NPDES Phase II: Annual Stormwater Monitoring Report WY 2013

Prepared for
City of Nampa
Nampa, Idaho
January 10, 2014

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Executive Summary

The City of Nampa (City) was issued a National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges by the United States Environmental Protection Agency (EPA). The EPA issued NPDES permit IDS-028126 (Permit) effective October 15, 2009. The City began conducting stormwater monitoring activities as defined in the Permit on October 15, 2011. Data from these monitoring activities are used to characterize local stormwater discharges, pollutant loads, and trends for water quality and quantity over time. This report presents monitoring data collected during water year (WY) 2013 (October 15, 2012, through October 14, 2013).

The Permit requires the collection of stormwater quality data from four storm events during defined monitoring periods. The following monitoring periods are defined in the Permit and were targeted during WY 2013 events:

- March – April
- May – June
- July – August
- September – October

In situations where program sampling criteria are not met during a defined monitoring period, a sample collected during another monitoring period will be used to supplement the data set as specified in the Permit. During WY 2013, there was no rain event that met the program criteria during the July – August period. Therefore, a supplemental sample collected on December 4, 2012, was used to supplement the July – August period. Table 1 is a program summary of monitoring efforts for WY 2013. Table 2 presents drainage area and runoff coefficients for each monitoring site, as well as the Nampa municipal separate storm sewer system (MS4) drainage area and the MS4 percent impervious groundcover.

During each monitoring period, ongoing flow was recorded using ISCO 2150 Flow Meters. All data collected are included in this annual report. Table 3 presents the grab sample analytical results.

In addition to flow measurements and grab samples, the City has installed a rain gauge at the Mason Creek monitoring site to collect continuous rainfall measurements. To fill in rain data prior to the time the Mason Creek rain gauge became fully operational, the City has utilized measured rain data from the Caldwell airport and another City-owned rain gauge located at the waste waster treatment plant (WWTP). This data is presented in Table 2 of each monitoring period report and included on hydrographs.

Stormwater runoff samples collected during monitoring events were submitted to Analytical Laboratories, Inc. (nitrogen analyses) in Boise, Idaho, and the Nampa Wastewater Division (all other analyses). Sample analytical results are presented in Table 3. Monitoring period and annual pollutant loading estimates are presented in Table 4.

Section 4 presents conclusions, notes, and deviations for WY 2013 as well as recommendations for WY 2014.

Storm Water Discharge Monitoring Reports (DMR) for WY 2013 are included as Appendix C.

Section 1

Introduction

As part of the Permit requirements, the City is required to develop and implement a stormwater monitoring program. Specific stormwater monitoring requirements and objectives are defined in Permit Part IV.

The NPDES stormwater monitoring program requires monitoring, which includes overall monitoring of stormwater management plan (SWMP) implementation as well as the actual collection and analysis of stormwater/surface water samples. Annual review of SWMP implementation allows the City to evaluate its compliance with the permit conditions, appropriateness of identified best management practices (BMPs), and progress towards achieving the minimum control measures. In addition, the City will conduct field monitoring of stormwater discharges. Over the years, after sufficient data have been collected, use of stormwater monitoring information may indicate trends to evaluate the effectiveness of the City's stormwater program. Based on the monitoring efforts, assuming enough data is collected to produce statistically robust results, the City will attempt to quantitatively evaluate whether pollutant loads are being reduced in the MS4 system and hence from receiving waters. Continual monitoring will provide information to support overall program management decisions.

The purpose of this monitoring plan is to address the monitoring component of the Permit requirements. The City has developed the monitoring plan and overall monitoring strategy based on the stormwater monitoring objectives defined in the Permit. Conducting monitoring activities as described in Permit Part IV would allow the City to evaluate pollutant sources, characterize stormwater discharges, evaluate receiving water trends (when sufficient data have been collected over many years), and identify effects of MS4 discharges on receiving waters.

This is the second NPDES Phase II Annual Storm Water Monitoring Report WY 2013.

This report is the summation of four individual Stormwater Discharge Monitoring Reports from WY 2013. As defined in the Permit, the annual report contains the following information:

- Dates of sample collection and analysis
- Results of analytical samples collected
- Location of sample collection
- For months sampled, estimates of the wet weather monthly average pollutant loads for each pollutant at each sample location
- An annual cumulative estimate of pollutant loading for each parameter at each sample location and an overall estimate of the contribution of pollutants from all stormwater emanating from the Nampa MS4

Three monitoring sites were selected and are described in detail in the *City of Nampa NPDES MS4 Monitoring Plan* (2010). The permit requires that samples collected from each site be analyzed for selected constituents that can be collected with manual grab sample methods. All samples were collected within the first two hours of measured stormwater runoff to capture the "first flush."

As required by the Permit, a minimum of four samples were collected during WY 2013. The Permit has identified the following periods that should be sampled for stormwater quality:

- March – April
- May – June
- July – August
- September – October

During WY 2013, there was no rain event that met the program criteria during the July – August period. Therefore, a supplemental sample collected on December 4, 2012, was used to supplement the July – August period. Table 1 is a program summary of monitoring efforts for WY 2013.

Field and laboratory activities were conducted according to the *City of Nampa Stormwater Division Quality Assurance Plan for Stormwater Monitoring* (QAP) (2010).

Section 2

Monitored Storms

During water year (WY) 2013, the City targeted four storm events for Phase II monitoring. This document describes the WY 2013 Phase II stormwater monitoring completed for the City at Indian Creek, Mason Creek, and Wilson Creek monitoring sites. The following is a summary of those events.

Event Summary					
	March – April	May – June	July – August	September – October	November 2012 – February 2013 (supplemental)
Indian Creek	Sampled on April 19, 2013	Sampled on June 19, 2013	Sample collected did not meet criteria. Required a supplement sample collected on December 4, 2012.	Sampled on September 24, 2013	Sampled on December 4, 2012, and February 22, 2013
Mason Creek	Sampled on April 19, 2013	Sampled on June 19, 2013	Sample collected did not meet criteria. Required a supplement sample collected on December 4, 2012.	Sampled on September 24, 2013	Sampled on December 4, 2012, and February 22, 2013
Wilson Creek	Sampled on April 19, 2013	Sampled on June 19, 2013	Sample collected did not meet criteria. Required a supplement sample collected on December 4, 2012.	Sampled on September 24, 2013	Sampled on December 4, 2012, and February 22, 2013

2.1 March – April Monitoring Period

National Weather Service (NWS) Summary March – April

The National Weather Service (NWS) prepares a summary of precipitation observations each month for inclusion in an overall monthly climate summary. The NWS monthly climate summary is made available through the local Boise Weather Forecast Office on the NWS website. Precipitation summaries from the NWS are included in the text below. Summaries are quoted directly with minor punctuation and grammar edits for readability.

"March is normally one of the wettest months of the year at Boise, but with only 0.36 inch of precipitation, March 2013 was the driest since 2007. It ranks as the 8th driest at the airport and the 14th driest since precipitation records began. Snowfall for the month was a meager 0.3 inch, one inch below normal.

April was a bit cooler and drier than average and seasonably windy. The average temperature was almost 1 degree below normal, placing it near the middle of the rankings. Precipitation was only about a quarter inch below normal. There were only two precipitation episodes: on the 5th through the 7th and again on the 19th. The first event brought a total of 0.62 inch of rain enhanced by thunderstorms which formed along and behind a cold front on the 7th. A few spots in the valley even received small hail. The second event brought 0.32 inch on the 19th." (NWS 2013)

Stormwater Monitoring Summary

On the morning of Friday, April 19, 2013, the NWS forecasted 80 percent chance of rain showers then afternoon showers with possible thunderstorms. Three individual rain events for this system were recorded throughout the day at the NWS rain gauge (Caldwell Airport), the first occurred early Friday morning beginning at 0715 and continuing to 0955, then Friday afternoon from 1335 to 1655, and finally from 1955 to 0205. Rain fall totaled 0.10", 0.16", and 0.13" for each period, respectively, cumulating to 0.39" for this storm event. Results from this storm are presented in Table 3.

2.2 May – June Monitoring Period

NWS Summary May – June

The NWS monthly climate summary for May – June is as follows.

"A wet period occurred May 26 through 30 with almost a third of an inch of rain in showers and thunderstorms in 24 hours ending on May 28. Moderate rain with showers and thunderstorms brought poor visibility to the Boise area the evening of May 26. [May] precipitation of 0.77 inches was a bit over half of normal for May.

For the first 23 days of [June], precipitation was sparse. No more than a hundredth of an inch of rain was measured at the airport. With little moisture in the westerly flow, the air remained very dry, and humidities often fell to the teens and single digits in the afternoons. The final and coldest trough of the series crossed the Aleutians to the Gulf of Alaska on the 23rd and approached the northwest coast. Airflow around the base of the trough managed to tap a wetter Pacific moisture source resulting in a total of four tenths of an inch of rain at the airport on the 24th and 25th." (NWS 2013)

Stormwater Monitoring Summary

On Tuesday, June 18, 2013, the NWS forecast predicted a 60 percent chance of rain with likely showers and a possible thunderstorm before noon with possible showers and thunderstorms after noon. This was followed with a Wednesday afternoon forecast of 70 percent chance of showers likely for the remainder of the day. Rain was recorded at the NWS rain gauge (Caldwell Airport) beginning early Wednesday morning at 0255, then from 0855-0955, and once more from 1415-1455. Rainfall totaled 0.01", 0.33", and 0.05" for each period, respectively, cumulating to 0.39" for this storm event. Results from this storm are presented in Table 3.

2.3 July – August Monitoring Period

NWS Summary July – August

The NWS monthly climate summary for July – August is as follows.

"As is typical of July, little precipitation fell. Thunderstorms and showers on the 16th brought 0.13 inch of rain, the only measurable rain at the airport. A persistent, very warm upper level high pressure ridge set up over the area early in the month resulting in record high temperatures. There was a surprisingly large amount of moisture for a ridge which had originated over the four corners. On the morning of the 3rd, precipitable water over Boise was more than double the median amount yet only traces of rain fell at the airport on the 2nd and 3rd. Heavier amounts were measured at a few Boise locations due to the isolated nature of the convection.

August is normally the driest month of the year. This year's August precipitation of 0.45 inch at the airport was slightly above normal, but was not representative of Boise as a whole. Due to the localized nature of thunderstorm rain, some parts of town had less than half as much rain and others received over twice as much rain.

Isolated thunderstorms crossing the Boise area were usually accompanied with gusty winds but little rain. The thunderstorm on the 22nd was the most noteworthy with 0.42 inch of rain at the airport. As this storm continued north toward the foothills, it dumped nearly 0.8 inch of rain at one location in the northeast part of town, while on the periphery of the storm in west Boise, only traces or a few hundredths of an inch were measured." (NWS 2013)

Stormwater Monitoring

One storm was targeted during this period on August 22, 2013. This storm event was characterized by very localized and isolated showers. During this storm, a rainfall total of 0.04 was recorded at the WWTP rain gauge, which was the closest gauge (geographically) to the monitored drainage areas. Data from this storm is included with other analytical results in Table 3, but was not used in pollutant loading estimates for the July – August period. Instead, the storm event sampled on December 4, 2012, was used to supplement the sampling requirements for this period.

2.4 September – October Monitoring Period

NWS Summary September – October

The NWS monthly climate summary for September – October is as follows.

"September 2013 was the 7th wettest at the airport and the 10th wettest since precipitation records began in 1864. Boise has not seen such a wet September since 1998 when 1.96 inches of rain fell. Since then, only three Septembers were wetter than normal, each totaling under an inch of rain. This September was the wettest of any month since April 2012.

Precipitation in October was only .01 inch above normal. Even so, it was a very interesting month in terms of rainfall as all but four hundredths of an inch fell in one storm on the 28th. Up until then, no significant rain had fallen since September. The three Pacific weather systems that did reach the intermountain region either lacked adequate moisture or were diverted far to the south. Most of the time, we were in the domain of the west coast high pressure ridge." (NWS 2013)

Stormwater Monitoring

On Monday, September 23, 2013, the NWS forecast for the Nampa area predicted a 60 percent chance of rain showers during the afternoon of the September 24, 2013. On Tuesday, September 24, 2013, the forecast increased the chance of afternoon showers to 80 percent. Rain was recorded at the Mason Creek rain gauge beginning Tuesday during the noon hour continuing until 1500 cumulating to 0.25" for this storm event. Results of this storm are provided in Table 3.

2.5 Supplemental November – February Monitoring Period

NWS Summary November – December

The NWS monthly climate summary for November - February is as follows.

"November was dry overall with a little more than a half inch of precipitation recorded in the bucket. This small total was about three-quarters of an inch below the normal amount. November is normally one of the wetter months of the year in Boise. Due to the lack of cold air, snowfall this month was only a trace. The normal value is 2.6 inches. November snow, however, is quite variable from year-to-year with some years having no snow and other years having several inches.

December was dry overall with just over an inch of precipitation recorded. This is about half an inch below the normal amount for December. However, this is well above the December 2011 monthly total of 0.36 inches. A total of 2.5 inches of snow fell this month, which is well below the normal snowfall of 7

inches. This is much higher than December 2011, which recorded no snowfall. Fourteen days in December reported snow in Boise.

The [January] snowfall total of 9.3 inches was slightly more than the average of 7.1 inches. There was 1 inch or more on the ground on all but four days and a continuous snow cover for nearly three weeks from the 8th through the 27th, but that is not terribly unusual. We had an equally long period of continuous snow cover in 2008 from January 20 through February 8, and periods exceeding two weeks in 2004 and 2010, as well as 22 earlier years going back to 1949. In fact, periods of continuous snow cover exceeding 50 days were commonplace during the winters of the 1980s and the early 1990s.

February 2013 was characterized by near normal weather throughout the entire month. There were no high or low temperatures observed and no heavy precipitation events. However, a more zonal flow brought numerous light precipitation events to the area with a trace or more of precipitation occurring on ten days spread throughout the month, which only totaled 0.63 inch. This monthly precipitation total is 0.36 inch below normal and allowed the seasonal precipitation deficit to grow to nearly an inch and a half below normal." (NWS 2013)

Stormwater Monitoring

Two storms were monitored during this reporting period. The first occurred the morning of Tuesday, December 4, 2012. The NWS forecasted 70 percent chance of rain. Rain was recorded early Tuesday morning at the NWS rain gauge (Caldwell Airport) between 0415 through 0555 and from 2015 to 2135. Total precipitation measured at the Caldwell airport was 0.21" and 0.06" during these time periods, respectively, cumulating to 0.27" for December 4, 2012. Results from this storm are provided in Table 3.

The second storm of this reporting period occurred the evening of Friday, February 22, 2013. The NWS forecast issued the day prior predicted a 40 percent chance of rain during the day, increasing to 100 percent chance for Friday night. Rain was recorded Friday evening at the NWS rain gauge (Caldwell Airport) measuring 0.31" between 1755 through 2255. Results from this storm are provided in Table 3. This storm was not used for pollutant loading estimates due to incomplete flow data during the storm.

Section 3

Stormwater Monitoring Results

3.1 Methods

During WY 2013, grab samples were collected from the Indian Creek, Mason Creek, and Wilson Creek sample locations. All samples were characterized as "wet" samples because they were collected during a storm event. In the situation of the December 4, 2012, storm event, the results were used in place of the lack of rain during the July – August monitoring period.

Permit Defined Analyses

The permit requires that the following stormwater parameters be collected during the monitoring periods detailed in Section 1:

- Flow (cfs)
- Total Suspended Solids (TSS) (milligrams per liter [mg/l])
- Total Phosphorus (TP) (mg/l)
- Total Nitrogen
- E. coli

Section 3.2 presents the analytical results for the wet weather monitoring. For this report, total nitrogen is calculated from Nitrate+Nitrite (as N) and Total Kjeldahl Nitrogen (TKN). Table 3 presents the analytical results for each event used in pollutant loading estimates. For statistical calculation concentrations reported below the detection limit, half the detection limit is the value used in the calculation.

Flow and Rain Data

Flow data were collected at the Indian Creek, Mason Creek, and Wilson Creek monitoring sites. Flow data were collected continuously using an ISCO 2150 Flow Meter. In situations where flow was not collected or measured, an estimate was calculated using the Rational Method based on drainage size, land use, and measured precipitation. Rain gauge data were collected from the Caldwell Airport located approximately 10 miles northwest of the City for the majority of the year. In situations where rain gauge data was not available, data from other sources was used to fill in the gaps. Extraneous rain data sources utilized also includes a City-owned rain gauge located at the WWTP.

In August, the City installed a rain gauge at the Mason Creek monitoring sites to collect continuous rainfall data representative of the drainages for all three monitoring sites. Section 3.3 presents the flow and rain gauge data for each event and for the entire 2013 water year. Tables 1 and 2 of each DMR (Appendix C) present measured and estimated flow and rain amounts. Table 3 of each DMR presents measured flow and rain amounts for targeted storm events. Hydrographs are included for each month and monitoring period in Appendix C.

The raw flow and rain data are analyzed to consistently differentiate between background flow and rain-induced flow in the conveyance system. The analysis compares a given flow measurement to the running average flow to predict the rain-induced portion and accounts for whether or not a rain measurement occurred near that time. The running average includes flow measurements for the previous 10 hours.

Pollutant Loading Estimates

Pollutant loading estimates were calculated for each site (and drainage area) based on the geometric means of analytical results for the water year. The analytical results for E. coli are provided as most probable numbers; therefore, a pollutant loading mass estimate is not calculated. Pollutant loading estimates were calculated for nitrate+nitrite as Nitrogen (N), TSS, TKN, and TP. Analytes that were not detected were included in the calculations as detections at half the detection limit. Precipitation and drainage areas for the monitoring sites and the Nampa MS4 are provided in Table 2 of each monitoring period report.

Table 3 provides the analytical results for each monitoring location for the water year. These concentrations are converted from milligrams per liter to pounds per acre based on flow volumes for the year. The pollutant loading values are calculated based on flow data for the two-month period and analytical data for the monitored storm. This load considers the concentration in combination with a conversion factor and the flow associated with runoff for measured events.

Pollutant loading estimates for the entire Nampa MS4 are calculated using the Simple Method approved by the EPA for simple pollutant loading estimations for urban stormwater. The drainage area of the Indian Creek monitoring site is comprised of industrial, commercial, and residential land uses, which are the three most prevalent land uses represented in the MS4. As such, the geometric means of analytical results from the Indian Creek monitoring site were used in pollutant loading estimates for the Nampa MS4. The following is the equation used to estimate the pollutant loads during each monitored month identified in the permit (March through October).

Simple Method

$$L = 0.226 * R * C * A$$

Where:

L = Annual Loads

R = Annual Runoff (inches)

C = Pollutant Concentration (mg/L)

A = Area (acres)

0.226 = Unit conversion factor

Annual Runoff Calculation

$$R = P * Pj * Rv$$

Where:

R = Annual Runoff (inches)

P = Annual Rainfall (inches)

Pj = Fraction of annual rainfall events that produce runoff (0.9)

Rv = Runoff Coefficient

During the establishment of the Nampa Utility, the City evaluated the MS4 percent impervious. The percent impervious used for the utility was used to calculate the runoff coefficient for the Simple Method.

The City derived impervious surface data in two different processes. The first process was manual digitization of the non-residential parcels using GIS software. This was completed by a consultant utilizing April 2008 imagery. Each parcel was individually digitized into a number of sub-categories that were associated with pervious or impervious surfaces. The second process was a number of calculations

to derive a standardized impervious measurement for residential properties within Nampa city limits. These calculations were provided by another consultant. Both of these processes went through a number of iterations and quality control checks.

3.2 Analytical Results

Samples were collected during wet weather conditions during each event for Indian Creek, Mason Creek, and Wilson Creek. During WY 2013, no flow was observed at any of the three sites during setup. Samples were analyzed (for the parameters noted in Section 3.1) by the Analytical Laboratories, Inc. (nitrogen analyses) in Boise, Idaho, and the Nampa Wastewater Division (all other analyses). Analytical laboratory results are included in Table 3.

Nitrate+Nitrite as N was detected in all wet samples collected during each targeted storm event. Nitrate+Nitrite as N concentrations in samples ranged from 0.34 to 1.86 mg/l for the Indian Creek location, 0.41 to 3.91 mg/l for the Mason Creek location, and 0.40 to 1.62 mg/l for the Wilson Creek Location.

TSS was detected in all targeted storm events for each sampling location. TSS wet weather concentrations ranged from 4 to 695 mg/l for the Indian Creek location, 2 to 22 mg/l for the Mason Creek location, and 11 to 194 mg/l for the Wilson Creek location.

TKN was detected in all targeted storm events for each sampling location. TKN wet weather concentrations ranged from 1.93 to 8.97 mg/l for the Indian Creek location, 0.98 to 6.91 mg/l for the Mason Creek location, and 2.54 to 10.10 mg/l for the Wilson Creek location.

TP was detected in all targeted storm events for each sampling location. TP wet weather concentrations ranged from 0.25 to 1.9 mg/l for the Indian Creek location, 0.35 to 1.4 mg/l for the Mason Creek location, and 0.28 to 1.4 mg/l for the Wilson Creek location.

E. coli was detected in all targeted storm events for each sampling location. E. coli wet weather concentrations ranged from 2 mg/l to exceeding lab reporting limits (>2,419.6 mg/l) for the Indian Creek location, 9.8 mg/l to >2419.6 mg/l for the Mason Creek location, and 125.9 mg/l to >2419.6 mg/l for the Wilson Creek location.

3.3 Flow and Rain Gauge Data

Tables 1 and 2 of each DMR summarize storm flow data, groundwater/irrigation flow, total flow, and total estimated runoff volume for each site by monitoring period over the year. Table 3 of each DMR summarizes targeted storm event flow data, storm duration, and total precipitation.

Problems with flowmeters resulted in flow measurement data gaps throughout the year. Annual and seasonal trends in flows at the monitoring sites are hidden by these gaps. Where flow data was lost or unavailable, the EPA Rational Method was used to calculate flow based on recorded rainfall.

3.4 Pollutant Loading Estimates

Monthly and annual pollutant loading estimates are presented in Table 4 for each monitoring site and the Nampa MS4.

Nitrate+Nitrite pollutant loading estimates for the year emanating from the Nampa MS4 were estimated to be 11,536 lbs for WY 2013, with the highest pollutant loads for the year being estimated in the months of September and October. Pollutant loading estimates from the monitoring locations were estimated to be 13.6 lbs at the Indian Creek site, 6.9 lbs at the Mason Creek site, and 1.8 lbs at the Wilson Creek site for WY 2013. The largest pollutant loading estimate for the year was reported for the month of October at Indian Creek, April at Mason Creek, and October at the Wilson Creek site.

TSS pollutant loading estimates for the year emanating from the Nampa MS4 were estimated to be 2,598,034 lbs for WY 2013, with the highest pollutant loads for the year being estimated in the month of May. Pollutant loading estimates from the monitoring locations were estimated to be 3,058 lbs at the Indian Creek site, 40 lbs at the Mason Creek site, and 202 lbs at the Wilson Creek site for WY 2013. The largest pollutant loading estimate for the year was reported for the month of June at Indian Creek, May at Mason Creek, and October at the Wilson Creek site.

TKN pollutant loading estimates for the year emanating from the Nampa MS4 were estimated to be 64,903 lbs for WY 2013, with the highest pollutant loads for the year being estimated in the month of May. Pollutant loading estimates from the monitoring locations were estimated to be 76.4 lbs at the Indian Creek site, 13.0 lbs at the Mason Creek site, and 11.5 lbs at the Wilson Creek site for WY 2013. The largest pollutant loading estimate for the year was reported for the month of June at Indian Creek and October at Mason Creek and Wilson Creek.

Total Phosphorus pollutant loading estimates for the year emanating from the Nampa MS4 were estimated to be 12,303 lbs for WY 2013, with the highest pollutant loads for the year being estimated in the month of May. Pollutant loading estimates from the monitoring locations were estimated to be 14.5 lbs at the Indian Creek site, 3.1 lbs at the Mason Creek site, and 1.4 lbs at the Wilson Creek site for WY 2013. The largest pollutant loading estimate for the year was reported for the month of June at Indian Creek, April at Mason Creek, and October at the Wilson Creek site.

Pollutant loading estimates were not estimated for E. coli because the E. coli value produced by the lab is a most probable number and not a mass equivalent.

Section 4

Conclusions

Grab samples were collected at all three sites during this monitoring year. For the second year, no complete storm was sampled during the July – August time period. Supplemental data has been useful in meeting the Permit requirements for monitoring four storm events.

Pollutant loading estimates are rough estimates.

The information presented in the report adds to the growing data set for the Nampa MS4. Additional monitoring data will be necessary to conduct statistical analyses to begin identifying pollutant loading and other trends in the monitored drainage areas and the Nampa MS4.

Precipitation data collected at the Mason Creek monitoring site rain gauge was the most representative of the monitored drainage areas. This data is more reliable than some other sources used and fits well with flow data measured at the monitoring sites. This relationship will help to refine pollutant loading estimates and provide higher confidence in monitoring results.

4.1 Recommendations and Plans for WY 2014

The addition of four more samples during WY 2014 will help to create a dataset that can better characterize the stormwater quality emanating from the Nampa MS4. As the program progresses, the pollutant loading estimates should become more representative of stormwater runoff from the Nampa area.

In WY 2013, City staff gained experience and familiarity with the monitoring equipment, data management techniques, and maintenance and logistical issues associated with the monitoring program. A review of sampling efforts, continuous monitoring, and data management over the course of the year will be used to refine monitoring and data management protocols. Revisions to the monitoring plan will be made to incorporate the strategies and approaches identified during the water year review.

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Tables

Appendix A: Site Maps

NPDES Phase II – Vicinity Map

Indian Creek Drainage Area

Wilson Creek Drainage Area

Mason Creek Drainage Area

Appendix B: Laboratory Analytical Reports

Appendix C: Stormwater Discharge Monitoring Reports