

# Trends in River Flow and Population Dynamics

Ryan Birmingham

# Note on Unlabeled Figure Order

Atlanta	Buford	GA 280
Norcross	Roswell	Peachtree Creek (not Chattahoochee)

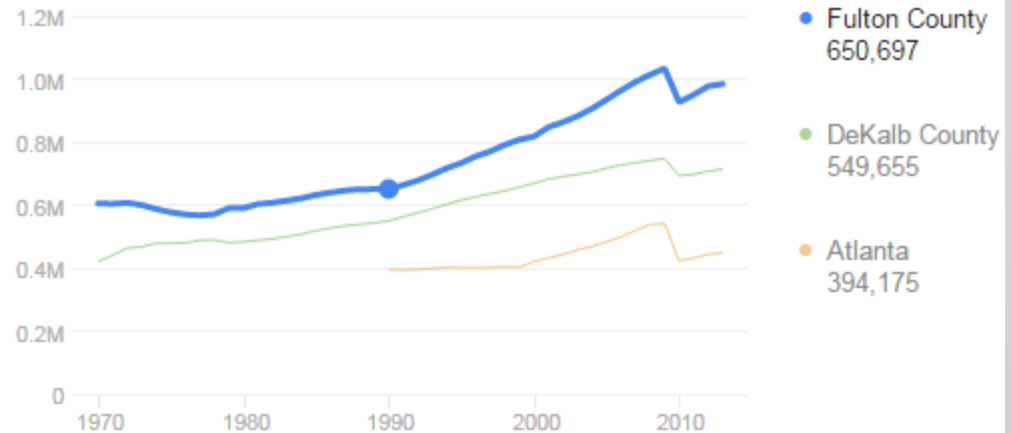
# Why This Topic

The 1996 Olympics

The population trend in the county

Fulton: 600k in 1990, 1.1 m in 2000

The water!



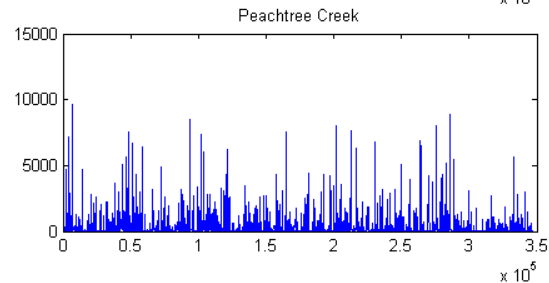
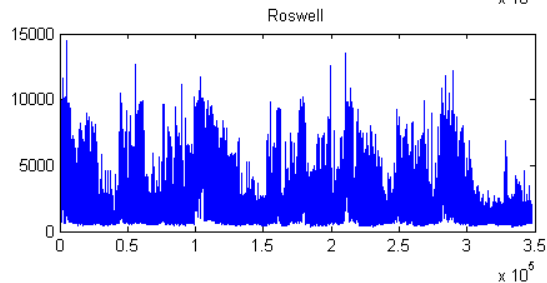
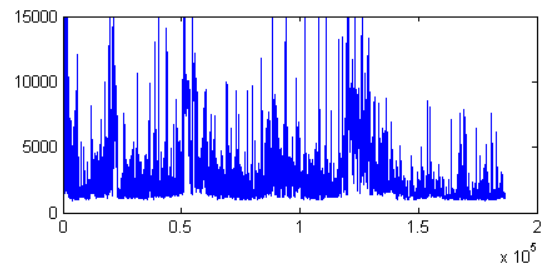
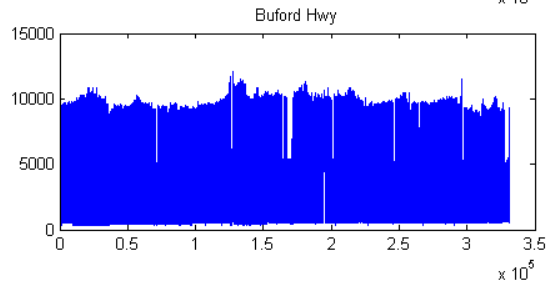
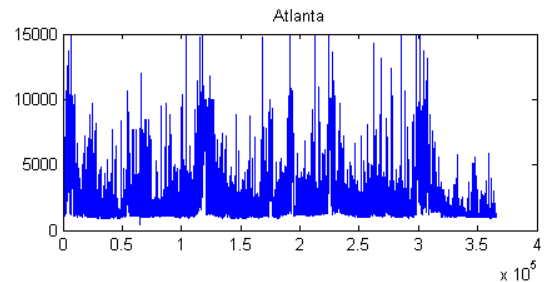
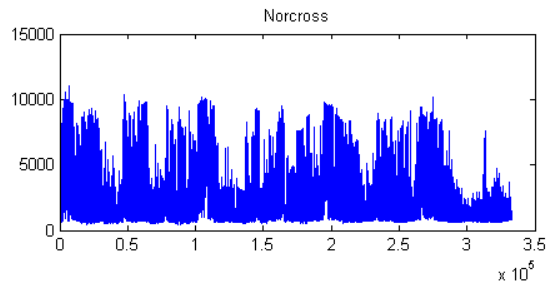
# The Data

Chattahoochee river flow  
(sampled about once every 15 min, over 1990  
to 2000)

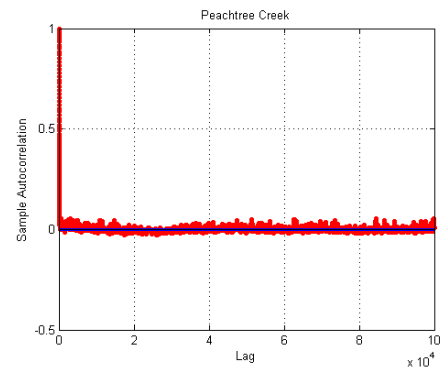
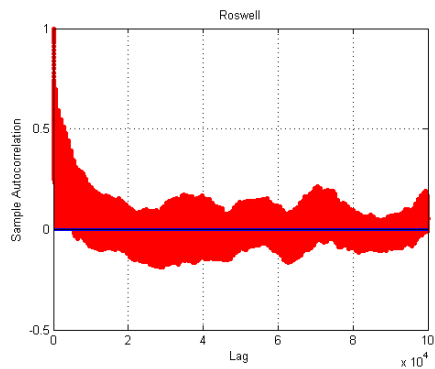
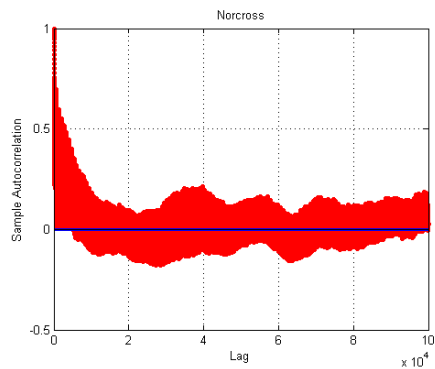
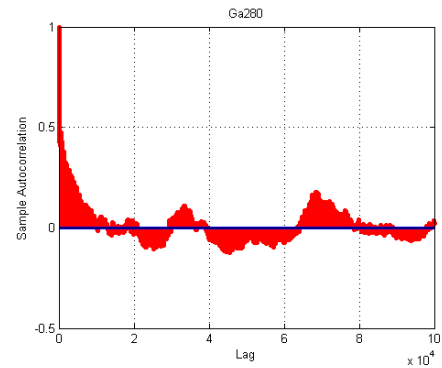
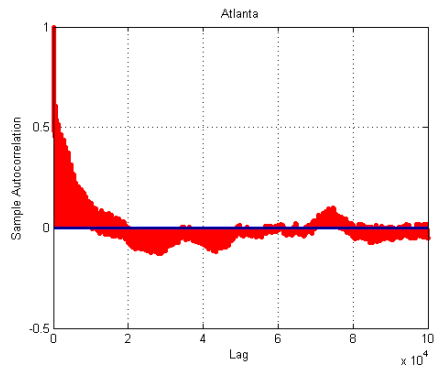
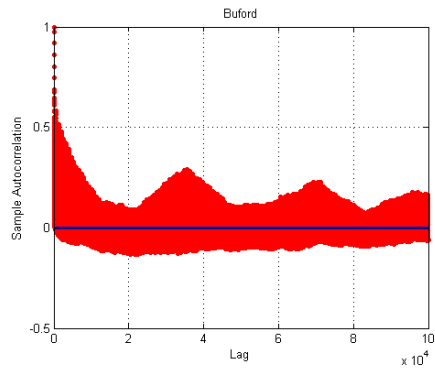
Peachtree Creek, same data



# Summary of Data

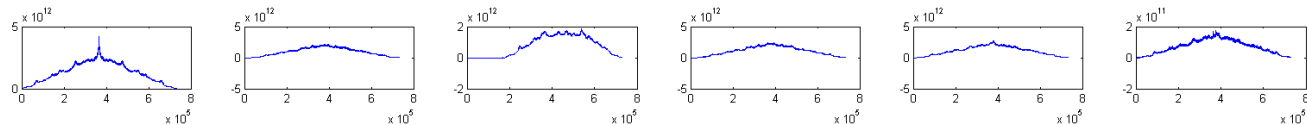


# Autocorrelation

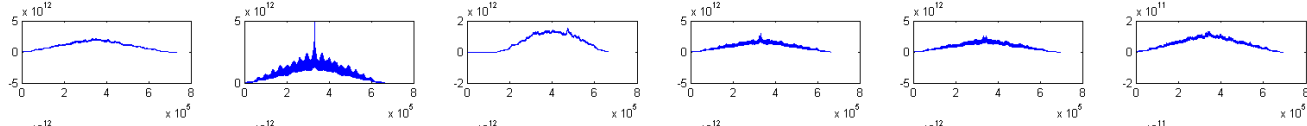


# Xcorr

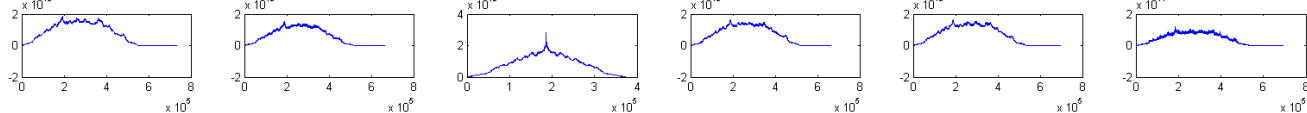
Atlanta



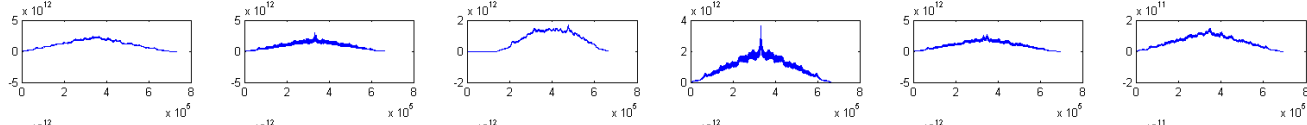
Buford



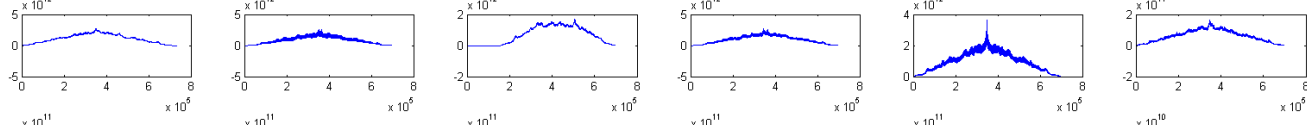
GA 280



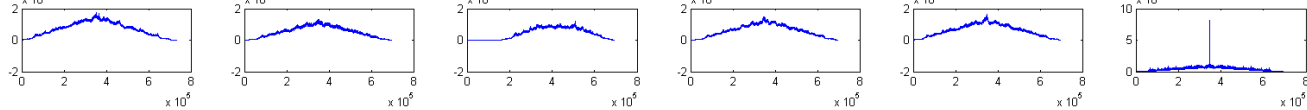
Norcross



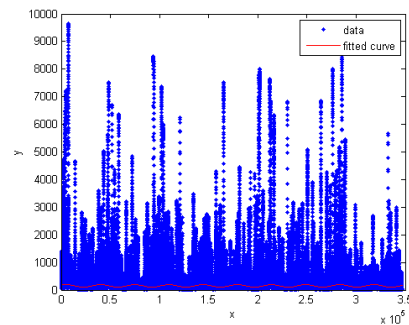
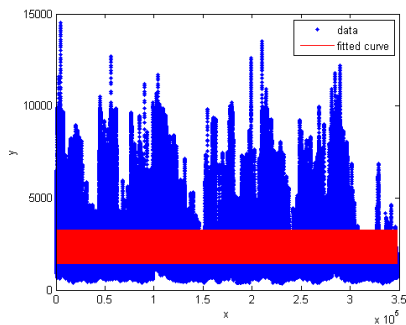
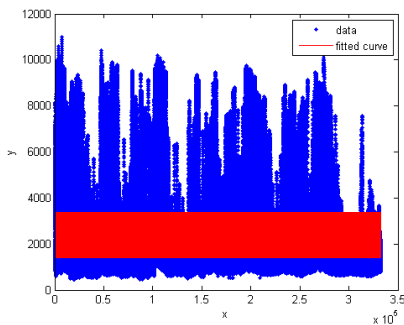
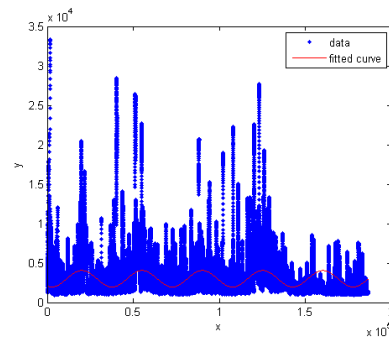
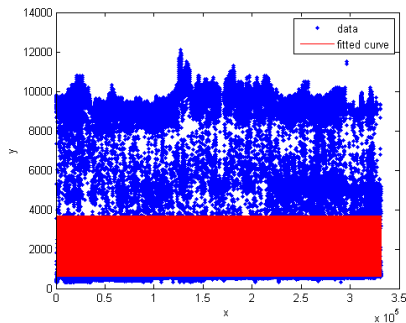
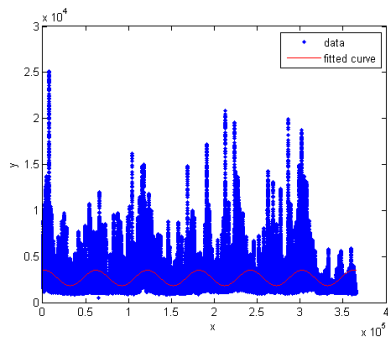
Roswell



Peachtree  
Creek

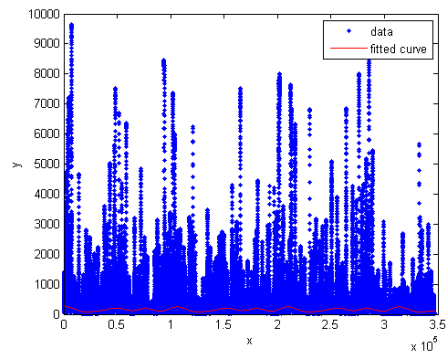
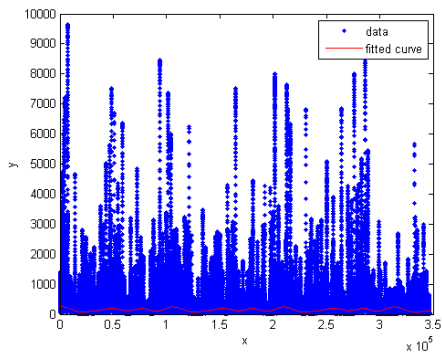
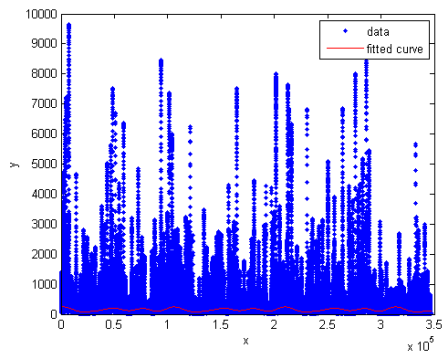
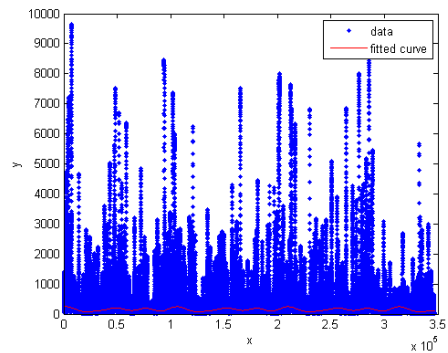
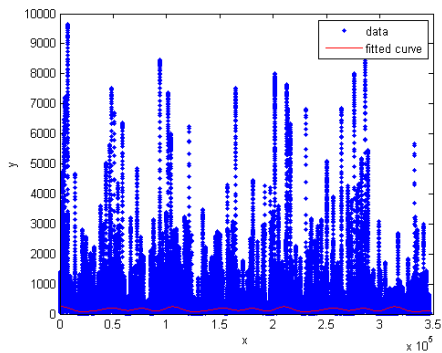
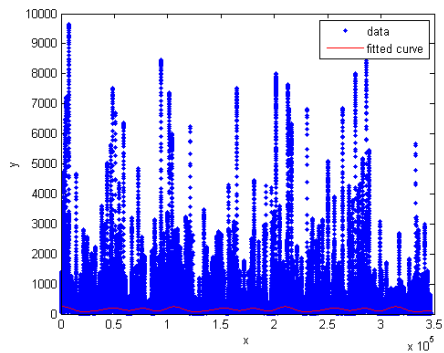


# Fitting Curves, single oscillation

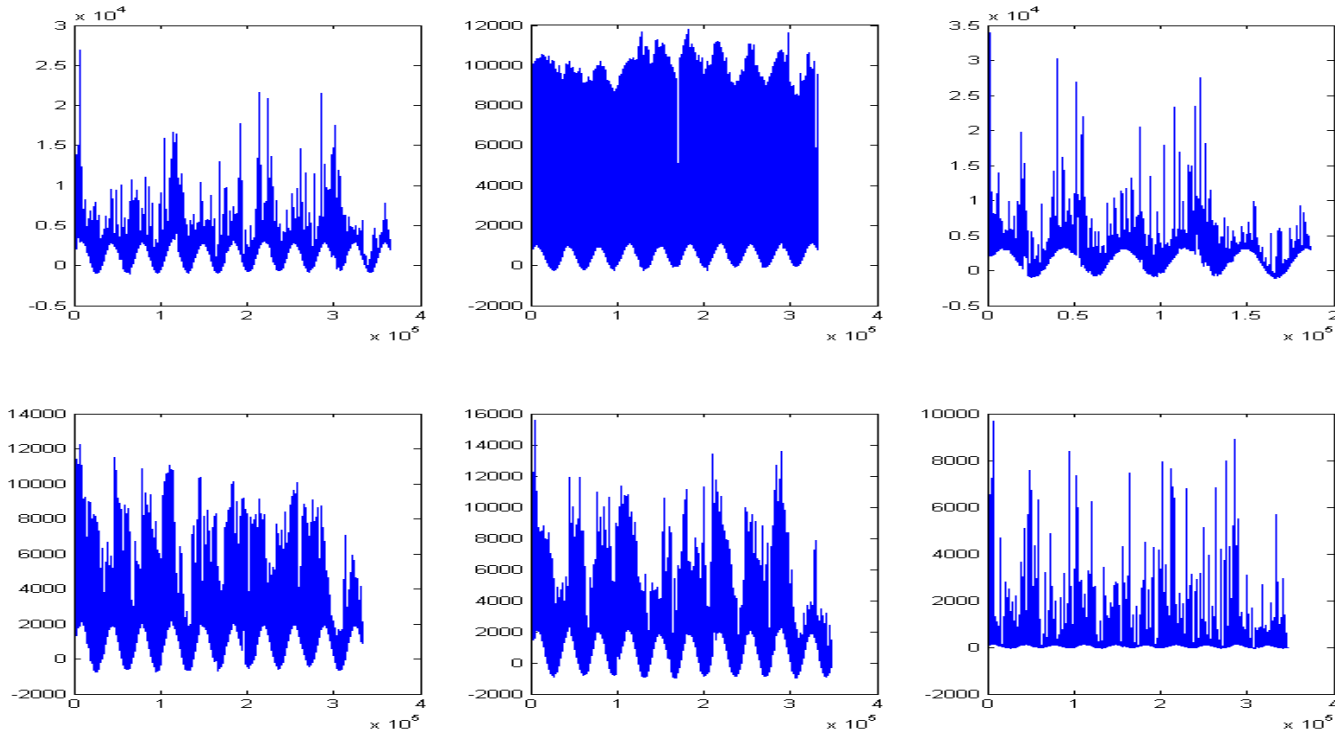




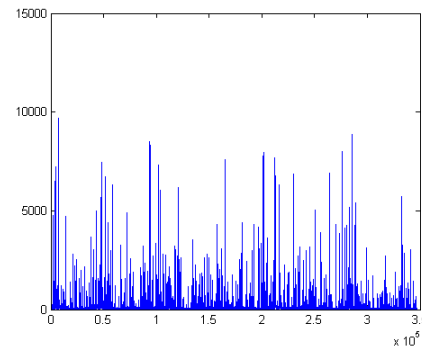
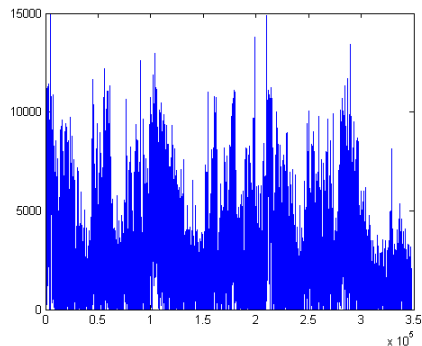
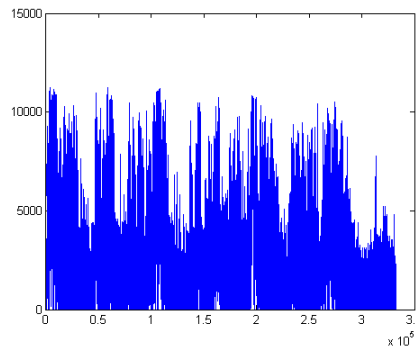
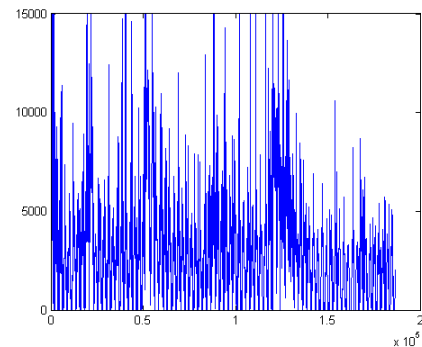
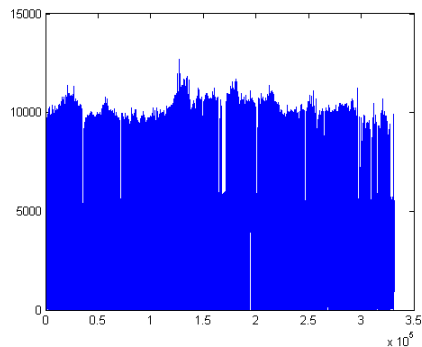
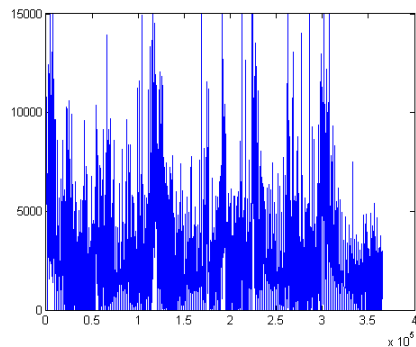
# Fitting Curves, 'fourier4'



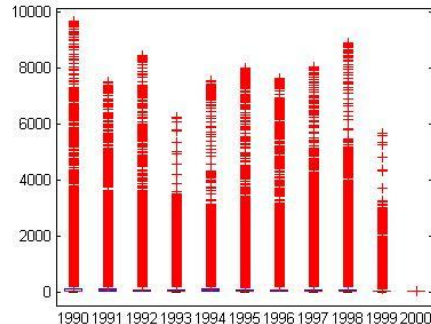
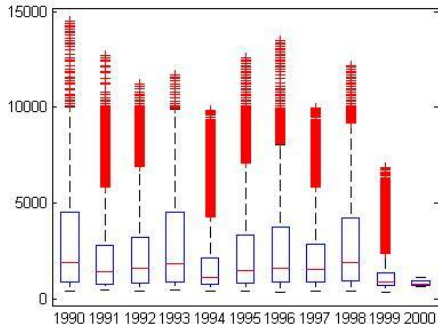
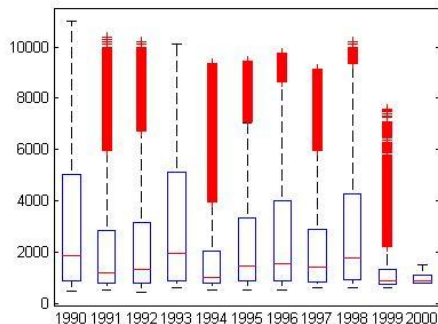
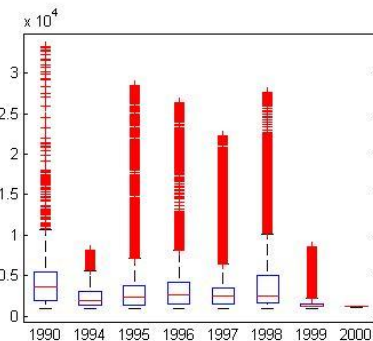
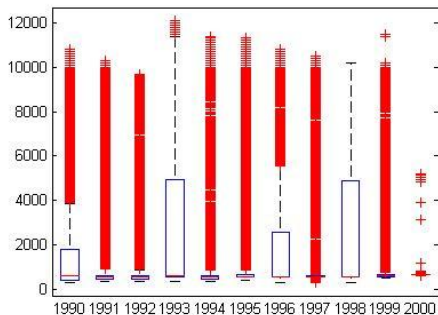
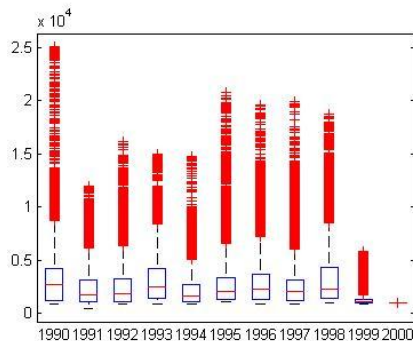
# Manual attempt to remove seasonality



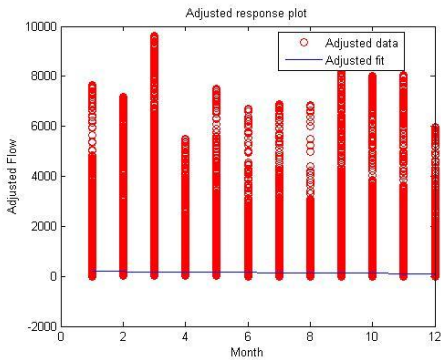
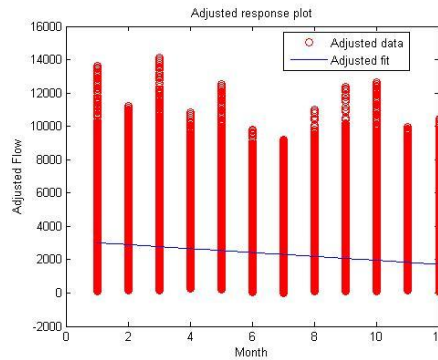
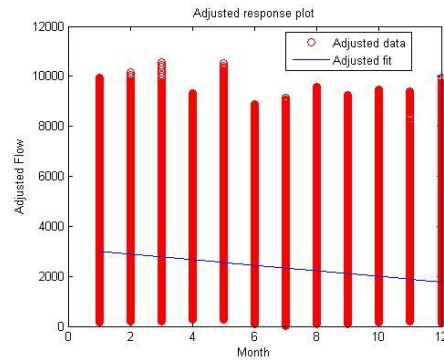
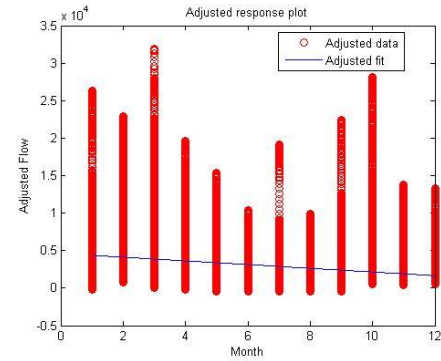
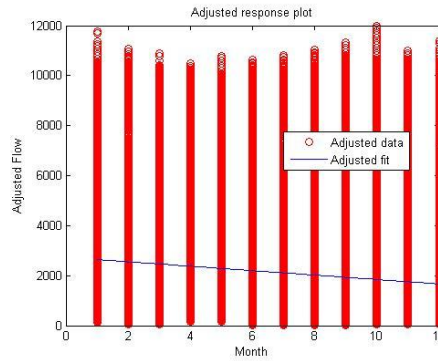
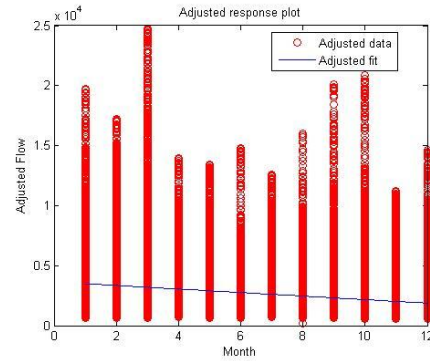
# Removing 'fourier4' model



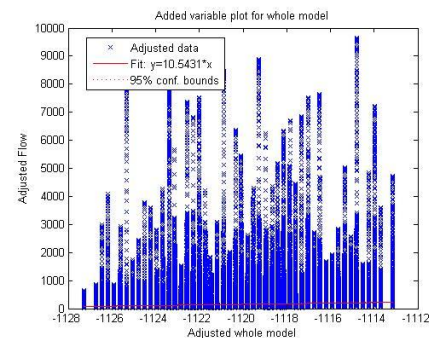
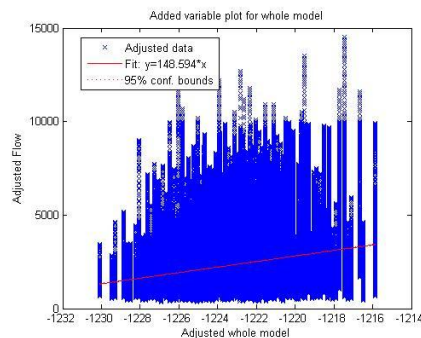
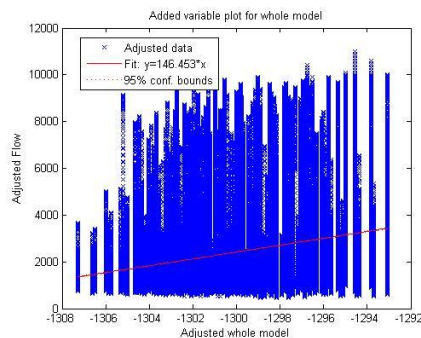
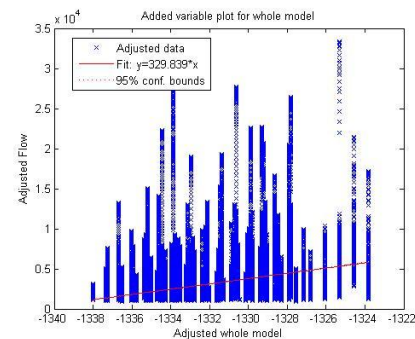
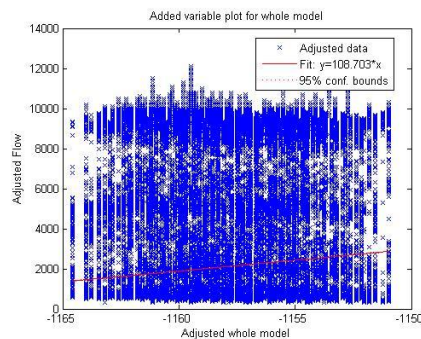
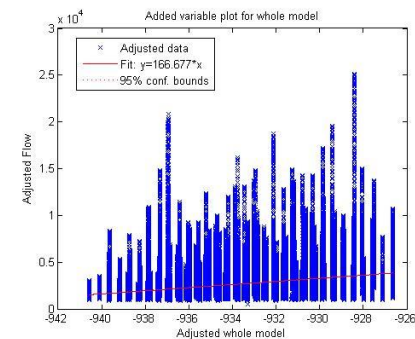
# Year Boxplot



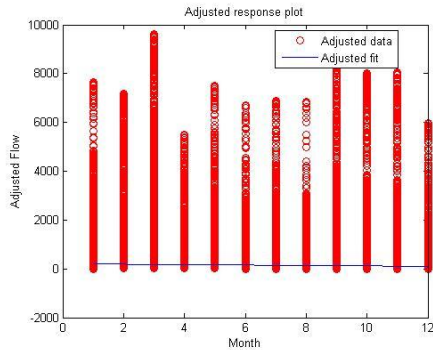
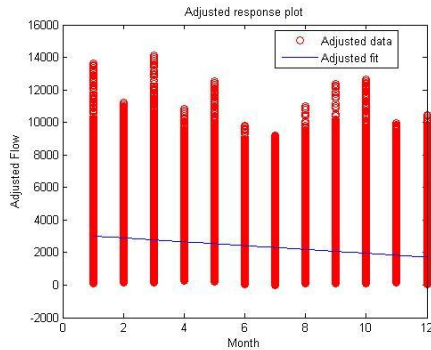
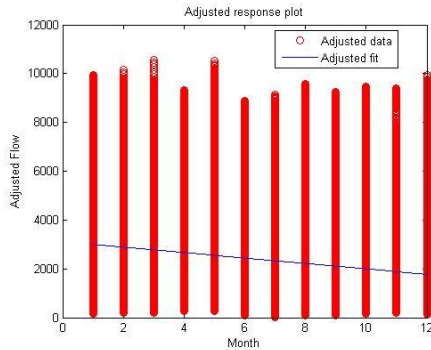
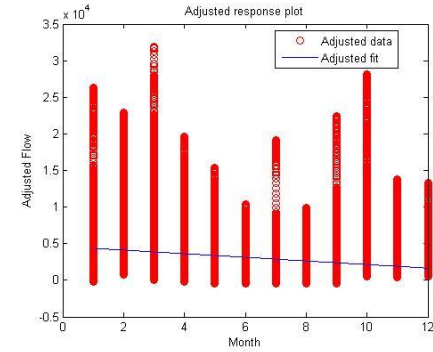
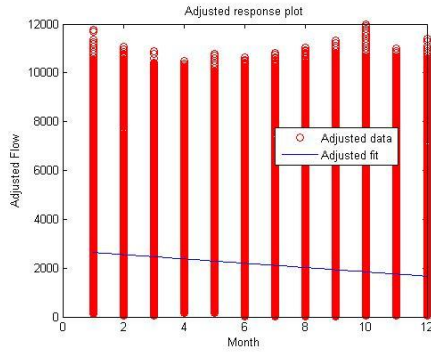
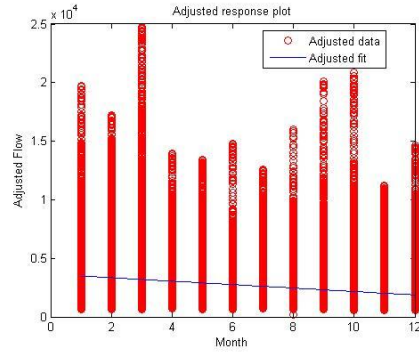
# Month Boxplot



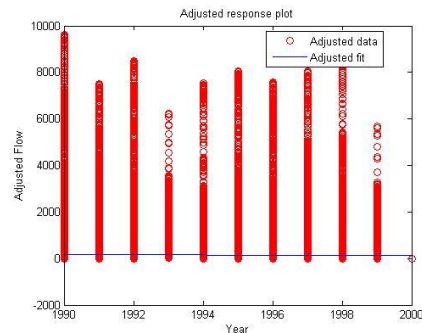
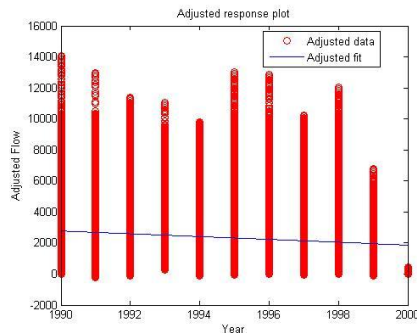
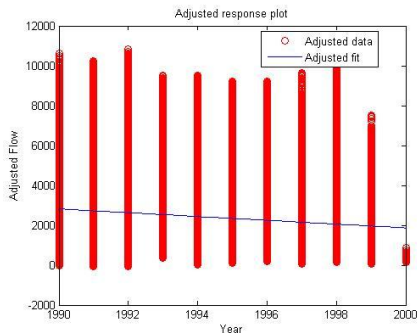
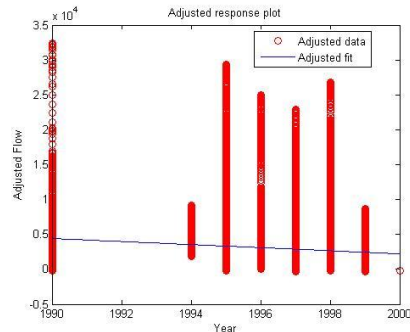
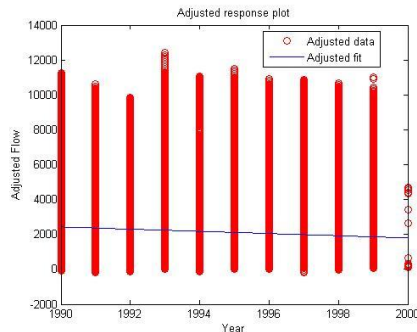
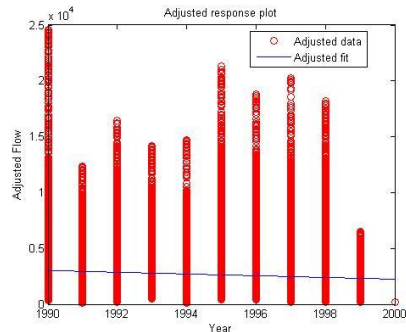
# Linear model (flow~year+month)



# Response to Month



# Response to Year





# Conclusions

Clearly Not Definitive

Seems that there is a suggestion of a trend

Flow Fluctuates Wildly

# Discussion

Lots of Outliers

Unable to validate consistently

Unable to find detailed-enough data on weather and Lake Lanier activity to remove that component.

New Question: What happened to other water sources during 1990 to 2000?