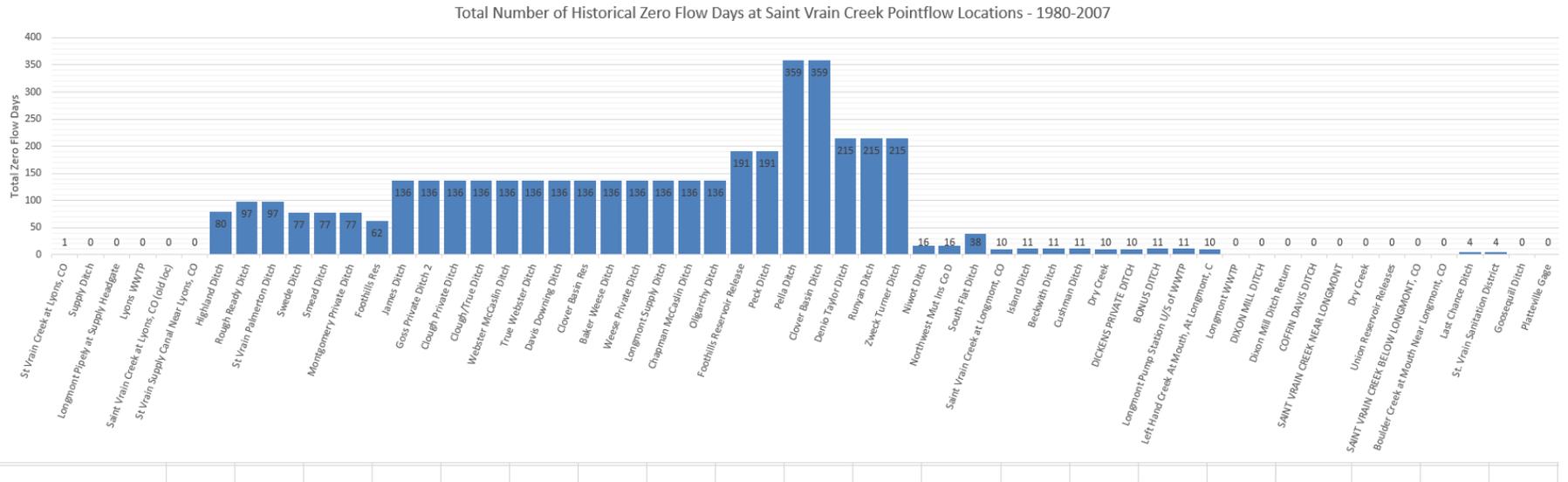


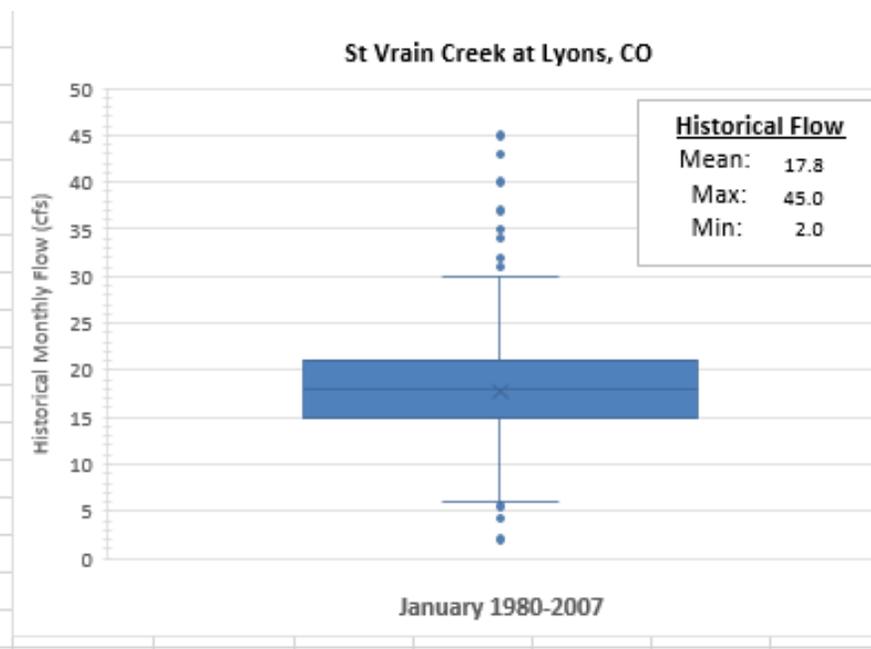
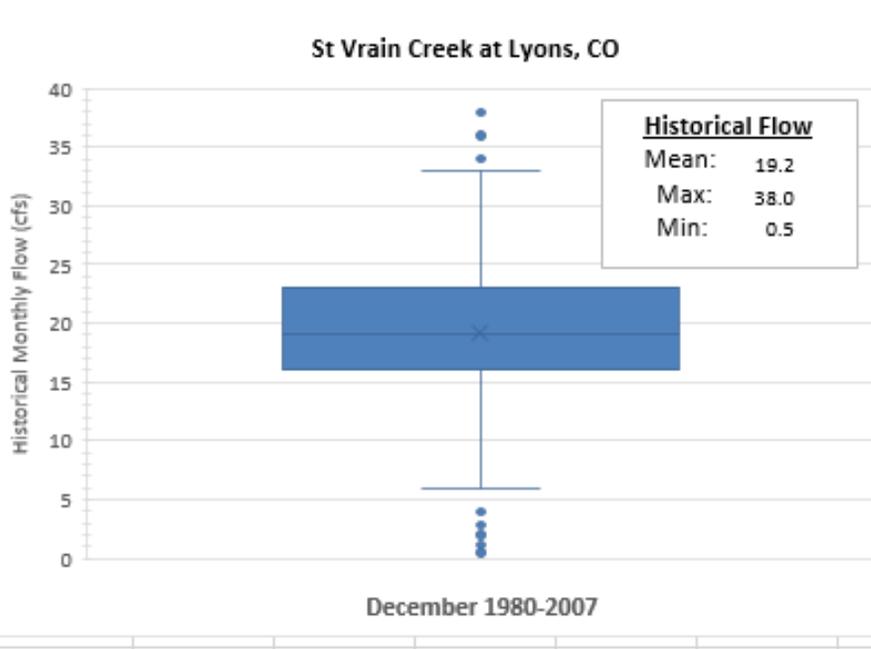
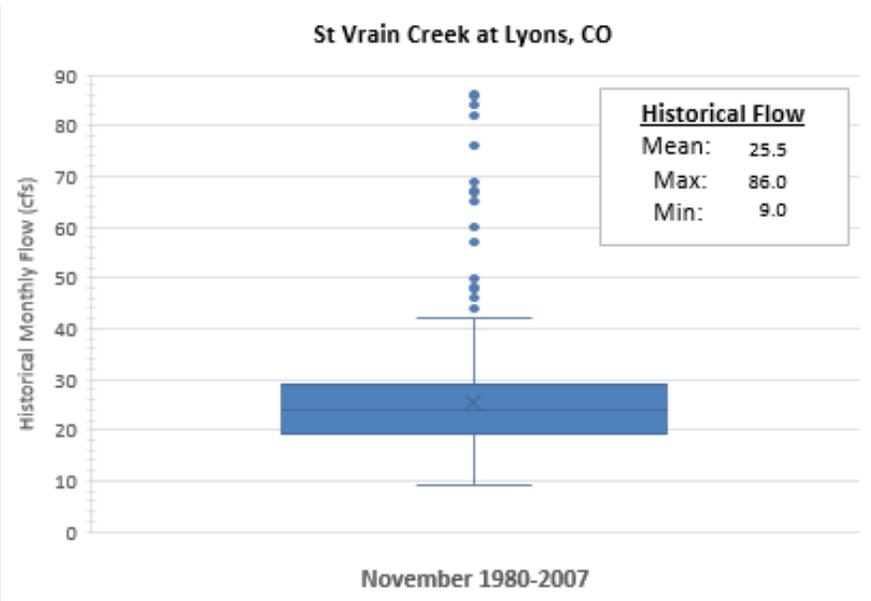
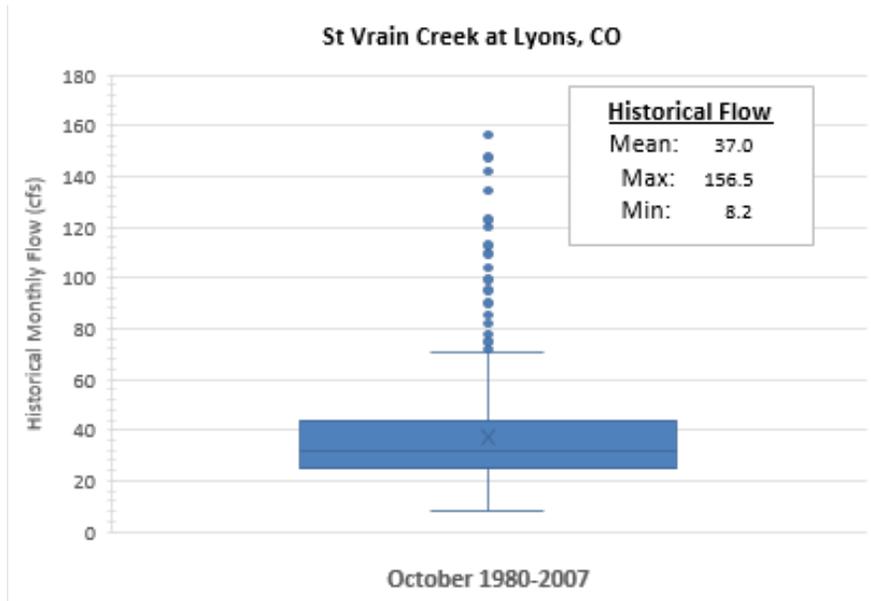
APPENDIX E

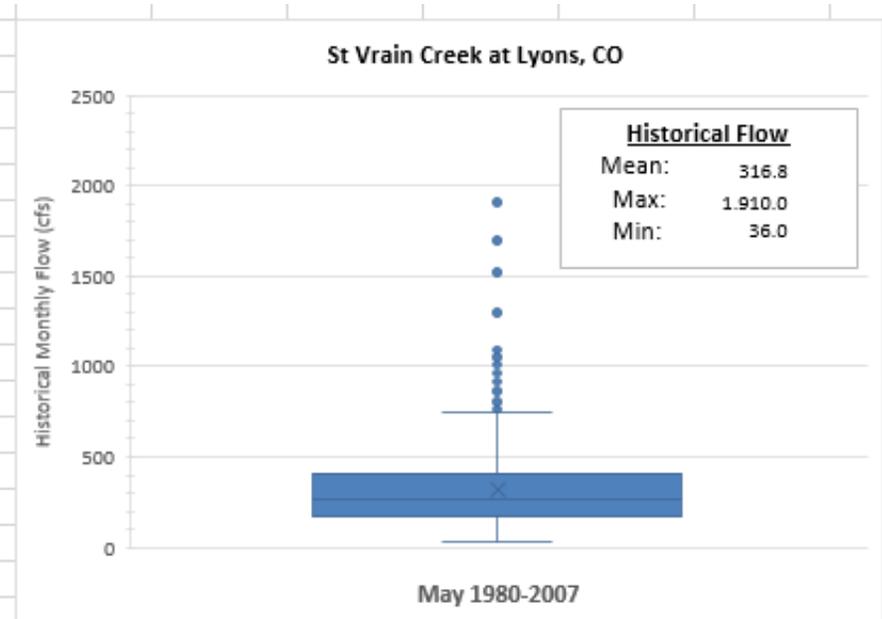
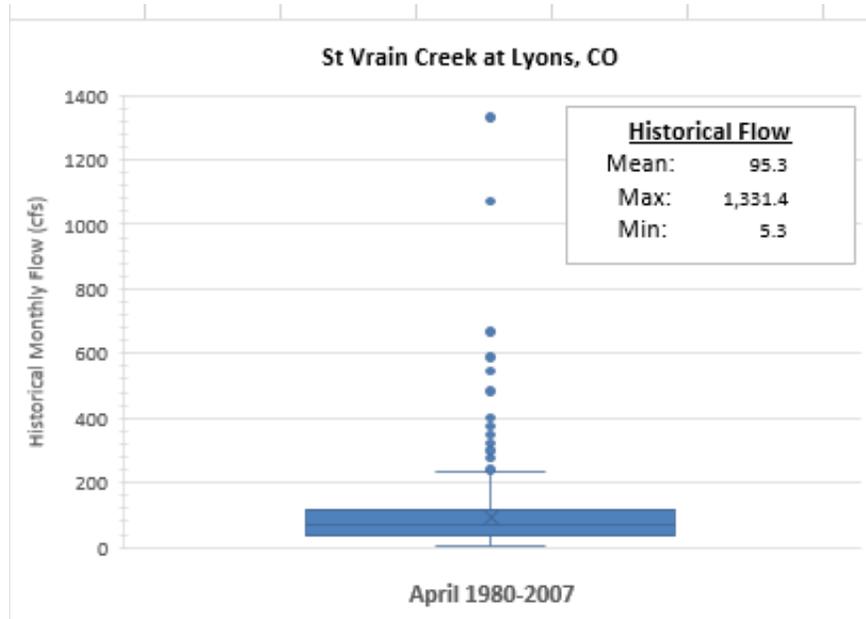
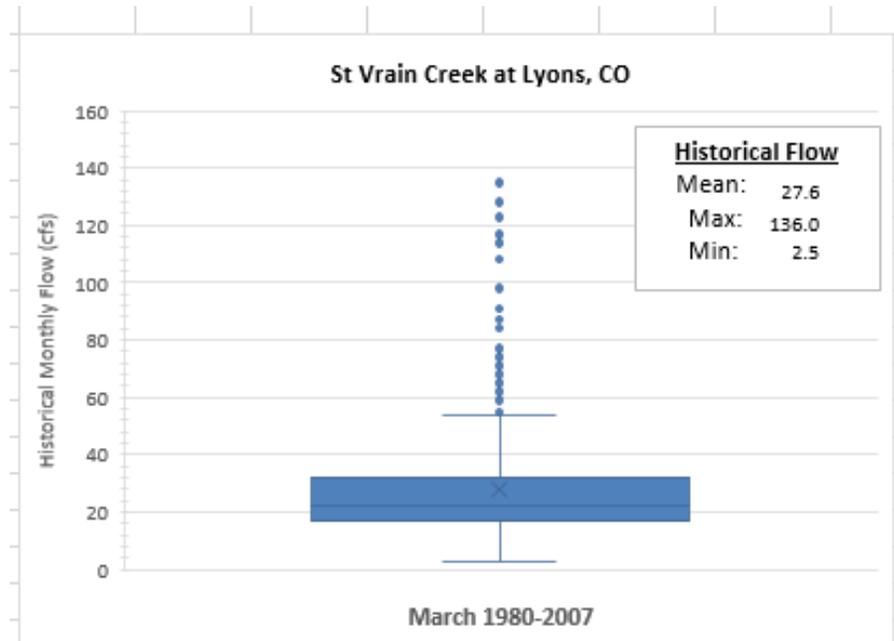
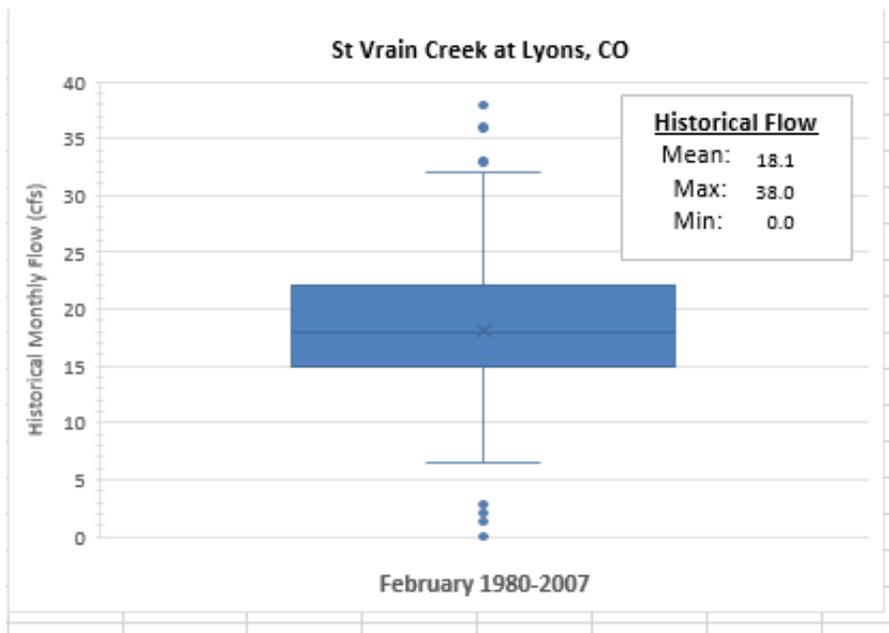
ADDITIONAL FLOW INFORMATION

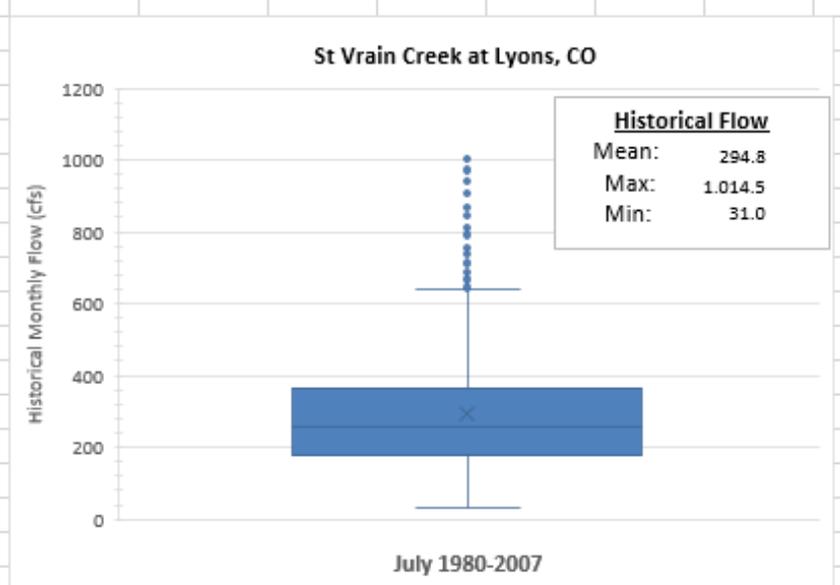
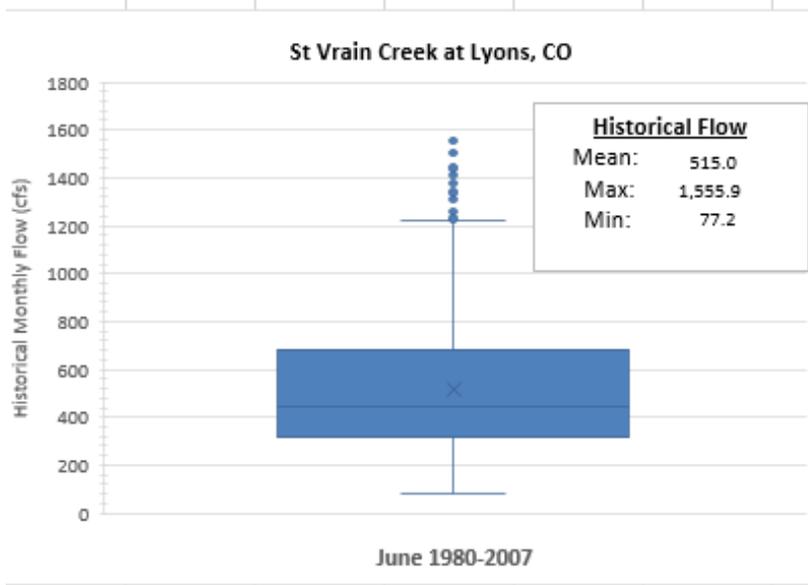


Average Annual Zero Flow Days at Saint Vrain Creek Pointflow Locations - 1980-2007

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MEMORANDUM

TO: File

FROM: Nathan D. Phelps, P.E.

DATE: May 22, 2019

RE: Operating Instructions for St. Vrain Pointflow Analysis Workbook

This memorandum presents a brief description and operating instructions for the St. Vrain Pointflow Analysis Workbook provided in Microsoft Excel workbook format (St Vrain Pointflow Analysis.xlsm). The workbook was prepared by Deere & Ault Consultants, Inc. at the request of Biohabitats for use in preparing the Stream Management Plan for the St. Vrain and Left Hand Water Conservancy District.

The pointflow data used in the workbook is derived from a St. Vrain pointflow analysis performed by the Northern Colorado Water Conservancy District (NCWCD) using a 1980 through 2007 period of record. A description of the worksheets added to NCWCD's original pointflow workbook along with operating instructions is provided below.

NOTE: This workbook uses VBA macros for some calculations; the user should make sure that macros are enabled in order to maintain full functionality. It is also important that the sheets described below are not re-named, manipulated, or removed from the workbook unless the VBA code is properly updated. Copies of the existing sheets under different sheet names, as well as new sheets, can be added to the workbook without issue.

MonthlySummary

The **MonthlySummary** sheet provides a single-node monthly summary table for the daily pointflow values calculated in the **Deere&Ault** sheet. A dropdown menu in the yellow-shaded area located to the upper right of the table is used to select the node being summarized. The up/down arrows located to the right of the dropdown menu can also be used to quickly scroll through nodes, which is helpful when making comparisons.

The option buttons located on the left-hand side of the yellow-shaded area are used to select the type of monthly summary provided in the table. The three options are: 1) "Sum of daily values" indicating that the monthly values shown in the table represent the monthly sum of the daily values calculated in the **Deere&Ault** sheet; 2) "Average of daily values" indicating that the monthly values shown in the table represent the monthly average of the daily values; and 3) "Zero flow occurrences" indicating that the values shown in the table represent the monthly number of days in which the daily pointflow values are equal to zero.

A "data multiplier" box is also provided within the yellow-shaded area in order to allow the user to quickly apply a conversion factor to the values in the monthly summary table. For example, when the "Sum of daily values" option button is selected, 1.9835 can be entered into the "data multiplier" box in order to convert the monthly sum of the daily flow data in cfs into monthly flow volumes in acre-feet. If no conversion factor is desired, the "data multiplier" box should be set to 1.

MonthlyStats

The **MonthlyStats** sheet generates historical monthly mean, maximum, and minimum flow statistics and monthly box and whisker plots for a single node using daily data over the period of record. A dropdown menu in the yellow-shaded area located at the top of the sheet is used to select the node for analysis.

A VBA macro is utilized to organize the daily data into monthly data strings used for the box and whisker plots and is automatically run whenever a different node is selected from the dropdown menu. A “Run Macro” button is also provided to allow the user to run the macro without selecting a different node; this is useful in the case that data is accidentally deleted from the macro output area beginning in Row 45. Processing speed may vary depending on computer processing power but typically should not take longer than 10 seconds to complete the macro. It is very important not to add or delete rows or columns on the **MonthlyStats** sheet, otherwise the macro may not run properly.

Whenever a new node is selected from the dropdown menu, the existing data will be overwritten. In order to preserve the output data, the user can simply create a copy of the **MonthlyStats** sheet and save it under a different sheet name (consider using the node identifier number as the sheet name). Once the data is saved under a new sheet name, it will no longer be linked to the VBA macro and rows or columns can be added without compromising workbook functionality.

Graphs

The **Graphs** sheet provides a series of bar charts showing the total number of zero flow days, average annual zero flow days, percent of time with zero flow, average daily flow, average winter flow, and average summer flow for each node in the pointflow analysis over the period of record.

Control

The **Control** sheet is primarily used for lookup and cell reference purposes and should not be edited or removed from the workbook

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