**Thurston County Water Resources**

**Technical Memorandum #6**

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Formatting and Evaluating Precipitation Data  
1988-2000

# Goal

To reformat Thurston County precipitation data from 1988-2000 into a usable data structure and file type for future analysis and import into the new GData database. Additionally, perform basic QA/QC on historic data to determine its utility.

# Results

There were 13 precipitation monitoring sites active during part or all of the 1988-2000 timespan; 8 of those stations are still in operation as of December 2016.

Table 1: List of Precipitation Monitoring Sites with Data Prior To 2000

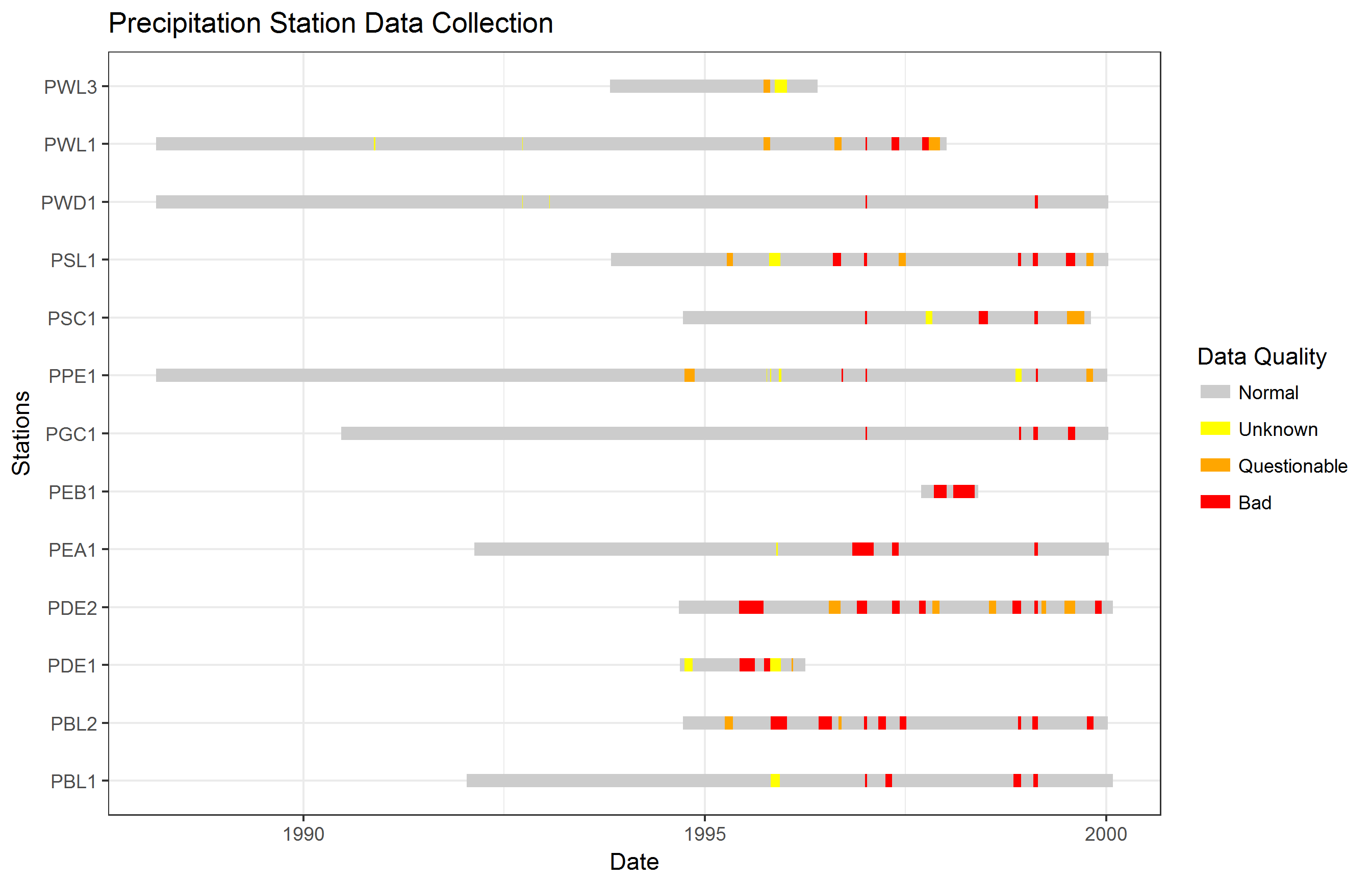
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Site Code** | **New Site Code** | **Site Name** | **Start Date** | **End Date** |
| PBL1 | 45u | Littlerock | 1988-03-01 |  |
| PBL2 |  | Capitol Forest Tacoma Trail Cruisers | 1994-09-23 | 2000-01-08 |
| PDE1 |  | Yelm Highway Pump Station | 1994-09-09 | 1996-04-01 |
| PDE2 | 13u | Lake Lawrence | 1992-01-13 |  |
| PEA1 | 10u | Meridian Rd | 1992-02-18 |  |
| PEB1 | 27u | Boston Harbor | 2008-11-26 |  |
| PGC1 | 32u | Kaiser Rd | 1990-06-22 | 2013-01-29 |
| PPE1 | 23u | Percival Creek, Bldg 4 | 1988-03-01 |  |
| PSC1 | 55u | Tenino | 1994-10-01 |  |
| PSL1 | 69u | Summit Lake | 1993-11-01 |  |
| PWD1 |  | 12th Ave - Woodard Creek | 1988-03-01 | 2008-08-06 |
| PWL1 |  | Woodland Creek - TC Fairgrounds | 1988-03-01 | 2008-12-31 |
| PWL3 | 18w | WARC TC | 1993-10-27 |  |

Figure 1: Map of Precipitation Monitoring Sites with Data Prior To 2000



The data collected from each of these sites was over varying spans of time and of varying quality. One site (PEB1) should be discarded from further study. An additional two sites (PDE2 and PBL2) should be carefully analyzed before using in additional research.

Figure 2: Precipitation Station Data Collection Timespan and Quality



# Methods

## Software

This analysis was conducted in Excel 2013; R 3.3.1 (RStudio 1.0.44, plus packages broom, cowplot, dplyr, ggplot2, readr, tools, and reshape2); and QGIS 2.14.

## Data

The primary dataset for this analysis was a set of \*.HSP files corresponding to each of the 13 stations listed in Table 1. Those files were generated by ANNIE, part of the Hydrologic Simulation Program: FORTRAN (HSPF) software suite, years before this analysis was completed. The files contained data in HSPF

## Analysis

# Recommendations

# References

Daly, C., Halbleib, M., Smith, J. I., Gibson, W. P., Doggett, M. K., Taylor, G. H., . . . Pasteris, P. P. (2008). Physiographically sensitive mapping of climatological temperature and precipitation across the conterminous United States. *INTERNATIONAL JOURNAL OF CLIMATOLOGY*.

Hofierka, J., Parajka, J., Mitasova, H., & Mitas, L. (2002). Simultaneous spline approximation and topographic analysis for lidar elevation data in open source GIS. *Transactions in GIS 6(2)*, 135-150.

PRISM Climate Group. (2016, 12 1). *PRISM 30-Year Normals*. Retrieved 12 1, 2016, from http://prism.oregonstate.edu/normals/

# Appendix 1: R Script for Adjusting Rain Gages