface horizon and throughout the profiles and are poorly drained having an available water holding capacity of 9.9 inches to a depth of five feet.

Figure 123: RE1 monitoring station, December 2011.

Figure 124: Re1 monitoring station, field and tile outlet in the downstream ditch, May 2012.

In WY2012, the western 40 acres was planted to sweet corn and the eastern 40 acres was planted to soybeans. The sweet corn was harvested from the western 40 acres on August 5-6, 2012.

Equipment installation for monitoring the subsurface drainage was completed in December 2011. An eight foot Agri Drain was installed for the eight inch tile as an access point for measuring the subsurface tile drainage and collecting the water samples. Two stop logs were inserted into the Agri Drain and an OTT CBS bubbler was installed to measure the water level over the boards. A shelter was installed and the site was equipped with a Forest Technology Systems (FTS) H2 axiom datalogger, FTS tipping bucket rain gage, FTS air temperature and humidity sensor, Campbell Scientific CS650 soil moisture probe, Microcom STX depth integrated soil temperature probe and ISCO 6712 portable automated sampler.

4.7.2 RE1 Precipitation

- Total measured precipitation for WY2012 was 21.31 inches, which was 6.12 inches below the 30-year normal (1981-2010) of 27.43 inches for the nearest station (Olivia, MN #216152).
- October through December 2011 had a combined precipitation deficit of 3.28 inches. June through September 2012 was also well below the normal with a deficit of 8.89 inches.
- May precipitation was significantly above normal, with a total of 7.65 inches compared with the 30-year normal of only 2.96 inches.
- Due to below normal fall precipitation, the snowpack on the field was minimal leading in to March. According to NOAA NOHRSC, the snow water equivalent at nearby stations was 0.00 inches by mid-March.

- The largest 24-hour precipitation total occurred on May 5-6 with 2.48 inches. This event, along with additional precipitation that fell May 4, resulted in the subsurface tile beginning to flow for the first time since monitoring began October 1, 2011.

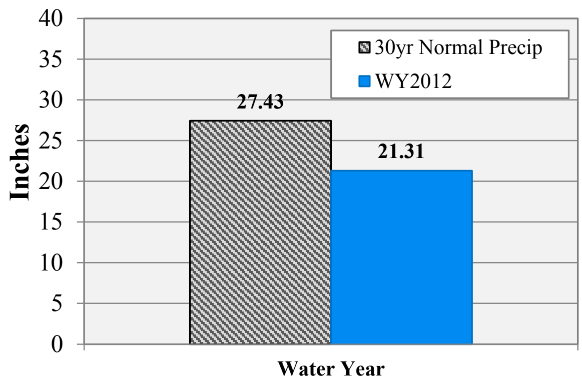

Figure 125: RE1 observed annual precipitation versus the 30-year normal precipitation.

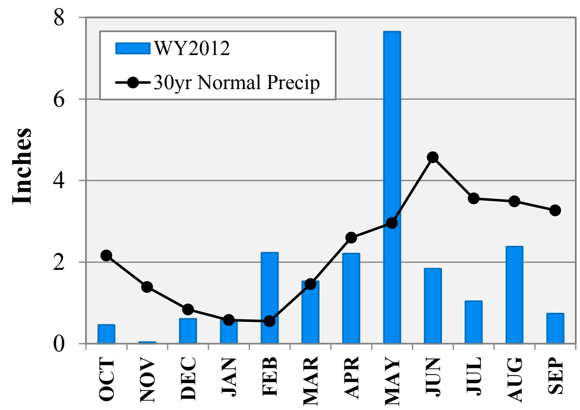

Figure 126: RE1 observed monthly precipitation versus the 30-year normal monthly precipitation.

4.7.3 RE1 Runoff

- The total subsurface tile drainage was 0.90 inches for WY2012.
- All subsurface tile drainage in WY2012 was during the non-frozen soil period.
- Four precipitation-driven runoff events occurred; three in May and one in June totaling 0.44 inches of runoff (48 percent). All were somewhat equally distributed, accounting for 10-14 percent each.
- Base flow accounted for 0.46 inches of runoff (52 percent).
- The subsurface tile did not begin to flow until May 6 following almost 2.7 inches of rain over the previous 48-hours. The tile ceased flowing from May 11 through May 14 and again from May 15 through May 24. Continuous subsurface flow was present from May 24 to July 4.
- The subsurface tile stopped flowing on July 4 and did not flow again for the remainder of WY2012.
- Subsurface tile drainage occurred for a combined total of 40.9 days and runoff was present on 50 out of 365 days monitored.
- The subsurface tile drainage to precipitation ratio was four percent.

IMPORTANT: WY2012 data is complete (October 1, 2011 – September 30, 2012).

Figure 127: RE1 subsurface tile frozen versus non-frozen annual runoff.

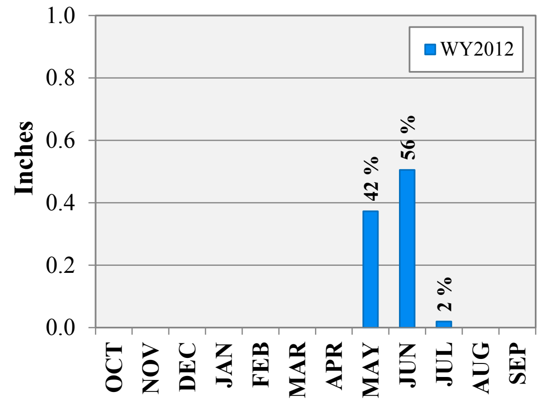

Figure 128: RE1 monthly runoff.

4.7.4 RE1 Loads, Yields and Flow-weighted Mean Concentrations

- 15 subsurface tile samples were collected in WY2012.
- All subsurface tile loading in WY2012 occurred during non-frozen soil conditions.
- 60 percent of the TP load was in the particulate form.
- The TN breakdown was 11 percent organic, less than one percent NH_3 and 88 percent NO_2+NO_3-N.
- Base flow accounted for 52 percent of the total subsurface tile runoff and two, 11 and 50 percent of the TSS, TP and TN loads, respectively.
- 70 percent of the TSS load occurred during the May 26-27 event (TP: 29 percent, TN: 10 percent)
- 47 percent of the TP load occurred during the June 19-20 event (TSS: 19 percent, TN: 14 percent).
- TN loading was somewhat equally dispersed between the four events, with contributions ranging from 10-14 percent each.

IMPORTANT: WY2012 data is complete (October 1, 2011 – September 30, 2012).

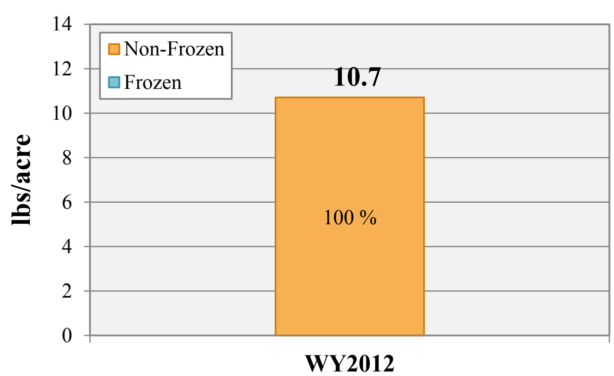

Figure 129: RE1 TSS yield.

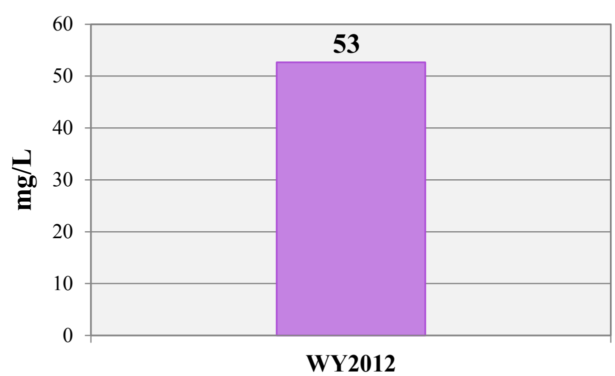

Figure 130: RE1 TSS FWMC.

Figure 131: RE1 TP yield.

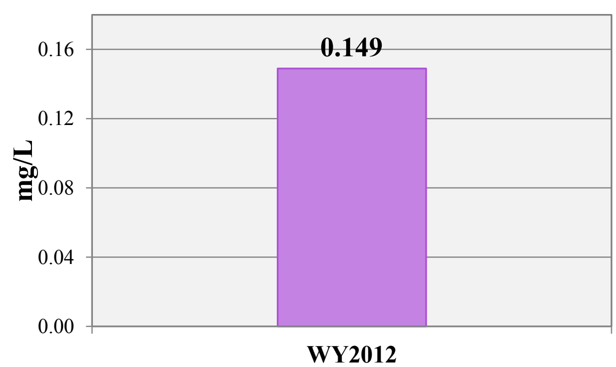

Figure 132: RE1 TP FWMC.

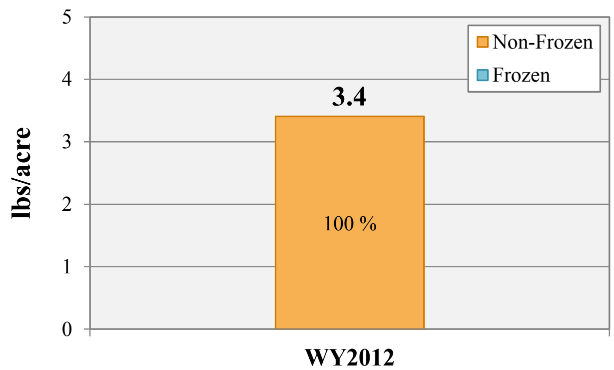

Figure 133: RE1 TN yield.

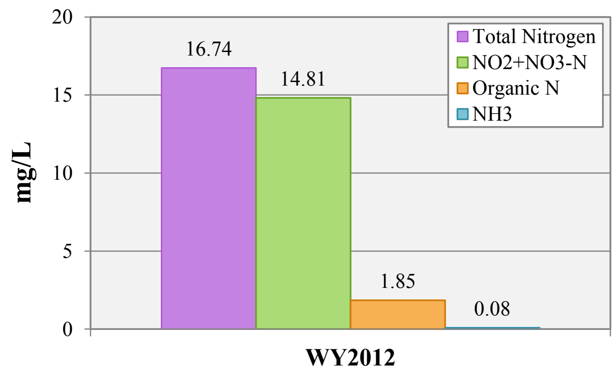

Figure 134: RE1 nitrogen FWMCs.

SECTION 5: Future Activities

5.1 Plans for the 2013 Water Year

New Discovery Farms

After an application process was completed in early spring of 2012, all of the potential farms were visited shortly after by MDA and MAWRC staff. An overview of the applicant farms was presented to the DFM Steering Committee on June 8, 2012. The steering committee voted to add three new farms to the program; two in the Red River Valley of the North (Norman and Wilkin County) and one in Dodge County. Equipment was ordered and the sites were installed in October and November 2012. The three new farms will bring the total core farms monitored by the DFM program to nine for the 2013 water year monitoring season. All new farms will be monitored following the same standard operating procedures as the existing sites. Relevant information for both farms is included in Table 7.

Table 7: New farms in WY2013 (October 2012 – September 2013) for the Discovery Farms Minnesota program.

Discovery Farm ID	County	Farm Type	Major Watershed	Major Basin	Drainage Area* (acres)	Dominant Soil Type	Nearest Town	Station Type
DO1	Dodge	Swine, Grain	Zumbro	Lower Mississippi	14 S 14 T	Silty loam, silty clay loam	Kasson	Surface and Subsurface
NO1-E	Norman	Grain	Eastern Wild Rice	Red River of the North	86 S 132 T	Fine sandy loam	Gary	Surface and Subsurface
NO1-W	Norman	Grain	Eastern Wild Rice	Red River of the North	574 T	Silt loam	Gary	Subsurface (2)
WI1	Wilkin	Grain	Upper Red River of the North	Red River of the North	160 T	Fine sandy loam	Rothsay	Subsurface

* Drainage area acreages are subject to change upon further evaluation of field and tile maps. | S = Surface, T = Subsurface Tile

DO1 is a grain and swine operation near Kasson, MN. The crop rotation on the field selected for monitoring is corn-soybean and the surface watershed is approximately 14 acres. The field is pattern tiled with no open intakes. The watershed has a slope of 3.1 percent. Both surface and subsurface runoff water will be measured. A four foot Agri Drain was installed along with a 2.5 foot H flume at this monitoring location.

NO1-E and NO1-W are two separate monitoring sites that are located roughly two miles apart on the same extensive grain farm near Gary, MN. NO1-E will have both a surface and subsurface tile monitoring component. Runoff water from NO1-E empties into a ravine leading to Marsh Creek and then to the Wild Rice River. The surface watershed for the field is approximately 86 acres. The subsurface pattern tile drains 132 acres (no open intakes) and outlets at the same locations as the surface runoff. The slope is 2.8 percent. NO1-W is fairly flat and was extensively pattern tiled in 2011; there is no surface outlet to the field. The slope is 2.4

percent. This site will evaluate only subsurface drainage water leaving an area that is nearly an entire section (574 acres), with no surface intakes. The subsurface tile is split into two components, each discharging into a large inverted culvert sumps. Water collects in the sumps and is then pumped to the adjacent shallow ditch. Both NO1-E and NO1-W will have a crop rotation that includes sugarbeets, corn, edible (dry) beans, soybeans and wheat.

WI1 is a grain operation in Wilkin County near Rothsay, MN. The crop rotation on the field selected for monitoring is corn-soybean. The field is relatively flat (slope 2.2 percent) and was pattern tiled in fall 2011; there is no surface outlet to the field. Like the Norman County farm, this subsurface tile also drains to an inverted culvert sump which is then discharged to the adjacent shallow ditch via a lift pump.

More information on the WY2013 monitoring activities can be found in the Discovery Farms Minnesota 2013 Work Plan, available at http://www.discoveryfarmsmn.org.

APPENDICES

Appendix 1: Runoff, load, yield and FWMC results by month and events.

Table 8: BE1 surface flume monthly runoff, water volume, and precipitation values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 – September 2012.

BE1 - SURFACE FLUME					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.80	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
NOV	0.00	0.0%	0	0.11	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
DEC	0.00	0.0%	0	1.25	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JAN	0.00	0.0%	0	0.59	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
FEB	0.03	7.3%	1,588	2.22	11.1	1.0%	0.8	112	0.0	1.9%	0.0	0.41	0.0	11.1%	0.0	0.24	0.3	0.6%	0.0	3.2
MAR	0.00	0.2%	38	1.25	0.3	0.0%	0.0	112	0.0	0.0%	0.0	0.41	0.0	0.3%	0.0	0.24	0.0	0.0%	0.0	3.2
APR	0.00	0.0%	0	3.12	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAY	0.39	92.5%	20,146	8.68	1,047.0	98.9%	73.2	832	2.0	98.0%	0.1	1.62	0.2	88.6%	0.0	0.15	54.0	99.4%	3.8	42.9
JUN	0.00	0.0%	0	1.24	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JUL	0.00	0.0%	0	1.29	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
AUG	0.00	0.0%	0	1.30	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
SEP	0.00	0.0%	0	0.70	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**0.42**		**21,773**	**22.55**	**1,058.4**		**74.0**		**2.1**		**0.1**		**0.2**		**0.0**		**54.3**		**3.8**	

Table 9: BE1 surface flume monthly runoff, water volume and precipitation values associated with the TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 – September 2012.

BE1 - SURFACE FLUME					TOTAL NITROGEN				NITRATE + NITRITE - N				TOTAL KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.80	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
NOV	0.00	0.0%	0	0.11	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
DEC	0.00	0.0%	0	1.25	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JAN	0.00	0.0%	0	0.59	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
FEB	0.03	7.3%	1,588	2.22	0.2	1.1%	0.0	1.7	0.0	2.2%	0.0	0.44	0.1	0.9%	0.0	1.3	0.0	2.4%	0.0	0.08
MAR	0.00	0.2%	38	1.25	0.0	0.0%	0.0	1.7	0.0	0.1%	0.0	0.44	0.0	0.0%	0.0	1.3	0.0	0.1%	0.0	0.08
APR	0.00	0.0%	0	3.12	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAY	0.39	92.5%	20,146	8.68	16.1	98.9%	1.1	12.8	2.0	97.8%	0.1	1.56	14.2	99.1%	1.0	11.3	0.3	97.6%	0.0	0.26
JUN	0.00	0.0%	0	1.24	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JUL	0.00	0.0%	0	1.29	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
AUG	0.00	0.0%	0	1.30	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
SEP	0.00	0.0%	0	0.70	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**0.42**		**21,773**	**22.55**	**16.3**		**1.1**		**2.0**		**0.1**		**14.3**		**1.0**		**0.3**		**0.0**	

Table 10: BE1 surface flume event runoff and water volume values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

BE1 – SURFACE FLUME					TOTAL SUSP. SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
EVENT	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
28-Feb	0.03	7.5%	1,627	1.98	11.4	1.1%	0.8	112	0.0	2.0%	0.0	0.41	0.0	11.4%	0.0	0.24	0.3	0.6%	0.0	3.2
1-May	0.00	0.1%	14	0.24	0.7	0.1%	0.1	832	0.0	0.1%	0.0	1.62	0.0	0.1%	0.0	0.15	0.0	0.1%	0.0	42.9
4-May	0.09	22.2%	4,838	2.73	190.3	18.0%	13.3	630	0.2	9.8%	0.0	0.68	0.1	25.7%	0.0	0.18	13.0	23.9%	0.9	42.9
24-May	0.00	0.5%	102	0.47	5.3	0.5%	0.4	832	0.0	0.5%	0.0	1.62	0.0	0.4%	0.0	0.15	0.3	0.5%	0.0	42.9
26-May	0.26	61.8%	13,458	0.36	717.7	67.8%	50.2	854	1.7	79.7%	0.1	1.97	0.1	57.4%	0.0	0.15	36.4	67.0%	2.5	43.3
27-May	0.03	7.9%	1,724	0.58	132.4	12.5%	9.3	1,230	0.2	7.8%	0.0	1.51	0.0	4.9%	0.0	0.10	4.3	7.9%	0.3	39.8
31-May	0.00	0.0%	9	0.04	0.5	0.0%	0.0	832	0.0	0.0%	0.0	1.62	0.0	0.0%	0.0	0.15	0.0	0.0%	0.0	42.9
TOTAL	**0.42**		**21,773**	**6.40**	**1,058.4**		**74.0**		**2.1**		**0.1**		**0.2**		**0.0**		**54.3**		**3.8**	

Table 11: BE1 surface flume event runoff and water volume values associated with the TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

BE1 – SURFACE FLUME					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
EVENT	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
28-Feb	0.03	7.5%	1,627	1.98	0.2	1.1%	0.0	1.7	0.0	2.2%	0.0	0.44	0.1	0.9%	0.0	1.3	0.0	2.4%	0.0	0.08
1-May	0.00	0.1%	14	0.24	0.0	0.1%	0.0	12.9	0.0	0.1%	0.0	1.56	0.0	0.1%	0.0	11.3	0.0	0.1%	0.0	0.26
4-May	0.09	22.2%	4,838	2.73	1.8	10.8%	0.1	5.8	0.8	42.2%	0.1	2.81	0.9	6.3%	0.1	3.0	0.0	7.3%	0.0	0.08
24-May	0.00	0.5%	102	0.47	0.1	0.5%	0.0	12.9	0.0	0.5%	0.0	1.56	0.1	0.5%	0.0	11.3	0.0	0.5%	0.0	0.26
26-May	0.26	61.8%	13,458	0.36	13.1	80.2%	0.9	15.6	1.1	53.0%	0.1	1.27	12.0	84.0%	0.8	14.3	0.3	82.3%	0.0	0.33
27-May	0.03	7.9%	1,724	0.58	1.2	7.4%	0.1	11.2	0.0	2.0%	0.0	0.37	1.2	8.1%	0.1	10.8	0.0	7.4%	0.0	0.23
31-May	0.00	0.0%	9	0.04	0.0	0.0%	0.0	12.9	0.0	0.0%	0.0	1.56	0.0	0.0%	0.0	11.3	0.0	0.0%	0.0	0.26
TOTAL	**0.42**		**21,773**	**6.40**	**16.3**		**1.1**		**2.0**		**0.1**		**14.3**		**1.0**		**0.3**		**0.0**	

Table 12: BE1 subsurface tile monthly runoff, water volume, and precipitation values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

BE1 – SUBSURFACE TILE					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.80	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
NOV	0.00	0.0%	0	0.11	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
DEC	0.00	0.0%	0	1.25	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JAN	0.00	0.0%	0	0.59	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
FEB	0.00	0.0%	0	2.22	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAR	0.00	0.0%	98	1.25	0.2	0.1%	0.0	27	0.0	0.2%	0.0	0.57	0.0	0.2%	0.0	0.29	0.1	0.0%	0.0	22.6
APR	0.00	0.0%	0	3.12	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAY	3.01	84.2%	286,457	8.68	193.1	93.4%	7.4	11	1.5	92.8%	0.1	0.08	0.6	89.2%	0.0	0.04	235.6	81.0%	9.0	13.2
JUN	0.54	15.2%	51,600	1.24	12.9	6.2%	0.5	4	0.1	6.7%	0.0	0.03	0.1	10.1%	0.0	0.02	52.8	18.2%	2.0	16.4
JUL	0.02	0.4%	1,470	1.29	0.4	0.2%	0.0	4	0.0	0.2%	0.0	0.03	0.0	0.3%	0.0	0.02	1.5	0.5%	0.1	16.4
AUG	0.01	0.2%	616	1.30	0.2	0.1%	0.0	4	0.0	0.1%	0.0	0.03	0.0	0.1%	0.0	0.02	0.6	0.2%	0.0	16.4
SEP	0.00	0.0%	0	0.70	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**3.58**		**340,242**	**22.55**	**206.6**		**7.9**		**1.6**		**0.1**		**0.7**		**0.0**		**290.7**		**11.1**	

Table 13: BE1 subsurface tile monthly runoff, water volume and precipitation values associated with the TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

BE1 – SUBSURFACE TILE					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.80	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
NOV	0.00	0.0%	0	0.11	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
DEC	0.00	0.0%	0	1.25	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JAN	0.00	0.0%	0	0.59	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
FEB	0.00	0.0%	0	2.22	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAR	0.00	0.0%	98	1.25	0.1	0.0%	0.0	8.9	0.0	0.0%	0.0	5.98	0.0	0.0%	0.0	2.9	0.0	0.0%	0.0	0.08
APR	0.00	0.0%	0	3.12	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAY	3.01	84.2%	286,457	8.68	301.0	83.6%	11.5	16.8	271.4	83.9%	10.4	15.17	29.6	80.8%	1.1	1.7	2.1	88.6%	0.1	0.12
JUN	0.54	15.2%	51,600	1.24	56.7	15.8%	2.2	17.6	49.9	15.4%	1.9	15.50	6.8	18.4%	0.3	2.1	0.3	11.0%	0.0	0.08
JUL	0.02	0.4%	1,470	1.29	1.6	0.4%	0.1	17.6	1.4	0.4%	0.1	15.50	0.2	0.5%	0.0	2.1	0.0	0.3%	0.0	0.08
AUG	0.01	0.2%	616	1.30	0.7	0.2%	0.0	17.6	0.6	0.2%	0.0	15.50	0.1	0.2%	0.0	2.1	0.0	0.1%	0.0	0.08
SEP	0.00	0.0%	0	0.70	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**3.58**		**340,242**	**22.55**	**360.0**		**13.7**		**323.4**		**12.3**		**36.7**		**1.4**		**2.4**		**0.1**	

Table 14: BE1 subsurface tile event runoff and water volume values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

BE1 – SUBSURFACE TILE						TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
EVENT #	EVENT DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	4-May	0.04	1.3%	4,255	0.78	2.1	1.0%	0.1	8	0.0	2.4%	0.0	0.14	0.0	2.1%	0.0	0.06	4.0	1.4%	0.2	15.2
2	5-May	0.24	6.6%	22,358	0.57	7.0	3.4%	0.3	5	0.2	11.7%	0.0	0.13	0.1	10.5%	0.0	0.05	20.8	7.2%	0.8	14.9
3	6-May	0.51	14.2%	48,307	1.56	8.6	4.2%	0.3	3	0.3	17.6%	0.0	0.09	0.1	18.3%	0.0	0.04	45.8	15.8%	1.7	15.2
4	24-May	0.11	3.2%	10,864	1.04	27.8	13.5%	1.1	41	0.1	5.9%	0.0	0.14	0.0	4.4%	0.0	0.05	11.9	4.1%	0.5	17.5
5	26-May	0.67	18.7%	63,562	1.40	71.4	34.5%	2.7	18	0.5	29.4%	0.0	0.12	0.2	25.2%	0.0	0.04	11.8	4.1%	0.5	3.0
6	27-May	0.35	9.9%	33,647	1.17	21.0	10.2%	0.8	10	0.2	9.7%	0.0	0.07	0.1	9.3%	0.0	0.03	33.2	11.4%	1.3	15.8
Base flow	Base flow	1.65	46.2%	157,151	109.30	68.6	33.2%	2.6	7	0.4	23.1%	0.0	0.04	0.2	29.9%	0.0	0.02	163.1	56.1%	6.2	16.6
Snowmelt	Snowmelt	0.00	0.0%	98	3.10	0.2	0.1%	0.0	27	0.0	0.2%	0.0	0.57	0.0	0.2%	0.0	0.29	0.1	0.0%	0.0	22.6
TOTAL		**3.58**		**340,242**	**118.92**	**206.6**		**7.9**		**1.6**		**0.1**		**0.7**		**0.0**		**290.7**		**11.1**	

Table 15: BE1 subsurface tile event runoff and water volume values associated with TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

BE1 – SUBSURFACE TILE						TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
EVENT #	EVENT DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	4-May	0.04	1.3%	4,255	0.78	4.3	1.2%	0.2	16.2	3.6	1.1%	0.1	13.62	0.7	1.8%	0.0	2.5	0.0	0.9%	0.0	0.08
2	5-May	0.24	6.6%	22,358	0.57	23.0	6.4%	0.9	16.5	19.4	6.0%	0.7	13.90	3.6	9.9%	0.1	2.6	0.1	4.8%	0.0	0.08
3	6-May	0.51	14.2%	48,307	1.56	50.0	13.9%	1.9	16.6	43.4	13.4%	1.7	14.39	6.6	17.9%	0.3	2.2	0.2	10.3%	0.0	0.08
4	24-May	0.11	3.2%	10,864	1.04	12.1	3.4%	0.5	17.8	10.4	3.2%	0.4	15.30	1.7	4.6%	0.1	2.5	0.1	2.3%	0.0	0.08
5	26-May	0.67	18.7%	63,562	1.40	62.9	17.5%	2.4	15.9	61.1	18.9%	2.3	15.39	1.9	5.0%	0.1	0.5	0.2	8.7%	0.0	0.05
6	27-May	0.35	9.9%	33,647	1.17	36.3	10.1%	1.4	17.3	31.9	9.9%	1.2	15.20	4.4	12.0%	0.2	2.1	0.2	7.2%	0.0	0.08
Base flow	Base flow	1.65	46.2%	157,151	109.30	171.3	47.6%	6.5	17.5	153.5	47.5%	5.9	15.64	17.8	48.6%	0.7	1.8	1.5	65.9%	0.1	0.16
Snowmelt	Snowmelt	0.00	0.0%	98	3.10	0.1	0.0%	0.0	8.9	0.0	0.0%	0.0	5.98	0.0	0.0%	0.0	2.9	0.0	0.0%	0.0	0.08
TOTAL		**3.58**		**340,242**	**118.92**	**360.0**		**13.7**		**323.4**		**12.3**		**36.7**		**1.4**		**2.4**		**0.1**	

Table 16: BE2 surface flume monthly runoff, water volume, and precipitation values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012. Totals in red indicate an underestimated total load or yield due to missing a large late February runoff as a result of frozen sampler lines.

BE2 – SURFACE FLUME					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	1.02	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
NOV	0.00	0.0%	0	0.11	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
DEC	0.00	0.0%	0	1.25	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JAN	0.00	0.0%	0	0.59	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
FEB	0.42	67.3%	21,788	2.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MAR	0.00	0.0%	0	1.25	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
APR	0.00	0.0%	0	3.30	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAY	0.21	32.7%	10,580	6.76	1,593.9	NA	112.2	2,413	1.9	NA	0.1	2.83	0.1	NA	0.0	0.23	43.3	NA	3.0	65.5
JUN	0.00	0.0%	0	1.44	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JUL	0.00	0.0%	0	1.92	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
AUG	0.00	0.0%	0	2.08	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
SEP	0.00	0.0%	0	0.57	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**0.63**		**32,368**	**22.51**	**1,593.9**		**112.2**		**1.9**		**0.1**		**0.1**		**0.0**		**43.3**		**3.0**	

Table 17: BE2 surface flume monthly runoff, water volume, and precipitation values associated with the TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012. Totals in red indicate an underestimated total load or yield due to missing a large late February runoff as a result of frozen sampler lines.

BE2 – SURFACE FLUME					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	1.02	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
NOV	0.00	0.0%	0	0.11	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
DEC	0.00	0.0%	0	1.25	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JAN	0.00	0.0%	0	0.59	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
FEB	0.42	67.3%	21,788	2.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MAR	0.00	0.0%	0	1.25	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
APR	0.00	0.0%	0	3.30	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAY	0.21	32.7%	10,580	6.76	10.9	NA	0.8	16.4	0.4	NA	0.0	0.66	10.4	NA	0.7	15.8	0.7	NA	0.0	1.06
JUN	0.00	0.0%	0	1.44	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JUL	0.00	0.0%	0	1.92	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
AUG	0.00	0.0%	0	2.08	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
SEP	0.00	0.0%	0	0.57	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**0.63**		**32,368**	**22.51**	**10.9**		**0.8**		**0.4**		**0.0**		**10.4**		**0.7**		**0.7**		**0.0**	

Table 18: BE2 surface flume event runoff and water volume values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012. Totals in red indicate an underestimated total load or yield due to missing a large late February runoff as a result of frozen sampler lines.

BE2 – SURFACE FLUME						TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
Event #	Event Date	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	28-Feb	0.42	67.3%	21,788	0.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	5-May	0.10	16.6%	5,370	0.06	1,093.2	NA	77.0	3,260	1.3	NA	0.1	3.88	0.1	NA	0.0	0.28	33.2	NA	2.3	98.9
3	6-May	0.02	3.4%	1,097	0.14	223.3	NA	15.7	3,260	0.3	NA	0.0	3.88	0.0	NA	0.0	0.28	6.8	NA	0.5	98.9
4	26-May	0.08	12.7%	4,112	0.07	277.3	NA	19.5	1,080	0.3	NA	0.0	1.17	0.0	NA	0.0	0.15	3.3	NA	0.2	13.0
TOTAL		**0.63**		**32,368**	**1.16**	**1,593.9**		**112.2**		**1.9**		**0.1**		**0.1**		**0.0**		**43.3**		**3.0**	

Table 19: BE2 surface flume event runoff and water volume values associated with the TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012. Totals in red indicate an underestimated total load or yield due to missing a large late February runoff as a result of frozen sampler lines.

BE2 – SURFACE FLUME						TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
Event #	Event Date	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	28-Feb	0.42	67.3%	21,788	0.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	5-May	0.10	16.6%	5,370	0.06	7.9	NA	0.6	23.5	0.2	NA	0.0	0.70	7.6	NA	0.5	22.8	0.3	NA	0.0	0.95
3	6-May	0.02	3.4%	1,097	0.14	1.6	NA	0.1	23.5	0.0	NA	0.0	0.70	1.6	NA	0.1	22.8	0.1	NA	0.0	0.95
4	26-May	0.08	12.7%	4,112	0.07	1.4	NA	0.1	5.3	0.2	NA	0.0	0.60	1.2	NA	0.1	4.7	0.3	NA	0.0	1.23
TOTAL		**0.63**		**32,368**	**1.16**	**10.9**		**0.8**		**0.4**		**0.0**		**10.4**		**0.7**		**0.7**		**0.0**	

Table 20: BE2 subsurface tile monthly runoff, water volume, and precipitation values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

BE2 – SUBSURFACE TILE					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	1.02	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
NOV	0.00	0.0%	0	0.11	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
DEC	0.00	0.0%	0	1.25	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JAN	0.00	0.0%	0	0.59	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
FEB	0.41	24.1%	21,100	2.22	235.6	15.2%	16.6	179	0.9	33.8%	0.1	0.72	0.3	40.6%	0.0	0.22	14.3	15.1%	1.0	10.9
MAR	0.00	0.0%	32	1.25	0.1	0.0%	0.0	67	0.0	0.0%	0.0	0.58	0.0	0.1%	0.0	0.18	0.0	0.0%	0.0	10.6
APR	0.02	1.2%	1,050	3.30	1.2	0.1%	0.1	19	0.0	0.4%	0.0	0.15	0.0	0.6%	0.0	0.07	0.9	0.9%	0.1	13.0
MAY	1.10	64.6%	56,448	6.76	1,298.6	84.0%	91.4	368	1.7	62.8%	0.1	0.50	0.4	52.4%	0.0	0.10	72.7	76.5%	5.1	20.6
JUN	0.14	8.2%	7,205	1.44	8.5	0.6%	0.6	19	0.1	2.5%	0.0	0.15	0.0	4.4%	0.0	0.07	5.8	6.2%	0.4	13.0
JUL	0.03	1.8%	1,580	1.92	1.9	0.1%	0.1	19	0.0	0.5%	0.0	0.15	0.0	1.0%	0.0	0.07	1.3	1.3%	0.1	13.0
AUG	0.00	0.0%	0	2.08	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	1.0%	0.0	0.00	0.0	0.0%	0.0	0.0
SEP	0.00	0.0%	0	0.57	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**1.70**		**87,416**	**22.51**	**1,546.0**		**108.9**		**2.8**		**0.2**		**0.7**		**0.0**		**95.0**		**6.7**	

Table 21: BE2 subsurface tile monthly runoff, water volume, and precipitation values associated with the TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

BE2 – SUBSURFACE TILE					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	1.02	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
NOV	0.00	0.0%	0	0.11	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
DEC	0.00	0.0%	0	1.25	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JAN	0.00	0.0%	0	0.59	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
FEB	0.41	24.1%	21,100	2.22	29.2	11.9%	2.1	22.2	21.3	10.2%	1.5	16.20	7.9	22.3%	0.6	6.0	0.4	36.1%	0.0	0.28
MAR	0.00	0.0%	32	1.25	0.1	0.0%	0.0	26.2	0.0	0.0%	0.0	19.70	0.0	0.0%	0.0	6.5	0.0	0.0%	0.0	0.24
APR	0.02	1.2%	1,050	3.30	3.1	1.3%	0.2	47.4	2.8	1.3%	0.2	42.10	0.3	1.0%	0.0	5.3	0.0	0.5%	0.0	0.08
MAY	1.10	64.6%	56,448	6.76	186.6	76.2%	13.1	52.9	162.4	77.5%	11.4	46.07	24.2	68.4%	1.7	6.9	0.6	59.1%	0.0	0.17
JUN	0.14	8.2%	7,205	1.44	21.3	8.7%	1.5	47.4	18.9	9.0%	1.3	42.10	2.4	6.8%	0.2	5.3	0.0	3.5%	0.0	0.08
JUL	0.03	1.8%	1,580	1.92	4.7	1.9%	0.3	47.4	4.2	2.0%	0.3	42.10	0.5	1.5%	0.0	5.3	0.0	0.8%	0.0	0.08
AUG	0.00	0.0%	0	2.08	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
SEP	0.00	0.0%	0	0.57	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**1.70**		**87,416**	**22.51**	**245.0**		**17.3**		**209.7**		**14.8**		**35.3**		**2.5**		**1.0**		**0.1**	

Table 22: BE2 subsurface tile event runoff, water volume, and precipitation values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

BE2 – SUBSURFACE TILE						TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
Event #	Event Date	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	28-Feb	0.41	24.2%	21,132	1.25	235.8	15.2%	16.6	179	0.9	33.9%	0.1	0.72	0.3	41.0%	0.0	0.22	14.4	15.1%	1.0	10.9
2	1-May	0.02	1.3%	1,121	1.00	25.1	1.6%	1.8	358	0.0	1.5%	0.0	0.61	0.0	1.4%	0.0	0.14	1.3	1.4%	0.1	18.5
3	4-May	0.03	1.5%	1,352	0.76	86.9	5.6%	6.1	1,030	0.1	2.9%	0.0	0.95	0.0	1.7%	0.0	0.14	2.7	2.9%	0.2	32.1
4	5-May	0.25	14.7%	12,842	0.56	752.8	48.7%	53.0	939	0.7	26.1%	0.1	0.91	0.1	16.1%	0.0	0.14	25.7	27.1%	1.8	32.1
5	6-May	0.32	19.1%	16,698	0.84	263.9	17.1%	18.6	253	0.4	16.0%	0.0	0.43	0.1	14.6%	0.0	0.10	23.7	24.9%	1.7	22.7
6	26-May	0.21	12.2%	10,679	0.33	114.7	7.4%	8.1	172	0.3	9.4%	0.0	0.39	0.1	9.4%	0.0	0.10	8.3	8.7%	0.6	12.4
7	28-May	0.05	2.8%	2,450	0.48	26.3	1.7%	1.9	172	0.1	2.2%	0.0	0.39	0.0	2.2%	0.0	0.10	1.9	2.0%	0.1	12.4
Base flow	Base flow	0.41	24.2%	21,143	69.74	40.6	2.6%	2.9	31	0.2	8.1%	0.0	0.17	0.1	13.5%	0.0	0.07	17.1	18.0%	1.2	13.0
TOTAL		**1.70**		**87,416**	**74.97**	**1,546.0**		**108.9**		**2.8**		**0.2**		**0.7**		**0.0**		**95.0**		**6.7**	

Table 23: BE2 subsurface tile event runoff, water volume, and precipitation values associated with the TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

BE2 – SUBSURFACE TILE						TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
Event #	Event Date	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	28-Feb	0.41	24.2%	21,132	1.25	29.3	12.0%	2.1	22.2	21.4	10.2%	1.5	16.21	7.9	22.4%	0.6	6.0	0.4	36.1%	0.0	0.28
2	1-May	0.02	1.3%	1,121	1.00	3.0	1.2%	0.2	43.2	2.6	1.2%	0.2	36.48	0.5	1.3%	0.0	6.7	0.0	1.5%	0.0	0.22
3	4-May	0.03	1.5%	1,352	0.76	5.2	2.1%	0.4	61.1	4.4	2.1%	0.3	52.30	0.7	2.1%	0.1	8.8	0.0	3.0%	0.0	0.37
4	5-May	0.25	14.7%	12,842	0.56	47.9	19.6%	3.4	59.8	40.9	19.5%	2.9	51.02	7.0	19.9%	0.5	8.8	0.3	27.0%	0.0	0.35
5	6-May	0.32	19.1%	16,698	0.84	52.5	21.4%	3.7	50.3	45.2	21.6%	3.2	43.37	7.3	20.6%	0.5	7.0	0.2	15.8%	0.0	0.16
6	26-May	0.21	12.2%	10,679	0.33	35.7	14.6%	2.5	53.5	31.7	15.1%	2.2	47.60	3.9	11.1%	0.3	5.9	0.1	5.2%	0.0	0.08
7	28-May	0.05	2.8%	2,450	0.48	8.2	3.3%	0.6	53.5	7.3	3.5%	0.5	47.60	0.9	2.6%	0.1	5.9	0.0	1.2%	0.0	0.08
Base flow	Base flow	0.41	24.2%	21,143	69.74	63.2	25.8%	4.5	47.9	56.1	26.8%	4.0	42.52	7.1	20.0%	0.5	5.3	0.1	10.2%	0.0	0.08
TOTAL		**1.70**		**87,416**	**74.97**	**245.0**		**17.3**		**209.7**		**14.8**		**35.3**		**2.5**		**1.0**		**0.1**	

Table 24: CH1 surface flume monthly runoff, water volume, and precipitation values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

CH1 – SURFACE FLUME					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.46	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
NOV	0.00	0.0%	0	0.22	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
DEC	0.00	0.0%	0	0.59	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JAN	0.00	0.0%	0	0.85	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
FEB	0.00	0.0%	0	0.05	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAR	0.98	43.0%	21,662	1.99	26.2	3.4%	4.3	19	2.4	43.9%	0.4	1.77	1.5	51.7%	0.2	1.08	35.4	81.5%	5.8	26.2
APR	0.00	0.0%	0	2.33	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAY	0.91	40.0%	20,186	7.50	373.0	47.8%	61.2	296	2.1	39.3%	0.4	1.70	1.1	37.3%	0.2	0.84	5.6	12.9%	0.9	4.4
JUN	0.38	16.8%	8,486	3.79	380.4	48.7%	62.4	718	0.9	16.7%	0.1	1.72	0.3	10.9%	0.1	0.58	2.4	5.5%	0.4	4.5
JUL	0.00	0.1%	75	3.03	1.2	0.1%	0.2	248	0.0	0.1%	0.0	1.74	0.0	0.1%	0.0	0.90	0.1	0.1%	0.0	13.8
AUG	0.00	0.0%	0	1.08	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
SEP	0.00	0.0%	0	0.45	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**2.28**		**50,409**	**22.34**	**780.8**		**128.0**		**5.5**		**0.9**		**2.8**		**0.5**		**43.5**		**7.1**	

Table 25: CH1 surface flume monthly runoff, water volume and precipitation values associated with TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

CH1 – SURFACE FLUME					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.46	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
NOV	0.00	0.0%	0	0.22	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
DEC	0.00	0.0%	0	0.59	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JAN	0.00	0.0%	0	0.85	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
FEB	0.00	0.0%	0	0.05	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAR	0.98	43.0%	21,662	1.99	10.9	62.1%	1.8	8.1	3.4	81.3%	0.6	2.49	7.6	56.2%	1.2	5.6	0.7	68.5%	0.1	0.51
APR	0.00	0.0%	0	2.33	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAY	0.91	40.0%	20,186	7.50	3.7	21.2%	0.6	3.0	0.5	11.3%	0.1	0.37	3.3	24.3%	0.5	2.6	0.2	16.2%	0.0	0.13
JUN	0.38	16.8%	8,486	3.79	2.9	16.6%	0.5	5.5	0.3	7.3%	0.0	0.57	2.6	19.4%	0.4	4.9	0.2	15.2%	0.0	0.29
JUL	0.00	0.1%	75	3.03	0.0	0.1%	0.0	5.6	0.0	0.1%	0.0	1.31	0.0	0.1%	0.0	4.3	0.0	0.1%	0.0	0.32
AUG	0.00	0.0%	0	1.08	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
SEP	0.00	0.0%	0	0.45	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**2.28**		**50,409**	**22.34**	**17.6**		**2.9**		**4.1**		**0.7**		**13.5**		**2.2**		**1.0**		**0.2**	

Table 26: CH1 surface flume event runoff and water volume values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

CH1 – SURFACE FLUME						TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
Event #	Event Date	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	6-Mar	0.98	43.0%	21,662	5.00	26.2	3.4%	4.3	19	2.4	43.9%	0.4	1.77	1.5	51.7%	0.2	1.08	35.4	81.5%	5.8	26.2
2	1-May	0.01	0.3%	148	0.20	2.3	0.3%	0.4	248	0.0	0.3%	0.0	1.74	0.0	0.3%	0.0	0.90	0.1	0.3%	0.0	13.8
3	6-May	0.03	1.3%	679	0.72	13.9	1.8%	2.3	328	0.1	1.7%	0.0	2.18	0.1	1.9%	0.0	1.29	0.6	1.3%	0.1	13.8
4	23-May	0.64	28.1%	14,176	1.19	228.0	29.2%	37.4	258	1.6	29.8%	0.3	1.84	0.8	26.7%	0.1	0.85	3.6	8.3%	0.6	4.1
5	26-May	0.00	0.2%	107	0.23	2.7	0.3%	0.4	398	0.0	0.2%	0.0	1.27	0.0	0.2%	0.0	0.73	0.0	0.1%	0.0	4.0
6	26-May	0.03	1.4%	712	0.55	17.7	2.3%	2.9	398	0.1	1.0%	0.0	1.27	0.0	1.1%	0.0	0.73	0.2	0.4%	0.0	4.0
7	27-May	0.20	8.7%	4,364	0.76	108.5	13.9%	17.8	398	0.3	6.3%	0.1	1.27	0.2	7.0%	0.0	0.73	1.1	2.5%	0.2	4.0
8	10-Jun	0.00	0.2%	84	0.21	1.3	0.2%	0.2	248	0.0	0.2%	0.0	1.74	0.0	0.2%	0.0	0.90	0.1	0.2%	0.0	13.8
9	14-Jun	0.03	1.4%	691	0.11	46.4	5.9%	7.6	1,075	0.1	1.6%	0.0	1.96	0.0	0.8%	0.0	0.50	0.2	0.4%	0.0	4.5
10	16-Jun	0.04	1.7%	863	0.18	57.9	7.4%	9.5	1,075	0.1	1.9%	0.0	1.96	0.0	0.9%	0.0	0.50	0.2	0.6%	0.0	4.5
11	17-Jun	0.30	13.3%	6,726	0.45	272.9	34.9%	44.7	650	0.7	12.9%	0.1	1.67	0.2	8.8%	0.0	0.59	1.8	4.1%	0.3	4.2
12	19-Jun	0.01	0.2%	122	0.38	1.9	0.2%	0.3	248	0.0	0.0%	0.0	0.32	0.0	0.2%	0.0	0.90	0.1	0.2%	0.0	13.8
13	3-Jul	0.00	0.1%	33	0.35	0.5	0.1%	0.1	248	0.0	0.1%	0.0	1.74	0.0	0.1%	0.0	0.90	0.0	0.1%	0.0	13.8
14	18-Jul	0.00	0.1%	42	0.10	0.6	0.1%	0.1	248	0.0	0.1%	0.0	1.74	0.0	0.1%	0.0	0.90	0.0	0.1%	0.0	13.8
TOTAL		**2.28**		**50,409**	**10.44**	**780.8**		**128.0**		**5.5**		**0.9**		**2.8**		**0.5**		**43.5**		**7.1**	

Table 27: CH1 surface flume event runoff and water volume values associated with the TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

CH1 – SURFACE FLUME						TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
Event #	Event Date	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	6-Mar	0.98	43.0%	21,662	5.00	10.9	62.1%	1.8	8.1	3.4	81.3%	0.6	2.49	7.6	56.2%	1.2	5.6	0.7	68.5%	0.1	0.51
2	1-May	0.01	0.3%	148	0.20	0.1	0.3%	0.0	5.6	0.0	0.3%	0.0	1.31	0.0	0.3%	0.0	4.3	0.0	0.3%	0.0	0.32
3	6-May	0.03	1.3%	679	0.72	0.2	0.9%	0.0	3.7	0.0	0.1%	0.0	0.10	0.2	1.1%	0.0	3.6	0.0	1.6%	0.0	0.37
4	23-May	0.64	28.1%	14,176	1.19	2.8	15.9%	0.5	3.2	0.3	8.1%	0.1	0.38	2.5	18.3%	0.4	2.8	0.1	7.0%	0.0	0.08
5	26-May	0.00	0.2%	107	0.23	0.0	0.1%	0.0	2.3	0.0	0.1%	0.0	0.35	0.0	0.1%	0.0	1.9	0.0	0.2%	0.0	0.23
6	26-May	0.03	1.4%	712	0.55	0.1	0.6%	0.0	2.3	0.0	0.4%	0.0	0.35	0.1	0.6%	0.0	1.9	0.0	1.0%	0.0	0.23
7	27-May	0.20	8.7%	4,364	0.76	0.6	3.5%	0.1	2.3	0.1	2.3%	0.0	0.35	0.5	3.8%	0.1	1.9	0.1	6.2%	0.0	0.23
8	10-Jun	0.00	0.2%	84	0.21	0.0	0.2%	0.0	5.6	0.0	0.2%	0.0	1.31	0.0	0.2%	0.0	4.3	0.0	0.2%	0.0	0.32
9	14-Jun	0.03	1.4%	691	0.11	0.3	1.7%	0.0	6.8	0.0	0.6%	0.0	0.61	0.3	2.0%	0.0	6.1	0.0	1.9%	0.0	0.44
10	16-Jun	0.04	1.7%	863	0.18	0.4	2.1%	0.1	6.8	0.0	0.8%	0.0	0.61	0.3	2.5%	0.1	6.1	0.0	2.3%	0.0	0.44
11	17-Jun	0.30	13.3%	6,726	0.45	2.2	12.4%	0.4	5.2	0.2	5.5%	0.0	0.54	2.0	14.6%	0.3	4.7	0.1	10.5%	0.0	0.25
12	19-Jun	0.01	0.2%	122	0.38	0.0	0.2%	0.0	5.6	0.0	0.2%	0.0	1.31	0.0	0.2%	0.0	4.3	0.0	0.2%	0.0	0.32
13	3-Jul	0.00	0.1%	33	0.35	0.0	0.1%	0.0	5.6	0.0	0.1%	0.0	1.31	0.0	0.1%	0.0	4.3	0.0	0.1%	0.0	0.32
14	18-Jul	0.00	0.1%	42	0.10	0.0	0.1%	0.0	5.6	0.0	0.1%	0.0	1.31	0.0	0.1%	0.0	4.3	0.0	0.1%	0.0	0.32
TOTAL		**2.28**		**50,409**	**10.44**	**17.6**		**2.9**		**4.1**		**0.7**		**13.5**		**2.2**		**1.0**		**0.2**	

Table 28: GO1 surface flume monthly runoff, water volume, and precipitation values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

GO1 – SURFACE FLUME					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	Cl- LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.80	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
NOV	0.00	0.0%	0	0.57	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
DEC	0.00	0.0%	0	0.90	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JAN	0.02	1.4%	557	0.50	0.7	0.5%	0.1	21	0.1	2.3%	0.0	1.93	0.0	2.2%	0.0	1.26	0.5	4.0%	0.1	15.1
FEB	1.13	65.9%	25,814	1.67	21.8	15.8%	3.5	14	2.0	68.4%	0.3	1.22	1.4	70.1%	0.2	0.86	9.9	76.2%	1.6	6.1
MAR	0.20	11.6%	4,562	2.24	20.2	14.6%	3.2	71	0.4	14.1%	0.1	1.43	0.3	16.2%	0.1	1.13	1.6	12.2%	0.3	5.6
APR	0.00	0.0%	0	2.34	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAY	0.00	0.0%	0	2.72	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JUN	0.36	20.8%	8,157	9.61	95.4	69.1%	15.1	187	0.4	15.1%	0.1	0.85	0.2	11.5%	0.0	0.45	1.0	7.5%	0.2	1.9
JUL	0.00	0.2%	0	2.94	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
AUG	0.00	0.0%	0	3.01	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
SEP	0.00	0.0%	0	0.79	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**1.71**		**39,091**	**28.09**	**138.2**		**21.9**		**2.9**		**0.5**		**2.0**		**0.3**		**13.0**		**2.1**	

Table 29: GO1 surface flume monthly runoff, water volume and precipitation values associated with TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

GO1 – SURFACE FLUME					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.80	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
NOV	0.00	0.0%	0	0.57	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
DEC	0.00	0.0%	0	0.90	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JAN	0.02	1.4%	557	0.50	0.3	1.9%	0.0	7.4	0.1	4.5%	0.0	2.29	0.2	1.5%	0.0	5.1	0.0	1.0%	0.0	0.84
FEB	1.13	65.9%	25,814	1.67	9.8	74.0%	1.6	6.1	1.3	71.4%	0.2	0.78	8.6	74.4%	1.4	5.3	2.3	80.0%	0.4	1.40
MAR	0.20	11.6%	4,562	2.24	1.8	13.6%	0.3	6.3	0.2	11.7%	0.0	0.72	1.6	13.8%	0.3	5.6	0.4	15.4%	0.1	1.52
APR	0.00	0.0%	0	2.34	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAY	0.00	0.0%	0	2.72	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JUN	0.36	20.8%	8,157	9.61	1.4	10.5%	0.2	2.7	0.2	12.4%	0.0	0.43	1.2	10.2%	0.2	2.3	0.1	3.6%	0.0	0.20
JUL	0.00	0.2%	0	2.94	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
AUG	0.00	0.0%	0	3.01	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
SEP	0.00	0.0%	0	0.79	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**1.71**		**39,091**	**28.09**	**13.2**		**2.1**		**1.8**		**0.3**		**11.5**		**1.8**		**2.8**		**0.4**	

Table 30: GO1 surface flume event runoff and water volume values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

GO1 – SURFACE FLUME						TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	31-Jan	0.02	1.5%	568	0.94	0.74	0.5%	0.1	21	0.07	2.4%	0.0	1.93	0.04	2.3%	0.0	1.26	0.54	4.1%	0.1	15.1
2	1-Feb	0.00	0.3%	106	0.23	0.14	0.1%	0.0	21	0.01	0.4%	0.0	1.93	0.01	0.4%	0.0	1.26	0.10	0.8%	0.0	15.1
3	2-Feb	0.00	0.3%	109	0.22	0.39	0.3%	0.1	57	0.01	0.3%	0.0	1.18	0.01	0.3%	0.0	0.81	0.04	0.3%	0.0	5.3
4	3-Feb	0.01	0.4%	141	0.21	0.08	0.1%	0.0	9	0.02	0.5%	0.0	1.76	0.01	0.5%	0.0	1.21	0.14	1.1%	0.0	16.1
5	6-Feb	0.03	1.6%	641	0.20	0.96	0.7%	0.2	24	0.06	2.1%	0.0	1.49	0.05	2.3%	0.0	1.13	0.34	2.6%	0.1	8.4
6	6-Feb	0.04	2.3%	899	0.40	1.35	1.0%	0.2	24	0.08	2.9%	0.0	1.49	0.06	3.2%	0.0	1.13	0.47	3.6%	0.1	8.4
7	16-Feb	0.01	0.4%	142	0.30	0.28	0.2%	0.0	32	0.02	0.5%	0.0	1.71	0.01	0.5%	0.0	1.19	0.12	0.9%	0.0	13.0
8	17-Feb	0.01	0.4%	151	0.15	0.30	0.2%	0.0	32	0.02	0.6%	0.0	1.71	0.01	0.6%	0.0	1.19	0.12	0.9%	0.0	13.0
9	21-Feb	0.01	0.5%	199	0.21	0.70	0.5%	0.1	57	0.01	0.5%	0.0	1.18	0.01	0.5%	0.0	0.81	0.07	0.5%	0.0	5.3
10	22-Feb	0.04	2.4%	931	0.42	0.99	0.7%	0.2	17	0.04	1.4%	0.0	0.68	0.02	1.1%	0.0	0.38	0.38	2.9%	0.1	6.6
11	28-Feb	0.98	57.5%	22,485	1.15	16.58	12.0%	2.6	12	1.70	59.1%	0.3	1.21	1.20	60.6%	0.2	0.85	8.12	62.5%	1.3	5.8
12	1-Mar	0.18	10.3%	4,009	0.43	18.27	13.2%	2.9	73	0.37	12.7%	0.1	1.46	0.29	14.8%	0.0	1.17	1.40	10.8%	0.2	5.6
13	2-Mar	0.02	1.4%	554	0.33	1.96	1.4%	0.3	57	0.04	1.4%	0.0	1.18	0.03	1.4%	0.0	0.81	0.18	1.4%	0.0	5.3
14	14-Jun	0.20	11.7%	4,566	0.23	58.45	42.3%	9.3	205	0.23	8.1%	0.0	0.81	0.11	5.8%	0.0	0.40	0.43	3.3%	0.1	1.5
15	17-Jun	0.12	6.9%	2,702	0.13	34.59	25.0%	5.5	205	0.14	4.8%	0.0	0.81	0.07	3.4%	0.0	0.40	0.25	1.9%	0.0	1.5
16	20-Jun	0.04	2.3%	890	0.35	2.39	1.7%	0.4	43	0.07	2.3%	0.0	1.18	0.05	2.3%	0.0	0.81	0.30	2.3%	0.0	5.3
TOTAL		**1.71**		**39,091**	**5.89**	**138.2**		**21.9**		**2.9**		**0.5**		**2.0**		**0.3**		**13.0**		**2.1**	

Table 31: GO1 surface flume event runoff and water volume values associated with TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

GO1 – SURFACE FLUME						TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	31-Jan	0.02	1.5%	568	0.94	0.26	2.0%	0.0	7.4	0.08	4.6%	0.0	2.29	0.18	1.6%	0.0	5.1	0.03	1.1%	0.0	0.84
2	1-Feb	0.00	0.3%	106	0.23	0.05	0.4%	0.0	7.4	0.02	0.9%	0.0	2.29	0.03	0.3%	0.0	5.1	0.01	0.2%	0.0	0.84
3	2-Feb	0.00	0.3%	109	0.22	0.04	0.3%	0.0	5.4	0.00	0.3%	0.0	0.72	0.03	0.3%	0.0	4.7	0.01	0.3%	0.0	1.15
4	3-Feb	0.01	0.4%	141	0.21	0.09	0.6%	0.0	9.7	0.03	1.5%	0.0	2.89	0.06	0.5%	0.0	6.8	0.01	0.4%	0.0	1.36
5	6-Feb	0.03	1.6%	641	0.20	0.23	1.8%	0.0	5.8	0.02	1.1%	0.0	0.50	0.21	1.8%	0.0	5.3	0.08	2.7%	0.0	1.89
6	6-Feb	0.04	2.3%	899	0.40	0.33	2.5%	0.1	5.8	0.03	1.6%	0.0	0.50	0.30	2.6%	0.0	5.3	0.11	3.8%	0.0	1.89
7	16-Feb	0.01	0.4%	142	0.30	0.07	0.5%	0.0	7.6	0.00	0.3%	0.0	0.56	0.06	0.5%	0.0	7.0	0.02	0.7%	0.0	2.19
8	17-Feb	0.01	0.4%	151	0.15	0.07	0.5%	0.0	7.6	0.01	0.3%	0.0	0.56	0.07	0.6%	0.0	7.0	0.02	0.7%	0.0	2.19
9	21-Feb	0.01	0.5%	199	0.21	0.07	0.5%	0.0	5.4	0.01	0.5%	0.0	0.72	0.06	0.5%	0.0	4.7	0.01	0.5%	0.0	1.15
10	22-Feb	0.04	2.4%	931	0.42	0.27	2.1%	0.0	4.7	0.04	2.2%	0.0	0.66	0.24	2.0%	0.0	4.1	0.04	1.6%	0.0	0.76
11	28-Feb	0.98	57.5%	22,485	1.15	8.59	64.9%	1.4	6.1	1.10	62.6%	0.2	0.78	7.49	65.2%	1.2	5.3	1.95	69.2%	0.3	1.39
12	1-Mar	0.18	10.3%	4,009	0.43	1.61	12.1%	0.3	6.4	0.18	10.3%	0.0	0.72	1.43	12.4%	0.2	5.7	0.39	13.9%	0.1	1.57
13	2-Mar	0.02	1.4%	554	0.33	0.19	1.4%	0.0	5.4	0.02	1.4%	0.0	0.72	0.16	1.4%	0.0	4.7	0.04	1.4%	0.0	1.15
14	14-Jun	0.20	11.7%	4,566	0.23	0.68	5.1%	0.1	2.4	0.11	6.3%	0.0	0.39	0.57	5.0%	0.1	2.0	0.02	0.8%	0.0	0.08
15	17-Jun	0.12	6.9%	2,702	0.13	0.40	3.0%	0.1	2.4	0.07	3.8%	0.0	0.39	0.34	2.9%	0.1	2.0	0.01	0.5%	0.0	0.08
16	20-Jun	0.04	2.3%	890	0.35	0.30	2.3%	0.0	5.4	0.04	2.3%	0.0	0.72	0.26	2.3%	0.0	4.7	0.06	2.3%	0.0	1.15
TOTAL		**1.71**		**39,091**	**5.89**	**13.2**		**2.1**		**1.8**		**0.3**		**11.5**		**1.8**		**2.8**		**0.4**	

Table 32: ST1 surface flume monthly runoff, water volume, and precipitation values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

ST1 – SURFACE FLUME					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	1.19	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
NOV	0.00	0.0%	0	0.25	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
DEC	0.00	0.0%	0	0.17	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JAN	0.00	0.0%	0	0.14	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
FEB	0.00	0.0%	0	1.04	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAR	0.00	0.0%	0	1.10	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
APR	0.00	0.0%	0	3.18	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAY	0.70	86.5%	71,811	6.78	17,482.9	93.2%	620.0	3,899	33.8	95.9%	1.2	7.54	2.1	87.7%	0.1	0.48	125.8	96.2%	4.5	28.0
JUN	0.11	13.5%	11,198	2.95	1,282.5	6.8%	45.5	1,834	1.4	4.1%	0.1	2.05	0.3	12.3%	0.0	0.43	4.9	3.8%	0.2	7.0
JUL	0.00	0.0%	0	3.32	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
AUG	0.00	0.0%	0	1.29	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
SEP	0.00	0.0%	0	0.24	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**0.81**		**83,009**	**21.65**	**18,765.4**		**665.4**		**35.2**		**1.2**		**2.4**		**0.1**		**130.7**		**4.6**	

Table 33: ST1 surface flume monthly runoff, water volume and precipitation values associated with TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

ST1 – SURFACE FLUME					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	1.19	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
NOV	0.00	0.0%	0	0.25	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
DEC	0.00	0.0%	0	0.17	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JAN	0.00	0.0%	0	0.14	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
FEB	0.00	0.0%	0	1.04	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAR	0.00	0.0%	0	1.10	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
APR	0.00	0.0%	0	3.18	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAY	0.70	86.5%	71,811	6.78	297.0	96.3%	10.5	66.2	11.8	92.8%	0.4	2.63	285.2	96.4%	10.1	63.6	11.2	98.3%	0.4	2.49
JUN	0.11	13.5%	11,198	2.95	11.5	3.7%	0.4	16.4	0.9	7.2%	0.0	1.31	10.6	3.6%	0.4	15.1	0.2	1.7%	0.0	0.28
JUL	0.00	0.0%	0	3.32	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
AUG	0.00	0.0%	0	1.29	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
SEP	0.00	0.0%	0	0.24	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**0.81**		**83,009**	**21.65**	**308.5**		**10.9**		**12.7**		**0.5**		**295.8**		**10.5**		**11.4**		**0.4**	

Table 34: ST1 surface flume event runoff and water volume values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

ST1 – SURFACE FLUME						TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	1-May	0.24	29.6%	24,602	0.30	4,851.1	25.9%	172.0	3,158	18.0	51.0%	0.6	11.70	0.8	33.2%	0.0	0.53	66.3	50.7%	2.4	43.1
2	2-May	0.05	6.3%	5,193	0.11	408.6	2.2%	14.5	1,260	2.5	7.2%	0.1	7.82	0.1	5.6%	0.0	0.42	12.3	9.4%	0.4	38.0
3	5-May	0.00	0.4%	307	0.30	69.3	0.4%	2.5	3,620	0.1	0.4%	0.0	6.80	0.0	0.4%	0.0	0.47	0.5	0.4%	0.0	25.2
4	18-May	0.17	21.2%	17,570	0.13	10,107.3	53.9%	358.4	9,212	6.9	19.7%	0.2	6.33	0.6	26.1%	0.0	0.58	20.5	15.6%	0.7	18.6
5	20-May	0.06	6.8%	5,658	0.28	1,279.0	6.8%	45.4	3,620	2.4	6.8%	0.1	6.80	0.2	6.8%	0.0	0.47	8.9	6.8%	0.3	25.2
6	24-May	0.00	0.3%	244	0.42	7.8	0.0%	0.3	513	0.0	0.1%	0.0	3.14	0.0	0.2%	0.0	0.39	0.2	0.2%	0.0	14.1
7	26-May	0.03	4.3%	3,559	0.12	114.0	0.6%	4.0	513	0.7	2.0%	0.0	3.14	0.1	3.5%	0.0	0.39	3.1	2.4%	0.1	14.1
8	26-May	0.14	16.9%	13,994	0.14	605.6	3.2%	21.5	693	2.9	8.2%	0.1	3.32	0.3	11.4%	0.0	0.32	13.4	10.3%	0.5	15.4
9	27-May	0.01	0.8%	684	0.46	40.2	0.2%	1.4	940	0.2	0.4%	0.0	3.66	0.0	0.5%	0.0	0.30	0.6	0.4%	0.0	13.2
10	14-Jun	0.05	6.1%	5,065	0.13	140.1	0.7%	5.0	443	0.8	2.1%	0.0	2.39	0.1	5.0%	0.0	0.39	2.2	1.6%	0.1	6.8
11	17-Jun	0.02	2.2%	1,797	0.05	335.6	1.8%	11.9	2,990	0.1	0.2%	0.0	0.76	0.0	2.0%	0.0	0.44	1.5	1.2%	0.1	13.5
12	19-Jun	0.01	1.3%	1,056	0.06	196.5	1.0%	7.0	2,980	0.1	0.4%	0.0	2.18	0.0	1.3%	0.0	0.47	0.3	0.2%	0.0	4.6
13	19-Jun	0.00	0.3%	216	0.06	40.2	0.2%	1.4	2,980	0.0	0.1%	0.0	2.18	0.0	0.3%	0.0	0.47	0.1	0.0%	0.0	4.6
14	20-Jun	0.03	3.7%	3,064	0.30	570.2	3.0%	20.2	2,980	0.4	1.2%	0.0	2.18	0.1	3.7%	0.0	0.47	0.9	0.7%	0.0	4.6
TOTAL		**0.81**		**83,009**	**2.87**	**18,765.4**		**665.4**		**35.2**		**1.2**		**2.4**		**0.1**		**130.7**		**4.6**	

Table 35: ST1 surface flume event runoff and water volume values associated with the TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

ST1 – SURFACE FLUME						TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	1-May	0.24	29.6%	24,602	0.30	143.5	46.5%	5.1	93.4	5.2	41.1%	0.2	3.40	138.3	46.8%	4.9	90.0	5.8	51.0%	0.2	3.78
2	2-May	0.05	6.3%	5,193	0.11	16.5	5.3%	0.6	50.8	1.4	10.7%	0.0	4.20	15.1	5.1%	0.5	46.6	0.5	4.7%	0.0	1.66
3	5-May	0.00	0.4%	307	0.30	1.1	0.4%	0.0	59.5	0.0	0.4%	0.0	2.45	1.1	0.4%	0.0	57.1	0.0	0.4%	0.0	2.20
4	18-May	0.17	21.2%	17,570	0.13	83.5	27.1%	3.0	76.1	3.4	27.1%	0.1	3.14	80.0	27.1%	2.8	72.9	2.7	23.4%	0.1	2.43
5	20-May	0.06	6.8%	5,658	0.28	21.0	6.8%	0.7	59.5	0.9	6.8%	0.0	2.45	20.2	6.8%	0.7	57.1	0.8	6.8%	0.0	2.20
6	24-May	0.00	0.3%	244	0.42	0.4	0.1%	0.0	26.0	0.0	0.1%	0.0	0.84	0.4	0.1%	0.0	25.2	0.0	0.1%	0.0	1.09
7	26-May	0.03	4.3%	3,559	0.12	5.8	1.9%	0.2	26.0	0.2	1.5%	0.0	0.84	5.6	1.9%	0.2	25.2	0.2	2.1%	0.0	1.09
8	26-May	0.14	16.9%	13,994	0.14	23.9	7.7%	0.8	27.3	0.6	4.8%	0.0	0.70	23.2	7.9%	0.8	26.6	1.0	9.2%	0.0	1.19
9	27-May	0.01	0.8%	684	0.46	1.3	0.4%	0.0	31.2	0.0	0.2%	0.0	0.74	1.3	0.4%	0.0	30.5	0.1	0.5%	0.0	1.23
10	14-Jun	0.05	6.1%	5,065	0.13	5.8	1.9%	0.2	18.3	0.4	3.1%	0.0	1.24	5.4	1.8%	0.2	17.1	0.0	0.2%	0.0	0.08
11	17-Jun	0.02	2.2%	1,797	0.05	1.9	0.6%	0.1	17.3	0.2	1.7%	0.0	1.88	1.7	0.6%	0.1	15.4	0.1	0.6%	0.0	0.65
12	19-Jun	0.01	1.3%	1,056	0.06	0.9	0.3%	0.0	13.9	0.1	0.6%	0.0	1.15	0.8	0.3%	0.0	12.7	0.0	0.2%	0.0	0.37
13	19-Jun	0.00	0.3%	216	0.06	0.2	0.1%	0.0	13.9	0.0	0.1%	0.0	1.15	0.2	0.1%	0.0	12.7	0.0	0.0%	0.0	0.37
14	20-Jun	0.03	3.7%	3,064	0.30	2.7	0.9%	0.1	13.9	0.2	1.7%	0.0	1.15	2.4	0.8%	0.1	12.7	0.1	0.6%	0.0	0.37
TOTAL		**0.81**		**83,009**	**2.87**	**308.5**		**10.9**		**12.7**		**0.5**		**295.8**		**10.5**		**11.4**		**0.4**	

Table 36: ST1 subsurface tile monthly runoff and water volume values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

ST1 – SUBSURFACE TILE					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.67	13.9%	58,673	1.19	55.0	3.7%	2.3	15	0.2	5.5%	0.0	0.07	0.1	5.5%	0.0	0.03	267.5	17.8%	11.1	73.0
NOV	0.55	11.4%	48,163	0.25	45.1	3.0%	1.9	15	0.2	4.5%	0.0	0.07	0.1	4.5%	0.0	0.03	219.6	14.6%	9.1	73.0
DEC	0.40	8.3%	35,318	0.17	33.1	2.2%	1.4	15	0.1	3.3%	0.0	0.07	0.1	3.3%	0.0	0.03	161.0	10.7%	6.7	73.0
JAN	0.28	5.9%	24,847	0.14	23.3	1.6%	1.0	15	0.1	2.3%	0.0	0.07	0.0	2.3%	0.0	0.03	113.3	7.5%	4.7	73.0
FEB	0.13	2.7%	11,221	1.04	10.5	0.7%	0.4	15	0.0	1.1%	0.0	0.07	0.0	1.1%	0.0	0.03	51.2	3.4%	2.1	73.0
MAR	0.14	2.9%	12,301	1.10	6.1	0.4%	0.3	8	0.0	1.0%	0.0	0.06	0.0	1.6%	0.0	0.04	49.1	3.3%	2.0	63.9
APR	0.34	7.1%	29,988	3.18	13.9	0.9%	0.6	7	0.1	2.1%	0.0	0.05	0.1	4.1%	0.0	0.04	117.3	7.8%	4.8	62.6
MAY	1.29	26.8%	113,236	6.78	930.4	62.1%	38.4	132	2.4	54.0%	0.1	0.35	0.9	48.0%	0.0	0.13	297.2	19.8%	12.3	42.0
JUN	0.89	18.6%	78,589	2.95	376.9	25.2%	15.6	77	1.1	24.9%	0.0	0.23	0.5	27.3%	0.0	0.10	196.1	13.1%	8.1	40.0
JUL	0.12	2.5%	10,650	3.32	3.1	0.2%	0.1	5	0.1	1.2%	0.0	0.08	0.0	2.3%	0.0	0.07	29.5	2.0%	1.2	44.4
AUG	0.00	0.0%	2	1.29	0.0	0.0%	0.0	14	0.0	0.0%	0.0	0.11	0.0	0.0%	0.0	0.09	0.0	0.0%	0.0	43.5
SEP	0.00	0.0%	0	0.24	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**4.82**		**422,988**	**21.65**	**1,497.3**		**61.9**		**4.5**		**0.2**		**1.9**		**0.1**		**1,501.6**		**62.0**	

Table 37: ST1 subsurface tile monthly runoff, water volume and precipitation values associated with TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

ST1 – SUBSURFACE TILE					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.67	13.9%	58,673	1.19	124.9	14.0%	5.2	34.1	109.2	13.7%	4.5	29.80	15.8	16.1%	0.7	4.3	0.3	10.2%	0.0	0.08
NOV	0.55	11.4%	48,163	0.25	102.6	11.5%	4.2	34.1	89.6	11.3%	3.7	29.80	12.9	13.3%	0.5	4.3	0.2	8.4%	0.0	0.08
DEC	0.40	8.3%	35,318	0.17	75.2	8.4%	3.1	34.1	65.7	8.3%	2.7	29.80	9.5	9.7%	0.4	4.3	0.2	6.1%	0.0	0.08
JAN	0.28	5.9%	24,847	0.14	52.9	5.9%	2.2	34.1	46.2	5.8%	1.9	29.80	6.7	6.8%	0.3	4.3	0.1	4.3%	0.0	0.08
FEB	0.13	2.7%	11,221	1.04	23.9	2.7%	1.0	34.1	20.9	2.6%	0.9	29.80	3.0	3.1%	0.1	4.3	0.1	1.9%	0.0	0.08
MAR	0.14	2.9%	12,301	1.10	25.0	2.8%	1.0	32.5	21.9	2.7%	0.9	28.48	3.1	3.2%	0.1	4.0	0.1	2.1%	0.0	0.08
APR	0.34	7.1%	29,988	3.18	59.3	6.6%	2.5	31.7	55.0	6.9%	2.3	29.37	4.3	4.4%	0.2	2.3	0.1	5.2%	0.0	0.08
MAY	1.29	26.8%	113,236	6.78	233.5	26.1%	9.7	33.0	207.9	26.1%	8.6	29.40	25.6	26.3%	1.1	3.6	1.3	46.3%	0.1	0.19
JUN	0.89	18.6%	78,589	2.95	172.7	19.3%	7.1	35.2	157.0	19.7%	6.5	32.00	15.6	16.0%	0.6	3.2	0.4	13.6%	0.0	0.08
JUL	0.12	2.5%	10,650	3.32	23.2	2.6%	1.0	34.8	22.1	2.8%	0.9	33.26	1.0	1.1%	0.0	1.6	0.1	1.8%	0.0	0.08
AUG	0.00	0.0%	2	1.29	0.0	0.0%	0.0	29.7	0.0	0.0%	0.0	29.00	0.0	0.0%	0.0	0.7	0.0	0.0%	0.0	0.08
SEP	0.00	0.0%	0	0.24	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**4.82**		**422,988**	**21.65**	**893.1**		**36.9**		**795.6**		**32.9**		**97.6**		**4.0**		**2.9**		**0.1**	

Table 38: ST1 subsurface tile event runoff and water volume values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

ST1 – SUBSURFACE TILE						TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	1-May	0.08	1.7%	7,207	1.29	220.5	14.7%	9.1	490	0.5	10.7%	0.0	1.08	0.2	8.2%	0.0	0.34	13.6	0.9%	0.6	30.2
2	2-May	0.05	1.1%	4,556	0.52	3.1	0.2%	0.1	11	0.1	1.6%	0.0	0.25	0.1	2.7%	0.0	0.18	11.1	0.7%	0.5	39.1
3	18-May	0.06	1.3%	5,495	1.08	308.8	20.6%	12.8	900	0.5	11.1%	0.0	1.46	0.1	4.2%	0.0	0.23	9.1	0.6%	0.4	26.6
4	20-May	0.06	1.3%	5,637	0.62	44.9	3.0%	1.9	128	0.1	2.3%	0.0	0.29	0.0	1.7%	0.0	0.09	15.4	1.0%	0.6	43.9
5	26-May	0.04	0.8%	3,417	0.57	188.2	12.6%	7.8	882	0.3	6.9%	0.0	1.46	0.0	2.6%	0.0	0.23	5.8	0.4%	0.2	27.0
6	26-May	0.11	2.4%	10,073	0.88	151.6	10.1%	6.3	241	0.4	9.8%	0.0	0.70	0.2	9.5%	0.0	0.28	19.8	1.3%	0.8	31.4
7	14-Jun	0.04	0.8%	3,304	0.29	108.8	7.3%	4.5	527	0.2	4.0%	0.0	0.88	0.1	3.1%	0.0	0.28	4.4	0.3%	0.2	21.3
8	17-Jun	0.02	0.3%	1,453	0.21	23.4	1.6%	1.0	258	0.0	1.1%	0.0	0.54	0.0	0.8%	0.0	0.16	3.0	0.2%	0.1	32.6
9	19-Jun	0.00	0.1%	307	0.04	1.2	0.1%	0.0	60	0.0	0.2%	0.0	0.45	0.0	0.3%	0.0	0.26	0.5	0.0%	0.0	27.2
10	20-Jun	0.08	1.6%	6,660	1.00	14.9	1.0%	0.6	36	0.1	1.8%	0.0	0.19	0.0	2.5%	0.0	0.11	14.0	0.9%	0.6	33.7
Base flow	Base flow	4.27	88.6%	374,878	319.88	431.8	28.8%	17.8	18	2.3	50.6%	0.1	0.10	1.2	64.5%	0.0	0.05	1,404.9	93.6%	58.1	60.0
TOTAL		**4.82**		**422,988**	**326.38**	**1,497.3**		**61.9**		**4.5**		**0.2**		**1.9**		**0.1**		**1,501.6**		**62.0**	

Table 39: ST1 subsurface tile event runoff, water volume and precipitation values associated with TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

ST1 – SUBSURFACE TILE						TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	1-May	0.08	1.7%	7,207	1.29	14.4	1.6%	0.6	32.1	11.7	1.5%	0.5	25.99	2.8	2.8%	0.1	6.1	0.1	2.4%	0.0	0.16
2	2-May	0.05	1.1%	4,556	0.52	10.4	1.2%	0.4	36.7	9.3	1.2%	0.4	32.60	1.2	1.2%	0.0	4.1	0.0	0.8%	0.0	0.08
3	18-May	0.06	1.3%	5,495	1.08	9.5	1.1%	0.4	27.6	5.0	0.6%	0.2	14.70	4.4	4.5%	0.2	12.9	0.1	4.5%	0.0	0.38
4	20-May	0.06	1.3%	5,637	0.62	11.4	1.3%	0.5	32.5	10.1	1.3%	0.4	28.80	1.3	1.3%	0.1	3.7	0.0	1.5%	0.0	0.12
5	26-May	0.04	0.8%	3,417	0.57	5.8	0.6%	0.2	27.0	3.7	0.5%	0.2	17.48	2.0	2.1%	0.1	9.6	0.1	2.7%	0.0	0.36
6	26-May	0.11	2.4%	10,073	0.88	21.1	2.4%	0.9	33.5	18.3	2.3%	0.8	29.09	2.8	2.8%	0.1	4.4	0.6	21.0%	0.0	0.96
7	14-Jun	0.04	0.8%	3,304	0.29	6.3	0.7%	0.3	30.6	5.0	0.6%	0.2	24.16	1.3	1.4%	0.1	6.5	0.0	0.6%	0.0	0.08
8	17-Jun	0.02	0.3%	1,453	0.21	3.0	0.3%	0.1	33.6	2.6	0.3%	0.1	28.80	0.4	0.4%	0.0	4.8	0.0	0.3%	0.0	0.08
9	19-Jun	0.00	0.1%	307	0.04	0.6	0.1%	0.0	30.9	0.6	0.1%	0.0	28.80	0.0	0.0%	0.0	2.1	0.0	0.1%	0.0	0.08
10	20-Jun	0.08	1.6%	6,660	1.00	15.0	1.7%	0.6	36.1	13.8	1.7%	0.6	33.10	1.3	1.3%	0.1	3.0	0.0	1.2%	0.0	0.08
Base flow	Base flow	4.27	88.6%	374,878	319.88	795.5	89.1%	32.9	34.0	715.5	89.9%	29.6	30.56	80.0	82.0%	3.3	3.4	1.9	65.0%	0.1	0.08
TOTAL		**4.82**		**422,988**	**326.38**	**893.1**		**36.9**		**795.6**		**32.9**		**97.6**		**4.0**		**2.9**		**0.1**	

Table 40: WR1 surface flume monthly runoff, water volume, and precipitation values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

WR1 – SURFACE FLUME					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.58	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
NOV	0.00	0.0%	0	0.07	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
DEC	0.00	0.0%	0	0.56	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JAN	0.00	0.0%	0	0.68	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
FEB	0.00	0.0%	0	2.09	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAR	0.03	0.7%	3,010	2.12	7.5	0.0%	0.3	40	0.1	0.2%	0.0	0.63	0.1	0.7%	0.0	0.44	0.6	0.2%	0.0	3.3
APR	0.00	0.0%	49	2.10	0.1	0.0%	0.0	40	0.0	0.0%	0.0	0.63	0.0	0.0%	0.0	0.44	0.0	0.0%	0.0	3.4
MAY	3.65	74.3%	316,266	11.76	43,734.1	77.3%	1,829.9	2,214	57.2	76.2%	2.4	2.90	9.9	79.4%	0.4	0.50	259.2	69.4%	10.8	13.1
JUN	0.93	19.0%	80,996	4.71	12,309.2	21.8%	515.0	2,434	16.6	22.1%	0.7	3.28	2.0	15.8%	0.1	0.39	111.4	29.8%	4.7	22.0
JUL	0.00	0.1%	215	4.39	28.8	0.1%	1.2	2,146	0.0	0.1%	0.0	2.84	0.0	0.1%	0.0	0.47	0.2	0.1%	0.0	14.2
AUG	0.29	5.9%	24,889	5.12	490.3	0.9%	20.5	315	1.1	1.5%	0.0	0.71	0.5	4.1%	0.0	0.33	2.3	0.6%	0.1	1.5
SEP	0.00	0.0%	0	0.40	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**4.90**		**425,425**	**34.58**	**56,570.0**		**2,366.9**		**75.0**		**3.1**		**12.5**		**0.5**		**373.8**		**15.6**	

Table 41: WR1 surface flume monthly runoff, water volume, and precipitation values associated with the TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

WR1 – SURFACE FLUME					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.58	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
NOV	0.00	0.0%	0	0.07	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
DEC	0.00	0.0%	0	0.56	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JAN	0.00	0.0%	0	0.68	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
FEB	0.00	0.0%	0	2.09	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAR	0.03	0.7%	3,010	2.12	0.6	0.1%	0.0	3.1	0.2	0.8%	0.0	1.17	0.4	0.1%	0.0	1.9	0.1	0.5%	0.0	0.31
APR	0.00	0.0%	49	2.10	0.0	0.0%	0.0	3.1	0.0	0.0%	0.0	1.17	0.0	0.0%	0.0	1.9	0.0	0.0%	0.0	0.31
MAY	3.65	74.3%	316,266	11.76	309.0	75.6%	12.9	15.6	17.5	67.1%	0.7	0.89	291.4	76.2%	12.2	14.8	8.8	71.4%	0.4	0.44
JUN	0.93	19.0%	80,996	4.71	91.8	22.5%	3.8	18.2	6.8	25.9%	0.3	1.34	85.1	22.2%	3.6	16.8	3.1	25.2%	0.1	0.61
JUL	0.00	0.1%	215	4.39	0.2	0.1%	0.0	15.5	0.0	0.1%	0.0	0.98	0.2	0.1%	0.0	14.5	0.0	0.1%	0.0	0.46
AUG	0.29	5.9%	24,889	5.12	7.0	1.7%	0.3	4.5	1.6	6.1%	0.1	1.02	5.4	1.4%	0.2	3.5	0.4	2.9%	0.0	0.23
SEP	0.00	0.0%	0	0.40	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**4.90**		**425,425**	**34.58**	**408.6**		**17.1**		**26.1**		**1.1**		**382.5**		**16.0**		**12.3**		**0.5**	

Table 42: WR1 surface flume event runoff and water volume values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

WR1 – SURFACE FLUME						TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	6-Mar	0.03	0.6%	2,730	4.90	6.8	0.0%	0.3	40	0.1	0.1%	0.0	0.63	0.1	0.6%	0.0	0.44	0.6	0.2%	0.0	3.3
2	19-Mar	0.00	0.1%	280	0.04	0.7	0.0%	0.0	40	0.0	0.0%	0.0	0.63	0.0	0.1%	0.0	0.44	0.1	0.0%	0.0	3.4
3	15-Apr	0.00	0.0%	8	0.00	0.0	0.0%	0.0	40	0.0	0.0%	0.0	0.63	0.0	0.0%	0.0	0.44	0.0	0.0%	0.0	3.4
4	18-Apr	0.00	0.0%	41	0.02	0.1	0.0%	0.0	40	0.0	0.0%	0.0	0.63	0.0	0.0%	0.0	0.44	0.0	0.0%	0.0	3.4
5	1-May	0.00	0.1%	258	0.02	0.6	0.0%	0.0	40	0.0	0.0%	0.0	0.63	0.0	0.1%	0.0	0.44	0.1	0.0%	0.0	3.4
6	1-May	0.07	1.4%	6,016	0.27	806.2	1.4%	33.7	2,146	1.1	1.4%	0.0	2.84	0.2	1.4%	0.0	0.47	5.3	1.4%	0.2	14.2
7	3-May	0.08	1.7%	7,198	0.17	271.5	0.5%	11.4	604	2.5	3.4%	0.1	5.62	0.2	1.9%	0.0	0.52	7.6	2.0%	0.3	17.0
8	6-May	0.49	10.0%	42,533	0.37	2,277.5	4.0%	95.3	857	8.3	11.1%	0.3	3.12	1.2	9.4%	0.0	0.44	22.4	6.0%	0.9	8.4
9	19-May	0.20	4.0%	17,056	0.24	3,594.8	6.4%	150.4	3,375	3.7	4.9%	0.2	3.47	0.7	5.4%	0.0	0.63	10.3	2.7%	0.4	9.6
10	23-May	1.55	31.7%	134,773	1.07	18,340.7	32.4%	767.4	2,179	25.4	33.9%	1.1	3.02	4.6	36.5%	0.2	0.54	89.0	23.8%	3.7	10.6
11	26-May	0.03	0.6%	2,465	0.17	537.2	0.9%	22.5	3,490	0.4	0.6%	0.0	2.85	0.1	0.5%	0.0	0.37	2.3	0.6%	0.1	15.0
12	27-May	1.22	24.9%	105,966	0.56	17,905.6	31.7%	749.2	2,706	15.7	21.0%	0.7	2.38	3.0	24.3%	0.1	0.46	122.2	32.7%	5.1	18.5
13	14-Jun	0.05	0.9%	4,027	0.16	668.9	1.2%	28.0	2,660	1.1	1.4%	0.0	4.29	0.1	0.9%	0.0	0.43	7.0	1.9%	0.3	28.0
14	17-Jun	0.46	9.4%	40,082	0.29	5,558.0	9.8%	232.6	2,221	9.8	13.1%	0.4	3.92	1.1	8.8%	0.0	0.44	70.1	18.7%	2.9	28.0
15	19-Jun	0.42	8.6%	36,588	0.37	6,042.3	10.7%	252.8	2,645	5.6	7.5%	0.2	2.46	0.8	6.0%	0.0	0.33	34.0	9.1%	1.4	14.9
16	20-Jun	0.00	0.0%	60	0.01	8.1	0.0%	0.3	2,146	0.0	0.0%	0.0	2.84	0.0	0.0%	0.0	0.47	0.1	0.0%	0.0	14.2
17	20-Jun	0.00	0.1%	239	0.12	32.0	0.1%	1.3	2,146	0.0	0.1%	0.0	2.84	0.0	0.1%	0.0	0.47	0.2	0.1%	0.0	14.2
18	24-Jul	0.00	0.0%	197	0.02	26.4	0.0%	1.1	2,146	0.0	0.0%	0.0	2.84	0.0	0.0%	0.0	0.47	0.2	0.0%	0.0	14.2
19	24-Jul	0.00	0.0%	18	0.01	2.4	0.0%	0.1	2,146	0.0	0.0%	0.0	2.84	0.0	0.0%	0.0	0.47	0.0	0.0%	0.0	14.2
20	23-Aug	0.29	5.9%	24,889	0.31	490.3	0.9%	20.5	315	1.1	1.5%	0.0	0.71	0.5	4.1%	0.0	0.33	2.3	0.6%	0.1	1.5
TOTAL		**4.90**		**425,425**	**9.11**	**56,570.0**		**2,366.9**		**75.0**		**3.1**		**12.5**		**0.5**		**373.8**		**15.6**	

Table 43: WR1 surface flume event runoff and water volume values associated with the TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

WR1 – SURFACE FLUME						TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	6-Mar	0.03	0.6%	2,730	4.90	0.5	0.1%	0.0	3.1	0.2	0.8%	0.0	1.17	0.3	0.1%	0.0	1.9	0.1	0.4%	0.0	0.31
2	19-Mar	0.00	0.1%	280	0.04	0.1	0.0%	0.0	3.1	0.0	0.1%	0.0	1.17	0.0	0.0%	0.0	1.9	0.0	0.0%	0.0	0.31
3	15-Apr	0.00	0.0%	8	0.00	0.0	0.0%	0.0	3.1	0.0	0.0%	0.0	1.17	0.0	0.0%	0.0	1.9	0.0	0.0%	0.0	0.31
4	18-Apr	0.00	0.0%	41	0.02	0.0	0.0%	0.0	3.1	0.0	0.0%	0.0	1.17	0.0	0.0%	0.0	1.9	0.0	0.0%	0.0	0.31
5	1-May	0.00	0.1%	258	0.02	0.0	0.0%	0.0	3.1	0.0	0.1%	0.0	1.17	0.0	0.0%	0.0	1.9	0.0	0.0%	0.0	0.31
6	1-May	0.07	1.4%	6,016	0.27	5.8	1.4%	0.2	15.5	0.4	1.4%	0.0	0.98	5.4	1.4%	0.2	14.5	0.2	1.4%	0.0	0.46
7	3-May	0.08	1.7%	7,198	0.17	6.6	1.6%	0.3	14.8	0.5	2.0%	0.0	1.14	6.1	1.6%	0.3	13.6	0.5	4.3%	0.0	1.18
8	6-May	0.49	10.0%	42,533	0.37	54.0	13.2%	2.3	20.3	2.0	7.5%	0.1	0.74	52.0	13.6%	2.2	19.6	1.2	10.0%	0.1	0.46
9	19-May	0.20	4.0%	17,056	0.24	27.2	6.6%	1.1	25.5	1.5	5.5%	0.1	1.36	25.7	6.7%	1.1	24.1	0.9	7.7%	0.0	0.89
10	23-May	1.55	31.7%	134,773	1.07	142.3	34.8%	6.0	16.9	6.1	23.4%	0.3	0.73	136.2	35.6%	5.7	16.2	3.3	27.2%	0.1	0.40
11	26-May	0.03	0.6%	2,465	0.17	2.6	0.6%	0.1	16.6	0.2	0.6%	0.0	1.08	2.4	0.6%	0.1	15.5	0.2	1.5%	0.0	1.23
12	27-May	1.22	24.9%	105,966	0.56	70.4	17.2%	2.9	10.6	6.9	26.5%	0.3	1.05	63.5	16.6%	2.7	9.6	2.4	19.3%	0.1	0.36
13	14-Jun	0.05	0.9%	4,027	0.16	6.6	1.6%	0.3	26.2	0.4	1.7%	0.0	1.77	6.1	1.6%	0.3	24.4	0.3	2.5%	0.0	1.22
14	17-Jun	0.46	9.4%	40,082	0.29	49.6	12.1%	2.1	19.8	4.1	15.8%	0.2	1.65	45.4	11.9%	1.9	18.2	2.2	18.3%	0.1	0.90
15	19-Jun	0.42	8.6%	36,588	0.37	35.4	8.7%	1.5	15.5	2.2	8.3%	0.1	0.95	33.2	8.7%	1.4	14.5	0.5	4.4%	0.0	0.23
16	20-Jun	0.00	0.0%	60	0.01	0.1	0.0%	0.0	15.5	0.0	0.0%	0.0	0.98	0.1	0.0%	0.0	14.5	0.0	0.0%	0.0	0.46
17	20-Jun	0.00	0.1%	239	0.12	0.2	0.1%	0.0	15.5	0.0	0.1%	0.0	0.98	0.2	0.1%	0.0	14.5	0.0	0.1%	0.0	0.46
18	24-Jul	0.00	0.0%	197	0.02	0.2	0.0%	0.0	15.5	0.0	0.0%	0.0	0.98	0.2	0.0%	0.0	14.5	0.0	0.0%	0.0	0.46
19	24-Jul	0.00	0.0%	18	0.01	0.0	0.0%	0.0	15.5	0.0	0.0%	0.0	0.98	0.0	0.0%	0.0	14.5	0.0	0.0%	0.0	0.46
20	23-Aug	0.29	5.9%	24,889	0.31	7.0	1.7%	0.3	4.5	1.6	6.1%	0.1	1.02	5.4	1.4%	0.2	3.5	0.4	2.9%	0.0	0.23
TOTAL		**4.90**		**425,425**	**9.11**	**408.6**		**17.1**		**26.1**		**1.1**		**382.5**		**16.0**		**12.3**		**0.5**	

Table 44: WR1 subsurface tile monthly runoff and water volume values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

WR1 – SUBSURFACE TILE					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.58	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
NOV	0.00	0.0%	0	0.07	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
DEC	0.00	0.0%	0	0.56	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JAN	0.00	0.0%	0	0.68	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
FEB	0.00	0.0%	0	2.09	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAR	0.02	0.9%	1,581	2.12	13.0	1.2%	0.5	132	0.0	1.0%	0.0	0.39	0.0	1.1%	0.0	0.20	5.3	0.9%	0.2	53.5
APR	0.02	0.9%	1,445	2.10	11.9	1.1%	0.5	132	0.0	1.0%	0.0	0.39	0.0	1.0%	0.0	0.20	4.8	0.8%	0.2	53.5
MAY	1.38	71.2%	119,679	11.76	869.2	79.1%	36.4	116	2.5	69.0%	0.1	0.34	1.4	73.3%	0.1	0.19	423.8	72.5%	17.7	56.7
JUN	0.49	25.4%	42,639	4.71	184.3	16.8%	7.7	69	1.0	27.0%	0.0	0.37	0.4	21.8%	0.0	0.16	146.8	25.1%	6.1	55.1
JUL	0.00	0.0%	0	4.39	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
AUG	0.03	1.6%	2,646	5.12	20.2	1.8%	0.8	122	0.1	2.0%	0.0	0.44	0.1	2.8%	0.0	0.32	4.1	0.7%	0.2	24.6
SEP	0.00	0.0%	0	0.40	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**1.94**		**167,991**	**34.58**	**1,098.6**		**46.0**		**3.6**		**0.2**		**1.9**		**0.1**		**584.7**		**24.5**	

Table 45: WR1 subsurface tile monthly runoff, water volume and precipitation values associated with TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

WR1 – SUBSURFACE TILE					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.58	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
NOV	0.00	0.0%	0	0.07	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
DEC	0.00	0.0%	0	0.56	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JAN	0.00	0.0%	0	0.68	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
FEB	0.00	0.0%	0	2.09	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAR	0.02	0.9%	1,581	2.12	2.1	1.0%	0.1	21.1	1.8	1.0%	0.1	18.00	0.3	1.0%	0.0	3.1	0.0	1.0%	0.0	0.09
APR	0.02	0.9%	1,445	2.10	1.9	0.9%	0.1	21.1	1.6	0.9%	0.1	18.00	0.3	0.9%	0.0	3.1	0.0	0.9%	0.0	0.09
MAY	1.38	71.2%	119,679	11.76	155.7	72.2%	6.5	20.8	133.4	71.7%	5.6	17.85	22.3	75.3%	0.9	3.0	0.6	66.2%	0.0	0.08
JUN	0.49	25.4%	42,639	4.71	53.6	24.8%	2.2	20.1	47.3	25.4%	2.0	17.76	6.3	21.3%	0.3	2.4	0.3	30.5%	0.0	0.10
JUL	0.00	0.0%	0	4.39	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
AUG	0.03	1.6%	2,646	5.12	2.5	1.1%	0.1	15.0	2.0	1.1%	0.1	12.39	0.4	1.5%	0.0	2.6	0.0	1.5%	0.0	0.08
SEP	0.00	0.0%	0	0.40	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**1.94**		**167,991**	**34.58**	**215.7**		**9.0**		**186.1**		**7.8**		**29.6**		**1.2**		**0.9**		**0.0**	

Table 46: WR1 subsurface tile event runoff and water volume values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

WR1 – SUBSURFACE TILE						TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	23-Mar	0.02	0.9%	1,581	1.91	13.0	1.2%	0.5	132	0.0	1.0%	0.0	0.39	0.0	1.1%	0.0	0.20	5.3	0.9%	0.2	53.5
2	18-Apr	0.02	0.9%	1,445	1.46	11.9	1.1%	0.5	132	0.0	1.0%	0.0	0.39	0.0	1.0%	0.0	0.20	4.8	0.8%	0.2	53.5
3	1-May	0.08	4.4%	7,356	0.73	60.6	5.5%	2.5	132	0.2	4.8%	0.0	0.39	0.1	4.9%	0.0	0.20	24.6	4.2%	1.0	53.5
4	2-May	0.08	4.2%	7,001	1.54	71.2	6.5%	3.0	163	0.2	6.1%	0.0	0.51	0.1	4.6%	0.0	0.20	26.3	4.5%	1.1	60.3
5	6-May	0.13	6.5%	10,980	1.40	149.0	13.6%	6.2	217	0.3	8.7%	0.0	0.46	0.1	6.4%	0.0	0.18	35.3	6.0%	1.5	51.4
6	19-May	0.10	4.9%	8,287	1.15	62.2	5.7%	2.6	120	0.2	6.6%	0.0	0.47	0.1	7.8%	0.0	0.29	27.6	4.7%	1.2	53.3
7	23-May	0.30	15.3%	25,633	2.16	175.4	16.0%	7.3	110	0.5	15.1%	0.0	0.34	0.4	20.0%	0.0	0.24	81.9	14.0%	3.4	51.2
8	26-May	0.09	4.7%	7,977	1.37	66.1	6.0%	2.8	133	0.1	3.2%	0.0	0.24	0.1	4.5%	0.0	0.17	29.2	5.0%	1.2	58.6
9	27-May	0.17	8.6%	14,365	1.74	76.6	7.0%	3.2	85	0.2	4.7%	0.0	0.19	0.1	6.4%	0.0	0.14	56.3	9.6%	2.4	62.7
10	14-Jun	0.06	2.9%	4,855	0.76	0.3	0.0%	0.0	1	0.2	6.1%	0.0	0.73	0.1	3.0%	0.0	0.19	14.6	2.5%	0.6	48.2
11	17-Jun	0.09	4.4%	7,454	0.79	69.8	6.4%	2.9	150	0.2	6.2%	0.0	0.49	0.1	5.2%	0.0	0.21	22.7	3.9%	0.9	48.7
12	18-Jun	0.08	4.1%	6,930	0.93	101.9	9.3%	4.3	236	0.2	4.6%	0.0	0.39	0.1	3.7%	0.0	0.16	23.5	4.0%	1.0	54.2
13	23-Aug	0.03	1.6%	2,646	0.28	20.2	1.8%	0.8	122	0.1	2.0%	0.0	0.44	0.1	2.8%	0.0	0.32	4.1	0.7%	0.2	24.6
Base flow	BF	0.71	36.6%	61,480	36.34	220.2	20.0%	9.2	57	1.1	29.8%	0.0	0.28	0.5	28.7%	0.0	0.14	228.7	39.1%	9.6	59.6
TOTAL		**1.94**		**167,991**	**52.54**	**1,098.6**		**46.0**		**3.6**		**0.2**		**1.9**		**0.1**		**584.7**		**24.5**	

Table 47: WR1 subsurface tile event runoff and water volume values associated with the TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

WR1 – SUBSURFACE TILE						TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	23-Mar	0.02	0.9%	1,581	1.91	2.1	1.0%	0.1	21.1	1.8	1.0%	0.1	18.00	0.3	1.0%	0.0	3.1	0.0	1.0%	0.0	0.09
2	18-Apr	0.02	0.9%	1,445	1.46	1.9	0.9%	0.1	21.1	1.6	0.9%	0.1	18.00	0.3	0.9%	0.0	3.1	0.0	0.9%	0.0	0.09
3	1-May	0.08	4.4%	7,356	0.73	9.7	4.5%	0.4	21.1	8.3	4.4%	0.3	18.00	1.4	4.8%	0.1	3.1	0.0	4.5%	0.0	0.09
4	2-May	0.08	4.2%	7,001	1.54	8.2	3.8%	0.3	18.7	6.8	3.7%	0.3	15.57	1.4	4.7%	0.1	3.2	0.0	3.8%	0.0	0.08
5	6-May	0.13	6.5%	10,980	1.40	13.6	6.3%	0.6	19.8	11.3	6.1%	0.5	16.45	2.3	7.7%	0.1	3.3	0.1	6.0%	0.0	0.08
6	19-May	0.10	4.9%	8,287	1.15	9.1	4.2%	0.4	17.6	7.5	4.0%	0.3	14.48	1.6	5.4%	0.1	3.1	0.0	4.5%	0.0	0.08
7	23-May	0.30	15.3%	25,633	2.16	39.4	18.3%	1.7	24.6	33.7	18.1%	1.4	21.07	5.7	19.4%	0.2	3.6	0.1	14.1%	0.0	0.08
8	26-May	0.09	4.7%	7,977	1.37	9.8	4.5%	0.4	19.6	8.6	4.6%	0.4	17.34	1.1	3.9%	0.0	2.3	0.0	4.4%	0.0	0.08
9	27-May	0.17	8.6%	14,365	1.74	19.8	9.2%	0.8	22.1	17.2	9.2%	0.7	19.18	2.6	8.7%	0.1	2.9	0.1	7.9%	0.0	0.08
10	14-Jun	0.06	2.9%	4,855	0.76	5.6	2.6%	0.2	18.6	4.7	2.5%	0.2	15.40	1.0	3.3%	0.0	3.2	0.0	2.7%	0.0	0.08
11	17-Jun	0.09	4.4%	7,454	0.79	10.2	4.7%	0.4	21.8	8.8	4.7%	0.4	18.83	1.4	4.7%	0.1	3.0	0.1	11.2%	0.0	0.22
12	18-Jun	0.08	4.1%	6,930	0.93	8.7	4.0%	0.4	20.1	7.6	4.1%	0.3	17.47	1.2	3.9%	0.0	2.7	0.0	3.8%	0.0	0.08
13	23-Aug	0.03	1.6%	2,646	0.28	2.5	1.1%	0.1	15.0	2.0	1.1%	0.1	12.39	0.4	1.5%	0.0	2.6	0.0	1.5%	0.0	0.08
Base flow	BF	0.71	36.6%	61,480	36.34	75.2	34.8%	3.1	19.6	66.3	35.6%	2.8	17.26	8.9	30.1%	0.4	2.3	0.3	33.7%	0.0	0.08
TOTAL		**1.94**		**167,991**	**52.54**	**215.7**		**9.0**		**186.1**		**7.8**		**29.6**		**1.2**		**0.9**		**0.0**	

Table 48: RE1 subsurface tile monthly runoff and water volume values associated with the TSS, TP, DOP and chloride monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

RE1 – SUBSURFACE TILE					TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS				CHLORIDE			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.46	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
NOV	0.00	0.0%	0	0.04	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
DEC	0.00	0.0%	0	0.61	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
JAN	0.00	0.0%	0	0.58	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
FEB	0.00	0.0%	0	2.23	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAR	0.00	0.0%	0	1.53	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
APR	0.00	0.0%	0	2.21	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
MAY	0.37	41.6%	109,675	7.65	689.7	79.5%	8.5	101	1.1	43.3%	0.0	0.16	0.4	44.7%	0.0	0.06	119.2	40.2%	1.5	17.4
JUN	0.51	56.3%	148,524	1.84	177.3	20.4%	2.2	19	1.4	56.1%	0.0	0.15	0.5	53.9%	0.0	0.06	170.4	57.4%	2.1	18.4
JUL	0.02	2.1%	5,657	1.04	0.4	0.0%	0.0	1	0.0	0.6%	0.0	0.04	0.0	1.4%	0.0	0.04	7.0	2.4%	0.1	19.9
AUG	0.00	0.0%	0	2.38	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
SEP	0.00	0.0%	0	0.74	0.0	0.0%	0.0	0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0
TOTAL	**0.90**		**263,857**	**21.31**	**867.4**		**10.7**		**2.5**		**0.0**		**1.0**		**0.0**		**296.6**		**3.7**	

Table 49: RE1 subsurface tile monthly runoff, water volume and precipitation values associated with TN, NO_2+NO_3-N, TKN and ammonia monthly loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

RE1 – SUBSURFACE TILE					TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
MONTH	RUNOFF		VOLUME	PRECIP	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
	inches	%	ft^3	inches	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
OCT	0.00	0.0%	0	0.46	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
NOV	0.00	0.0%	0	0.04	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
DEC	0.00	0.0%	0	0.61	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
JAN	0.00	0.0%	0	0.58	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
FEB	0.00	0.0%	0	2.23	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAR	0.00	0.0%	0	1.53	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
APR	0.00	0.0%	0	2.21	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
MAY	0.37	41.6%	109,675	7.65	111.0	40.2%	1.4	16.2	96.8	39.7%	1.2	14.14	14.2	44.7%	0.2	2.1	0.6	44.2%	0.0	0.09
JUN	0.51	56.3%	148,524	1.84	158.4	57.4%	2.0	17.1	141.1	57.8%	1.7	15.21	17.3	54.4%	0.2	1.9	0.7	53.8%	0.0	0.08
JUL	0.02	2.1%	5,657	1.04	6.5	2.3%	0.1	18.3	6.2	2.5%	0.1	17.50	0.3	0.9%	0.0	0.8	0.0	2.0%	0.0	0.08
AUG	0.00	0.0%	0	2.38	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
SEP	0.00	0.0%	0	0.74	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00	0.0	0.0%	0.0	0.0	0.0	0.0%	0.0	0.00
TOTAL	**0.90**		**263,857**	**21.31**	**275.9**		**3.4**		**244.1**		**3.0**		**31.8**		**0.4**		**1.4**		**0.0**	

Table 50: RE1 subsurface tile event runoff and water volume values associated with the TSS, TP, DOP and chloride event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

RE1 – SUBSURFACE TILE						TOTAL SUSPENDED SOLIDS				TOTAL PHOSPHORUS				DISSOLVED ORTHOPHOS.				CHLORIDE			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	24-May	0.10	11.2%	29,499	2.26	54.8	6.3%	0.7	30	0.2	8.4%	0.0	0.11	0.1	9.2%	0.0	0.05	31.7	10.7%	0.4	17.2
2	26-May	0.09	10.2%	26,979	1.58	617.5	71.2%	7.6	367	0.7	29.5%	0.0	0.43	0.3	27.2%	0.0	0.16	25.4	8.6%	0.3	15.1
3	27-May	0.13	14.2%	37,575	3.74	9.3	1.1%	0.1	4	0.1	4.2%	0.0	0.04	0.1	6.6%	0.0	0.03	45.1	15.2%	0.6	19.2
4	19-Jun	0.12	12.8%	33,890	1.66	167.1	19.3%	2.1	79	1.2	47.2%	0.0	0.55	0.3	35.4%	0.0	0.16	26.9	9.1%	0.3	12.7
Base flow	B. flow	0.46	51.5%	135,913	31.68	18.7	2.2%	0.2	2	0.3	10.8%	0.0	0.03	0.2	21.6%	0.0	0.03	167.4	56.4%	2.1	19.7
TOTAL		**0.90**		**263,857**	**40.92**	**867.4**		**10.7**		**2.5**		**0.0**		**1.0**		**0.0**		**296.6**		**3.7**	

Table 51: RE1 subsurface tile event runoff and water volume values associated with the TN, NO_2+NO_3-N, TKN and ammonia event loads, yields and flow-weighted mean concentrations, October 2011 - September 2012.

RE1 – SUBSURFACE TILE						TOTAL NITROGEN				NITRATE + NITRITE - N				TOT. KJELDAHL NITROGEN				AMMONIA			
EVENT	DATE	RUNOFF		VOLUME	DURATION	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC	LOAD		YIELD	FWMC
		inches	%	ft^3	days	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L	lbs	%	lbs/acre	mg/L
1	24-May	0.10	11.2%	29,499	2.26	30.2	10.9%	0.4	16.4	26.6	10.9%	0.3	14.45	3.6	11.2%	0.0	1.9	0.2	15.2%	0.0	0.11
2	26-May	0.09	10.2%	26,979	1.58	27.7	10.0%	0.3	16.4	22.2	9.1%	0.3	13.15	5.6	17.4%	0.1	3.3	0.1	9.8%	0.0	0.08
3	27-May	0.13	14.2%	37,575	3.74	38.9	14.1%	0.5	16.6	35.3	14.4%	0.4	15.02	3.6	11.4%	0.0	1.5	0.2	13.6%	0.0	0.08
4	19-Jun	0.12	12.8%	33,890	1.66	40.0	14.5%	0.5	18.9	28.7	11.7%	0.4	13.55	11.3	35.6%	0.1	5.3	0.2	12.3%	0.0	0.08
Base flow	B. flow	0.46	51.5%	135,913	31.68	139.1	50.4%	1.7	16.4	131.4	53.8%	1.6	15.48	7.8	24.4%	0.1	0.9	0.7	49.2%	0.0	0.08
TOTAL		**0.90**		**263,857**	**40.92**	**275.9**		**3.4**		**244.1**		**3.0**		**31.8**		**0.4**		**1.4**		**0.0**	

Appendix 2: Water quality results

Table 52: Summary of all water quality results by DFM site in WY2012.

SITE ID	SAMPLE START Date/Time	SAMPLE END Date/Time	SAMPLE TYPE	TSS mg/L	TP mg/L	DOP mg/L	CL mg/L	NO_2+NO_3-N mg/L	NH_3 mg/L	TKN mg/L
BE1-T	02/29/12 10:15		G	27	0.574	0.286	22.6	5.98	<0.16	2.9
BE1-T	05/04/12 17:53	05/05/12 23:10	CF-F	16	0.166	0.062	15.9	12.9	<0.16	2.4
BE1-T	05/05/12 00:06	05/06/12 11:58	CF-F	5	0.132	0.053	14.9	13.9	<0.16	2.6
BE1-T	05/06/12 12:33	05/07/12 09:37	CF-F	<2	0.068	0.037	15.3	14.5	<0.16	2
BE1-T	05/07/12 12:33	05/11/12 06:06	CF-F	3	0.027	0.019	16	16.5	<0.16	0.9
BE1-T	05/11/12 14:01	05/17/12 09:36	CF-F	9	0.021	0.014	17.6	15.2	0.23	1.4
BE1-T	05/17/12 21:03	05/24/12 03:30	CF-F	9	0.014	0.008	18.3	15.7	0.94	2.7
BE1-T	05/26/12 09:21	05/26/12 09:55	CF-F	41	0.137	0.046	17.5	15.3	<0.16	2.5
BE1-T	05/26/12 09:56	05/26/12 10:48	CF-F	34	0.189	0.079	13.7	15.8	<0.16	2.7
BE1-T	05/26/12 10:52	05/26/12 13:34	CF-F	18	0.12	0.045	15.5	15.4	<0.16	1.8
BE1-T	05/27/12 12:02	05/29/12 10:04	CF-F	10	0.073	0.031	15.8	15.2	<0.16	2.1
BE1-T	05/29/12 15:14	06/03/12 23:59	CF-F	4	0.033	0.022	16.4	15.5	<0.16	2.1
BE1-T	09/07/12 10:00		QAQC-EB	<2	<0.005	<0.005	<3	<0.2	<0.16	0.2
BE1-F	02/24/12 10:30		QAQC-EB	<2	<0.005	<0.005	<3	<.02	<0.16	<0.2
BE1-F	02/28/12 17:48	02/29/12 05:40	CF-F	112	0.408	0.239	3.2	0.44	<0.16	1.3
BE1-F	05/05/12 05:50	05/06/12 12:53	CF-F	630	0.676	0.182	<30	2.81	<0.16	3
BE1-F	05/26/12 09:21	05/26/12 09:55	CF-F	840	2.44	0.105	44.4	0.86	0.37	18.5
BE1-F	05/26/12 09:56	05/26/12 10:48	CF-F	970	1.71	0.148	46.1	1.18	0.37	12.8
BE1-F	05/26/12 10:52	05/26/12 13:34	CF-F	610	1.15	0.27	32.7	2.77	<0.16	4.8
BE1-F	05/27/12 18:52	05/28/12 03:49	CF-F	1,230	1.51	0.098	39.8	0.37	0.23	10.8
BE2-T	02/24/12 13:15		QAQC-EB	<2	<0.005	0.006	<3	<.2	<0.16	0.4
BE2-T	02/28/12 22:19	02/29/12 05:40	CF-F	270	0.806	0.245	10.8	13.5	0.39	5.9
BE2-T	02/28/12 22:19	02/29/12 05:40	CF-F-Rep	257	0.83	0.247	11.4	13.6	0.24	5.3
BE2-T	02/29/12 05:54	02/29/12 12:21	CF-F	67	0.58	0.176	10.6	19.7	0.24	6.5
BE2-T	05/04/12 20:26	05/05/12 17:47	CF-F	1,030	0.948	0.142	32.1	52.3	0.37	8.8
BE2-T	05/05/12 18:18	05/06/12 06:47	CF-F	480	0.697	0.125	32.1	44.6	0.23	8.6
BE2-T	05/06/12 07:00	05/07/12 10:57	CF-F	19	0.152	0.069	13	42.1	<0.16	5.3
BE2-T	05/26/12 10:20	05/28/12 10:31	CF-F	172	0.392	0.098	12.4	47.6	<0.16	5.9
BE2-F	05/05/12 13:16	05/06/12 04:03	CF-F	3,260	3.88	0.277	98.9	0.7	0.95	22.8
BE2-F	05/26/12 10:16	05/26/12 11:27	CF-F	1,080	1.17	0.147	13	0.6	1.23	4.7
BE2-F	09/07/12 08:30		QAQC-EB	2	<.005	0.006	<3	<0.2	<0.16	0.2
CH1	03/08/12 13:50		G	18	2.45	1.57	42.1	4.14	0.98	7.9
CH1	03/08/12 13:50		CF-F-Rep	16	2.45	1.58	41.9	4.08	0.89	7.8
CH1	03/08/12 16:00		G	30	2.32	1.38	36.8	3.46	<0.16	6.8
CH1	03/10/12 11:36	03/10/12 14:00	CF-F	13	0.859	0.419	9.8	0.88	<0.16	3
CH1	03/10/12 14:05	03/10/12 16:41	CF-F	28	0.984	0.505	8.9	0.68	<0.16	3
CH1	03/10/12 16:54	03/11/12 11:06	CF-F	22	1.8	1.11	10.9	0.85	0.24	4.6
CH1	05/06/12 02:24	05/06/12 05:06	CF-F	328	2.18	1.29	<30	<.2	0.37	3.6
CH1	05/23/12 22:11	05/24/12 08:17	CF-F	378	2.14	0.939	4.5	0.63	<0.16	3.7
CH1	05/24/12 08:31	05/24/12 14:04	CF-F	250	1.83	0.632	4.3	0.3	<0.16	3.1
CH1	05/24/12 14:06	05/24/12 17:05	CF-F	172	1.61	0.981	3.5	0.26	<0.16	1.8
CH1	05/26/12 10:40	05/28/12 07:15	CF-F	398	1.27	0.726	4	0.35	0.23	1.9
CH1	06/06/12 11:55		QAQC-EB	2	<0.005	<0.005	<3	<0.2	<0.16	<0.2
CH1	06/14/12 08:36	06/17/12 22:33	CF-F	1,070	1.95	0.474	4.5	0.61	0.51	6.1
CH1	06/14/12 08:36	06/17/12 22:33	CF-F-Rep	1,080	1.97	0.518	4.5	0.6	0.37	6.2
CH1	06/17/12 22:35	06/18/12 00:22	CF-F	256	1.4	0.675	4	0.48	<0.16	3.3
GO1	01/31/12 15:12	02/01/12 00:59	CF-F	21	1.93	1.26	15.1	2.29	0.84	5.1
GO1	02/06/12 13:10	02/06/12 21:21	CF-F	24	1.49	1.13	8.4	0.5	1.89	5.3
GO1	02/03/12 17:47	02/03/12 19:01	CF-F	12	1.79	1.21	15.6	2.86	1.29	6.5
GO1	02/03/12 19:02	02/03/12 20:00	CF-F	7	1.93	1.19	16.1	2.88	1.44	7
GO1	02/03/12 20:01	02/03/12 20:27	CF-F	8	1.6	1.22	16.7	2.94	1.38	6.9
GO1	02/16/12 13:38	02/19/12 19:01	CF-F	32	1.71	1.19	13	0.56	2.19	7
GO1	02/22/12 14:05	02/28/12 22:44	CF-F	18	0.676	0.406	6.5	0.64	0.98	4.3
GO1	02/22/12 14:05	02/28/12 22:44	CF-F-Rep	16	0.676	0.363	6.6	0.68	0.54	3.8
GO1	02/28/12 23:00	02/29/12 08:04	CF-F	3	1.11	0.905	4.6	0.76	1.13	4.1

Table 52 continued: Summary of all water quality results by DFM site in WY2012.

SITE ID	SAMPLE START	SAMPLE END	SAMPLE TYPE	TSS	TP	DOP	CL	NO_2+NO_3-N	NH_3	TKN
	Date/Time	Date/Time		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GO1	02/29/12 09:12	02/29/12 19:00	CF-F	17	1.87	1.27	6.4	0.93	2.33	8.1
GO1	03/01/12 11:35	03/01/12 16:02	CF-F	73	1.46	1.17	5.6	<2	1.57	5.7
GO1	06/14/12 18:48	06/18/12 01:30	CF-F	205	0.812	0.402	<3	0.39	<0.16	2
GO1	06/20/12 16:41	06/20/12 20:28	CF-F	43						
GO1	06/12/12 14:40		QAQC-EB	<2	0.005		<3	<0.2	<0.16	<0.2
RE1-T	05/08/12 09:00		G	9	0.033	0.015	16.8	12.9	<0.16	1.7
RE1-T	05/08/12 09:02		CF-F-Rep	10	0.032	0.018	17.1	12.8	<0.16	1.5
RE1-T	05/24/12 02:54	05/24/12 09:20	CF-F	40	0.175	0.078	16	15.3	<0.16	2.6
RE1-T	05/24/12 09:35	05/24/12 12:43	CF-F	14	0.136	0.072	17	14.4	<0.16	1.8
RE1-T	05/24/12 13:21	05/24/12 21:44	CF-F	18	0.113	0.039	16.9	13.9	0.23	1.9
RE1-T	05/24/12 22:11	05/25/12 10:56	CF-F	7	0.044	0.023	17.9	14.3	<0.16	1.8
RE1-T	05/25/12 11:36	05/26/12 04:46	CF-F	3	0.029	0.019	18.9	14.5	<0.16	1.1
RE1-T	05/26/12 05:35	05/26/12 12:03	CF-F	413	0.478	0.175	14.6	12.9	<0.16	3.5
RE1-T	05/27/12 14:52	05/29/12 06:30	CF-F	5	0.05	0.029	19	15.1	<0.16	1.7
RE1-T	05/30/12 09:29	06/02/12 14:38	CF-F	<2	0.026	0.023	19.9	14.8	<0.16	1.1
RE1-T	06/02/12 18:17	06/06/12 06:45	CF-F-Rep	<2	0.026	0.022	19.8	14.8	<0.16	1.1
RE1-T	06/06/12 11:18	06/11/12 02:36	CF-F	<2	0.023	0.016	20.3	14.7	<0.16	0.6
RE1-T	06/11/12 08:13	06/14/12 14:45	CF-F	3	0.025	0.016	20.3	14.6	<0.16	0.8
RE1-T	06/19/12 02:31	06/19/12 14:05	CF-F	118	0.79	0.216	9.8	11.8	<0.16	7.2
RE1-T	06/19/12 17:15	06/20/12 13:29	CF-F	2	0.069	0.062	18.5	17	<0.16	1.7
RE1-T	06/25/12 09:55		G	<2	0.041	0.038	19.9	17.5	<0.16	0.8
RE1-T	09/20/12 12:30		QAQC-EB	3	<0.005	<0.005	<3	<0.2	<0.16	0.5
ST1-T	02/09/12 12:40		G	15	0.068	0.028	73	29.8	<0.16	4.3
ST1-T	04/05/12 12:55		G	9	0.058	0.039	62.4	27.6	<0.16	3.8
ST1-T	04/05/12 13:05		G-Rep	4	0.054	0.042	61.7	28.9	<0.16	4.1
ST1-T	04/26/12 14:30		G	8	0.049	0.042	63	30.1	<0.16	1.3
ST1-T	05/01/12 17:17	05/01/12 22:03	CF-F		1.58			25.6	0.23	8.4
ST1-T	05/02/12 10:10		G	77	0.624	0.416	30.1	25.9	<0.16	4.1
ST1-T	05/03/12 10:34		G	11	0.247	0.179	39.1	32.6	<0.16	4.1
ST1-T	05/07/12 09:06		G	2	0.1	0.066	46.7	31.1	<0.16	2.2
ST1-T	05/18/12 23:05	05/20/12 01:56	CF-F		1.46			14.7	0.38	12.9
ST1-T	05/26/12 09:11	05/26/12 23:43	CF-F	900	1.49	0.23	26.6	17.2	0.37	9.7
ST1-T	05/26/12 23:54	05/27/12 07:56	CF-F	170	0.678	0.332	29.4	30.8	1.23	3.9
ST1-T	06/14/12 06:24	06/14/12 09:00	CF-F	595	0.965	0.307	18.4	23	<0.16	6.9
ST1-T	06/14/12 12:31	06/18/12 01:09	CF-F	258	0.541	0.163	32.6	28.8	<0.16	4.8
ST1-T	06/19/12 05:51	06/20/12 08:27	CF-F	60	0.447	0.263	27.2	28.8	<0.16	2.1
ST1-T	06/28/12 07:55		G	3	0.068	0.059	42.6	37	<0.16	3.2
ST1-T	06/20/12 09:26	06/21/12 03:50	CF-F	20	0.027	0.011	37.9	35.9	<0.16	3.6
ST1-T	07/11/12 13:36		G	5	0.09	0.07	45.4	31.6	<0.16	0.7
ST1-T	07/11/12 13:36		G-Rep	4	0.087	0.063	45.6	31.5	<0.16	0.7
ST1-T	07/25/12 13:45		G	14	0.107	0.082	43.5	28.5	<0.16	0.7
ST1-T	07/25/12 13:45		G-Rep	13	0.106	0.092	43.5	29.5	<0.16	0.7
ST1-T	09/05/12 10:35		QAQC-EB	<2	<.005	<0.005	<3	<0.2	<0.16	0.2
ST-F	05/01/12 16:10	05/01/12 16:37	CF-F	4,720	14.4	0.475	50.1	3.65	4.94	125
ST-F	05/01/12 16:38	05/01/12 17:09	CF-F	1,670	10.6	0.57	38.1	3.46	3.37	72.2
ST-F	05/01/12 17:11	05/01/12 18:47	CF-F	2,950	6.2	0.598	<30	2.39	1.09	28
ST-F	05/02/12 23:13	05/02/12 23:52	CF-F	1,260	7.82	0.424	38	4.2	1.66	46.6
ST-F	05/18/12 22:19	05/18/12 22:41	CF-F	9,460	6.74	0.579	18.1	2.88	2.56	82.2
ST-F	05/18/12 22:42	05/19/12 00:21	CF-F	8,780	5.94	0.59	19.5	3.51	2.27	62.4
ST-F	05/18/12 22:42	05/19/12 00:21	CF-F-Rep	9,020	5.68	0.572	19.2	3.45	2.27	59.7
ST-F	05/19/12 00:24	05/19/12 04:09	CF-F	3,130	3.28	0.709	10	2.51	0.96	22.6
ST-F	05/24/12 11:28	05/26/12 22:40	CF-F	513	3.14	0.385	14.1	0.84	1.09	25.2
ST-F	05/26/12 22:41	05/26/12 23:06	CF-F	703	3.31	0.292	16.6	0.63	1.23	26.1
ST-F	05/26/12 23:08	05/27/12 22:48	CF-F	940	3.66	0.304	13.2	0.74	1.23	30.5
ST-F	06/14/12 04:59	06/14/12 06:48	CF-F	443	2.39	0.388	6.8	1.24	<0.16	17.1
ST-F	06/17/12 20:03	06/17/12 20:24	CF-F	2,990	0.758	0.443	13.5	1.88	0.65	15.4
ST-F	06/19/12 04:33	06/20/12 04:32	CF-F	2,980	2.18	0.472	4.6	1.15	0.37	12.7
ST-F	09/05/12 10:25		QAQC-EB	7	<.005	<0.005	<3	<0.2	<0.16	<0.2
WR1 -T	03/14/12 12:00		QAQC-EB	<2	<0.005	<0.005	<3	<0.2	<0.16	<.2
WR1 -T	05/02/12 16:30	05/02/12 16:30	G	43	0.457	0.178	60.5	21.5	<0.16	4.4

Table 52 continued: Summary of all water quality results by DFM site in WY2012.

SITE ID	SAMPLE START	SAMPLE END	SAMPLE TYPE	TSS	TP	DOP	CL	NO_2+NO_3-N	NH_3	TKN
	Date/Time	Date/Time		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WR1 -T	05/02/12 19:46	05/03/12 18:08	CF-F	225	0.604	0.233	58	15.4	<0.16	3.8
WR1 -T	05/03/12 18:54	05/05/12 03:01	CF-F	24	0.273	0.126	65.9	15.2	<0.16	1.4
WR1 -T	05/05/12 04:20	05/06/12 04:50	CF-F	792	0.867	0.19	53.7	13.8	<0.16	6.3
WR1 -T	05/06/12 05:10	05/06/12 16:16	CF-F	56	0.352	0.174	50.8	17.2	<0.16	2.5
WR1 -T	05/19/12 21:35	05/20/12 08:21	CF-F	187	0.627	0.356	44.7	14	<0.16	3.7
WR1 -T	05/20/12 08:57	05/21/12 07:39	CF-F	20	0.226	0.182	66.1	15.2	<0.16	2.2
WR1 -T	05/23/12 10:40		G	2	0.107	0.074	83.1	15	<0.16	0.7
WR1 -T	05/23/12 10:45		G-Rep	2	0.105	0.074	82	14.9	<0.16	2.6
WR1 -T	05/23/12 16:21	05/23/12 19:34	CF-F	1,940	1.3	0.293	38.8	12.4	<0.16	10.2
WR1 -T	05/23/12 19:36	05/23/12 20:35	CF-F	147	0.5	0.261	50.7	22.1	<0.16	4.2
WR1 -T	05/23/12 20:37	05/24/12 01:56	CF-F	25	0.381	0.304	44.1	22.8	<0.16	3.6
WR1 -T	05/25/12 14:06	05/26/12 14:10	CF-F	16	0.16	0.13	63.5	19.4	<0.16	2.7
WR1 -T	05/26/12 14:56	05/27/12 11:26	CF-F	11	0.204	0.184	57.6	17	<0.16	1.7
WR1 -T	05/27/12 13:03	05/27/12 21:07	CF-F	1,700	0.782	0.197	53	14.1	<0.16	6.9
WR1 -T	05/27/12 21:09	05/27/12 21:55	CF-F	172	0.47	0.25	49.9	19	<0.16	3.2
WR1 -T	06/14/12 08:48	06/17/12 21:34	CF-F	<2	0.733	0.188	48.2	15.4	<0.16	3.2
WR1 -T	06/17/12 21:44	06/17/12 22:30	CF-F	812	1.18	0.186	45	18.6	0.23	5.7
WR1 -T	06/17/12 22:32	06/18/12 06:38	CF-F	95	0.453	0.221	48	19	0.23	2.8
WR1 -T	06/18/12 14:33	06/19/12 02:06	CF-F	464	0.492	0.128	59.1	16.8	<0.16	3.8
WR1 -T	06/19/12 02:08	06/19/12 09:26	CF-F	164	0.453	0.218	47.1	17.4	<0.16	2.5
WR1 -T	06/19/12 02:08	06/19/12 09:26	CF-F-Rep	175	0.465	0.215	46.4	17	<0.16	2.5
WR1 -T	06/19/12 09:57	06/20/12 04:09	CF-F	8	0.152	0.132	57.7	18.8	<0.16	1.3
WR1 -T	06/20/12 04:58	06/20/12 23:45	CF-F	7	0.145	0.114	57.7	17.7	<0.16	1.3
WR1 -T	06/21/12 00:23	06/22/12 08:37	CF-F	10	0.12	0.106	63.7	18.6	<0.16	1.4
WR1 -T	07/24/12 09:30		G	17	0.144	0.121	75.5	12.8	<0.16	1.3
WR1 -T	08/23/12 19:44	08/23/12 22:29	CF-F	163	0.444	0.31	24.5	11.7	<0.16	2.7
WR1 -T	08/23/12 22:31	08/23/12 23:19	CF-F	80	0.439	0.326	24.7	13.9	<0.16	2.5
WR1 -T	08/24/12 23:22	08/24/12 00:32	CF-F	55	0.419	0.371	24.6	11.5	<0.16	2.4
WR1-F	03/10/12 13:30		G	38	0.63	0.377	3.4	1.17	0.24	1.9
WR1-F	03/10/12 13:30		G-Rep	42	0.634	0.509	3.3	1.16	0.39	1.9
WR1-F	03/14/12 10:00		QAQC-FB	10	<0.005	<0.005	<3	<0.2	<0.16	<.2
WR1-F	03/14/12 10:00		QAQC-EB	2	<0.005	<0.005	<3	<0.2	<0.16	<.2
WR1-F	05/03/12 09:20		G	2,100	5.54	0.409	30.9	1	1.8	32.5
WR1-F	05/03/12 08:02	05/03/12 08:58	CF-F	450	6.56	0.516	18	1.11	1.23	5
WR1-F	05/03/12 09:00	05/06/12 00:35	CF-F	850	4.11	0.521	15.4	1.2	1.09	27.4
WR1-F	05/06/12 00:36	05/06/12 01:00	CF-F	420	3.44	0.412	9.4	0.76	0.8	25.3
WR1-F	05/06/12 01:01	05/06/12 01:45	CF-F	950	3.02	0.448	8	0.72	0.37	18.1
WR1-F	05/19/12 21:01	05/19/12 21:34	CF-F	6,360	4.62	0.712	8.7	1.09	1.69	34.1
WR1-F	05/19/12 21:35	05/19/12 21:58	CF-F	3,810	3.53	0.67	10.2	1.34	0.82	27.4
WR1-F	05/19/12 22:00	05/19/12 23:55	CF-F	1,880	3.38	0.592	10.5	1.37	0.67	21.5
WR1-F	05/19/12 23:57	05/20/12 02:00	CF-F	1,590	2.11	0.527	8.3	1.72	0.38	10.9
WR1-F	05/23/12 16:02	05/23/12 16:33	CF-F	3,680	3.49	0.507	12.3	0.69	0.38	15.1
WR1-F	05/23/12 16:34	05/23/12 18:15	CF-F	1,940	3.06	0.56	11	0.74	0.38	17.1
WR1-F	05/23/12 18:17	05/23/12 18:53	CF-F	3,440	2.27	0.459	7.4	0.7	0.47	6.2
WR1-F	05/23/12 18:51	05/23/12 19:22	CF-F	3,230	2.87	0.395	6.4	0.61	0.58	13.9
WR1-F	05/26/12 09:23	05/27/12 20:40	CF-F	3,490	2.85	0.374	<30	1.08	1.23	15.5
WR1-F	05/27/12 20:41	05/27/12 21:04	CF-F	3,600	3.02	0.394	31.8	0.65	0.37	13.4
WR1-F	05/27/12 21:05	05/27/12 21:35	CF-F	2,800	2.27	0.418	<30	0.68	0.23	10.4
WR1-F	05/27/12 21:37	05/27/12 22:23	CF-F	2,120	2.05	0.525	<30	1.37	0.23	6.4
WR1-F	06/14/12 08:37	06/17/12 21:58	CF-F	2,660	4.29	0.427	28	1.77	1.22	24.4
WR1-F	06/17/12 21:59	06/17/12 22:55	CF-F	2,920	4.45	0.452	29.2	1.42	1.08	19.5
WR1-F	06/17/12 21:59	06/17/12 22:55	CF-F-Rep	1,830	4.15	0.46	29.6	1.43	<0.16	18.5
WR1-F	06/17/12 23:00	06/18/12 01:34	CF-F	1,370	2.52	0.413	24.1	2.17	<0.16	9.8
WR1-F	06/19/12 01:33	06/19/12 02:24	CF-F	3,920	2.99	0.305	<30	0.84	0.37	19.7
WR1-F	06/19/12 02:26	06/19/12 04:48	CF-F	1,220	1.88	0.359	<30	1.08	<0.16	8.8
WR1-F	06/19/12 06:09	06/20/12 06:25	CF-F	650						
WR1-F	08/23/12 19:31	08/23/12 22:22	CF-F	219	0.744	0.385	<3	0.96	0.23	3.7
WR1-F	08/23/12 22:23	08/23/12 22:46	CF-F	554	0.804	0.313	<3	0.96	0.23	4.3
WR1-F	08/23/12 22:47	08/24/12 00:17	CF-F	191	0.623	0.315	<3	1.1	0.23	2.8

G = grab sample | **CF-F** = flow composited sample

QAQC-EB = equipment blank | **CF-F-Rep** = field replicate (flow composite) | **G-Rep** = field replicate (grab sample)