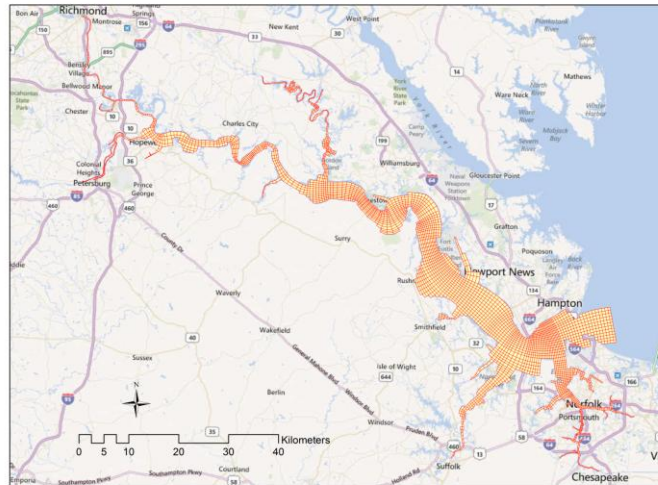


# James River CHLa Study – 2014 Review

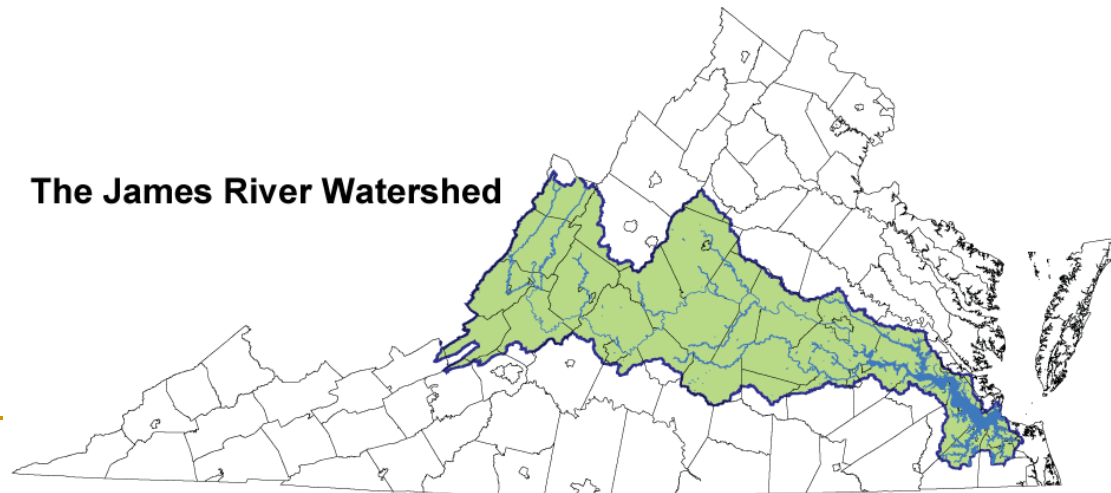
## WQGIT

October 8, 2014



# James River Watershed

- Virginia's largest river
- 3rd largest tributary to Chesapeake Bay
- Over 10,000 square miles (about 25% of VA)
- Home to 1/3 of all Virginians (2.5 million with half living in the lower section)
- Land-use
  - 71% forest
  - 16% agriculture
  - 5% urban
  - 8% other



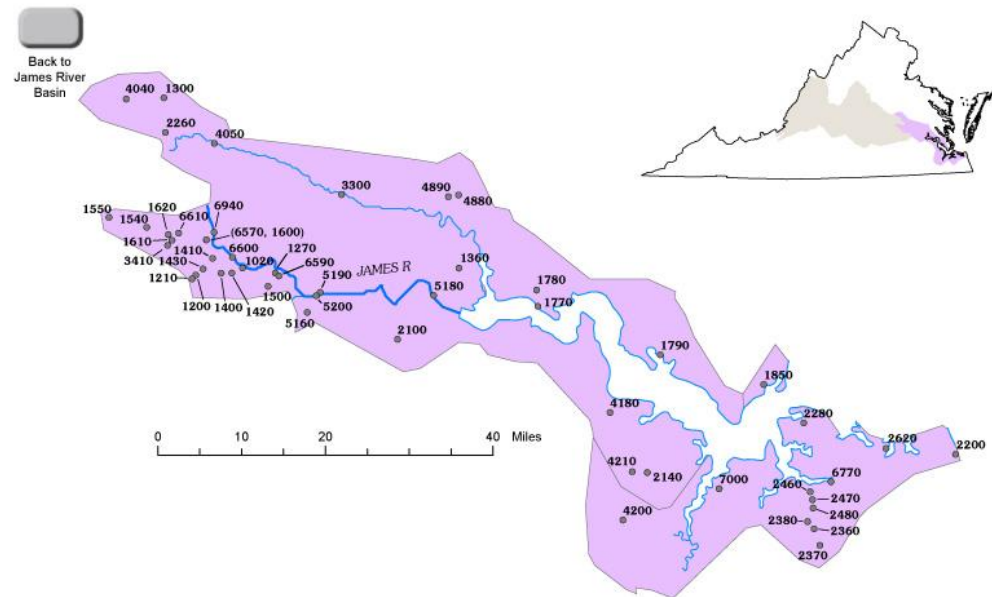
# Lower James River

## ■ Land-use

- ❑ 31% forest
- ❑ 54% urban/suburban/mixed open
- ❑ 12% agriculture
- ❑ 3% other

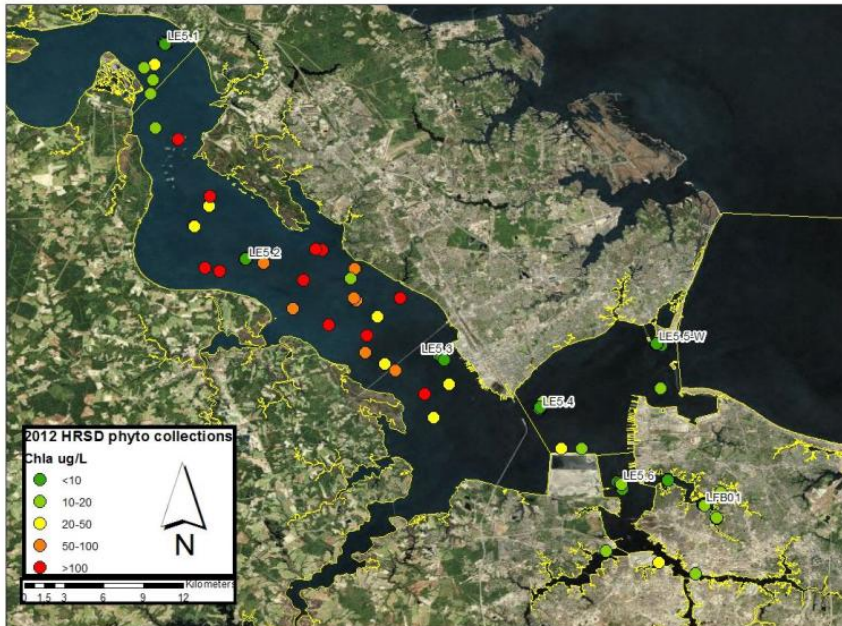
## ■ Residence time

- ❑ 36 days – high flow
- ❑ 74 days – low flow



# Outline

- Regulatory Background
- James River Chlorophyll Study
- Regulatory Path Forward



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# Virginia Regulations

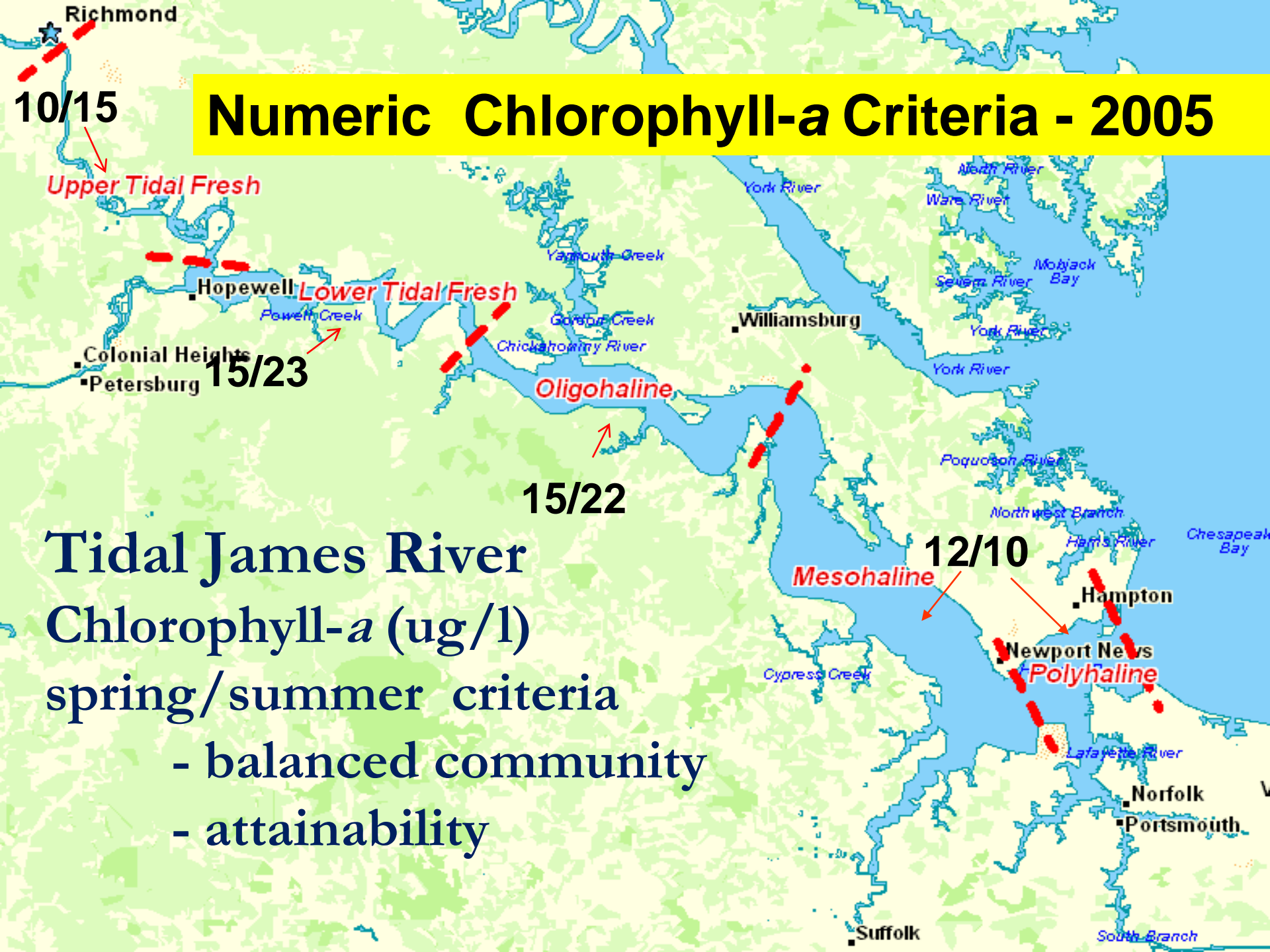
## Existing Before 2005

- **Designated Uses** - 9 VAC 25-260-10  
“...balanced, indigenous population of aquatic life...”
- **General Criteria** - 9 VAC 25-260-20  
“...undesirable or nuisance aquatic plant life...”
- **Nutrient Enriched Waters** - 9 VAC 25-260-330  
“...undesirable growths of aquatic plant life in surface waters...”

## Adopted in 2005 for All Bay Waters

- **Narrative chlorophyll a criterion** - 9 VAC 25-260-185  
“concentrations of chlorophyll-a shall not exceed levels... undesirable... unsuitable... ecologically undesirable water conditions...”
-





# Numeric Chlorophyll-a Criteria - 2005

**Tidal James River**  
**Chlorophyll-a (ug/l)**  
**spring/summer criteria**  
- balanced community  
- attainability

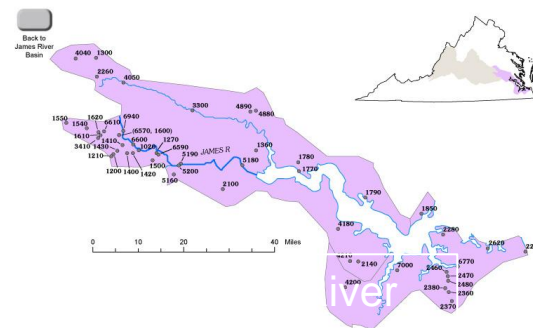
# Chesapeake Bay TMDL

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- Set nutrient load caps for all river basins throughout Bay watershed
- James River basin cap loads much lower than 2005 when EPA approved chlorophyll standard
- Impact estimated to add \$1-2 billion to nutrient reduction costs
- VA conclusion: let's make sure first

# Study Goals

- Revisit the James River TMDL allocations  
(Appendix O & X, Bay TMDL)
  - Develop a site specific James River water quality model
  - Re-assess attainability of chl-a criteria
- Review and confirm/adjust James River chl-a standard
  - Scientific Advisory Panel to make recommendations
  - Conduct scientific study to review basis for setting chlorophyll standard





# JR Chl-a Study Schedule

2011	Develop Study Workplan Issue Notice of Intended Regulatory Action (NOIRA)
2012	Workplan Implementation
2012-14	Monitoring and Modeling
2015	Science Panel Recommendations & Model TMDL scenarios
2016	Develop Regulatory Proposal (if warranted)
2017	Coordinate WIP development Complete Regulatory Review

---

# **James River Chlorophyll *a* Criteria**

## Rulemaking :

- NOIRA published Sept. 12, 2011
  - DEQ requested a waiver to the usual regulatory schedule – VA Governor approved
  - Ensure timely completion of regulatory process until 2017, if necessary
-

# James River CHLa Study

\$3MM appropriation

Re-visit existing numeric CHLa criteria for the James. Are they protective of aquatic life?

Re-visit the JR TMDL loads with a site-specific water quality – HAB model.

Data Collection/Research:

- When, where, why of algal blooms.
- Effects on water quality and aquatic resources

Modeling: James-specific linkages between nutrient inputs to the estuary and CHLa in the estuary

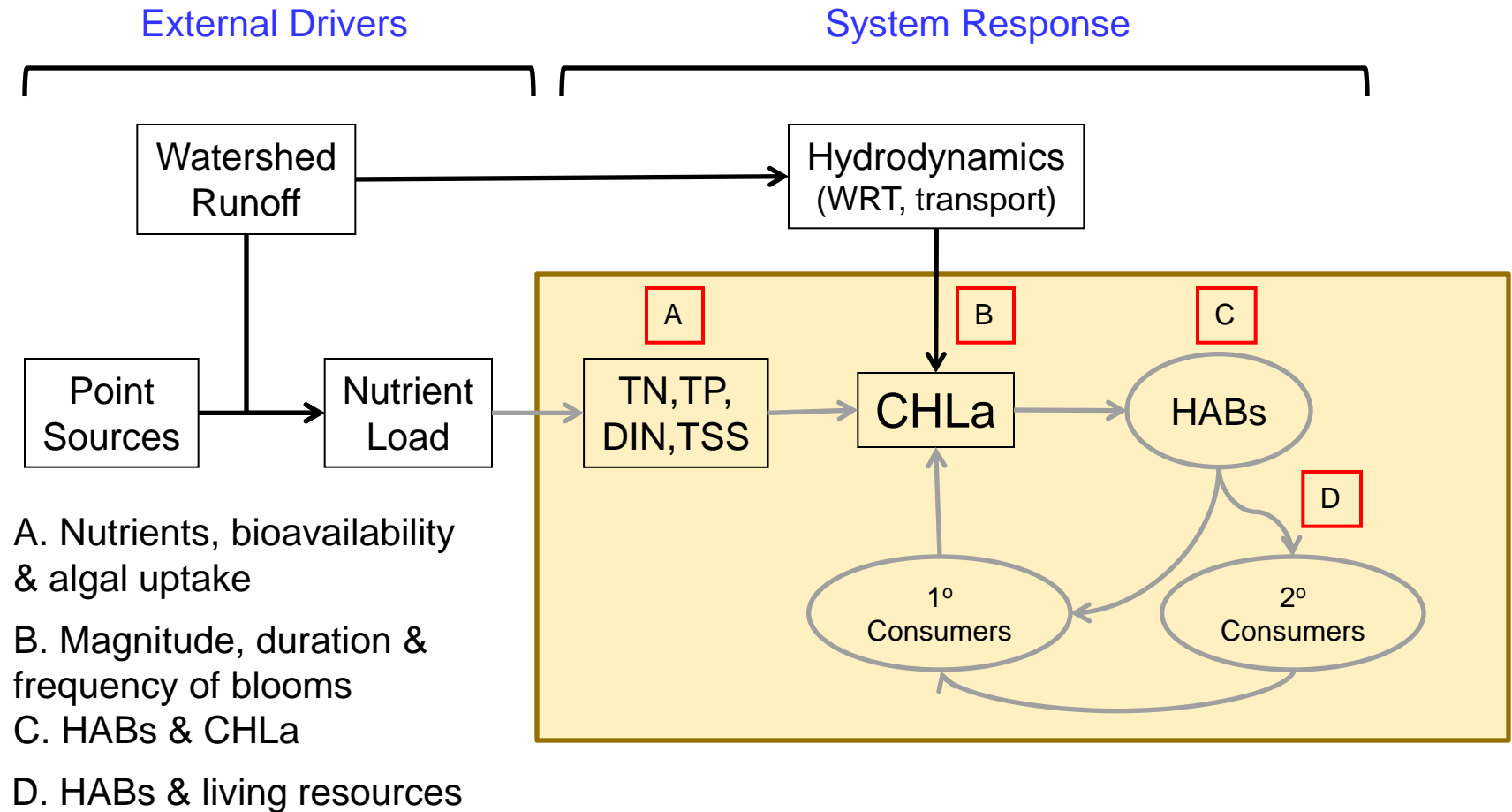
Designated Use	Chlorophyll a $\mu/l$	James River Segment	Temporal Application
Open Water	10	JMSTF2	March 1 - May 31
	15	JMSTF1	
	15	JMSOH	
	12	JMSMH	
	12	JMSPH	
	15	JMSTF2	July 1 - September 30
	23	JMSTF1	
	22	JMSOH	
	10	JMSMH	
	10	JMSPH	



# JR Chl-a Study Schedule

2011	- - - - -	Workplan Developed Notice of Intended Regulatory Action (NOIRA)
2012	- - - - -	Workplan Implementation
<b>2012-14</b>	<b>- - - -</b>	<b>Monitoring and Modeling</b>
2015	- - - - -	Science Advisory Panel Criteria Recommendations
2016	- - - - -	Develop Regulatory Proposal (if appropriate)
2017	- - - - -	Complete Regulatory Review & WIP coordination

# Data Collection and Modeling Framework

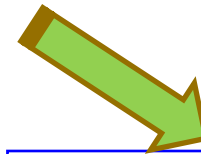




## Science Advisory Panel

Clifton Bell (B&C) \*  
Brian Benham (VPI)  
Claire Buchanan (ICPRB) \*  
Paul Bukaveckas (VCU)  
Greg Garman (VCU)  
Eileen E. Hoffman (ODU)  
Will Hunley (HRSD) \*  
Rebecca LePrell (VDH) \*

Harold G. Marshall/Todd Egerton (ODU)  
Kenneth Moore (VIMS)  
Margaret Mulholland (ODU)  
Kimberly Reece (VIMS)  
Winston Lung (UVA)  
Peter Tango (USGS) \*  
Harry V. Wang (VIMS)



### Research Collection Team (PIs)

- Iris Anderson (VIMS)
- Paul Bukaveckas (VCU)
- Harold Marshall/Todd Egerton (ODU)
- Ken Moore (VIMS)
- Margie Mulholland (ODU)
- Kim Reece (VIMS)

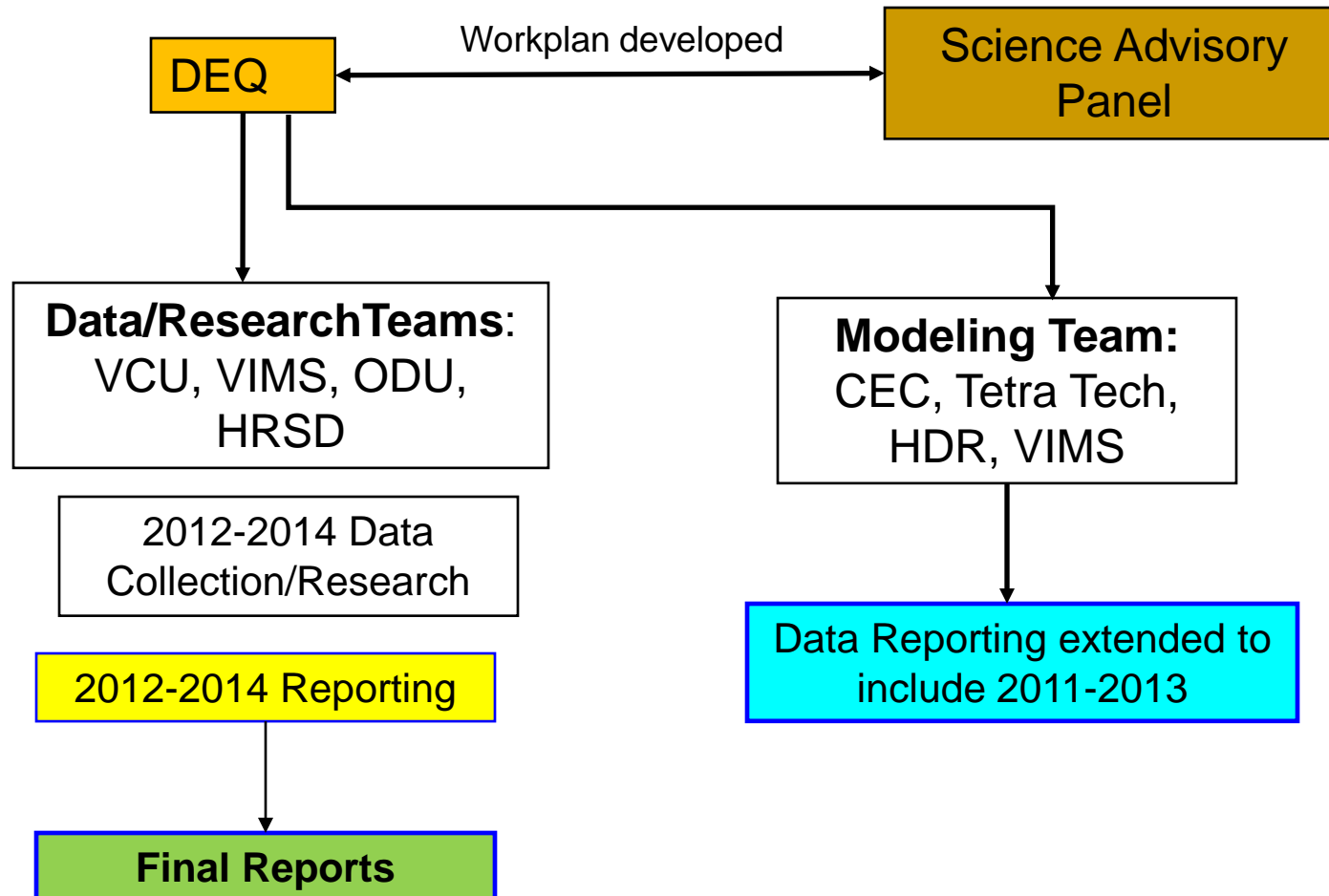


Reporting

### Modeling Team (PIs)

- Jim Fitzpatrick (HDR/HydroQual)
- David Jasinski (CEC)
- Andrew Parker (TetraTech)
- Jian Shen (VIMS)
- Harry Wang (VIMS)
- HAB Advisory
  - Paul Bukaveckas,
  - Margie Mulholland
  - Hans Paerl

# Project Status



# SAP Priorities: Spring 2013

## VCU Rice Center

April 26, 2013

- Evaluate results from 2012 data collection
- Assess 2013 data collection activities
- Evaluate progress in modeling effort



# JR Chl-a Study Schedule

**Science Advisory Panel Reports for 2012 & 2013 now available**

[http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityStandards/NutrientCriteriaDevelopment.aspx#James\\_R\\_CHLa\\_Study](http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityStandards/NutrientCriteriaDevelopment.aspx#James_R_CHLa_Study)

**New Report on empirical relationships between harmful algal blooms and potential impacts to the aquatic life - due end of this year**

**Scientific Study Report summarizing the Panel findings - due mid-2015**

**Modeling efforts extended thru end of 2015 to include the 2011-2013 data.**

# JR Chl-a Study Schedule

2011	- - - - -	Workplan Developed Notice of Intended Regulatory Action (NOIRA)
2012	- - - - -	Workplan Implementation
2012-14	- - - -	Monitoring and Modeling
2015-	- - - - -	Science Panel Criteria Recommendations STAC criteria review, and Model TMDL Scenarios
2016-	- - - - -	Develop Regulatory Proposal (if appropriate) STAC Model Review
2017	- - - - -	Complete Regulatory Review & WIP considerations



# James River CHL-a Study



## Questions?

[http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityStandards/NutrientCriteriaDevelopment.aspx#James R CHLa Study](http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityStandards/NutrientCriteriaDevelopment.aspx#James_R_CHLa_Study)