Prepared for:
Nestlé Waters North America Inc.

2009 Annual Monitoring Report
Ruby Mountain Springs
Chaffee County, Colorado

AECOM

February 2010
Document No.: 60138495

Submitted w/ 2009 Annual Report (App C)
March 1, 2010

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1.0 Introduction

Pursuant to Condition 4.8 of Chaffee County Resolution No. 2009-42, this report prepared by AECOM documents the findings of the 2009 monitoring program associated with the Nestlé Waters North America Inc. (NWNA) spring-water project near Buena Vista, Colorado. The monitoring network reported herein refers to the DRAFT Surface- and Ground-Water Monitoring and Mitigation Plan (draft SGWMMP) submitted by NWNA to Chaffee County.

The goal of the draft SGWMMP is to provide the data needed to assess the potential for up-gradient migration of the zone of influence from spring-water withdrawals over time. The water-level record from monitoring wells will be compared to their historic levels (starting in April 2008) and examined within the context of the prevailing hydrogeological conditions (weather patterns, irrigation ditch diversion records, surface-water monitoring and the water-level variation in the more distant, northern parts of the aquifer) to assess potential effects that could be attributable to the onset of commercial spring-water withdrawals from the Ruby Mountain site.

Withdrawals for production from the existing permitted borehole at Ruby Mountain (Ruby Mountain Borehole 2, or RMBH-2) have yet to begin and the proposed backup borehole (RMBH-3) has not yet been installed and tested. In the absence of spring-water withdrawals, the data reported in this annual report represent a continuation of baseline monitoring prior to the initiation of withdrawals.

The data reported herein is the full contiguous record for each monitoring point in the draft SGWMMP network. In future reports, this baseline data will be used in conjunction with other hydrogeologic information to evaluate variations observed following the onset of withdrawals from Ruby Mountain.

2.0 Monitoring Network

The draft SGWMMP network consists of ten wells and boreholes (Figure 1), and two surface-water monitoring stations each at the Ruby Mountain Springs site (Figure 2) and the Bighorn Springs site (Figure 3). When RMBH-3 is completed, it will be added to the monitoring network. As shown in Table 1, these monitoring points are divided into three main areas based upon their location and general objective. Table 1 also includes a summary of measurement type and monitoring frequency. All stations within the network are instrumented with pressure transducers for automated data collection.

At the Ruby Mountain site, several of the monitoring points are likely to be effected by pumping at RMBH-2 (RMBH-1, RMBH-3, and the Ruby Weir). Other stations have not been observed to respond to borehole utilization during hydrogeologic testing conducted to date, either due to their distance from the pumping source (no effect has been observed at BVMW-10), or due to the fact that the monitoring point was not established at the time of testing (RMBH-3, and Ruby Parshall 1, which was recently added to the network at the request of the County). Any expansion of the zone of influence or the magnitude of influence from withdrawals for production would first become evident in this relatively proximal group of monitoring points.

The monitoring points at Bighorn Springs have not shown any pumping-related effects from the testing of boreholes at Ruby Mountain. Importantly, it is expected that any potential effects from the pumping of RMBH-2 in the aquifer at Bighorn Springs would be reflected in test borehole BHBH-2, as borehole BHBH-2 has been shown to have a direct hydraulic connection to the Bighorn Springs, which flow through some of the wetlands at the site. It is also expected that any decrease in water levels due to pumping would be reflected within the channel draining the springs (Bighorn Parshall 1 and 3). Water levels at Bighorn Monitoring Well 1 (BHMW-1) have been observed to be between those observed at the Ruby Monitoring stations and BHBH-2. As such, it will serve as a sentinel for the potential migration of the zone of influence towards BHBH-2.

Several of the upgradient monitoring wells have also been retained within the draft SGWMMP network (Figure 1). These include Well A, and four of the wells installed by NWNA during their ongoing hydrogeologic investigations of the alluvial aquifer (Buena Vista monitoring wells BVMW-2, BVMW-5, BVMW-8, and BVMW-9). These up-gradient monitoring points will allow for evaluation of background water-level changes in the aquifer and how those relate to the water-level variability observed at Ruby Mountain and Bighorn Springs. Evaluation of background water-level variability will be critical to discriminating between natural fluctuations in water-level and discharge patterns (resulting from changes in background recharge mechanisms), and those that might result from withdrawals at Ruby Mountain.

In addition to data collected from the monitoring network, additional data are (or will be) recorded and reported. With the onset of spring-water production from Ruby Mountain (anticipated to begin in 2010), daily withdrawals from the production boreholes (RMBH-2 and RMBH-3) will be recorded and reported. Precipitation data will be collected on site (a recording rain gauge is being installed as part of the ongoing construction activities) and compared to the data collected at a nearby, long-term weather station. Irrigation data for upgradient areas reported to the Colorado Division of Water Resources will also be tabulated and analyzed (the data for 2009 have yet to be released). Lastly, streamflow data for the Arkansas River from nearby gaging stations will help to place monitoring data within the context of hydrogeological conditions throughout the larger watershed.

3.0 Precipitation Monitoring

As part of the upcoming construction activities, NWNA will install a heated tipping-bucket rain gauge at the Ruby Mountain facility. Data collected at that rain gauge will be compared to ongoing and historic measurements being collected at the National Oceanic and Atmospheric Administration (NOAA) station in Buena Vista (Buena Vista 2S, National Weather Service Cooperative Station Network i.d. 051071).

Every ten years, NOAA publishes the monthly- and annual-average precipitation recorded at their long-term stations over the previous thirty-year period (often referred to as the 30-year Normal). Between 1971 and 2000, an average of 10.03 inches of precipitation were recorded at Buena Vista 2S. Precipitation data collected during 2009 are shown in Table 2. During 2009, a total of 8.82 inches were recorded at Buena Vista 2S. That total is 1.21 inches (12%) below the 30-year average. The monthly total precipitation was below average during eight months in 2009, with above average totals being recorded in May, June, September, and December.

Monthly precipitation totals during 2009 are also shown graphically in Figure 4a, along with the station's average monthly total and the 12-month moving total departure from those average values. Figure 4a demonstrates that the generally dry conditions observed during 2009 were a continuation of a trend from the previous year. During the 12-month period from February 2008 through January 2009, the 12-month total precipitation at Buena Vista 2S was 1.38 inches (14%) below average. During 2009, the cumulative annual departure ranged from 0.64 inches above average in July, to 2.16 inches below average in August.

Precipitation plays a key role in several of the recharge mechanisms supplying the aquifer as a whole, directly impacting the water-level and discharge patterns observed throughout the monitoring network. Various aspects of the monitoring program have been in operation since September 2007. To help understand the variability at these monitoring stations, which is discussed in the following sections, the September 2007 through January 2010 precipitation record from Buena Vista 2s is shown in Figure 4b.

As shown in Figure 4b, the first half of the period of record (September 2007 through November 2008), was relatively wet. During that period, the median value of the 12-month cumulative total was 2.65 inches (26%) above average, primarily due to a wet spring and summer in 2007. During the 6-month period prior to September 2007, a total of 9.98 inches of precipitation were recorded at Buena Vista 2S, which is 3.28 inches (49%) above average for that period.

The second half of the period shown in Figure 4b (December 2008 through January 2010) was relatively dry. The median 12-month cumulative totals recorded at Buena Vista 2S during that period was 1.28 inches (13%) below average. The results of the ongoing monitoring program should be evaluated in the context of these prevailing climatological conditions.

4.0 Ground-Water Monitoring

The ground-water monitoring network as defined in the draft SGWMMP consists of ten wells and boreholes in three distinct areas (Table 1). At the Ruby Mountain Springs site, water levels are monitored at the two spring-water boreholes: Ruby Mountain Boreholes 1 and 2 (RMBH-1 and RMBH-2, Figures 1 and 2). RMBH-2 is being converted into a production borehole, but at the time of this report no production withdrawals have been made. RMBH-1 is only used as a monitoring well. NWNA plans to install a backup source at Ruby Mountain (RMBH-3). Following its installation, RMBH-3 will be added to the Ruby Mountain monitoring network. Also included within the Ruby Mountain network is BVMW-10, a monitoring well located between RMBH-2 and the upgradient Bighorn Springs site (Figure 1).

At Bighorn Springs, ground-water monitoring is conducted in BHBH-2 and BHMW-1 (Figures 1 and 3). Bighorn Borehole 2 (BHBH-2) was the primary test borehole at the site while it was being evaluated as a potential source for spring water (the site is no longer being considered for spring-water development). Bighorn monitoring well 1 (BHMW-1) is located between the springs at Bighorn (and the associated boreholes) and the Mosquito Range to the east.

Several upgradient monitoring wells have also been retained within the draft SGWMMP network. These include Well A, and four of the wells installed by NWNA during their ongoing hydrogeologic investigations of the alluvial aquifer (Buena Vista monitoring wells BVMW-2, BVMW-5, BVMW-8, and BVMW-9, Figure 1).

Together, these monitoring points will be used to assess background fluctuations within the aquifer due to seasonal and annual variation in recharge, and the potential for up-gradient migration of the zone of influence over time. Observations during pumping tests and other hydrogeologic evidence (aquifer parameters, distance, and proposed rate of withdrawal) indicate that no adverse impacts from production at Ruby Mountain will occur in the wetlands at Bighorn. Those wetlands are associated with the Bighorn Springs, which have shown direct hydrogeologic connection to BHBH-2. Any potential water-level changes that might effect the spring-fed wetlands will be reflected within the water-level record at BHBH-2. Between BHBH-2 and the downgradient production borehole at Ruby Mountain, there are three monitoring wells within the draft SGWMMP network: RMBH-1; BVMW-10; and BHMW-1. Water levels in RMBH-1 will be impacted by the pumping of RMBH-2, as has been observed during the three pumping tests conducted on the source to date. No measurable pumping-related effect has been observed at any of the more distant monitoring points.

Due to the temporal variability in recharge rate, water levels throughout the aquifer have a natural seasonal variation. The magnitude of the annual water-level variation in the aquifer tends to increase in an upgradient direction. There is also an earlier onset of annual water-level peaks and lows with further distance upgradient in the aquifer. In general, water levels have demonstrated a small decline during the period of record, with lower annual peaks and lows in 2009 relative to those observed in 2008. That general decline is consistent with the recent pattern of rainfall, as discussed in Section 3.0. The earlier data were recorded during a generally moist period. Starting in late 2008, precipitation has generally been below average.

Observed water-level variations within the monitoring network are further described in the following sections. The water-level data are presented in graphical format only. Tabular data of daily average water levels are available upon request.

4.1 Ruby Mountain Ground-Water Network

Water-level measurements collected to date at Ruby Mountain are shown in Figure 5. BVMW-10 was outfitted with a recording pressure transducer on April 28, 2008. RMBH-2 was outfitted with a recording transducer on May 6, 2008. Manual measurements of water levels have been occurring at the site on a bi-weekly to monthly basis. Those measurements have demonstrated a close relationship between water levels in RMBH-1 and RMBH-2, as would be expected given their close proximity and similar construction. That relationship was used to synthesize a record of daily water level data for RMBH-1 from data collected in RMBH-2 (a transducer was installed in RBMH-1 in February 2010). Similarly, water levels from RMBH-2 were used to estimate water levels in BVMW-10 during a brief interruption in data collection (dashed green line in Figure 5). A replacement transducer was installed on August 26, 2009.

Water levels recorded to date in RMBH-2 have averaged approximately 7,650 feet above mean sea level (ft amsl). During the annual cycle, water levels at RMBH-2 typically vary by 5 to 6 feet from their annual highs in the summer and fall to their annual lows in the spring. As was typical throughout the aquifer as a whole, water levels during 2009 were lower than observed during 2008 (0.4 feet lower during the peak of 2009, and 1.2 ft lower during the annual low of 2009).

Water levels in RMBH-1 have averaged approximately 0.65 feet higher in elevation than water levels in RMBH-2 (7,651 ft amsl). That relationship is not constant throughout the year. During observed peak periods, water levels in RMBH-1 have been approximately 0.8 feet higher. During low periods, water levels have been approximately 0.5 feet higher. As a result, the annual variation observed at RMBH-1 is somewhat higher than at RBBH-2 (5.3 to 6.5 feet at RMBH-1 vs. 5.0 to 6.2 feet at RMBH-2).

Water levels in BVMW-10 have averaged 7,663 ft amsl, or 13 feet higher than water levels in RMBH-2 (14 to 14.5 feet higher during peak periods, and 11.5 to 12 feet higher during annual lows). The observed annual range of water levels in BVMW-10 has been between 7.5 to 9 feet.

4.2 Bighorn Springs Ground-Water Network

Water-level measurements collected to date at Bighorn Springs are shown in Figure 6. BHMW-1 was outfitted with a recording pressure transducer on April 24, 2008. BHBH-2 was outfitted with a recording transducer on May 8, 2008.

Water levels in BHMW-1 have averaged approximately 7,677 ft amsl, or 27 feet higher than water levels in Ruby Mountain Borehole 2. The water-level differences between those two monitoring points typically range from

28.5 to 29 feet higher during peak periods, to 25.5 to 26 feet higher during annual lows. The observed annual range of water levels in BHMW-1 has been between 8.5 to 9.5 feet. Water levels in BHMW-1 have averaged 7 feet lower than water levels in Bighorn Borehole 2 (5.5 to 6 feet lower during peak periods and 7.5 to 8 feet lower during annual lows).

Water levels in BHBH-2 have averaged approximately 7,684 ft amsl, or 34 feet higher than those observed in RMBH-2. During annual water-level peaks, water levels are typically 34.5 to 35 feet higher than RMBH-2. During annual lows, water levels are typically 33 to 33.5 feet higher. The annual fluctuation in BHBH-2 has been between 6.5 to 8 feet. As was typical throughout the aquifer as a whole, water levels in BHBH-2 during 2009 were lower than observed during 2008 (0.5 feet lower during the peak of 2009, and 1.5 ft lower during the annual low of 2009).

4.3 Upgradient Monitoring Network

Water level measurements collected to date in the five upgradient wells in the draft SGWMMP network (Well A, BVMW-2, BVMW-5, BVMW-8, and BVMW-9) are shown in Figure 7, along with the data from the Ruby Mountain and Bighorn Springs sites. These upgradient monitoring points were instrumented with pressure transducers on April 24, 2008. During the spring of 2009, water levels in BVMW-8 briefly dropped below the setting of the pressure transducer. Water levels during that brief period were estimated using manual observations at BVMW-8 in conjunction with the automated data recorded at BVMW-9 (red line in Figure 7).

Water levels in BVMW-9 have averaged 7,710 ft amsl, or 60 feet higher than observed in RMBH-2 and 26 feet higher than BHBH-2. The annual variation in water levels in BVMW-9 has been between 10.5 to 12.5 feet. Water levels in BVMW8 have averaged 5 feet higher than BVMW-9 (7,715 ft amsl), experiencing an annual variation of 13.5 to 15 feet. At both of these locations, the annual peaks and lows during 2009 were approximately 2 feet lower than they were in 2008.

Water levels in BVMW-5 have averaged 7,750 ft amsl, or 100 feet higher than RMBH-2 and 66 feet higher than BHBH-2. The annual variation in BVMW-5 appears to be on the order of 13 to 16.5 feet, however the annual low during 2008 may not have been captured in the record. In these upgradient areas, the annual lows and peaks occur earlier in the year. This may be particularly true of BVMW-5 which may have experienced a significant amount of recharge through releases from Trout Creek in the spring of 2008 (prior to the start of data collection activities at the well). The Trout Creek channel terminates within the center-pivot irrigation field immediately northwest (upgradient) of BVMW-5 (Figure 1). This may also explain the relatively large variation in annual lows (3.3 feet lower in 2009) compared to other monitoring stations (generally 0.5 to 2 feet) and to the difference in annual peaks at BVMW-5 (1 foot lower in 2009).

Water levels in BVMW-2 have averaged 7,687 ft amsl, or 137 feet above RMBH-2 and 105 feet above BHBH-2. The annual variation at BVMW-2 has been 15 to 17 feet. Unlike other ground-water stations in the network, the annual peak and low during 2009 were actually higher than observed in 2008 (by 1.8 feet and 0.5 feet, respectively). Due to its location, that station is impacted by a large number of variables, including recharge from Trout Creek to the east, irrigation applications on nearby center pivot fields, and infiltration along the unlined ditches immediately to the west. As a result, the water level record from BVMW-2 tends to show the most fluctuation.

In comparison, Well A, which is located upgradient of the northernmost center pivot system, has a relatively small annual variation (11.5 to 12 feet) compared to other monitoring points in the upper portions of the aquifer. Water levels in Well A have averaged 7,810 ft amsl, or 160 feet above RMBH-2 and 126 feet above BHBH-2. Water levels in 2009 (annual peaks and lows) were less than 1 foot lower than observed in 2008.

5.0 Surface-Water Monitoring

Surface-water monitoring at the Ruby Mountain site consists of flow measurements (automated readings of stage converted to flow from standard equations) at the Ruby Weir, and at a recently installed flume (Ruby Parshall 1) located on the Hagen trench, a spring-fed channel upstream of the existing hatchery facilities. These stations are sometimes referred to as the Lower Weir and the Upper Flume, respectively. The Ruby Weir measures the combined flow of discharge from the springs which are drained by the Ruby Mountain channel.

Surface-water monitoring at Bighorn Springs consists of automated flow measurements at Bighorn Parshall 1 and Bighorn Parshall 3. Parshall 1 is located approximately 50 to 75 feet down gradient of Bighorn Spring 1, representing the uppermost portions of the Bighorn Springs channel. Bighorn Parshall 3 was installed about 400 feet further downstream along the same spring-water discharge channel, near the confluence of the channel and the Arkansas River.

Observed variations in discharge patterns within the draft SGWMMP network are described in the following sections. The discharge data are presented in graphical format only. Tabular data of daily average flow are available upon request.

Similar to observations from the ground-water monitoring network (Section 4.0), the magnitude of annual flow variation tends to increase in an upgradient direction, and the rate of discharge has demonstrated a decrease through time. These phenomena are related to natural cycles, variations in recharge, and how recharge propagates throughout the aquifer. Most importantly, the earlier part of the record was characterized by relatively moist climatological conditions (Section 3.0). Precipitation totals recorded during the second half of the record have been below average. While none of the monitored surface-water stations show any immediate response to precipitation events, the precipitation totals recorded over time play a key role in the overall recharge to the contributory spring-water aquifer.

5.1 Ruby Mountain Channel

Discharge data collected to date in the Ruby Mountain channel are shown in Figure 8. The Ruby Weir (a.k.a. Lower Weir) was instrumented with a recording pressure transducer in September 2007. The numerous structures within the Ruby Mountain channel associated with the now discontinued trout hatchery are prone to clogging by debris (tumbleweeds, aquatic plants, and beaver activity), which can cause a significant amount of water to bypass the channel above the weir by flowing through engineered structures or overland into the Arkansas River. NWNA is actively maintaining the site to limit these monitoring issues, however during certain times of year these debris dams form very rapidly and some degree of bypass is unavoidable. The clearing of these blockages is often accompanied by a release of stored water, as shown by the small, periodic spikes in flow.

Ignoring the variations in flow related to these monitoring challenges, the rate of discharge in the channel is very steady, demonstrating only slow, seasonal changes. The rate of discharge is highest in the summer and fall, with lower flows in the winter and spring. No immediate response to precipitation events has been observed at this or any other surface-water station in the Ruby Mountain and Bighorn Springs channels.

As a result of the monitoring challenges, the daily averages of the data collected at the weir (the blue line in Figure 8) do not always reflect the actual rate of flow in the Ruby Mountain channel. To better characterize the natural discharge patterns in the channel and how they relate to climatological variations, AECOM has estimated flow for a number of days that were known to be impacted by the bypass of flow from the channel to the Arkansas River upstream of the weir (purple line in Figure 8). Those estimates were based upon discharge data that were not impacted by bypass (flows measured before and after the impacted periods), and on-site observations of the magnitude of bypass.

Since the initiation of automated measurements, the annual average rate of discharge (moving 365-day mean) has decreased from 3.4 cfs to 3.0 cfs (approximately 12%) in response to the climatological conditions of the period (Section 3.0). Along with this overall decline in discharge, annual peak flows and annual low flows have also decreased over time. The peak flows have decreased from 5.2 cfs in 2007, to 4.7 cfs in 2008, and 4.1 cfs in 2009. Lows have decreased from 2.1 cfs in 2008 to 1.6 cfs in 2009.

In contrast, the permitted rate of withdrawal (200 acre-feet per year, or an average of 0.27 cfs) represents only a small portion of that discharge. The immediate effect of pumping from the production borehole (RMBH-2) during hydrogeologic testing has been relatively minor (Figure 8), even though the rates of pumping during those tests were significantly higher than permitted rates for production.

Ruby Parshall 1 (a.k.a. Upper Flume) was installed in June 2009, and instrumented in late August. Initially the rate of discharge within the Hagen trench, which represents the northernmost portions of the Ruby Mountain channel, was very low (0.09 cfs, or 41 gpm on June 25, 2009). The rate of discharge increased steadily into the late summer and early fall when measured flow peaked at 1.0 cfs. Low seasonal rates of discharge are expected in this area. Significant reaches of the Hagen trench, which extends for some distance northwest of the flume, dries up during low-flow periods. As water-levels in the aquifer rise in the summer or recede in the spring, the location at which flow in the trench begins migrates up-gradient and down-gradient in response. Given the low rates of flow observed in the early summer of 2009, it is anticipated that flow at Ruby Parshall 1 may cease during portions of the year due to background hydrogeologic variations unrelated to withdrawals from the Ruby Mountain facility.

5.2 Bighorn Springs Channel

Discharge data collected to date in the Bighorn Springs channel are shown in Figure 9. Bighorn Parshall 1 is located below Bighorn Spring 1, representing the uppermost portion of the Bighorn Springs channel. Bighorn Parshall 2 was located below Bighorn Spring 2, which drains a complex of seasonal wetlands east of the channel. Due to its short period of record and the highly intermittent nature of discharge, data collected at that station are not included in Figure 8. During the majority of the year, the discharge from Spring 2 ceases and the associated wetlands dry up. That flume was removed in the spring of 2008 and relocated downstream near the channel's confluence with the Arkansas River (Bighorn Parshall 3).

Between Bighorn Parshall 1 and Bighorn Parshall 3, the Bighorn Springs channel gains a significant volume of spring discharge from both the seasonal flow of Spring 2 and more consistent contributions from a series of unmapped springs entering along the northwest bank. During the pumping tests conducted on nearby Bighorn Borehole 2, some decrease in flow was observed from Bighorn Springs 1 and 2 (when that later spring was flowing). No significant additional pumping-related effect was discernable within the Bighorn Springs channel near its confluence with the Arkansas River (Bighorn Parshall 3).

Bighorn Parshall 1 was instrumented in September 2007. A location near Bighorn Parshall 3 was gauged during the May 2008 pumping test, and the flume was installed that June. Monitoring at Bighorn Parshall 3 consisted of manual observations on a bi-weekly to monthly basis prior to the installation of a recording pressure transducer in August 2009. Similar to the monitoring challenges encountered at Ruby Mountain (Section 4.1), flumes at Bighorn Springs are prone to clogging at certain times of the year. Despite ongoing maintenance at the sites, the resulting data is sometimes difficult to interpret. During the first month of automated data collection at Bighorn Parshall 3 the data were impacted by the formation and clearing of debris dams. During this period the manual observations (recorded after the blockages were cleared and the flume stage was allowed to equilibrate) are more representative of the general flow regime. During the early fall of 2008, Bighorn Parshall 1 became blocked by the rapid growth of aquatic plants. For the purposes of characterizing the natural discharge patterns of the Bighorn Springs channel, AECOM has estimated data for this brief period (purple line in Figure 9).

Since the initiation of automated measurements, the annual average rate of discharge measured at Bighorn Parshall 1 (moving 365-day mean) has decreased from 0.65 cfs to 0.38 cfs (approximately 42%) in response to the climatological conditions (Section 3.0). Along with this overall decline in discharge, annual peak flows and annual low flows have also decreased over time. The peak flows have decreased from 1.57 cfs in 2007, to 1.32 cfs in 2008, and 0.87 cfs in 2009. Lows have decreased from 0.20 cfs in 2008 to 0.10 cfs in 2009.

Due to the downstream gain in discharge, streamflow measured at Bighorn Parshall 3 appears to be much more resilient to moderate variability in climate. While low flows observed at the station during 2009 were lower than observed during 2008 (0.24 cfs vs. 0.33 cfs), the downstream gain between Parshall 1 and Parshall 3 during both years was a relatively steady 0.13 to 0.14 cfs (approximately 60 gpm). During periods of peak flow the downstream gain is significantly higher (between 0.48 to 0.40 cfs during the peak of 2008 and 2009, respectively).

Given the relatively large variation in seasonal flow rates and the overall decline in discharge observed at Bighorn Parshall 1 under the range of climatological conditions of the existing period of record, it is reasonable to expect that discharge from Bighorn Spring 1 will be significantly reduced during drier years or multi-year droughts. Other nearby springs are seasonal in nature even under relatively moist climatological conditions. Spring 1 may similarly cease to flow during extended dry periods due solely to variations in climate. The downstream gain in discharge in the Bighorn Springs channel appears to be more resilient, however that behavior has only been observed for a short period of time.

6.0 Arkansas River

Annual streamflow in the Arkansas River largely originates as snowfall in the mountains during the winter and spring. As the snowpack melts, streamflow generally peaks in the late spring to early summer. Lower flows typically occur from late summer through the early spring. It should also be noted that streamflow in the Arkansas River is influenced to a significant degree by storage in, and releases from, reservoirs and interbasin water transfers.

The annual pattern of flow in the Arkansas River is significantly different than the pattern of discharge in the spring-fed channels at Bighorn Springs and Ruby Mountain (Section 5), where flows peak in the summer and fall, and experience annual lows in the spring season.

Near the confluence of the Ruby Mountain channel, the Arkansas River drains an area of approximately 871 square miles. There are two nearby stations in the Arkansas River: the Arkansas River near Nathrop (1,060 square mile watershed); and the Arkansas River at Salida (1,218 square miles). The Nathrop station is operated by the United States Geological Survey (USGS) as a seasonal station (April 1 through September 30), although there is a historic record of annual flows. The Salida station is operated year round by the Colorado Division of Water Resources.

Streamflow data collected at these two Arkansas River stations are shown in Figure 10, along with the median of historic daily average flows reported for the Nathrop station. The period of record for Figure 10 was chosen to coincide with that of the surface-monitoring network at the Ruby Mountain Springs and Bighorn Springs sites (Figures 8 and 9). Recent streamflow data for the Arkansas River generally compares favorably to the historic record. In their monthly Basin Outlook Report for February 2009 (ftp://ftp-fc.sc.egov.usda.gov/CO/Snow/fcst/state/monthly/borco210.pdfl), the Colorado Office of the Natural Resources Conservation Service estimates that flows in the Arkansas River (at Salida) will be close to average over the near term (approximately 90% of the average April to July and April to September flows).

7.0 Irrigation Diversions

At the time that this report was written, records for irrigation diversions for the Trout Creek Reservoir, Helena Ditch, Bray Ditch, Trout Creek Ditch, and Trout Creek lateral of the Cottonwood Ditch during 2009 were unavailable. The Colorado Division of Water Resources reports this information after the irrigation season and the diversion records are typically completed by the beginning of the next irrigation season. When those records become available, they will be compiled and provided to the County as a supplement to this report.

8.0 Conclusions

In the absence of spring-water withdrawals, the data reported in this annual report represent a continuation of baseline monitoring prior to the initiation of withdrawals. Many of the monitoring locations have been observed since September 2007. Earlier data were collected under moderately wet climatic conditions (averaging 26% above the 30-year average rate of precipitation for the area). Starting in late 2008, the overall rate of precipitation has generally been below average (averaging 14% below average).

Water levels in the aquifer and discharge rates from the springs have continued to follow a seasonal pattern of peak levels and rates in the summer and fall, with lower levels and rates in the spring. Superimposed upon this pattern is the impact of the overall change in precipitation from relatively moist early in the record to relatively dry later in the record. All of the different monitoring locations are impacted by these seasonal and climatic changes in a somewhat unique fashion. The magnitude of the annual water-level variation in the aquifer tends to increase in an upgradient direction, along with an earlier onset of annual water-level peaks and lows.

2010 Annual Monitoring Report
Ruby Mountain Springs
Chaffee County, Colorado

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1.0 INTRODUCTION

Ruby Mountain Springs is located in central Chaffee County, Colorado, in the Upper Arkansas River Valley on the east bank of the Arkansas River (Figure 1.1). Under Chaffee County Resolution No. 2009-42, Nestlé Waters North America Inc. (NWNA) is allowed to divert up to 200 acre-feet of spring water per year from the Ruby Mountain Springs site, subject to limitations set forth in the permit. NWNA has committed to Chaffee County to conduct periodic surface water and groundwater monitoring as a means to characterize hydrologic conditions and to document any effects, if observed, from diversions by NWNA. Effects from withdrawals are expected to be minimal, localized, and to not produce adverse impacts to surface water, groundwater, wetlands, or nearby water resources. A copy of Resolution No. 2009-42 is included in Appendix A-1.

This Annual Report is prepared in accordance with Condition 4.8 of Resolution No. 2009-42, which states that NWNA "...shall submit an annual report to the County ... that describes progress on the Project and compliance with Permit conditions, including but not limited to water pumping operations; [and] wetland and groundwater monitoring..." The Surface- and Ground-Water Monitoring and Mitigation Plan (SGWMMP), submitted by NWNA to Chaffee County on April 29, 2010, satisfies Condition 4.16 of Resolution No. 2009-42, provides an outline for developing a baseline characterization of hydrologic conditions, and sets requirements for monitoring and evaluating any impacts on local water resources due to pumping at the Ruby Mountain Springs site. A copy of the SGWMMP is included in Appendix A-2.

In September 2010, SSPA began assisting NWNA with monitoring and evaluating the aquifer conditions for the Ruby Mountain Springs and Bighorn Springs sites. Prior monitoring and reporting was conducted by ENSR/AECOM. Significant activities during the 2010 water year included completion of Ruby Mountain Borehole 2 (RMBH-2) as a production source, construction of the tanker truck loadout station along U.S. Highway 24/285 in Johnson Village, and completion of the pipeline between RMBH-2 and the loadout station. Since August 5, 2010, three additional monitoring wells and one additional production well have been constructed at Ruby Mountain Springs; data from these wells will be summarized in the 2011 water year monitoring report.

2.0 REGIONAL SETTING AND DISTRIBUTION OF MONITORING STATIONS

The Ruby Mountain Springs and Bighorn Springs sites are located in Chaffee County, Colorado, along the eastern banks of the Arkansas River. Bighorn Springs is approximately 8 river miles south of Buena Vista, Colorado. The Ruby Mountain Springs, which emanate at the site of a former fish hatchery, are located another 0.8 miles downstream. The springs represent groundwater discharge from the productive alluvial Pinedale outwash aquifer (ENSR/AECOM, 2008).

Spring flow and water level monitoring at the Ruby Mountain Springs and Bighorn Springs sites began in January 2007. Expansion of the monitoring network continued throughout 2007 and 2008 and included installation of surface water gages near the springs (including staff gages, flumes, and a weir) and groundwater monitoring wells throughout the valley east of the Arkansas River and north of the springs. The area of the monitoring project and distribution of stations discussed in this report are shown on Figure 2.1.

As described in the SGWMMP, the monitoring network consists of three areas: the upgradient monitoring wells, the Ruby Mountain Springs site, and the Bighorn Springs site. In addition, weather and precipitation monitoring data and irrigation diversions in the valley are also compiled from monitoring conducted by others. All monitoring stations discussed in this report are listed in Table 2.1. The locations of the up-gradient monitoring wells, weather stations, and river gages are shown on Figure 2.1, and the monitoring locations at the Ruby Mountain Springs and Bighorn Springs sites are shown on Figure 2.2. A summary of field investigations performed during the 2010 water year and observations at each area are discussed in the following sections.

3.0 PRECIPITATION MONITORING

Daily precipitation is recorded at two locations as part of the SGWMMP (see Figure 2.1). The Ruby Mountain Springs station (PPT-RMB) records precipitation on-site, and the Buena Vista National Weather Service Station 2S (Buena Vista 2S) records precipitation at the Chaffee County Regional Airport, approximately seven miles north-northwest of Ruby Mountain Springs.

Precipitation measurements at the Ruby Mountain Springs station, which was installed in July 2010, are collected using a Texas Electronics Series 525 heated tipping bucket rainfall sensor with an accuracy of 1.0 percent. Data for this monitoring station are available from mid-July to mid-September 2010; data are not available for the latter part of September and October due to instrument malfunction. (Monitoring at this station was restarted on January 12, 2011, and daily precipitation will be recorded for the remainder of the 2011 water year.)

The Buena Vista 2S station data include long-term daily and monthly precipitation records that date back to August 1, 1899. Precipitation records for both stations are summarized in Table 3.1.

Monthly precipitation at these two stations during the 2010 water year is shown on Figure 3.1. Also shown on the figure for comparison purposes is the long-term monthly average precipitation at the Buena Vista 2S station. Additionally, the deviation in precipitation calculated over the previous 12-month period compared to the long-term average for the same 12-month period (the "cumulative annual departure") is shown on the figure. During the 2010 water year, 12.46 inches of precipitation were recorded at the Buena Vista 2S station, which is 2.43 inches greater than the long-term average of 10.03 inches. Monthly precipitation from November 2009 through April 2010, and in June and August 2010 was greater than the long-term average. This period of above-average precipitation reversed an 8-month period of shortfall in the cumulative annual departure for the Buena Vista 2S station.

For August 2010, the only full month that the Ruby Mountain Springs station was operational, precipitation totals were similar to those recorded at the Buena Vista 2S station; 2.92 inches and 2.91 inches, respectively.

4.0 SURFACE-WATER MONITORING

The SGWMMP specifies that surface water monitoring will be conducted at both the Ruby Mountain Springs and Bighorn Springs locations. A total of four flow measurement stations are maintained, two at each of the spring locations (see Figure 2.2). Each of the stations is outfitted with a datalogger that records the depth of water flowing over a weir or through a flume. The depths are converted to flows based on the dimensions of the gaging structure.

Some of the surface-water monitoring data associated with the SGWMMP was incomplete or showed anomalous measurements during periods of the 2010 water year. Monitoring complications included the failure of data logging equipment, such as breakdown of existing hardware, startup issues with new equipment (e.g., programming errors or bad sensors), and long-term sensor drift. Additional challenges arose from the need to maintain the integrity of monitoring structures on a continual basis; most commonly by clearing tumbleweeds, aquatic plants, and incipient beaver dams from the measurement structures and associated channels. Currently, all monitoring parameters at all stations identified in the SGWMMP are functioning properly.

4.1. Ruby Mountain Springs Site

Surface water monitoring at Ruby Mountain Springs consists of temperature and flow measurements at the Ruby Mountain Weir (RM-Weir), immediately downstream of the former fish hatchery, and at the Ruby Mountain-Hagen Parshall Flume (RMPF), which is upstream of the former hatchery, approximately 1,300 feet northwest of the weir. The locations of these monitoring stations are shown on Figure 2.2. The Hagen Trench is a channel entering the springs at the northern end of the former hatchery. Flow through this channel comes from upstream of the spring-water discharges. The flow passes through the RMPF and is conveyed to the former hatchery site, routed through the hatchery raceways and ponds, and discharges to the Arkansas River below the RM-Weir, which is located at the downstream end of the active spring discharge. The RM-Weir, therefore, measures combined flow from the Hagen Trench and from Ruby Mountain Springs discharges. The difference between flows at the two stations approximates the discharge from the Ruby Mountain Springs.

Average daily flows and temperature measurements for the RMPF and RM-Weir are included in Appendix B. The daily flows for the flume and weir were calculated from automated stage measurements using the U. S. Bureau of Reclamation (USBR) equations for a Parshall flume and a contracted, sharp-crested, rectangular weir, respectively (USBR, 2001). Monthly and annual measurements are shown in Table 4.1. Figure 4.1 is a plot of RM-Weir and available RMPF flows for the past two water years, as well as the daily precipitation at the Buena Vista 2S weather station.

The average monthly discharge from Ruby Mountain Springs during water year 2010 varied from 3.5 cfs (1600 gpm) in November 2009 to 1.2 cfs (540 gpm) in May 2010. While the data are noisy (primarily for the reasons discussed in Section 4.0, above) the seasonal trends are obvious and similar to those observed in the 2009 water year.

Since August 2010, and possibly earlier, overland surface flows and discharge from buried pipes assumed to be part of the former hatchery have resulted in the flow of spring water into the Arkansas River between the RMPF and the RM-Weir. These ungaged flows, which cause Ruby Mountain Springs discharges to be underestimated, have been documented in monthly reports to Chaffee County. Methods for monitoring and/or channeling the discharges into the monitoring system are currently being evaluated. In the latest high flow period for Ruby Mountains Springs (September through November 2010) it is estimated that up to 0.7 cfs (300 gpm) flowed into the Arkansas River and was not recorded as flow at the RM-Weir (SSPA, 2010).

4.2. Bighorn Springs Site

Surface water flows at the Bighorn Springs site are monitored at two measurement locations, Bighorn Parshall Flume 1 (BHPF-1) and Bighorn Parshall Flume 3 (BHPF-3), both of which are shown on Figure 2.2. BHPF-1 is located approximately 400 feet upgradient of BHPF-3. BHPF-1 measures flow upstream of Bighorn Springs, which during most of the year emanates from the wetlands area just upstream of the flume. BHPF-3 measures combined upstream flow and spring flow before the confluence with the Arkansas River. This flow normally can be considered to be the total Bighorn Springs flow.

Average daily flows, calculated from automated stage measurements using the USBR equation for a Parshall flume (USBR, 2001), and temperature measurements at BHPF-1 and BHPF-3 are included in Appendix C. Monthly and annual flows are shown in Table 4.2. Figure 4.2 is a plot of BHPF-1 and BHPF-3 flows for water year 2010, as well as the daily precipitation at the Buena Vista 2S weather station.

Flows from Bighorn Springs are considerably smaller than from Ruby Mountain Springs. The gain in the stream flow between BHPF-1 and BHPF-3 ranged from 0.1 cfs (approximately 45 gpm) in May through June 2010 to slightly above 0.4 cfs (180 gpm) in September and October 2010. Since BHPF-1 flows are also considered to be Bighorn Springs flows, total minimum and maximum flows ranged from 0.2 cfs (90 gpm) to nearly 1.2 cfs (540 gpm), respectively. Surface water flows at the Bighorn flumes have been recorded since late August 2009; therefore the water year 2009 flow history is only about 2 months long. Spring discharge between BHPF-1 and BHPF-3 appears to be similar to or slightly larger in October at the end of water year 2010 than they were a year earlier, although the noise in the records for both years makes quantitative interpretation uncertain.

4.3. Arkansas River

Provisional daily flow data for water year 2010 and long-term average flow data collected from the Arkansas River near Nathrop and Salida, downstream from Ruby Mountain Springs, are shown on Figure 4.3. Monitoring at the Nathrop gaging station began in October 1964 but the station currently is operated only on a seasonal basis (generally from April 1 through September 30) by the United States Geological Survey (USGS). The watershed area for this gage is 1,060 square miles. The Colorado Division of Water Resources (DWR) has been operating the Salida gage since October 1, 1909. The watershed area for this gage is 1,218 square miles. Flows in the Arkansas River measured at the Salida and Nathrop gages are partially controlled by the operation of reservoirs on streams that are tributary to the river and that are upstream of the Ruby Mountain Springs site. Daily average observed and long-term normal flows for the Arkansas River near Nathrop and Salida are provided in tabular form in Appendix D.

The spring runoff in the Arkansas River in 2010 in the vicinity of Ruby Mountain Springs was characterized by a short, but intense period of flows that were well above normal for the period. High flows did not begin until mid-May (approximately two to three weeks later than normal), but by late June, with the exception of one wet period in late July and early August, flows in the river were consistently below long-term averages.

4.4. Irrigation Diversions

Annual diversions for the Trout Creek Reservoir, Helena Ditch, Bray Ditch, and Trout Creek Lateral of the Cottonwood Ditch are reported by the DWR. Diversion records for the 2010 water year will not be available from the DWR until the spring of 2011. A summary of diversions for the 2008 and 2009 irrigation season are included in Table 4.3. The approximate locations of diversion structures and the conveyance system near the monitoring network (high accuracy location data for canals and diversion structures are not available at this time) are shown on Figure 4.4.

While there is a strong correlation between irrigation diversions and aquifer recharge, because of the areal and temporal variability in diversions, it is not possible to estimate 2010 diversions from the monitoring well hydrographs. When 2010 diversion records become available this relationship will be evaluated more closely and reported to Chaffee County.

5.0 GROUNDWATER MONITORING

In accordance with Condition 4.16 of Chaffee County Resolution No. 2009-42, NWNA monitors groundwater levels in the Pinedale outwash aquifer from its upgradient extent north of Highway 24/285 to Ruby Mountain Springs. To comply with the requirements of Resolution No. 2009-42, NWNA operates three monitoring programs as specified in the April 29, 2010, SGWMMP. The three programs are upgradient monitoring, Ruby Mountain Springs monitoring, and Bighorn Springs monitoring. The required monitoring wells and spring flow monitoring points, and the parameters measured at each, are provided in Table 2.1 Locations of the monitoring points are shown in Figures 2.1 and 2.2. The following subsections discuss each of the monitoring programs.

5.1. Upgradient Monitoring

Pinedale outwash aquifer groundwater levels are monitored through a network of six wells installed throughout the valley. The wells included in the upgradient monitoring network are Well A, BVMW-2, BVMW-5, BVMW-8, BVMW-9, and BVMW-10. The wells were constructed in April 2008 except for Well A, which was converted from an existing water supply well to a monitoring well. Groundwater monitoring in these wells, which consists of automated water level and temperature measurements, was initiated in April 2008. In addition to water level and temperature measurements, specific conductance is recorded in BVMW-10.

This network of monitoring wells serves to provide an indication of overall aquifer conditions and characterize water levels at locations not expected to be affected by water production at the springs. (The location of BVMW-10 is such that it is used in all three monitoring programs.) Average daily water levels for these wells for water year 2010 are provided in Appendix E.

Hydrographs from the upgradient monitoring wells from 2008 to present (Figure 5.1) show that the Pinedale outwash aquifer has relatively large seasonal changes in water levels over the entire extent of the aquifer. Highest water levels are observed August through October and lowest levels are observed March through May. The actual timing of highest and lowest water levels, and the amount of fluctuation between the highest and lowest levels, are dependent on the location within the aquifer and recharge conditions during the year (especially from irrigation diversions). The variability in water level fluctuations for the upgradient and the Ruby Mountain Springs and Bighorn Springs monitoring wells for the 2009 and 2010 water years are illustrated in Figure 5.1. Figure 5.2 provides a map view illustration of the magnitude of the water level fluctuations within the aquifer. Generally the magnitude of fluctuations decreases slightly from north to south and is higher on the eastern side of the valley and lower near the groundwater discharge points, whether the Arkansas River or the Ruby Mountain and Bighorn Springs. Over the course of the year, wells near irrigation ditches, such as BVMW-2 and BVMW-5, show relatively rapid and significantly large responses to periods of flow in the ditches.

Overall, water levels in the aquifer appear to have declined slightly from 2009 through 2010. This trend continues the decline that is apparent between 2008 and 2009. It is not clear if this decline is primarily related to changes in precipitation and infiltration in the aquifer watershed or to changes in irrigation diversions. These changes in water levels over time, however, clearly are independent of pumping at Ruby Mountain Springs, which did not begin with regularity until July 2010.

Groundwater flow in the aquifer throughout the 2010 water year was north to south and southwest with discharge along the west side of the aquifer to the Arkansas River. These flow directions are consistent with previous years (ENSR/AECOM, 2008; AECOM, 2010). Figures 5.3 through 5.6 show water level contours for the aquifer for each quarter of the 2010 water year.

5.2. Ruby Mountain Springs and Bighorn Springs Monitoring

Groundwater monitoring at Ruby Mountain Springs consists of automated water level and temperature measurements at RMBH-1, RMBH-2, RMBH-3, RMMW-1, and BVMW-10. Locations of the monitoring points are shown on Figure 2.2. RMBH-1 is a test borehole that is now used as a monitoring well. RMMW-1 was constructed in August 2010 and monitoring in the well was initiated in November 2010. Production borehole RMBH-2 was constructed on November 15, 2007, and following extensive aquifer testing, was approved for spring water production by the DWR on April 5, 2010. Production testing was initiated on May 20, 2010. Testing continued throughout the remainder of the 2010 water year, with some water from the well also being transported to the Nestle bottling plant in Denver, Colorado, for test runs and commercial distribution. The permit to construct a new production well, RMBH-3, was approved by the DWR on April 29, 2010, and well construction was completed in October. Testing of the new production well was conducted in November 2010, following the end of the water year. Water level measurements from RMMW-1 and RMBH-3 will be included in the 2011 quarterly and annual reports for the Ruby Mountains Springs project.

Groundwater levels and temperature at the Bighorn Springs site are monitored at wells BHMW-1 and BHBH-2, which are shown on Figure 2.2. BHMW-1 was installed concurrently with the upgradient monitoring wells in April 2008. BHBH-2 is a test borehole installed in May 2008 as part of NWNA work to evaluate the development potential of Bighorn Springs as a production water source. In addition to water level and temperature measurements, specific conductance is recorded in wells RMBH-2, RMBH-3, BHBH-2, BHMW-1, and BVMW-10.

Hydrographs for the Ruby Mountain Springs and Bighorn Springs groundwater monitoring stations are shown in Figure 5.7 for the 2009 and 2010 water years. (Average daily water levels and temperature are included in Appendix E.) The hydrographs are overlain with RMBH-2 pumping to illustrate relationships between pumping and water level changes in the wells.

As shown in Figure 5.7, annual water level fluctuations in the groundwater monitoring wells located near the springs are approximately 0.5 to 1 feet less than fluctuations in the monitoring wells located away from the springs (BVMW-10 and BHMW-1). Changes in water levels over time since 2008 generally are similar to the declining trends seen in the wells in the upgradient monitoring program; as with the upgradient wells, the trend was established well before withdrawals from production well RMBH-2 began.

6.0 PRODUCTION WELL WATER WITHDRAWALS

Withdrawals from production well RMBH-2 began on June 1, 2010. Initially, daily flows were low (less than 60,000 gallons/day; see Table 6.1 and Figure 6.1); however beginning in July, daily withdrawals increased significantly, although they varied widely from day-to-day through the end of the water year as system testing was conducted. The maximum daily pumping from the well was 173,410 gallons (0.53 acre-feet; average withdrawal rate of 120 gpm) on August 1. For the year a total of 40.9 acre-feet of water was withdrawn from RMBH-2. Total daily withdrawals for RMBH-2 are provided in Appendix F. Both the daily maximum production and the annual production totals provided above are well below the 0.884 acre-feet/day and 196-acre-foot annual limits established in the Well Use Permit issued to NWNA by the DWR.

RMBH-2 is hydraulically connected to the Pinedale outwash aquifer and to Ruby Mountain Springs, as was demonstrated by pre-production pump testing that resulted in reduced flows from the springs (ENSR/AECOM, 2008). Slight reductions in flows from Ruby Mountain Springs that are coincident with withdrawals from RMBH-2 possibly can be seen on Figure 4.1, although noise in the spring flow data and the relatively short production period make it difficult to confirm these changes. Comparisons of periods of pumping in RMBH-2 (Figures 5.7 and 6.1) with flows at Bighorn Springs (Figure 4.2) do not show any effects from pumping on flows at Bighorn Springs; although the Bighorn Springs data are hampered by noise and by the relatively short period of record.

As shown in Figure 5.7, withdrawals from RMBH-2 have not affected water levels in either RMBH-1 or BVMW-10 or in the more distant Bighorn Springs monitoring wells (BHMW-1 and BHBH-2). Significantly, with regard to detecting potential impacts on Bighorn Springs, RMBH-1 is only 200 feet from RMBH-2, and it is located between RMBH-2 and Bighorn Springs.

7.0 GROUNDWATER QUALITY

Water quality samples were collected April 27, 2010, at RMBH-2. Sample results for general water quality parameters, physical properties (color, odor, and turbidity), primary and secondary inorganic parameters and metals, volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), pesticides, and bacteria are presented in Appendix G. All primary and secondary inorganic parameters and metals concentrations in the water were below Colorado Basic Standards for Ground Water (5 CCR 1002-41) and there were no VOCs, SVOCs, or pesticides in the water.

8.0 CONCLUSIONS

For the 2010 water year, NWNA conducted all surface water, groundwater, and flow monitoring activities specified in Chaffee County Resolution 2009-42 and the SGWMMP. During the course of the year NWNA responded to changing conditions (e.g., blockages of the flumes and weir) and problems that occurred with specific dataloggers in the monitoring network in a timely fashion. As of the end of 2010, conditions at the surface water measurement stations were being field-checked on a frequent basis and all dataloggers were functioning correctly and being downloaded according to SGWMMP requirements.

Surface water flow and groundwater level trends in the Ruby Mountain Springs project area were consistent between the 2010 water year and the two previous years for which relevant data exist. The seasonal surface water flows from both Ruby Mountain and Bighorn springs are at a maximum from September through November and at a minimum from April through June. Flows generally were lower during 2010 than 2009, although that trend is beginning to stabilize, and possibly reverse at Bighorn Springs. Groundwater levels in both the upgradient wells and the Ruby Mountain and Bighorn Springs wells in 2010 were similar to levels in 2009. The largest seasonal variations water levels occur in the wells that are influenced by seepage from irrigation ditches and irrigated fields (BVMW-2 and BVMW-5; Figure 5.1).

The withdrawal of groundwater from Ruby Mountain Springs production well RMBH-2 began in June 2010 and increased in July 2010. Most of the water withdrawn was used for testing purposes and returned to the Arkansas River at Johnson Village. The withdrawal of water had a small effect on flows at Ruby Mountain Springs, but did not affect water levels in the Pinedale outwash aquifer beyond the Ruby Mountains Spring site. There were no effects from pumping in RMBH-2 at Bighorn Springs, which is located approximately 3000 feet northwest of RMBH-2. This is expected since pumping from the well did not lower water levels in well RMBH-1, which is located only 200 feet northwest of RMBH-2 and directly between the production well and Bighorn Springs. The localized nature of the impacts of pumping on the water levels in the aquifer are consistent with the results of pump testing conducted in the well in 2008 (ENSR/AECOM, 2008).

9.0 REFERENCES

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2011 Annual Monitoring Report
Ruby Mountain Springs
Chaffee County, Colorado

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Boulder, Colorado

February 29, 2012

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Chaffee County, Colorado

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1.0 INTRODUCTION

Ruby Mountain Springs is located in central Chaffee County, Colorado, in the Upper Arkansas River Valley on the east bank of the Arkansas River (Figure 1.1). Under Chaffee County Resolution No. 2009-42, Nestlé Waters North America Inc. (NWNA) is allowed to divert up to 196 acre-feet of spring water per year from the Ruby Mountain Springs site, subject to limitations set forth in the permit. NWNA has committed to Chaffee County to conduct periodic surface water and groundwater monitoring as a means to characterize hydrologic conditions and to document any effects, if observed, from diversions by NWNA. Effects from withdrawals are expected to be minimal, localized, and to not produce adverse impacts to surface water, groundwater, wetlands, or nearby water resources. A copy of Resolution No. 2009-42 was included the 2010 Annual Monitoring Report (SSPA, 2011).

This Annual Report is prepared in accordance with Condition 4.8 of Resolution No. 2009-42, which states that NWNA "...shall submit an annual report to the County ... that describes progress on the Project and compliance with Permit conditions, including but not limited to water pumping operations; [and] wetland and groundwater monitoring..." The Surface- and Ground-Water Monitoring and Mitigation Plan (SGWMMP), submitted by NWNA to Chaffee County on April 29, 2010, satisfies Condition 4.16 of Resolution No. 2009-42, provides an outline for developing a baseline characterization of hydrologic conditions, and sets requirements for monitoring and evaluating any impacts on local water resources due to pumping at the Ruby Mountain Springs site. A copy of the SGWMMP was included in 2010 Annual Monitoring Report (SSPA, 2011).

During the 2011 water year, monitoring was initiated at monitoring wells BVMW-11, BVMW-12, BVMW-13, and production well RMBH-3, which were completed in the fall of 2010. In early 2011, RMBH-2 was in use as the spring water production well while infrastructure associated with RMBH-3 was being completed. In February 2011, RMBH-2 was offline for seven days while sampling of RMBH-3 was completed for the purpose of Nestle Waters internal spring source qualification. Following the RMBH-3 sampling, production withdrawals continued from RMBH-2 through the end of April 2011, when RMBH-3 was brought online as the primary production well. Additional details and 2011 water year observations for the Ruby Mountain Springs project are provided in the following sections.

2.0 REGIONAL SETTING AND DISTRIBUTION OF MONITORING STATIONS

The Ruby Mountain Springs and Bighorn Springs sites are located in Chaffee County, Colorado, along the eastern banks of the Arkansas River. The Bighorn Springs are approximately eight river miles south of Buena Vista, Colorado. The Ruby Mountain Springs, which emanate at the site of a former fish hatchery, are located another 0.8 miles downstream. The springs represent groundwater discharge from the productive alluvial Pinedale outwash aquifer (ENSR/AECOM, 2008).

Spring flow and water level monitoring at the Ruby Mountain Springs and Bighorn Springs sites began in January 2007. Expansion of the monitoring network continued throughout 2007 and 2008 and included installation of surface water gages near the springs (including staff gages, flumes, and a weir) and groundwater monitoring wells throughout the valley east of the Arkansas River and north of the springs.

As described in the SGWMMP, the monitoring network consists of three areas: the upgradient monitoring wells, the Ruby Mountain Springs site, and the Bighorn Springs site. In addition, weather and precipitation monitoring data and irrigation diversions in the valley are also compiled from monitoring conducted by others. All monitoring stations discussed in this report are listed in Table 2.1. The project area for the Ruby Mountain Springs and distribution of up-gradient groundwater monitoring wells is shown on Figure 2.1 and monitoring locations at the Ruby Mountain Springs and Bighorn Springs sites are shown on Figure 2.2. The locations of nearby weather stations and river gages discussed in this report are shown on Figure 1.1.

3.0 PRECIPITATION MONITORING

Daily precipitation is recorded at two locations as part of the SGWMMP (Figure 1.1). The Ruby Mountain Springs Rain Gage records precipitation on-site, and the Buena Vista National Weather Service Station 2S (Buena Vista 2S) records precipitation at the Chaffee County Regional Airport, approximately seven miles north-northwest of Ruby Mountain Springs.

3.1. Precipitation at Ruby Mountain Springs and Buena Vista 2S

Precipitation measurements at the Ruby Mountain Springs Rain Gage, which was installed in July 2010, are collected using a Texas Electronics Series 525 heated tipping bucket rainfall sensor with an accuracy of 1.0 percent. Data for this monitoring station are available from mid-January through the end of the water year (Table 3.1). Prior to January 12, precipitation recordings are not available due to programming errors during data logger downloading.

The Buena Vista 2S station data includes long-term daily and monthly precipitation records that date back to August 1, 1899. Precipitation records for both stations are summarized in Table 3.1.

Monthly precipitation at the two stations during the 2011 water year is shown on Figure 3.1. Also shown on the figure, for comparison purposes, is the long-term monthly average precipitation at the Buena Vista 2S station. Additionally, the deviation in precipitation calculated over the previous 12-month period compared to the long-term average for the same 12-month period (the "cumulative annual departure") is shown.

During the 2011 water year, 7.47 inches (vs. 12.46 in 2010) of precipitation were recorded at the Buena Vista 2S station, which is 2.56 inches lower than the long-term average of 10.03 inches. Below average monthly precipitation from November 2010 through April 2011 reversed the above-average cumulative annual departure since April 2010 for the Buena Vista 2S station.

During the months the Ruby Mountain Springs station was operational, precipitation totals were approximately 45% to 50% below those recorded at the Buena Vista 2S station, with the exception of June, which was an especially dry month. Observations indicate moisture is dropped via rain and snow on the western slopes of the valley leaving drier conditions from precipitation on the eastern side of the Arkansas River.

3.2. Snow Water Equivalent from SNOTEL Sites

Precipitation and snowmelt in the Mosquito Range mountains recharges the Pinedale Outwash aquifer (ENSR/AECOM, 2008). To provide a general sense of snowmelt that occurs in the mountainous regions in the vicinity of the Ruby Mountain and Bighorn Springs, the two nearest SNOpack TELemetry (SNOTEL) stations maintained by the Natural Resources Conservation Service (NRCS) are presented.

As shown on Figure 1.1, the Rough and Tumble station is located in the Mosquito Range to the east, approximately 25 miles north of the springs in Park County. The Saint Elmo station is located 20 miles west of the springs in the Sawatch Range to the west of the Arkansas River and lies on the eastern side of the Continental Divide. Both SNOTEL stations are 2,500 to 2,900 feet above the elevations of monitoring stations for the Ruby Mountain Springs network. Neither SNOTEL station provides a quantitative measure of snow water equivalent (SWE) in the mountains east of the Pinedale Outwash aquifer (the area contributing to Ruby Mountain Springs recharge); however, they do show the general relationship between the east and west sides of the Arkansas River Valley and observations at Rough and Tumble possibly reflect trends in recharge from snowmelt in the Mosquito Range.

Snow water equivalent measured over the previous four winters at Rough and Tumble and Saint Elmo are shown on Figure 3.2, along with precipitation measured at Buena Vista 2S. As demonstrated in the figure, winter precipitation to the west is generally higher than to the east and snowmelt east of the aquifer was relatively low in the winter of 2010-11 compared to the previous three years.

4.0 SURFACE-WATER MONITORING

The SGWMMP specifies that surface water monitoring will be conducted at both the Ruby Mountain Springs and Bighorn Springs locations. A total of four spring flow measurement stations are maintained, two at each of the spring locations (Figure 2.2). Each of the stations is outfitted with a datalogger that records the depth of water flowing over a weir or through a flume. The depths are converted to flows based on the dimensions of the gaging structure. Some of the surface-water monitoring data associated with the spring flow stations was incomplete or showed anomalous measurements during periods of the 2011 water year. Challenges arose from the need to maintain the integrity of monitoring structures on a continual basis; most commonly by clearing tumbleweeds, aquatic plants, and incipient beaver dams from the measurement structures and associated channels. Currently, all monitoring parameters at all stations identified in the SGWMMP are functioning properly.

In addition to spring flows, river discharge is reported for gages along the Arkansas River near Nathrop and at Salida. Information on river monitoring stations are provided in Section 4.3 below.

4.1. Ruby Mountain Springs Site

Surface water monitoring at Ruby Mountain Springs consists of temperature and flow measurements at the Ruby Mountain Weir (RM-Weir), immediately downstream of the former fish hatchery, and at the Ruby Mountain-Hagen Parshall Flume (RMPF), which is upstream of the former hatchery, approximately 1,300 feet northwest of the weir. The locations of these monitoring stations are shown on Figure 2.2. The Hagen Trench is a channel entering the springs at the northern end of the former hatchery. Flow through this channel comes from upstream of the spring-water discharges. The flow passes through the RMPF and is conveyed to the former hatchery site, routed through the hatchery raceways and ponds, and discharges to the Arkansas River below the RM-Weir, which is located at the downstream end of the active spring discharge. The RM-Weir, therefore, measures combined flow from the Hagen Trench and from Ruby Mountain Springs discharges. The difference between flows at the two stations approximates the discharge from the Ruby Mountain Springs.

The daily flows for the RMPF and RM-Weir were calculated from automated stage measurements using the U. S. Bureau of Reclamation (USBR) equations for a Parshall flume and a contracted, sharp-crested, rectangular weir, respectively (USBR, 2001). Monthly and annual measurements are shown in Table 4.1, and average daily flow measurements are included in Appendix A. RM-Weir and RMPF flows for the past three water years, including daily precipitation and pumping records for the 2011 water year, are shown on Figure 4.1.

It should be noted that there were two periods during the year when weir data was inaccurate or incomplete. Flows during these periods are estimated on Figure 4.1 based on linear interpolation between accurate flow measurements. Between November 9^{th} and November 30^{th}, 2010, the logger memory card had reached its maximum value and failed to record stage measurements. From September 14^{th} to October 6^{th}, 2011, the cable was dislodged from the casing (likely due to high winds) causing the cable and desiccant to fall into the water and prevent the logger from reading accurate (vented) pressure measurements.

The average monthly discharge from Ruby Mountain Springs during water year 2011 varied from 2.5 cfs (1,110 gpm) in November 2010 to 0.7 cfs (300 gpm) in June 2010 and rose to 3.3 cfs (1,480 gpm) in October 2011. While the data are noisy (primarily for the reasons discussed in Section 4.0, above) the seasonal trends are obvious and similar to those observed in previous years, with the exception that minimum water levels were reached later in the year and a sharp rise in flows was observed in August. Flows at the end of the 2011 water year are higher than flows observed at the end of the 2010 water year.

Since August 2010, and possibly earlier, overland surface flows and discharge from buried pipes assumed to be part of the former hatchery have resulted in the flow of spring water in to the Arkansas River between the RMPF and the RM-Weir. These ungaged flows, which cause Ruby Mountain Springs discharges to be underestimated, have been documented in monthly reports to Chaffee County. It is estimated that approximately 150 to 170 acre-feet of spring discharge were unmeasured during the 2011 water year; therefore, estimated discharge between the downstream weir and upstream flume is 1,460 acre-feet for the water year.

4.2. Bighorn Springs Site

Surface water flows at the Bighorn Springs site are monitored at two measurement locations, Bighorn Parshall Flume 1 (BHPF-1) and Bighorn Parshall Flume 3 (BHPF-3), both of which are shown on Figure 2.2. Surface water flows at the Bighorn flumes have been recorded since late August 2009. BHPF-1 is located approximately 400 feet upgradient of BHPF-3. BHPF-1 measures flow upstream of Bighorn Springs, which during most of the year emanates from the wetlands area just upstream of the flume. BHPF-3 measures combined upstream flow and spring flow before the confluence with the Arkansas River.

The daily flows for BHPF-1 and BHPF-3 were calculated from automated stage measurements using the USBR equations for a Parshall flume (USBR, 2001). Monthly and annual measurements are shown in Table 4.2, and average daily flow measurements are included in Appendix B. BHPF-1 and BHPF-3 flows for the past three water years, including daily precipitation records for the 2011 water year, are shown on Figure 4.2. From approximately September 18th to October 6th, BHPF-1 flume was flooded from debris blocking the flow. During this period measurements are suspect and estimated flows are shown in Table 4.2 and on Figure 4.2.

BHPF-3 flows reflect total Bighorn Springs flows, which ranged from 0.2 cfs (75 gpm) in June to 1.9 cfs (845 gpm) in October. The average monthly gain in the spring flow between BHPF-1 and BHPF-3 ranged from 0.1 cfs (45 gpm) in June to 0.5 cfs (225 gpm) in October 2011.

Similar to Ruby Mountain springs observations, flow levels reached their seasonal minimum later in the summer and exhibited a sharp rise in flows during August. Spring discharge at both BHPF-1 and BHPF-3 gage stations were higher at the end of the 2011 water year than at the end of the 2010 water year.

4.3. Arkansas River

The SGWMMP specifies that two Arkansas River gages will be reported, the gage near Nathrop (Station ID 07091200) and the gage at Salida (Station ID 07091500). Daily average observed and long-term normal flows for these gages during the 2011 water year are provided in

Appendix C. Locations for Arkansas River gages discussed in this section are shown on Figure 1.1.

Monitoring at the Nathrop gaging station began in October 1964 but the station currently is operated only on a seasonal basis (generally from April 1 through September 30) by the United States Geological Survey (USGS). The watershed area for this gage is 1,060 square miles. The Colorado Division of Water Resources (DWR) has been operating the Salida gage since October 1, 1909. The watershed area for this gage is 1,218 square miles. Flows at the Nathrop and Salida gages are similar from year to year and are partially controlled by the operation of reservoirs on streams that are tributary to the river and that are upstream of the Ruby Mountain Springs site.

Hydrographs of average daily flows in the upper Arkansas River for the 2011 water year and long-term average flow data collected from the Arkansas River gages near Nathrop and at Salida are shown on Figure 4.3. The combined Nathrop/Salida hydrograph reflects seasonal flows for Nathrop and off-season flows at Salida (during the time when no data is available at Nathrop). In addition, daily flows are shown for locations in the headwaters of the Arkansas River upstream of the Ruby Mountain Springs at the gage near Leadville (Station ID 07081200) and the gage below Granite (Station ID 07087050). Flows indicate the river gains significantly in the headwaters above the gage at the Arkansas River below Granite. A comparison of discharge between the gage below Granite and the gage near Nathrop (the reach from above the Ruby Mountain Springs project area to below the springs discharge) indicates river flows are only slightly gaining compared to the headwaters.

Observations for the 2011 water year compared to the long-term average indicate the Arkansas River underwent normal duration, high volume flows. Peak spring runoff in the Arkansas River near Nathrop and at Salida for 2011 was well above average. Above average flows began the end of May and continued through the summer until the beginning of August. The maximum deviation from normal flows was observed in mid-July at 165% (2,340 cfs) above average near Nathrop and 140% (2,420 cfs) above average at Salida. 2011 cumulative departure from normal flows during the seasonal gaging period (April through September) was over

100,000 acre-feet above average at both gaging stations. For comparison, during the 2010 season, flows were greater than 20,000 acre-feet below average.

4.4. Irrigation Diversions

Annual diversions for Trout Creek Ditch sourced from Cottonwood Creek (Trout Creek Ditch-Cottonwood), Trout Creek Ditch sourced from Trout Creek (Trout Creek Ditch), Helena Ditch, Bray-Allen Ditch, and Trout Creek Reservoir are reported by the DWR. Diversion records for the 2011 water year were made available for this report by the Chaffee County Water Commissioner and are provisional.

Monthly diversions for the 2010 and 2011 irrigation season are included in Table 4.3a and a summary of total diversions for each water year, from 2008 through 2011, is shown in Table 4.3b. The approximate locations of canals near the monitoring network (high accuracy location data for canals are not available at this time) are shown on Figure 4.4.

According to information provided by the DWR, no diversion flow data is available for the Bray-Allen Ditch for the 2008 irrigation season because the flume washed out in August of 2007. Historical average diversions for available years from the Bray-Allen ditch since 1946 are approximately 1,400 acre-feet. Additionally, no data is available for the Trout Creek Ditch (not the Trout Creek Ditch – Cottonwood) and the Trout Creek Reservoir for the 2010 irrigation season because of recording equipment failure. Historical average diversions for available years from the Trough Creek Ditch since 1911 is approximately 580 acre-feet, and flows from the Trout Creek Reservoir are negligible (Trout Creek Reservoir accounts for less than 1% of the annual diversion total).

5.0 GROUNDWATER MONITORING

In accordance with Condition 4.16 of Chaffee County Resolution No. 2009-42, NWNA monitors groundwater levels in the Pinedale Outwash aquifer from its up-gradient extent north of Highway 24/285 to Ruby Mountain Springs. To comply with the requirements of Resolution No. 2009-42, NWNA operates three monitoring programs as specified in the April 29, 2010, SGWMMP. The three programs areas are up-gradient monitoring, Ruby Mountain Springs monitoring, and Bighorn Springs monitoring. Groundwater monitoring wells and spring flow monitoring points, and the parameters measured at each, are provided in Table 2.1 Locations of the monitoring points are shown in Figures 2.1 and 2.2. The following subsections discuss each of the monitoring programs.

5.1. Up-gradient Monitoring

Pinedale outwash aquifer groundwater levels are monitored through a network of six wells installed throughout the valley. The wells included in the up-gradient monitoring network are Well A, BVMW-2, BVMW-5, BVMW-8, BVMW-9, and BVMW-10. The wells were constructed in April 2008 except for Well A, which was converted from an existing water supply well to a monitoring well. Groundwater monitoring in these wells, which consists of automated water level and temperature measurements, was initiated in April 2008. In addition to water level and temperature measurements, specific conductance is recorded in BVMW-10.

This network of monitoring wells serves to provide an indication of overall aquifer conditions and characterize water levels at locations not expected to be affected by water production at the springs. (The location of BVMW-10 is such that it is used in all three monitoring programs.) Average daily water levels for these wells for water year 2011 are provided in Appendix D.

Hydrographs from the up-gradient monitoring wells from 2008 to present (Figure 5.1) show that the Pinedale outwash aquifer has relatively large seasonal changes in water levels over the entire extent of the aquifer. Highest water levels are observed August through October and lowest levels are observed March through May. The actual timing of highest and lowest water levels, and the amount of fluctuation between the highest and lowest levels, are dependent on the location within the aquifer and recharge conditions during the year. The variability in water level fluctuations for the up-gradient and the Ruby Mountain Springs and Bighorn Springs monitoring wells for the 2011 water year is illustrated in Figure 5.2, which provides a map view illustration of the magnitude of the groundwater fluctuations within the aquifer. Generally the magnitude of fluctuations is higher on the eastern side of the valley and lower near the groundwater discharge points, whether the Arkansas River or the Ruby Mountain and Bighorn Springs. Over the course of the year, wells near irrigation ditches, such as BVMW-2 and BVMW-5, show relatively rapid and significantly large responses to periods of flow in the ditches.

Overall, water levels in the aquifer have increased from 2010 to 2011, and do not follow observed declines from 2008 to 2010. These changes in water levels over time clearly are independent of pumping at Ruby Mountain Springs, which did not begin with regularity until July 2010.

Groundwater flow in the aquifer throughout the 2011 water year was north to south and southwest with discharge to the west side into the Arkansas River. These flow directions are consistent with previous years (ENSR/AECOM, 2008; AECOM, 2010; SSPA, 2011). Figure 5.3 is a map of water level contours for the aquifer during the seasonal low groundwater levels on April 7. High seasonal groundwater levels are depicted on Figure 5.4 showing conditions on October 5.

5.2. Ruby Mountain Springs and Bighorn Springs Monitoring

Groundwater monitoring at Ruby Mountain Springs consists of automated water level and temperature measurements at RMBH-1, RMBH-2, RMBH-3, BVMW-11, BVMW-12, BVMW-13, and BVMW-10. Locations of the monitoring points are shown on Figure 2.2. RMBH-1 is a test borehole that is now used as a monitoring well. BVMW-11was completed in August 2010 and monitoring was initiated in August 2011. BVMW-12 and BMVW-13 were completed in October 2010 and monitoring began in December 2010 and July 2011, respectively. Production borehole RMBH-2 was constructed on November 15, 2007, and received final approval for production of spring water in July 2010. The permit to construct a new production well, RMBH-3, was approved by the DWR on April 29, 2010, and well construction was completed in October. Testing of the new production well was conducted in early November 2010. Production of spring water was switched from RMBH-2 to RMBH-3 on April 29, 2011. Currently, RMBH-3 is used as the primary production well and RMBH-2 is maintained as a backup production well.

Groundwater levels and temperature at the Bighorn Springs site are monitored at wells BHMW-1 and BHBH-2, which are shown on Figure 2.2. BHMW-1 was installed concurrently with the upgradient monitoring wells in April 2008. BHBH-2 is a test borehole installed in May 2008 as part of NWNA work to evaluate the development potential of Bighorn Springs as a production water source.

Hydrographs for the Ruby Mountain Springs and Bighorn Springs groundwater monitoring stations are shown in Figure 5.5. The hydrographs are overlain with combined pumping from RMBH-2 and RMBH-3 to illustrate any relationships between pumping and water level changes in the wells. Average daily water levels and temperature are included in Appendix D. In addition to water level and temperature measurements, specific conductance is recorded in wells RMBH-2, RMBH-3, BHBH-2, BHMW-1, and BVMW-10.

As shown in Figures 5.2 and 5.5, seasonal changes in groundwater levels in monitoring wells located near springs (e.g., RMBH-1 and BHBH-2) fluctuate less than groundwater levels in monitoring wells located away from the springs (e.g., BVMW-10 and BHMW-1). Groundwater levels since 2008 generally show a declining trend until the spring of 2011 when a majority of the water levels within the monitoring network rose and exceeded observed water levels in the three previous water years.

6.0 PRODUCTION WELL WATER WITHDRAWALS

Prior to the 2011 water year, withdrawals from production well RMBH-2 began in June 2010 and production of bottled water commenced the following August. In October 2010, production well RMBH-3 was completed. This water year, testing was performed on RMBH-3 in February; and on April 29, 2011, pumping for production of water was transitioned from RMBH-2 to RMBH-3. The production wells are never pumped simultaneously.

Under the Well Use Permit issued by the DWR, NWNA is allowed to divert up to 200 gpm, or 0.884 acre-foot/day (288,052 gpd), or 16.6 acre-feet in one month. Annual diversions are not to exceed 196 acre-feet. A summary of total monthly and annual production withdrawals for the 2011 water year are shown on Table 6.1. Total daily withdrawals in acre-feet for RMBH-2 and RMBH-3 are provided in Appendix E.

Figure 6.1 exhibits total daily pumping from each production well for the 2011 water year. A one-time maximum daily pumping from RMBH-2 was 185,750 gallons on April 17. Maximum daily pumping from all other days from RMBH-2 and RMBH-3 did not exceed 173,150 gallons per day. For the 2011 water year, a total of 143 acre-feet of water was withdrawn from wells RMBH-2 and RMBH-3 combined. The daily, monthly and annual production totals provided above are well below the limits established in the Well Use Permit.

RMBH-2 and RMBH-3 are hydraulically connected to the Pinedale outwash aquifer and to Ruby Mountain Springs, as was demonstrated by pump testing that resulted in reduced flows from the springs (ENSR/AECOM, 2008; Malcolm-Pirnie, 2010). Slight reductions in flows from Ruby Mountain Springs that are coincident with withdrawals from RMBH-2 and RMBH-3 possibly can be seen on Figure 4.1, although any effect is small and therefore difficult to discern within the noise in the data. Comparison of periods of pumping with flow levels at Bighorn Springs (Figure 4.2) show no effects from pumping during the 2011 water year.

As shown in Figure 5.5, withdrawals from RMBH-2 and RMBH-3 have slight effects on groundwater levels in Ruby Mountain Springs monitoring wells (RMBH-1, RMBH-2, and BVMW-11) but show no effects in the more distant Bighorn Springs monitoring wells (BVMW-10, BHMW-1 and BHBH-2);

7.0 GROUNDWATER QUALITY

Water quality samples were collected April 26, 2011 at RMBH-2, May 11, 2011 at RMBH-3, and August 17, 2011 at BVMW-10. Sample results for general water quality parameters, physical properties (color, odor, and turbidity), primary and secondary inorganic parameters and metals, volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), pesticides, and bacteria are presented in Appendix G. EPA approved methods were used in all of the analyses.

All primary and secondary inorganic parameters and metals concentrations in RMBH-2 and RMBH-3 were below Colorado Basic Standards for Ground Water (5 CCR 1002-41) and there were no VOCs, SVOCs, or pesticides in any of the samples.[1] The pH for RMBH-2, RMBH-3 and BVMW-10 was 7.6, 7.9, and 7.8, respectively, and specific conductance was 400 µmho/cm, 380 µmho/cm, and 370 µmho/cm, respectively.

[1] Aluminum and iron concentrations in BVMW-10 were above secondary groundwater standards, but may not be representative of formation water in the Pinedale Aquifer.

8.0 CONCLUSIONS

For the 2011 water year, NWNA conducted all surface water, groundwater, and flow monitoring activities specified in Chaffee County Resolution 2009-42 and the SGWMMP. During the course of the year, NWNA responded to changing conditions (e.g., blockages of the flumes and weir) and problems that occurred with specific dataloggers in the monitoring network in a timely fashion. As of the end of 2011, conditions at the surface water measurement stations were being field-checked on a frequent basis and all dataloggers were functioning correctly and being downloaded according to SGWMMP requirements.

Spring water flows and groundwater level trends in the Ruby Mountain Springs monitoring network differed slightly between the 2011 water year and the two and a half previous years for which observation data exists. Since the beginning of the NWNA monitoring program in April 2008, water levels for the Pinedale Outwash aquifer were generally declining. During the 2011 seasonal rise in water levels (June to July for groundwater wells and July to August for spring flows), levels rose relatively sharply compared to previously observed seasonal trends, and nearly met or exceeded levels measured in the beginning of the 2009 water year.

Seasonal surface water flows from both Ruby Mountain and Bighorn springs are generally at a maximum from September through November and at a minimum from April through June (Figure 4.1 and Figure 4.2). During the 2011 water year, flows were lower during the seasonal low flows compared to previous years, following the general trend of historical decline, and reached the lowest levels later in the year than previously observed. However, during the seasonal increase in flows from late-July to early-September, spring flows exceeded rates observed in the previous water years.

Groundwater levels in wells for both the up-gradient and near springs areas followed a similar trend as the spring water flows. Water levels generally reached a lower seasonal minimum in March or April following the historical general decline in the aquifer before rising to maximum levels between July and October, depending on the location within the aquifer and proximity to irrigation fields and canal diversions (Figure 5.1 and Figure 5.7). Wells located further up-gradient tend to reach maximum and minimum levels earlier than wells located down gradient. The smallest seasonal variations in groundwater water levels occur in the wells that are closest to groundwater discharge points (near the Arkansas River, Bighorn Springs, or Ruby Mountain Springs) as shown in Figure 5.2. Seepage from irrigation diversions influences groundwater levels in wells located near canals as demonstrated in wells BVMW-2 and BVMW-5 in Figure 5.1.

The correlation between irrigation and groundwater levels has been noted previously for the Pinedale Outwash aquifer (ENSR/AECOM, 2008), and review of the 2011 timing of irrigation diversions with the timing and magnitude of water level increases, confirms this relationship. As previously noted, groundwater levels during the 2011 high water season rose to levels higher than the previous three years, yet total irrigation diversions were relatively consistent (Table 4.3b) and precipitation measurements at the Buena Vista2S weather station were below average compared to the long-term records (Figure 3.1). However, early season diversions in April and May were relatively low compared to the three previous years and diversions in June through August were the highest rates observed in the last four years. This increased diversion rate later in the spring—primarily for the Trout Creek Ditch-Cottonwood—corresponds closely with the observed low water levels in early spring and the sharp increase in water levels in Well A and BVMW-2, which are adjacent to the ditch. As in the past, the effect of local precipitation in the Arkansas River Valley on the aquifer appear to be minimal, although there here have not been any significant precipitation events in the last two years that could be expected to have a measureable effect on the aquifer.

Aquifer recharge via groundwater inflows from the mountains directly east of the Pinedale Outwash aquifer is significant (ENSR/AECOM, 2008). As discussed in Section 3.2, the closest SNOTEL precipitation monitoring station east of the Arkansas River is the Rough and Tumble station, which is located more than 20 miles north of Ruby Mountain and Bighorn Springs. From a general perspective, the station shows that the snow water equivalent (SWE) for the 2010-11 snowpack in the Mosquito Range was as low or lower than any of the past four years. NWNA is evaluating options for more closely determining precipitation in the mountains directly to the east of the springs.

The withdrawal of groundwater from Ruby Mountain Springs production well RMBH-2 continued into the beginning of the 2011 water year. Sampling from RMBH-3 was completed in early-February 2011, and in late April pumping was switched from RMBH-2 to RMBH-3. The withdrawal of water has a small effect on flows at Ruby Mountain Springs, but does not affect water levels in the Pinedale Outwash aquifer beyond the Springs site. There were no effects from pumping at Bighorn Springs, which is located approximately 3,000 feet northwest of RMBH-2. The localized nature of the impacts of pumping on the water levels in the aquifer are consistent with the results of the pump testing conducted for RMBH-2 in 2008 (ENSR/AECOM, 2008) and for RMBH-3 in 2010 (Malcolm-Pirnie, 2011).

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2012 Annual Monitoring Report
Ruby Mountain Springs
Chaffee County, Colorado

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1.0 INTRODUCTION

Ruby Mountain Springs is located in central Chaffee County, Colorado, in the Upper Arkansas River Valley on the east bank of the Arkansas River (Figure 1.1). Under Chaffee County Resolution No. 2009-42, Nestlé Waters North America Inc. (NWNA) is allowed to divert up to 196 acre-feet of spring water per year from the Ruby Mountain Springs site, subject to limitations set forth in the permit. NWNA has committed to Chaffee County to conduct periodic surface water and groundwater monitoring as a means to characterize hydrologic conditions and to document any effects, if observed, from diversions by NWNA. Effects from withdrawals are expected to be minimal, localized, and to not produce adverse impacts to surface water, groundwater, wetlands, or nearby water resources. A copy of Resolution No. 2009-42 was included the 2010 Annual Monitoring Report (SSPA, 2011).

This Annual Report is prepared in accordance with Condition 4.8 of Resolution No. 2009-42, which states that NWNA "...shall submit an annual report to the County ... that describes progress on the Project and compliance with Permit conditions, including but not limited to water pumping operations; [and] wetland and groundwater monitoring..." The Surface- and Ground-Water Monitoring and Mitigation Plan (SGWMMP), submitted by NWNA to Chaffee County on April 29, 2010, satisfies Condition 4.16 of Resolution No. 2009-42, provides an outline for developing a baseline characterization of hydrologic conditions, and sets requirements for monitoring and evaluating any impacts on local water resources due to pumping at the Ruby Mountain Springs site. A copy of the SGWMMP was included in 2010 Annual Monitoring Report (SSPA, 2011).

All monitoring locations required by the SGWMMP, and additional monitoring wells BVMW-11, BVMW-12, and BVMW-13 were completed by the fall of 2010 and monitored throughout the 2012 water year. RMBH-3 was the primary production well and production well RMBH-2 was only operated for two days for water quality sampling. In March 2012, reclamation of the Ruby Mountain springs site was initiated and the construction phase was completed on May 29. Additional details and observations for the 2012 water year (constituting November 1, 2011, to October 31, 2012) for the Ruby Mountain Springs project are provided in the following sections.

2.0 REGIONAL SETTING AND DISTRIBUTION OF MONITORING STATIONS

The Ruby Mountain Springs and Bighorn Springs sites are located in Chaffee County, Colorado, along the eastern banks of the Arkansas River. The Bighorn Springs are approximately eight river miles south of Buena Vista, Colorado. The Ruby Mountain Springs, which emanate at the site of a former fish hatchery, are located another 0.8 miles downstream. The springs represent groundwater discharge from the productive alluvial Pinedale outwash aquifer (ENSR/AECOM, 2008).

Spring flow and water level monitoring at the Ruby Mountain Springs and Bighorn Springs sites began in January 2007. Expansion of the monitoring network continued throughout 2007 and 2008 and included installation of surface water gauges near the springs (including staff gauges, flumes, and a weir) and groundwater monitoring wells throughout the valley east of the Arkansas River and north of the springs. Automatic dataloggers were installed in many of the groundwater wells within the network in April 2008.

As described in the SGWMMP, the monitoring network consists of three areas: the up-gradient monitoring wells, the Bighorn Springs site, and the Ruby Mountain Springs site. In addition, weather and precipitation monitoring data and irrigation diversions in the valley are also compiled from monitoring conducted by others. All monitoring stations discussed in this report are listed in Table 2.1. The project area for the Ruby Mountain Springs and distribution of up-gradient groundwater monitoring wells is shown on Figure 2.1 and monitoring locations at the Ruby Mountain Springs and Bighorn Springs sites are shown on Figure 2.2. The locations of nearby weather stations and river gauges discussed in this report are shown on Figure 1.1.

3.0 PRECIPITATION MONITORING

Daily precipitation is recorded at two locations as part of the SGWMMP (Figure 1.1). The Ruby Mountain Springs Rain Gauge (RM-PPT) records precipitation on-site, and the National Weather Service Station Buena Vista 2S (BV2S) records precipitation at the Chaffee County Regional Airport, approximately seven miles north-northwest of Ruby Mountain Springs.

Precipitation as snow water equivalent is recorded at SNOTEL stations in the Mosquito and Sawatch Mountain Ranges to the east and west of the Ruby Mountain Site. Measurements for these stations are discussed in Section 3.2 below.

3.1. Precipitation at Ruby Mountain Springs and Buena Vista 2S

Precipitation measurements at the Ruby Mountain Springs Rain Gauge (RM-PPT), which was installed in July 2010, are collected using a Texas Electronics Series 525 heated tipping bucket rainfall sensor with an accuracy of 1.0 percent. The Buena Vista 2S station (BV2S) data includes long-term daily and monthly precipitation records that date back to August 1, 1899. Precipitation records for the 2012 water year for both stations are summarized in Table 3.1.

Monthly precipitation at the two stations during the 2012 water year is shown on Figure 3.1. Also shown on the figure, for comparison purposes, is the long-term monthly average precipitation at the Buena Vista 2S station. Additionally, the deviation in precipitation calculated over the previous 12-month period compared to the long-term average for the same 12-month period (the "cumulative annual departure") is shown.

During the 2012 water year, 8.61 inches (vs. 7.47 in 2011 and 12.46 in 2010) of precipitation were recorded at the Buena Vista 2S station, which is 1.97 inches lower than the 30-year long-term average of 10.58 inches (based on 1981-2010). There was no precipitation measured at Buena Vista 2S or the Ruby Mountain Rain Gauge during the month of March 2012. Below average cumulative monthly precipitation since November 2010, in addition to low precipitation during the 2012 water year, results in below average cumulative departure from normal conditions at the Buena Vista 2S station during the 2012 water year.

Similar to the 2011 water year, precipitation at the Ruby Mountain Springs station (RM-PPT) was approximately 45% to 50% below those recorded at the Buena Vista 2S station. Observations indicate moisture is dropped via rain and snow on the western slopes of the valley leaving drier conditions from a lack of precipitation on the eastern side of the Arkansas River.

3.2. Snow Water Equivalent from SNOTEL Sites

Precipitation and snowmelt in the Mosquito Range mountains recharges the Pinedale Outwash aquifer (ENSR/AECOM, 2008). To provide a general sense of snowmelt that occurs in the mountainous regions in the vicinity of the Ruby Mountain and Bighorn Springs, the two nearest SNOpack TELemetry (SNOTEL) stations maintained by the Natural Resources Conservation Service (NRCS) are presented.

As shown on Figure 1.1, the Rough and Tumble station is located in the Mosquito Range to the east, approximately 25 miles north of the springs site in Park County. The Saint Elmo station is located 20 miles west of the springs site in the Sawatch Range to the west of the Arkansas River and lies on the eastern side of the Continental Divide. Both SNOTEL stations are 2,500 to 2,900 feet above the elevations of monitoring stations for the Ruby Mountain Springs network. Neither SNOTEL station provides a quantitative measure of snow water equivalent (SWE) in the mountains east of the Pinedale Outwash aquifer (the area contributing to Ruby Mountain Springs recharge); however, they do show the general relationship between the east and west sides of the Arkansas River Valley and observations at Rough and Tumble possibly reflect trends in recharge from snowmelt in the Mosquito Range.

Snow water equivalent measured over the last five winters at Rough and Tumble and Saint Elmo are shown on Figure 3.2, along with precipitation measured at Buena Vista 2S. As demonstrated in the figure, winter precipitation in the Sawatch Range to the west is typically higher than in the Mosquito Range to the east; however, SWE was similar in duration and magnitude for both SNOTEL stations during the winter of 2011-12. Long term observations at Saint Elmo are unavailable because the station was started in 2007. Maximum SWE observations at Rough and Tumble was 7.4 inches, which is below the maximum SWE of ten inches for the 30-year average (based on 1971-2000).

4.0 SURFACE-WATER MONITORING

The SGWMMP specifies that surface water monitoring will be conducted at both the Ruby Mountain Springs and Bighorn Springs locations. A total of four spring flow measurement stations are maintained, two at each of the spring locations (Figure 2.2). Each of the stations is outfitted with a datalogger that records the depth of water flowing over a weir or through a flume. The depths are converted to flows based on the dimensions of the gaging structure. Some of the surface-water monitoring data associated with the spring flow stations showed anomalous measurements during periods of the 2012 water year. Challenges arose from the need to maintain the integrity of monitoring structures on a continual basis; most commonly by clearing tumbleweeds, aquatic plants, and incipient beaver dams from the measurement structures and associated channels. Currently, all monitoring parameters at all stations identified in the SGWMMP are functioning properly.

In addition to spring flows, river discharge is reported for gauges along the Arkansas River near Nathrop and at Salida. Information on river monitoring stations are provided in Section 4.3 below.

4.1. Ruby Mountain Springs Site

Surface water monitoring at Ruby Mountain Springs consists of temperature and flow measurements at the Ruby Mountain Weir (RM-Weir), immediately downstream of the former fish hatchery, and at the Ruby Mountain-Hagen Parshall Flume (RMPF), which is upstream of the former hatchery, approximately 1,300 feet northwest of the weir. The locations of these monitoring stations are shown on Figure 2.2. The Hagen Trench is a channel entering the springs at the northern end of the former hatchery. Flow through this channel comes from upstream of the spring-water discharges. The flow passes through the Hagen Parshall flume and is conveyed to the former hatchery site and discharges to the Arkansas River below the weir, which is located at the downstream end of the active spring discharge. The weir, therefore, measures combined flow from the Hagen Trench and from Ruby Mountain Springs discharges. The difference between flows at the two stations approximates the discharge from the Ruby Mountain Springs.

The daily flows for the Hagen Parshall flume and weir were calculated from automated stage measurements using the U. S. Bureau of Reclamation (USBR) equations for a Parshall flume and a contracted, sharp-crested, rectangular weir, respectively (USBR, 2001). Monthly and annual measurements are shown in Table 4.1, and average daily flow measurements are included in Appendix A. Weir and Hagen Parshall flume flows for the past four water years, including daily precipitation and pumping records for the 2012 water year, are shown on Figure 4.1.

It should be noted that there were three periods during the year when weir data were not representative of actual springs discharge conditions. During the period between March 1 and March 30, 2012, the data logger failed to record accurate stage measurements due to debris blocking the gauge. From September 5 to October 9, 2012, there was daily beaver activity at the springs causing flows to fluctuate due to damming and debris removal. Flows more reflective of natural conditions during these two periods were estimated based on linear interpolation between accurate flow measurements, which are shown on Figure 4.1 and summarized in Table 4.1. The third period of erratic flows occurred from April 5 through July 10, which coincided with construction activities associated with the reclamation of wetlands near the former fish hatchery.

Reclamation was initiated in late March 2012, and construction began on April 5. The objective of reclamation of the springs site was to remove former hatchery infrastructure (raceways, building foundations, and drainage structures) and to create a more natural setting with functional wildlife and trout habitat. Construction activities included creation of a new pond, revitalization of the stream channel system and associated wetland areas, and elimination of ungagged overland surface flows that were previously discharging to the Arkansas River upstream of the weir and downstream of the Parshall Flume. Also, the Upper Ditch, which was created to convey oxygenated flows to the upper reaches of the former hatchery, was replaced with a buried perforated pipe.

At the beginning of reclamation, water levels were reduced at the springs site to facilitate construction, and periodically spring water sources were diverted directly to the Arkansas River to reduce surface water quality impacts from runoff near the construction area. Figure 4.1 shows the reduced flows through weir from April 5 through the beginning of May. As construction was completed at the upper reaches of the former hatchery site, previously un-gauged overland flows were captured and diverted down-channel in the conveyance system to the weir. Thus, flows through weir increased in May and June (but were also erratic as construction was ongoing). Watering of the re-vegetated site was initiated on June 24 and occurred sporadically through mid-July resulting in slightly reduced flows through the weir.

The average monthly discharge from Ruby Mountain Springs (weir flows minus Hagen Parshall flume flows) during water year 2012 varied from a high of 3.2 cfs (1,410 gpm) in November 2011 to a low (compounded by site watering) of 0.7 cfs (310 gpm) in July 2012, and then rose to 2.6 cfs (1,180 gpm) in October 2012. While the data are noisy, primarily for the reasons discussed above, the seasonal trends are similar to those observed in previous years with the exception that minimum water levels are lower than those observed since 2009, possibly being influenced by reclamation activities.

4.2. Bighorn Springs Site

Surface water flows at the Bighorn Springs site are monitored at two measurement locations, Bighorn Parshall Flume 1 (BHPF-1) and Bighorn Parshall Flume 3 (BHPF-3), both of which are shown on Figure 2.2. Surface water flows at the Bighorn flumes have been recorded since late August 2009. BHPF-1 is located approximately 400 feet up-gradient of BHPF-3. BHPF-1 measures flow upstream of Bighorn Springs, which during most of the year emanates from the wetlands area just upstream of the flume. BHPF-3 measures combined upstream flow and spring flow before the confluence with the Arkansas River.

The daily flows for BHPF-1 and BHPF-3 were calculated from automated stage measurements using the USBR equations for a Parshall flume (USBR, 2001). Monthly and annual measurements are shown in Table 4.2, and average daily flow measurements are included in Appendix B. BHPF-1 and BHPF-3 flows for the past four water years, including daily precipitation records for the 2012 water year, are shown on Figure 4.2. BHPF-1 flume was flooded from debris blocking the flow on March 18 and 19, 2012. Measured flows at BHPF-3 were higher than actual flow between December 13, 2011 and January 5, 2012 due to debris buildup in the flume and the desiccant being submerged, causing unvented readings in the logger. During these periods, measurements are suspect and estimated flows are shown in Table 4.2 and on Figure 4.2.

The average monthly gain in the spring flow between BHPF-1 and BHPF-3 ranged from 0.5 cfs (240 gpm) in November 2011 to 0.1 cfs (23 gpm) in June and July to 0.3 cfs (130 gpm) in October 2012. BHPF-3 flows reflect total Bighorn Springs flows, which ranged from 1.7 cfs (760 gpm) in November 2011 to 0.2 cfs (97 gpm) in June 2012 and rose to 0.6 cfs (270 gpm) in October 2012. Similar to Ruby Mountain Springs flows, the seasonal trends are similar to those observed in previous years, with the exception that minimum water levels are lower than those observed since 2009.

4.3. Arkansas River

The SGWMMP specifies that two Arkansas River gauges will be reported, the gauge near Nathrop (Station ID 07091200) and the gauge at Salida (Station ID 07091500). Daily average observed and long-term normal flows for these gauges during the 2012 water year are provided in Appendix C. Locations for Arkansas River gauges discussed in this section are shown on Figure 1.1. Flows at the Nathrop and Salida gauges are similar from year to year and are partially controlled by the operation of reservoirs on streams that are tributary to the river and that are upstream of the Ruby Mountain Springs site.

Monitoring at the Nathrop gaging station began in October 1964 but the station is currently operated only on a seasonal basis (generally from April 1 through September 30) by the United States Geological Survey (USGS). The watershed area for this gauge is 1,060 square miles. The Colorado Division of Water Resources (DWR) has been operating the Salida gauge since October 1, 1909. The watershed area for this gauge is 1,218 square miles.

Hydrographs of average daily flows in the upper Arkansas River for the 2012 water year and long-term average flow data collected from the Arkansas River gauges near Nathrop and at Salida are shown on Figure 4.3. There was no observed peak spring runoff in the Arkansas River near Nathrop and at Salida during the 2012 season. Observations for the year compared to the long-term average indicate the Arkansas River maintained low-flow, winter stage levels throughout the spring and summer. Conditions during the month of June (when peak flows historically are at their highest) were 23% of normal near Nathrop and 18% of normal at Salida. 2012 cumulative departure from normal flows during the seasonal gaging period (April through September) was over 210,000 acre-feet below average at both gaging stations. For comparison, during the 2011 season, flows were over 100,000 acre-feet above average.

4.4. Irrigation Diversions

Annual diversions for Trout Creek Ditch sourced from Cottonwood Creek (Trout Creek Ditch-Cottonwood), Trout Creek Ditch sourced from Trout Creek (Trout Creek Ditch), Helena Ditch, Bray-Allen Ditch, and Trout Creek Reservoir are reported by the DWR. Diversion records for the 2012 water year were made available for this report by the Chaffee County Water Commissioner and are provisional.

Monthly diversions for the 2011 and 2012 irrigation season are included in Table 4.3a and a summary of total diversions for each water year, from 2008 through 2012, is shown in Table 4.3b. The approximate locations of canals near the monitoring network (high accuracy location data for canals are not available at this time) are shown on Figure 4.4. Combined total monthly diversions for 2008 through 2012 are shown on Figure 4.5 reflecting the timing and magnitude of ditch flows in the valley.

Goal to obtain in future?

According to information provided by the DWR, no diversion flow data is available for the Bray-Allen Ditch for the 2008 irrigation season because the flume washed out in August of 2007. Historical average diversions for available years from the Bray-Allen ditch since 1946 are approximately 1,400 acre-feet. No data is available for the Trout Creek Ditch (not the Trout Creek Ditch – Cottonwood Creek) for the 2010 irrigation season because of recording equipment failure. Historical average diversion for available years from the Trout Creek Ditch since 1911 is approximately 580 acre-feet. Flows from the Trout Creek Reservoir are negligible (Trout Creek Reservoir accounts for less than 1% of the annual diversion total); no data is available since 2009. As shown on Figure 4.5, there was significant curtailment of irrigation (largely in the Helena Ditch) beginning about May relative to the previous years, due to reduced flows available in the Arkansas River and downstream senior-priority water calls.

5.0 GROUNDWATER MONITORING

In accordance with Condition 4.16 of Chaffee County Resolution No. 2009-42, NWNA monitors groundwater levels in the Pinedale Outwash aquifer from its up-gradient extent north of Highway 24/285 to Ruby Mountain Springs. To comply with the requirements of Resolution No. 2009-42, NWNA operates three monitoring programs as specified in the April 29, 2010, SGWMMP. The three programs areas are up-gradient monitoring, Ruby Mountain Springs monitoring, and Bighorn Springs monitoring. Groundwater monitoring wells and spring flow monitoring points, and the parameters measured at each, are provided in Table 2.1 Locations of the monitoring points are shown in Figures 2.1 and 2.2. The following subsections discuss each of the monitoring programs.

5.1. Up-gradient Monitoring

Pinedale outwash aquifer groundwater levels are monitored through a network of six wells installed throughout the valley. The wells included in the upgradient monitoring network are Well A, BVMW-2, BVMW-5, BVMW-8, BVMW-9, and BVMW-10. The wells were constructed in April 2008 except for Well A, which was converted from an existing water supply well to a monitoring well. Groundwater monitoring in these wells, which consists of automated water level and temperature measurements, was initiated in April 2008. In addition to water level and temperature measurements, specific conductance is recorded in BVMW-10.

This network of monitoring wells serves to provide an indication of overall aquifer conditions and characterize water levels at locations not expected to be affected by water production at the springs. (The location of BVMW-10 is such that it is used in all three monitoring programs.) Average daily water levels for these wells for water year 2012 are provided in Appendix D.

Hydrographs from the upgradient monitoring wells from 2008 to present (Figure 5.1) show that the Pinedale outwash aquifer has relatively large seasonal changes in water levels over the entire extent of the aquifer. Highest water levels are observed August through October and lowest levels are observed March through May. The actual timing of highest and lowest water levels, and the amount of fluctuation between the highest and lowest levels, are dependent on the location within the aquifer and recharge conditions during the year. The variability in water level fluctuations for upgradient, Ruby Mountain Springs, and Bighorn Springs monitoring wells for the 2012 water year is illustrated in Figure 5.2, which provides a map view illustration of the magnitude of the groundwater fluctuations within the aquifer during the 2012 water year. Annual water level changes range from four feet to 20 feet.

In previous years, the magnitude of fluctuations has been higher on the eastern side of the valley and lower near the groundwater discharge points, whether the Arkansas River to the west or the Ruby Mountain and Bighorn Springs to the south. Except for near BVMW-8, this pattern is not prominent during the 2012 water year. Similar to previous years, wells near irrigation ditches, such as BVMW-2 and BVMW-5, show relatively rapid and significantly large responses to periods of flow in the ditches.

Water levels in the aquifer decreased from 2011 to 2012, generally following the overall rate of decline since 2008. These changes in water levels are clearly independent of pumping at Ruby Mountain Springs, which did not begin with regularity until July 2010.

Groundwater flow in the aquifer throughout the 2012 water year was north to south and southwest with discharge to the west side into the Arkansas River. These flow directions are consistent with previous years (ENSR/AECOM, 2008; AECOM, 2010; SSPA, 2011; SSPA, 2012). Figure 5.3 is a map of water level contours for the aquifer during the seasonal low groundwater levels on April 10, 2012. High seasonal groundwater levels are depicted on Figure 5.4 showing conditions on October 8, 2012.

5.2. Ruby Mountain Springs and Bighorn Springs Monitoring

Groundwater monitoring at Ruby Mountain Springs consists of automated water level and temperature measurements at RMBH-1, RMBH-2, RMBH-3, BVMW-11, BVMW-12, BVMW-13, and BVMW-10. Locations of the monitoring points are shown on Figure 2.2. RMBH-1 is a test borehole that is now used as a monitoring well. BVMW-11 was completed in August 2010 and monitoring was initiated in August 2011. BVMW-12 and BMVW-13 were completed in October 2010 and monitoring began in December 2010 and July 2011, respectively. Production borehole RMBH-2 was constructed on November 15, 2007, and received final approval for production of spring water in July 2010. The permit to construct a new production well, RMBH-3, was approved by the DWR on April 29, 2010, and well construction was completed in October. Testing of the new production well was conducted in early November 2010. Production of spring water was switched from RMBH-2 to RMBH-3 on April 29, 2011. Currently, RMBH-3 is used as the primary production well and RMBH-2 is maintained as a backup production well.

On the afternoon of July 7, 2012, an electrical surge caused by a lightning strike damaged the analog input card of the electronic supervisory control system at RMBH-3. The remote monitoring system and electronic equipment for monitoring water levels (the datalogger in the well) was impaired. When the problem was discovered on the morning of July 10 the datalogger was reset. However, after a period of monitoring water levels, it was apparent the monitoring equipment was permanently damaged and was replaced on November 8. As a result water levels for RMBH-3 from July 8 through November 8 are estimated based on the water level difference between RMBH-2 and RMBH-3.

Reclamation activities (discussed in Section 4.1) have slightly influenced groundwater levels at the springs due to the changes in pressure head from removal of underground piping, redesign of the upper pond, and installation of the perforated pipe where the Upper Ditch previously existed; however, changes are minimal and localized (near BVMW-12). Maximum seasonal water levels at BVMW-12 have increased, in contrast to other wells at the springs that demonstrate a decrease in seasonal water levels during the 2012 water year. This is attributed to the close proximity of the perforated pipe and local redistribution of groundwater near it.

* See change in 2013 compare to other wells

Groundwater levels and temperature at the Bighorn Springs site are monitored at wells BHMW-1 and BHBH-2, which are shown on Figure 2.2. BHMW-1 was installed concurrently with the upgradient monitoring wells in April 2008. BHBH-2 is a test borehole installed in May 2008 as part of NWNA work to evaluate the development potential of Bighorn Springs as a production water source.

Hydrographs for the Ruby Mountain Springs and Bighorn Springs groundwater monitoring stations are shown in Figure 5.5. The hydrographs are overlain with combined pumping from RMBH-2 and RMBH-3 to illustrate any relationships between pumping and water level changes in the wells. Average daily water levels and temperature are included in Appendix D. In addition to water level and temperature measurements, specific conductance is recorded in wells RMBH-2, RMBH-3, BHBH-2, BHMW-1, and BVMW-10. Figure 5.6 details groundwater levels at Ruby Mountain Springs for the 2012 water year and shows the relationship and minimal changes in water levels associated with production withdrawals.

As shown in Figures 5.5 and 5.6, seasonal changes in groundwater levels in monitoring wells located near springs (e.g., RMBH-1 and BHBH-2) fluctuate less than groundwater levels in monitoring wells located away from the springs (e.g., BVMW-10 and BHMW-1). Groundwater levels since 2008 generally show a declining trend, except for the spring of 2011 when a majority of the water levels within the monitoring network rose and exceeded observed water levels in the three previous water years. Observed maximum and minimum water level measurements from 2008 to 2012 for the monitoring network show a linear declining trend ranging from approximately 0.3 to 0.9 feet per year, with most wells showing a rate of 0.4 feet of decline per year.

6.0 PRODUCTION WELL WATER WITHDRAWALS

Withdrawals from production well RMBH-2 began in June 2010 and production of bottled water commenced the following August. On April 29, 2011, pumping for production of water was transitioned from RMBH-2 to RMBH-3. The two production wells are never pumped simultaneously.

Under the Well Use Permit issued by the DWR, NWNA is allowed to divert up to 200 gpm, or 0.884 acre-foot/day (288,052 gpd), or 16.6 acre-feet in one month. Annual diversions are not to exceed 196 acre-feet. A summary of total monthly and annual production withdrawals for the 2012 water year are shown on Table 6.1. Figure 6.1 exhibits total daily pumping from each production well for the 2012 water year. Total daily withdrawals in acre-feet for RMBH-2 and RMBH-3 are provided in Appendix E.

As discussed in Section 5.2, the electronic supervisory system at RMBH-3 was damaged due to an electrical surge from a lightning strike. Increased pressure in the system was not detected until the system was repaired on the morning of July 10, at which time flows were immediately reduced. A one-time maximum daily pumping from RMBH-3 was 228,340 gallons on July 8 and 226,000 gallons on July 9. Maximum daily pumping from all other days from RMBH-2 and RMBH-3 did not exceed 169,000 gallons per day.

For the 2012 water year, a total of 168 acre-feet of water was withdrawn from wells RMBH-2 and RMBH-3 combined. RMBH-3 was the primary production source, pumping a total of 54,655,820 gallons during the 2012 water year. RMBH-2 was only pumped for water quality sampling on March 8, 2012, and June 27, 2012 (total of 30,850 gallons). The daily, monthly and annual production totals provided above are well below the limits established in the Well Use Permit.

RMBH-2 and RMBH-3 are hydraulically connected to the Pinedale outwash aquifer and to Ruby Mountain Springs, as was demonstrated by pump testing that resulted in reduced flows from the springs (ENSR/AECOM, 2008; Malcolm-Pirnie, 2010). Slight reductions in flows from Ruby Mountain Springs that are coincident with withdrawals from RMBH-2 and RMBH-3 possibly can be seen on Figure 4.1, although any effect is small and therefore difficult to discern within the noise in the data. Comparison of periods of pumping with surface flow levels at Bighorn Springs (Figure 4.2) show no effects from pumping during the 2012 water year.

As shown in Figures 5.5 and 5.6, withdrawals from RMBH-2 and RMBH-3 have slight effects on groundwater levels in Ruby Mountain Springs monitoring wells (RMBH-1, RMBH-2, BVMW-11, BVMW-12 and BVMW-13) but show no effects in the more distant Bighorn Springs monitoring wells (BVMW-10, BHMW-1 and BHBH-2).

7.0 GROUNDWATER QUALITY

Water quality samples were collected on March 8, 2012 at RMBH-2, on March 23, 2012 at RMBH-3 and on October 29, 2012 at BVMW-10. Samples from production wells RMBH-2 and RMBH-2 were analyzed for general water quality parameters, physical properties (color, odor, and turbidity), primary and secondary inorganic parameters and metals, volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), pesticides, and bacteria. EPA approved methods were used in the analyses of samples from the production wells. Samples collected at BVMW-10 were analyzed for general inorganic parameters only. All sample results are presented in Appendix F.

The pH for RMBH-2 and RMBH-3 was 7.7 and 7.9, respectively, and specific conductance was 380 μohm/cm and 370 μohm/cm, respectively. Total Dissolved Solids (TDS) for RMBH-2 was 230 mg/L and RMBH-3 was 220 mg/L.

All primary and secondary inorganic parameters and metals concentrations in production wells RMBH-2 and RMBH-3 were below Colorado Basic Standards for Ground Water (5 CCR 1002-41) and there were no VOCs, SVOCs, or pesticides in any of the samples.

8.0 CONCLUSIONS

For the 2012 water year, NWNA conducted all surface water, groundwater, and flow monitoring activities specified in Chaffee County Resolution 2009-42 and the SGWMMP. During the course of the year, NWNA responded to changing conditions (e.g. blockages of the flumes and weir) and sporadic problems that occurred with specific dataloggers in the monitoring network. As of the end of 2012, conditions at the surface water measurement stations were being field-checked on a frequent basis and all dataloggers were functioning correctly and being downloaded according to SGWMMP requirements.

Seasonal trends in spring water flows and groundwater levels in the Ruby Mountain Springs monitoring system were similar to those observed in water years 2008 through 2010 (water levels in 2011 rose to higher levels than in any of the other four years). Since the beginning of the NWNA monitoring program in April 2008, water levels for the Pinedale Outwash aquifer were generally declining.

Seasonal surface water flows from both Ruby Mountain and Bighorn springs are generally at a maximum from September through November and at a minimum from April through June (Figure 4.1 and Figure 4.2). During the 2012 water year, springs flows were similar or slightly below previous seasonal low flow observations; however, seasonal peak flows declined due primarily to reduced irrigation flows.

Groundwater levels in wells for both the up-gradient and near springs areas followed a similar trend as the spring water flows. Water levels generally reached a lower seasonal minimum in April to June following the historical general decline in the aquifer before rising to maximum seasonal levels in September to October, depending on the location within the aquifer and proximity to irrigation fields and canal diversions (Figure 5.1 and Figure 5.5). Wells located further up-gradient tend to reach maximum and minimum levels earlier than wells located down gradient. The smallest seasonal variations in groundwater water levels occur in the wells that are closest to groundwater discharge points as shown in Figure 5.2. Seepage from irrigation diversions influences groundwater levels in wells located near canals as demonstrated in wells BVMW-2 and BVMW-5 in Figure 5.1s and 5.2.

The correlation between irrigation and groundwater levels has been noted previously for the Pinedale Outwash aquifer (ENSR/AECOM, 2008), and review of the 2012 timing of irrigation diversions with the timing and magnitude of water level increases, confirms this relationship. As previously noted, groundwater levels during the 2012 high water season declined and total irrigation diversions were the lowest recorded since 2008 (Table 4.3b) and precipitation measurements at the Buena Vista 2S weather station were below average compared to the long-term records (Figure 3.1). Early season diversions in April and May were consistent with water year 2009 (Figure 4.5), however diversions during the remaining of the irrigation season (June through September) were the lowest rates observed in the last four years. This decreased diversion rate—primarily from restricted flows in the Helena Ditch and the Bray Allen Ditch—corresponds closely with the observed low water levels in the seasonal high flows. As in the past, the effects of local precipitation in the Arkansas River Valley on the aquifer appear to be minimal.

Aquifer recharge via groundwater inflows from the mountains directly east of the Pinedale Outwash aquifer is significant (ENSR/AECOM, 2008). As discussed in Section 3.2, the closest SNOTEL precipitation monitoring station east of the Arkansas River is the Rough and Tumble station, which is located more than 20 miles north of Ruby Mountain and Bighorn Springs. From a general perspective, the station shows that the snow water equivalent (SWE) for the 2011-12 snowpack in the Mosquito Range was below average compared to the 30-year average but average compared to the last five years. SWE was well above 2010-11 snowpack, although it was considerably lower than 2009-10. NWNA is evaluating options for more closely determining precipitation in the mountains directly to the east of the springs.

The sole source of withdrawals for the production of water were from Ruby Mountain Springs production well RMBH-3 for the 2012 water year. The withdrawal of water has a small effect on flows at Ruby Mountain Springs, but does not affect water levels in the Pinedale Outwash aquifer beyond the Ruby Mountain Springs site. There were no effects at Bighorn Springs, which is located approximately 3,000 feet northwest of the Ruby Mountain Springs site. The localized nature of the impacts of pumping on the water levels in the aquifer are consistent with the results of the pump testing conducted for RMBH-2 in 2008 (ENSR/AECOM, 2008) and for RMBH-3 in 2010 (Malcolm-Pirnie, 2011).

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2013 Annual Monitoring Report
Ruby Mountain Springs
Chaffee County, Colorado

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Boulder, Colorado

February 27, 2014

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1.0 INTRODUCTION

Ruby Mountain Springs is located in the Upper Arkansas River Valley near Buena Vista, Colorado, on the east bank of the Arkansas River (Figure 1.1). Under Chaffee County Resolution No. 2009-42, Nestlé Waters North America Inc. (NWNA) is allowed to divert up to 196 acre-feet of spring water per year from the Ruby Mountain Springs site, subject to limitations set forth in the permit. NWNA has committed to Chaffee County to conduct periodic surface water and groundwater monitoring as a means to characterize hydrologic conditions and to document any effects, if observed, from diversions by NWNA. Effects from withdrawals are expected to be minimal, localized, and to not produce adverse impacts to surface water, groundwater, wetlands, or nearby water resources. A copy of Resolution No. 2009-42 was included the 2010 Annual Monitoring Report (SSPA, 2011).

This Annual Report is prepared in accordance with Condition 4.8 of Resolution No. 2009-42, which states that NWNA "…shall submit an annual report to the County … that describes progress on the Project and compliance with Permit conditions, including but not limited to water pumping operations; [and] wetland and groundwater monitoring…" The Surface- and Ground-Water Monitoring and Mitigation Plan (SGWMMP), submitted by NWNA to Chaffee County on April 29, 2010, satisfies Condition 4.16 of Resolution No. 2009-42, provides an outline for developing a baseline characterization of hydrologic conditions, and sets requirements for monitoring and evaluating any impacts on local water resources due to pumping at the Ruby Mountain Springs site. A copy of the SGWMMP was included in 2010 Annual Monitoring Report (SSPA, 2011).

All monitoring locations required by the SGWMMP, and additional monitoring wells BVMW-11, BVMW-12, and BVMW-13 were completed by the fall of 2010 and monitored throughout the 2013 water year. RMBH-3 was the primary production well during the 2013 water year. Production well RMBH-2 was only operated for a portion of two days in mid-July for water quality sampling (RMBH-3 was not operated at the same time). Additional details and observations for the 2013 water year (constituting November 1, 2012, to October 31, 2013) for the Ruby Mountain Springs project are provided in the following sections.

2.0 REGIONAL SETTING AND DISTRIBUTION OF MONITORING STATIONS

The Ruby Mountain Springs and Bighorn Springs sites are located in central Chaffee County, Colorado, along the eastern banks of the Arkansas River. The Bighorn Springs are approximately eight river miles south of the town of Buena Vista. The Ruby Mountain Springs, which emanate at the site of a former fish hatchery, are located another 0.8 miles downstream from Bighorn Springs. The springs represent groundwater discharge from the productive alluvial Pinedale outwash aquifer (ENSR/AECOM, 2008).

Spring flow and water level monitoring at the Ruby Mountain Springs and Bighorn Springs sites began in January 2007. Expansion of the monitoring network continued throughout 2007 and 2008 and included installation of surface water gauges near the springs (including staff gauges, flumes, and a weir) and groundwater monitoring wells throughout the valley east of the Arkansas River and north of the springs. Automatic dataloggers were installed in many of the groundwater wells within the network in April 2008.

As described in the SGWMMP, the monitoring network consists of three areas: the up-gradient monitoring wells, the Bighorn Springs site, and the Ruby Mountain Springs site. In addition, weather and precipitation monitoring data and irrigation diversions in the valley are also compiled from monitoring conducted by others. All monitoring stations discussed in this report are listed in Table 2.1. The project area for the Ruby Mountain Springs and distribution of up-gradient groundwater monitoring wells is shown on Figure 2.1 and monitoring locations at the Ruby Mountain Springs and Bighorn Springs sites are shown on Figure 2.2. The locations of nearby weather stations and river gauges discussed in this report are shown on Figure 1.1.

3.0 PRECIPITATION MONITORING

Daily precipitation is recorded at two locations as part of the SGWMMP (Figure 1.1). The Ruby Mountain Springs Rain Gauge (RM-PPT) records precipitation on-site, and the National Weather Service Station Buena Vista 2S (BV2S) records precipitation at the Chaffee County Regional Airport, approximately seven miles north-northwest of Ruby Mountain Springs.

Precipitation as snow water equivalent is recorded at SNOTEL stations in the Mosquito and Sawatch Mountain Ranges to the east and west of the Ruby Mountain Site. Measurements for these stations are discussed in Section 3.2 below.

3.1. Precipitation at Ruby Mountain Springs and Buena Vista 2S

Precipitation measurements at the Ruby Mountain Springs Rain Gauge (RM-PPT), which was installed in July 2010, are collected using a Texas Electronics Series 525 heated tipping bucket rainfall sensor with an accuracy of 1.0 percent. The Buena Vista 2S station (BV2S) data includes long-term daily and monthly precipitation records that date back to August 1, 1899. Precipitation records for the 2013 water year for both stations are summarized in Table 3.1.

Monthly precipitation at the two stations during the 2013 water year is shown on Figure 3.1. Also shown on the figure, for comparison purposes, is the long-term monthly 30-year average precipitation (based on 1981-2010) at BV2S. Additionally, the deviation in precipitation calculated over the previous 12-month period compared to the long-term average for the same 12-month period (the "cumulative annual departure") is shown.

During the 2013 water year, a total of 10.18 inches of precipitation were recorded at BV2S, which is 0.40 in lower than the 30-year long-term average of 10.58 inches. Below average precipitation during the 2011 and 2012 water years, resulted in below average cumulative departure from normal conditions at BV2S at the beginning of the 2013 water year. A slightly wet spring and very wet months of July and September rebounded cumulative departure to near normal conditions by the end of the 2013 water year.

Similar to the previous water year observations, precipitation at the Ruby Mountain Springs station (RM-PPT) was below that recorded at BV2S. Observations indicate moisture is normally dropped via rain and snow on the western slopes of the valley leaving drier conditions from a lack of precipitation on the eastern side of the Arkansas River. In 2013 RM-PPT recorded 8.83 inches of precipitation, with the differences between the two stations reduced by the unusually high level of precipitation at RM-PPT relative to BV2S in July.

3.2. Snow Water Equivalent from SNOTEL Sites

Precipitation and snowmelt in the Mosquito Range mountains recharges the Pinedale Outwash aquifer (ENSR/AECOM, 2008). To provide a general sense of snowmelt that occurs in the mountainous regions in the vicinity of the Ruby Mountain and Bighorn Springs, the two nearest SNOpack TELemetry (SNOTEL) stations maintained by the Natural Resources Conservation Service (NRCS) are presented.

As shown on Figure 1.1, the Rough and Tumble station is located in the Mosquito Range to the east, approximately 25 miles north of the springs site in Park County. The Saint Elmo station is located 20 miles west of the spring site in the Sawatch Range to the west of the Arkansas River and lies on the eastern side of the Continental Divide. Both SNOTEL stations are 2,500 to 2,900 feet above the elevations of monitoring stations for the Ruby Mountain Springs network. Neither SNOTEL station provides a quantitative measure of snow water equivalent (SWE) in the mountains east of the Pinedale Outwash aquifer (the area contributing to Ruby Mountain Springs recharge); however, they do show the general relationship between the east and west sides of the Arkansas River Valley and observations at Rough and Tumble possibly reflect trends in recharge from snowmelt in the Mosquito Range.

Snow water equivalent measured over the last six winters at Rough and Tumble and Saint Elmo are shown on Figure 3.2, along with precipitation measured at Buena Vista 2S. As demonstrated in the figure, winter precipitation in the Sawatch Range to the west is typically higher than in the Mosquito Range to the east. Measured SWE was similar in magnitude for both SNOTEL stations during the winter of 2012-13 although the duration and accumulation of

SWE at the Rough and Tumble station was delayed and shortened compared to the Saint Elmo station.

The maximum SWE observation during the 2013 water year at Rough and Tumble was 8.5 inches on May 10, which is above the maximum of historical median observations from 1981 to 2010 (7.7 inches on April 26 for the 30-year average). However, the seasonal snowpack accumulated later in the winter resulting in a shorter duration snowpack at the Rough and Tumble station compared to the long-term median. Long term observations at Saint Elmo are unavailable because the station was started in 2007.

4.0 SURFACE-WATER MONITORING

The SGWMMP specifies that surface water monitoring will be conducted at both the Ruby Mountain Springs and Bighorn Springs locations. A total of four spring flow measurement stations are maintained, two at each of the spring locations (Figure 2.2). Each of the stations is outfitted with a datalogger that records the depth of water flowing over a weir or through a flume. The depths are converted to flows based on the dimensions of the gaging structure. Some of the surface-water monitoring data associated with the spring flow stations showed anomalous measurements during periods of the 2013 water year. Challenges arose from the need to maintain the integrity of monitoring structures on a continual basis; most commonly by clearing tumbleweeds, aquatic plants, and incipient beaver dams from the measurement structures and associated channels.

In addition to spring flows, river discharge is reported for two gauges along the Arkansas River; the gauge near Nathrop (Station ID 07091200), monitored seasonally by the United States Geological Survey (USGS), and the gauge at Salida (Station ID 07091500), monitored year-round by the Colorado Division of Water Resources (DWR). Information on river monitoring stations are provided in Section 4.3 below.

4.1. Ruby Mountain Springs Site

Surface water monitoring at Ruby Mountain Springs consists of temperature and flow measurements at the Ruby Mountain Weir (RM-Weir), immediately downstream of the former fish hatchery, and at the Ruby Mountain-Hagen Parshall Flume (RMPF), which is upstream of the former hatchery, approximately 1,300 feet northwest of the weir. The locations of these monitoring stations are shown on Figure 2.2. The Hagen Trench is a channel entering the springs at the northern end of the former hatchery. Flow through this channel comes from upstream of the spring-water discharges. The flow passes through the Hagen Parshall flume and is conveyed in the channel through the former hatchery site and discharges to the Arkansas River below the weir, which is located at the downstream end of the active spring discharge. The weir, therefore, measures combined flow from the Hagen Trench and from Ruby Mountain Springs discharges. The difference between flows at the two stations approximates the discharge from the Ruby Mountain Springs.

During the spring of 2012 (March through May), Ruby Mountain springs site underwent reclamation to remove former hatchery infrastructure (raceways, building foundations, and drainage structures) and to create a more natural setting with functional wildlife and trout habitat. Construction activities included creation of a new pond, revitalization of the stream channel system and associated wetland areas, and elimination of ungagged overland surface flows that were previously discharging to the Arkansas River upstream of the weir and downstream of the Parshall Flume. Also, the Upper Ditch, which was created to convey oxygenated flows to the upper reaches of the former hatchery, was replaced with a buried perforated pipe.

The daily flows for the upstream Hagen Parshall flume and downstream weir were calculated from automated stage measurements using the U. S. Bureau of Reclamation (USBR) equations for a Parshall flume and a contracted, sharp-crested, rectangular weir, respectively (USBR, 2001). Monthly and annual measurements are shown in Table 4.1, and average daily flow measurements are included in Appendix A. Weir and Hagen Parshall flume flows for the past five water years, including daily precipitation and pumping records for the 2013 water year, are shown on Figure 4.1.

There were three periods during the year when weir data were not representative of actual springs discharge conditions. During the period between June 27 and July 8, 2013, frequent beaver activity at the springs caused flow levels to rise due to damming at the weir and in the conveyance channel. From July 14 to August 18, and from September 13 to September 23, the data logger failed to record accurate stage measurements due to moisture in the cable, preventing the logger from being vented. Flows more reflective of natural conditions during these three periods, as shown on Figure 4.1 and summarized in Table 4.1, were estimated based on a rising water level curve and coinciding with visual site observations on August 8, September 5, and October 2.

Flow through the Hagen Parshall Flume began on July 27, 2013, approximately two weeks earlier than the 2012 season and the same week that flows began in the 2011 season.

Beginning in early September, the datalogger in the flume was dislodged (likely due to cattle grazing in the area) and was replaced in early October. Flows during this period are based on measured depth from the datalogger and the visual site observations on September 5 and October 2.

The average monthly discharge from Ruby Mountain Springs (weir flows minus Hagen Parshall flume flows) during water year 2013 are shown on Table 4.1. Flows varied from a high of 2.6 cfs (1,180 gpm) in November 2012 to a low of 0.8 cfs (360 gpm) in June 2013, and then rose to 3.2 cfs (1,460 gpm) in October 2013. The seasonal trends are similar to those observed in previous years; however, the minimum water level at the weir was slightly higher than previous seasonal observations (prior to the 2012 reclamation) due to flow that is currently captured in the channel that was previously discharged to the river upstream of the gauge.

4.2. Bighorn Springs Site

Surface water flows at the Bighorn Springs site are monitored at two measurement locations, Bighorn Parshall Flume 1 (BHPF-1) and Bighorn Parshall Flume 3 (BHPF-3), both of which are shown on Figure 2.2. Surface water flows at the Bighorn flumes have been recorded since late August 2009. BHPF-1 is located approximately 400 feet up-gradient of BHPF-3. BHPF-1 measures flow upstream of Bighorn Springs, which during most of the year emanates from the wetlands area just upstream of the flume. BHPF-3 measures combined upstream flow and spring flow before the confluence with the Arkansas River.

The daily flows for BHPF-1 and BHPF-3 were calculated from automated stage measurements using the USBR equations for a Parshall flume (USBR, 2001). Observed and estimated monthly and annual measurements are shown in Table 4.2, and average daily flow measurements are included in Appendix B. BHPF-1 and BHPF-3 flows for the past five water years, including daily precipitation records for the 2013 water year, are shown on Figure 4.2.

The upper flume (BHPF-1) was periodically obstructed due to the buildup of debris in and around the flume from April 12 to August 9, 2013. After early September, it appears flows at BHPF-1 are elevated, possibly due to sediment buildup upstream of the flume. Measured flows at the lower flume (BHPF-3) were elevated from December 3, 2012 until June 12, 2013 when the flume was cleared of sediment and debris, and repairs were performed in the area around the flume (including performing maintenance on the corridor fence and placing compacted soil and sand adjacent to the flume box where the fill material had eroded away).

During the October site visit, visual inspection indicated persistent flow bypassing the lower flume (BHPF-3), however flow loss was minimal. Vegetation continues to be cleared during routine maintenance visits; however, options for maintaining these flow stations, or removing them, are being evaluated. Repairs would include rebuilding the walls adjacent to the lower flume to recapture water that currently flows around the flume and to initiate a more aggressive program for clearing sediment and debris that persistently builds up around the flumes.

Based on estimated flows, the average monthly gain in the spring flow between BHPF-1 and BHPF-3 ranged from 0.3 cfs (134 gpm) in November 2012 to a loss of 0.1 cfs (35 gpm) in June. BHPF-3 flows reflect total Bighorn Springs flows, which ranged from 0.6 cfs (264 gpm) in November 2012 to 0.1 cfs (66 gpm) in June 2013 and rose to 0.7 cfs (342 gpm) in October 2013. Similar to Ruby Mountain Springs upper flume flows, the seasonal trends are similar to those observed in previous years, with the exception that peak seasonal flows were subdued compared to years prior to 2012.

4.3. Arkansas River

The SGWMMP specifies that two Arkansas River gauges will be reported, the gauge near Nathrop (USGS Station ID 07091200) and the gauge at Salida (DWR Station ID 07091500). Daily average observed and long-term normal flows for these gauges during the 2013 water year are provided in Appendix C. Locations for Arkansas River gauges discussed in this section are shown on Figure 1.1. Flows at the Nathrop and Salida gauges are similar from year to year and are partially controlled by the operation of reservoirs on streams that are tributary to the river and that are upstream of the Ruby Mountain Springs site.

Monitoring at the Nathrop gaging station began in October 1964 but the station is currently operated only on a seasonal basis (generally from April 1 through September 30) by the USGS. The watershed area for this gauge is 1,060 square miles. The Colorado Division of

Water Resources (DWR) has been operating the Salida gauge since October 1, 1909 and monitors discharge at the gauge every fifteen minutes throughout the year. The watershed area for this gauge is 1,218 square miles.

Hydrographs of average daily flows in the upper Arkansas River for the 2013 water year and long-term average flow data collected from the Arkansas River gauges near Nathrop and at Salida are shown on Figure 4.3. Observations for the year compared to the long-term average indicate the Arkansas River maintained low-flow levels throughout the spring and summer except for a few days in mid-June. Flows for the month of June (when peak flows historically are at their highest) were 66% of normal near Nathrop and 64% of normal at Salida. 2012 cumulative departure from normal flows during the seasonal gaging period (April through September) was approximately 130,000 acre-feet below average at both stations. For comparison, during the 2012 and 2011 seasons, flows were over 210,000 acre-feet below average and over 100,000 acre-feet above average, respectively.

4.4. Irrigation Diversions

Annual diversions for Trout Creek Ditch sourced from Cottonwood Creek (Trout Creek Ditch-Cottonwood), Trout Creek Ditch sourced from Trout Creek (Trout Creek Ditch), Bray-Allen Ditch, Helena Ditch, Cogan Ditch[1], and Trout Creek Reservoir are reported by the DWR. Diversion records for the 2013 water year were made available for this report by the Chaffee County Water Commissioner and are provisional.

Monthly diversions for the 2012 and 2013 irrigation season are included in Table 4.3a and a summary of total diversions for each water year, from 2008 through 2013, is shown in Table 4.3b. The approximate locations of canals near the monitoring network (high accuracy location data for canals are not available at this time) are shown on Figure 4.4. Combined total monthly diversions for 2008 through 2013 are shown on Figure 4.5 reflecting the timing and magnitude of ditch flows in the valley.

[1] Cogan Ditch is operated under a futile call. Diversions from Cogan Ditch were not reported in previous annual monitoring reports for Ruby Mountain Springs, Chaffee County, Colorado but will be included in future reports.

Historical average diversions for available years from the Bray-Allen ditch since 1946 are approximately 1,400 acre-feet[2]. Historical average diversion for available years from the Trout Creek Ditch since 1911 is approximately 580 acre-feet[3]. Flows from the Trout Creek Reservoir are negligible (Trout Creek Reservoir accounts for less than 1% of the annual diversion total[4]). As shown on Table 4.3a, diversions from Trout Creek (Trout Creek Ditch and Cogan Ditch) occurred earlier in the season (March) compared to diversions from Cottonwood Creek (Trout Creek Ditch – Cottonwood, Bray-Allen Ditch, and Helena Ditch), which were delayed until April, May, and June, respectively.

[2] According to information provided by the DWR, no diversion flow data is available for the Bray-Allen Ditch for the 2008 irrigation season because the flume washed out in August of 2007.

[3] No data is available for the Trout Creek Ditch (not the Trout Creek Ditch – Cottonwood Creek) for the 2010 irrigation season because of recording equipment failure.

[4] No datafor the Trout Creek Reservoir is available since 2009 from the Colorado Department of Natural Resources, Water Conservation Board, Colorado's Decision Support Systems

5.0 GROUNDWATER MONITORING

In accordance with Condition 4.16 of Chaffee County Resolution No. 2009-42, NWNA monitors groundwater levels in the Pinedale Outwash aquifer from its up-gradient extent north of Highway 24/285 to Ruby Mountain Springs. To comply with the requirements of Resolution No. 2009-42, NWNA operates three monitoring programs as specified in the April 29, 2010, SGWMMP. The three programs areas are up-gradient monitoring, Ruby Mountain Springs monitoring, and Bighorn Springs monitoring. Groundwater monitoring wells and spring flow monitoring points, and the parameters measured at each, are provided in Table 2.1 Locations of the monitoring points are shown in Figures 2.1 and 2.2. The following subsections discuss each of the monitoring programs.

5.1. Up-gradient Monitoring

Pinedale outwash aquifer groundwater levels are monitored through a network of six wells installed throughout the valley. The wells included in the up-gradient monitoring network are Well A, BVMW-2, BVMW-5, BVMW-8, BVMW-9, and BVMW-10. The wells were constructed in April 2008 except for Well A, which was converted from an existing water supply well to a monitoring well. Groundwater monitoring in these wells, which consists of automated water level and temperature measurements, was initiated in April 2008. In addition to water level and temperature measurements, specific conductance is recorded in BVMW-10.

This network of monitoring wells serves to provide an indication of overall aquifer conditions and characterize water levels at locations not expected to be affected by water production at the springs. (The location of BVMW-10 is such that it is used in all three monitoring programs.) Average daily water levels, temperature, and conductivity for these wells for the 2013 water year are provided in Appendix D.

Hydrographs from the up-gradient monitoring wells from 2008 to present (Figure 5.1) show that the Pinedale outwash aquifer has relatively large seasonal changes in water levels over the entire extent of the aquifer. Highest water levels are observed August through October and lowest levels are observed March through June. The actual timing of highest and lowest water levels, and the amount of fluctuation between the highest and lowest levels, are dependent on the location within the aquifer and recharge conditions during the year. The variability in water level fluctuations for up-gradient, Ruby Mountain Springs, and Bighorn Springs monitoring wells for the 2013 water year is illustrated in Figure 5.2, which provides a map view illustration of the magnitude of the groundwater fluctuations within the aquifer during the 2013 water year. Annual water level changes range from five feet to 20 feet.

As in previous years, the magnitude of fluctuations has been higher in wells near irrigation ditches and center pivots, such as BVMW-2 and BVMW-5. These wells show relatively rapid and significantly large responses to periods of flow in the ditches. Additionally, fluctuations are slightly higher on the eastern side of the valley and lower near the groundwater discharge points, whether the Arkansas River to the west or the Ruby Mountain and Bighorn Springs to the south.

Minimum water levels in up-gradient wells decreased slightly (less than one foot) from 2012 to 2013; however maximum water levels increased (more than 2.5 feet). In general, the minimum water levels in up-gradient wells have been undergoing a slight decline since 2008. These changes in water levels are clearly independent of pumping at Ruby Mountain Springs, which did not begin with regularity until July 2010.

Groundwater flow in the aquifer throughout the 2013 water year was north to south and southwest with discharge to the west side into the Arkansas River. These flow directions are consistent with previous years (ENSR/AECOM, 2008; AECOM, 2010; SSPA, 2011; SSPA, 2012; SSPA, 2013). Figure 5.3 is a map of water level contours for the aquifer during the seasonal low groundwater levels on April 4, 2013. High seasonal groundwater levels are depicted on Figure 5.4 showing conditions on October 2, 2013.

5.2. Ruby Mountain Springs and Bighorn Springs Monitoring

Groundwater monitoring at Ruby Mountain Springs consists of automated water level and temperature measurements at RMBH-1, RMBH-2, RMBH-3, BVMW-11, BVMW-12, BVMW-13, and BVMW-10. Locations of the monitoring points are shown on Figure 2.2. RMBH-1 is a test borehole that is now used as a monitoring well. BVMW-11 was completed in August 2010 and monitoring was initiated in August 2011. BVMW-12 and BMVW-13 were completed in October 2010 and monitoring began in December 2010 and July 2011, respectively. Production borehole RMBH-2 was constructed on November 15, 2007, and received final approval for production of spring water in June 2010. The permit to construct a new production well, RMBH-3, was approved by the DWR on April 29, 2010, and well construction was completed in October 2010. Testing of the new production well was conducted in early November 2010. Production of spring water was switched from RMBH-2 to RMBH-3 on April 29, 2011. Currently, RMBH-3 is used as the primary production well and RMBH-2 is maintained as a backup production well.

Reclamation activities (discussed in Section 4.1) have slightly influenced groundwater levels at the springs due to the changes in pressure head from removal of underground piping, redesign of the upper pond, and installation of the perforated pipe where the Upper Ditch previously existed; however, changes are minimal and localized (near BVMW-12).

Groundwater levels and temperature at the Bighorn Springs site are monitored at wells BHMW-1 and BHBH-2, which are shown on Figure 2.2. BHMW-1 was installed concurrently with the up-gradient monitoring wells in April 2008. BHBH-2 is a test borehole installed in May 2008 as part of NWNA work to evaluate the development potential of Bighorn Springs as a production water source.

Hydrographs for the Ruby Mountain Springs and Bighorn Springs groundwater monitoring stations are shown in Figure 5.5. The hydrographs are overlain with combined pumping from RMBH-2 and RMBH-3 to illustrate any relationships between pumping and water level changes in the wells. Average daily water levels and temperature are included in Appendix D. In addition to water level and temperature measurements, specific conductance is recorded in wells RMBH-2, RMBH-3, BHBH-2, BHMW-1, and BVMW-10. Figure 5.6 details groundwater levels at Ruby Mountain Springs for the 2013 water year and shows the relationship and minimal changes in water levels associated with production withdrawals.

As shown in Figures 5.5 and 5.6, seasonal changes in groundwater levels in monitoring wells located near springs (e.g., RMBH-1 and BHBH-2) fluctuate less than groundwater levels in monitoring wells located away from the springs (e.g., BVMW-10 and BHMW-1). Minimum water levels at wells near Ruby Mountain and Bighorn springs did not change significantly from 2012 to 2013; however, maximum water levels increased by over 1.5 feet.

A declining trend in groundwater levels that began prior to NWNA's production was present for the years 2008 to 2010. In 2011, this trend was reversed with a majority of the water levels within the monitoring network exceeding observed water levels in the three previous water years. The effects of regional drought were apparent in the low maximum and minimum water levels measured in all wells during 2012. However, in 2013, the maximum water levels rebounded from the lows measured in 2012 and were similar to the maximum levels measured in 2010.

6.0 PRODUCTION WELL WATER WITHDRAWALS

Withdrawals from production well RMBH-2 began in June 2010 and production of bottled water commenced the following August. On April 29, 2011, pumping for production of water was transitioned from RMBH-2 to RMBH-3. The two production wells are never pumped simultaneously.

Under the Well Use Permit issued by the DWR, NWNA is allowed to divert up to 200 gpm, or 0.884 acre-foot/day (288,052 gpd), or 16.6 acre-feet in one month. Annual diversions are not to exceed 196 acre-feet. A summary of total monthly and annual production withdrawals for the 2013 water year are shown on Table 6.1. Figure 6.1 exhibits total daily pumping from each production well for the 2013 water year. Total daily withdrawals in acre-feet for RMBH-2 and RMBH-3 are provided in Appendix E. Maximum daily pumping from RMBH-2 and RMBH-3 did not exceed 144,070 gallons per day.

For the 2013 water year, a total of 156 acre-feet of water was withdrawn from wells RMBH-2 and RMBH-3 combined. RMBH-3 was the primary production source, pumping a total of 50,686,110 gallons during the 2013 water year. RMBH-2 was only pumped for water quality sampling on July 14 and 16, 2013 (total of 5,271 gallons). The daily, monthly and annual production totals provided above are well below the limits established in the Well Use Permit.

RMBH-2 and RMBH-3 are hydraulically connected to the Pinedale outwash aquifer and to Ruby Mountain Springs, as was demonstrated by the aquifer pumping test that resulted in reduced flows from the springs (ENSR/AECOM, 2008; Malcolm-Pirnie, 2010). Slight reductions in flows from Ruby Mountain Springs that are coincident with withdrawals from RMBH-2 and RMBH-3 possibly can be seen on Figure 4.1, although any effect is small and therefore difficult to discern within the noise in the data. Comparison of periods of pumping with surface flow levels at Bighorn Springs (Figure 4.2) show no effects from pumping during the 2013 water year.

As shown in Figures 5.5 and 5.6, withdrawals from RMBH-2 and RMBH-3 have slight effects on groundwater levels in Ruby Mountain Springs monitoring wells (RMBH-1, RMBH-2, BVMW-11, BVMW-12 and BVMW-13) but no effects of pumping are observed in the more distant Bighorn Springs monitoring wells (BVMW-10, BHMW-1 and BHBH-2).

7.0 GROUNDWATER QUALITY

Water quality samples were collected on July 16, 2013 at RMBH-2, on February 27, 2013 at RMBH-3 and on December 18, 2013 at BVMW-10. Samples from production wells RMBH-2 and RMBH-2 were analyzed for general water quality parameters, physical properties (color, odor, and turbidity), primary and secondary inorganic parameters and metals, volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), pesticides, and bacteria. EPA approved methods were used in the analyses of samples from the production wells. Samples collected at BVMW-10 were analyzed for general inorganic parameters and metals only. All sample results are presented in Appendix F.

The pH for RMBH-2 and RMBH-3 was 7.6 and 8.0, respectively, and specific conductance was 400 μohm/cm and 370 μohm/cm, respectively. Total Dissolved Solids (TDS) for RMBH-2 was 240 mg/L and RMBH-3 was 220 mg/L.

All primary and secondary inorganic parameters and metals concentrations in production wells RMBH-2 and RMBH-3 were below Colorado Basic Standards for Ground Water (5 CCR 1002-41) and there were no VOCs, SVOCs, or pesticides in any of the samples.

8.0 CONCLUSIONS

For the 2013 water year, NWNA conducted all surface water, groundwater, and flow monitoring activities specified in Chaffee County Resolution 2009-42 and the SGWMMP. During the course of the year, NWNA responded to changing conditions (e.g. blockages of the flumes and weir) and sporadic problems that occurred with specific dataloggers in the monitoring network. As of the end of 2013, conditions at the surface water measurement stations were being field-checked on a frequent basis and all dataloggers were functioning correctly and being downloaded according to SGWMMP requirements.

Seasonal trends in spring water flows and groundwater levels in the Ruby Mountain Springs monitoring system were similar to those observed in water years 2008 through 2010. (Water levels in 2011 rose to higher levels than in any of the other four years and water levels in 2012 were lower compared to 2008 through 2013). The generally declining trend that was present in the Pinedale Outwash Aquifer in the years 2008 to 2010 has not been consistently observed since the water year 2011.

Seasonal surface water flows from both Ruby Mountain and Bighorn springs are generally at a maximum from September through November and at a minimum from April through June (Figure 4.1 and Figure 4.2). During the 2013 water year, the minimum flow from the Ruby Mountain springs was average relative to previous seasonal low flow observations. However, seasonal peak flows at the upstream Ruby Mountain Parshall Flume and both Bighorn springs flumes were lower than average (similar to 2012 observations) possibly due to reduced irrigation diversions[5]. Flows at Ruby Mountain Weir began the water year in November 2012 at a relatively low level, but by the end of the water year had returned to normal levels.

Groundwater levels in wells for both the up-gradient and near-springs areas followed a similar trend as the spring water flows. 2013 water levels generally reached a lower seasonal

[5] A reduction in irrigation flow results in lower water levels in the northern and western portions of the Pinedale aquifer. This drop in water levels causes recharge to the aquifer from the mountains to the east to equilibrate at a lower level on the east side of the aquifer, thereby reducing the amount of water discharging from the springs. Water quality analytical results for Ruby Mountain Springs and Bighorn Springs (ENSR/AECOM, 2008) and throughout the long-term monitoring program for Ruby Mountain Springs (AECOM, 2010; SSPA, 2011; SSPA, 2012; and SSPA, 2013) show that springs water quality has remained distinctly different than irrigation-influenced water quality regardless of spring flow rates.

minimum in April to June following the 2012 drought before rising to maximum seasonal levels in September to October (Figure 5.1 and Figure 5.5). Wells located further up-gradient reached maximum and minimum levels earlier than wells located down gradient. The smallest seasonal variations in groundwater water levels occurred in the wells closest to groundwater discharge points, as shown in Figure 5.2. Seepage from irrigation diversions influenced groundwater levels in wells located near canals and center pivots as demonstrated in wells BVMW-2 and BVMW-5 in Figure 5.1s and 5.2.

The correlation between irrigation and groundwater levels has been noted previously for the Pinedale Outwash aquifer (ENSR/AECOM, 2008), and review of the 2013 timing of irrigation diversions with the timing and magnitude of water level increases, confirms this relationship. As previously noted, groundwater levels during the 2013 high water season increased compared to 2012 and total irrigation diversions also increased (Table 4.3b), whereas precipitation measurements at the Buena Vista 2S weather station were below average for most of the 2013 water year compared to the long-term records (Figure 3.1). The observed decrease in total irrigation diversions in July (Figure 4.5), primarily from reduced flows in the Helena Ditch (Table 4.3a), corresponds with paired high water level peaks in wells throughout the network (Figure 5.1 and Figure 5.5). As in the past, the effect of local precipitation in the Arkansas River Valley on the aquifer appears to be minimal.

Aquifer recharge via groundwater inflows from the mountains directly east of the Pinedale Outwash aquifer is significant (ENSR/AECOM, 2008). As discussed in Section 3.2, the closest SNOTEL precipitation monitoring station east of the Arkansas River is the Rough and Tumble station, which is located more than 20 miles north of Ruby Mountain and Bighorn Springs. From a general perspective, the station shows that the peak snow water equivalent (SWE) for the 2012-13 snowpack in the Mosquito Range was above average compared to the 30-year median, however the duration of the snowpack was reduced due to a late season accumulation. SWE was well below 2011-12 snowpack.

The sole source of withdrawals for the production of water was from Ruby Mountain Springs production well RMBH-3 for the 2013 water year. The withdrawal of water has a small effect on flows at Ruby Mountain Springs, but does not affect water levels in the Pinedale

Outwash aquifer beyond the Ruby Mountain Springs site. There were no effects at Bighorn Springs, which is located approximately 3,000 feet northwest of the Ruby Mountain Springs site. The localized nature of the impacts of pumping on the water levels in the aquifer are consistent with the results of the aquifer pumping test conducted for RMBH-2 in 2008 (ENSR/AECOM, 2008) and for RMBH-3 in 2010 (Malcolm-Pirnie, 2011).

9.0 REFERENCES

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2014 Annual Report

Nestlé Waters North America Inc.
Chaffee County 1041 Permit

Submitted

March 1, 2015

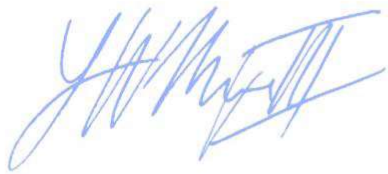
TABLE OF CONTENTS

LIST OF EXHIBITS:

CERTIFICATION OF ANNUAL REPORT

NWNA is pleased to submit its 1041 Permit Annual Report for 2014 to Chaffee County, and by signing below, I certify that the information contained herein represents NWNA's activities in Chaffee County and demonstrates NWNA's compliance with it Permits in 2014. If the County needs clarification of the information presented herein, or additional information to meet compliance with the 1041 Permit Condition for Annual Reporting, please contact me.

Sincerely,



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1.0 INTRODUCTION

Nestle Waters North America (NWNA) applied to Chaffee County (County) for a 1041 Permit and Special Land Use Permit (Permits) in November 2008 to construct and operate a spring water withdrawal and transport project (Project) at the Ruby Mountain Springs in Chaffee County. The County granted approval of NWNA's Permits on September 23, 2009. In accordance with Section 4.8 of the 1041 Permit, NWNA must submit an Annual Report to Chaffee County regarding its compliance with its Permits as well as its operations and activities in Chaffee County.

This report covers NWNA's operations and activities from January 1 through December 31, 2014, (Report Period). For continuity, this 2014 Annual Report may contain information addressing NWNA's compliance with all requirements specified in the Permits for the Reporting Period as well as up through the date of this report.

2.0 COMPLIANCE WITH 1041 PERMIT CONDITIONS

NWNA presents this annual report in accordance with recommendations of County staff made in the review letter dated April 7, 2010. NWNA's 2014 activities and compliance with 1041 permit conditions are presented subsequently being organized by condition number (e.g. Section 4.1) as presented in Chaffee County Resolution 2009-42 and as amended by Resolution 2010-20, and Resolution 2013-35.

2.4.1 Scope of Permit

Condition is County proviso. No submittal is required.

2.4.2 Technical Revision or Permit Amendment

According to NWNA's 1041 Permit Section 5.1, NWNA may seek and be granted by the County Technical Revisions to its Permits and permit conditions if certain provisions in permit Section 5 are met. Additionally, according to Section 5.2 NWNA may seek and be granted by the County an amendment to its Permits if provisions within Section 5 are met. NWNA applied for and received approval for ten (10) Technical Revisions and two (2) Permit Amendments subsequent to initial issuance of NWNA's Permits granted by Resolutions 2009-42 and 2009-43.

NWNA has received the following Technical Revisions:

TR#1: Truck Loading Facility (TLF) – Office Space and Parking Space

NWNA applied for modification of the floor-plan of the TLF to provide an office space for a locally-based NWNA employee and associated on-site parking.

The County approved this Technical Revision on November 3, 2009. The TLF was constructed in accordance with this revision.

TR#2: Pipeline Size Reduction and Pipeline Realignment

NWNA applied for reduction of its water transmission pipeline from 8" (O.D.) to 6" (O.D.) based on final engineering calculations. NWNA also requested minor realignments of the pipeline along some segments between the Ruby Mountain Springs Parcel and the TLF because: (1) the Project no longer included pumping at the Bighorn Springs; and (2) the pipeline would be afforded more protection within easements on private property as opposed to within County Road Right of Way (ROW) and within the Union Pacific Railroad ROW.

The County approved this Technical Revision on February 23, 2010. The pipeline was constructed in accordance with this revision.

TR#3: Pipeline Realignment on Gunsmoke Property
NWNA applied for a minor realignment of its pipeline on the Gunsmoke property to accommodate the realignment of NWNA's pipeline due to the alternate river crossing alignment, the addition of the Town of Buena Vista's water main at the river crossing, and to minimize impact to the private owner's commercial utility of the Gunsmoke property.

The County approved this Technical Revision on March 10, 2010. The pipeline was constructed in accordance with this revision.

TR#4: Construction of a Water Discharge Pipeline to Bray Ditch
NWNA applied to the County to construct a spring-water discharge pipeline that would transmit spring water from the TLF back across the Arkansas River through NWNA's crossing sleeve to discharge to the Bray Irrigation Ditch. This discharge pipeline was sought by NWNA in order to keep NWNA's pipeline from the Ruby Mountain Springs to the TLF operational even when NWNA was not transporting water to its Denver Bottling plant in order to maintain sanitary conditions of the pipeline and associated infrastructure.

The County approved this Technical Revision April 5, 2010. NWNA did not ultimately pursue this Technical Revision, since a final agreement between NWNA and the owner of the Bray Ditch was never finalized.

TR#5: Installation of Pipeline Sleeve under County Road 301
NWNA applied to construct a 12" diameter sleeve at NWNA's pipeline crossing at County Road 301 in order to expedite construction of the County road crossing and to minimize any lane closures of CR 301 during installation of the pipeline.

The County approved this Technical Revision on April 23, 2010. The pipeline was constructed in accordance with this revision.

TR#6: Water Discharge Pipeline to Arkansas River Outfall
NWNA applied to the County to construct a spring-water discharge pipeline that would transmit spring water from the TLF back across the Arkansas River through NWNA's crossing sleeve to discharge to a protected outfall on the east bank of the Arkansas River. This discharge pipeline was sought by NWNA in order to keep NWNA's pipeline from the Ruby Mountain Springs to the TLF operational even when NWNA was not transporting water to its Denver Bottling plant in order to maintain sanitary conditions of the pipeline and associated infrastructure.

The County approved this Technical Revision on June 14, 2010. The discharge pipeline was constructed in accordance with this revision and has been in operation through 2014.

TR#7: Alternative Truck and Tanker Size
In order to increase efficiency and to reduce total number of truck trips between Chaffee County and Denver, NWNA applied to the County to allow for use of an alternative tractor and tanker size. The proposed change potentially allows for 2,600 fewer truck trips annually. The proposed alternative configuration utilizes a 500 horsepower tractor and an 8,200 gallon tanker, versus the previously-approved 450 horsepower tractor with a 6,500 gallon tanker.

The County approved this Technical Revision on June 23, 2010. Since beginning operations in 2010, NWNA has employed both permitted tractor-tanker configurations in its water transport to the Denver plant.

TR#8: Modifications to Production Well (RMBH3) Configuration
NWNA requested certain modifications of the configuration for the new production well RMBH3. The requested modifications included: a larger casing diameter to allow for installation of water quality sampling instrumentation, a shorter screen interval to allow for a deeper pump placement to provide better pump cooling. NWNA did not request changes to County-imposed water-level pumping constraints.

Additionally, NWNA applied for a minor increase in the size of the RMBH3 wellhouse to accommodate water quality sampling and process equipment for pipeline sanitation.

The County approved this Technical Revision on August 18, 2010. NWNA has since constructed RMBH3 and associated wellhouse in accordance with this permit revision. RMBH3 was used as the primary production well in 2014.

TR#9: Tanker and Driver Parking at Truck Loading Facility
In order to facilitate the hiring of local truck drivers by making access to the NWNA tankers and the Truck Loading Facility convenient, NWNA applied to modify its site plan to allow for the parking of four (4) tankers and six (6) truck driver automobiles on private property south of and adjacent to NWNA's property. This re-configuration requires modification of the south fence and driveway apron in order for drivers to have access to the off-property parking spaces. This request was presented as an alternative to the permitted site plan and is to be implemented by NWNA when tanker parking on-site was no longer feasible due to increased activity.

The County approved this Technical Revision on September 13, 2010. However, NWNA did not implement the reconfiguration of its site allowed by this permit revision in 2014.

TR#10: Tanker and Driver Parking at Truck Loading Facility
In order to meet growing plant demand and to facilitate the hiring of local truck drivers by making access to the NWNA tankers and the Truck Loading Facility convenient, NWNA applied to the County on April 12, 2012 to modify its site plan to allow for the parking of additional tankers and truck driver automobiles on site.

The County approved this Technical Revision on April 19 2012, and NWNA modified its parking facility according to the plan in 2012.

NWNA has received the following amendments to its Permits:

PA#1: Alternative River Crossing
At the request of the Town of Buena Vista in order to provide a major water transmission line across the Arkansas River to meet the Town's projected need for water resources, NWNA applied to change its previously-approved directional drilling approach to cross the river to an open trenching method. This modification allowed for concurrent installation of NWNA's and the Town's water lines at no cost to the Town. In addition, the alternative crossing method required a minor realignment of the pipeline.

The U.S. Army Corps of Engineers (USACE) granted NWNA a General Permit 12 on March 2, 2010 for the river crossing. The County approved this 1041 Permit Amendment on February 22, 2010 by Resolution 2010-20 and approved a revised Special Land Use Permit (SLUP) by Resolution 2010-21. The pipeline was constructed in accordance with this Permit Amendment and USACE Permit.

PA#2: Alternative Augmentation Water Source
In 2014, the Upper Arkansas Water Conservancy District (UAWCD) requested that NWNA consider using the UAWCD Augmentation Plan to supply replacement water for the depletions from the NWNA's production wells. After negotiating an agreement with UAWCD, NWNA filed a request with Chaffee County to revise its 1041 Permit to allow NWNA to use the UAWCD Augmentation Plan as an alternative to using augmentation water from the City of Aurora. Chaffee County approved a Permit Amendment by Resolution 2013-35 on October 8, 2013.

This Permit Amendment allows for NWNA to receive the UAWCD augmentation water and requires that NWNA operate it wells under the same restrictions previously specified in NWNA's original 1041 Permit which allowed for use of City of Aurora augmentation water. NWNA did not use the UAWCD source for its augmentation water in 2014.

2.4.3 Dispute Resolution
There are no NWNA-County disputes and no submittal is required.

2.4.4 Term of Permit
NWNA' Chaffee County 1041 Permit expires on October 22, 2019, unless extended by the Chaffee County Board of County Commissioners (BOCC).

2.4.5 Commencement of Project
NWNA completed construction of the Project as permitted in 2010 and after Chaffee County issued on July 27, 2010 a Notice to Proceed, NWNA began water transport operations on August 19, 2010. Therefore, NWNA has fully satisfied this permit condition.

2.4.6 Transfer of Permit
NWNA does not request a transfer of, nor has it transferred, its rights under this Permit to any parties.

2.4.7 Permit Violation
NWNA has not been notified by Chaffee County, or any other permit authority, of any violations of permits.

2.4.8 Annual Reporting
This report is submitted to Chaffee County for 2014 in compliance with this condition.

2.4.9 Hagen Exception
The metes and bounds description of the Hagen exclusion to the NWNA 1041 Permit Application has not changed. NWNA took no action on this exclusion in 2014. The land covered by the exclusion has been grazed according to the NWNA's 2014 Grazing Management Plan.

2.4.10 Financial Security
NWNA submitted a Letter of Credit (LOC) to the County on January 19, 2010 to cover costs associated with revegetation of the well sites, pipeline route, and County Road crossings. This initial LOC has been released by Chaffee County after revegetation was sufficient. On behalf of NWNA, ACA Products Inc., submitted a LOC to the County on February 18, 2010 to cover costs associated with revegetation of the pipeline crossing of the Arkansas River. That LOC remained in effect until the closure of the USACE permit in 2013 and the release of the LOC by Chaffee County on May 20, 2014. Additionally, NWNA maintained the required Reimbursement Fund with the County used as financial security to cover the habitat reclamation project of the old hatchery site at Ruby Mountain Springs. The reclamation project was completed in 2012 and the USACE closed out the Stream Restoration Permit in a letter dated February 7, 2014. NWNA continues to maintain the Reimbursement Fund to cover County costs associated with administration of NWNA's 1041 Permit.

2.4.11 Compliance with Other Permits
On April 5, 2010 the CDWR issued to NWNA a well permit (69092-F) for RMBH2 which specifies conditions of well operation. CDWR re-issued well permit (78196-F) for RMBH2 on June 6, 2014. NWNA operated RMBH2 in compliance with those permits in 2014.

On April 29, 2010 the CDWR issued to NWNA a well permit (69165-F) for RMBH3 which specifies conditions of operation. CDWR re-issued well permit (78192-F) for RMBH3 on June 6, 2014. NWNA operated RMBH3 in compliance with those permits in 2014.

On August 4, 2010, the CDPHE issued to NWNA Source Approval for RMBH2 to provide water to be processed into bottled drinking water.

On May 25, 2011, the CDPHE issued Source Approval for RMBH3 to provide water to be processed into bottled drinking water.

NWNA received from the Colorado Division of Water Resources (CDWR) on March 22, 2014 approval of its 2014-2015 Substitute Water Supply Plan allowing NWNA to operate the production wells RMBH2 and RMBH3 under specified conditions of operation and required augmentation. NWNA operated RMBH2 and RMBH3 in compliance with that permit in 2014.

NWNA received a Nationwide 27 Stream and Wetlands Restoration Permit from the USACE on February 1, 2012. This permit was closed out by the USACE on February 7, 2014.

On March 13, 2012, NWNA received a Stormwater Discharge Permit Associated with Construction Activities from the CDPHE for the habitat reclamation project of the old hatchery site at Ruby Mountain Springs. That permit was closed in November 2012.

On March 29, 2012 NWNA received a Construction Dewatering Operations Permit from CDPHE for the habitat reclamation project. That permit was terminated at the end of July 2012.

2.4.12 Cost Reimbursement Fund and Application Review Costs

In compliance with this section of the 1041 Permit, NWNA has maintained its Cost Reimbursement Fund balance per County requirements and has not objected to reimbursement of County costs presented in 2014. The following table contains an accounting of the NWNA Reimbursement Fund during 2014 as received from the Chaffee County Finance Director.

Chaffee County - Nestle Waters 2014 Reimbursement Fund Report				
Date	Vendor / Description	Payments	Receipts	Balance
January-14	Interest		$ 19.79	$ 163,343.85
February-14	Interest		$ 19.79	$ 163,363.64
March-14	Interest		$ 17.87	$ 163,381.51
March-14	Felt, Monson, Culichia	$ 800.00		$ 162,581.51
April-14	Interest		$ 19.79	$ 162,601.30
May-14	Interest		$ 19.16	$ 162,620.46
June-14	Interest		$ 19.78	$ 162,640.24
June-14	Chaffee County Reimb			$ 162,640.24
July-14	Interest	$ 711.10	$ 19.16	$ 161,948.30
August-14	Interest		$ 19.80	$ 161,968.10
September-14	Interest		$ 19.79	$ 161,987.89
October-14	Interest		$ 19.16	$ 162,007.05
November-14	Interest		$ 19.80	$ 162,026.85
December-14	Interest		$ 19.13	$ 162,045.98

2.4.13 Bighorn Springs Land Management Plan

The County approved NWNA's Final Bighorn Springs Parcel Land Management Plan on May 5, 2010.

According to the NWNA-County ROW dedication agreement, the County after coordination with NWNA applied dust suppression on CR300 adjacent to the Bighorn Springs Parcel during May, 2014.

NWNA did not observe noxious weeds on the property and did not receive notification from the County concerning noxious weeds, so conducted no weed control on the parcel.

The Colorado Mountain College Natural Resources Management department (CMC NRM) prepared NWNA's 2014 Bighorn Springs Grazing Management Plan. The plan was submitted to Colorado Division of Wildlife (CDOW), the Natural Resources Conservation Service (NRCS), and the County which was approved in March 2014 after no written comment.

NWNA submitted its 2014 Bighorn Springs grazing report (contained in NWNA's 2014 Bighorn Springs Parcel Grazing Management Plan (Exhibit 1), to Colorado Parks and Wildlife and NRCS in October, 2014. NWNA received no written comment from these agencies, though NRCS indicated verbally that the report and grazing plan looked acceptable.

In 2014, NWNA had a local cattle rancher graze the property in August for about 17 days. Cattle spent seven and a half days in the upland and nine and a half days in the lowland. During the summer grazing, approximately 15 cow/calf pairs were on the parcels, a reduction in quantity from previous years. Salt licks and cross fencing was utilized to encourage the cows to remain in the upland area of the property during that period of grazing.

NWNA's 2015 grazing plan calls for a single grazing event to occur in August 2015. NWNA will work closely with CMC NRM and the agencies to evaluate if the land has received sufficient moisture and vegetative cover to allow for a grazing event in 2015.

2.4.14 Ruby Mountain Springs Land Management Plan

The County approved NWNA's Final Ruby Mountain Springs Parcel Land Management Plan on May 5, 2010.

According to the NWNA-County ROW dedication agreement, the County after coordination with NWNA applied dust suppression on CR300 adjacent to NWNA's Ruby Mountain Springs Parcel during May, 2014

NWNA did not observe noxious weed species on the property. The County did not notify NWNA of the presence of noxious weeds on the property, so NWNA did not perform weed mitigation during 2014.

NWNA performed removal of the old hatchery, habitat reclamation, and revegetation on the parcel in 2012. Revegetation was periodically inspected in 2014 and a monitoring report was prepared by CMC NRM. (See next section.) NWNA contracted with a local wildlife specialist to trap and relocate several beavers according to CP&W regulations 2014 from the reconstructed channel/pond system due to repetitive damming of the channel and lower measuring weir that threatened washing out of the berm adjacent to the river.

Grazing was not permitted on the property in accordance with the approved RMS Parcel Land Management Plan.

2.4.15 Habitat Reclamation of old Hatchery Site

The County approved NWNA's Final Ruby Mountain Springs Hatchery Restoration Plan on April 26, 2010. CMC NRM completed a site inventory and documentation on July 1, 2010. NWNA removed the residential structures, rubbish, the old fish hatchery building and associated non-fixed equipment and structures from the property in 2010. Fish were also removed from the hatchery ponds and raceways at the request of the Colorado Division of Wildlife (CDOW).

Upon completion of the stakeholder process, CMC NRM completed The Ruby Mountain Springs Hatchery Reclamation Plan and submitted the plan to the stakeholders, including the County, on January 20, 2012. NWNA received from the USACE a Nationwide 27 Stream and Wetlands Restoration Permit on February 1, 2012. Construction of the reclamation project was completed by the end of 2012. The USACE performed a final inspection of the restored habitat in the fall of 2013 and

NWNA received a letter from the USACE dated February 7, 2014 confirming closure of this permit.

CMC performed a site inventory of the reclaimed habitat in late fall of 2014 and prepared the NWNA Ruby Mountain Springs Annual Monitoring Report (see Exhibit 2). Vegetative growth was vigorous in 2014 with continued increase in coverage and diversity being observed. The aquatic and riparian habitat continued to be occupied by wildlife including ducks, geese, kingfisher, muskrat, beaver, squirrels, deer and Bighorn Sheep. Significant numbers of mature and fingerling trout were observed the pond and stream channel system. The success of the habitat reclamation project is illustrated in the following photos taken in 2014.

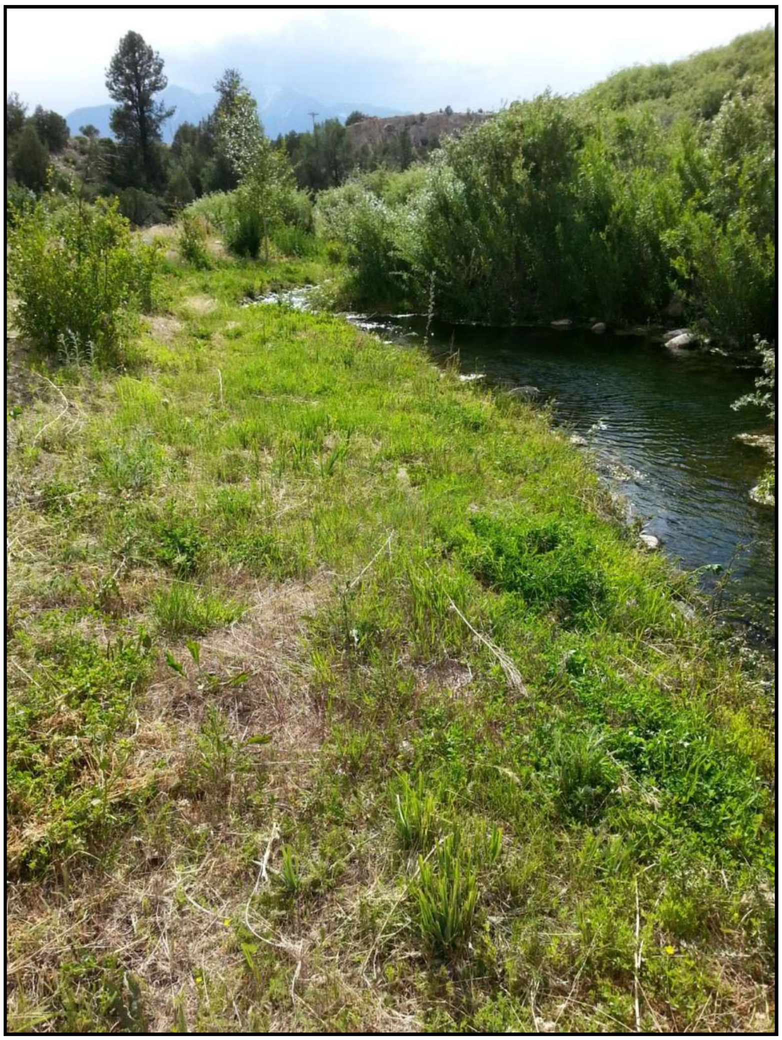

Photo of reclaimed riparian habitat east of Upper Pond at Ruby Mountain Springs, June 18, 2014.

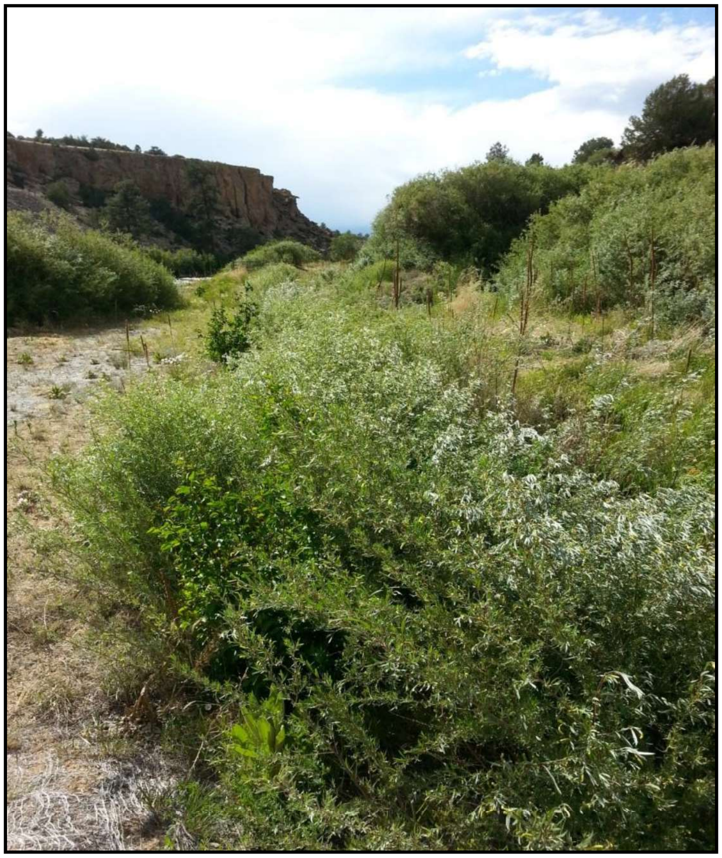

Photo of reclaimed hatchery building site at Ruby Mountain Springs June 18, 2014

Photo of reclaimed hatchery building site at Ruby Mountain Springs, 2012.

With completion of its Ruby Mountain Springs habitat reclamation project, NWNA continued conversations with the Wild Sheep Foundation (WSF) exploring options for permanent conservation of its Ruby Mountains and Bighorn Springs properties. NWNA's will continue to explore options for conservation easements for these properties in 2015.

2.4.16 Surface and Groundwater Monitoring and Wetlands Monitoring

Surface and Groundwater Monitoring

The County approved NWNA's Final Surface- and Groundwater Monitoring and Mitigation Plan on May 5, 2010 which includes provision for wetlands monitoring of the Bighorn Springs property.

In support of this present report, NWNA submits copies of: (1) NWNA's 2014 Surface Water and Groundwater Monitoring (SWGWM) report (Exhibit 3), and (2) NWNA's 2014 Bighorn Springs Wetlands Monitoring (BHSWM) Report (Exhibit 4).

The SWGWM report presents flow data collected from the weir and flumes on the Ruby Mountain Springs and Bighorn Springs Parcels, water level data for the wells in the monitoring well network, water quality data from approved monitoring locations, local and regional precipitation data, Arkansas River flows, and irrigation diversions for ditches that flow onto the local aquifer. The report provides an analysis of seasonal water levels relative to previously monitored years, as well as an evaluation of any affects that NWNA's pumping causes on spring flow and water levels in nearby monitoring wells.

The report, similar to last year's report, demonstrates that NWNA's production pumping is detectable by very slightly reduced flows through the lower weir, and slightly lower water levels in immediately adjacent monitoring wells. Further, the monitoring data reveal no influence of NWNA's withdrawals on water levels in up-gradient monitoring wells on either the adjacent Cogan parcel or the Bighorn Springs parcel, thus demonstrating that NWNA's withdrawals have only the predicted localized effect on aquifer water levels.

Water quality results for Ruby Mountain Springs throughout the long-term monitoring program for Ruby Mountain Springs (AECOM, 2010; SSPA, 2011; SSPA, 2012; SSPA, 2013; and SSPA, 2014) show that spring water quality has remained consistently high.

Findings and Conclusions presented in the SWGWM report are summarized below:

Seasonal surface water flows from both Ruby Mountain and Bighorn springs are generally at a maximum from September through November and at a minimum from April through June. During the 2014 water year, the minimum flow from the Ruby Mountain springs was higher relative to previous seasonal low flow observations. Additionally, seasonal peak flows at the upstream Ruby Mountain Parshall Flume and *both Bighorn springs flumes were higher than average (similar to 2011 observations). Flows at Ruby Mountain Weir began the water year in November 2013 at a normal level, but by the end of the water year had increased to the highest level observed since monitoring began.*

Seasonal trends in groundwater levels in the Ruby Mountain Springs monitoring system were generally similar to those observed in previous water years with low levels from April through June and elevated levels from September through November. Peak water levels were higher than all years previously recorded since 2008, except for up-gradient wells Well-A and BVMW-2, which had higher peak measurements in the 2011 water year. Minimum water levels were generally higher than the previous three or four water years (minimum water levels were generally higher in 2009 and 2010 than in 2014). The declining trend that was present in the Pinedale Outwash Aquifer in the years 2008 to 2010 has not been consistently observed since the water year 2011, and increasing trends have been observed since 2012.

The correlation between irrigation and groundwater levels has been noted previously for the Pinedale Outwash aquifer (ENSR/AECOM, 2008), and review of previous years timing of irrigation diversions with the timing and magnitude of water level increases, confirms this relationship. Groundwater levels during the 2014 water year increased compared to 2013, and … total irrigation diversions were the highest recorded since monitoring began. As in the past, the effect of local precipitation in the Arkansas River Valley on the aquifer appears to be minimal. Aquifer recharge via groundwater inflows from the mountains directly east of the Pinedale Outwash aquifer is significant (ENSR/AECOM, 2008). From a general perspective, … the peak snow water equivalent (SWE) for the 2013-14 snowpack in the Mosquito Range was above average compared to the 30-year median, and snowpack persistence was of slightly longer-than-average duration with melt occurring a week later compared to the 30 year median.

The sole source of withdrawals for the production of water was from Ruby Mountain Springs production well RMBH-3 for the 2014 water year. The withdrawal of water has a small effect on flows at Ruby Mountain Springs, but does not affect water levels in the Pinedale Outwash aquifer beyond the Ruby Mountain Springs site. There were no effects at Bighorn Springs, which is located approximately 3,000 feet northwest of the Ruby Mountain Springs site. The localized nature of the impacts of pumping on the water levels in the aquifer are consistent with the results of the aquifer pumping test conducted for RMBH-2 in 2008 (ENSR/AECOM, 2008) and for RMBH-3 in 2010 (Malcolm-Pirnie, 2011).

Bighorn Springs Wetlands Monitoring

The 2014 BHSWM report presents the results of monitoring by CMC NRM of the conditions of the Bighorn Springs upland and wetlands conducted in 2014. Measurements of vegetative cover and species representation are presented. It can be seen that from year to year the percentage of land cover within the same transect is quite variable. In several of the plots, vegetative cover appears to coincide with moisture in any given year. On average when the eight transects are considered, there was an increase in vegetative coverage of about 2.75% in 2014 from 2013.

To reliably identify long-term trends, either the number of variables in an analysis needs to be small to limit the combined random variation, or it is necessary to collect a large amount of multi-year data. Several factors may introduce random variation and error or bias into monitoring data sets including: sampling variations (human error), long periods of wetter or dryer than normal years, unknown time period for plots to adjust from wetter or dryer than normal years, and heavier or lighter grazing. It is reasonable to expect that several additional sampling events/years will be necessary to reliably establish any trends in vegetation distribution and density throughout the site.

2.4.17 Education Endowment and Annual Programmatic Contributions

NWNA becomes an active corporate citizen in the communities in which we operate. From Chaffee County citizen input, NWNA focused its community partnering primarily in the area of education, but also supports other local causes including, recycling, conservation, emergency response, community health, and other community-specific events and needs. The following presents a brief summary of NWNA's 2014 community partnering in Chaffee County.

Support of Education

In December of 2009, NWNA funded the science education endowments to the Buena Vista Education Assistance Fund (BVCEAF) and to Support Our Schools Salida! (SOSS), each in the amount of $250,000. Since the inception of these endowment funds, the BVCEAF has received more than $63,000 and SOSS received more than $70,000 in distributions for worthy education causes. During that same time, the principal balance of the BVCEAF has grown to more than 280,000 while the SOSS fund principal has grown to more than $287,000. The BVCEAF received more than $13,500 in distribution from its endowment fund in 2014, whereas SOSS received more than $16,500 in distribution in 2014.

Since the fund's inception, the BVCEAF awarded more than $24,000 in scholarships to worthy students entering science-oriented college programs, including $5,300 awarded to three students in 2014 who are pursuing programs in biomedicine and engineering. SOSS awarded $7,000 in scholarships to seven students in 2014 who will be pursuing programs including biomedicine, neuroscience, veterinary medicine, engineering and physics.

The following table presents a summary of BVCEAF's grants made from the NWNA endowment distribution, as reported by BVCEAF.

Annual Report 2014: BVCEAF-Nestle Waters Science Education Endowment

Summary Denver Foundation Endowment Fund		
Denver Foundation Ending Balance 1-1-2014		283,481.17
Additions to Principal		1,000.00
Investment Earnings		11,745.18
Less disbursement in August 2014		(13,534.00)
Administration Fee		(2,167.56)
Ending balance in September 2014		**280,524.79**
BVCEAF Account Balance as of 6-30-2014		$1,468.40
2014-Denver Foundation Disbursement (August)	$	13,534.00
Total for 2014-2015 Grants/Scholarships	**$**	**15,002.40**

Scholarships Awarded Spring 2014

Student/School Attending/Major		
Lindsey Fagerberg/ Rose Hulmon/BioMed Engineering		$2,000
Tyler Murphy/University of Colorado/Engineering		$1,800
Evan Walters/Colorado State University/Egnineering		$1,500
Total Scholarships Awarded 2014		**$5,300**

GRANTS Issued 2014

PROJECT NAME/SCHOOL/TEACHERS	**AMOUNT FUNDED**
Hands on Science Fun - APES Kite	$1,458.00
Garden to Table Greenhouse - BVHS Kohls	$800.00
Hydroponic Garden - CCHS Friedman	$631.70
Genetics Project - MMS Jacobson	$1,433.00
High Magnification Microscope - BVHS Keidel	$2,027.20
Digital Camera - BVHS Keidel	$808.00
Science Night at APES - BVHS Naegle	$300.00
Total Grants Funded 2014	**$7,457.90**
Remaining Balance 2014-2015	**$7,544.50**

Grants issued by the BVCEAF from the NWNA Endowment distribution in 2014 served students and faculty in all four of the schools in the Buena Vista School District. BVCEAF grants in 2014 stimulated science and nutrition education across a broad spectrum of student ages. Grants supported two extracurricular, hands-on, science activities which encouraged interest in science learning among more than 160 elementary school students. The BVHS biology class was awarded a grant to fund purchase of a high-magnification microscope and digital camera for full-class participation in microscopic biological observation and experimentation. This specialized equipment will be useful to introductory and advanced level biology classes for years to come. NWNA also contributed $1,000 to the BVCEAF Science Endowment principal in 2014.

The following table presents SOSS's grant awards made from the NWNA endowment distribution, as reported by SOSS.

Support our Schools Salida
Nestle Waters Science Education Endowment
Annual Summary for 2014

(Prepared December 2014)
Endowment Fund Summary (From Denver Foundation July Report)
Beginning Fund Balance: $ $283,944.35
Disbursement: $ $16,570.00
Ending Fund Balance: $ $287,319.68
Grant and Scholarship Summary (From SOSS Board)
Carry-over Balance from Prior Award Cycle (End of Spring Semester): $ 5,000
Total Grants Awarded Spring/Fall 2014: $ $21,563.00
Grant Topic Teacher/Grade Amount

1/9	Lego Robotics	LES	$ 5,323
4/14	Drinking Fountains	SECC, SMS, Crest	$ 3,000
4/14	Garden Supervisor	SMS	$ 500
5/14	Scholarships	SHS	$ 7,000
8/14	Garden and Outdoor Education	LES	$ 2,000
8/14	Outdoor Science Center	SECC	$ 2,000
10/21	Science Explorers	SMS	$ 740
10/21	GPS mapping systems	SMS	1,000

Total Scholarships Awarded Spring Semester 2014: $ 7,000
Student School/Major Amount

Ashley Potts	CSU	Bio Med Science	$ 1000
Tylea Enz	CSU	Veterinarian Medicine	$ 1000
Samantha Sharrar	CU Denver	Bio-engineering	$ 1000
John Michael Kreski	Regis University	Computer Science	$ 1000
Michael Proco	CU Boulder	Neuroscience	$ 1000
Ethan Coit	Colo Schools of Mines	Engineering	$ 1000
Evan Schehrer	Adams State College	Physics	$ 1000

Grants issued by SOSS from the NWNA Endowment distribution in 2014 served students and faculty in five of the six schools in the Salida School District. Similar to the BVCEAF, the SOSS grants in 2014 stimulated healthy hydration, science, and nutrition learning across a broad spectrum of student ages. SOSS awarded a grant for replacement water fountains in the preschool, elementary school, and middle school, where younger children are less likely to properly hydrate themselves. Several of the grants awarded by SOSS in 2014 helped support educational activities held during the Friday Enrichment program, which offers Salida children the opportunity for extracurricular learning on Fridays. (The Salida School District is on a four-day week. The Friday Enrichment program is also supported by the efforts and contributions of several other local organizations including The City of Salida, High Country Bank, GARNA, Guidestone, Live Well Colorado, Boys and Girls Club, etc.) A grant supported purchase of elementary robotics kits to help 1st through 5th graders develop STEM (science, technology, engineering, and math) skills on Fridays. Grants also supported out-doors science and garden projects focused on teaching elementary and middle-school aged students about nature, agriculture, and nutrition. NWNA also contributed $1,000 to the SOSS Science Endowment principal in 2014.

Community Partnering

In addition to supporting education and schools in Chaffee County, NWNA has remained an active supporter of other community organizations and activities. The following table summarizes the more than $14,000 in financial contributions NWNA made to local organizations in 2014.

NWNA Chaffee County 2014 Donation Summary

In order to complement the company's financial support of worthy causes in the community, NWNA's local community relations consultant was actively involved in 2014 with the efforts of some of these organizations.

Name of Organization/Event	Amount
American Legion	$1,000
Arkansas Valley Broadcasting	$200
Arkansas Valley Broadcasting	$200
Boys & Girls Clubs	$500
Buena Vista Community Education Assistance Endowment	$1,000
Buena Vista Optimist Club	$1,500
Buena Vista Pregnancy Center	$1,000
Collegiate Peaks Anglers	$750
Colorado Foundation for Water Education	$2,000
Livewell Chaffee County	$1,300
Salida Youth Football	$750
Salida Youth Wrestling	$250
Support Our Schools Salida Endowment	$1,000
VFW Post 1166	$3,000
Total:	***$14,450***

NWNA contributed more than 11,800 bottles of water to Chaffee County organizations and events in 2014 as part of its programmatic giving. NWNA is pleased to have provided healthy hydration to so many worthy causes and organizations including emergency responders, local health fairs, schools and athletic clubs, and community fundraising events. (See following table.)

Nestle Waters 2014 Chaffee County Water Donations

Organization/Event	# of Cases	# of Bottles
American Cancer Society Tenderfoot Hillclimb Fundraiser	13	312
Buena Vista American Legion	40	960
Buena Vista Autumn Color Run	34	816
Buena Vista Channel 9 Health Fair	24	576
Buena Vista Fire Protection	72	1,728
Buena Vista High School After Prom	3	72
Buena Vista Optimist Club	12	288
Buena Vista Strong (Memorial Dinner)	45	1,080
BVCEAF Wetland Project	10	240
Chaffee County Fire Protection	20	480
Collegiate Peaks Rodeo	16	384
Cotopaxi Channel 9 Health Fair	9	216
High Rocky Riders Off Road	15	360
Mountain Mania Car Show Fundraiser	18	432
Saguache Channel 9 Health Fair	9	216
Salida Middle School	69	1,876
Salida Rotary Club Fundraiser	8	192
Salida Youth Wrestling	21	504
VFW Post 1166	40	960
Walden Chamber Music Fundraiser	7	168
Total:	**485**	**11,860**

Finally, according to NWNA's 1041 Permit hearing testimony, NWNA will continue its annual discretionary community programmatic support of worthy local organizations, events, and causes for as long as it operates in Chaffee County.

2.4.18 Right-of-Way

The NWNA-Chaffee County Right of Way (ROW) Agreement requires NWNA to re-iterate to the County in each Annual Report certain deed restrictions NWNA instituted when it granted to the County a right of way for County Road 300 through NWNA's properties. These deed restrictions require that the County notify NWNA annually of planned dust suppression, weed control, or construction activities on County Road 300 adjacent to NWNA's Bighorn Springs and Ruby Mountain Springs properties. The County notified NWNA in 2014 of its plans for application of dust suppression on CR 300 adjacent to both NWNA parcels. NWNA agreed to the County's dust suppression compound, and application method and rate at ½ normal strength and the County completed that activity in May 2014. NWNA did not observe any noxious weeds on its properties along CR 300 and therefore did no weed mitigation along those ROWs. The County performed no road construction on CR 300

The County Road and Bridge Superintendent indicated to NWNA's community relations consultant that the County will be applying dust suppression in May 2015 with the same method and at the same rate as in 2014 (pers. comm. February 18, 2015). NWNA hereby notifies the County that it would agree to the County applying dust suppression on CR 300 in 2015 along both NWNA properties as long as the same compound and application rate and method used in 2014 are used in 2015. NWNA requests notification from the County if it intends to modify its dust suppression procedures in 2015.

The County Road and Bridge Superintendent indicated that the County had no plans in 2015 for any road construction (except for normal maintenance) along CR 300, nor of any specific plans for weed control along CR 300

2.4.19 Wildlife Friendly Fencing
This condition is satisfied.

2.4.20 River Wade Fishing on Bighorn and Ruby Mountain Springs Parcels
On May 24, 2011, NWNA and CDOW finalized and signed permanent fishing easement agreement on the Ruby Mountain and Bighorn Springs parcels, to be managed by Colorado Parks and Wildlife. Colorado Parks and Wildlife installed an information sign in the Fisherman Parking Area next to the Ruby Mountain Springs site and posted additional signage in 2014 as part of its management of these easements.

2.4.21 Fishing Access on Bighorn Springs Parcel
On May 24, 2011, NWNA and CDOW finalized a permanent fisherman-parking-and-access easement agreement on the Bighorn Springs parcel, to be managed by Colorado Parks and Wildlife. Colorado Parks and Wildlife has completed construction of the access road, parking area, signage, and trail on the Bighorn Springs Parcel.

2.4.22 Pipeline Requirements
This condition is satisfied.

2.4.23 Buildings and Structures
NWNA did not construct or modify any buildings or structures in 2014.

2.4.24 Construction Conditions Imposed by Special Land Use Permit
NWNA did not perform any construction in 2014.

2.4.25 Local Construction Jobs and Local Purchasing
This 1041 Permit condition requires NWNA to hire local firms and purchase materials for the construction of the Ruby Mountain Springs Project to the degree that it is commercially practical. NWNA's corporate policy toward supporting the local

communities in which it operates supports the objective of this permit condition, and therefore in 2014 NWNA made every attempt at achieving local hiring and purchasing of materials for the project.

Construction Contractors & Material and Equipment Purchases

NWNA did not perform any construction in 2014, but did require the services and materials for system operation, maintenance, and equipment up-grade. These services and supplies were supplied to NWNA from local and non-local contractors and suppliers, as dictated by local availability. NWNA's local contractor and supply expenditures amounted to $13,685, while NWNA's non-local contractor and supply expenditures for specialized equipment installation was $22,546.

Professional Service Contractors

NWNA employed local professional service contractors including community relations, technical consulting, operations and monitoring assistance, etc., for the project in 2014 amounting $91,744 of local expenditure. NWNA also employed non-local professional service contractors largely due to either their specialized service not available locally, or they were NWNA's national consultants (e.g. legal counsel, water resource specialists, etc.). In 2014, NWNA, in support of its Ruby Mountain Springs project, employed non-local specialized professional service and legal contractors totaling $127,535.

NWNA's Other Local Spending

NWNA paid $35,294 for local utilities associated with project operations in 2014. NWNA also began payment in 2014 to the UAWCD for water augmentation to begin in 2015 in the amount of $135,000 (which was in addition to payment to the City of Aurora for augmentation in 2014). NWNA also paid $9673 to local service providers in 2014 for waste management, telecommunications, and storage.

NWNA, through its trucking contractor, endeavors to hire local truck drivers to make hauls of spring water to the NWNA Denver bottling plant. In 2014, more than 52% of the 3,253 trips to the bottling plant were made by local drivers whose pay totaled more than $514,023.

NWNA's Taxes Paid

NWNA's 2013 real property taxes payable and paid in 2014 was $45,513.

2.4.26 Local Drivers

In 2014, NWNA's trucking contractor (DG Coleman) employed 33 drivers to haul water from the NWNA Truck Loading Facility to the Denver Bottling Plant. (NWNA did not utilize a mid-trip, drop-and-pick up, scenario for trucking during 2014.) Of the 33 drivers employed, 17 resided in Chaffee County. Local drivers conducted 1,712 round-trips, and non-local drivers conducted 1,541 round-trips.

NWNA and its trucking contractor have made continuous efforts since May 13, 2010 to recruit local drivers as evidenced by advertising in the following media sources: The Mountain Mail; The Chaffee County Times; The Fairplay Flume; The Leadville

Herold Democrat; and Craigslist. NWNA and DG Coleman also participated in job fairs with the Colorado Unemployment Office in Salida in 2014. An advertising banner was also hung at the loading station in Johnson Village.

Due to the challenge of attracting and retaining local drivers, NWNA's trucking contractor increased pay by 11% and offered a $2,500 signing bonus to local drivers. NWNA also purchased and domiciled new equipment in Chaffee County for greater driver convenience.

During the time period January 1, 2014 through December 31, 2014, NWNA's trucking contractor received 14 applications for employment from Chaffee County residents. Seven of the applicants did not meet the driving qualifications of the contractor, 2 declined employment offers, and 5 were hired.

More detailed information regarding NWNA's 2014 trucking operations is presented in Exhibit 5.

2.4.27 Project Impacts Related to Well Pumping
Condition is County permit proviso. No submittal is required.

2.4.28 Augmentation Water Source Restrictions
IN 2014 NWNA only utilized augmentation water from the City of Aurora lease as permitted by NWNA's 1041 permit. NWNA's compliance with the water augmentation operational terms of the 1041 permit is presented in NWNA's 2014 Annual Accounting Report Regarding Well Pumping Operations and Augmentation Releases (Exhibit 6). (NWNA did not use the UAWCD's augmentation plan in 2014, so provisions to this condition from County Resolution 2013-35 do not apply.)

2.4.29 Limitation on Project Depletions
This permit condition requires that NWNA's water depletions to the Arkansas River be limited to the net amount (196.0 acre-feet which accounts for transit losses) of replacement water available to the Arkansas River in time, place and amount and that releases of augmentation water from Aurora's existing Lake County storage facilities or Aurora's existing Lake County consumptive use credits to the Arkansas River shall match the depletion in time and amount. NWNA's compliance with the water augmentation operational terms of the 1041 permit is presented in NWNA's monthly reports to Chaffee County and in NWNA's 2014 Annual Accounting Report Regarding Well Pumping Operations and Augmentation Releases (Exhibit 6). (NWNA did not use the UAWCD's augmentation plan in 2014, so provisions to this condition from County Resolution 2013-35 do not apply.)

2.4.30 Approved SWSP or Augmentation Plan Required
NWNA received approval of its 2014-2015 Substitute Water Supply Plan ("SWSP") from the CDWR on March 22, 2014 that imposed the same SWSP restrictions on NWNA's spring-water withdrawals contained within NWNA's 1041 Permit (see Exhibit 7). NWNA operated RMBH3 and RMBH2 in compliance with the SWSP in 2014.

NWNA did not apply for renewal of a SWSP for 2015-2016 since NWNA will transition to the UAWCD's water augmentation plan according to the terms of the 06CW32 decree at the expiration of the SWSP based on augmentation from the City of Aurora. (NWNA did not use the UAWCD's augmentation plan in 2014, so additional provisions to this condition from County Resolution 2013-35 do not apply.)

2.4.31 Augmentation Water Delivery Restrictions

This 1041 Permit condition requires that NWNA's depletions be replaced by augmentation water released up-stream of the Ruby Mountain Springs on the Arkansas River. NWNA's compliance with this permit condition is presented in NWNA's 2014 Annual Accounting Report Regarding Well Pumping Operations and Augmentation Releases (Exhibit 6). (NWNA did not use the UAWCD's augmentation plan in 2014, so provisions to this condition from County Resolution 2013-35 do not apply.)

2.4.32 Accounting and Reporting for Augmentation Water Source

NWNA has provided the County with monthly reports presenting the City of Aurora's water operations on the Arkansas River and augmentation of NWNA's depletions which demonstrate NWNA's compliance with this permit condition. NWNA's compliance with this water augmentation operational term of the 1041 permit is summarized in Nestle's 2014 Accounting of the City of Aurora Supply and Demands (Exhibit 8). (NWNA did not use the UAWCD's augmentation plan in 2014, so provisions to this condition from County Resolution 2013-35 do not apply.)

2.4.33 Pumping Well Operational Restrictions

This 1041 Permit condition restricts NWNA's pumping from RMBH2 and RMBH3 simultaneously and limits diversions from the wells to 200 gallons per minute, 1 acre-foot per day, and 16.6 acre-feet per month.

In 2014, NWNA operated RMBH3 as the primary production well. NWNA operated both RMBH-2 and RMBH-3 on June 25th, 2014 for water-quality testing of RMBH-2, but at no time did the two wells operate simultaneously. NWNA has provided the County with monthly reports presenting NWNA's pumping, and NWNA's 2014 Annual Accounting Report Regarding Well Pumping Operations and Augmentation Releases (Exhibit 6) summarizes these data. NWNA pumped approximately 160.8 acre-feet of water in 2014, of which approximately 82 acre-feet was transported to the Denver Plant for bottling.

In 2014, NWNA's diversions from RMBH2 and RMBH3 complied with the provisions of this permit condition not exceeding the daily limit of 1 acre-foot or the monthly limit of 16.6 acre-feet. NWNA operated its production wells according to these limits.

2.4.34 Construction of Pumping Wells

NWNA constructed RMBH3 in accordance with the County-approved provisions of the Technical Revision to the 1041 Permit.

2.4.35 Surface Water Flow Measurements

NWNA 2014 Surface Water and Groundwater Monitoring Report (Exhibit 3) presents a reporting of required surface flow measurements taken during 2014 from the required locations on the Ruby Mountain Springs Parcel ("Lower Weir" and "Upper Flume"). That report also presents surface water flow data for two locations on the Bighorn Springs Parcel ("Parshall-1" and "Parshall-3"), the Arkansas River, and irrigation ditch diversions relevant to the Ruby Mountain Springs aquifer.

From the SWGWM Report it can be concluded that surface water flow at the Ruby Mountain Springs is predominantly controlled by seasonal groundwater level fluctuations. Further, NWNA has demonstrated that production pumping from RMBH-3 has a measureable, though very minor, effect on flows at the Ruby Mountain Springs.

Also from the SWGWM Report it can be concluded that surface water flows at Bighorn Springs are controlled by seasonal groundwater level fluctuations. No influence of NWNA's water withdrawals at the Ruby Mountain Springs on the surface water flows or groundwater levels at the Bighorn Springs is detectable.

2.4.36 Suspension of Pumping - Adverse Effects on Reconstructed Wetlands

NWNA completed its habitat reclamation project in 2012. The restored habitat was monitored in 2014 to evaluate the success of revegetation and function of created habitat and the results have been outstanding. Sufficient success of the re-established habitat was observed that the USACE closed out its reclamation permit ahead of the full monitoring term in early 2014.

NWNA's 2014 Surface Water and Groundwater Monitoring Report (Exhibit 3) demonstrates that production pumping from RMBH3 has a measureable, but very minor, effect on spring flows consistent with studies conducted prior to permitting of operations. Therefore, NWNA does not anticipate the need for suspension of operations. In compliance with NWNA's 1041 Permit, monitoring of groundwater levels and spring flows in relation to water withdrawals will be made on a systematic basis during operations in order to evaluate and mitigate any negative effect on the Ruby Mountain Springs and associated wetlands.

2.4.37 Inclusion of Reconstructed Wetlands in SWSP or Augmentation Plan

NWNA did not include reconstructed wetlands augmentation in its 2014-2015 SWSP since the habitat reclamation project entailed a significant reduction in water surface area and consumptive water use (1,150 cubic feet per year). NWNA does not anticipate the need for augmentation in the future for the reclaimed habitat at the old hatchery site since the habitat is flourishing.

2.4.38 Cessation of Diversions upon Termination of Aurora Lease

The City of Aurora's lease of augmentation water for NWNA's Ruby Mountain Springs operations remained in full force and effect during 2014. (NWNA did not use the UAWCD's augmentation plan in 2014, so provisions to this condition from County Resolution 2013-35 do not apply.)

2.4.39 Restrictions on Acquisition of Additional Water Rights in County

In 2014, NWNA continued to rely on augmentation water leased from the City of Aurora. The NWNA-Aurora lease has not been amended or modified in any way.

2.4.40 Water Rights Filing and Administration Costs

NWNA applied for renewal of the SWSP in 2014 containing the same provisions as the previous years' SWSPs. Prior to submitting the 2014 SWSP renewal, NWNA provided a draft to Chaffee County for review and comment in compliance with this permit condition. Jim Culichia, water attorney for the County, confirmed that the SWSP application conformed to permit requirements. NWNA received approval from the CDWR for its 2014 SWSP which imposed the same SWSP restrictions on NWNA's spring-water withdrawals contained within NWNA's 1041 Permit (see Exhibit 7). NWNA operated RMBH3 and RMBH2 in compliance with the SWSP in 2014.

NWNA has not filed a Plan for Augmentation in Colorado Water Court to date. With the transition of augmentation from the City of Aurora to the UAWCD 06CW32 decree, NWNA will not be filing for a Plan for Augmentation.

Also in compliance with this permit condition, NWNA has maintained sufficient funds in its Chaffee County Reimbursement Account to cover the County's expenses associated with NWNA's processing of its SWSP and Water Court filings.

(NWNA did not use the UAWCD's augmentation plan in 2014, so provisions to this condition from County Resolution 2013-35 do not apply.)

2.4.41 Trout Creek Pass Improvements Lobbying

NWNA did not receive notification or request from Chaffee County regarding lobbying actions with CDOT for improvements to US Highway 285 in 2014. Therefore, NWNA did not directly or indirectly lobby CDOT for such improvements in 2014.

2.4.42 Limits on Truck Traffic

This permit condition places certain restrictions on NWNA's trucking activity to limit impacts on the Trout Creek Pass portion of US Highway 285. These limitations include no more than 25 loaded trucks per day, with no more than two trucks per hour. During the restricted peak-hours period from the Friday of Memorial Day weekend through the Labor Day, truck traffic is limited to no more than two loaded trucks per hour, with an average of one truck per hour for the peak-hours period of each day.

Detailed information regarding NWNA's 2014 trucking operations is presented in Exhibit 5. NWNA made a total 3,253 truck trips over 307 days in 2014 from the Truck Loading Facility to the Denver Bottling Plant. NWNA utilized 8,200-gallon tankers in 2014.

The average daily volume of NWNA's truck traffic over the course of 2014 was approximately 10.6 trips per day. The maximum number of tanker trips on any given day in 2014 was 19. In 2014, NWNA's Process Logic Controller (PLC computer) at it Truck Loading Facility in Johnson Village was programmed to allow the filling of no more than 1 truck per hour during the seasonally restricted dates and times. The maximum number of truck trips for the 7-hour period for any day during the restricted period was 3 and the average trucking volume for the 7-hour restricted period was no more than 1 truck per hour. NWNA's is not aware of any violations of the limitations of this permit condition.

2.4.43 Emission Standards
NWNA employed the use of tanker trucks for its water shipments meeting the sample specifications that were submitted as part of the initial 1041 Application and subsequent Technical Revision (TR #7). In 2014, NWNA used only late-model tractors meeting all federal and state emission standards. The two tractor models were equipped with 435 to 500 horsepower engines. More detailed information regarding NWNA's 2014 trucking operations is presented in Exhibit 5.

2.4.44 No Idling During Loading
In compliance with its Permits, NWNA has not allowed its trucks to idle during loading. Limited idling only occurs as required for cold-weather start-up.

2.4.45 Emergency River Access
NWNA completed construction and revegetation of the emergency river access in the summer of 2010. This condition is completely satisfied.

2.4.46 River Crossing Revegetation and CDOW Approval
The CDOW conducted a final review of the revegetation of the river crossing and provided a letter of approval to the County dated August 30, 2010. This condition is completely satisfied.

2.4.47 River Crossing Construction Plans
NWNA completed construction of the pipeline crossing of the Arkansas River under the provision of a USACE General Permit 12 and NWNA's Amended 1041 permit before the March 15, 2010 deadline. The CDOW conducted a final review of the revegetation of the river crossing and provided a letter of approval to the County dated August 30, 2010. The USACE approved closure of the General Permit 12 on September 25, 2012. This condition is completely satisfied.

2.4.48 Army Corps of Engineers
NWNA completed the pipeline river crossing construction and revegetation in 2020 in accordance with USACE General Permit 12 (SPA-2008-00255-SCO; March 2, 2010). The USACE approved closure of the General Permit 12 on September 25, 2012. This condition is completely satisfied.

2.4.49 Town of Buena Vista Water Pipeline
NWNA completed construction in 2010 of the pipeline for the Town of Buena Vista in accordance with the USACE General Permit 12 and County-approved plans and requirements. NWNA understands that all required easement agreements have been

submitted to the County by the affected parties. This condition is completely satisfied.