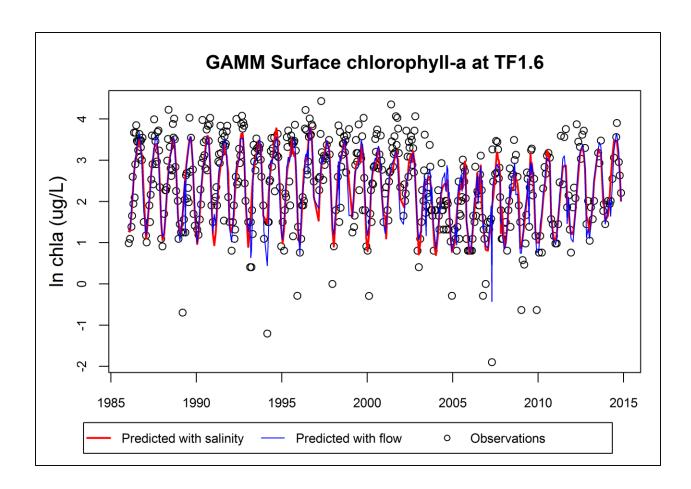
First-Cut GAM Fits for Patuxent Chlorophyll-*a*

Rebecca Murphy April 30, 2015

GAM Models tested

In each case, for "flow", used: (1) vertically averaged salinity at that location, and (2) fall-line flow from previous x days.

- Model 1: Basic additive model
 log(chla) ~ s(date) + s(doy) + s(flow)
- Model 2: Allow for smooth interactions of the variables log(chla) ~ te(date, doy, flow)
- Model 3: Account for residual autocorrelation, using a mixed model
 log(chla) ~ te(date, doy, flow) + AR1
 - s() is one of a number of possible GAM spline fits
 - te() is the tensor product smooth that allows for a combination of interacting splines



Fit statistic	GAMM model for TF1.6	
	With Salinity	With Flow (5 day lag)
RMSE (of logs!)	0.63	0.59
AIC	1079	1036

TF1.6 GAMM salinity-normalized predictions with each month's data January **February** March In(chla in ug/L) 3 7 0 **April** May June In(chla in ug/L) 3 2 0 September July **August** In(chla in ug/L) 4 က 7 0 October November December In(chla in ug/L) က 7 0 2010 2015 1985 1990 1995 2000 2005 2010 2015 1985 1990 1995 2000 2005 1985 1990 1995 2000 2005

90th Percentile Salinity

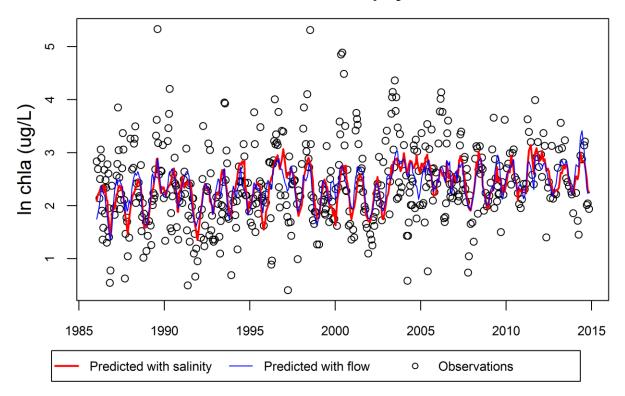
Median Salinity

Note: Salinity percentiles are for that month of the year in the 1986-2014 record.

Month's Observations

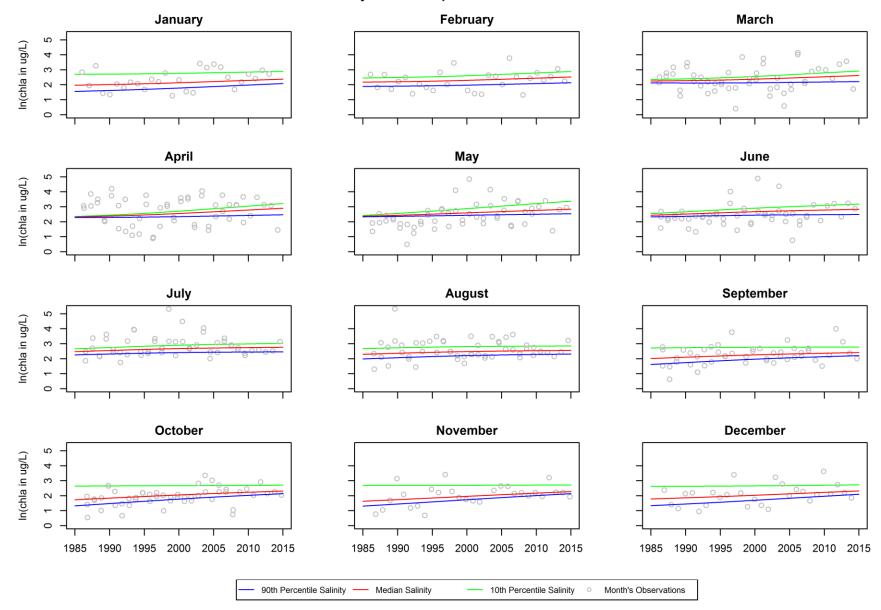
10th Percentile Salinity

GAMM Surface chlorophyll-a at LE1.3



Fit statistic	GAMM model for LE1.3	
	With Salinity	With Flow (90 day lag)
RMSE (of logs!)	0.66	0.65
AIC	1006	1016

LE1.3 GAMM salinity-normalized predictions with each month's data



April 30, 2015 DRAFT Note: Salinity percentiles are for that month of the year in the 1986-2014 record.

To-do for GAMs

- This was a rough first cut, so still tweaking model fit
- Log back-transformation approach
- Develop some additional comparable graphics