Analysis of loadings

Wesley Brooks

First, we'll read the data files and divide the events into a few classes: one class for events that occured with snowmelt, one class for events that occured after the spring's last snowmelt but before mid-May (defined here as Julian date 135), and one class for events that occured after julian 135 and before the first snowmelt of the next winter.

We also will look at dividing the data into just two groups: one that is snow-influenced and one that is not. "Not snow-influenced" just combines event classes two and three.

The next block of code produces a set of bar charts that show the relative contributions of the snow-driven events, post-snow-pre-vegetation events, and the post-vegetation events.

The next block prints a table of the proportion of total phosphorus loading due to each class of event at each site

	snowmelt-driven	early post-snow	late post-snow
eagle	32.8%	22.9%	44.2%
joosvalley	36.4%	16.9%	46.7%
otter	40.4%	16.9%	42.6%

Table 1: Proportion of total phosphorus loading contributed by each type of event

Produce plots of the proportion of the suspended solids and phosphorus (both total loading and stormflow loading) that is contributed by each class of event at each stream site:

	snowmelt-driven	early post-snow	late post-snow
eagle	27.0%	29.1%	43.9%
joosvalley	26.9%	20.5%	52.6%
otter	29.4%	20.9%	49.7%

Table 2: Proportion of total suspended solids loading contributed by each type of event

Now let's do the same between the snow and no-snow events:

Put the barchart into the document here:

We will use a Wilcoxon rank-sum test to establish whether the average daily load from a snowmelt-driven event is different from that of a post-snow event:

```
[1] 0
```

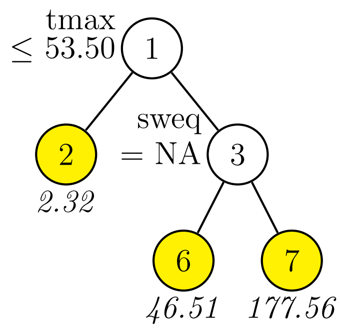
```
[1] 0.1827669
```

```
[1] 0.61315
```

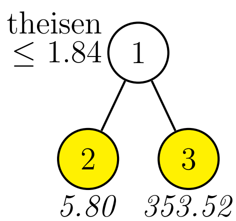
Figure out what proportion of total storm loading is contributed by the top 10% of storms:

The top 10% of storms contributed 0% of the storm loading at Eagle Creek, 0% of the storm loading at Otter Creek, and 0% of the storm loading at Joos Valley Creek.

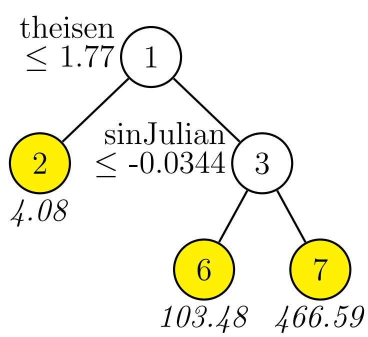
Now we want to know how these major events are distributed within the event classes; that is, whether snowmelt tends to produce major loading events, or whether it is the post-snow events. Note that the _tot column measures the total loading during an event. The snowmelt-driven events are different in kind than the rainfall-driven ones because they don't require continuous rain during the event. If the snowmelt-driven events are caused by warm weather, it seems reasonable that a single event might last for many days and cause more loading than a more-intense rainfall event that only lasts a day or two. To account for this, we will look both at total loading (_tot) and average daily loading during an event (_avg).



GUIDE piecewise constant least-squares regression tree model. At each intermediate node, a case goes to the left branch if and only if the condition is satisfied. Number in italics beneath leaf node is sample mean of stottot.



GUIDE piecewise constant least-squares regression tree model. At each intermediate node, a case goes to the left branch if and only if the condition is satisfied. Number in italics beneath leaf node is sample mean of stottot.



GUIDE piecewise constant least-squares regression tree model. At each intermediate node, a case goes to the left branch if and only if the condition is satisfied. Number in italics beneath leaf node is sample mean of stottot.

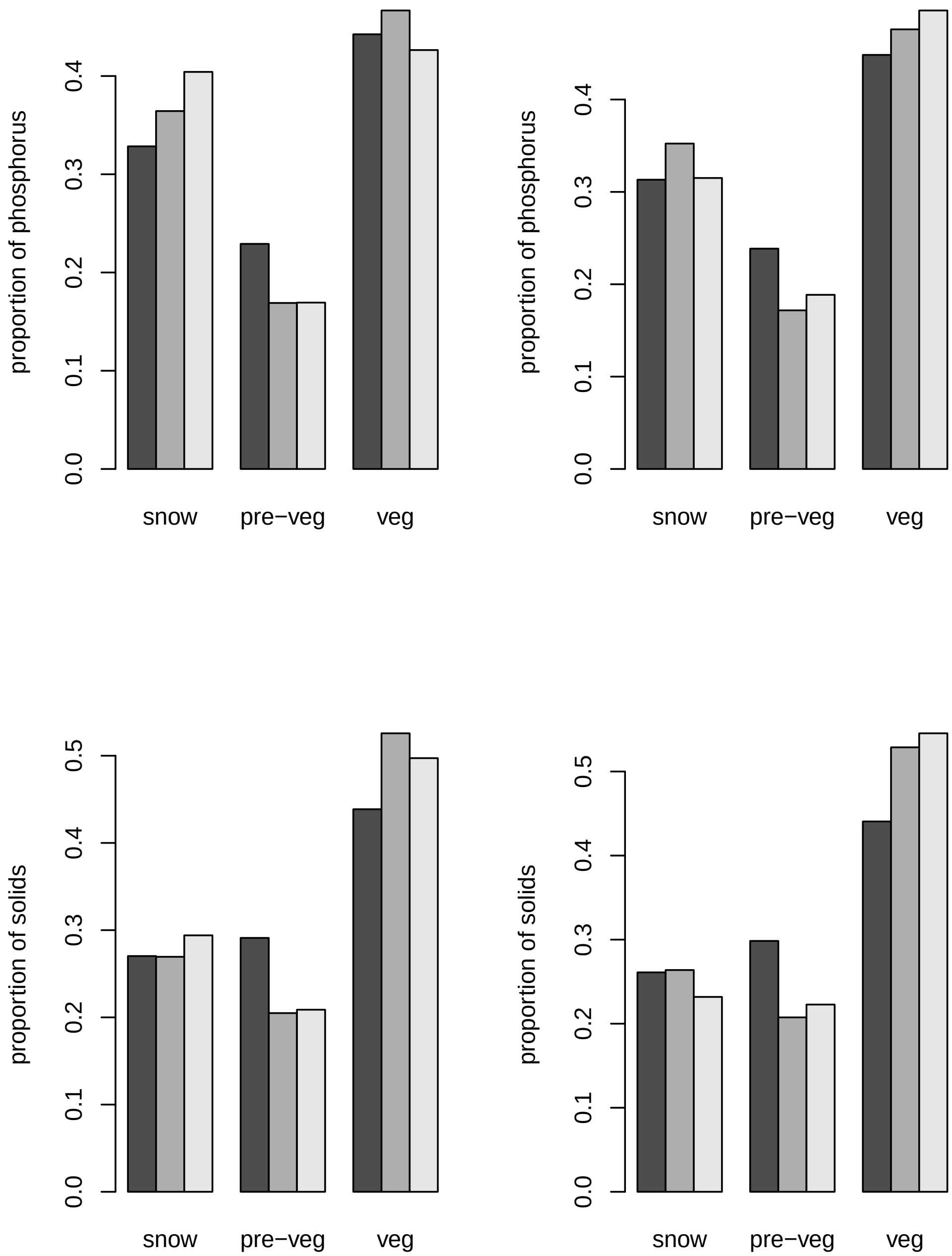


Figure 1: Cumulative storm loadings at the three creeks.

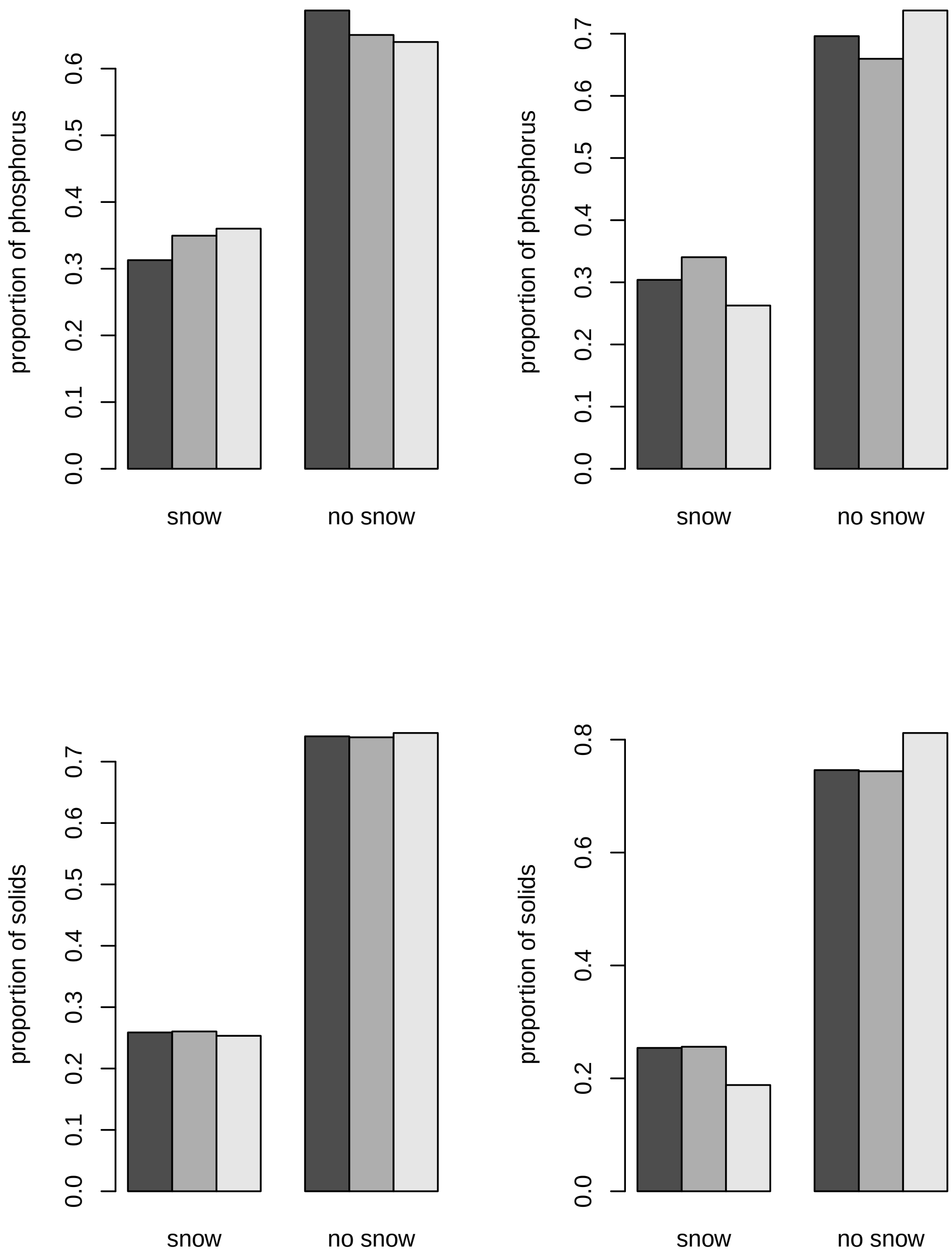


Figure 2: Cumulative storm loadings at the three creeks.

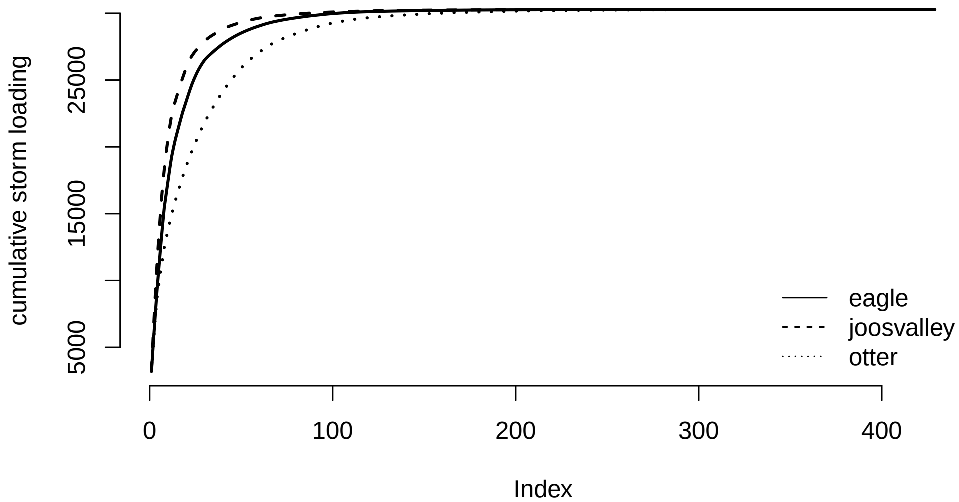


Figure 3: Cumulative storm loadings at the three creeks.