PACIFIC groundwater GROUP

WRIA 44/50
GROUNDWATER ELEVATION MONITORING REPORT
2008 WATER YEAR
EXEMPT WELL WATER USE PHASE 2

February 2009

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EXEMPT WELL WATER USE PHASE 2

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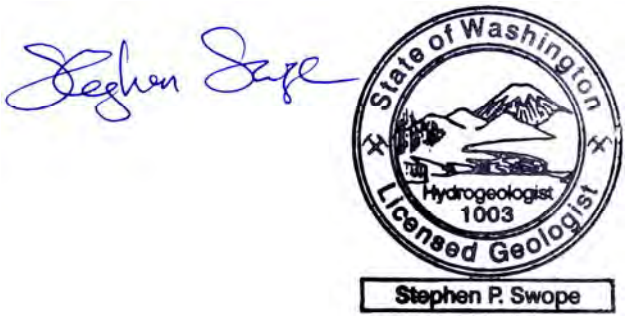
SIGNATURE

This report, and Pacific Groundwater Group's work contributing to this report, were reviewed by the undersigned and approved for release.



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ACKNOWLEGEMENTS

Long-term groundwater elevation monitoring in Douglas County would not be possible without the support of local well owners. We would like to thank the following well owners for agreeing to participate in this study by providing access to their wells for long-term monitoring:

Lower Moses Coulee:
Mike Biram
Steve King (monitoring discontinued)
Jack Linville
Palisades Irrigation Dist. (Don Jordan)

Upper Moses Coulee:
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Badger Mountain:
Edward Murray
Gary Wilcox and Rich Wasson (Wilcox well)
Bruce Moulton
Dan Robins

Foster Creek:
Chuck Hammons
Lee James Hanford
Lee Hemmer
Ray Henton
Terry Hunt
Barry Watson (Malone well)

1.0 SUMMARY OF FINDINGS

Groundwater elevations in Water Resource Inventory Area (WRIA) 44/50 fluctuated seasonally between a high spring elevation and low late summer to fall elevation in most monitored wells. Seasonal fluctuations ranged from an apparent 20 feet to less than 1 foot. In general, shallow wells within the alluvial aquifer or basalt wells completed in recharge areas (Badger Mountain) displayed the largest seasonal fluctuations, while deeper wells within the basalt aquifer away from recharge areas displayed little seasonal fluctuation. Groundwater within the basalt aquifer is influenced by a more regional source and, therefore, groundwater elevations are less responsive to local recharge events.

Fluctuations in groundwater elevations are generally consistent from one year to the next with slight variations. However, an overall pattern of decline is noted in the minimum annual water levels of the PID and Biram wells, located in the Lower Moses Coulee and the Hemmer well, located in the Foster Creek Area. A number of wells indicated a decline but have too short data records to be reliable. These wells include TNC, Johnson, Downes, Nystrom, and Moulton. The apparent decline may be due to variations in annual usage and/or precipitation in those areas. Groundwater elevation increases are noted in the Matthiesen and Hanford wells.

2.0 INTRODUCTION

The subsequent sections provide an introductory discussion on the following: (1) the purpose of this study and this report; (2) background on the exempt well water use study; (3) a summary of the hydrogeology of the area; and (4) a description of the monitoring system and method of well selection.

2.1 PURPOSE OF STUDY AND REPORT

Many areas across Washington State are experiencing growth in the number of houses with exempt wells and septic tanks. This growth is unregulated and can result in declines in groundwater quantity and quality.

The purpose of this study is to monitor long-term trends in groundwater elevations in areas identified during the Phase 1 Exempt Well Water Use Study as having potential for future groundwater level declines. These areas include Chelan Springs, Chelan Hills, Rimrock Meadows, and Badger Mountain. Existing monitoring wells in the Foster Creek basin and the Lower and Upper Moses Coulee were also added to the long-term monitoring program. These wells were instrumented during previous studies and continued monitoring will provide useful information on long-term trends in groundwater elevations throughout WRIA 44/50. All long-term groundwater monitoring areas are shown in **Figure 1**.

The purpose of this report is to provide a summary of groundwater elevation trends observed at the monitoring sites through the end of the 2008 water year (October 2008). Monitoring began as early as 2003 in some wells and as late as 2007 in other wells.

This work was performed, and this report prepared, using generally accepted hydrogeologic practices used at this time and in this vicinity, for exclusive application to the WRIA 44/50 Watershed Planning process and for the exclusive use of the Foster Creek Conservation District, the WRIA 44/50 Planning Unit, and their agents. This is in lieu of other warranties, express or implied.

2.2 PREVIOUS STUDIES

To address the issue of exempt well water use, the WRIA 44/50 Watershed Planning Unit proposed an Exempt Well Water Use Study in 2004. Pacific Groundwater Group (PGG) per-

formed an initial Phase 1 Exempt Well Water Use Study in 2005 in four areas of Douglas County: Chelan Springs/Chelan Hills, Rimrock Meadows/Sagebrush Flats, and Badger Mountain (**Figure 1**). These areas were identified as high growth in exempt well water use. The Phase 1 Study involved the following elements:

- A water balance calculation comparing current and future groundwater use to recharge.
- A groundwater level survey to compare current groundwater levels to levels at the time of drilling.
- A nitrate loading calculation to assess the affects of full build-out conditions on water quality.

The results of the Phase 1 Study suggested the potential for groundwater level declines exists in all study areas except for Chelan Springs, and that nitrate loading at full build-out conditions should have minimal impacts on groundwater quality in all areas except possibly Rimrock Meadows, an area that could experience relatively dense development (PGG, 2006a).

Another component of the Phase 2 Exempt Well Water Use Study is monitoring long-term trends in groundwater elevations. Wells in four areas were initially instrumented for long-term monitoring: Lower Moses Coulee, Upper Moses Coulee, Jameson/Grimes Lake Area, and Foster Creek (**Figure 1**). Surface water elevations are also monitored at the Jameson/Grimes Lake site. The first annual report on long-term groundwater elevations summarized monitoring up to October 2005 at these four monitoring areas (PGG, 2006b). Since then three additional areas (The Chelan Hills, Chelan Springs, and the Badger Mountain areas) were added to the monitoring program (**Figure 1**). As of December 2008, the monitoring program for the Phase 2 Exempt Well Use Study consists of six areas with a total of 24 monitored wells and 2 lake stations (**Table 1**). Well logs for all monitored wells are provided in **Appendix A.**

2.3 HYDROGEOLOGY

The hydrogeology of the study area is described in the WRIA 44/50 Final Phase 2 Basin Assessment (PGG, 2003a) and in the WRIA 44/50 Foster Creek and Lower Moses Coulee Level 2 Hydrogeologic Assessment (PGG, 2003b). The following summary is drawn predominantly from those reports.

WRIA 44/50 is underlain primarily by the Miocene basaltic rocks of the Columbia River Basalt Group. The basalt sequence is generally 2,000 to 3,000 feet thick in the area and is made up of numerous individual basalt flows ranging from a few tens of feet to about 300 feet thick; the average thickness is about 100 feet. Interbed deposits, often consisting of mudstones, siltstones, and sandstones, separate many of the individual basalt flows. The tops and bottoms of the flows are typically more permeable than flow interiors because of rubble zones, vesicles, and fractures. These zones form the principal aquifers within the basalt. Flow interiors are generally dense and less permeable. Openings caused by minor vertical cooling fractures provide some limited, primarily vertical, permeability in the central part of the flows.

In the Chelan Hills and Chelan Springs area, the Columbia River Basalt Group thins in the direction of the Cascades Mountains. In this area along the Columbia River valley, older, light-colored granitic rocks underlying the Columbia River Basalt can be seen in outcrops. Water saturated fractures in these older rocks provide some water supply to wells in this area.

The Ellensburg formation and other unconsolidated deposits, consisting of sand and gravel with varying amounts of clay and silt, overlie the basalts in many areas. These deposits are generally less than 50 feet thick on the plateau but may be as much as 300 feet thick on the banks of the Columbia River and in Moses Coulee. In these areas the unconsolidated deposits form a productive aquifer referred to as the alluvial aquifer.

All wells included in this analysis are completed in either the basalt aquifer or alluvial aquifer, except for the Corcoran and Nystrom wells in the Chelan Hills and Chelan Springs area, which are completed in the older fractured granitic rocks (**Table 1**).

2.4 MONITORING SYSTEM

The following criteria were used in selecting monitored wells:

- Favorable location in study area.
- Permission granted by well owner.
- Well head accessibility (pitless adaptor versus top seal). Instrumenting wells with pitless adaptors is preferred, but modifications to instrument top seals is possible with owner's permission.
- Water levels in well recover to static conditions between pumping periods.

These criteria limit the number of potential wells available for monitoring in each area. For example, in the Chelan Hills and Chelan Springs area, the preferred number of wells (3 at each study area) could not be achieved because the above criteria could not be met.

The monitoring system uses Solinst LT Leveloggers transducers to measure and record both groundwater levels and barometric pressure at six different study areas within WRIA 44/50 (**Figure 1**). The wells are all privately owned domestic, irrigation, or stock watering wells. Monitoring in Lower Moses Coulee and Foster Creek area began in 2003. Monitoring in Upper Moses Coulee and Jameson Lake began in 2004. Monitoring in the Chelan Springs, Chelan Hills, and Badger Mountain areas began in 2006.

Transducers are downloaded in the spring each year with a laptop computer and imported into an MS Access database to managed as needed. Water levels are corrected for barometric pressure because the transducers are not vented to the atmosphere.

3.0 RESULTS OF LONG-TERM GROUNDWATER ELEVATION MONITORING

The following subsections provide a brief summary of annual precipitation records during the monitoring period followed by results of the long-term groundwater elevation monitoring through the end of the 2008 water year (October 1, 2008) at each site. Site maps and hydrographs are provided in **Figures 2-33**.

3.1 PRECIPITATION RECORDS

The Western Regional Climate Center (WRCC) operates a number of Remote Automated Weather Stations (RAW), that record daily values of total precipitation. There are RAW stations at the town of Douglas, located in the central portion of WRIA 44/50, and at the town of Nespelem, just north of WRIA 44/50 (**Figure 1**). Time series plots of precipitation for both stations are presented in **Appendix B**. The plots were constructed from data available at http://www.raws.dri.edu/wraws/waF.html.

The precipitation records indicate that 2008 was generally drier that the previous three years, at both locations.

3.2 LOWER MOSES COULEE

Lower Moses Coulee (**Figure 2**), from Rattle Snake Springs to the Columbia River, is approximately 20 miles long and 1 mile wide with steep basalt cliffs rising up to 1500 feet above the valley floor. The surface elevation of the valley floor ranges from 1100 feet (relative to mean sea level, msl) near McCarteney Creek to 850 feet msl near the Columbia River.

3.2.1 Monitoring Network

Groundwater elevation monitoring in the Lower Moses Coulee commenced in late spring of 2003. Monitored wells include: Palisades Irrigation District (PID), King, Biram, Linville N, and

Linville S (**Table 1, Figure 2**). Groundwater elevations were monitored in the King well from May 2003 to December 2003, when monitoring in this well was terminated. Monitoring continues in the remaining wells. None of the wells are currently used for water supply.

Driller's logs indicate that the Linville South and PID wells are completed within the alluvial aquifer. A driller's log is not available for the Biram monitored well; however, based on its depth and a driller's log for Biram's second well 50 feet away, the Biram well is likely completed within the alluvial aquifer.

3.2.2 Seasonal Fluctuations

Groundwater elevations in all monitored wells in the Lower Moses Coulee display distinct seasonal fluctuations (**Figures 3-6**). In all monitored wells, groundwater elevations increase during the wet winter months, reaching their peaks in March or April after the spring snow melt. Groundwater elevations decrease during the dry summer months, reaching their lows in September or October before the start of the wet winter months.

Seasonal fluctuations in groundwater elevations result from seasonal cycles in local groundwater recharge. Local recharge in the Lower Moses Coulee is derived from infiltrating precipitation and snow melt within the coulee itself and from infiltrating surface water sources, both of which contribute more recharge during the wet winter and spring months. Surface water sources include Douglas and McCarteney Creeks, which enter the Coulee near its upper reaches and lose all their water to the highly permeable alluvial aquifer. However, during exceptionally large runoff events, Douglas Creek has been known to flow all the way to the Columbia River.

In general, the seasonal fluctuations in groundwater elevations are most pronounced in the shallow alluvial aquifer where recharge lag times are short. Seasonal fluctuations observed in these wells range from over 11 feet in the Linville South well to about 7 feet in the PID and 5 feet in the Biram well. The larger seasonal fluctuations observed in the Linville South well may be related to heterogeneities within the aquifer, bedrock slope, and/or irrigation withdrawals.

3.2.3 Summer Fluctuations

Groundwater elevations in the Linville North, Linville South, and Biram wells also display smaller, shorter time-scale fluctuations during the summer months in addition to the seasonal fluctuations described above. These smaller fluctuations are not observed in the PID well, which is located in the upper reaches of the coulee.

The smaller fluctuations observed during the summer months are likely in response to variable groundwater withdrawal during summer irrigation. The Palisades Irrigation District near Palisades in the upper reaches of the coulee uses surface water from Douglas Creek for irrigation and may explain the lack of summer fluctuations observed in that well.

3.2.4 Long Term Trends

Five complete years of monitoring have now been collected in the Lower Moses Coulee and preliminary long-term trends can begin to be assessed.

Groundwater elevations appear to generally correlate with precipitation. The decrease in elevations between the 2006 and 2007 water years is likely due to this correlation. Groundwater elevations are stable for the duration of the record in the Linville wells but an overall pattern of decline is noted in the PID and Biram minimum annual water levels (**Figures 4 and 5**). The apparent decline may be due to variations in annual usage in these areas. Statistical analysis is required to evaluate the validity and source of the decline.

3.3 UPPER MOSES COULEE

Upper Moses Coulee from Jameson Lake to Lower Moses Coulee is approximately 20 miles

long and follows McCarteney Creek (**Figure 7**). The surface elevation along the Upper Moses Coulee ranges from 850 feet msl near the upper reaches of Lower Moses Coulee to 1800 feet msl near Jameson Lake.

3.3.1 Monitoring Network

Groundwater elevation monitoring in the Upper Moses Coulee was initiated in the summer of 2004. Groundwater elevation time series plots are presented in **Figures 8-12**. Initially monitored wells included Bechtol, Mayer, and The Nature Conservancy [TNC] (**Table 1)**. Monitoring of the Bechtol well was terminated in May 2005. The Johnson well was added in 2006 and the NAAC, Downes, and Johncox wells were added in 2007. All of the wells are completed in the basalt aquifer except for the Johnson well, which is completed in the overlying alluvial aquifer.

3.3.2 Observations

Static groundwater levels in the Mayer well at the end of the 2008 water year were approximately 0.5 feet lower than previously monitored (**Figure 8**). This is likely due to the relatively decreased precipitation in 2008. The small instantaneous drops in groundwater levels in **Figure 8** are in response to pumping in the well.

The scatter evident in the Johncox groundwater elevation record (**Figure 9**) is due to pumping and recovery of the well. The water levels show a seasonal variation of approximately two feet. 2008 groundwater elevations are down approximately half a foot compared to 2005, likely due to decreased precipitation. Data from water year 2007 is missing due to an equipment malfunction.

Groundwater elevations in the TNC well (**Figure 10**) indicate a seasonal variation of approximately two feet. Groundwater elevations declined slightly between 2007 and 2008, likely due to the decreased precipitation.

The groundwater elevation record for the Johnson well (**Figure 11**) is typical for an irrigation well. Groundwater elevations rise from October until the beginning of the irrigation season in April of each year. During the irrigation season, groundwater elevations decline in response to pumping. The two sets of readings for the irrigation season indicate the groundwater elevations during pumping and non-pumping periods. Seasonal groundwater elevation changes are approximately three feet. As with other monitored wells in the Upper Moses Coulee, groundwater elevations have decreased by approximately half a foot since 2007.

The seasonal groundwater elevation change in the Downes well (**Figure 12**) evident in 2007 was greatly reduced in 2008. Groundwater elevations did not recover during the wet season but continued to decline. The total measured decline is approximately two feet. More data is required to evaluate this water level record.

3.4 JAMESON AND GRIMES LAKE

Jameson and Grimes Lake are contained behind a glacial moraine in the upper most reaches of Moses Coulee (**Figure 13**). Grimes Lake is approximately 2 miles upgradient of Jameson Lake and approximately 40 feet higher in elevation than Jameson Lake. Discharge to the lakes and the surrounding alluvial aquifer is derived mainly from precipitation, snow melt, runoff from storm events, and upward flow from the underlying basalt aquifer.

Throughout the first part of the 20th century, the lake level in Jameson Lake rose, apparently as a result of agricultural practices in the surrounding watershed. The lake water elevation is now controlled by ditch and culvert structures at the south end of the lake. Details on the historical and current lake water quality can be found in *WRIA 44/50 Water Quality Assessment Jameson and Grimes Lakes* (Pacific Groundwater Group and Water Quality Engineering, 2004) and a more detailed discussion on the hydrogeology of the Jameson Lake area can be found in *WRIA 44/50 Jameson Lake and Moses Coulee Flood*

Mitigation Hydrogeologic Assessment (PGG, 2006c).

3.4.1 Monitoring Network

Lake level monitoring in Jameson and Grimes Lakes began in May 2004. Lake levels are monitored at the northern end of Jameson Lake and at the south-western end of Grimes Lake (**Figure 13**). The transducers are housed in 2-inch diameter PVC pipes attached to steel fences posts within the lakes.

The Grimes Lake station was initially located at the southern end of the lake. The station was relocated to its current position in September 2006 because the freeze and thaw movement of the lake at the initial location affected water level measurement. The freeze and thaw movement continued at the new location because flows into Grimes are not sufficient to keep the transducer ice free in the winter. The transducer will be reinstalled at the original location and removed each fall.

Groundwater level monitoring of the shallow alluvial aquifer was initiated in March 2005 at the Matthiesen Resort (Matthiesen well) adjacent to Jameson Lake. Groundwater level monitoring of the deep alluvial aquifer was initiated in August 2006 in a deep groundwater monitoring well (PGG-1) at the north end of Jameson Lake.

All four monitoring stations were surveyed in September 2006. Hydrographs for all four stations are shown in **Figures 14-17.**

3.4.2 Observations

Water level elevations of Jamison and Grimes Lakes display similar seasonal fluctuations of about 2 feet (**Figures 14 and 15**). Both lakes reach their peak levels by early May and declined to their lows by early October before the start of the wet winter months. Seasonal fluctuations during the period of record were fairly similar for both lakes. Lake stage elevations have been generally stable over the period of record. The increased variability (small scale fluctuations of less than 0.5 feet) noted in 2006 diminished during 2007 and 2008.

The water level in Grimes Lake is about 40 ft higher than Jameson Lake throughout the year indicating a hydraulic gradient (slope) of 0.004 ft/ft between the two lakes.

Groundwater elevations in the Mattheisen water supply well (**Figure 16**) are closely tied to the Jameson Lake elevation indicating a strong hydraulic connection between the shallow aluvial aquifer and the lake in this vicinity. Seasonal variation in the Mattheisen well is approximately two feet.

Groundwater elevations in deep monitoring well PGG-1 indicate approximately one foot of seasonal variation since monitoring began (**Figure 17**). The groundwater elevation in PGG-1 is about 8.5 feet higher than the Jameson Lake and shallow aquifer levels indicating an upward groundwater gradient at the north end of the lake. The upward vertical gradient between PGG-1 and Jameson Lake is 0.05 ft/ft. Continued monitoring will indicate if there are any seasonal or long term trends.

3.5 FOSTER CREEK

Foster Creek drains approximately 660 square miles and lies north of Jameson and Grimes Lake. The Foster Creek monitoring network is presented in **Figure 18**.

3.5.1 Monitoring Network

Groundwater monitoring of six wells in the Foster Creek area began in the summer of 2003 (**Table 1**). Three monitored wells (Malone, Henton and Hanford), completed within the alluvial aquifer, are located in the Foster Creek valley and three monitored wells (Hammons, Hemmer, and Hunt) are located along the uplands above Foster Creek. The Hunt and Hemmer wells are completed within the basalt aquifer and the Hammons, Hanford, Henton, and Malone wells are completed in the alluvial aquifer. Upland

elevations are approximately 1000 feet higher than the valley.

Hydrographs for all monitored Foster Creek wells are shown in **Figures 19** through **24**. The barometric pressure transducer malfunctioned from December 2004 to February 2005. The barometric pressure transducer was subsequently replaced in June of 2005. The following data gaps occur in the Hunt, Hanford, Henton, and Hammons wells:

- The transducer in the Hunt monitoring well malfunctioned in April 2004 and was subsequently replaced in June 2005 when monitoring resumed.
- October 2005 to May 2006 data from the Hanford well was inadvertently overwritten during the May 2006 download. The logger was temporarily removed and was reinstalled in late June 2006.
- Data from the Henton well is missing from October 2007 to March 2008 when the transducer was removed for well head maintenance.

3.5.2 Valley Observations

Groundwater elevations in monitored wells in the Foster Creek valley (Hanford, Henton, and Malone) display variable amounts of seasonal fluctuations (**Figures 19, 20, and 21**).. Fluctuations are generally between 1 and 2 feet, although higher fluctuations are apparent in the Henton well due to pumping of the well. Peak water level elevations are highly variable and range from December to April. Groundwater lows occur between July and October. In general, seasonal peaks and lows in the Malone well occur about two months later than the Hanford and Henton wells.

The 2008 peak groundwater elevation is slightly lower (about 0.2 feet) in the Malone well compared to 2007, likely a result of reduced precipitation. The 2008 peak groundwater elevation in the Henton well is lower by about 1 foot compared to 2007; however, water level changes in the Henton well are difficult to discern because of frequent pumping and the winter 2007-2008 data gap. The 2008 peak groundwater elevation in the Hanford well was approximately 0.5 feet higher than in 2007.

The seasonal fluctuations in the valley monitored wells result from cycles in local recharge derived from infiltrating precipitation, snow melt, and storm runoff. The lower 2008 peak groundwater elevations in the Malone and Henton wells are likely due to the dryer 2008 water year. Groundwater elevations in the Hanford well have increased every year since monitoring began in 2003. The source of the increased groundwater elevations in the Hanford well is unknown.

3.5.3 Upland Observations

Trends in groundwater elevations along the upland wells (Hammons, Hunt, and Hemmer) are variable. Unlike the monitored wells in the Foster Creek valley, the groundwater elevations in the Hammons and Hunt wells increase rapidly in the early spring, likely in response to snow melt, and then gradually decline during the summer and fall before leveling off during the winter months. Rapid changes in groundwater elevations are common in uplands which are typically considered recharge areas for aquifer systems.

In the Hammons well, seasonal fluctuations range from 2 feet to over 9 feet (**Figure 22**). The 2008 groundwater elevations were approximately 1 to 2 feet lower than in 2007.

Seasonal variability in the Hunt well (**Figure 23**) is approximately 2 to 4 feet. Groundwater elevations during the 2008 water year were comparable to previous years.

Groundwater elevations in the Hemmer well (**Figure 24**) have declined since monitoring began in 2003 except for spring of 2006 through spring 2007. The total decline is approximately 7 feet.

3.6 CHELAN HILLS / CHELAN SPRINGS

Chelan Hills and Chelan Springs were added to the long term groundwater monitoring program in 2006. The sites are located about 30 miles north of Wenatchee along the Columbia River near Chelan Falls (**Figure 1**). Chelan Springs is a 6,731 acre area in the McNeil Canyon area and Chelan Hills is a 7,637 acre area immediately south and adjacent to the Chelan Springs (**Figure 25**). Both sites occur along the eastern slopes of the Columbia River valley. Many springs emanate within the study area indicating it is a groundwater discharge area fed by more than water recharging directly within it, likely from upland recharge. Both areas have experienced relatively consistent population growth since 1988.

3.6.1 Monitoring Network

Four domestic wells were instrumented with pressure transducers in the Chelan Hills and Chelan Springs area. In the Chelan Hills area, the Luce and Sandum wells were instrumented on May 9, 2006. Monitoring of the Sandum well was discontinued because the water level did not recover between pumping periods. In the Chelan Springs area, the Nystrom well was instrumented on May 9, 2006 and the Cocoran well was instrumented on November 8, 2006 (**Table 1**).

All monitored wells except the Luce well are completed in fractured granite. The Luce well is completed in the basalt aquifer.

3.6.2 Observations

Time series plots of groundwater elevations for the Chelan Hills/Chelan Springs wells are presented in **Figures 26-28**. Groundwater elevations in the Luce well (**Figure 26**) indicate a 3-foot annual variation with the highest water levels in March or April and lowest in October. The data dispersion evident in the first half of water year 2007 is likely due to instrument error. Groundwater elevations were consistent between the 2007 and 2008 water years.

Groundwater elevations in the Nystrom well (**Figure 27**) indicate a decline of approximately 2 feet during the two year monitoring period. The Nystrom well hydrograph reflects the influence of pumping.

Groundwater elevations in the Cocoran well (**Figure 28**) show high seasonal variability. During the fall of 2008 the water level dropped over 20 feet and apparently below the data logger, causing the flat-line effect.

3.7 BADGER MOUNTAIN

Badger Mountain was added to the long term groundwater monitoring program in 2006. The site is located northeast of East Wenatchee, between East Wenatchee and Waterville (**Figure 1**). Badger Mountain is located on a local topographic high and therefore has no up-gradient recharge area. As such, it may be susceptible to groundwater declines if development of the area continues.

3.7.1 Monitoring Network

Four domestic wells were instrumented with pressure transducers at the Badger Mountain site on May 9, 2006: the Murray, Mouton, Robins and Wilcox wells (**Figure 29** and **Table 1**). The Murray, Moulton, and Robins wells are currently used for domestic water supply. The Wilcox well is a domestic water supply well that is currently unused. All wells are completed within the basalt aquifer.

3.7.2 Observations

Time series plots of groundwater elevations for the Badger Mountain wells are presented in **Figures 30-33**. Peak groundwater elevations occur in April to June while annual minimums occur in October to February. Groundwater elevations in the Moulton well (**Figure 30**) vary by 15 to 20 feet annually. Groundwater elevations have declined approximately three feet since 2007.

The groundwater level may have dropped below the bottom of the transducer at the end of 2008, causing the flat effect seen in **Figure 30**.

The Murray well (**Figure 31**) indicates up to 9 feet of annual water level variation. The spring freshet in 2008 resulted in about half as much elevation rise as in 2007.

The Robins well (**Figure 32**) indicates over 10 feet of water level change annually, with the peak water levels occurring in June.

Groundwater elevations in the Wilcox well (**Figure 33**) remained essentially constant throughout the 2007 and 2008 water years, although they showed much higher variability during the winter months. Much of the variability appears to be associates with barometric changes more than water level variation.

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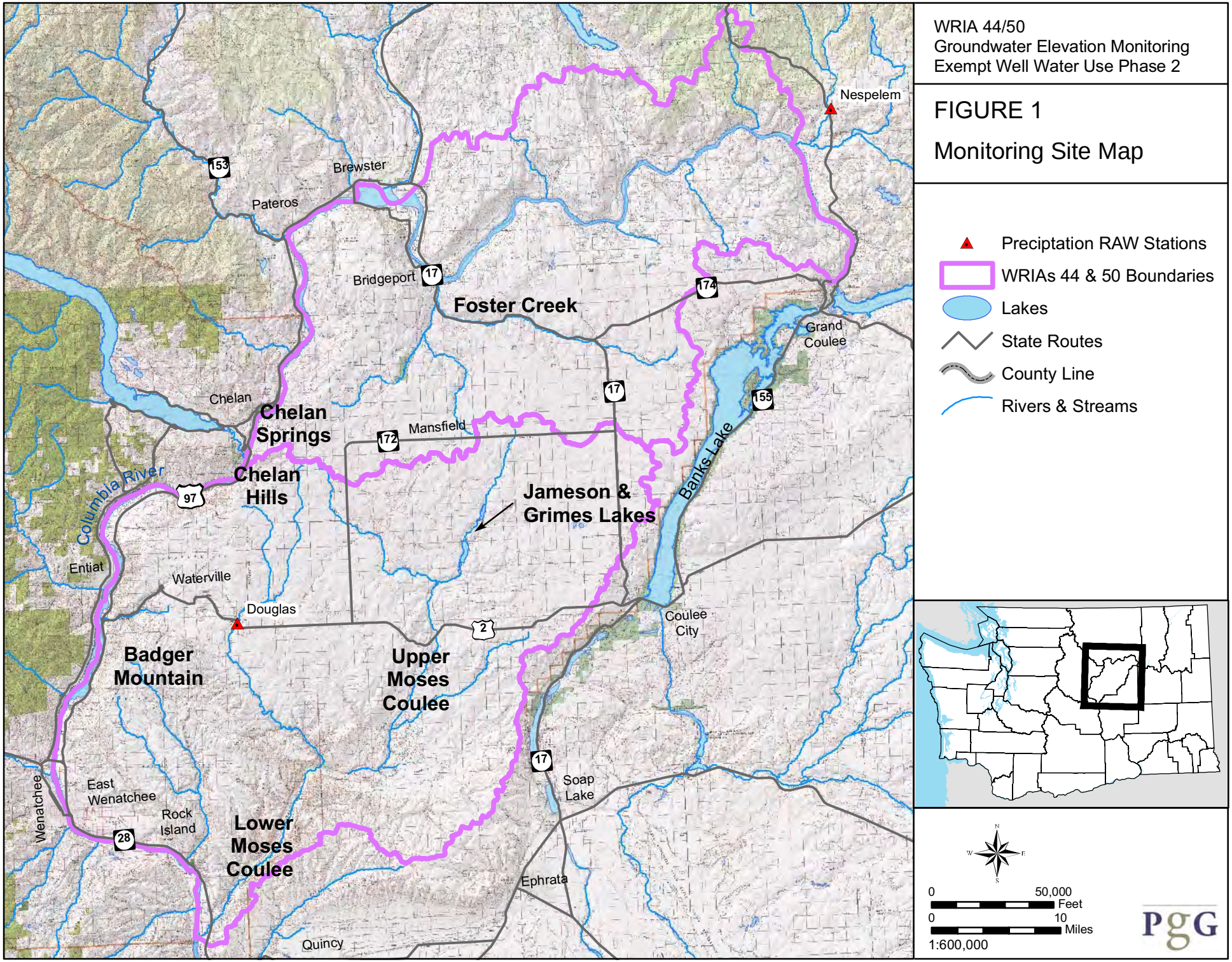
APPENDIX A
MONITORED WELL LOGS


WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2
FIGURE 1
Monitoring Site Map
Preciptation RAW Stations
WRIAs 44 & 50 Boundaries
Lakes
State Routes
County Line
Rivers & Streams
Nespelem
Brewster
Pateros
Bridgeport
Foster Creek
Grand Coulee
Chelan
Chelan Springs
Chelan Hills
Mansfield
Columbia River
Banks Lake
Jameson & Grimes Lakes
Entiat
Waterville
Douglas
Coulee City
Badger Mountain
Upper Moses Coulee
Wenatchee
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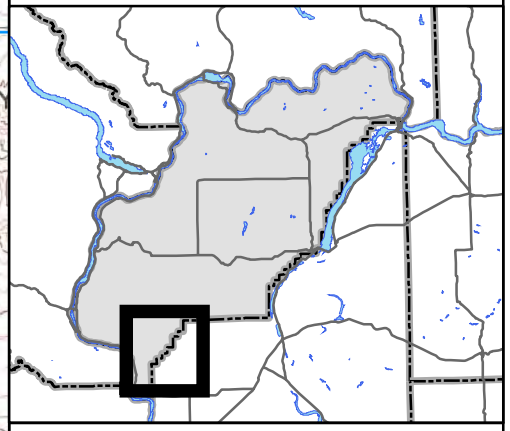
WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

FIGURE 2

Lower Moses Coulee Monitoring Locations

Palisades Irrigation District
King (Discontinued)
Biram
Linville N
Linville S

Groundwater Level Monitored Well



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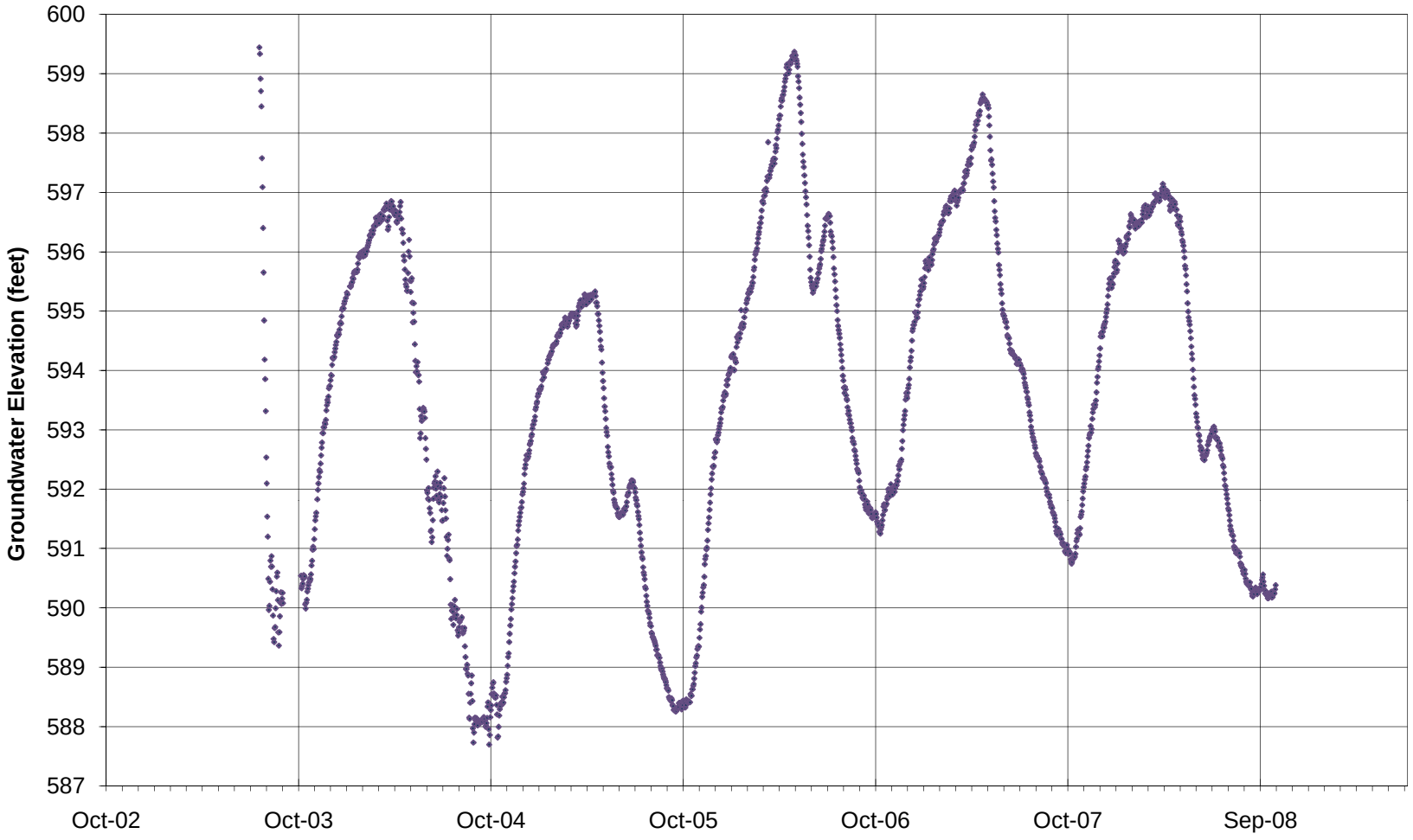


Note: Scale modified from standard report scale

Figure 3
Linville South Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

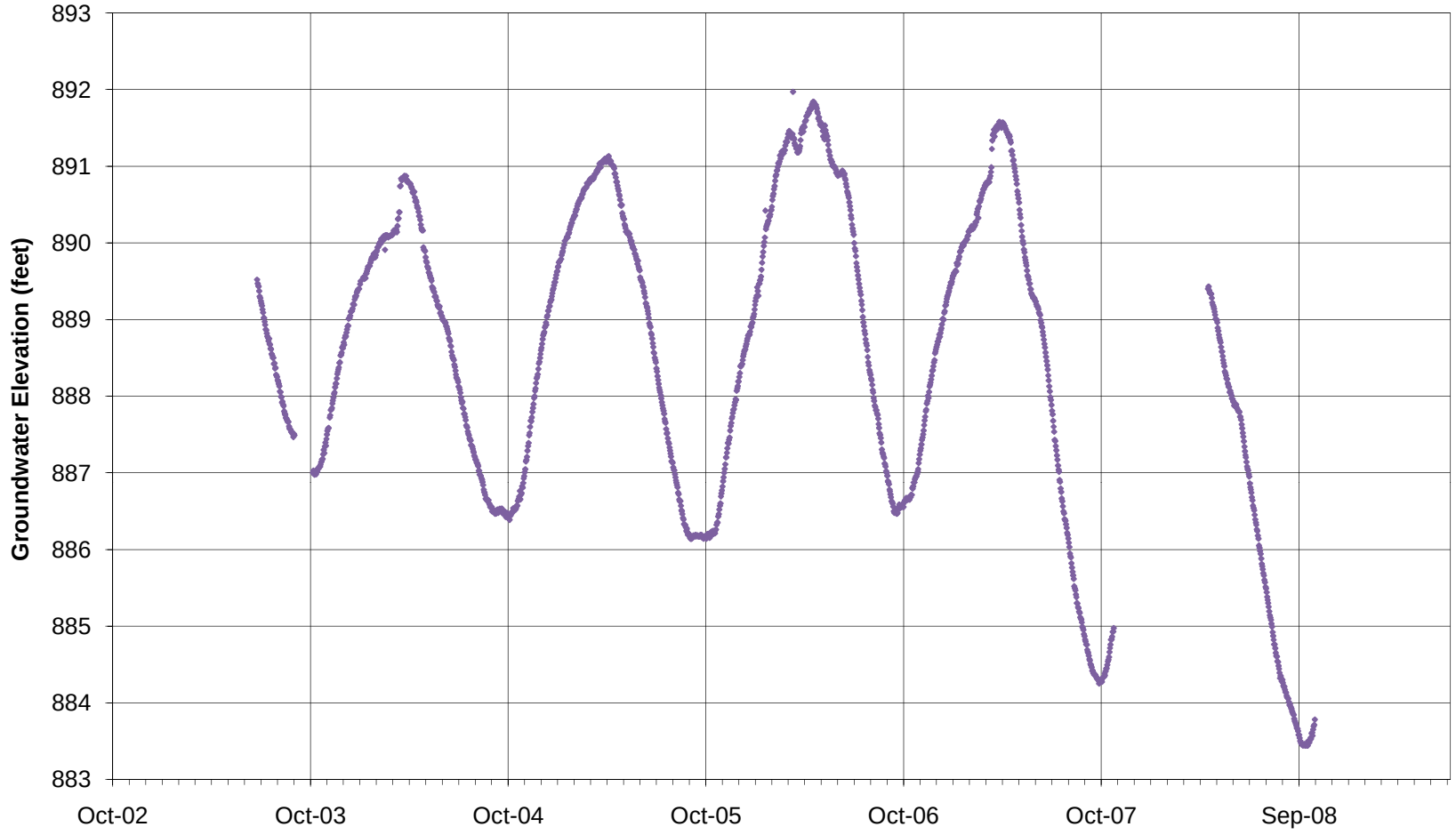


Figure 4
Palisades Irrigation District (PID) Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

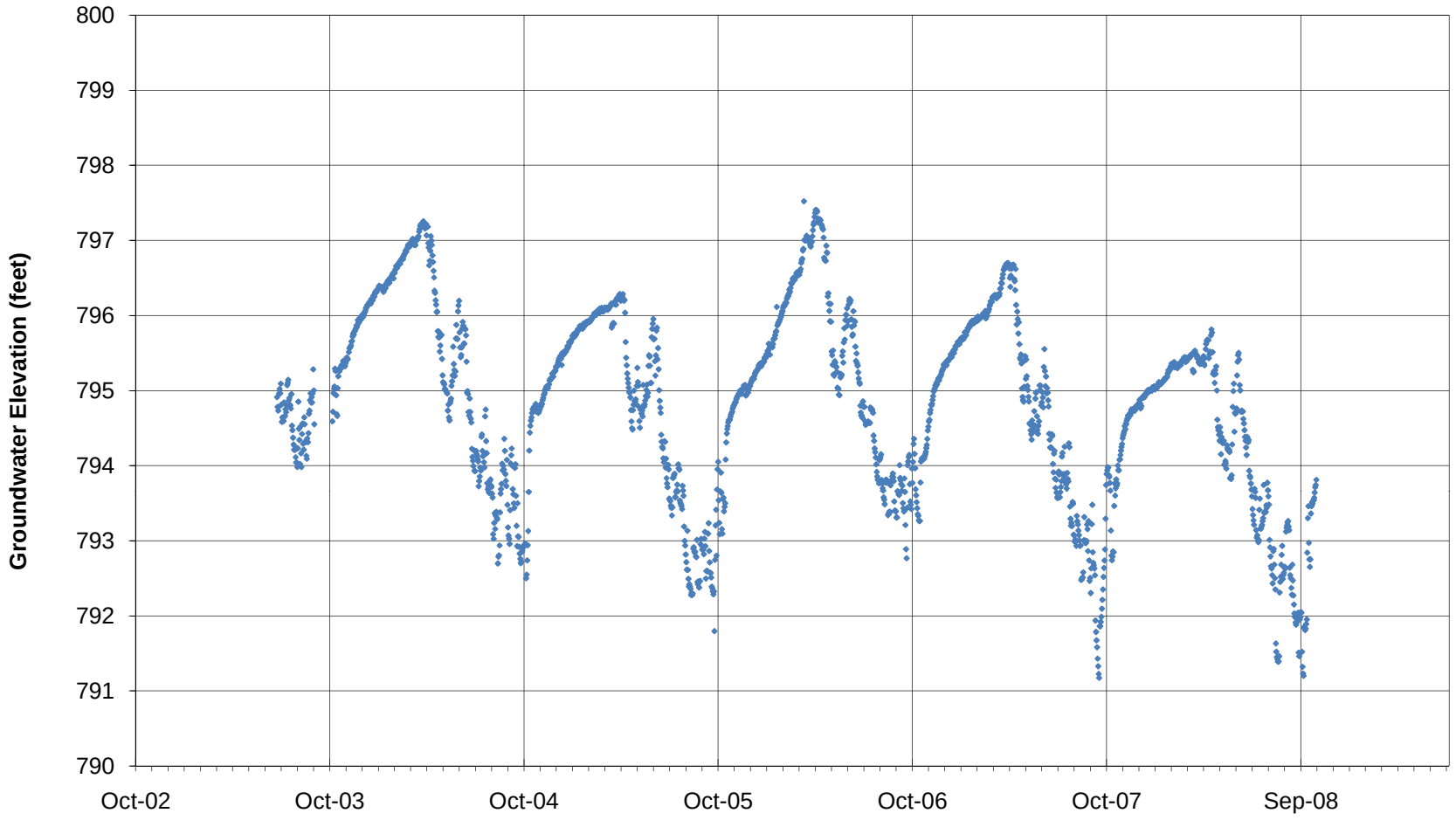


Figure 5
Biram Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

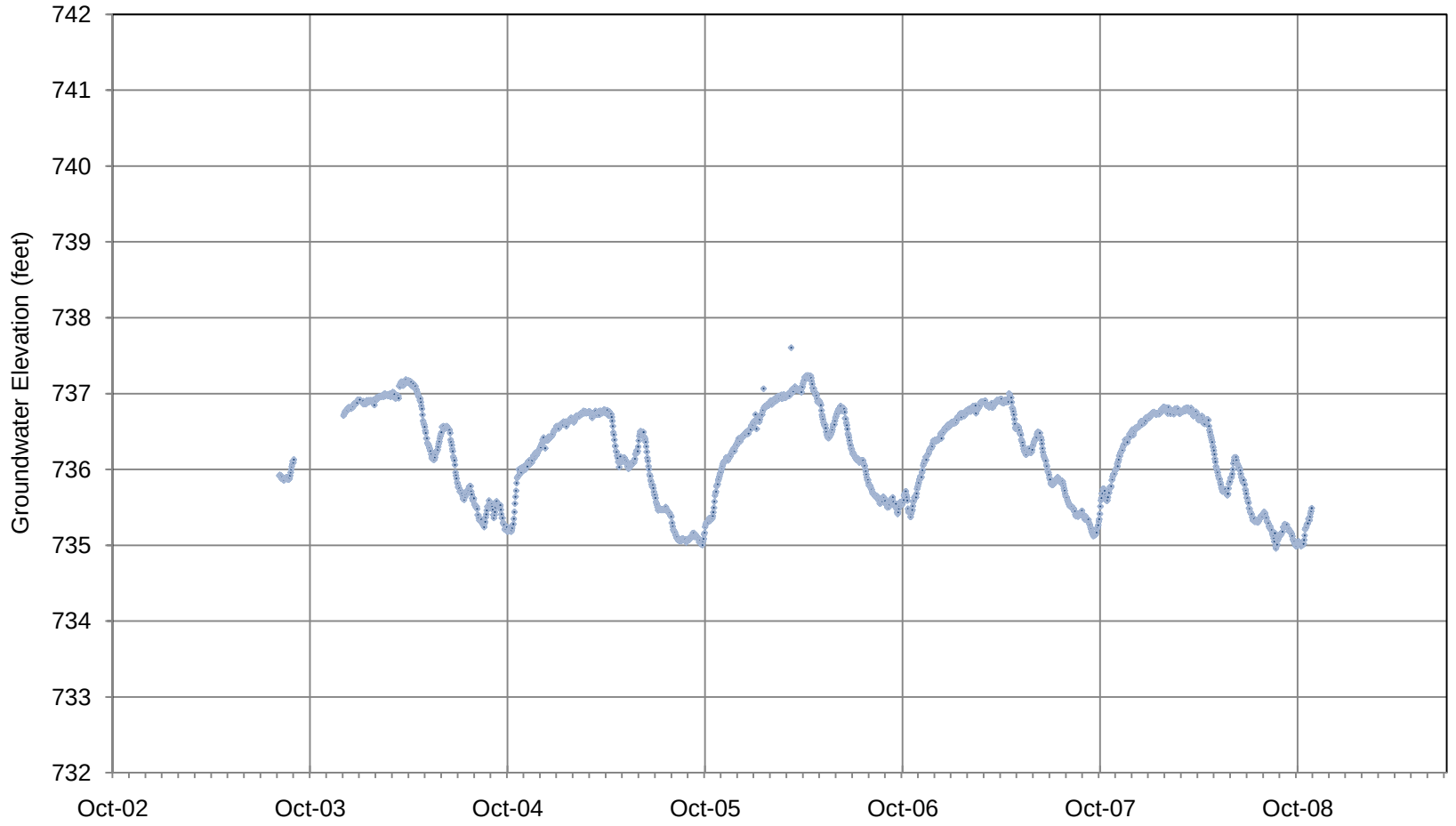
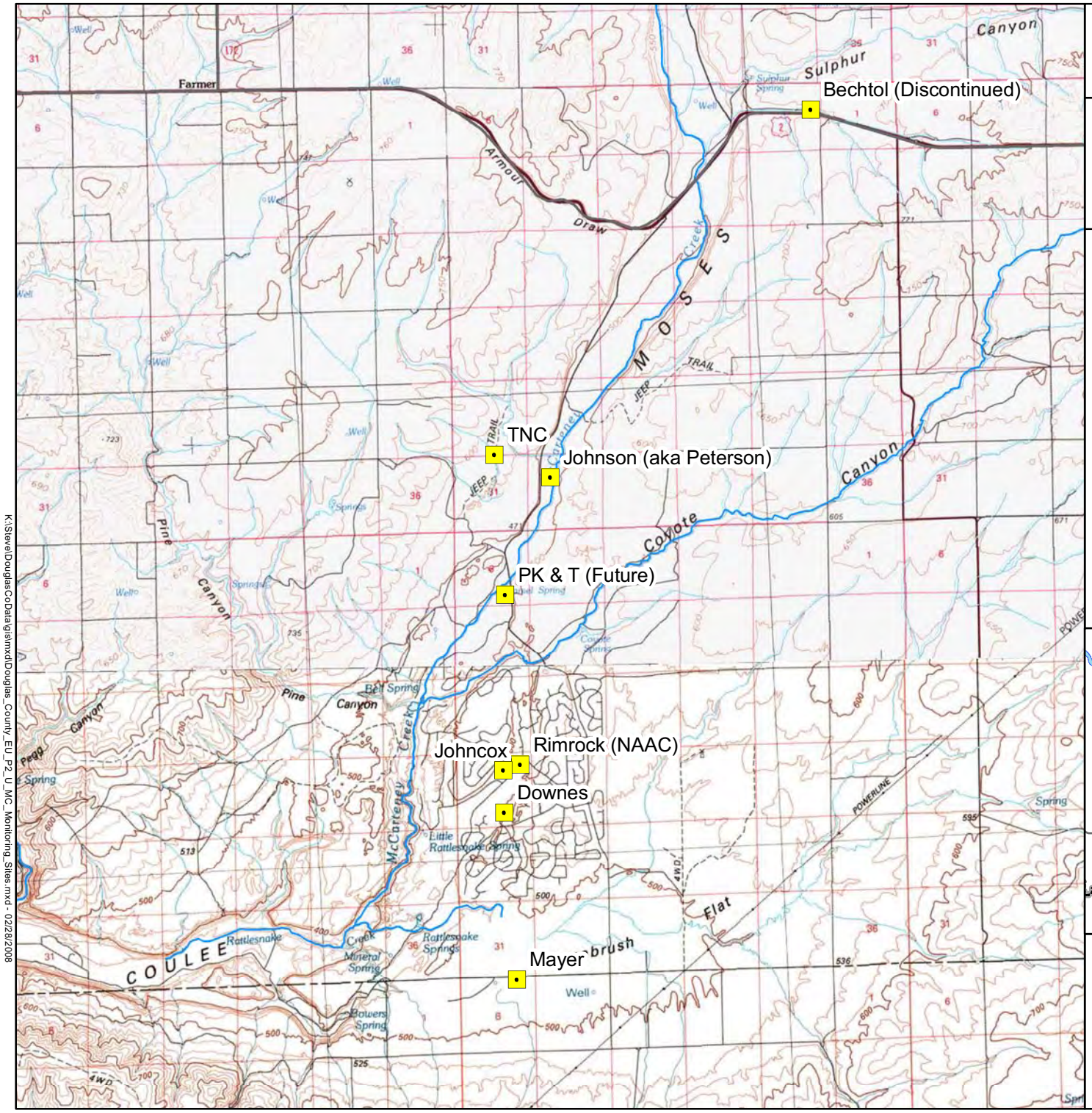


Figure 6
Linville North Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

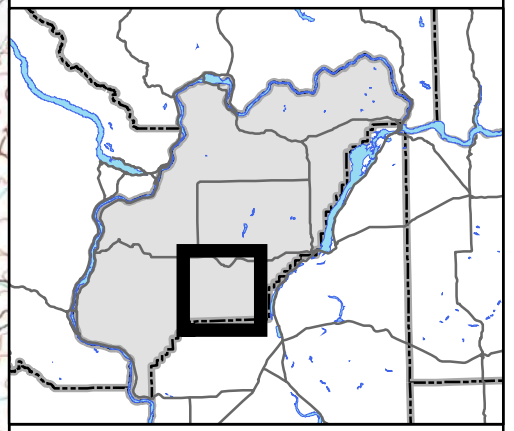


WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

FIGURE 7

Upper Moses Coulee Monitoring Well Locations

Groundwater Level Monitored Well



0 10,000 Feet
0 2 Miles
1:120,000

PgG

K:\Steve\DouglasCoData\gis\mxd\Douglas_County_EU_P2_U_MC_Monitoring_Sites.mxd - 02/28/2008

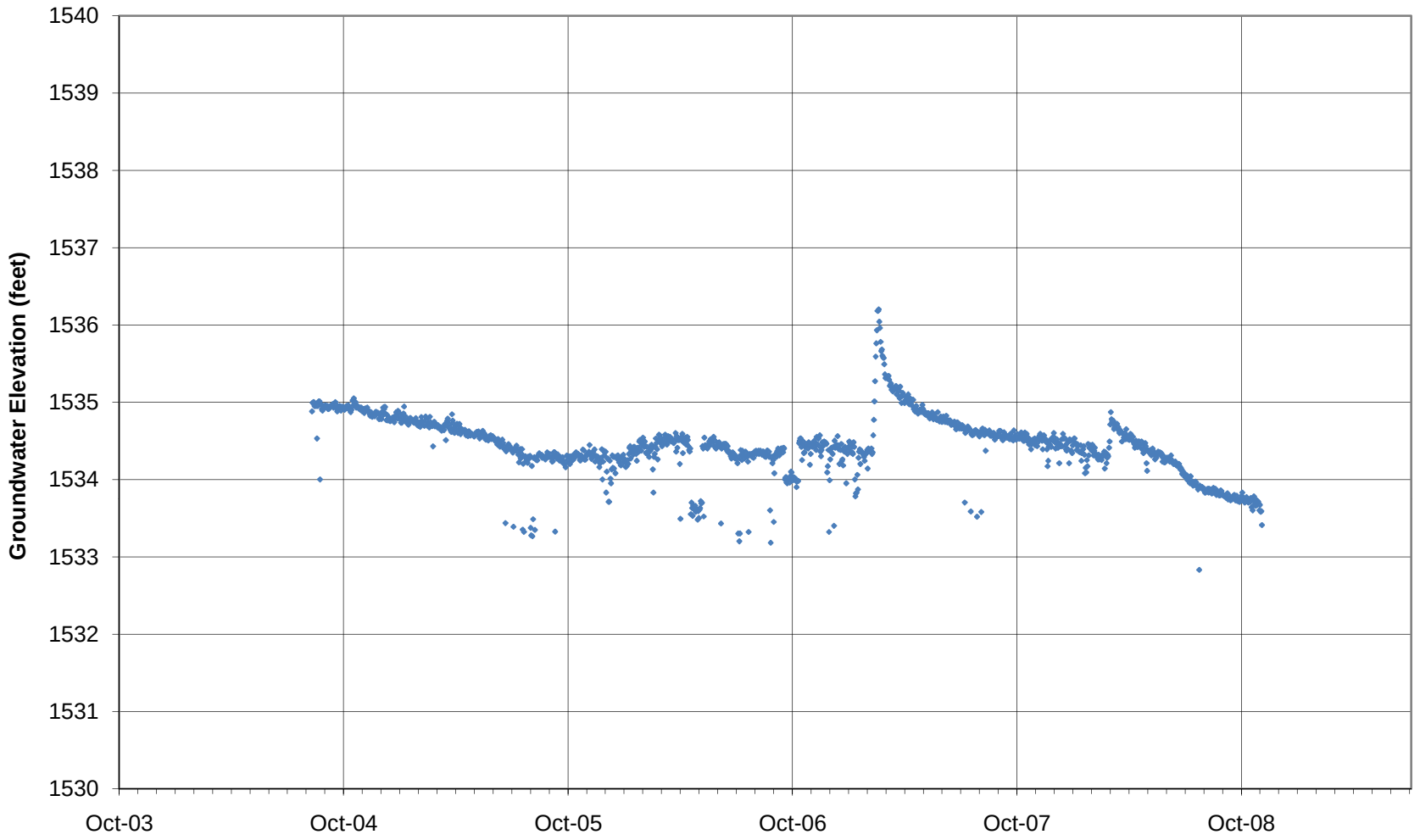
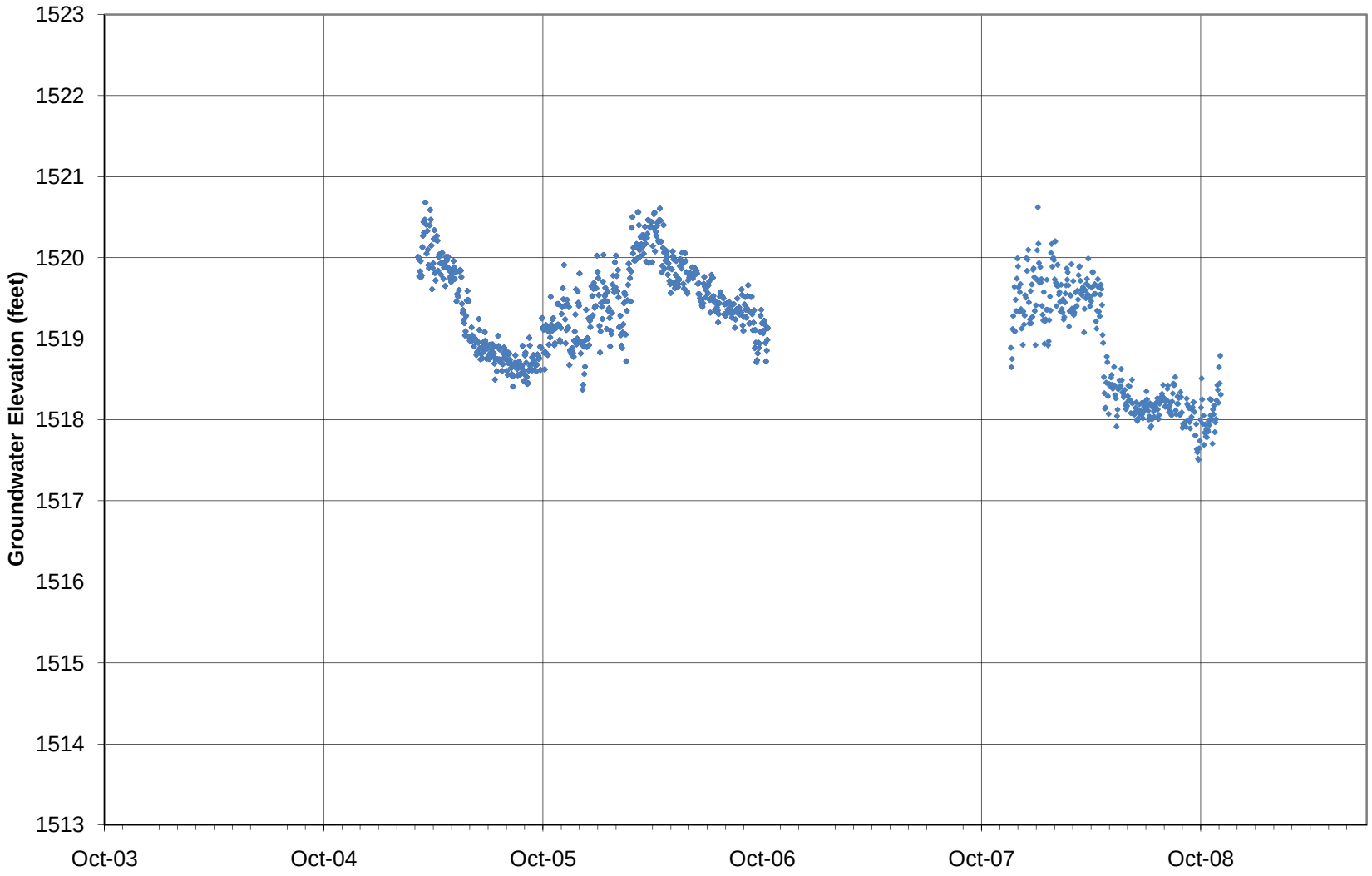


Figure 8
Mayer Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

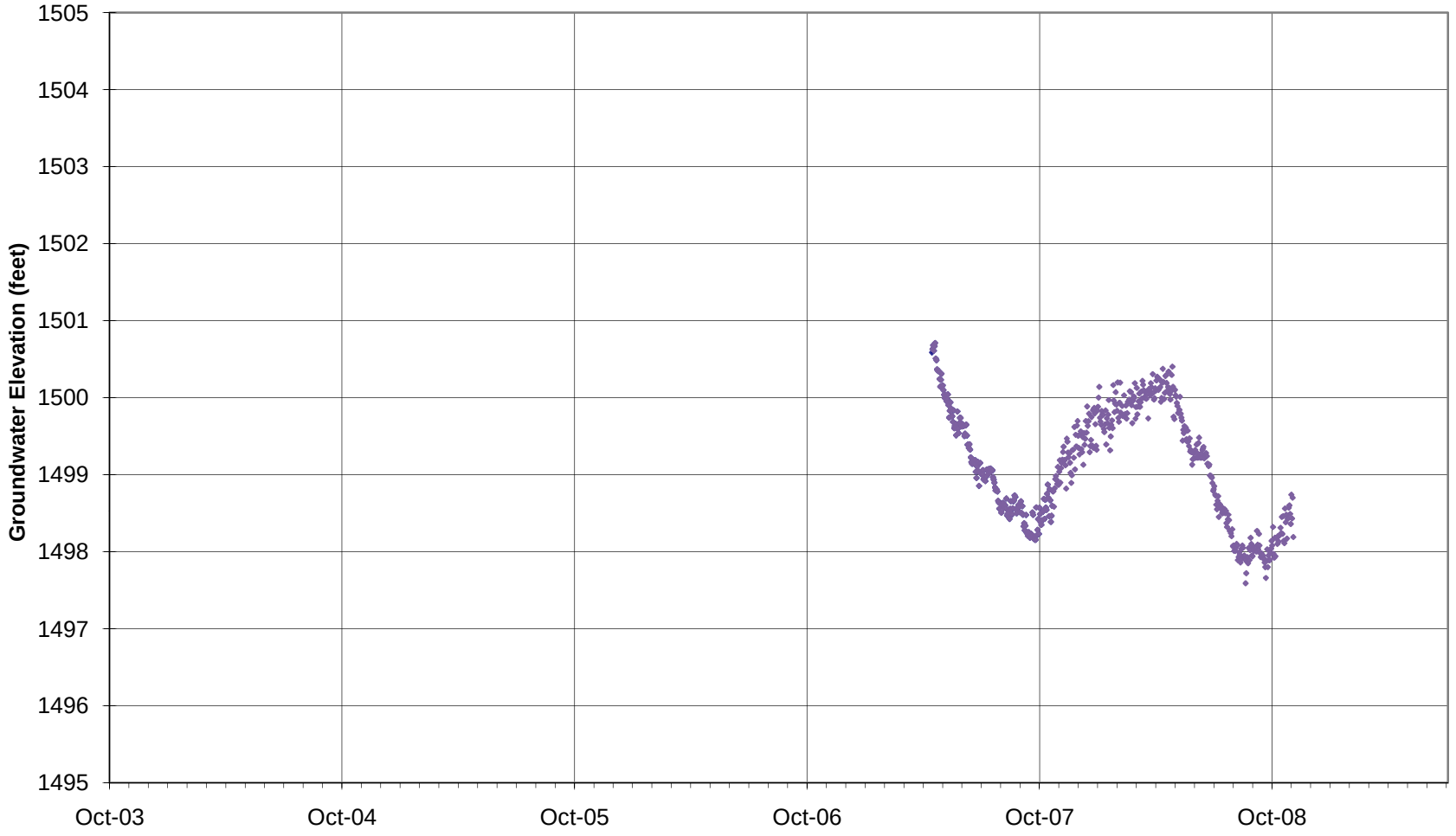


No data is available for October 2006 - October 2007 due to well head maintenance.

Figure 9
Johncox Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG



Data before 4/17/2007 is not valid because the logger was likely above water level based on hand measurements

Figure 10
TNC Observation Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

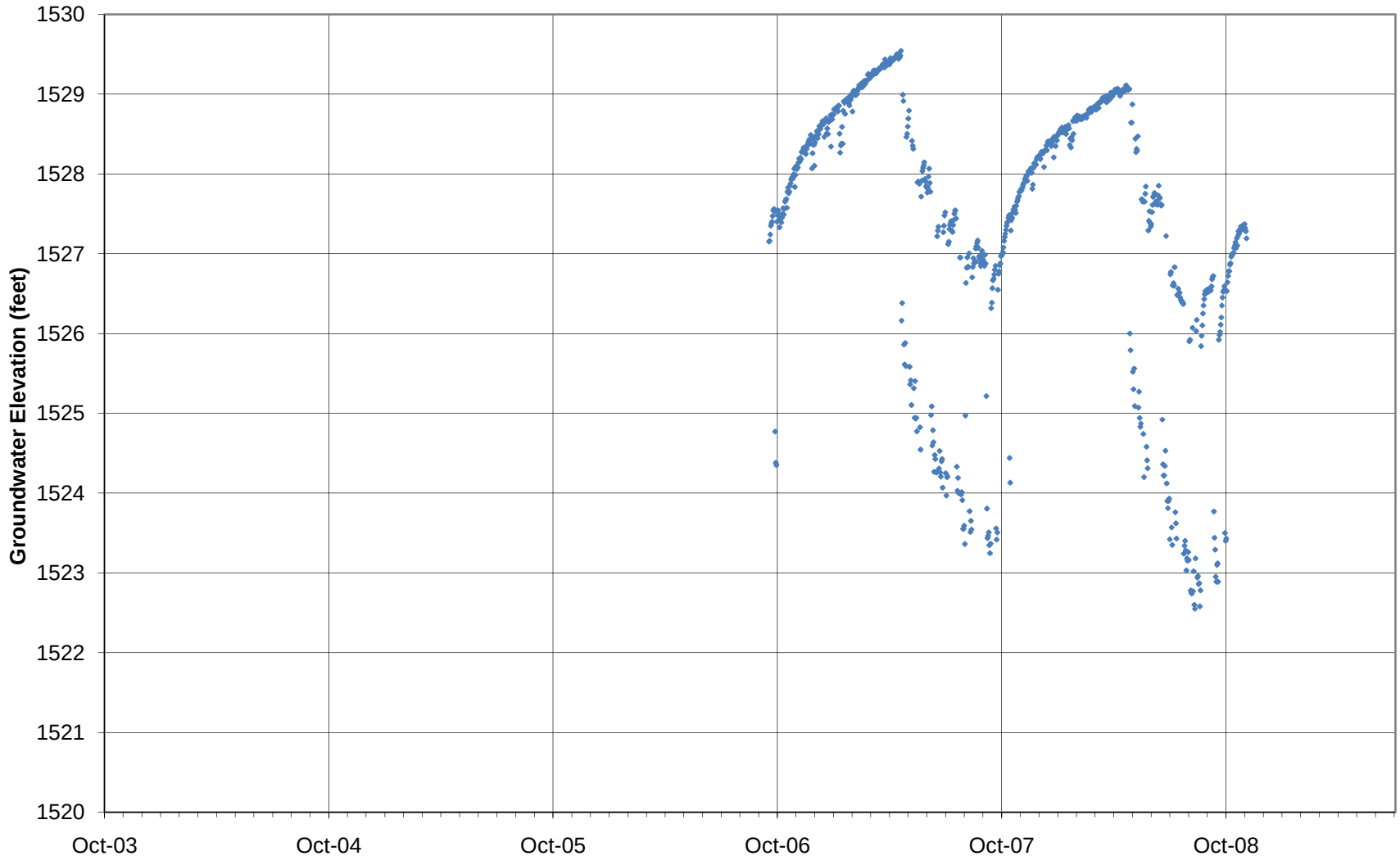


Figure 11
Johnson (aka Peterson) Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

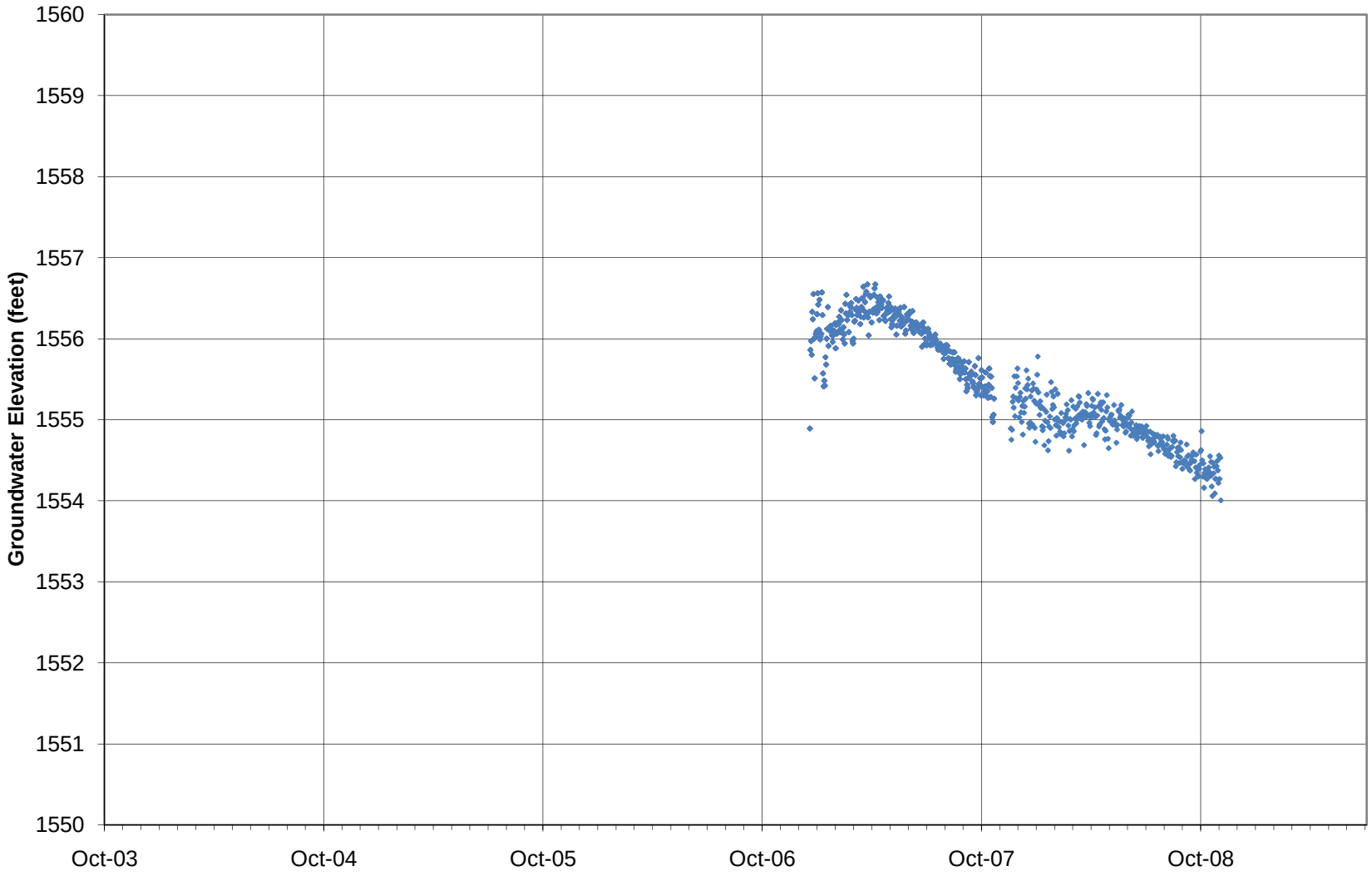
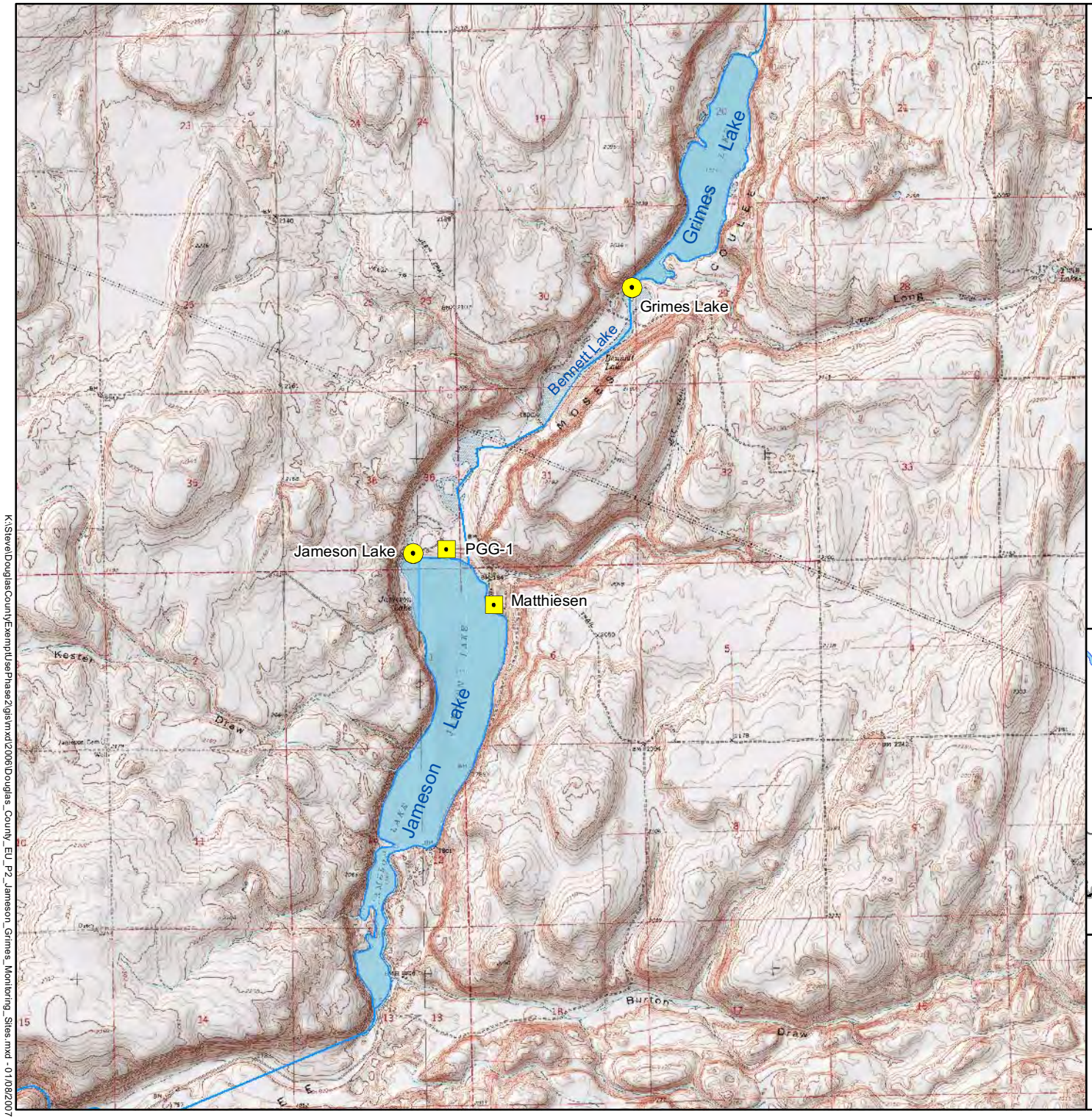


Figure 12
Downes Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG



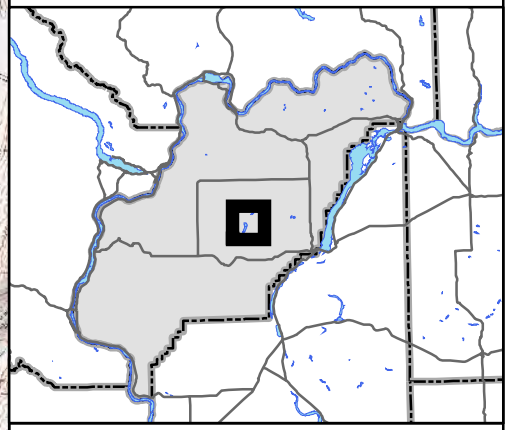
WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

FIGURE 13

Jameson & Grimes Lake Monitoring Well Locations

Surface Water Level Monitoring Station

Groundwater Level Monitored Well



0 5,000 Feet
0 1 Miles
1:50,000

PgG

K:\Steve\DouglasCountyExemptUsePhase2\gis\mxd\2006\Douglas_County_EU_P2_Jameson_Grimes_Monitoring_Sites.mxd - 01/08/2007

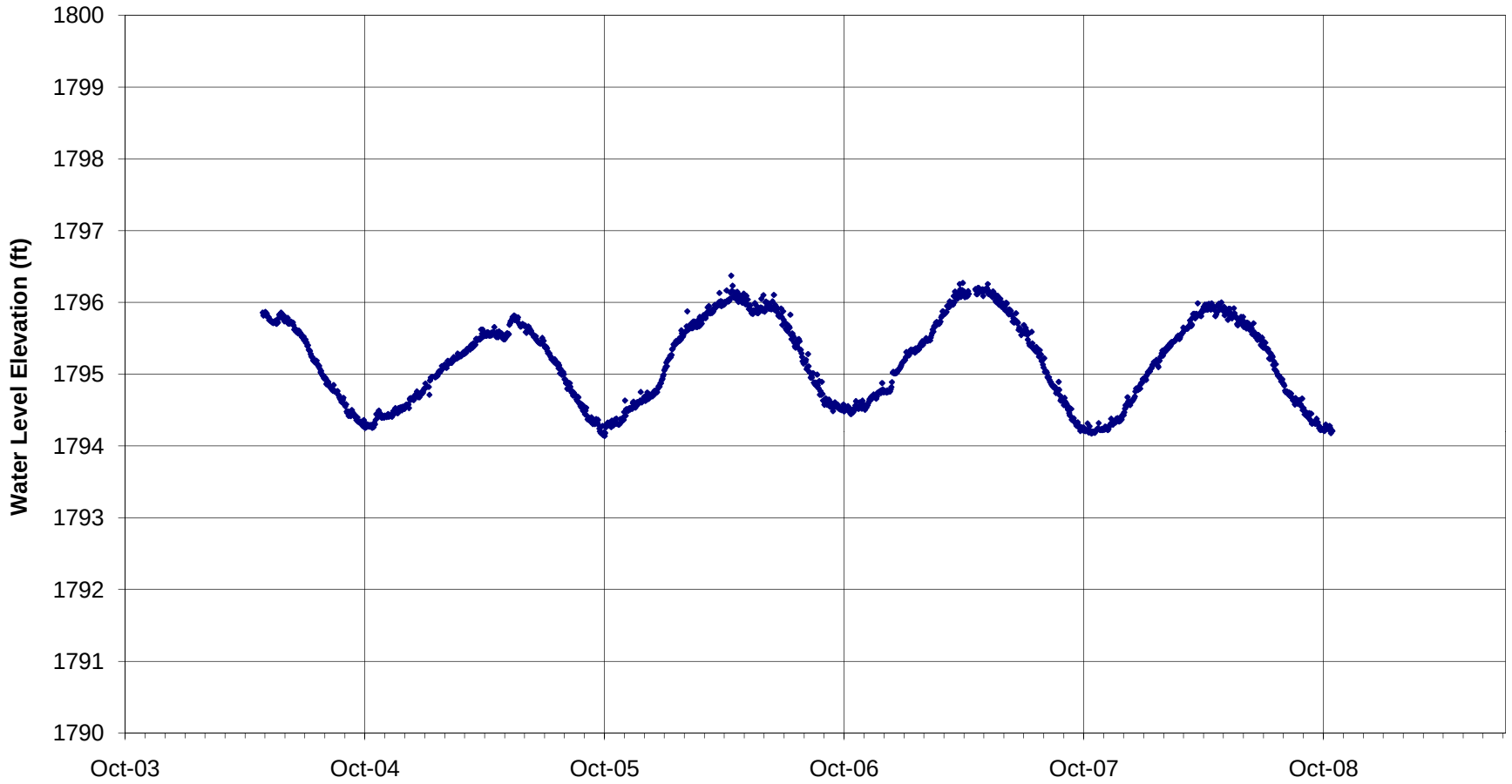
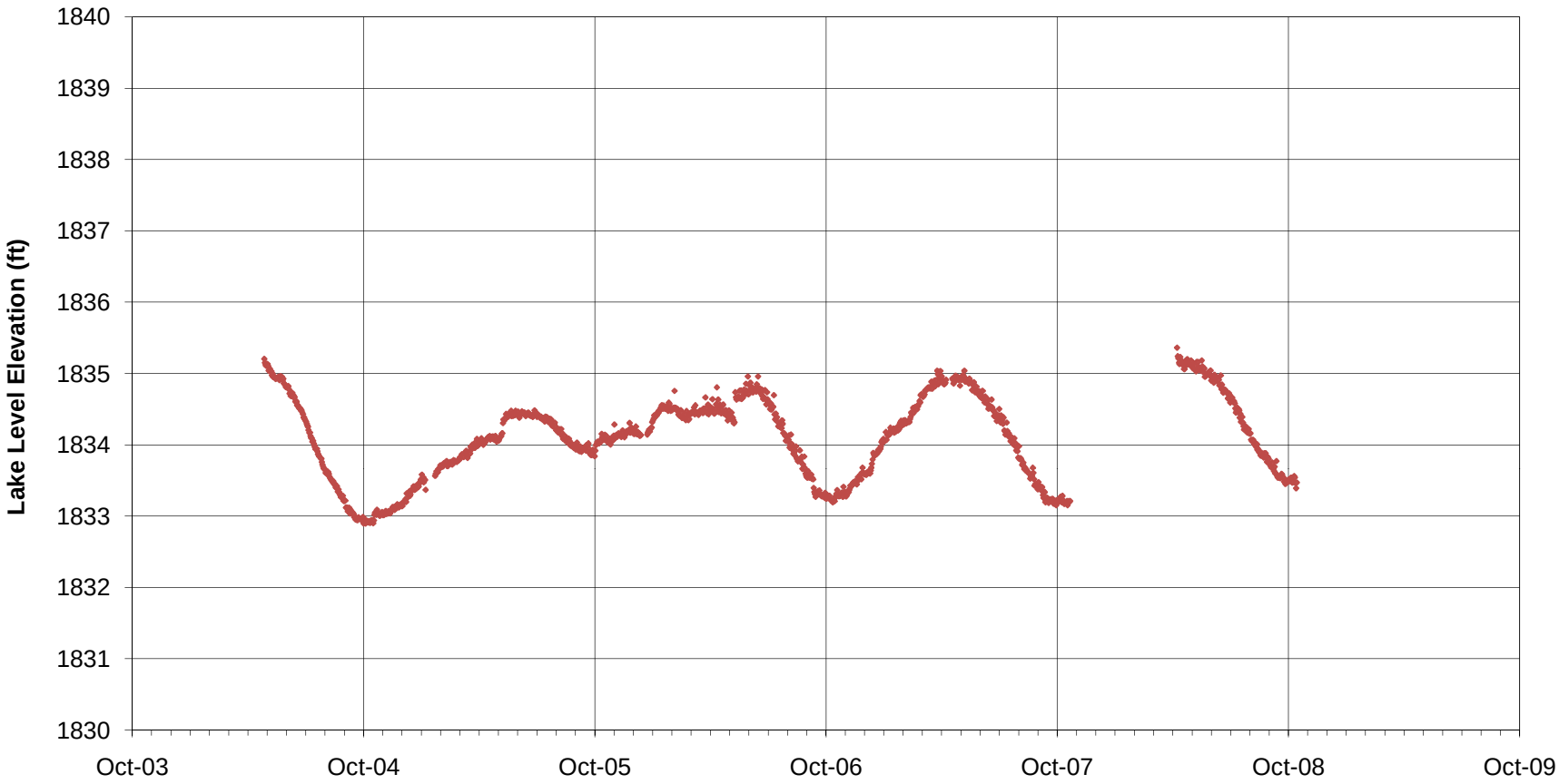


Figure 14
Jameson Lake Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG



History of Grimes Station:

Originally 7.87' below Bench Mark (BM) = 1836.6
Spring 05 moved up 0.25 (7.62' below BM) = 1836.9
Spring 06 moved up anoth 0.47' (7.15' below BM) = 1837.4
Station Moved 9/12/06 to new location where less ice expected. = 1837.5715

Figure 15
Grimes Lake Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

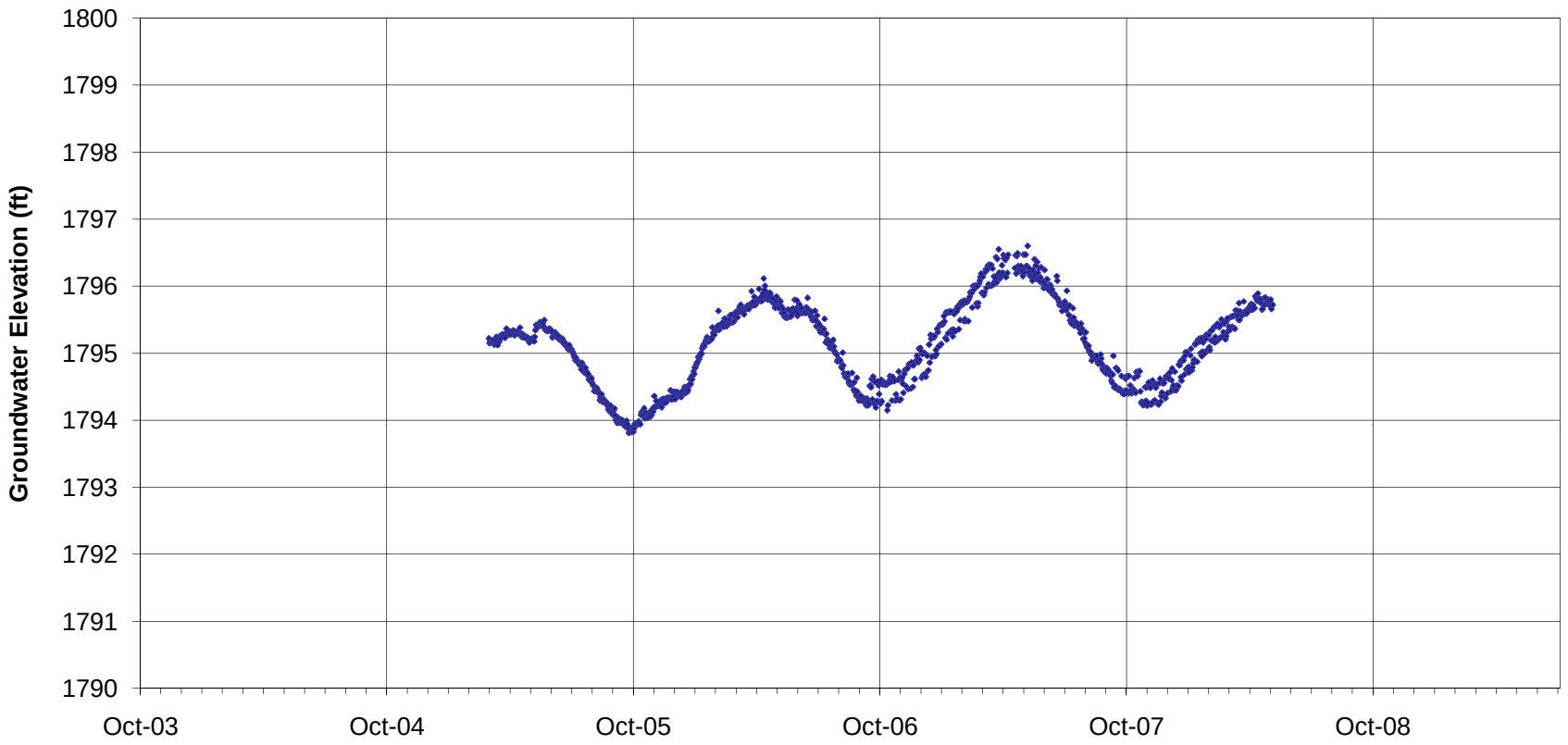


Figure 16
Matthiesen Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

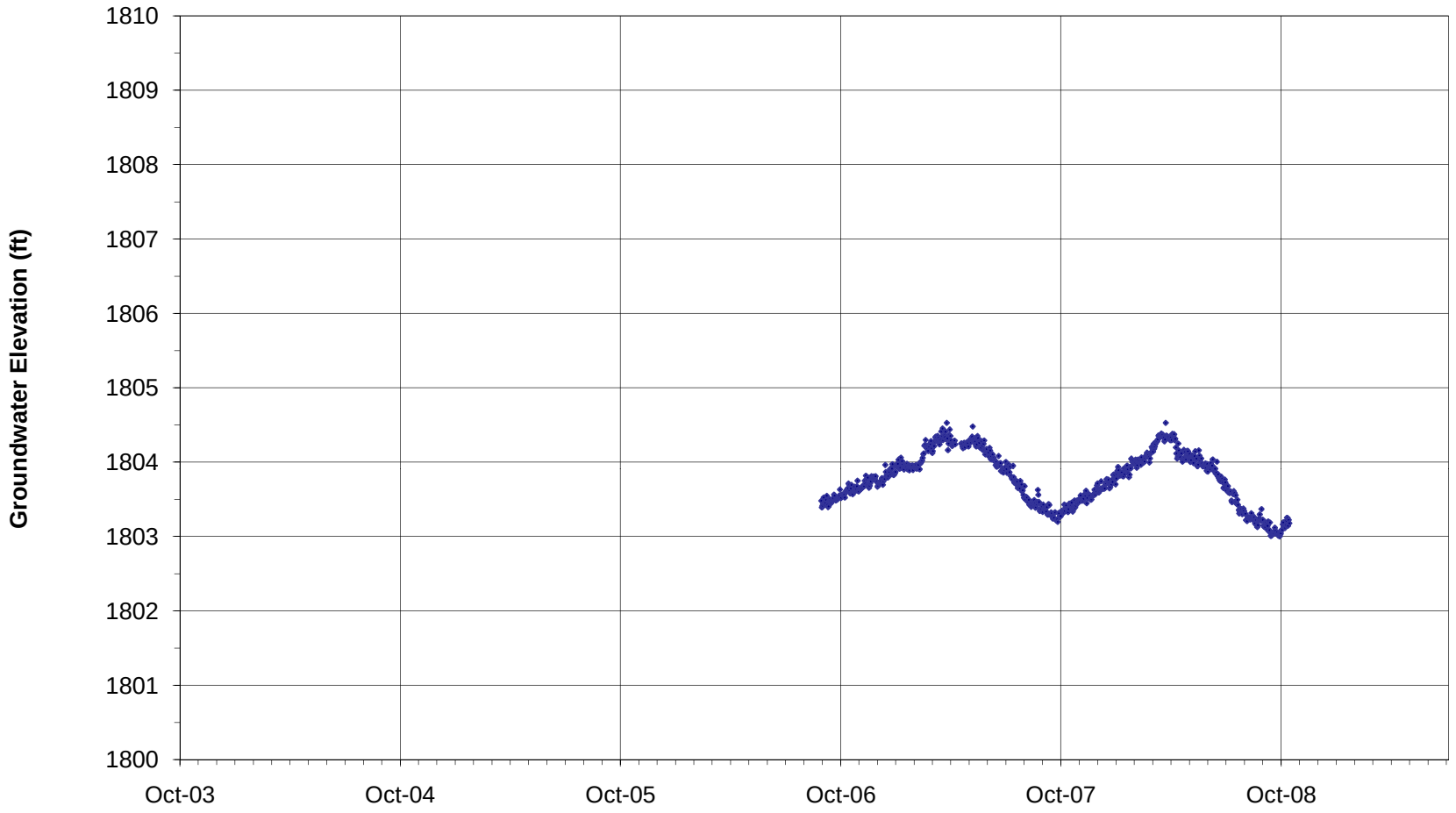
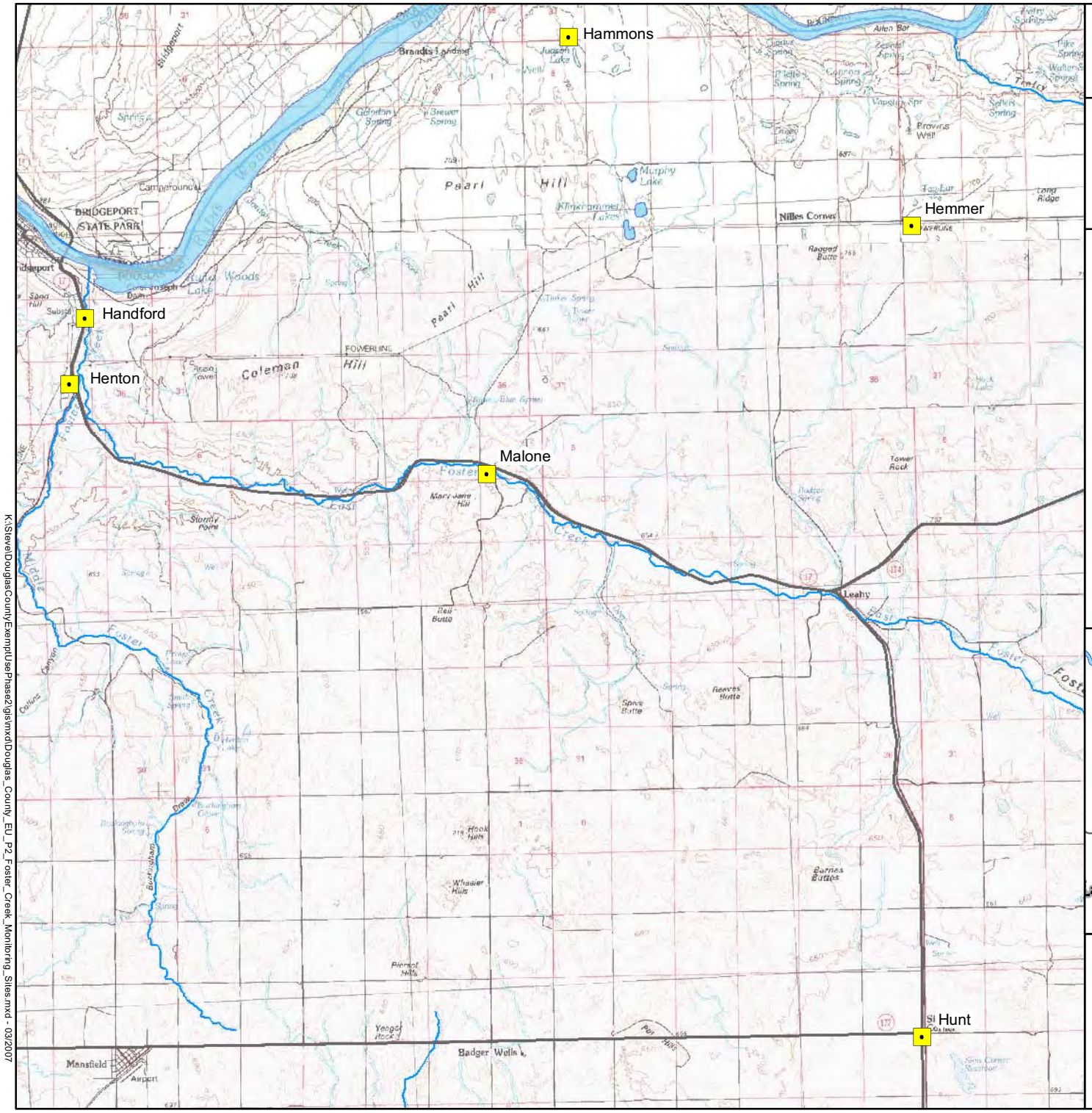


Figure 17
PGG-1 Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG



WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

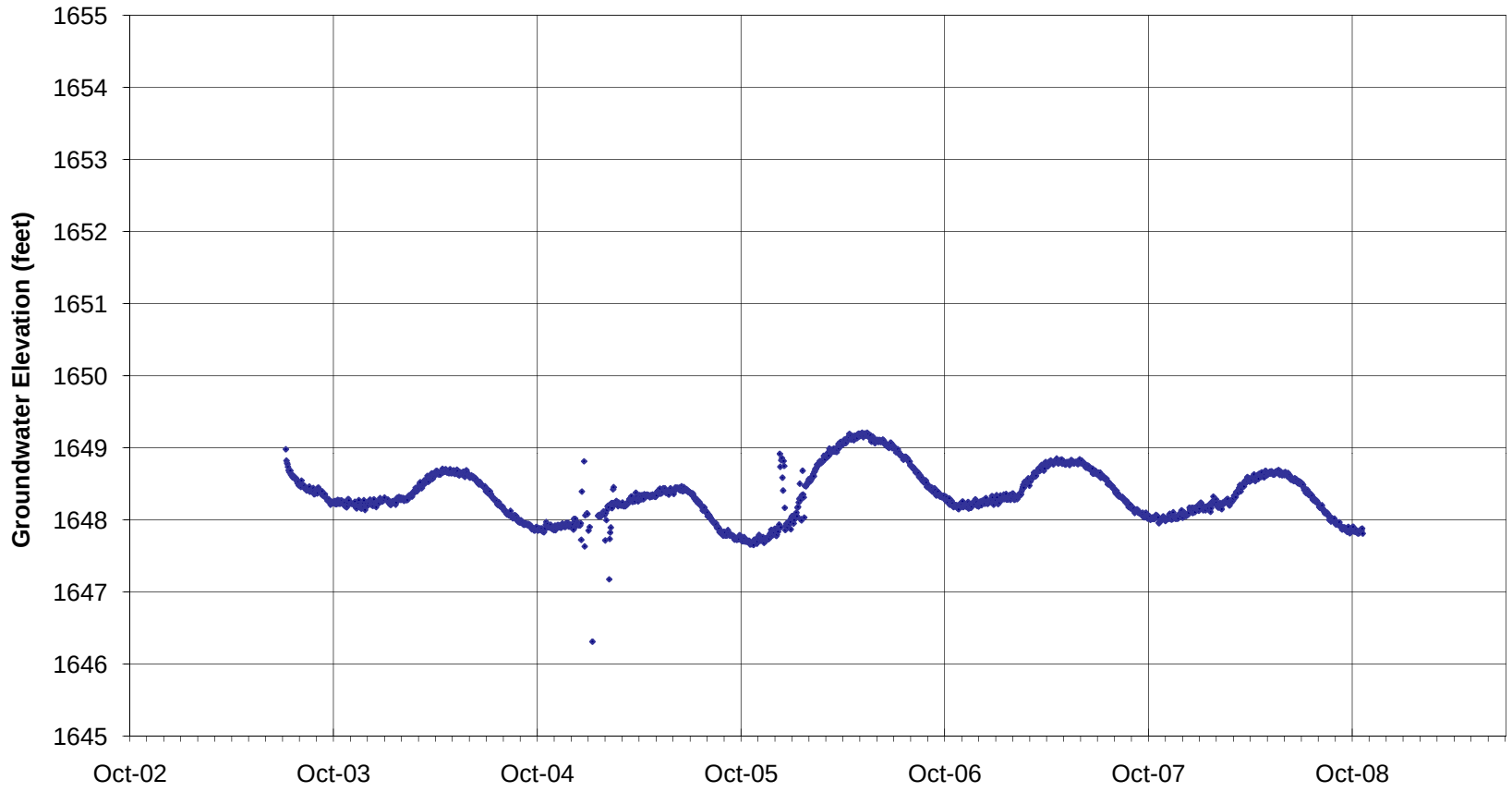
FIGURE 18

Foster Creek Monitoring Locations

Groundwater Level Monitored Well

PgG

K:\Steve\DouglasCountyExemptUsePhase2\gis\mxd\Douglas_County_EU_P2_Foster_Creek_Monitoring_Sites.mxd - 03/2007

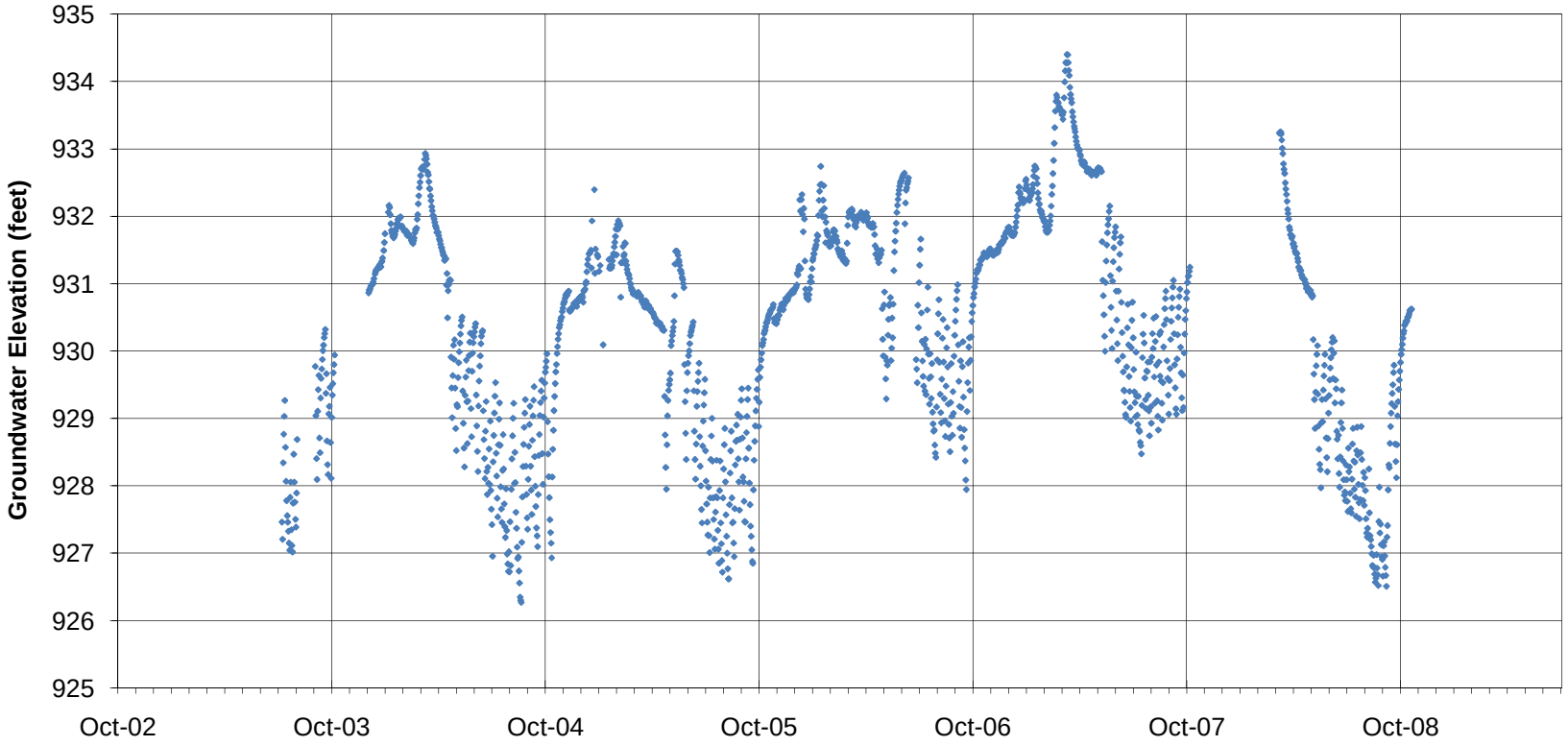


Spurious data variability is related to barometer malfunction.

Figure 19
Malone Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

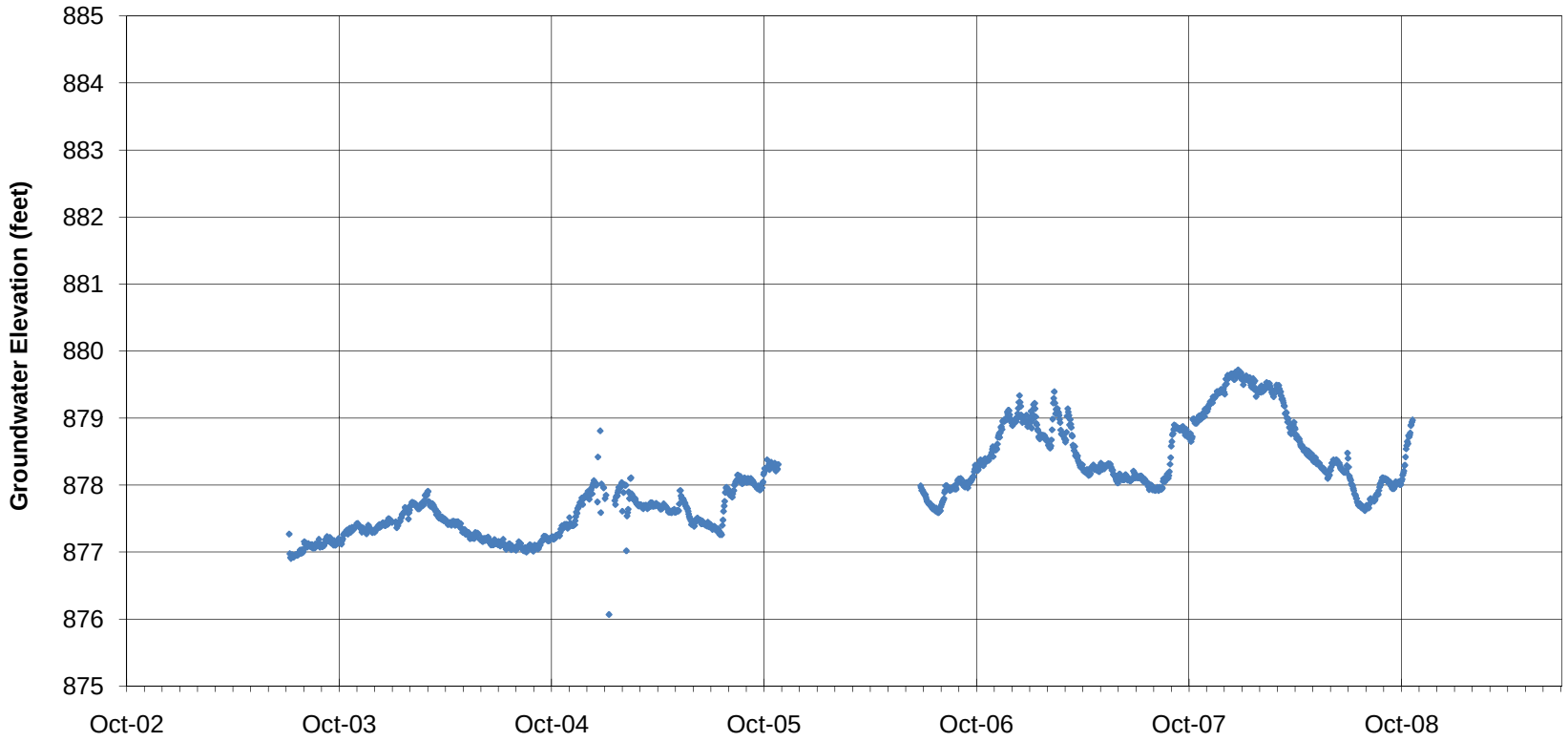


Data gap between 10/07 and 3/08 due to wellhead maintenence.
Jumps between 12/04 and 2/05 due to the barometer logger malfunctioning.
Small gap in data (5/4/05 to 6/10/05) while logger was replaced.
Possible logger malfunction 6/15/06 to 6/28/06 (data not included)
Irrigation season fluctuations due to pumping of monitored well

Figure 20
Henton Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

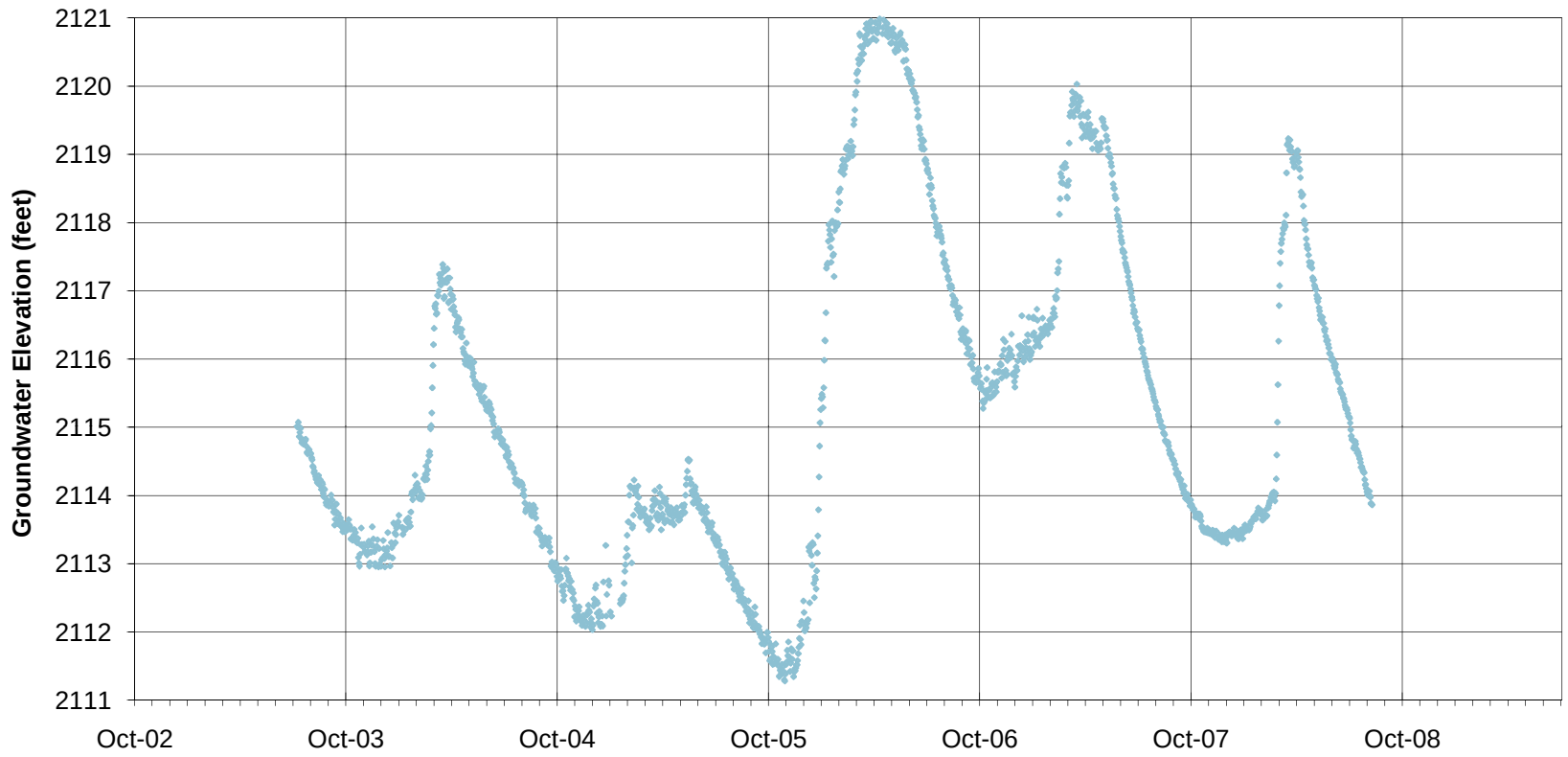


Jumps between 12/04 and 2/05 due to the barometer logger malfunctioning.
Small gap in data (5/4/05 to 6/10/05) while logger was replaced.
Data collected June 06 to Oct. 06 lost.

Figure 21
Hanford Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

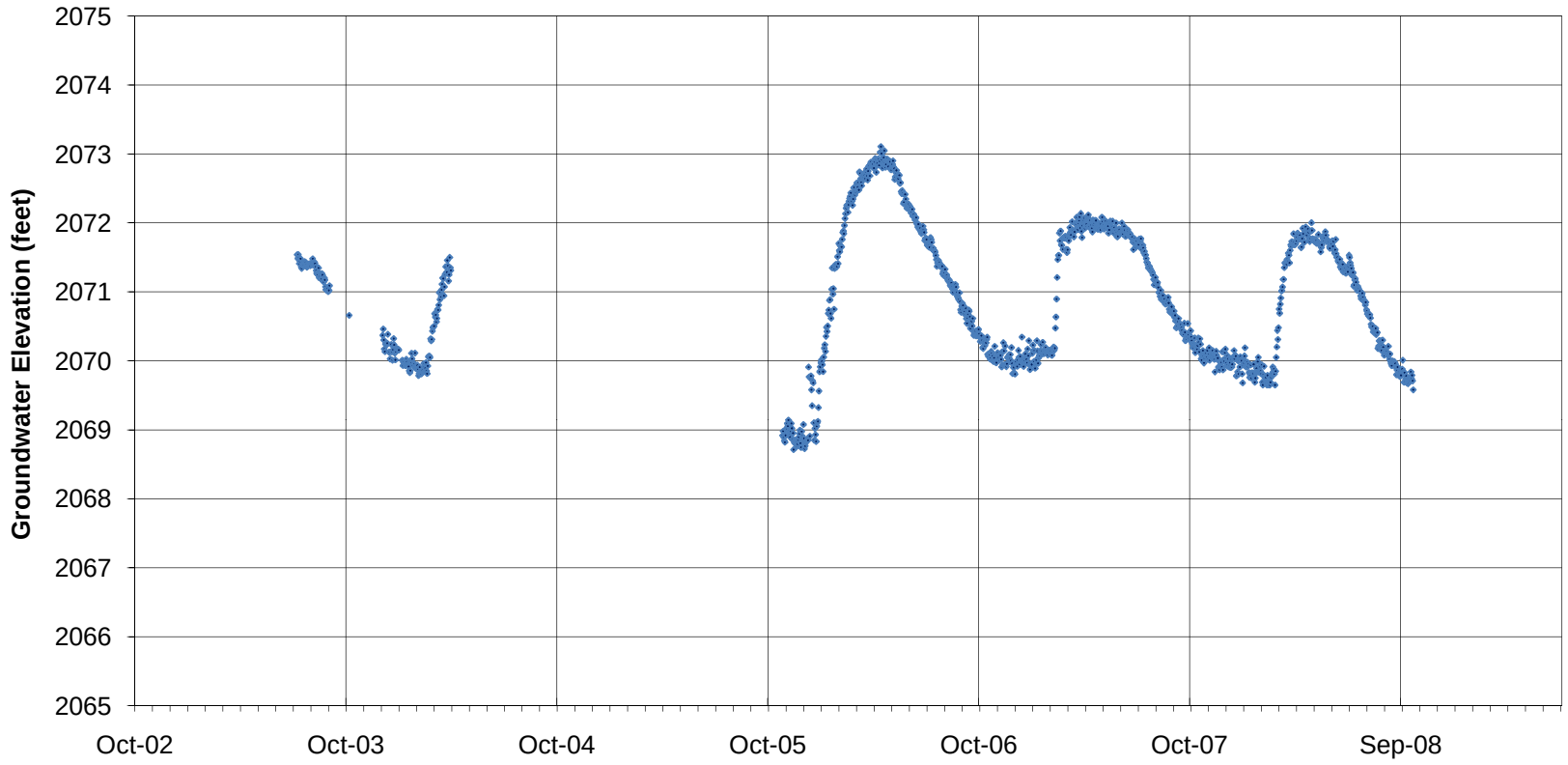


Jumps between 12/04 and 2/05 due to the barometer logger malfunctioning.
Small gap in data (5/4/05 to 6/10/05) while logger was replaced.
This well has no pump in it.
Data collected June 22, 2006 to October 1, 2006 unreliable.

Figure 22
Hammons Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

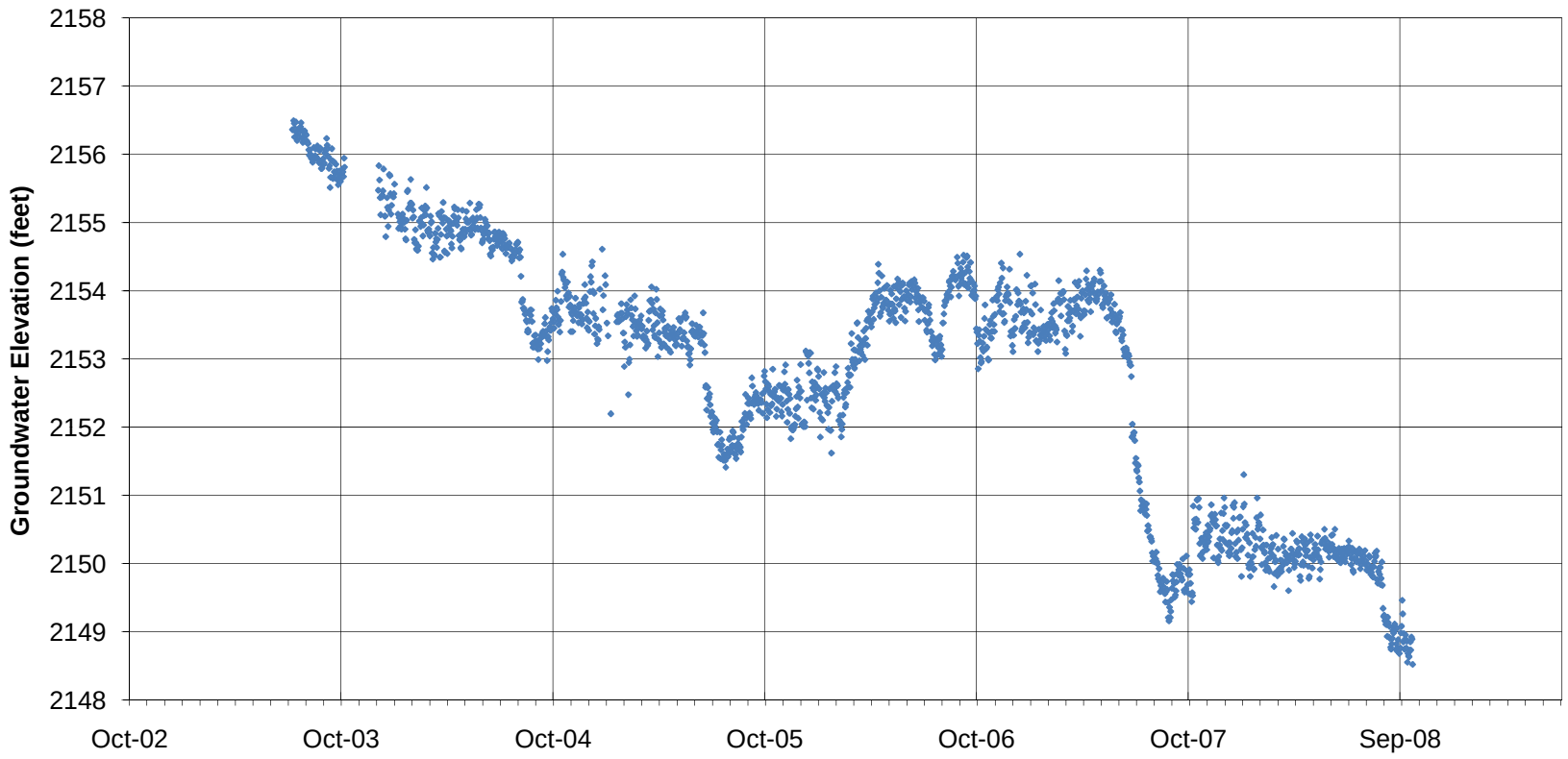


Data from April 2004 to June 2005 is unreliable because of logger malfunction and is therefore not displayed. The logger was replaced in June 2005.

Figure 23
Hunt Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG



Jumps between 12/04 and 2/05 due to the barometer logger malfunctioning. Small gap in data (5/4/05 to 6/10/05) while logger was replaced.

Late summer declines due to pumping of monitored well.

Figure 24
Hemmer Well Hydrograph

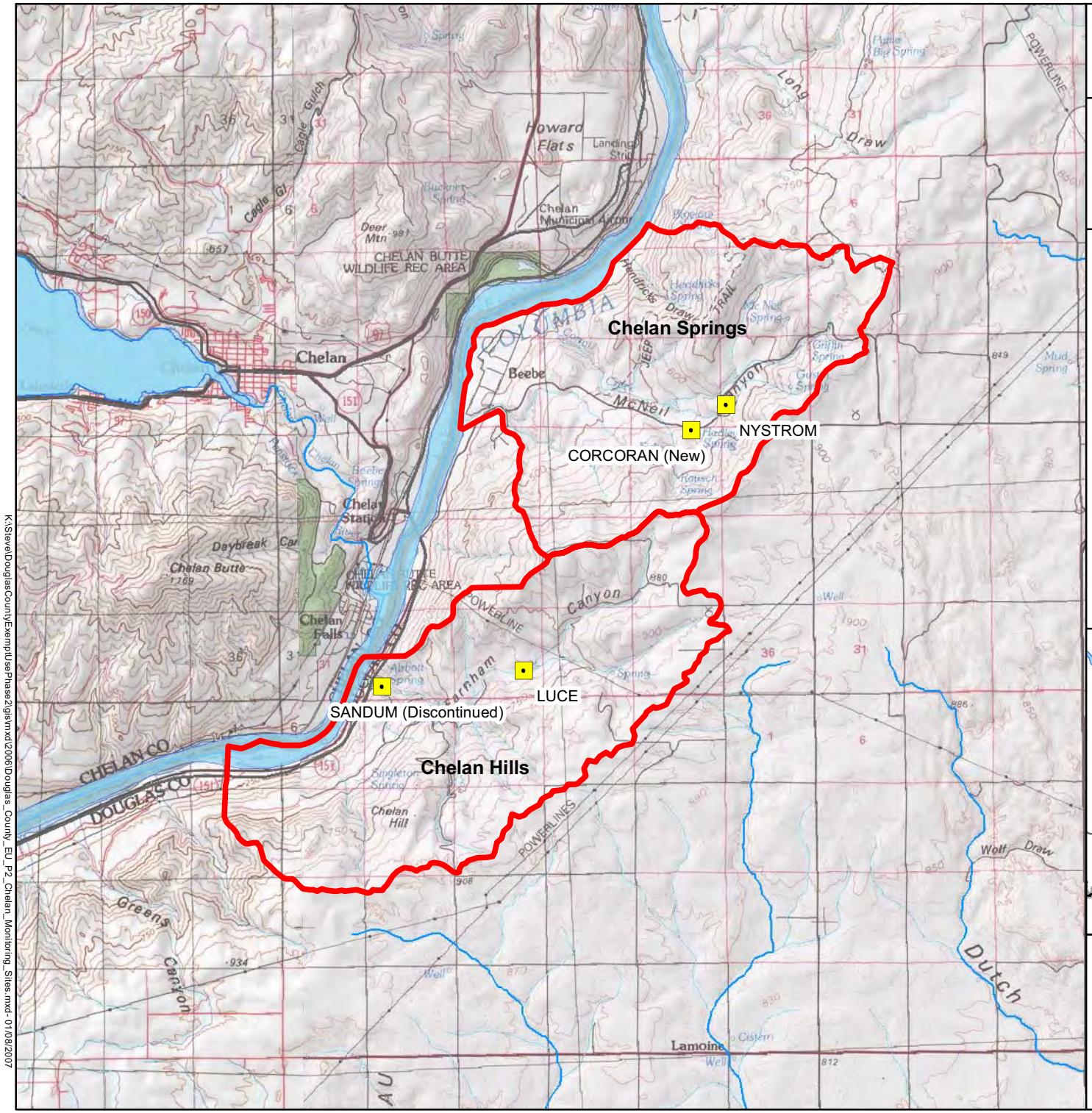
WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

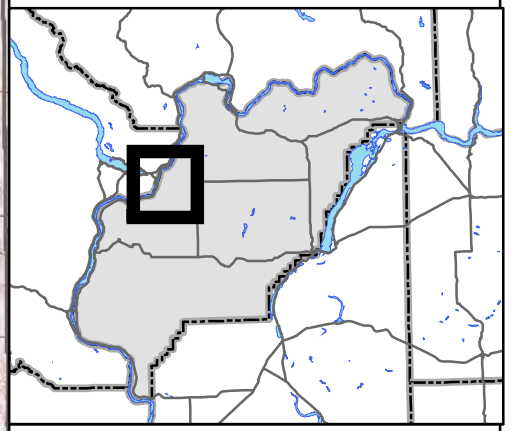
FIGURE 25

Chelan Hills and Chelan Springs Monitoring Sites



Groundwater Level Monitored Well

Project Boundaries



0 10,000 Feet
0 2 Miles
1:100,000

PgG

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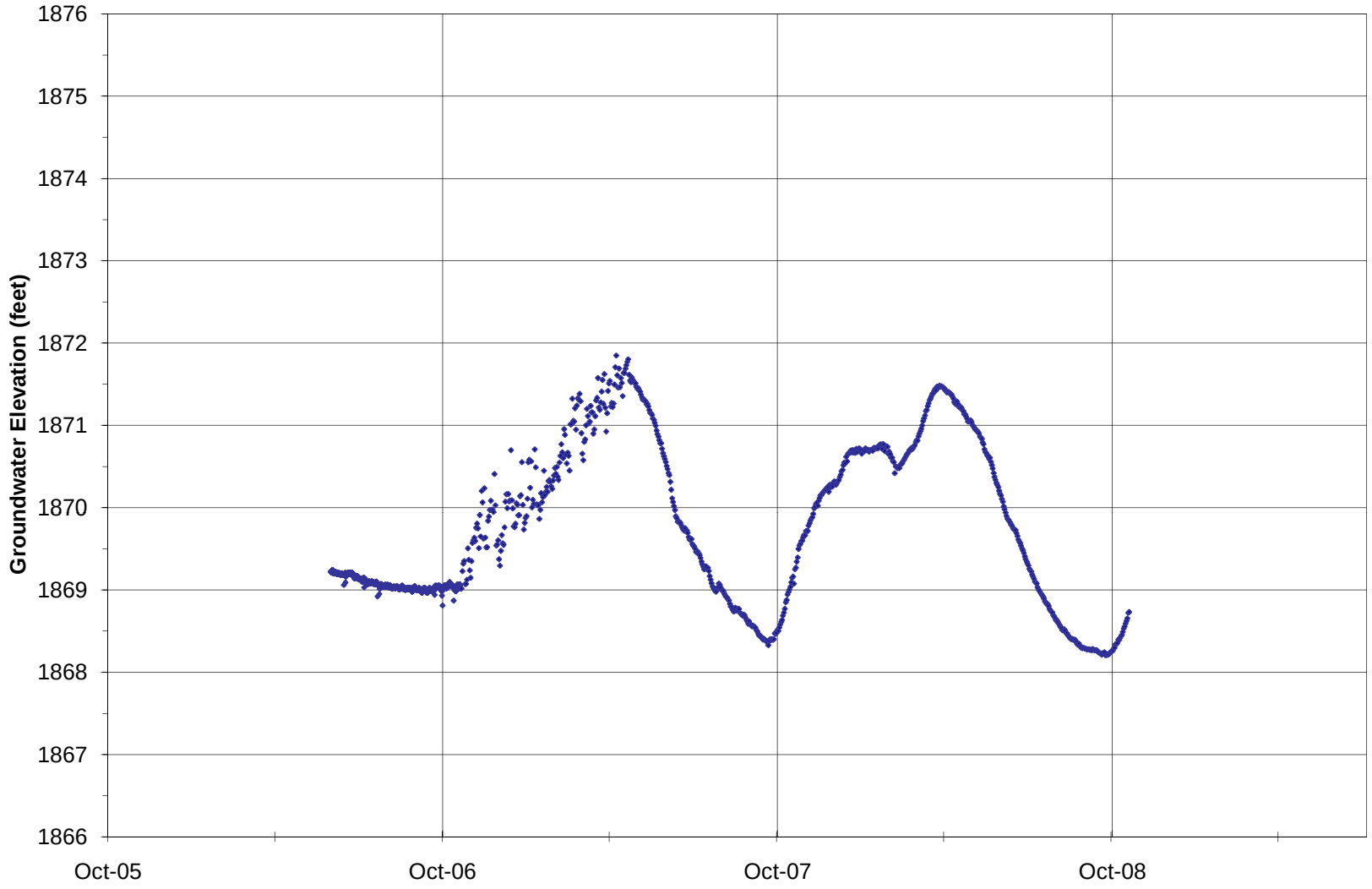


Figure 26
Luce Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

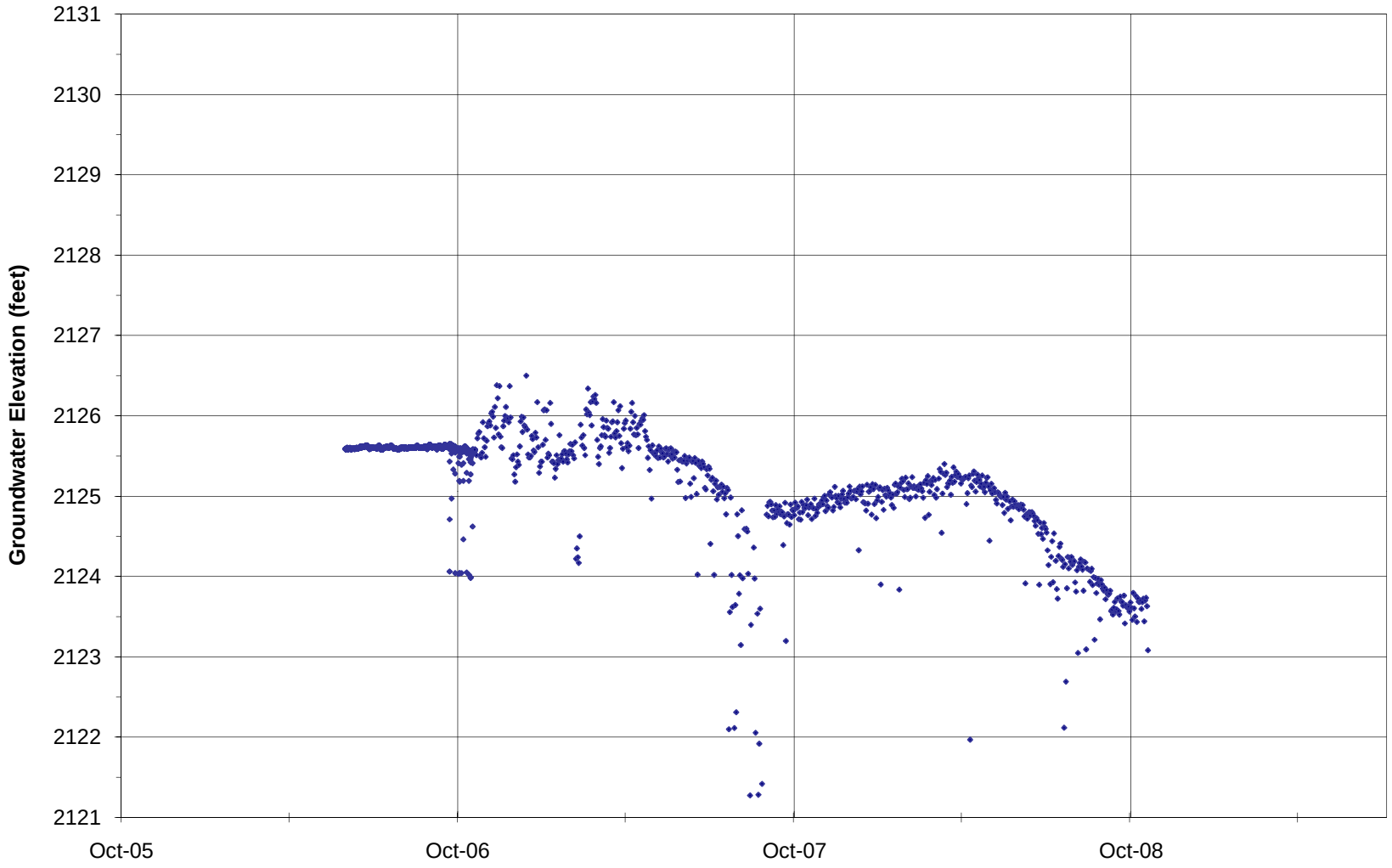
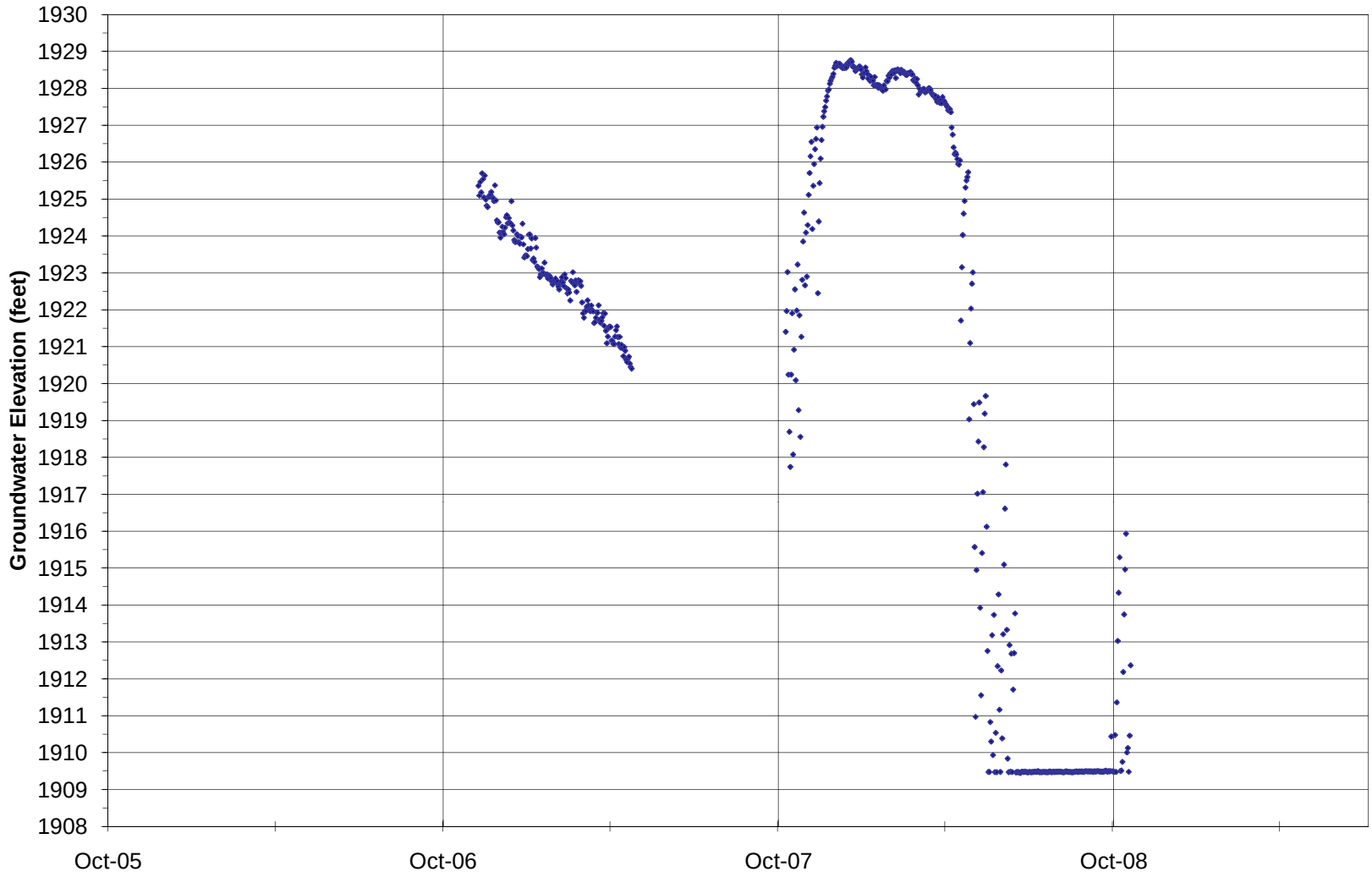


Figure 27
Nystrom Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

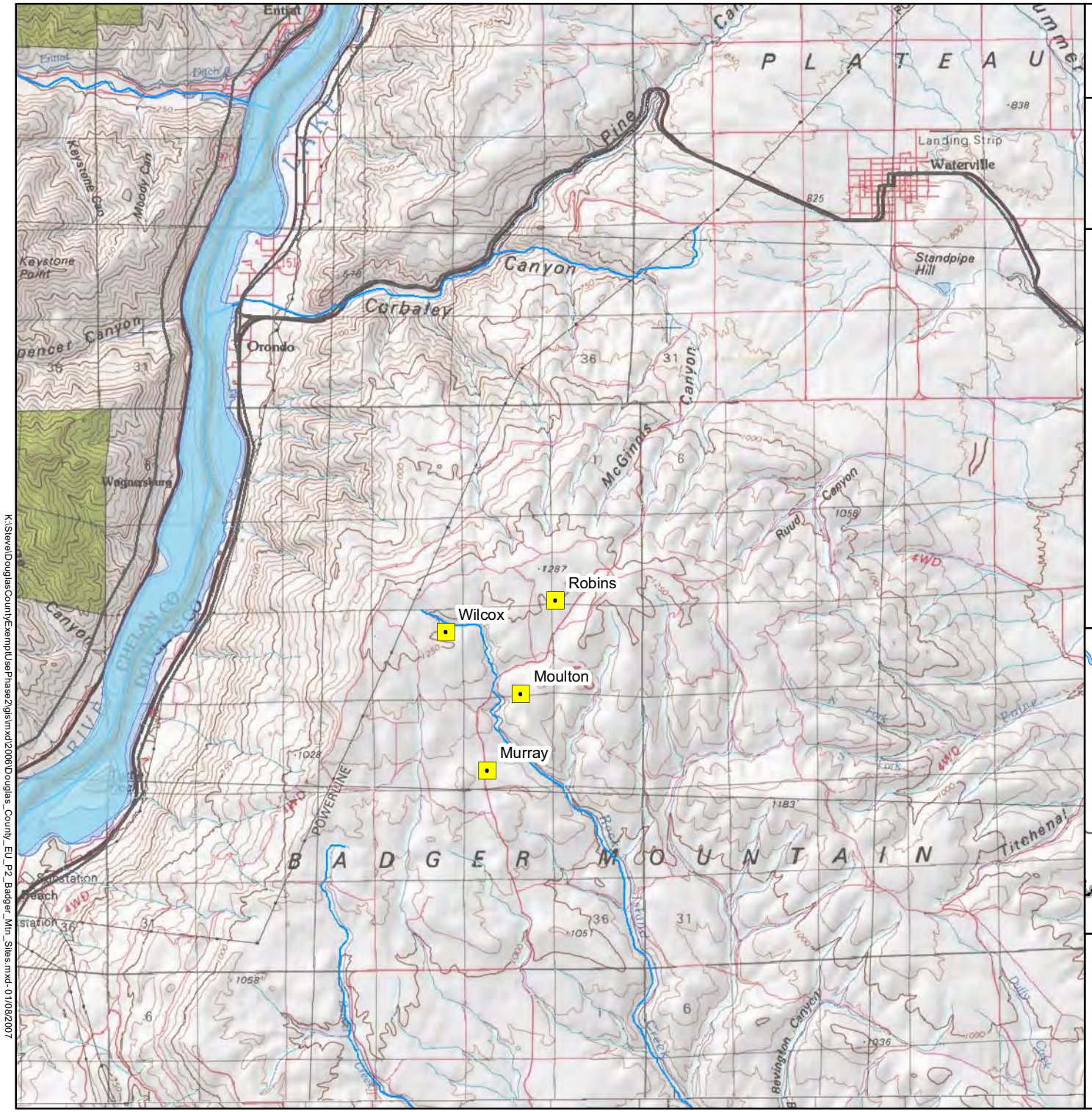


Faulty logger in Fall 2007

Figure 28
Cocoran Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

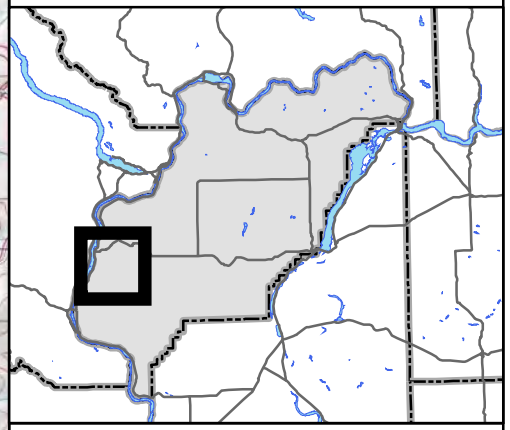


WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

FIGURE 29

Badger Mountain Monitoring Locations

Groundwater Level Monitored Well



0 10,000 Feet
0 2 Miles
1:100,000

PgG

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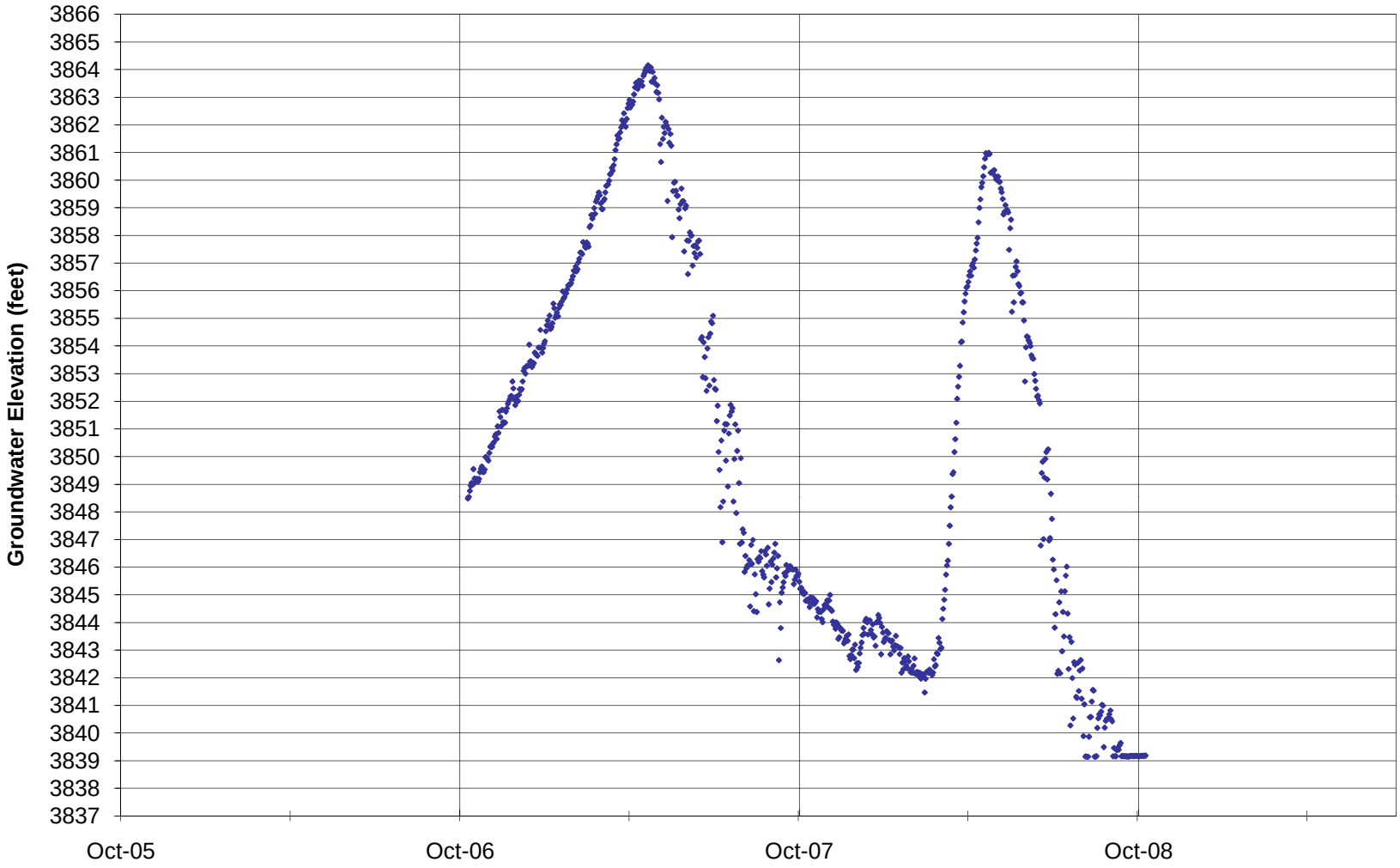


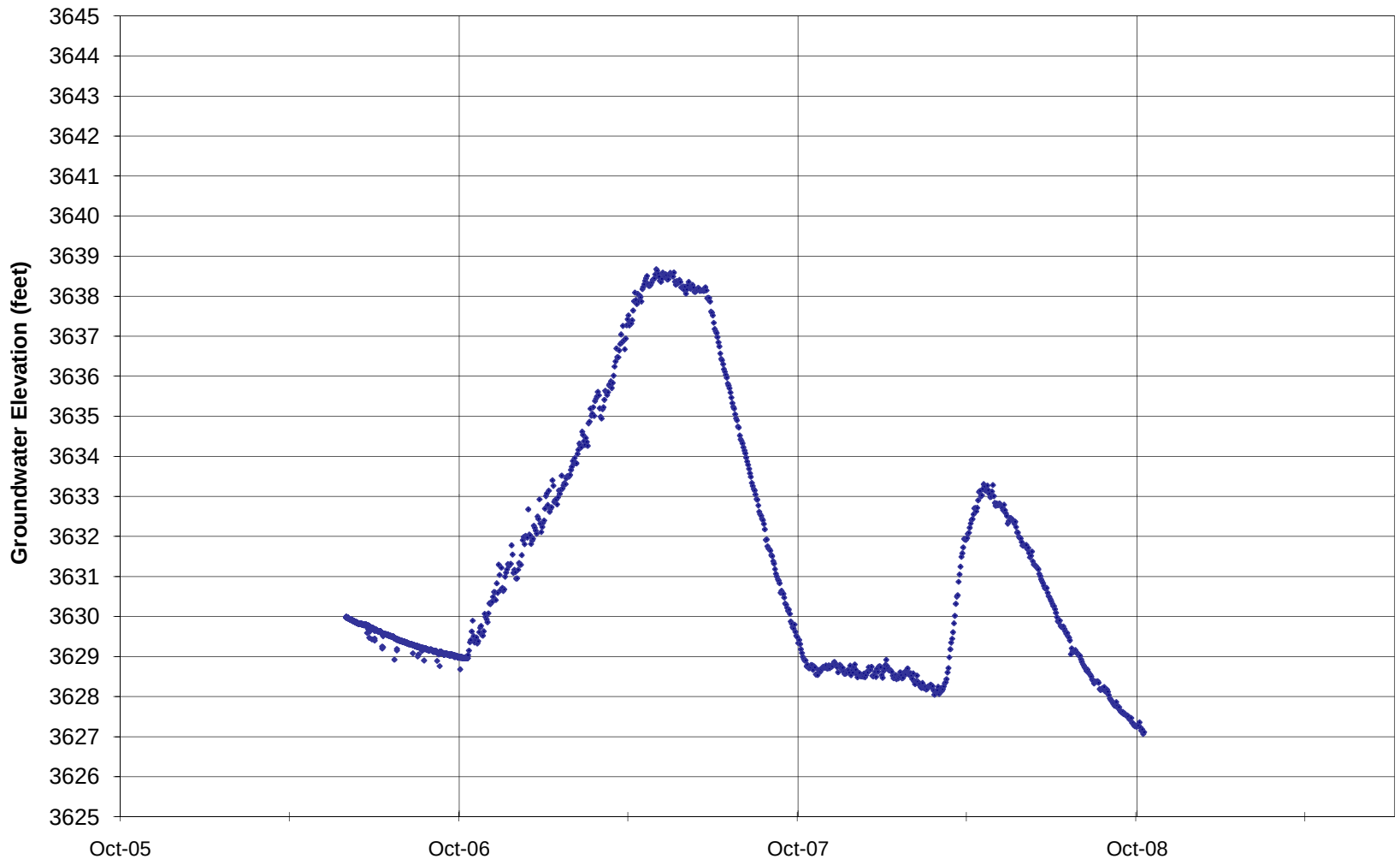
Note: Scale modified from standard report scale

Pre-October 2006 data is unreliable due to faulty firmware

Figure 30
Moulton Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

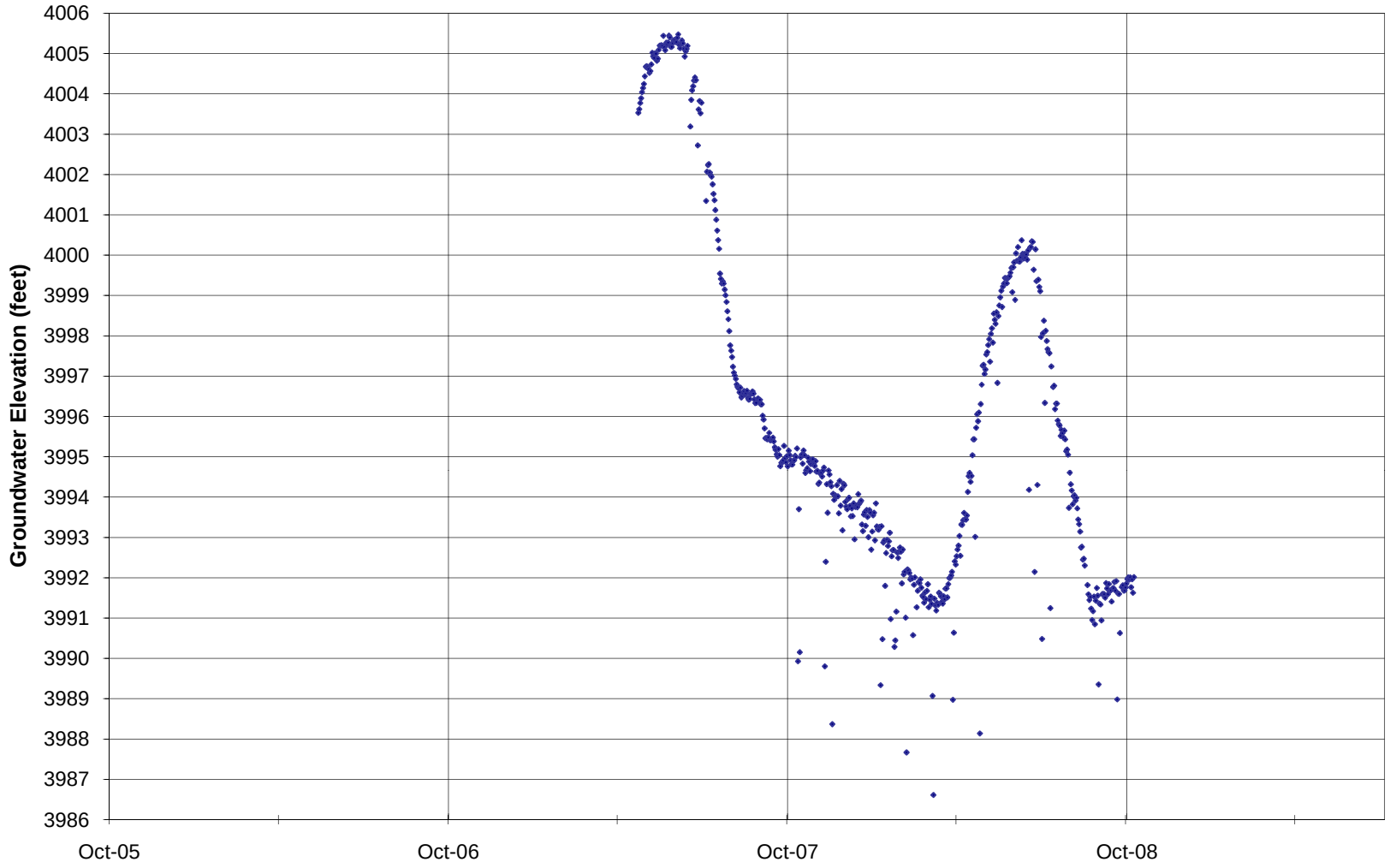


April 2006 to October 2006 - unable to reteive logger

Figure 31
Murray Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

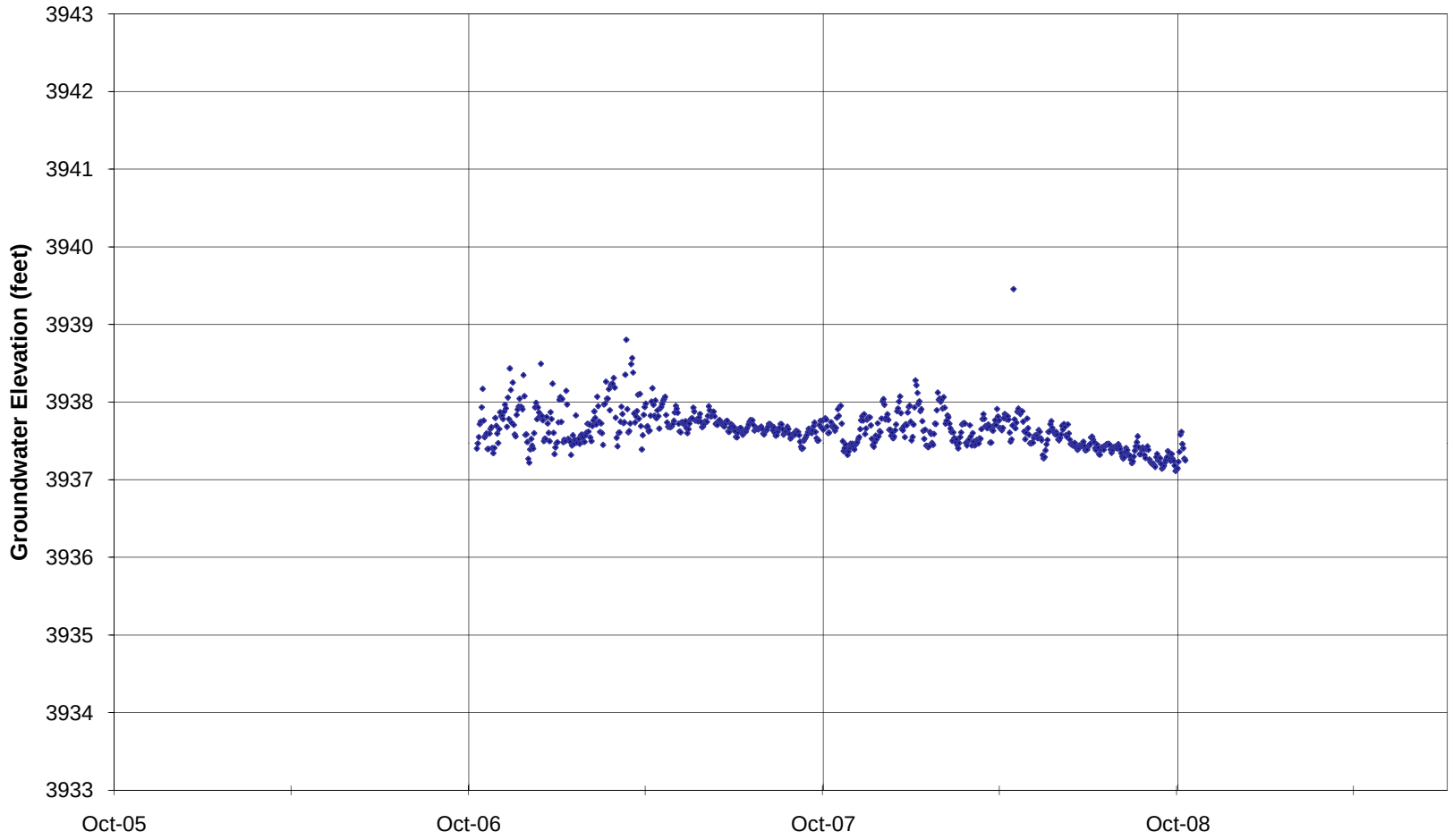


Note: Scale modified from standard report scale

Figure 32
Robins Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG



Pre-October 2006 data is unreliable due to faulty firmware

Figure 33
Wilcox Well Hydrograph

WRIA 44/50
Groundwater Elevation Monitoring
Exempt Well Water Use Phase 2

PgG

APPENDIX A
MONITORED WELL LOGS

LOWER MOSES COULEE
MONITORED WELL LOGS

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG

No. Decla. #385
Cert. #321-D

Date 1929, 19

Record by R. L. Davis, Jr.

Source G. W. Decla. Claim

Location: State of WASHINGTON

County Douglas

Area

Map

SW ¼ NE ¼ sec. 36 T. 23 N., R. 23 E. W.

DIAGRAM OF SECTION

Drilling Co.

Address

Method of Drilling dug Date 1930 19

Owner Palisades Irrigation District

Address Palisades, Washington

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Estimated from case history of neighboring wells		
	Soil	40	40
	Dry round stream bed rock	40	80
	Wet sand, stream " "	80	160
Pump	Test:		
	Dim: 160' x 4'		
	SWL: 160'		
	Dd: none		
	Yield: 800 g.p.m.		
	Casing: not given, cement curbed from top to bottom		

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

Turn up

Sheet of sheets

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG No. Appl. 1921
Cert. #1568-A

Date Oct. 2, 1952

Record by K. V. Linville

Source Driller's Record

Location: State of WASHINGTON

County Douglas

Area

Map

SE ¼ SE ¼ sec. 1 T. 21 N., R. 22 E. W.

DIAGRAM OF SECTION

Drilling Co.

Address

Method of Drilling Date Aug. 15 1953

Owner K. V. Linville

Address Palisades, Washington

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Soil	18	18
	Soil, gravel & rocks	88	100
	Black sand & gravel, trace of water,	1	101
	Hard formation, floater	4	105
	Rocks & boulders, blasted	15	120
	Hole & drove 8" casing to 120' (End of 8" casing at 120')		
	Perforated rocks and gravel and some sand, caved in 3 times, pored concrete and drilled out	150	270
	Hard formation	3	273
	Struck water, black sand & gravel	1½	274½

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses If material water-bearing, so state and record static level if reported Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc)

Turn up

Sheet of sheets

WELL LOG.—Continued No A/1921

Correlation	Material	Thickness (feet)	Depth (feet)
	K.V. Linville Depth forward	———	
	Balance of hole fine sand & gravel	19½	294
Pump	Test:		
	Dim: 294' x 7"		
	SWL: 257'		
	Dd: unknown		
	Yield: 180 g.p.m.		
	Casing: 8" dia. O.D. Standard, top to 120'		
	7" I.D. Standard, top to 294'		
	Perforations:		
	20' perforated, 3/8" wide 4" long, about 11 per ft. from 270' to 290'		

S F 7449-46 REMINGTON INC - 20 20 745-2 46

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. W 09053
Unique Well I.D. # AET969
Water Right Permit No.

(1) OWNER: Name KING, STEPHEN Address 5473 8TH ST. SE EAST WENATCHEE, WA 98802-

(2) LOCATION OF WELL: County DOUGLAS - NW 1/4 SE 1/4 Sec 2 T 22 N., R 23E WM
(2a) STREET ADDRESS OF WELL (or nearest address) PALISADES RD., PALISADES

K

(3) PROPOSED USE: DOMESTIC

(4) TYPE OF WORK: Owner's Number of well (If more than one)
NEW WELL Method: ROTARY

(5) DIMENSIONS: Diameter of well 6 inches
Drilled 139 ft. Depth of completed well 138 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Dia. from +3 ft. to 138 ft.
WELDED " Dia. from ft. to ft.
" Dia. from ft. to ft.

Perforations: NO
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: NO
Manufacturer's Name
Type Model No.
Diam. slot size from ft. to ft.
Diam. slot size from ft. to ft.

Gravel packed: NO Size of gravel
Gravel placed from ft. to ft.

Surface seal: YES To what depth? 20 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? NO
Type of water? Depth of strata ft.
Method of sealing strata off SEAL METHOD 1

(7) PUMP: Manufacturer's Name
Type SUBMERSIBLE H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ... ft.
Static level 85 ft. below top of well Date 03/04/99
Artesian Pressure lbs. per square inch Date
Artesian water controlled by CAP

(9) WELL TESTS: Drawdown is amount water level is lowered below static level.
Was a pump test made? NO If yes, by whom?
Yield: gal./min with ft. drawdown after hrs.

Recovery data

Time	Water Level	Time	Water Level	Time	Water Level

Date of test / /
Bailer test gal/min. ft. drawdown after hrs.
Air test 70+ gal/min. w/ stem set at 137 ft. for 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? YES

(10) WELL LOG

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change in formation.

MATERIAL	FROM	TO
BROWN CLAY	0	32
BROKEN BASALT	32	49
BROWN CLAY BROKEN BASALT	49	54
BROKEN BASALT	54	139

CENTRAL REGION OFFICE DEPT. OF ECOLOGY Received MAY 7 1999

Work started 03/03/99 Completed 03/04/99

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME TUMWATER DRILLING, INC.
(Person, firm, or corporation) (Type or print)

ADDRESS P.O.BOX 777

[SIGNED] License No. 1249

Contractor's
Registration No. TUMWADI 1330 C Date 03/04/99

Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Permit No 7768

(1) OWNER: Name Jack Seymour Address Palisades Wash

(2) LOCATION OF WELL: County Douglas SW ¼ SE ¼ Sec 28 T 22 N., R 23 W.M.
Bearing and distance from section or subdivision corner 1000' north and 250' E from South ¼ corner of Sec 28

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 12 inches.
Drilled ft. Depth of completed well 240 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 12" Diam. from 0 ft. to 209 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 213 ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

NOT A PRODUCTION WELL
LIMITED YIELD

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Over Burden	0	20
Gravel	20	112
Brown Clay	112	205
Black Basalt	205	208
Brown Clay	208	216
Black Basalt	216	220
Large Gravel Water Bearing	220	223
Black Basalt	223	240

RECEIVED
AUG 30 1976
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 4 - 6, 19 76 Completed 5-14, 19 76

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Jox Drilling Co (Person, firm, or corporation) (Type or print)
Address Moses Lake Wash
[Signed] (Well Driller)
License No. 648 Date June 3, 1976

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71)
ECY-070-28

9/7/76

UPPER MOSES COULEE
MONITORED WELL LOGS

22

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. UI 87563
UNIQUE WELL I.D. # ACL 330
Water Right Permit No. _____

(1) OWNER: Name Raymond Mayer Address 7781 Sage Brush Flats Rd Ephrata

(1) LOCATION OF WELL: County [redacted] GRANT NE 1/4 NE 1/4 Sec 6 [redacted] N., R 25 E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) Rd 24 N.W. 22

(3) PROPOSED USE: ☒ Domestic ☐ Irrigation ☐ DeWater ☐ Industrial ☐ Test Well ☐ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (If more than one) _____
Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☐ Rotary ☒ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches. Drilled 80 feet. Depth of completed well 80 ft.

(6) CONSTRUCTION DETAILS:
Casing Installed: 6" Diam. from +2 ft. to 28 ft.
Welded ☒ Liner installed ☐ Threaded ☐ _____" Diam. from _____ ft. to _____ ft.
_____" Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 28 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____
Static level 29 ft. below top of well Date 9-24-96
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" " " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest 30 gal./min. with stem set at 75 ft. for 1 hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Top Soil	0	14
Brown Clay	14	18
Caliche	18	23
Sandy Clay	23	26
Brown Basalt	26	30
Black Basalt	30	57
Fractured Basalt & water	57	73
Black Basalt	73	80

Work Started 9-24 19 Completed 9-24 19 96

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Mathews Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 9455 Stonecast Rd Mt. Vo.
(Signed) Mitch Mathews (WELL DRILLER) License No. 1267
Contractor's Registration No. Mathedc117BC Date 9-24 19 96

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (206) 407-6600. The TDD number is (206) 407-6006.

ECY 050-1-20 (9/93)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Appl# 8736
Perm# 9276

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

WELL LOG

Record by: Driller
Source: Well Report

Location: State of WASHINGTON
County: Douglas
Area: —
Map: —
¼ ¼ sec 30 T. 24 N., R. 25 E. W.

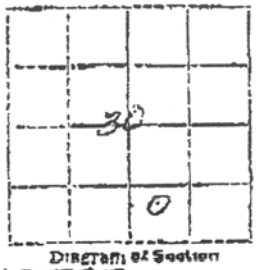


Diagram of Section

Drilling Co.: Frank L. Zimmerman
Address: 2004 South Colbert Mead Lake Wn.
Method of Drilling: Cable Date: 24 Nov., 1968
Owner: Glen Corning
Address: Box 845 Ephrata Wn.
Land surface, datum: 1910 ft. above ~~below~~ MSL
SWL: 315' Date: 24 Nov 1968, 19 Duns: 12" x 705'

Consolidation	Material	From (feet)	To (feet)
	Domestic & Irrigation		

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

	This is an old well reamed to 12"		
	0-575', casing here only data		
	at deepest portion of well		
	6" hole 575'-705'		
	Basalt, black, med. hard.	575'	690'
	Basalt, black porous water-bearing	690	705'
	Pump: Worthington Turbine 125 HP		
	Pump Test: 500 gpm - 175' DD (2 hrs) (24 Nov. 1968)		
	Recovery Time 30 sec		

Turn up

Sheet ___ of ___ sheets

WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

Construction/Decommission *("x" in circle)*
(X) Construction
( ) Decommission *ORIGINAL CONSTRUCTION Notice of Intent Number* _____

179919

CURRENT Notice of Intent No. W 166008

Unique Ecology Well ID Tag No. AHC 852

Water Right Permit No. _____

Property Owner Name Roy Downes

Well Street Address 3808 Tom Marks Rd

City Snohomish County: Douglas Meadows

Location NE 1/4 - 1/4 NE 1/4 Sec 26 Twn 25 R 5 E/W/M circle one

Lot 73 Blk 11 Rim Rock Meadows

Lat/Long: (s,t,r still REQUIRED) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec _____

Tax Parcel No. _____

PROPOSED USE: (X) Domestic ( ) Industrial ( ) Municipal ( ) DeWater ( ) Irrigation ( ) Test Well ( ) Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____
(X) New Well ( ) Reconditioned *Method:* ( ) Dug ( ) Bored ( ) Driven ( ) Deepened ( ) Cable (X) Rotary ( ) Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 200 ft.
Depth of completed well 200 ft.

CONSTRUCTION DETAILS
Casing ( ) Welded 6" Diam. from 0 ft. to 18 ft.
Installed: (X) Liner installed 4" Diam. from 6 ft. to 200 ft.
( ) Threaded _____" Diam. from _____ ft. to _____ ft.

Perforations: (X) Yes ( ) No
Type of perforator used Skil Saw
SIZE of perfs 1/8 in. by 4 in. and no. of perfs 100 from 160 ft. to 200 ft.

Screens: ( ) Yes (X) No ( ) K-Pac Location _____
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot Size _____ from _____ ft. to _____ ft.
Diam. _____ Slot Size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ( ) Yes (X) No ( ) Size of gravel/sand _____
Materials placed from _____ ft. to _____ ft.

Surface Seal: (X) Yes ( ) No To what depth? 18 ft
Materials used in seal Bentonite
Did any strata contain unusable water? ( ) Yes (X) No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP: Manufacturer's Name Grunfos
Type: Submersible H.P. 1/2

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 83 ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (cap,valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level.
Was a pump test made? ( ) Yes (X) No If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Recovery data (time taken as zero when pump turned off)(water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest 60 gal./min. with stem set at 198 ft. for 1 hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? ( ) Yes ( ) No

CONSTRUCTION OR DECOMMISSION PROCEDURE
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Soil	0	1
Med Basalt	1	30
Med Basalt Lt Brn Silt	30	45
Med Basalt	45	185
DK Brn Basalt	185	195
Grn Clay	195	200

RECEIVED
SEP 15 2005
DEPARTMENT OF ECOLOGY
EASTERN REGIONAL OFFICE

Start Date 4-12-05 Completed Date 4-19-05

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

(X) Driller ( ) Engineer ( ) Trainee Name (Print) Fred Emerson
Driller/Engineer/Trainee Signature Fred Emerson
Driller or Trainee License No. 2604

Drilling Company Four Star Drilling
Address P.O. Box 37
City, State, Zip Hartline Wa 99135
Contractor's Registration No. Four SD 110 D6 Date 4-21-05

If trainee, licensed driller's Signature and License no. _____

Ecology is an Equal Opportunity Employer. ECY 050-1-20 (Rev 4/01)

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT

WELL LOG No. Appli. 3138

Date Feb. 15, 1955.

Record by Edwin L. Johnson

Source Driller's Record

Location: State of WASHINGTON

County Douglas

Area

~~Mark~~ SE¼ of NW¼ &

NE.¼ SW.¼ sec 32 T. 24 N., R. 25E E. W.

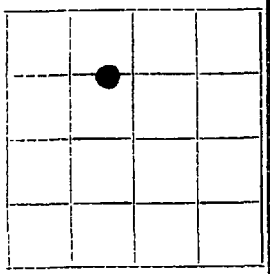


Diagram of Section

Drilling Co. Courtney Bach

Address Quincy, Washington

Method of Drilling Drilled Date ....., 19.....

Owner Edwin L. Johnson

Address Farmer, Washington

Land surface, datum ..... ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Gravel & clay	70	70
	Fine sand & silt	18	88
	Silt & clay	21	109
	Silt & clay	11	120
	Silt & clay	24	144
	Silt & clay	19	163
	Yellow clay & water gravel	5	168
	Water gravel	23	191
	Pump Test:		
	Dia: 191' X 10"		
	SWL: 37'		
	DD: 10'		
	Yield: 900 g.p.m.		
	Casing 10 in dia from	o to	191'

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

Turn up

Sheet ..... of ..... sheets

WELL LOG.—Continued No. A/3138

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Edwin L Johnson Depth forward	———	
	10" dia from	0 to 191'	
	10" dia from	0 to 191'	
	10" dia from	0 to 191'	
	~~Perforations: 8" by ½ from 163 to 189'~~		

S. F. No. 7[illegible]—12-54—3M. [illegible]08.

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No G4-24488

(1) OWNER: Name NAAC of WASH. Address P.O. 1195

(2) LOCATION OF WELL: County Douglas NE¼ NE¼ ¼ Sec. 19 T. 23 N., R. 25 E.M.
Bearing and distance from section or subdivision corner 910'S & 757'W of Corner Sec 19 A

(3) PROPOSED USE: Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☑ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 4
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 16" inches.
Drilled 738 Depth of completed well 738 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 16" Diam. from 0 ft. to 49' ft.
Threaded ☐ 12" Diam. from 0 ft. to 335 ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☒ No ☐
Type of perforator used Milk Knife
SIZE of perforations ¼" in. by 4" in.
305 perforations from 305 ft. to 320 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☑
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☑ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☑ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name GENERAL Electric
Type: Turbine K H.P. 150

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 305 ft. below top of well Date April 1969
Artesian pressure NO lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level Well Dug
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Layne
Yield: 1150 gal./min. with 60' ft. drawdown after 4 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	Immediatly				

Date of test APRIL 1969
Bailer test NO gal./min. with ft. drawdown after hrs.
Artesian flow NO g.p.m. Date
Temperature of water NO Was a chemical analysis made? Yes ☒ No ☐

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
TOP SOIL	0	7
GRAVEL	7	22
CLAY	22	48
MED HARD BASALT.	48	195
POUROUS ROCK WATER	195	205
TEST AT 250GAL		
HARD GRAY BASALT.	205	305
SOFT BROWN BASALT.	305	332
HARD GREY BASALT	332	431
BROKEN BROWN BASALT	431	500
HARD GREY BASALT	500	623
CHANGE to 8" HOLE		
POUROUS BLACK BASALT.	623	668
HARD GREY BASALT.	668	712
INTER FLOOD WATER.	712	738

RECEIVED
DEC 5 - 1977
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started ....., 19..... Completed ....., 19.....

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Frank Zimmerman
(Person, firm, or corporation) (Type or print)

Address [illegible]

[Signed] [signature]
(Well Driller)

License No. 0548 Date 11/30 19 77

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original with Department of Ecology
Second Copy - Owner's Copy 97450
Third Copy - Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Notice of Intent W 123727

UNIQUE WELL I D # AFL 121

Water Right Permit No. 98020

DEPT. OF ECOLOGY RECEIVED NOV 16 2000 CENTRAL REGION OFFICE

(1) OWNER: Name PKT Inc, Address 1430 olympic Ave Edmonds Wa,

(2) LOCATION OF WELL County Douglas SW 1/4 SE 1/4 Sec 6 T 23 N R 25E WM

(2a) STREET ADDRESS OF WELL. (or nearest address) Rim Rock Rd.

TAX PARCEL NO

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one)
☒ New Well Method: ☐ Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☒ Rotary ☐ Jetted ☐ Decommission

(5) DIMENSIONS: Diameter of well 6 inches
Drilled 80 feet. Depth of completed well 80 ft

(6) CONSTRUCTION DETAILS
Casing Installed.
☒ Welded 6 " Diam from +2 ft to 60 ft
☐ Liner installed " Diam from ft to ft
☐ Threaded " Diam from ft to ft

Perforations. ☐ Yes ☒ No
Type of perforator used
SIZE of perforations in by in
perforations from ft to ft

Screens ☐ Yes ☒ No ☐ K-Pac Location
Manufacturer's Name
Type Model No
Diam Slot Size from ft to ft
Diam Slot Size from ft to ft

Gravel/Filter packed ☐ Yes ☒ No ☐ Size of gravel/sand
Material placed from ft to ft

Surface seal ☒ Yes ☐ No To what depth? 18 ft
Material used in seal Bentonite
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? Surface Depth of strata 4-26
Method of sealing strata off Casing

(7) PUMP Manufacturer's Name
Type H P

(8) WATER LEVELS Land-surface elevation above mean sea level ft
Static level 65 ft below top of well Date 10/13/00
Artesian pressure lbs per square inch Date
Artesian water is controlled by (Cap, valve, etc)

(9) WELL TESTS Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield gal./min with ft drawdown after hrs
Yield gal./min with ft drawdown after hrs
Yield gal./min with ft drawdown after hrs
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min with ft drawdown after hrs
Airtest 27 gal./min with -0- ft drawdown after 2 hrs
Artesian flow g p m Date
Temperature of water Was a chemical analysis made? ☐ Yes ☒ No

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
Formation Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information Indicate all water encountered

MATERIAL	FROM	TO
Top Soil	0	4
Brown Clay & water	4	16
Gravel & Clay Streaks	16	26
Sticky Clay	26	60
Brown Basalt & water	60	64
Black Basalt	64	80

RECEIVED NOV 16 2000 DEPARTMENT OF ECOLOGY EASTERN REGIONAL OFFICE

Work Started 10/11/00 Completed 10/12/00

WELL CONSTRUCTION CERTIFICATION

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief

Type or Print Name Mitch Mathews License No 1267
(Licensed Driller/Engineer)

Trainee Name License No
Drilling Company Mathews Drilling
(Signed) Mitch Mathews License No 1267
(Licensed Driller/Engineer)
Address 2317 Rd 10.2 NE Moses Lake Wa 98837
Contractor's Registration No MATHEDC117B Date 10/17/00

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer For special accommodation needs, contact the Water Resources Program at (360) 407-6600 The TDD number is (360) 407-6006

ECY 050-1-20 (11/98)

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

3885
Start Card No. _____

Water Right Permit No. A

(1) OWNER: Name Jim Johncox Address 12251 NE 70th Kirkland Wa.

(2) LOCATION OF WELL: County Douglas NE ¼ NE ¼ Sec 19 T 23 N., R 25 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Rim Rock Meadows

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) _____
Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches. Drilled 150 feet. Depth of completed well 150 ft.

(6) CONSTRUCTION DETAILS:
Casing Installed: 6 " Diam. from 0 ft. to 43 ft.
Welded ☒ Liner installed ☐ Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.
_____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 18' ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 100' ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? _____
Yield: 20 gal./min. with _____ ft. drawdown after _____ hrs.
" " " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with _____ stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Gravel	0	~~30~~ 10'
Brn Soil	30'	~~40~~ 40'
Broken Rock	40'	43'
Med Basalt	43	80'
Clay & Rock	80	82'
Med Basalt	82	130
Hard Basalt	130	144
Porous Basalt & water	144	160

RECEIVED
AUG 17 1990
DEPARTMENT OF ECOLOGY
SPOKANE OFFICE

Work started 8-6-90, 19. Completed 8-8-, 19 90

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Four Star Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address Box 37 Hartline Wa.
(Signed) _____ License No. 124
Registered Driller Date 8-2

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 060-1-20 (10/87) -1329-

JAMESON LAKE AREA
MONITORED WELL LOGS

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. 029000

Water Right Permit No.

(1) OWNER: Name Denny Smullen Address 23331 Woods Cr. Rd Snohomish WA

(2) LOCATION OF WELL: County Douglas Lot 4 ¼ NW ¼ Sec 5 T 25 N., R 26 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Jamison Lake Resort

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) 2
Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches. Drilled 40 feet. Depth of completed well 41 ft.

(6) CONSTRUCTION DETAILS:
Casing Installed: 6 " Diam. from +1 ft. to 39 ft. Welded ☒
" Diam. from ft. to ft. Liner installed ☐
" Diam. from ft. to ft. Threaded ☐
Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.
Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.
Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level 1600 ft.
Static level 12 ft. below top of well Date 10/18/90
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: 30 gal./min. with ft. drawdown after hrs.
" EST AIR Lift " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)
Time | Water Level | Time | Water Level | Time | Water Level
Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Overburden	0	3
Sand & Gravel, Dk Brown, Dry	3	12
Sand & Gravel, Moist	12	23
Gravel, Water bearing, w/ Broken Basalt,	23	41

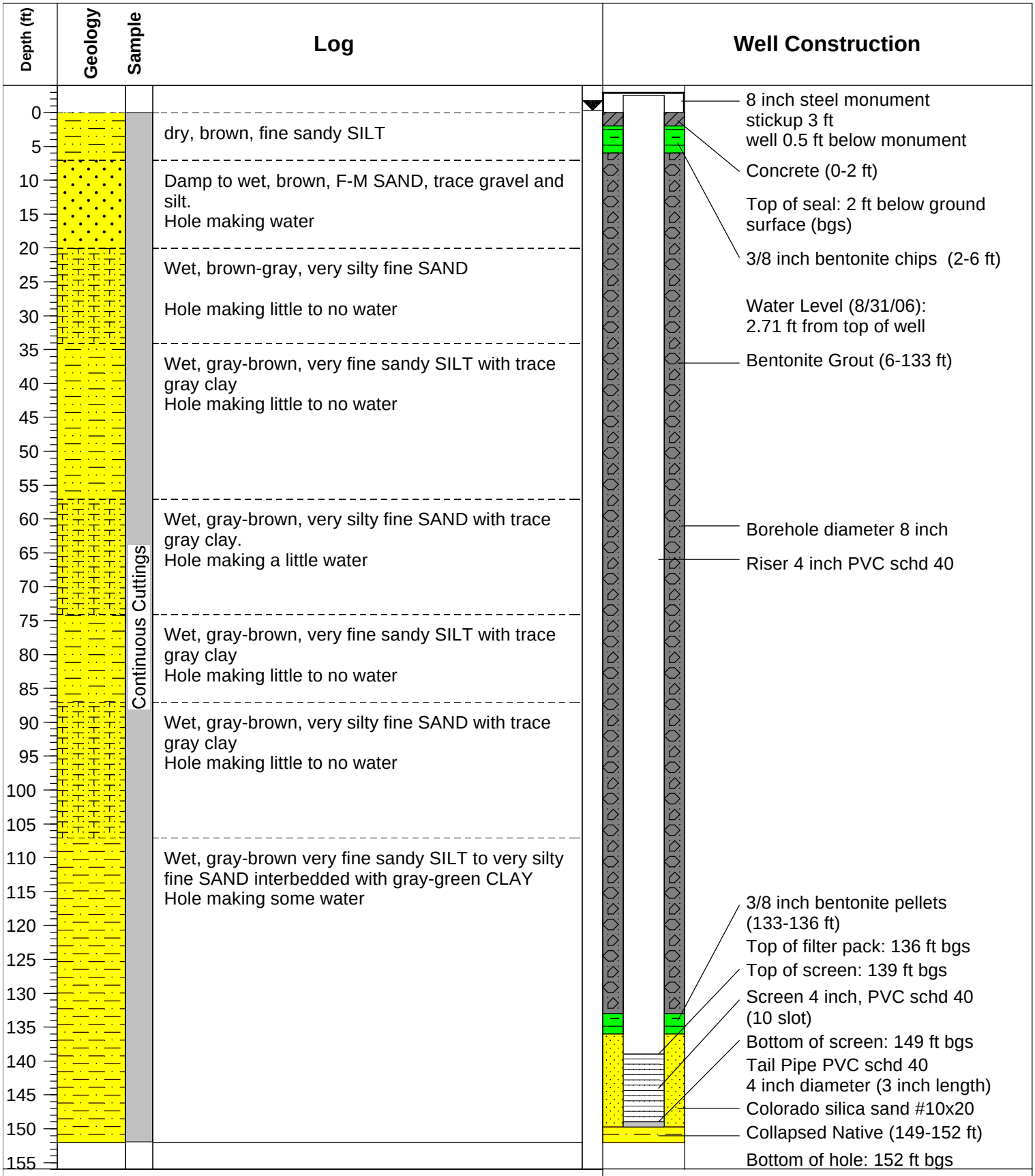
Work started 10/17 19 90 completed 10/18 19 90

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Eagle Pump & Supply (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 316 W 5th Colville WA. 99114
(Signed) Mike Loosen (WELL DRILLER) License No. 1451
Contractor's Registration No. PS194MF Date 10/19 19 90

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329-



Project Name: Douglas County Recharge
Drilling Method: Air Rotary
Driller: Roy Sink
Firm: Environmental West Explorations
Consulting Firm: PGG
Logged by: Dawn Chapel
Location: Jameson Lake, Douglas County

Well Name: PGG-1
UWID: APK319
MP Elevation: 1805.4059
Datum: NAVD88
Installed: 7/18/2006

Figure
GEOLOGIC LOG AND AS-BUILT FOR MONITORING WELL PGG-1

Douglas County Recharge
JS0604, PGG-1.ldf, 9/2006

PgG

FOSTER CREEK
MONITORED WELL LOGS

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. 87360
UNIQUE WELL I.D. # ACE 8
Water Right Permit No.

(1) OWNER: Name Charles & Sharon Hammond Address Box 879 Bridgeport WA 9881

(2) LOCATION OF WELL: County Douglas SE 1/4 SW 1/4 Sec. 8 T. 29 N., R. 27 E

(2a) STREET ADDRESS OF WELL (or nearest address)

(3) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other Stock ☒ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (If more than one)
Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches. Drilled 57 feet. Depth of completed well 57 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8" Diam. from +2 ft. to 57 ft.
Welded ☒ Liner installed ☐ Threaded ☐
" Diam. from ft. to ft.
" Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level
Static level 25 ft. below top of well Date 9-5-96
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airlift 24 gal./min. with stem set at 57 ft. for 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Sandy loam	0	4
heavy gravel	4	18
wet clay	18	46
wet clay & gravel	46	53
sand & gravel	53	54
clean round gravel	54	57

Suggest pumping @ 15 gpm ±

RECEIVED
SEP 18 1996
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work Started 9-5 19 Completed 9-6 19 96

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME MVM Quality Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 760 Big Hand Rd 9881
(Signed) MV Mill (WELL DRILLER) License No. 1437
Contractor's Registration No. MVMQUD138NO Date 9-13 19 96

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Lee Hartford Address Bridgeport, WA

(2) LOCATION OF WELL: County Douglas NE ¼ SE ¼ Sec 26 T 29 N., R 25 W.M.

ng and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 45 ft. Depth of completed well 45 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from +1 ft. to 45 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal cement
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 15 ft. below top of well Date 2-25-81
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
		are left	2at	60 gpm.	

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Top soil	0	2
Sand & gravel	2	45

MAY 27 1981

Work started 2-24, 19 81 Completed 2-25, 19 81

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME MM Quality Drilling
(Person, firm, or corporation) (Type or print)

Address 483 Bridgeport Wash

[Signed] Darrell B Connell
(Well Driller)

License No. 0358 Date 2-25, 1981

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Lee Heppner Address Star Route Mansfield, Wn.

(2) LOCATION OF WELL: County Douglas NE ¼ NW ¼ Sec. 19 T. 29 N., R. 28 E.W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☑ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 200 ft. Depth of completed well 200 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 21 ft. to 21 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☐ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☑ No ☐ To what depth? 20 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level ..... ft.
Static level 34 ft. below top of well Date 5-8-78
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Soil & boulders	0	16
Basalt (black)	17	35
Basalt (brown 2 gpm)	36	40
Basalt (black hard)	41	160
Basalt (broken 15 to 20 gpm)	161	170
Clay (green)	171	200

Work started 5-3 19 78 Completed 5-5 19 78

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Henry Bach Well Drilling
(Person, firm, or corporation) (Type or print)

Address P.O. Box 1651 Yakima, Wn. 98907

[Signed] Henry Bach
(Well Driller)

License No. 0059 Date 5-8, 19 78

(USE ADDITIONAL SHEETS IF NECESSARY) OR

S. F. No. 7356—OS—(Rev. 4-71)
ECY-070-28

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. /
Permit No. ....

(1) OWNER: Name Terry Hunt Address .....

LOCATION OF WELL: County Douglas — ¼ NW ¼ Sec. 30 T. 27 N., R. 25 E.M.
ng and distance from section or subdivision corner

(3) PROPOSED USE: Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 8-6 inches.
Drilled 290 ft. Depth of completed well 290 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8 " Diam. from 0 ft. to 24' ft.
Threaded [ ] " Diam. from ..... ft. to ..... ft.
Welded [X] " Diam. from ..... ft. to ..... ft.

Perforations: Yes [ ] No [X]
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes [ ] No [X]
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes [ ] No [X] Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes [X] No [ ] To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes [ ] No [ ]
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 60 ft. below top of well Date .....
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [X] If yes, by whom? .....
Yield: 40 gal./min. with 0 ft. drawdown after 1 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes [ ] No [ ]

(10) WELL LOG:
Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Soil	0'	10'
Gravel & water	10'	116'
Red Basalt Rock	116'	130'
Brown Basalt & water	130'	132'
Red Basalt Rock	132'	290'
Hole - Cemented		

Work started 7-26, 19 79 Completed 7-30, 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Four Star Drilling Co
(Person, firm, or corporation) (Type or print)
Address Box 885 Coulee City
[Signed] [signature]
(Well Driller)
License No. 124 Date 10-26, 19 79

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

12-79

7047

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 87187

Water Right Permit No. 1716 G

(1) OWNER: Name Ray Henton Address Bridgeport, Wa.

(2) LOCATION OF WELL: County Douglas SW¼ NE¼ Sec 35 T 29 N., R 25E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Highway 17 & Foster Creek Junction

(3) PROPOSED USE: ☐ Domestic ☒ Irrigation ☐ DeWater ☐ Industrial ☐ Test Well ☐ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) Replacement Well

Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☒ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 10 inches. Drilled 90 feet. Depth of completed well 90 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 10" Diam. from 0 ft. to 60 ft.
Welded ☒ Liner installed ☐ Threaded ☐ 11" Diam. from 11 ft. to 11 ft.
9" Diam. from 71 ft. to 83 ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type Stainless Model No.
Diam. 10T Slot size .100 from 61 ft. to 76 ft.
Diam. 10T Slot size .080 from 83 ft. to 90 ft.

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 25 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level
Static level 140 ft. below top of well Date 7-24-92
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 20 gal./min. with 0 ft. drawdown after 4 hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date 7-24-92
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Top Soil	0	3
Sand & Gravel, Consolicated	3	24
Sand & Gravel & Clay	24	28
Bolders, Sand & Gravel	28	38
Sand & Gravel	38	46
Good Gravel with water	46	56
Gravel & Sand, (Tight)	56	62
Good Gravel	62	70
Sand	70	78
Good Gravel & Sand	78	90

JUL 8

Work started 7-6-92 Completed 7-24-, 1992

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Windle Enterprises (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address P.O Box 279 Brewster, Wa. 98812

(Signed) Abe L Windle (WELL DRILLER) License No. 1421

Contractor's Registration No. WINDLE121AR Date 7-26-, 1992

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 060-1-20 (10/87) -1329-

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. ....

(1) OWNER: Name Foster Creek Land & Cattle Co. Address Mansfield, Wash 98830

(OCATION OF WELL: County Douglas 1/4 SW 1/4 Sec 1 T 28 N., R 26 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one).... 2
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 10 inches.
Drilled 68 ft. Depth of completed well 64 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 10 " Diam. from +2 ft. to 64 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☒ No ☐
Type of perforator used Torch
SIZE of perforations 1/8 in. by 4 in.
24 perforations from 64 ft. to 60 ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P .....

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ..... ft.
Static level 12 ft. below top of well Date 2-3-81
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
		air	lift	100+	

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Top soil	0	1
Sandy clay	1	18
Sandy clay wet	18	49
Sandy clay & gravel	49	53
Sand & gravel	53	64
Log @ Malone Property		

Work started 2-3-81, 19 ..... Completed 2-3, 1981

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M.V.M. Quality Drilling
(Person, firm, or corporation) (Type or print)

Address P.O. Box 483 Bridgport, Wa. 98821

[Signed] .....
(Well Driller)

License No. 0658 Date 2-15, 1981

(USE ADDITIONAL SHEETS IF NECESSARY)

CHELAN HILLS AND CHELAN SPRINGS MONITORED WELL LOGS

File Original with Department of Ecology
Second Copy Owner's Copy
Third Copy Driller's Copy

97312

WATER WELL REPORT

STATE OF WASHINGTON

Notice of Intent W109842

UNIQUE WELL I D # AFE 409

Water Right Permit No

(1) **OWNER** Name Roy Luce Address 37845 M.L. Kay Rd Auburn WA 98001

(2) **LOCATION OF WELL** County Douglas 1/4 E ½ Sec 33 T 27 N R 23 WM

(2a) **STREET ADDRESS OF WELL** (or nearest address)

TAX PARCEL NO

(3) **PROPOSED USE** ☒ Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐ DeWater

(4) **TYPE OF WORK** Owner's number of well (if more than one)
☒ New Well Method
☐ Deepened ☐ Dug ☐ Bored
☐ Reconditioned ☐ Cable ☐ Driven
☐ Decommission ☒ Rotary ☐ Jetted

(5) **DIMENSIONS** Diameter of well 8 inches
Drilled 61 feet Depth of completed well 59 ft

(6) **CONSTRUCTION DETAILS**
Casing Installed
☐ Welded 8 Diam from +2 ft to 59 ft
☐ Liner installed Diam from ft to ft
☐ Threaded Diam from ft to ft

Perforations ☐ Yes ☒ No
Type of perforator used
SIZE of perforations in by in
perforations from ft to ft

Screens ☐ Yes ☒ No ☐ K Pac Location
Manufacturer's Name
Type Model No
Diam Slot Size from ft to ft
Diam Slot Size from ft to ft

Gravel/Filter packed ☐ Yes ☒ No ☐ Size of gravel/sand
Material placed from ft to ft

Surface seal ☒ Yes ☐ No To what depth? 18 ft
Material used in seal Lenton, Fo
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? Depth of strata
Method of sealing strata off

(7) **PUMP** Manufacturer's Name
Type H P

(8) **WATER LEVELS** Land surface elevation above mean sea level ft
Static level 42.5 ft below top of well Date 10-29-99
Artesian pressure lbs per square inch Date
Artesian water is controlled by
(Cap valve etc)

(9) **WELL TESTS** Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes by whom?
Yield gal /min with ft drawdown after hrs
Yield gal /min with ft drawdown after hrs
Yield gal /min with ft drawdown after hrs
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	12 gpm air lift estimate				

Date of test
Bailer test gal /min with ft drawdown after hrs
Airtest 12 gal /min with 4 psi ft drawdown after 1 hrs
Artesian flow g p m Date
Temperature of water Was a chemical analysis made? ☐ Yes ☒ No

(10) **WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION**
Formation Describe by color character size of material and structure and the kind and nature of the material in each stratum penetrated with at least one entry for each change of information Indicate all water encountered

MATERIAL	FROM	TO
Sandy loam	0	2
gravel & boulders	2	15
red silt & angular gravel	15	40
damp clay & round gravel	40	46
silty sand	46	48
cinder basalt & angular gravel	48	59

RECEIVED
NOV 15 1999
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

Work Started 10-28 99 Completed 10-29 99

WELL CONSTRUCTION CERTIFICATION

I constructed and/or accept responsibility for construction of this well and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief

Type or Print Name Marshall Miller License No 1437
(Licensed Driller/Engineer)

Trainee Name License No
Drilling Company MM Quality Drilling, LLC
(Signed) 1437 License No
(Licensed Driller/Engineer)
Address 22905 Riverview Rd, Chelan, WA 98816

Contractor's Registration No MVMQUDLO33MM Date

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer For special accommodation needs contact the Water Resources Program at (360) 407 6600 The TDD number is (360) 407 6006

ECY 050 1 20 (11/98)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 48235

UNIQUE WELL I.D. # ABX 913

Water Right Permit No.

(1) OWNER: Name Jason Sindum Address HCR 80 Box 486 Chelan WA 98831

(2) LOCATION OF WELL: County Douglas SW 1/4 SW 1/4 Sec 32 T 27 N. R 23 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) N

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (If more than one)

Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches. Drilled 485 feet. Depth of completed well 485 ft.

(6) CONSTRUCTION DETAILS:

Casing Installed: 6" Diam. from +2 ft. to 45 ft.
Welded ☒
Liner installed ☐ 4" Diam. from −6 ft. to 485 ft.
Threaded ☐ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 150 ft. below top of well Date 7-19-95
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	1080 gallons per day				

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest 25 gal./min. with stem set at 484 ft. for 3 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Sandy loam	0	8
gravel in silt	8	24
silty sands / gravel	24	43
soft white gran. fe	43	150
orange soft granite (w)	150	155
med. hard black white gran.	155	305
green white soft granite (w)	305	340
black white med hard granite	340	405
black hard granite with intermittent soft loose zones	405	485

RECEIVED
JUL 24 1995
DEPARTMENT OF ECOLOGY

Work Started 7-14 19. Completed 7-19 19 95

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME MVM Quality Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 760 Kirkland Rd. 98813

(Signed) MV Mills (WELL DRILLER) License No. 1437

Contractor's Registration No. MVMAQUI38NO Date 7-21 19 95

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (206) 407-6600. The TDD number is (206) 407-6006.

ECY 050-1-20 (9/93)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

01

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Don Nystrom Address 500 McNiel Canyon Rd. Orondo Wa.

(2) LOCATION OF WELL: County Douglas — NE ¼ NE ¼ Sec. 13 T. 22 N., R. 23 W.M.

Bearing and distance from section or subdivision corner Lot 4 Div 3 Shelan Springs

(3) PROPOSED USE: Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well [ ] Method: Dug [ ] Bored [ ]
Deepened [X] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 150 ft. Depth of completed well 205 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ..." Diam. from .... ft. to .... ft.
Threaded [ ] ..." Diam. from .... ft. to .... ft.
Welded [ ] ..." Diam. from .... ft. to .... ft.

Perforations: Yes [ ] No [X]
Type of perforator used .....
SIZE of perforations ... in. by ... in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

Screens: Yes [ ] No [X]
Manufacturer's Name .....
Type ... Model No. ...
Diam. ... Slot size ... from ... ft. to ... ft.
Diam. ... Slot size ... from ... ft. to ... ft.

Gravel packed: Yes [ ] No [X] Size of gravel: .....
Gravel placed from ... ft. to ... ft.

Surface seal: Yes [ ] No [ ] To what depth? ... ft.
Material used in seal .....
Did any strata contain unusable water? Yes [ ] No [ ]
Type of water? ... Depth of strata ...
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ... H.P. ...

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 150 ft. below top of well Date .....
Artesian pressure ... lbs. per square inch Date .....
Artesian water is controlled by ... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [ ] If yes, by whom? .....
Yield: 2 gal./min. with ... ft. drawdown after ... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ... gal./min. with ... ft. drawdown after ... hrs.
Artesian flow ... g.p.m. Date .....
Temperature of water ... Was a chemical analysis made? Yes [ ] No [ ]

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Decomposed Granite	55	205

RECEIVED
MAR 1 - [illegible]
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 3-15, 19 88 Completed 3-16, 19 88

WELL DRILLER'S STATEMENT: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Four Star Drilling (Person, firm, or corporation) (Type or print)

Address Box 37 Hartline Wa. 99135

[Signed] Dwight Emerson (Well Driller)

License No. 124 Date 3-16, 19 88

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. 50792
UNIQUE WELL I.D. # ABL957
Water Right Permit No.

OWNER: Name Tom Cochran Address P.O. Box 4 Chelan Falls WA 98817

(2) LOCATION OF WELL: County Douglas 1/4 NE 1/4 Sec 23 T. 27 N., R. 23 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) A

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (If more than one)
Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8+6 inches. Drilled 165 feet. Depth of completed well 165 ft.

(6) CONSTRUCTION DETAILS:
Casing Installed: 8" Diam. from 72 ft. to 39 ft.
Welded ☐ 6" Diam. from 72 ft. to 145 ft.
Liner installed ☒
Threaded ☐ 6 unknown wt. Per his request ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☒ No ☐
Type of water? Volume too small Depth of strata
Method of sealing strata off cased

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level
Static level 85 ft. below top of well Date 10-14
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest 6 gal./min. with stem set at 164 ft. for 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Top Soil	0	4
cobbles in silty ground	4	19
silt	19	28
basalt flakes in clay	28	39
light matrix	39	43
wet gravel in clay	43	46
cobbles and ground water	46	145
decomposed gran. rock	145	165

Work Started 10-12 19. Completed 10-14 19 94

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME MVM Quality Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 760 Highland Rd. 98813
(Signed) MV Mill (WELL DRILLER) License No. 1437
Contractor's Registration No. MVMQUD138NO Date 10-24 19 94

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (206) 407-6600. The TDD number is (206) 407-6006.

ECY 050-1-20 (9/93)

BADGER MOUNTAIN
MONITORED WELL LOGS

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No W 170552
Unique Well I D # AKH866
Water Right Permit No

137784

(1) OWNER Name MOULTON, BRUCE H Address 628 LOWE ST WENATCHEE, WA 98801

(2) LOCATION OF WELL County DOUGLAS SE 1/4 SE 1/4 Sec 14 T 24 N , R 21E WM
(2a) STREET ADDRESS OF WELL (or nearest address) 114 PONDEROSA RD , EAST WENATCHEE

(3) PROPOSED USE DOMESTIC

(4) TYPE OF WORK Owner's Number of well (If more than one)
NEW WELL Method ROTARY

(5) DIMENSIONS Diameter of well 6 inches
Drilled 299 ft Depth of completed well 299 ft

(6) CONSTRUCTION DETAILS
Casing installed 6 " Dia from +1 5 ft to 18 5 ft
WELDED W/LINER 4 " Dia from 9 ft to 299 ft
" Dia from ft to ft

Perforations YES
Type of perforator used SKILL SAW
SIZE of perforations 125 in by 7 in
42 perforations from 139 ft to 159 ft
84 perforations from 259 ft to 299 ft
perforations from ft to ft

Screens NO
Manufacturer's Name
Type Model No
Diam slot size from ft to ft
Diam slot size from ft to ft

Gravel packed NO Size of gravel
Gravel placed from ft to ft

Surface seal YES To what depth? 18 ft
Material used in seal BENTONITE
Did any strata contain unusable water? NO
Type of water? Depth of strata ft
Method of sealing strata off SEAL METHOD 1

(7) PUMP Manufacturer's Name
Type H P

(8) WATER LEVELS Land surface elevation above mean sea level ft
Static level 24 ft below top of well Date 06/18/03
Artesian Pressure lbs per square inch Date
Artesian water controlled by

(9) WELL TESTS Drawdown is amount water level is lowered below static level
Was a pump test made? NO If yes, by whom?
Yield gal /min with ft drawdown after hrs

Recovery data
Time Water Level Time Water Level Time Water Level

Date of test / /
Bailer test gal/min ft drawdown after hrs
Air test 4 5 gal/min w/ stem set at 298 ft for 3 25 hrs
Artesian flow g p m Date
Temperature of water Was a chemical analysis made? NO

(10) WELL LOG

R

Formation Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change in formation

MATERIAL	FROM	TO
BROWN CLAY	0	2
BROWN CLAY BROKEN BASALT	2	11
HARD BASALT WITH	11	108
BROKEN LAYER(S)	11	108
BROKEN BASALT	108	118
BASALT	118	127
BROKEN BASALT WATER BEARING	127	131
BASALT	131	143
HARD BASALT	143	158
BROKEN BASALT WATER BEARING	158	161
HARD BASALT	161	258
FRACTURED BASALT WATER BEARING	258	266
HARD BASALT	266	289
BLACK CLAY	289	291
DARK BROWN CLAY	291	299

DEPT OF ECOLOGY Received AUG 01 2003 CENTRAL REGIONAL OFFICE

Work started 06/17/03 Completed 06/18/03

WELL CONSTRUCTOR CERTIFICATION
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief

NAME TUMWATER DRILLING, INC
(Person, firm, or corporation) (Type or print)

ADDRESS ~~P O BOX 779~~

[SIGNED] License No 1249

Contractor's
Registration No TUMWADP 011 LZ Date 06/18/03

1955

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. 55141

Permit No. .....

(1) OWNER: Name Ron Robins Address RT 6 Box 52 55B Wenatchee Wa.

LOCATION OF WELL: County Grant Douglas NW ¼ NW ¼ Sec 13 T. 24 N., R. 21 W.M.

Bearing and distance from section or subdivision corner Lot 7 Badger Mtn Development D

(3) PROPOSED USE: Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 125 ft. Depth of completed well 125 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 20 ft.
Threaded [ ] ..... " Diam. from ..... ft. to ..... ft.
Welded [ ] ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes [ ] No [X]
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes [ ] No [X]
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes [ ] No [X] Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes [X] No [ ] To what depth? 18' ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes [ ] No [ ]
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level ..... ft. below top of well Date .....
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [ ] If yes, by whom? .....
Yield: 8 gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes [ ] No [ ]

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Soil	0	5'
Brown Broken Basalt rock	5'	125'
Water 100 to 125'		

Work started 6-1 1986 Completed 6-9- 1986

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Four Star Drilling (Person, firm, or corporation) (Type or print)

Address Box 37 Hartline Wa.

[Signed] Fred E Emerson (Well Driller)

License No. 124 Date 6-9- 1986

(USE ADDITIONAL SHEETS IF NECESSARY)

2/17/87

ECY 050-1-20 3

WELL LOG CHANGE FORM

Instructions: Record any change made to the well log record on this form. Append this form to the well log image. File with the original.

WCL Log ID (Required) N/A Well Log ID 145034

Regional Office: ☑CRO ☐ERO ☐NWRO ☐SWRO

Type of Well: ☑Water ☐ Resource

Notice of Intent: N/A Ecology Well ID Tag No. N/A

Property (Well) Owner's Name Ron Robins
Well Street Address _____
City _____ County Douglas Zip Code _____

Location: NW 1/4-1/4 NW 1/4 (Sec 12) Twn 24 R 21 (E) or W (Circle One)

Lat./Long: (Required) Lat. Deg. _____ Lat. Min/Sec _____
Long. Deg. _____ Long. Min/Sec _____
Horizontal Collection Method Code _____

Tax Parcel No _____

Type of Work: ☐ New Well ☐ Reconditioned ☐ Deepened
Well Log Received Date __/__/__
Well Diameter ___ (in inches) Well Depth _____ (in feet) Well Completed Date __/__/__

Driller's Ecology License No. _____
Trainee's Ecology License No. _____

Reason/Source of Change (Required)
CORRECTION TO SECTION ONLY
Well is in Section 12, not 13.

Signature of Well Log Tracker (Required) EB Date 1/20/05

WATER WELL REPORT

State of Washington Date Printed: **17-Jun-2005** Log No. **16405**

Construction/Decommission Original Construction Notice **175767**

Construction

PROPOSED USE: **DOMESTIC**

TYPE OF WOR Owners's Well Number: (If more than one well) **1**

NEW WELL Method: **ROTARY**

DIMENSIONS Diameter of well: **6** inches

Drilled **140** ft. Depth of completed well **140** ft.

CONSTRUCTION DETAILS: Casing installed **WELDED**

6 " Dia from **+2** ft. to **18** ft.

Liner installed: **PVC**

4 " Dia from **10** ft. to **140** ft.

" Dia from ft. to ft.

" Dia from ft. to ft.

Perforations: **Yes** Used In: **Liner**

Type of perforator used **SKILL SAW**

SIZE of perforations **6** in. b **1/8** in.

60 Perforation from **100** ft. to **140** ft.

Perforation from ft. to ft.

Perforation from ft. to ft.

Screens: **No** K-Pac Location

Manufacture's Name

Type: Model No

Diam. slot size from ft. to ft.

Diam. slot size from ft. to ft.

Gravel/Filter packed: **No** Size of Gravel

Material placed fro ft. to ft.

Surface seal: **Yes** To what depth **18** ft.

Seal method: Material used in seal **BENTONITE**

Did any strata contain unusable water **No**

Type of water Depth of strata

Method of sealing strata off

PUMP: Manufacture's name

Type: H.P. **0**

WATER LEVELS Land-surface elevation above mean sea level: **0** ft.

Static level **60** ft. below top of well Date **05/19/2005**

Artesian Pressure lbs per square inch Date

Artesian water controlled by

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made **No** If yes, by whom

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Recovery data (time taken as zero when pump turned off)(water level measured from well top to water level

Time:	Water Leve	Time:	Water Leve	Time:	Water Leve

Date of test:

Bailer test gal/min ft drawdown after hrs.

Air test **20** gal/min w/ stem set at **140** ft. for **1** hours

Artesian flow gpm Date

Temperature of water Was a chemical analysis made **No**

CURRENT

Notice of Intent No.: **W190406**

Unique Ecology Well I.D. No **AKM235**

Water Right Permit Number:

OWNER: **MURRAY, EDWARD L.**

OWNER ADDR: **519 N. FRENCH RD ARLINGTON, WA 98223**

Well Street Address: **LOT 7 BADGER MTN. "D"**

City: **Wenatchee, WA 98802** County: **DOUGLAS**

Location: 1/4 **SW** 1/4 Sec **23** T **24** R **21E** EW

Lat/Long: (s, t, r still REQUIRED) Lat Deg Lat Min/Sec

Long Deg Long Min/Se

Tax Parcel No.: **45100000700**

L M, N P

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure. Show thickness of aquifiers and the kind and nature of the material in each stratum penetrated. Show at least one entry for each change in formation.

Material	From	To
BASALT COBBLE CLAY	0	2
BASALT MEDIUM	2	40
BASALT HARD	40	98
BROKEN BASALT	98	110
BASALT FRACTURED W/WATER	110	130
BASALT HARD	130	140

DEPT. OF ECOLOGY Received JUL 07 2005 CENTRAL REGION OFFICE

Notes:

Work starte **05/19/2005** Complete **05/20/2005**

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well and its compliance with all Washington well construction standards Materials used and the information reported are true to my best knowledge and belief.

☑ Driller ☐ Engineer ☐ Trainee

Name: **MARTY RUGO** License No.: **2038**

Signature: Marty Rugo

If trainee, Licensed driller is License No.:

Licensed Driller Signature

Drilling Company:

NAME: **FOGLE PUMP & SUPPLY, INC.** Shop: **REPUBLIC**

ADDRESS: **PO Box 456**

Republic, WA 99166

Phone: **5097752878** Toll Free: **8008453500**

E-Mail: **foglewest@rcabletv.com**

FAX: **5097750498** WEB Site: **www.foglepump.com**

Contractor's Registration No.: **FOGLEPS095L4** Date Log Created: **06/17/200**

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No ~~W-088714C~~
UNIQUE WELL I.D. # ACK 059
Water Right Permit No. _____

(1) OWNER: Name WILLEY, GARY Address 9269 CRESENT BAR N.W. QUincy WA 98848

(2) LOCATION OF WELL: County DOUGLAS SE 1/4 NE 1/4 Sec 15 T 24 N.R 21E WM.

(2a) STREET ADDRESS OF WELL (or nearest address) 3 SW 17.5 BADGER MT, EAST WENATCHEE 4

(3) PROPOSED USE: [X] Domestic [ ] Industrial [ ] Municipal [ ] Irrigation [ ] Test Well [ ] Other [ ] DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) _____
Abandoned [ ] New well [ ] Method: Dug [ ] Bored [ ]
Deepened [X] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 33 feet. Depth of completed well 210 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 4½" Diam. from 180 ft. to 210 ft.
Welded [ ] _____" Diam. from _____ ft. to _____ ft.
Liner installed [X] Threaded [ ] _____" Diam from _____ ft. to _____ ft.

Perforations: Yes [X] No [ ]
Type of perforator used 1/8 SKIL SAW
SIZE of perforations 1/8 in by 7 in.
42 perforations from 190 ft to 210 ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft to _____ ft.

Screens: Yes [ ] No [X]
Manufacturer's Name _____
Type _____ Model No. _____
Diam. ____ Slot size _____ from _____ ft. to _____ ft.
Diam. ____ Slot size _____ from _____ ft to _____ ft.

Gravel packed: Yes [ ] No [X] Size of gravel _____
Gravel placed from _____ ft to _____ ft

Surface seal: Yes [ ] No [ ] To what depth? _____ ft.
Material used in seal _____
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H P _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 116 ft below top of well Date 5-6-98
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [X] If yes, by whom? _____
Yield _____ gal./min with _____ ft drawdown after _____ hrs
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

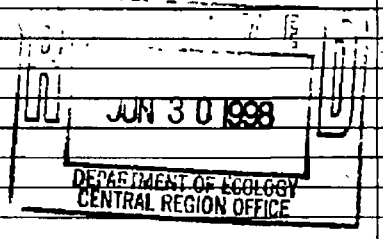
Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest 15 gal./min. with stem set at 210 ft. for 1½ hrs.
Artesian flow _____ g.p.m. Date 5-6-98
Temperature of water _____ Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
EXISTING 6" WELL - 0GPM	0	178
BASALT	178	182
BROKEN BASALT ½-1GPM	182	185
BASALT	185	189½
BLACK CLAY	189½	197
BROWN CLAY WBEC 201'-204	197	208
BROWN VERY FINE SAND	208	211



Work Started 5-6 19 Completed 5-7 1998

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME TUMWATER DRILLING INC. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address LEAVENWORTH WA
(Signed) _____ (WELL DRILLER) License No 1349
Contractor's Registration No. TUMWAD2 1330C Date 5-26 1998

(USE ADDITIONAL SHEETS IF NECESSARY)

WELL LOG CHANGE FORM

Instructions: Record any change made to the well log record on this form
Then always append this form to the well log image File with the original

WCL Log ID (Required)_____ Well Log ID _____

Regional Office: ☐CRO ☐ERO ☐NWRO ☐SWRO

Type of Well: ☐ Water ☐ Resource
Notice of Intent Ecology Well ID Tag No. _
Property (Well) Owner's Name _____
Well Street Address _____
City _____ County _____ Zip Code _____
Location ____1/4-1/4 ____1/4 Sec ____ Twn ____ R ____ E or W (Circle One)
Lat /Long: (Required) Lat. Deg _____ Lat. Min/Sec _____
Long. Deg. _____ Long Min/Sec _____
Horizontal Collection Method Code _____
Tax Parcel No _____
Type of Work: ☐New Well ☐ Reconditioned ☐ Deepened ☐ Decommission
Well Log Received Date __/__/__
Well Diameter ___ (in inches) Well Depth _____ (in feet) Well Completed Date __/__/__
Driller's Ecology License No. _____
Trainee's Ecology License No _____

Reason/Source of Change (Required)
No Notice of Intent (NOI) sent in for this well log. Go to NOI# on this form for more information regarding this well.

Signature of Well Log Tracker (Required) Peg Plummer Date 1 1

ECY-WR-WLCF Rev. 10/02/02

APPENDIX B
PRECIPITATION PLOTS

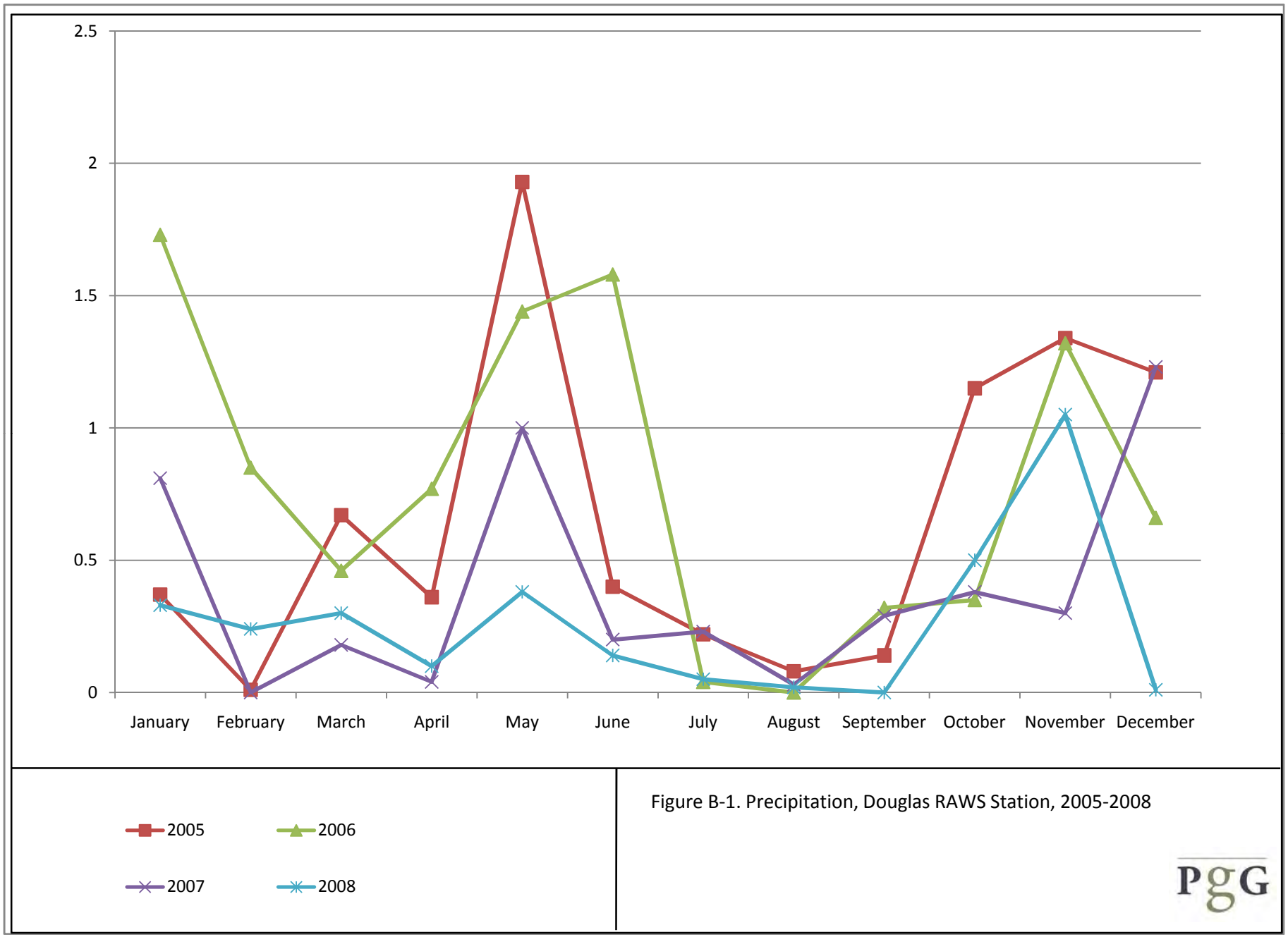


Figure B-1. Precipitation, Douglas RAWS Station, 2005-2008

PgG

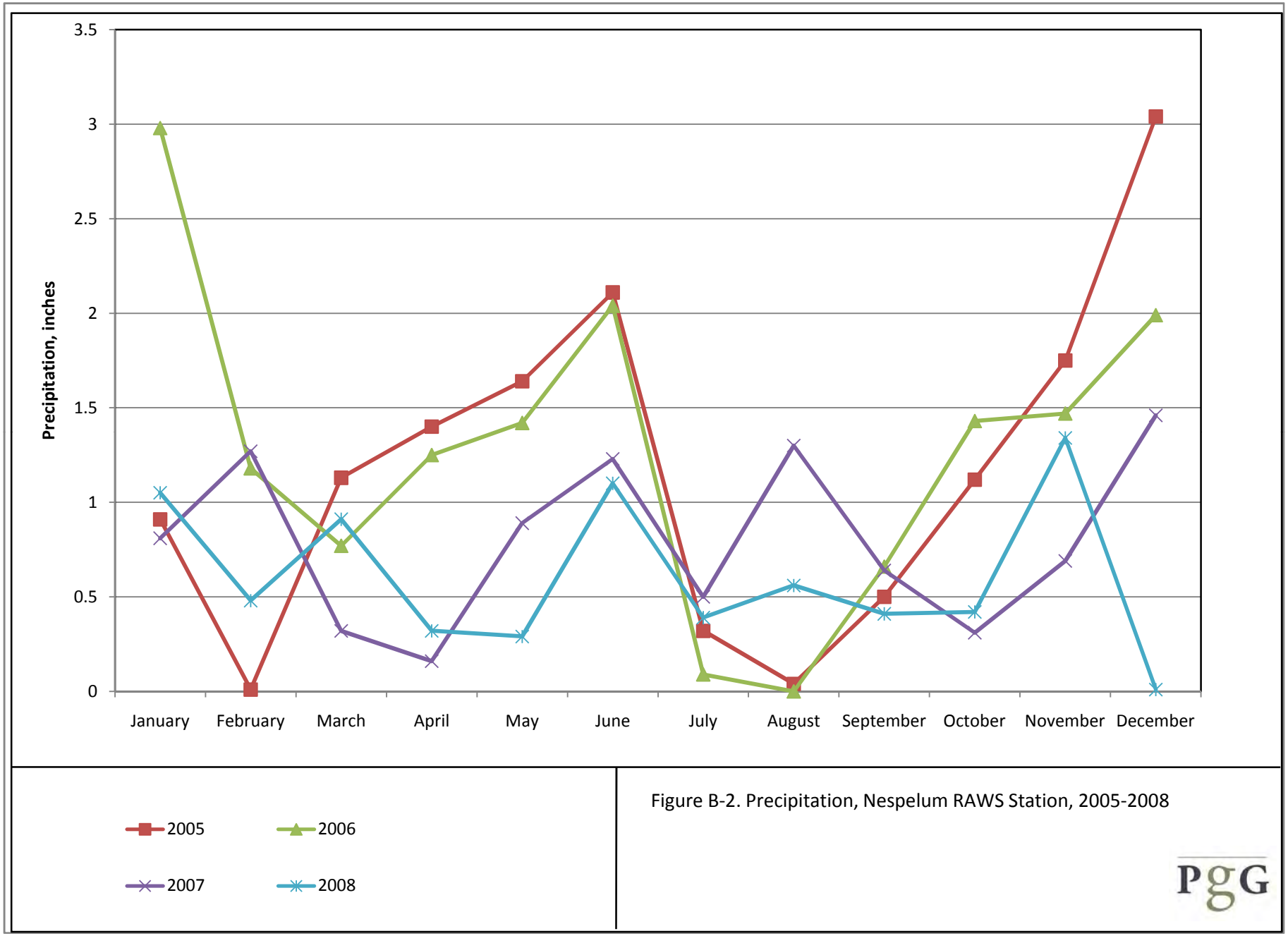


Figure B-2. Precipitation, Nespelum RAWS Station, 2005-2008

PgG