

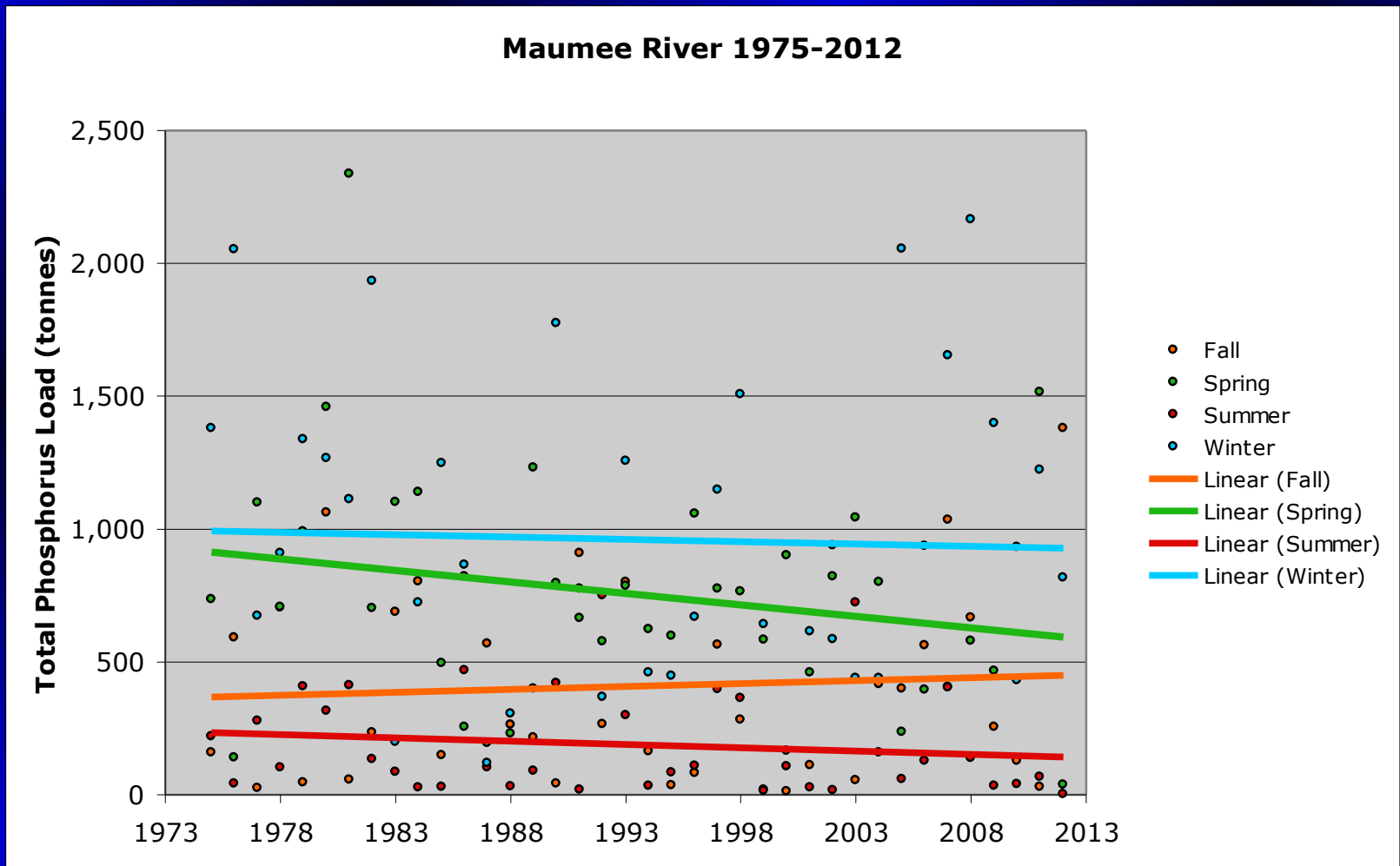
Phosphorus Loading to Lake Erie: Exploring Running Averages

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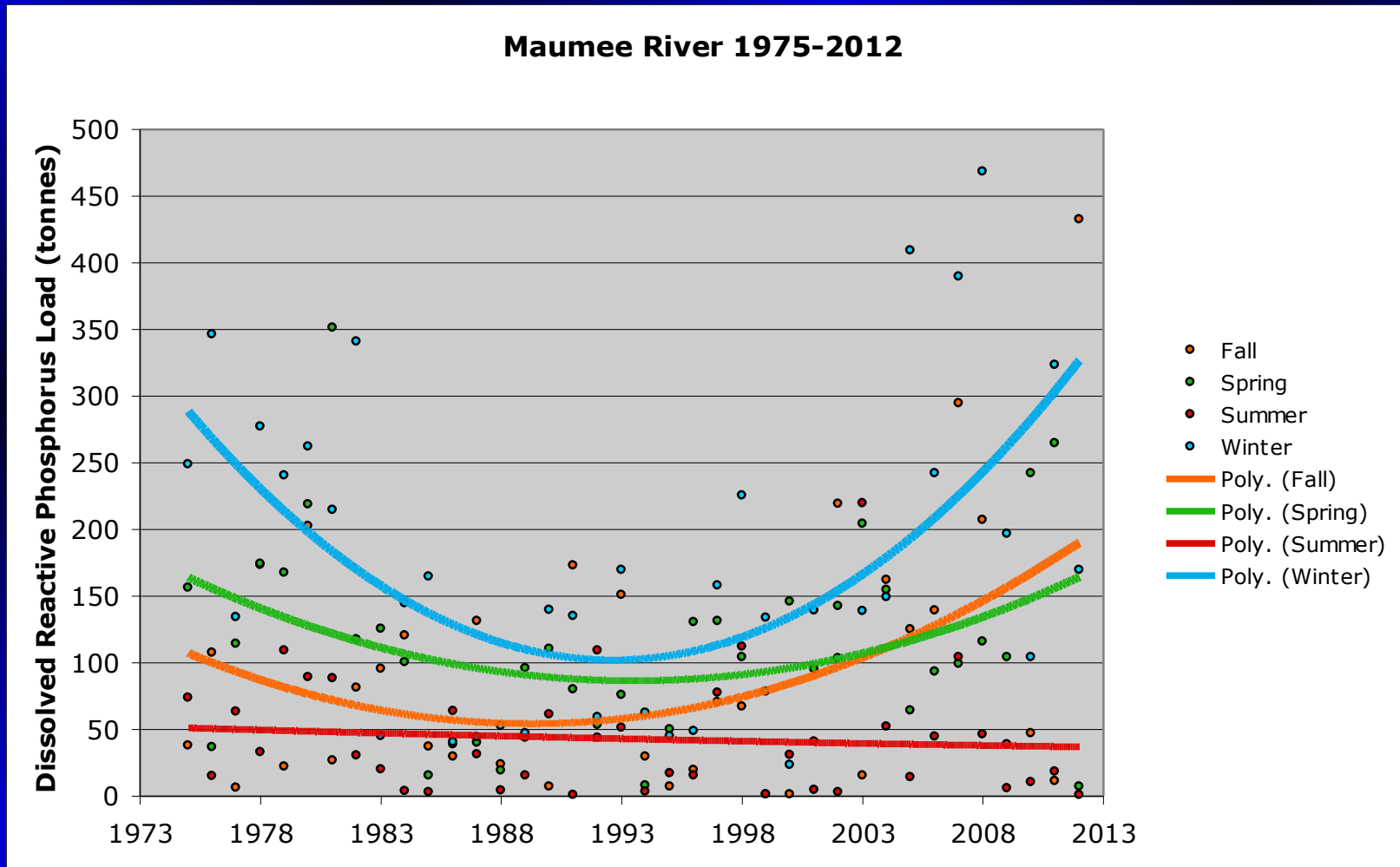
Material

- Five-year running averages of Q and P, annually and seasonally, Maumee River.
 - Backward looking - i.e the value plotted at 2005 is the average of 2001-2005.
 - Year 1=year 1
 - Year 2=Average (year 1 : year 2)
 - Year 3=Average (year 1 : year 3)
 - Year 4=Average (year 1 : year 4)
- Data plotted are the averages, not the raw data
- Also explored a polynomial fit of order five

Maumee Trends 1975-2012: TP Loads



Maumee Trends 1975-2012: DRP Loads



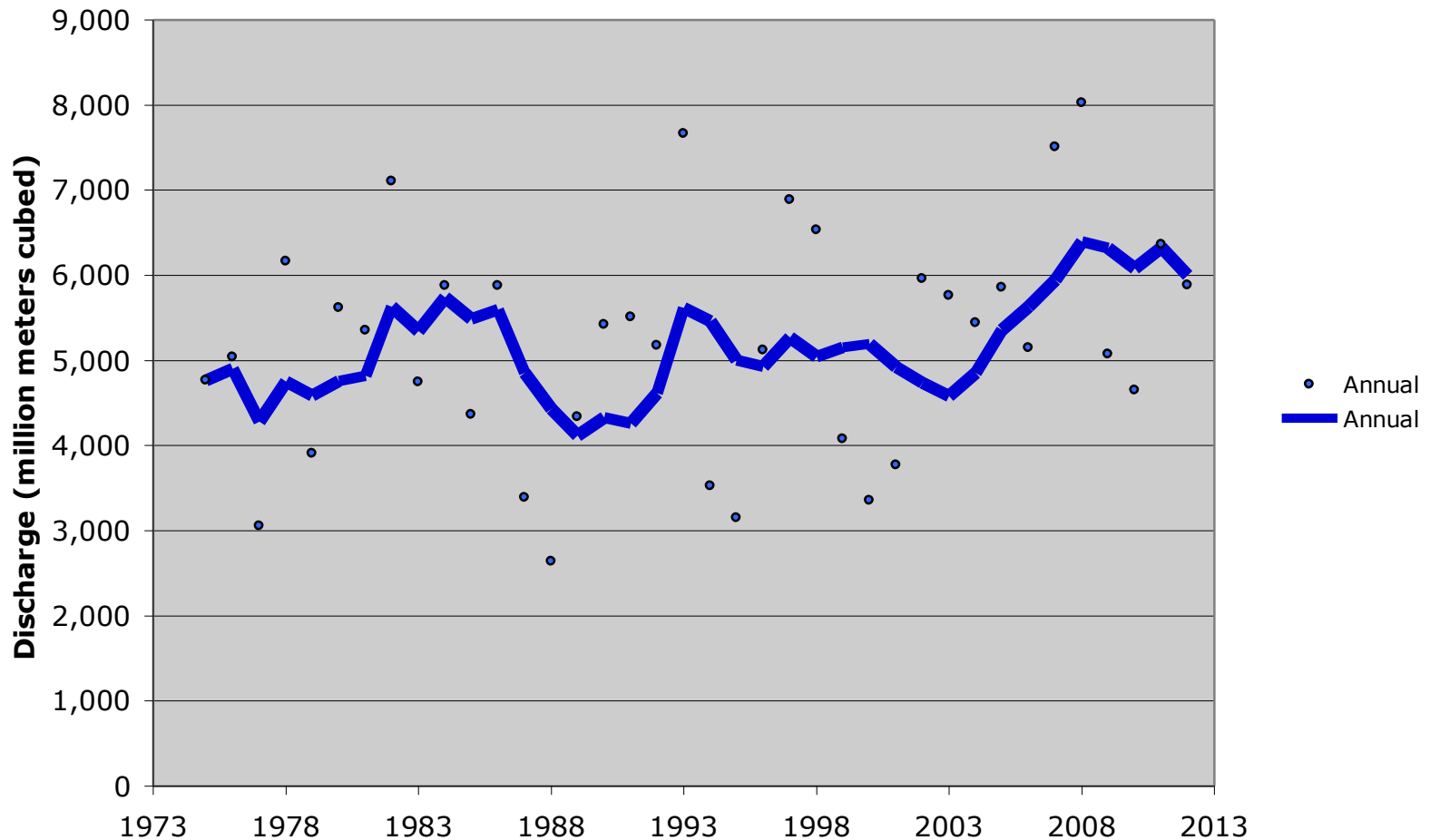
Rationale

- Five-year running averages:
 - Reduce scatter of data
 - Produce some smoothing of trends compared to annual values
 - Portray more detail than linear or quadratic trend lines

Annual (Water Year) Graphs, Maumee River

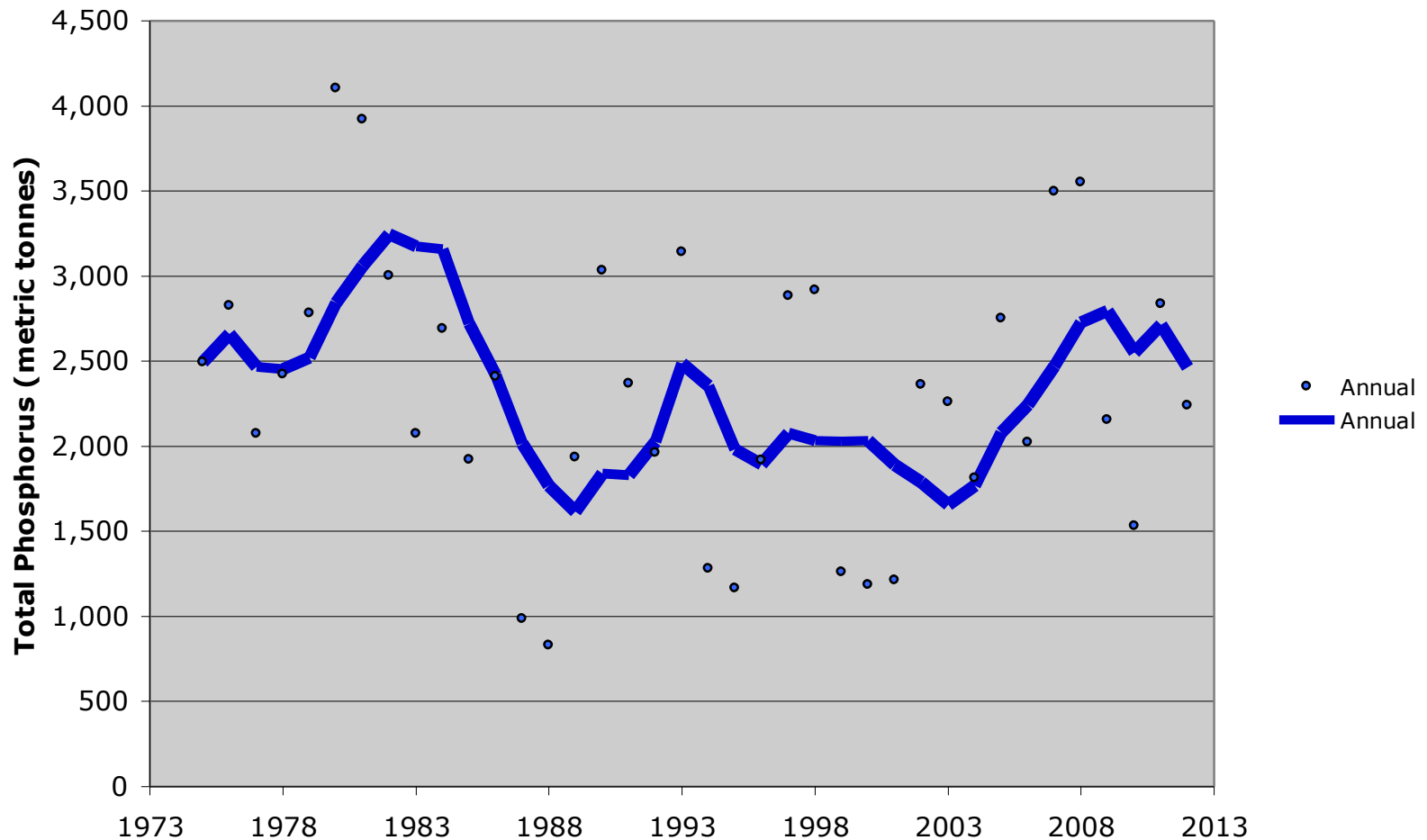
Maumee Trends 1975-2012: Discharge

Maumee River 1975-2012



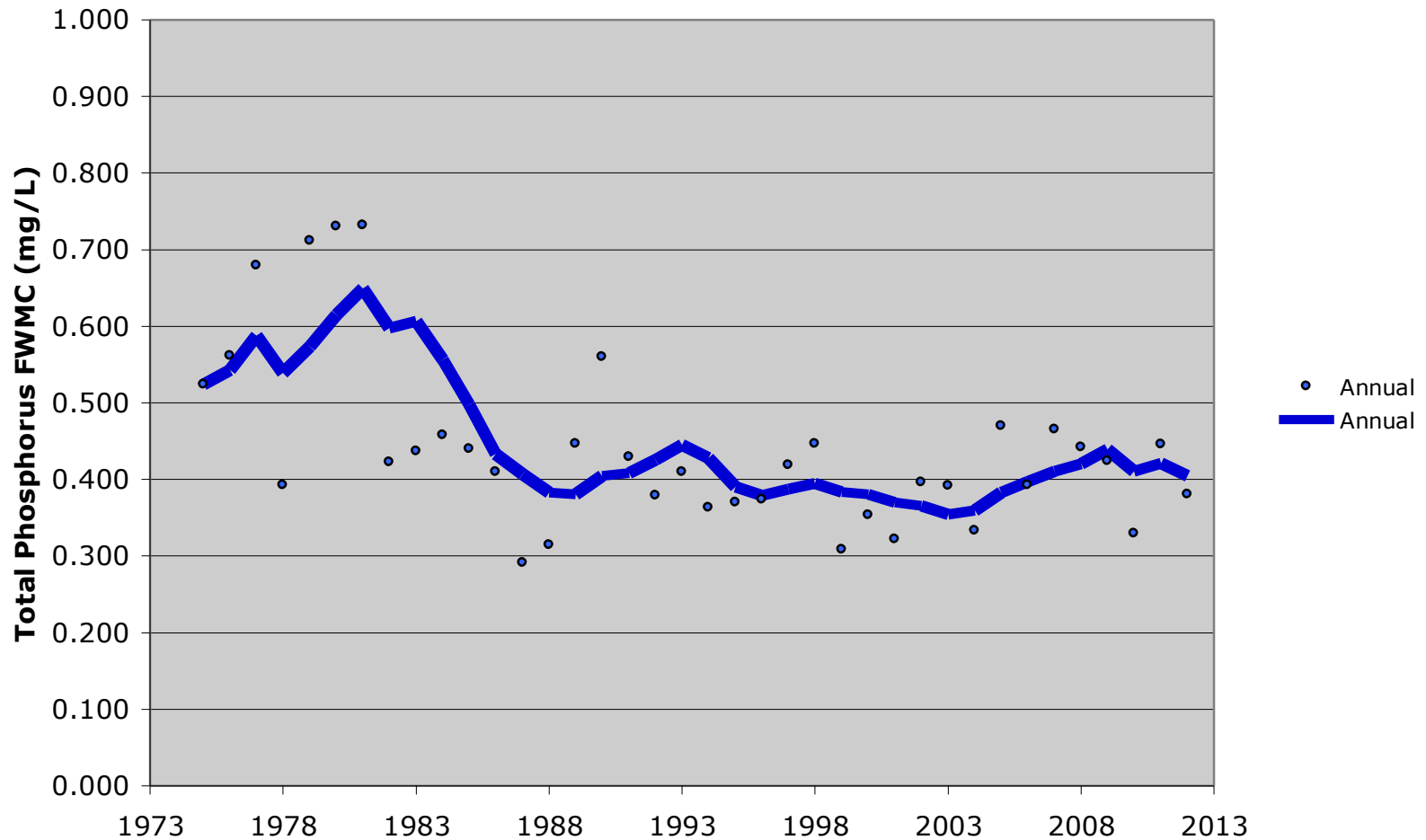
Maumee Trends 1975-2012: TP Load

Maumee River 1975-2012



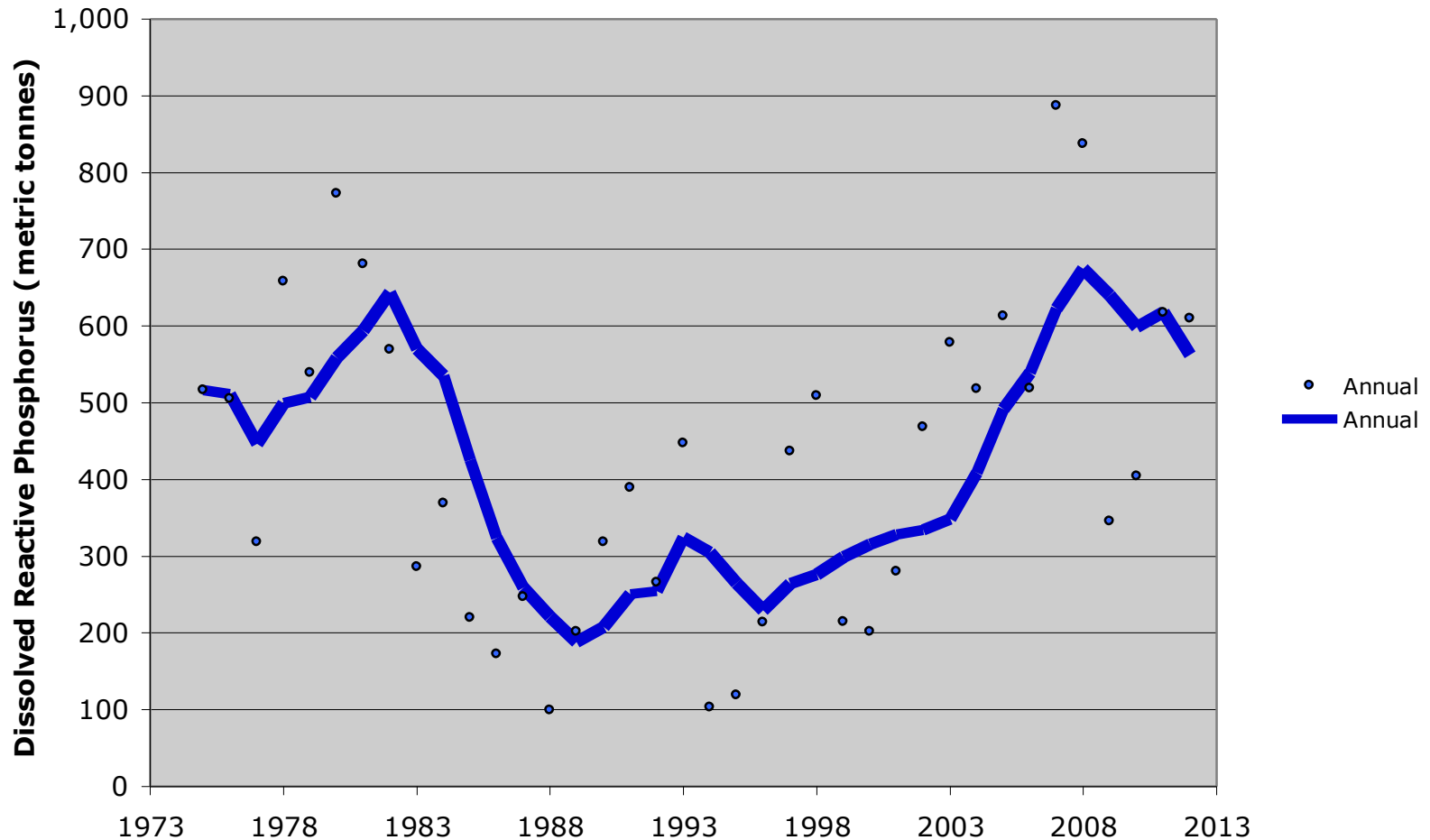
Maumee Trends 1975-2012: TP FWMC

Maumee River 1975-2012



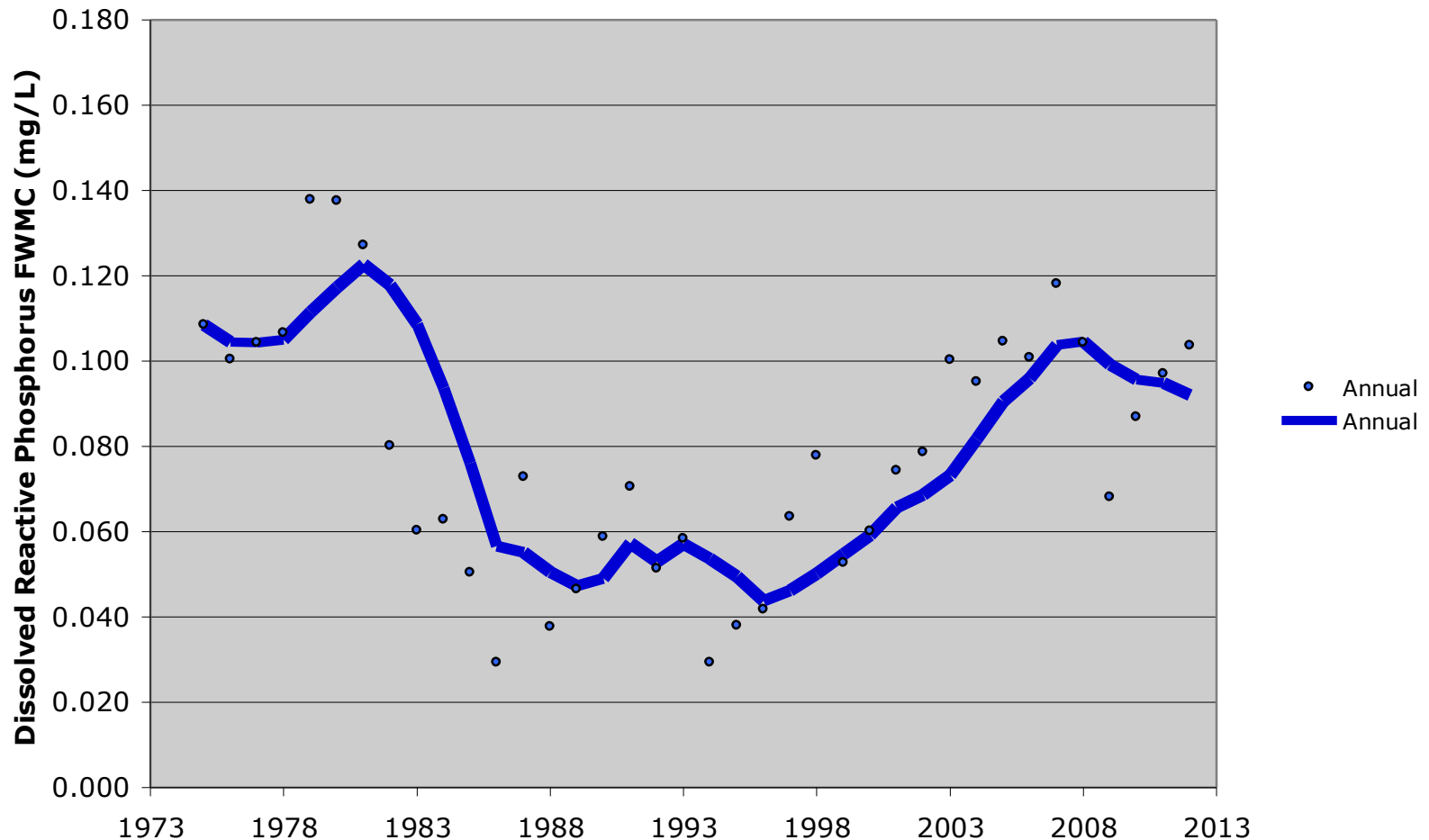
Maumee Trends 1975-2012: DRP Load

Maumee River 1975-2012

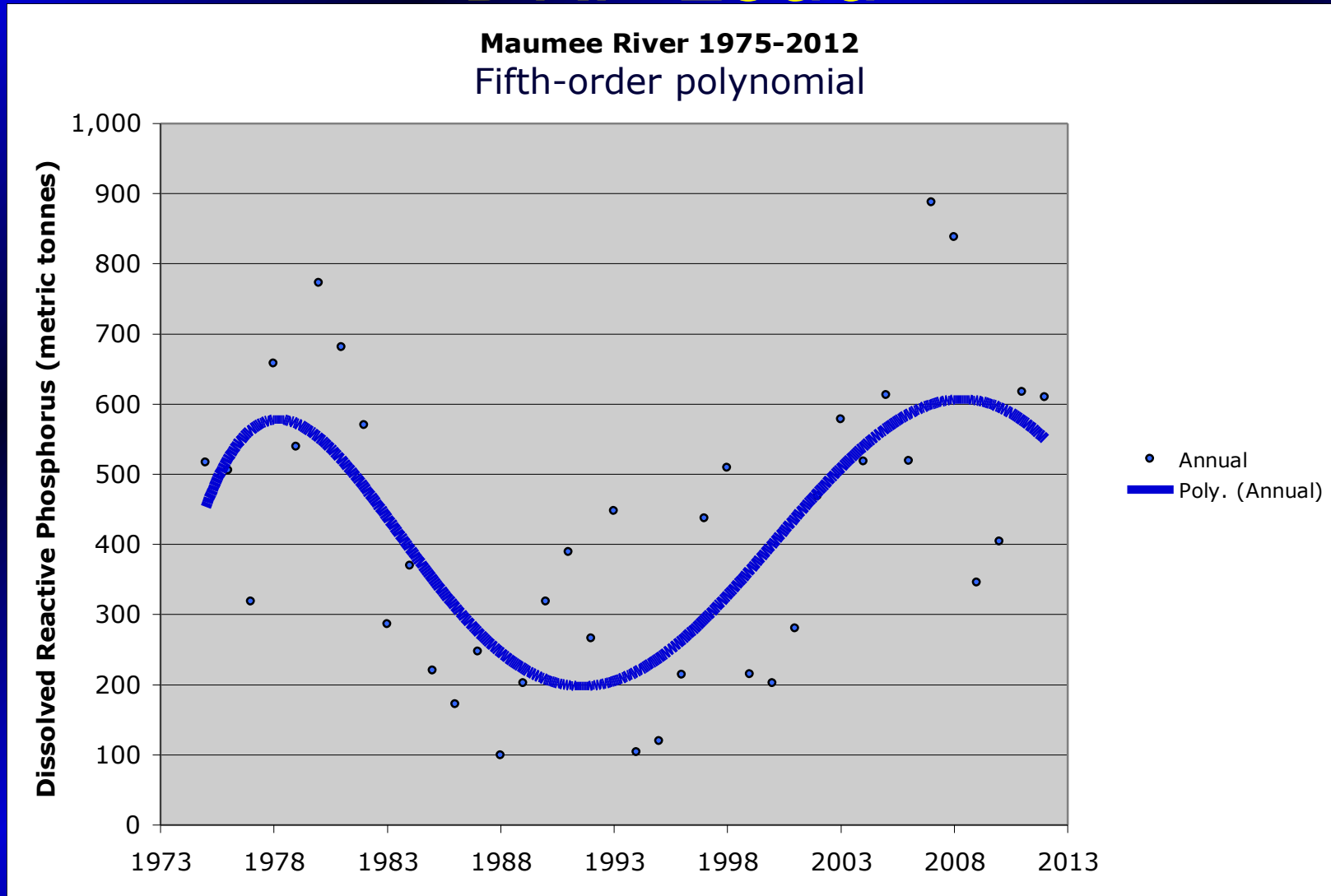


Maumee Trends 1975-2012: DRP FWMC

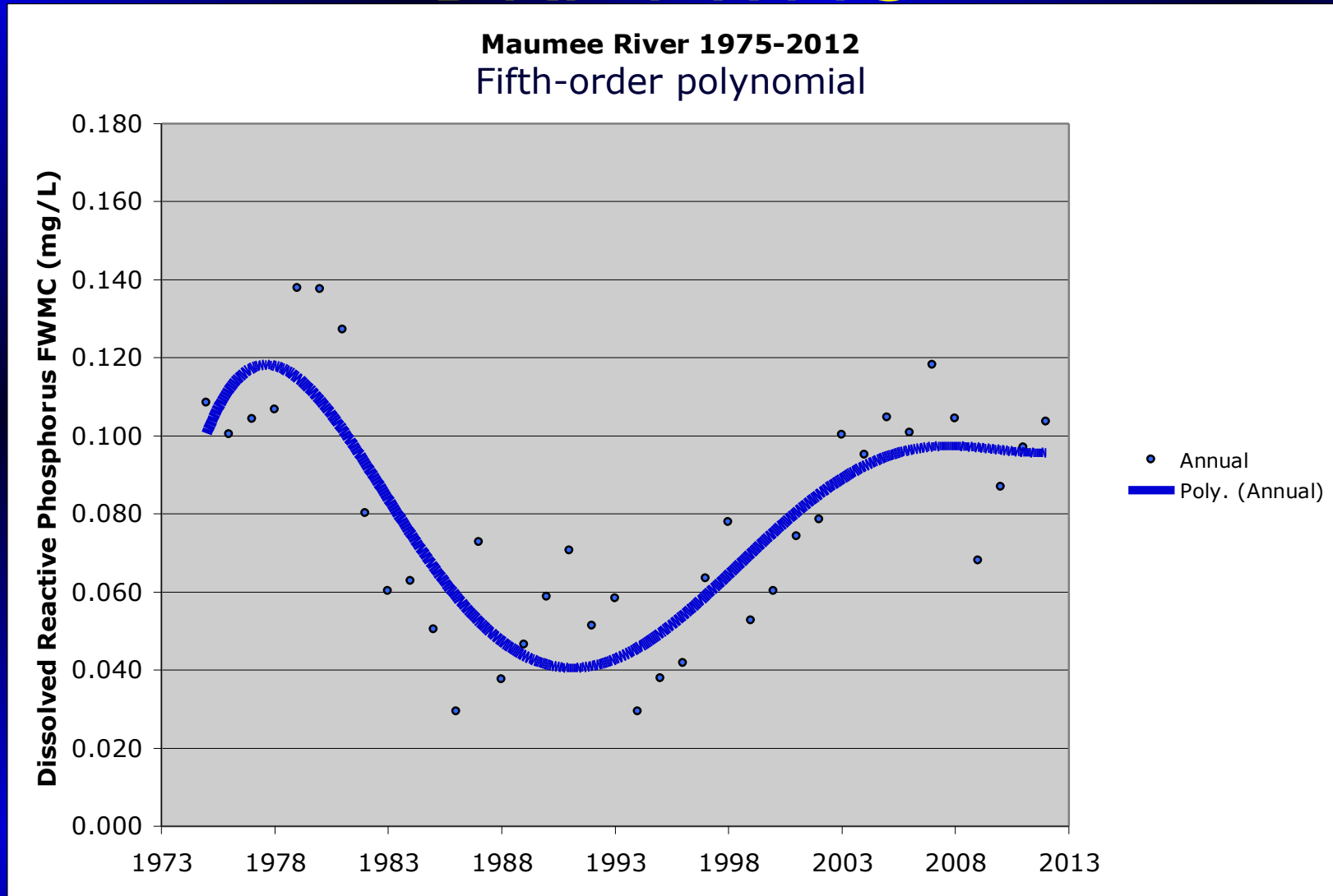
Maumee River 1975-2012



Maumee Trends 1975-2012: DRP Load

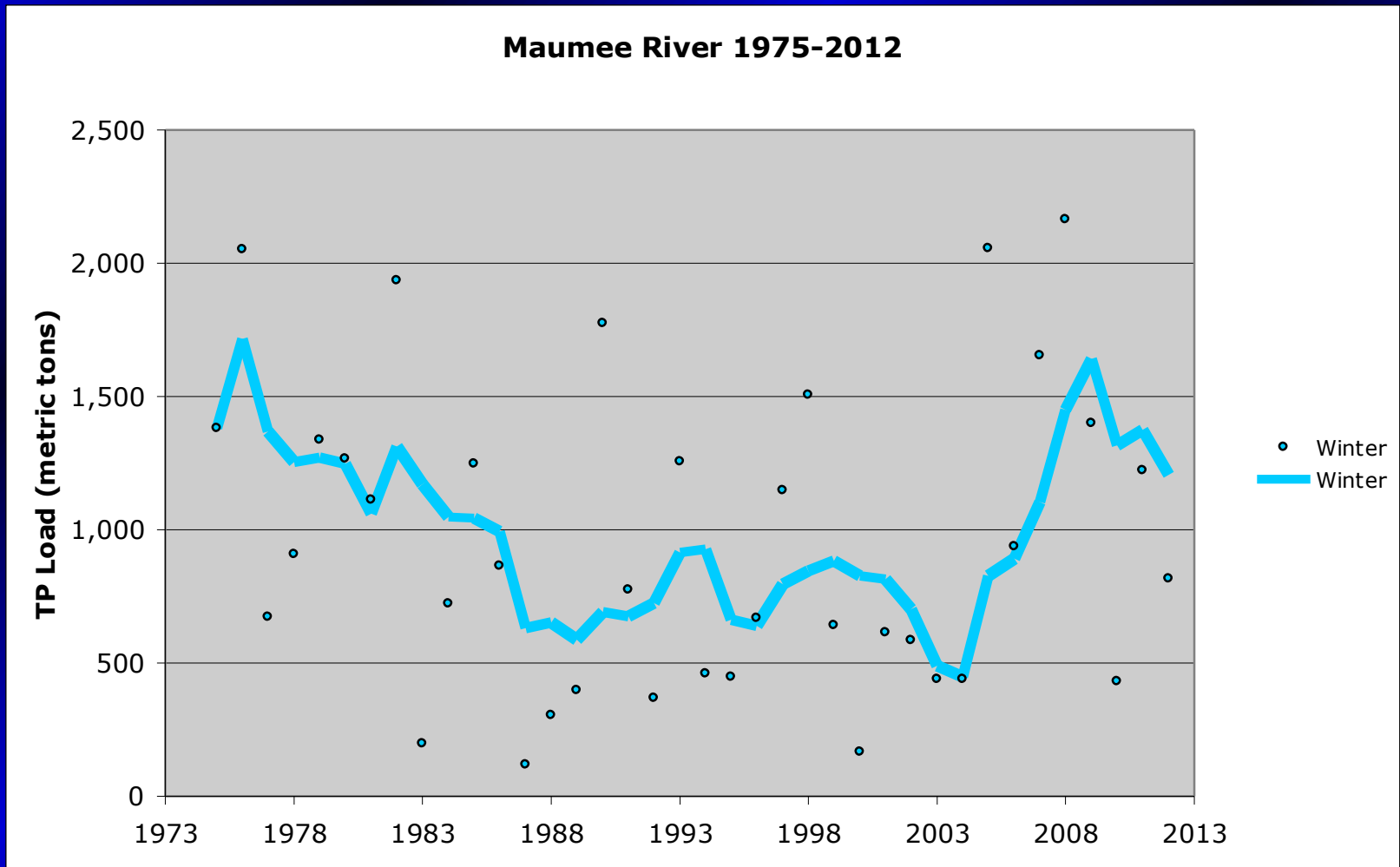


Maumee Trends 1975-2012: DRP FWMC

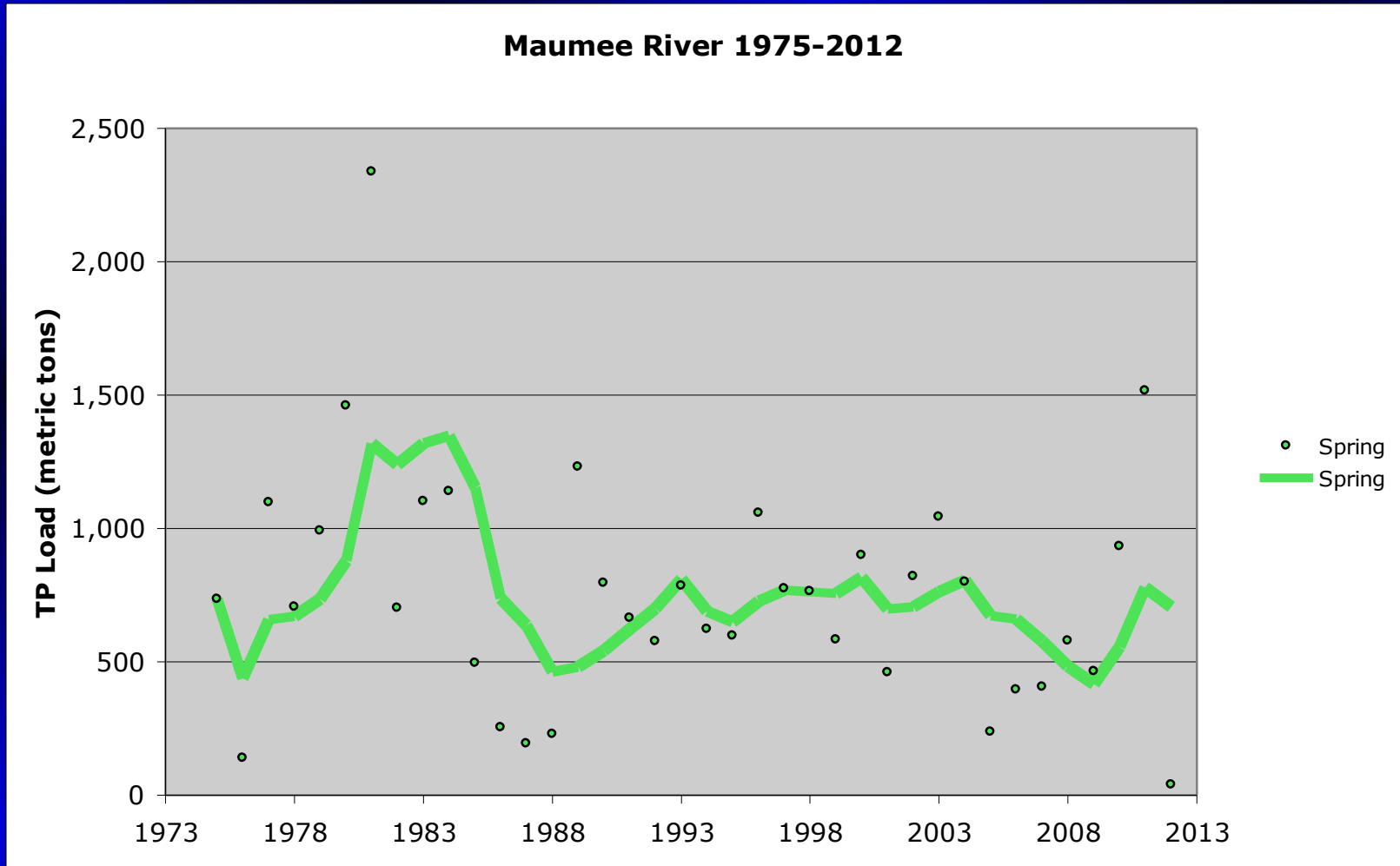


Seasonal Graphs, Maumee River

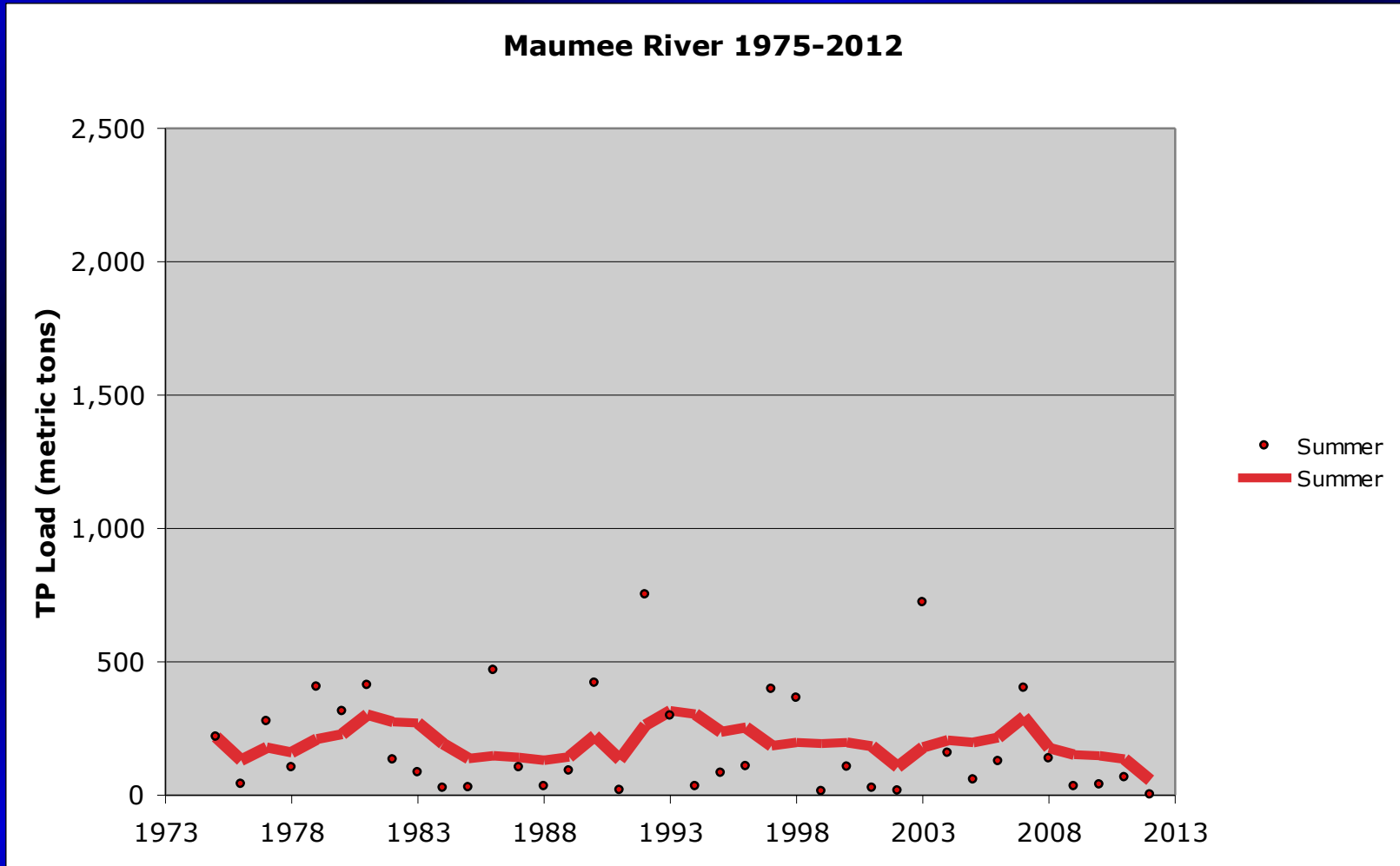
Maumee Trends 1975-2012



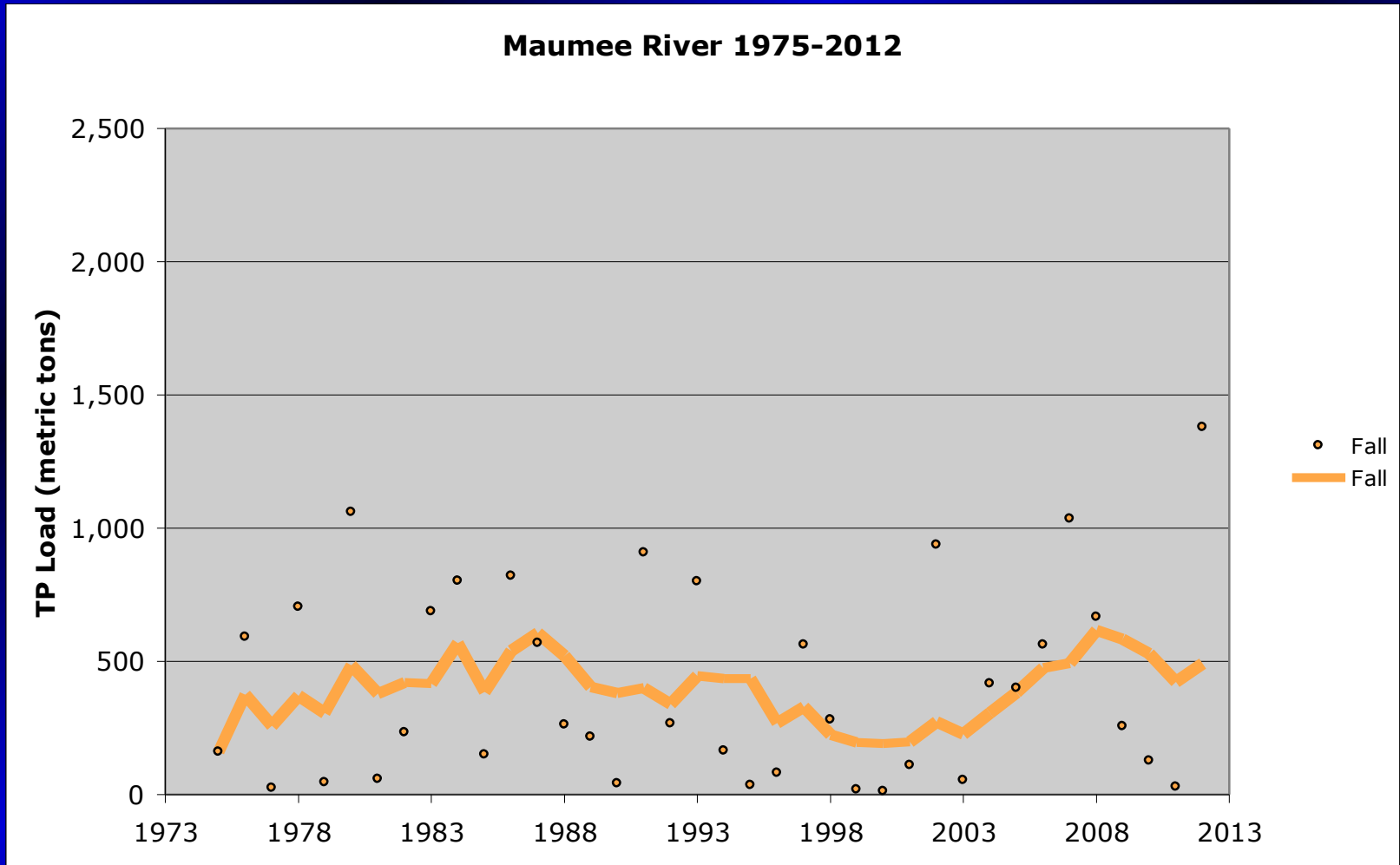
Maumee Trends 1975-2012



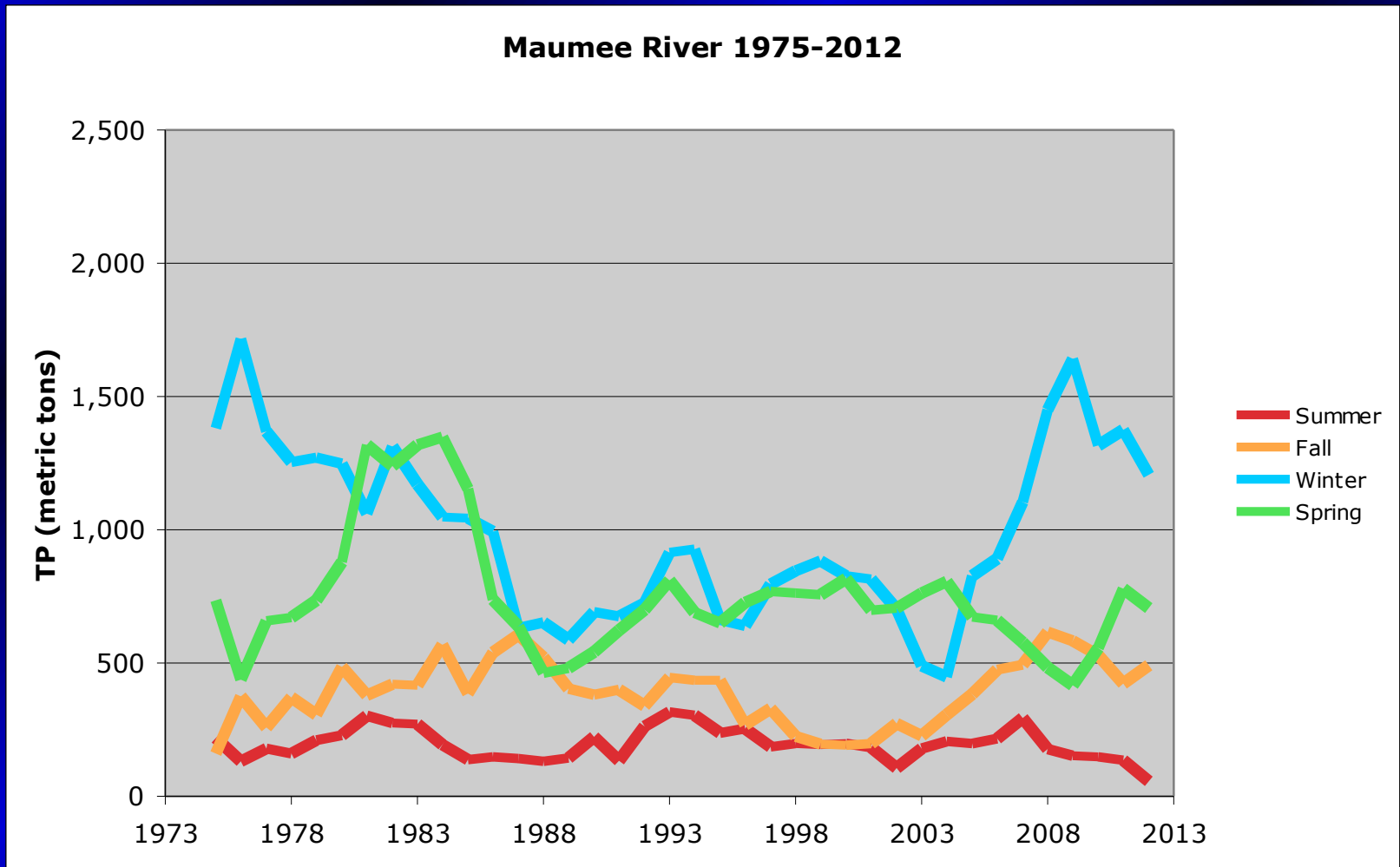
Maumee Trends 1975-2012



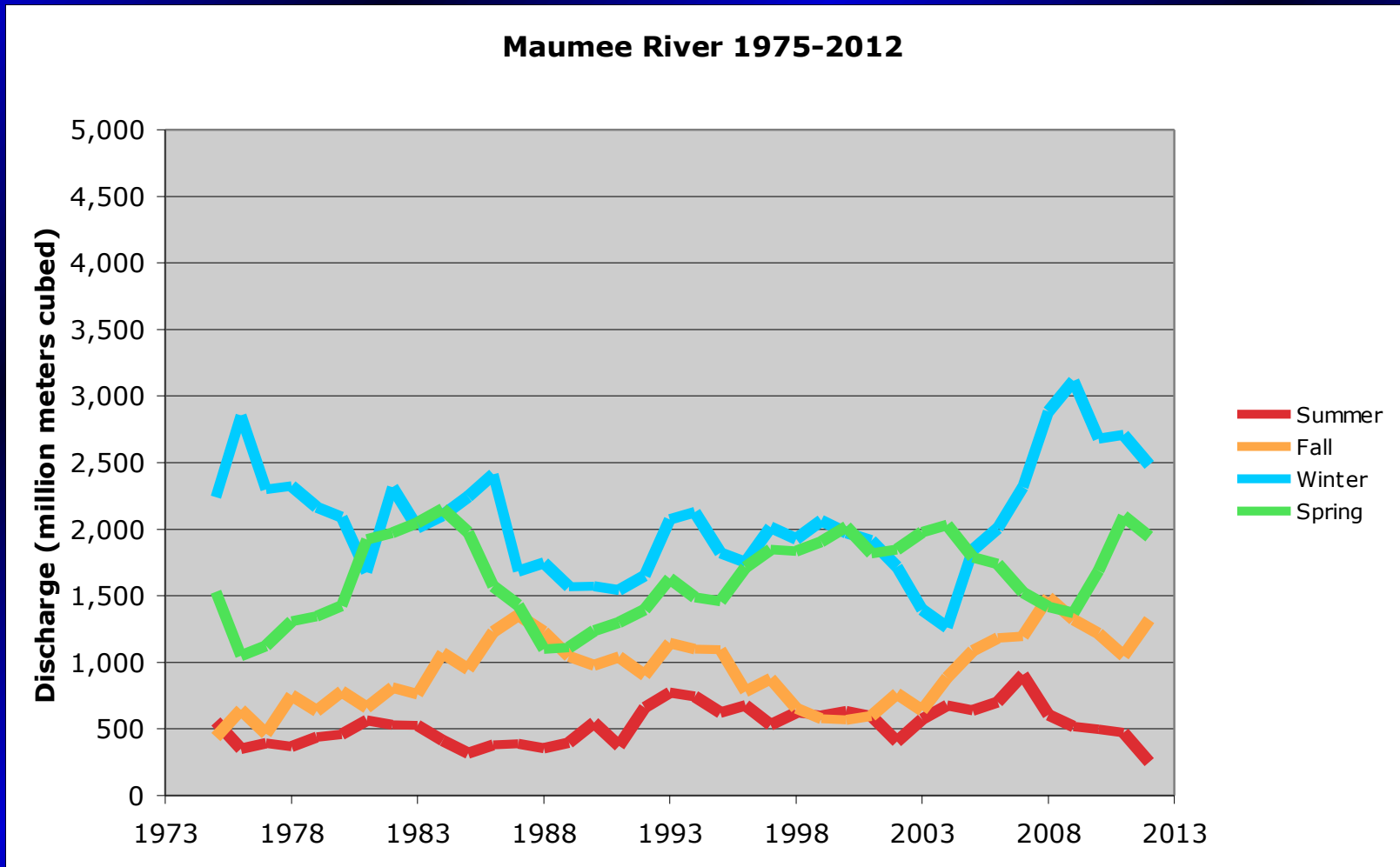
Maumee Trends 1975-2012



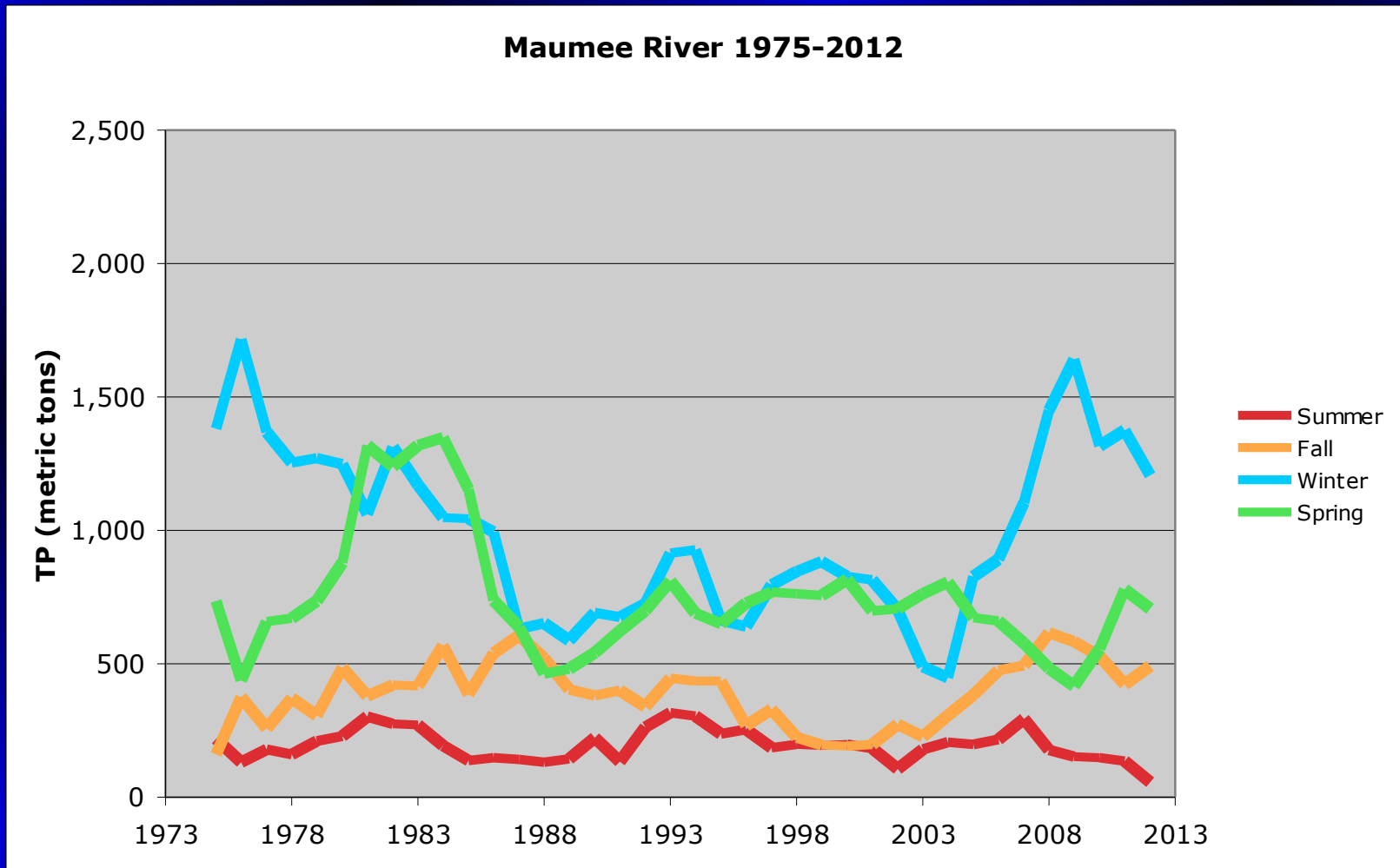
Maumee Trends 1975-2012



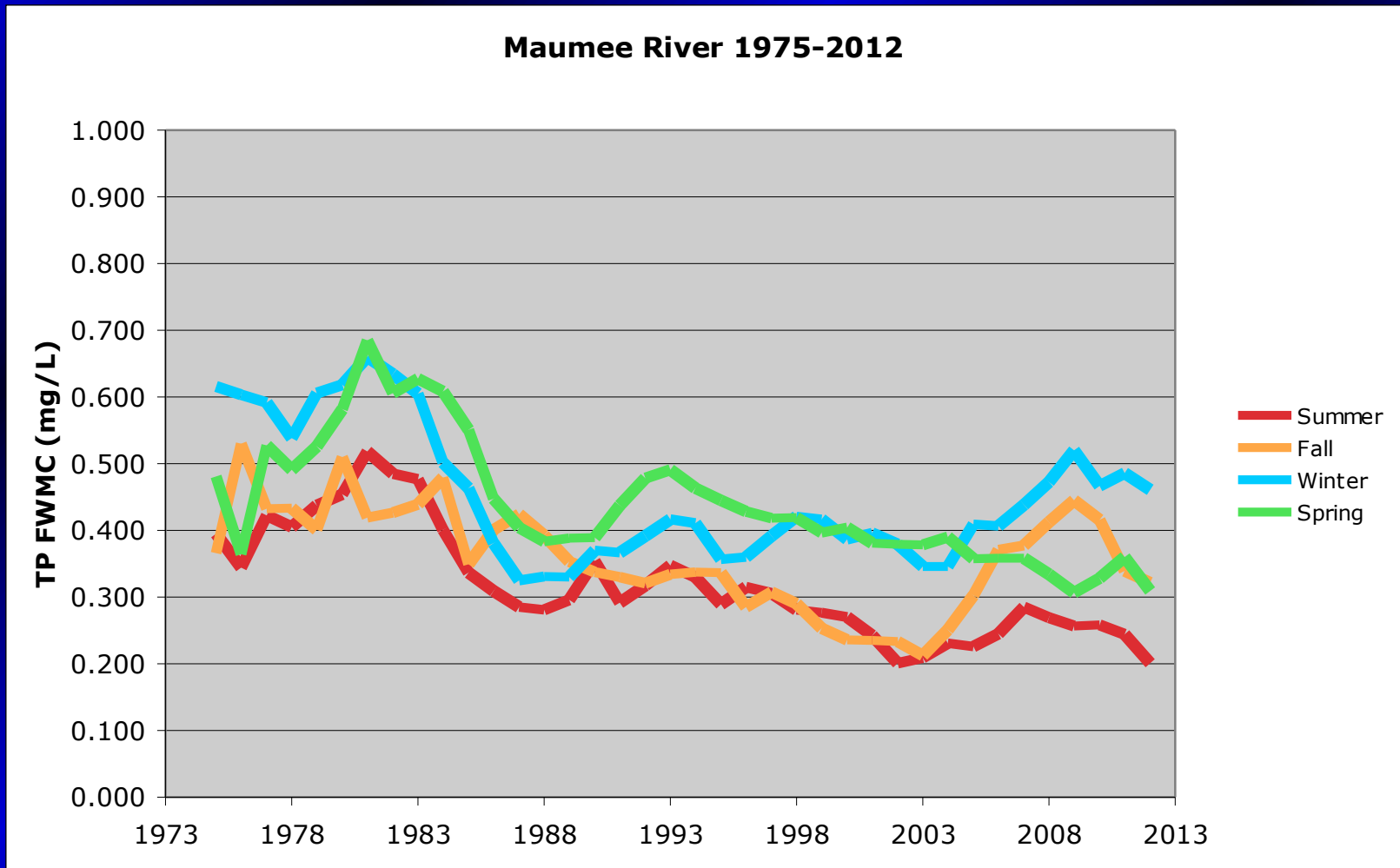
Maumee Trends 1975-2012: Discharge



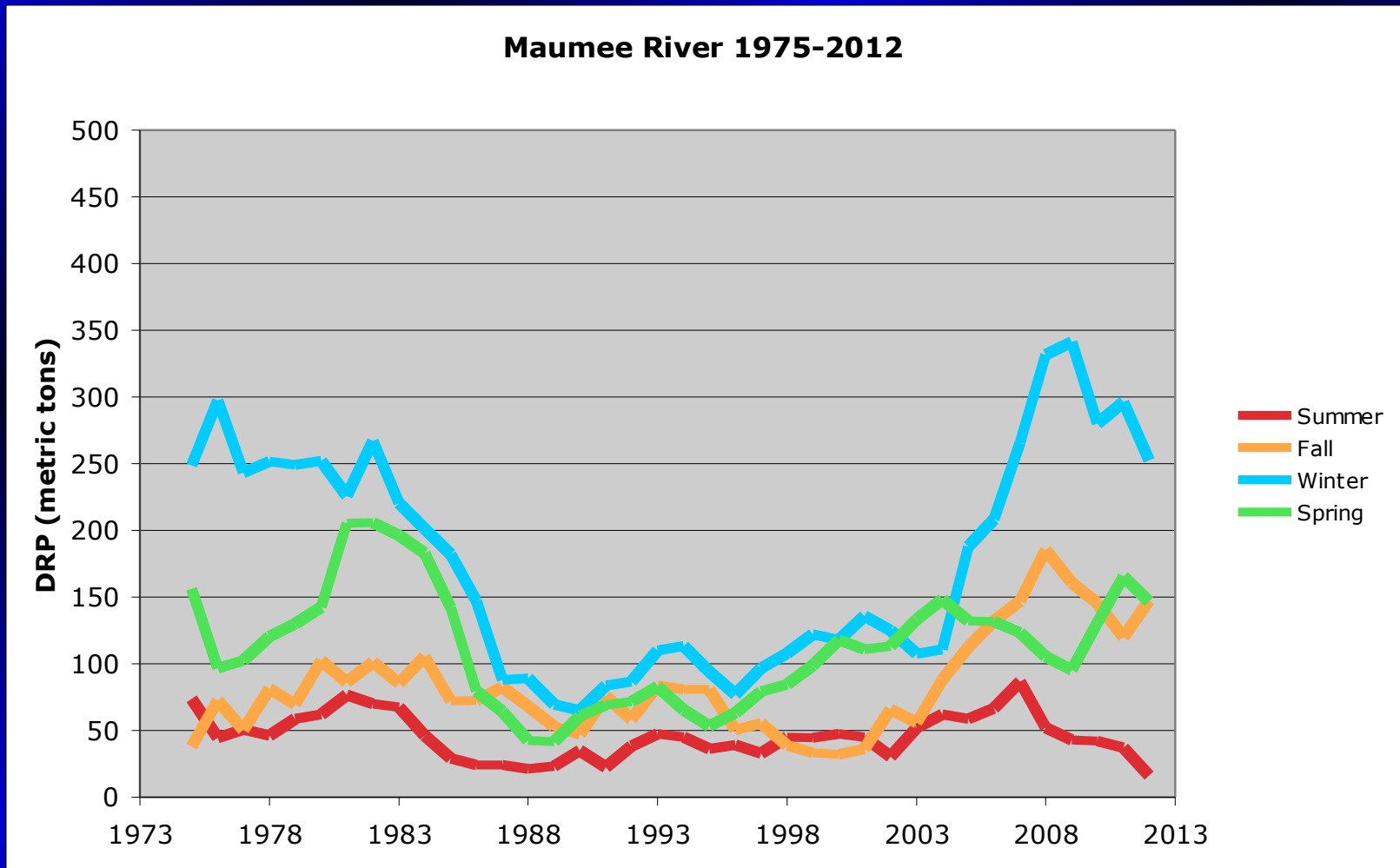
Maumee Trends 1975-2012: TP Load



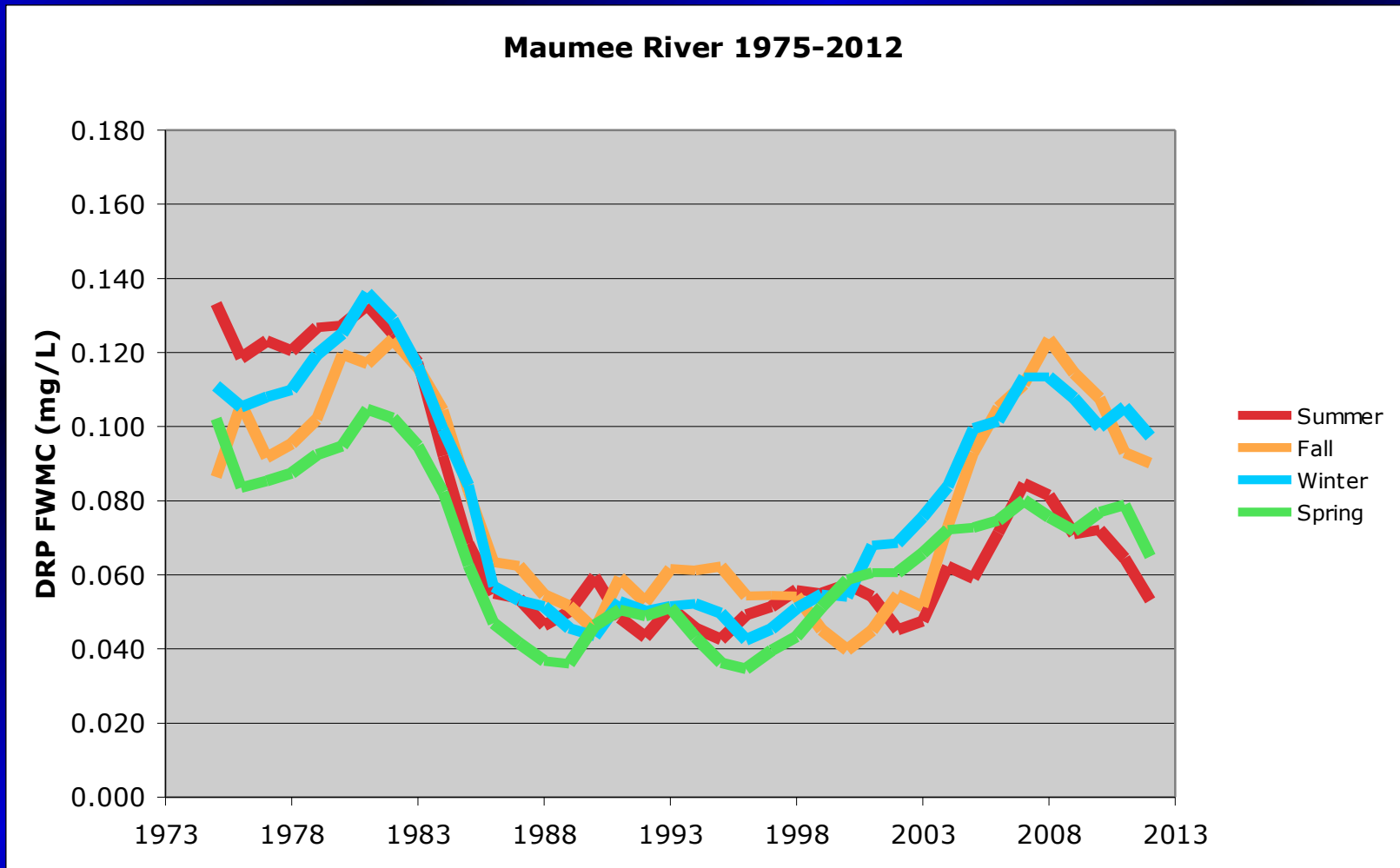
Maumee Trends 1975-2012: TP FWMC



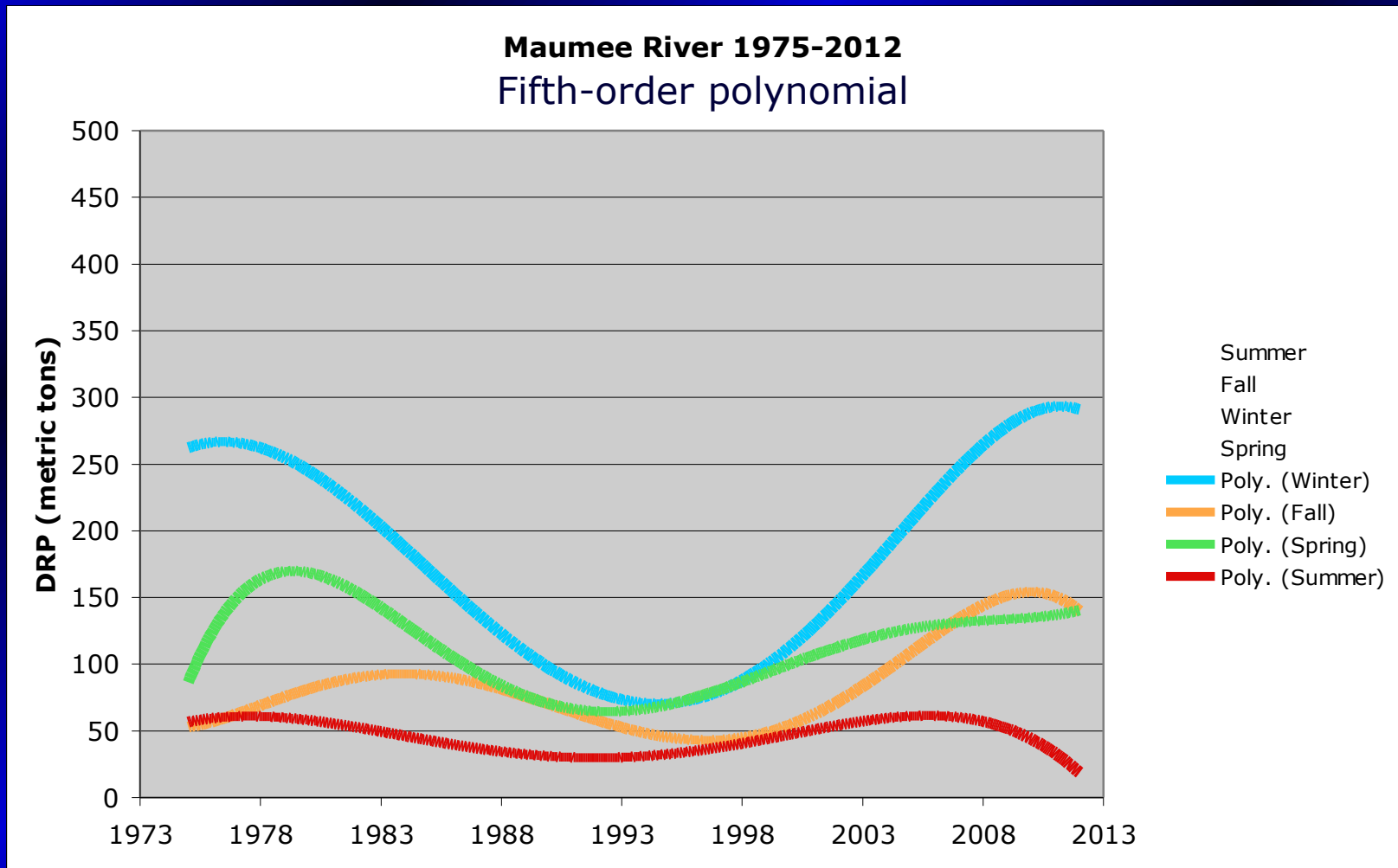
Maumee Trends 1975-2012: DRP Load



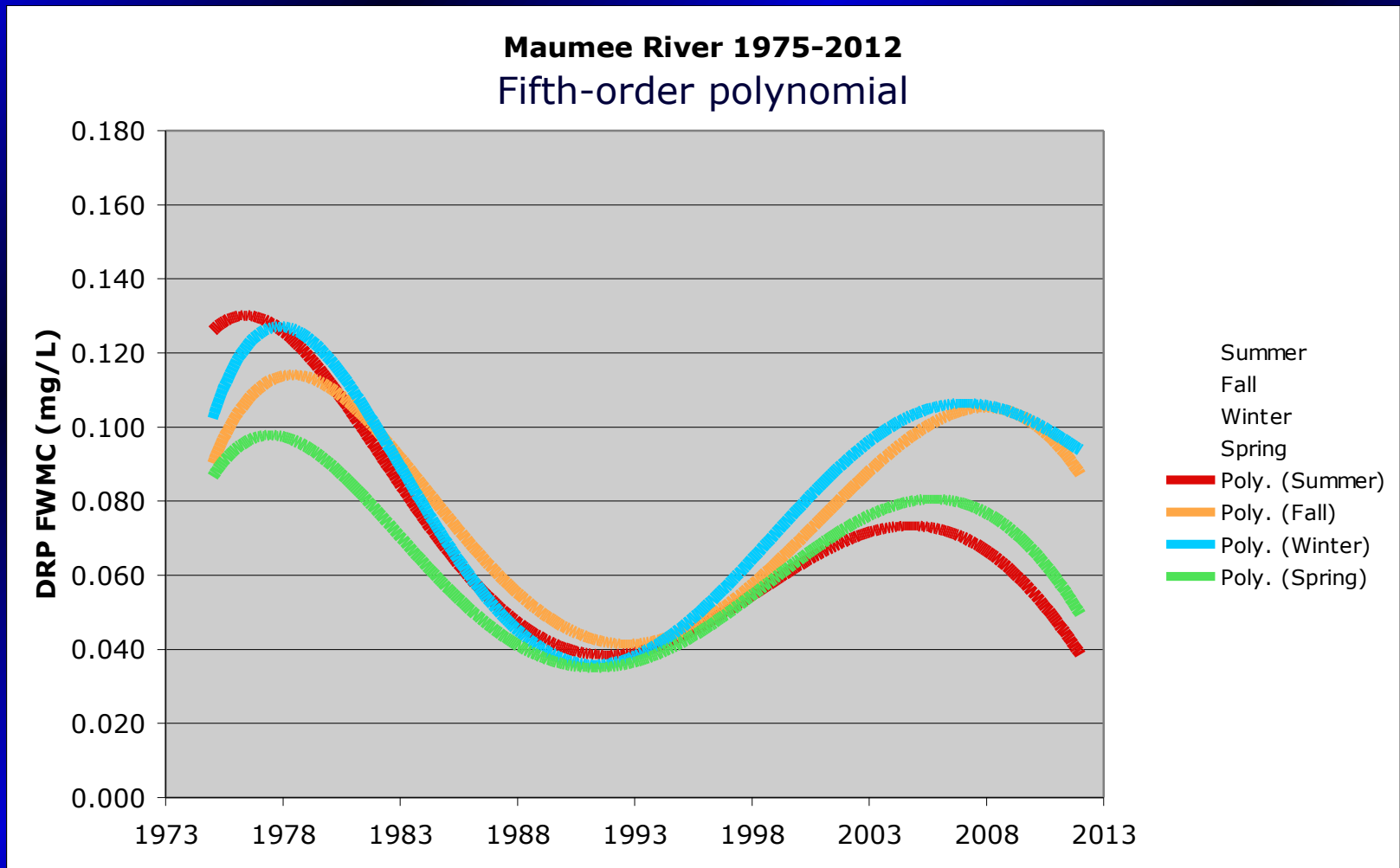
Maumee Trends 1975-2012: DRP FWMC



Maumee Trends 1975-2012: DRP Load



Maumee Trends 1975-2012: DRP FWMC



Observations

- Five-year running averages are a useful compromise between annual data and linear trend lines
- Higher-order polynomials may be even better (but how do you know what order to choose?)
- FWMCs much less variable than loads



09/03/2011 (DOY=246)

That's all!



08/30/2012 (DOY=243)