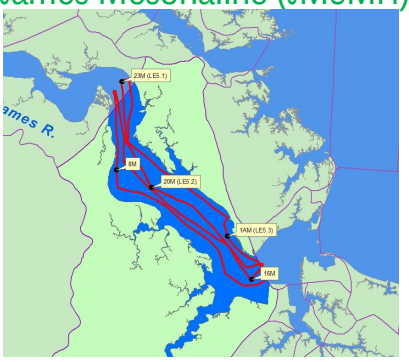
Lower James River Monitoring

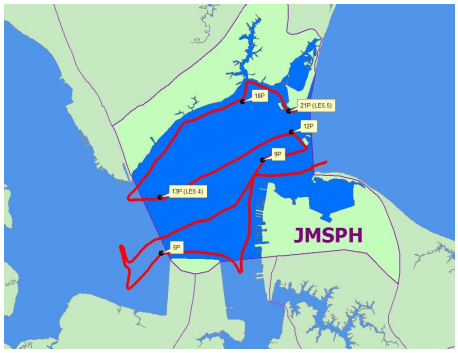
2011 Summary
May 3, 2012
CHLA Science Advisory Panel

HRSD
Cleaning wastewater every day for a better Bay.

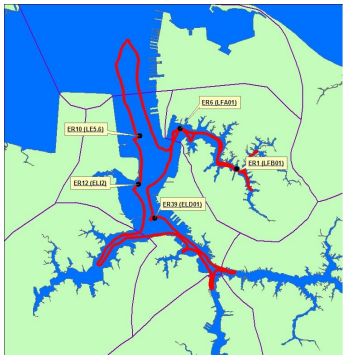
James Mesohaline (JMSMH)



James Polyhaline (JMSPH)



Elizabeth (LAFMH and ELIPH)



Other Details

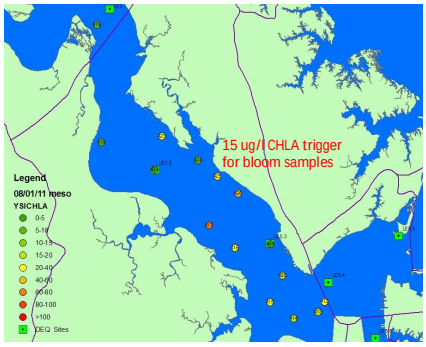
- HRSD monitoring conducted weekly
- James River segments monitored since 2005
- Elizabeth River segments monitored since 2008
- Data is available at:

http://www3.vims.edu/vecos/

DATE	TIME	TEMP	COND	SALIN	PH	TURB	CHLA	DO%	DO	BATT	Lat	Long	Speed	Depth
9/21/2011	8:06:44	22.68	24.15	14.67	7.6	5.6	7.6	95.9	7.6	12.4	3700.33	7627.596	21.1	9
9/21/2011	8:06:48	22.68	24.18	14.69	7.6	5.5	7.9	95.7	7.6	12.3	3700.921	7627.623	20.9	10.2
9/21/2011	8:06:52	22.67	24.08	14.62	7.7	5.3	8.1	95.6	7.6	12.4	3700.906	7627.643	20.6	10.6
9/21/2011	8:06:55	22.64	23.94	14.53	7.7	4.9	8.3	95.8	7.6	12.4	3700.884	7627.653	20.9	10
9/21/2011	8:06:59	22.61	23.86	14.48	7.7	4.6	8.8	96.5	7.7	12.2	3700.861	7627.656	20.9	10.7
9/21/2011	8:07:03	22.59	23.82	14.45	7.8	4.4	9.2	97	7.7	12.3	3700.838	7627.661	20.6	12
9/21/2011	8:07:07	22.58	23.83	14.46	7.8	4.3	9.4	97.4	7.7	12.3	3700.817	7627.671	20.6	11.9
9/21/2011	8:07:11	22.58	23.83	14.46	7.8	4.2	9.2	97.3	7.7	12.5	3700.797	7627.685	20.6	12.1
9/21/2011	8:07:16	22.56	23.83	14.46	7.8	4.2	9.4	97.1	7.7	12.3	3700.777	7627.699	20	11.8
9/21/2011	8:07:20	22.57	23.86	14.48	7.8	4.2	9.3	96.9	7.7	12.4	3700.758	7627.713	19.4	12.6
9/21/2011	8:07:24	22.58	23.92	14.45	7.8	4.2	9.3	96.7	7.7	12.4	3700.74	7627.727	20.2	9.9
9/21/2011	8:07:27	22.56	23.78	14.43	7.8	4.2	9.4	96.6	7.7	12.4	3700.721	7627.741	19.9	10.3
9/21/2011	8:07:31	22.56	23.77	14.42	7.8	4.2	9.3	96.5	7.7	12.4	3700.702	7627.756	19.9	9.4
9/21/2011	8:07:35	22.57	23.71	14.38	7.8	4.2	9.6	96.3	7.7	12.3	3700.683	7627.77	19.4	9.9
9/21/2011	8:07:39	22.55	23.65	14.34	7.8	4.2	9.6	96.1	7.7	12.4	3700.664	7627.783	20.1	12.3
9/21/2011	8:07:44	22.56	23.59	14.3	7.8	4.2	9.4	96.1	7.7	12.4	3700.645	7627.797	19.4	12.1
9/21/2011	8:07:47	22.55	23.52	14.25	7.8	4.2	9.4	96.1	7.7	12.4	3700.626	7627.81	19	11.9
9/21/2011	8:07:52	22.53	23.46	14.21	7.8	4.2	9.5	96	7.7	12.4	3700.606	7627.823	19.8	12
9/21/2011	8:07:55	22.52	23.39	14.17	7.8	4.2	9.5	96	7.7	12.3	3700.587	7627.835	19.4	12.1
9/21/2011	8:07:59	22.51	23.29	14.1	7.8	4.1	9.2	96	7.7	12.4	3700.568	7627.847	19.9	12.1
9/21/2011	8:08:04	22.49	23.24	14.07	7.8	4	9.1	96.1	7.7	12.4	3700.546	7627.859	21.8	12.1
9/21/2011	8:08:07	22.5	23.21	14.05	7.8	4	8.6	96.3	7.7	12.4	3700.524	7627.872	22.9	12.9
9/21/2011	8:08:11	22.51	23.16	14.02	7.8	4	8.6	96.4	7.7	12.4	3700.501	7627.883	21.4	14.3
9/21/2011	8:08:16	22.52	23.13	14	7.9	4	8.3	96.6	7.7	12.4	3700.479	7627.892	20.5	13.9

Example output
Number of observations ranges by segment (~2,500-4,500)

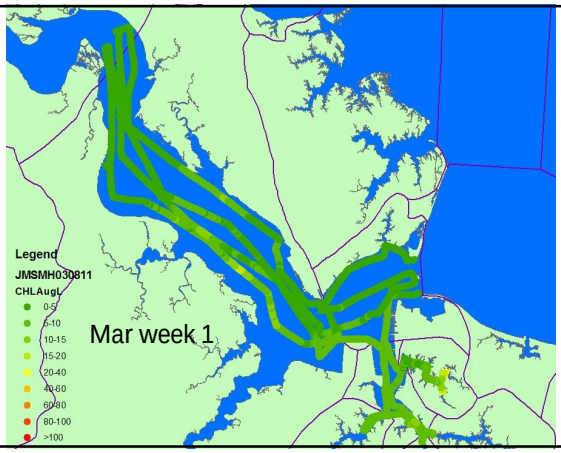
Phytoplankton and HPLC filter sampling - example

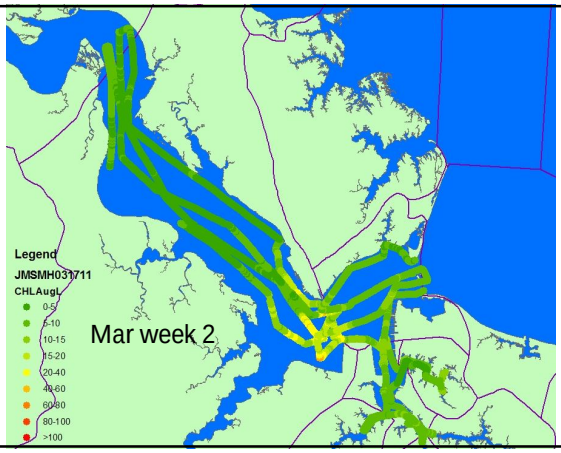


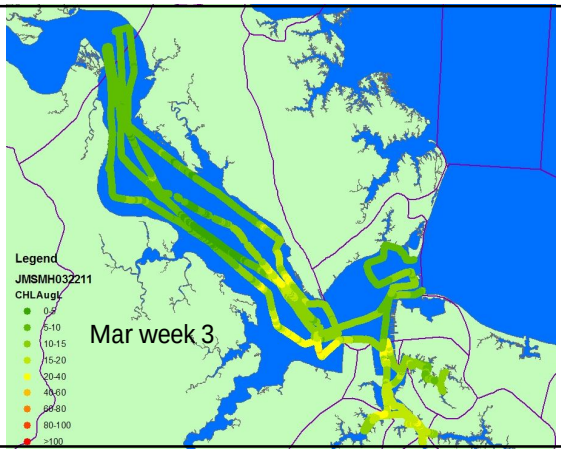
Data generated - 2011

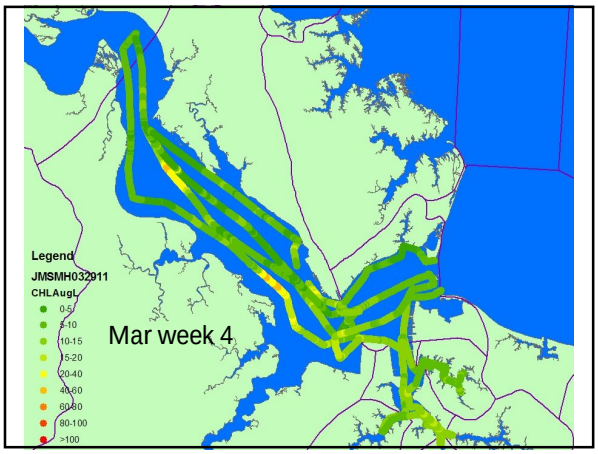
- 94 cruises completed and reported on VECOS
- 728 phytoplankton and HPLC filter samples collected
- 267 submitted to ODU for phytoplankton ID and cell density determinations - balance preserved and archived
- Special sampling (fixed site and blooms) resulted in a paired dataset – spanning wide range of CHLA conditions (<5 to >300 ug/l) over space and time

A. Spring DFLO CHLA time series








Legend
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CHLAugL
0-5
5-10
10-15
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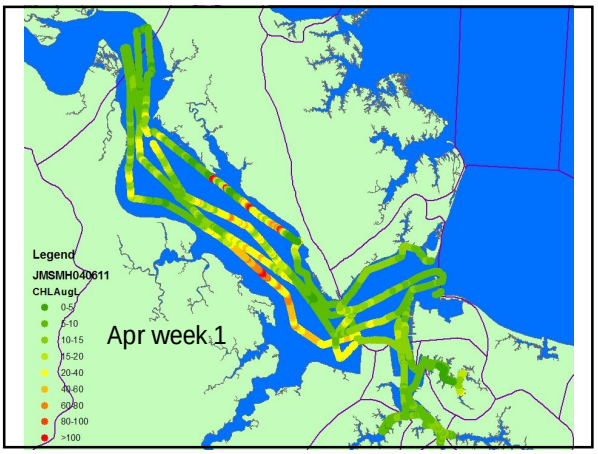
Mar week 4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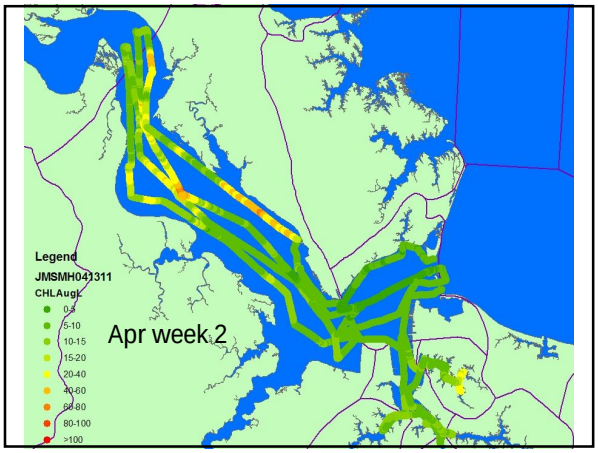
Apr week 1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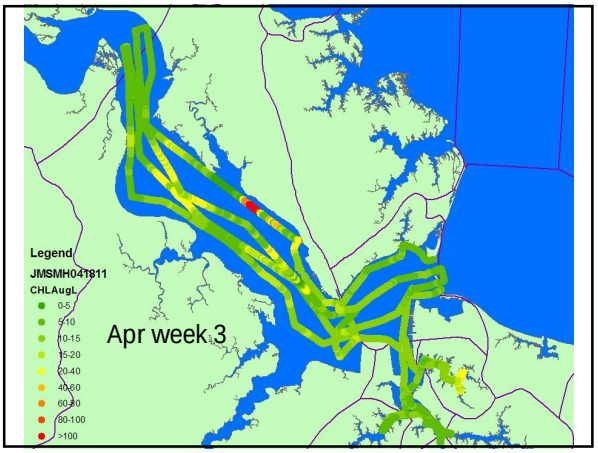
Apr week 2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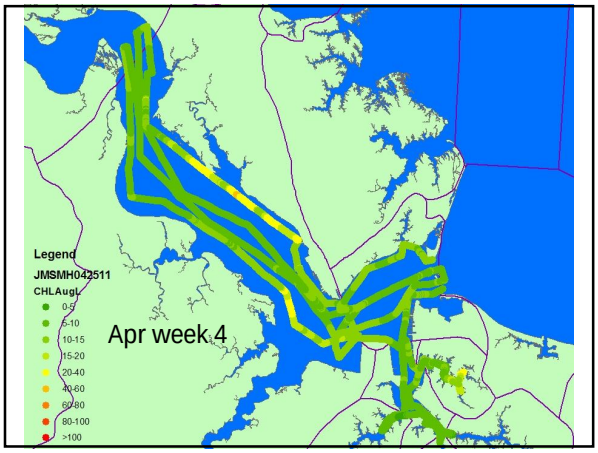
Apr week 3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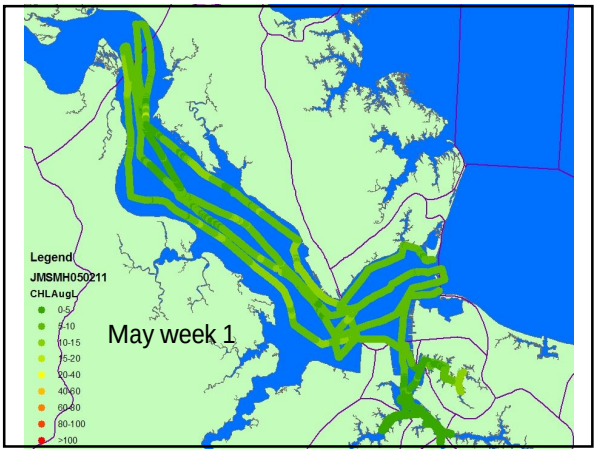
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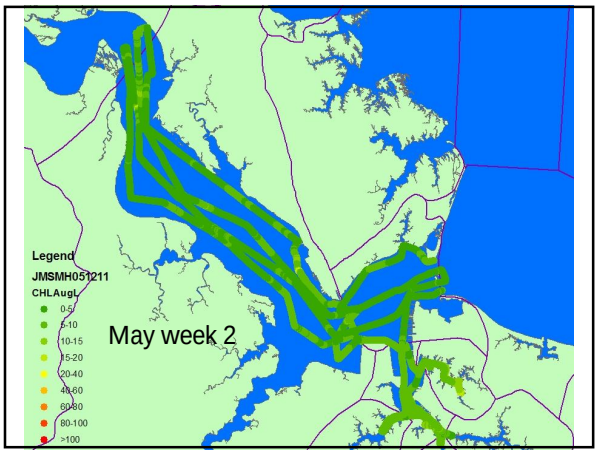
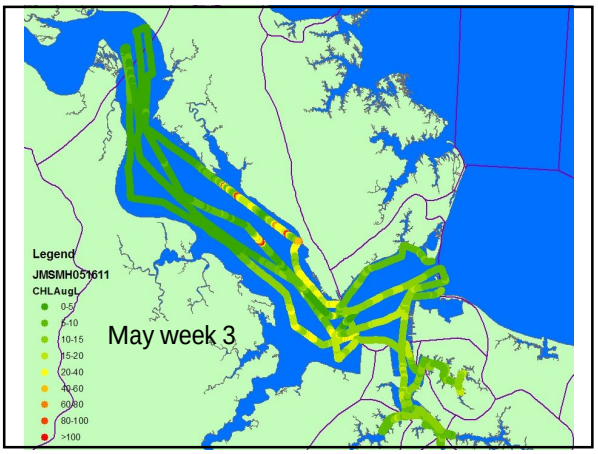
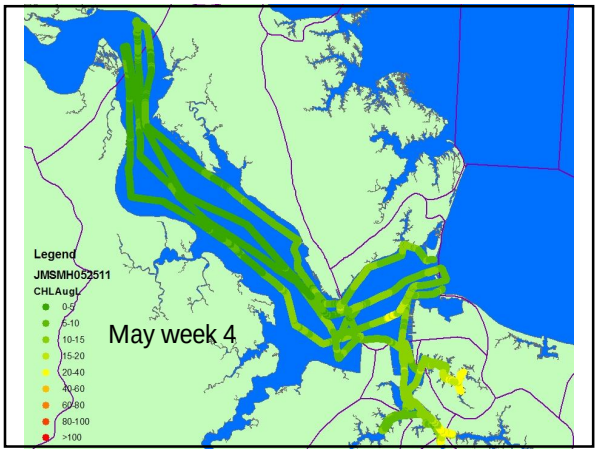
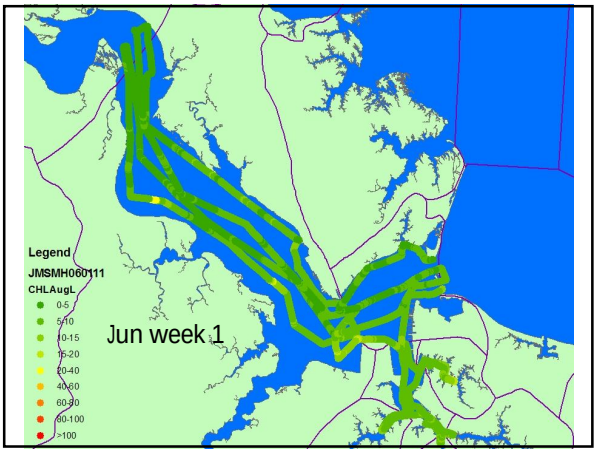
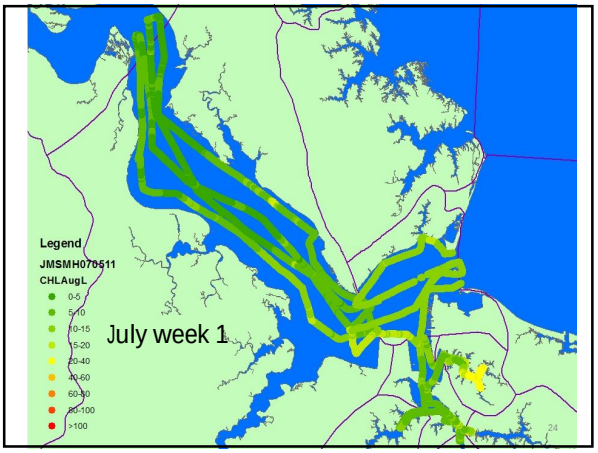


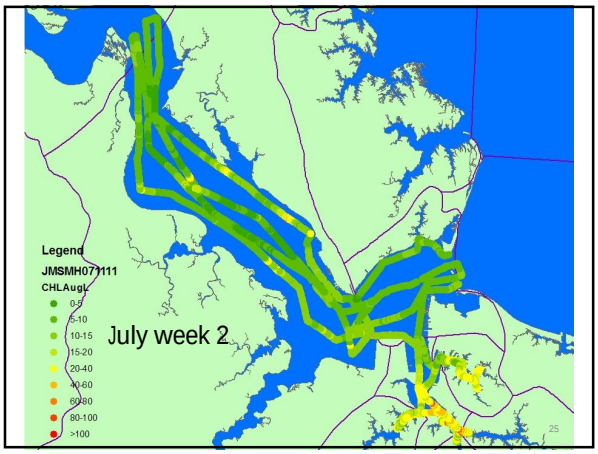






B. Summer DFLO CHLA time series

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July week 2
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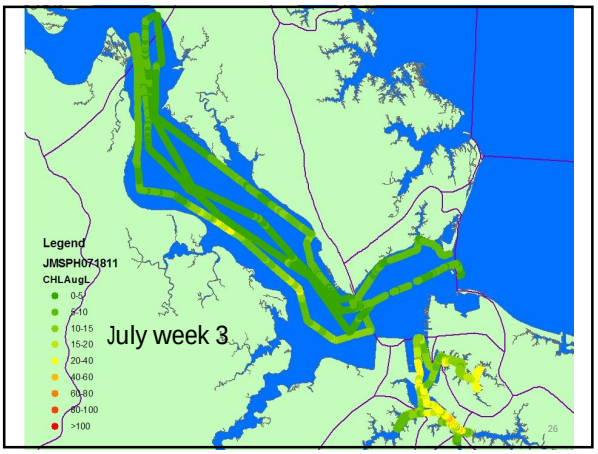
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>100
July week 3
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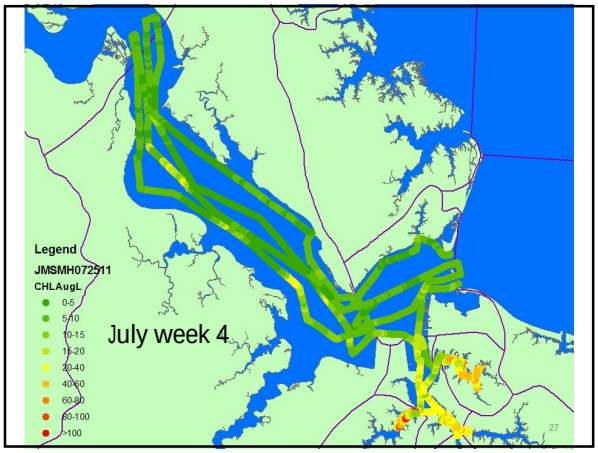
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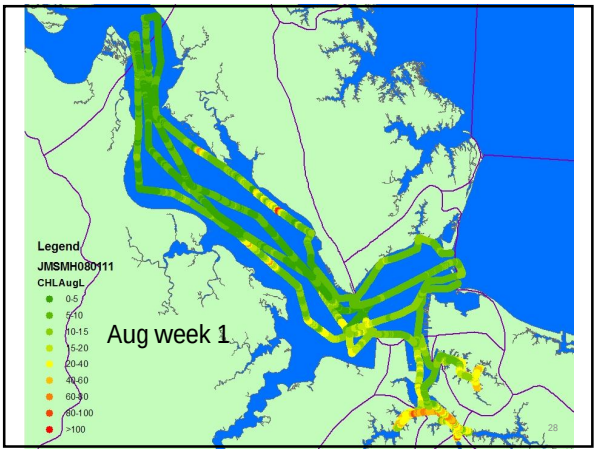
>100
July week 4
27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Aug week 1
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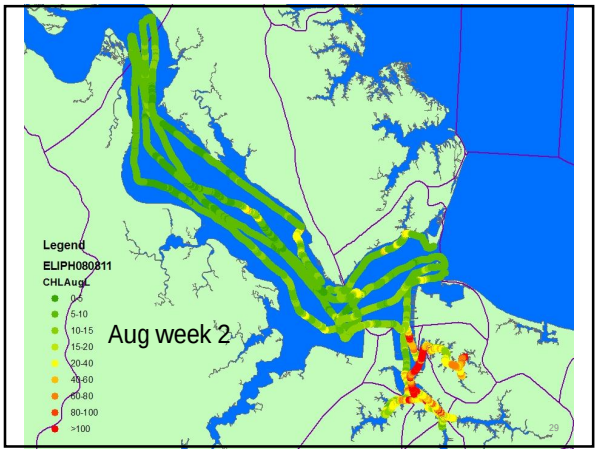
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Aug week 2
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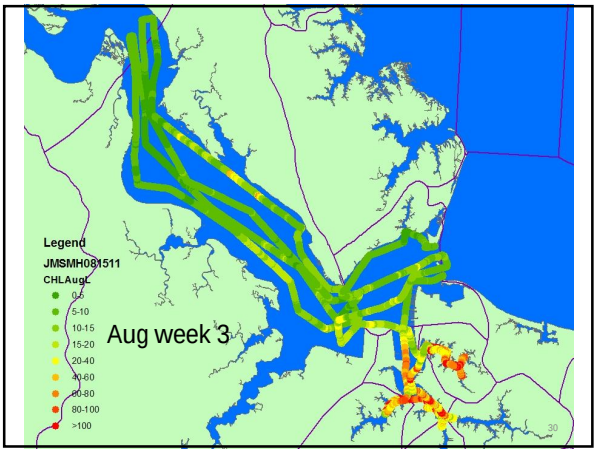
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Aug week 3
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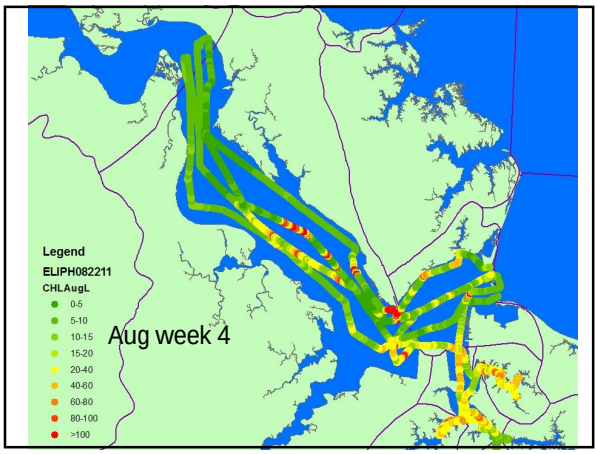
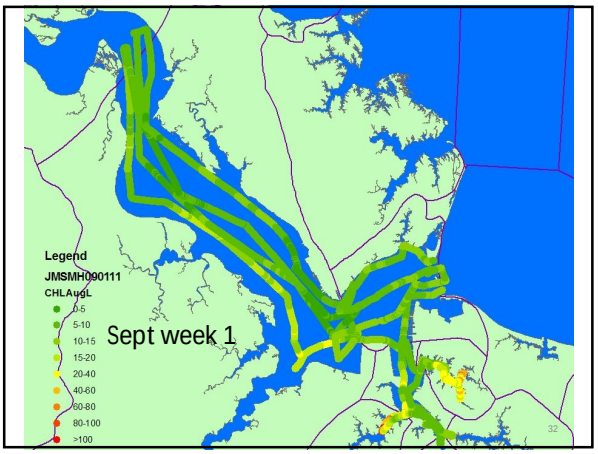
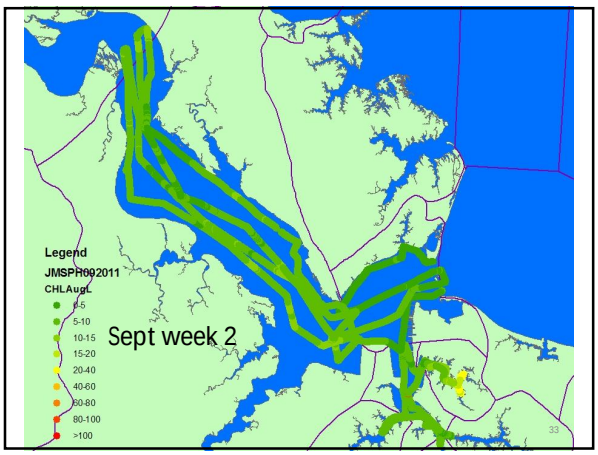




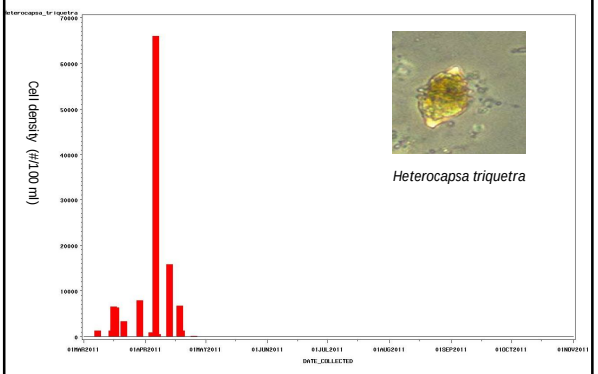


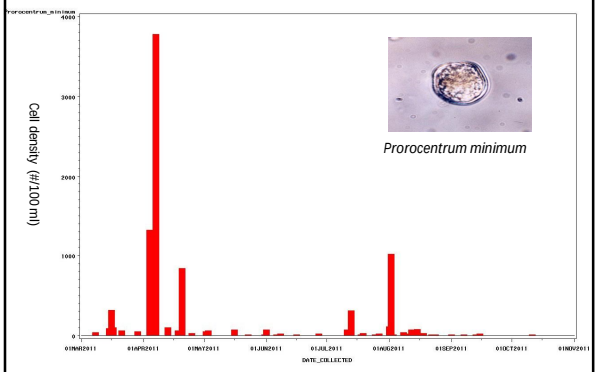
Bloom Summary - 2011

- Summer bloom followed previous pattern
  - Initiation associated with storm events
  - The Elizabeth River appears to be the initiation grounds for the larger system
  - Hydrodynamic transport of blooms from the Elizabeth to the James is an important feature
- Spring bloom appears to follow a different pattern – more intense in lower James
- There is large variability in CHLA over space and time in both seasons

B. Seasonal distribution of species (w/ emphasis on work plan species)

Heterocapsa triquetra, Prorocentrum minimum, Akashiwo sanguinea, Scrippsiella trochoidea, and Cochlodinium polykrikoides





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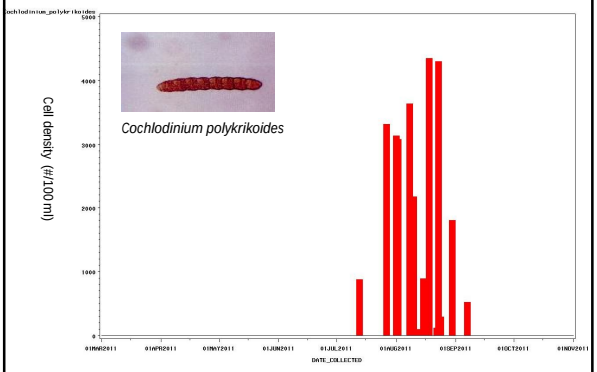

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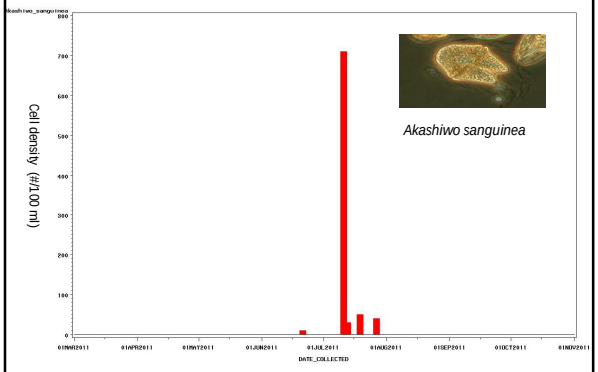

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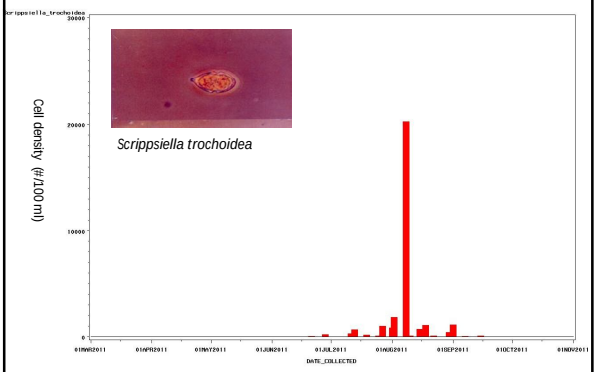
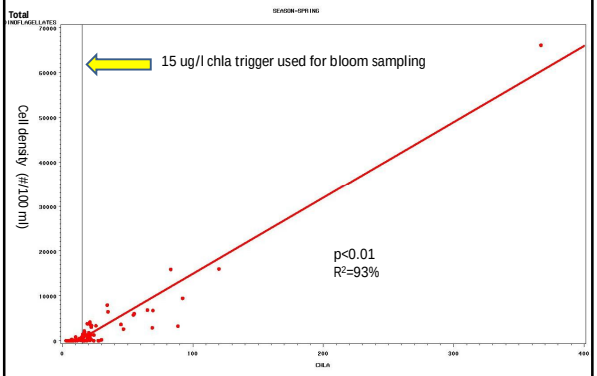


40

C. CHLA * Dinoflagellate cell density relationships (x-y)

41



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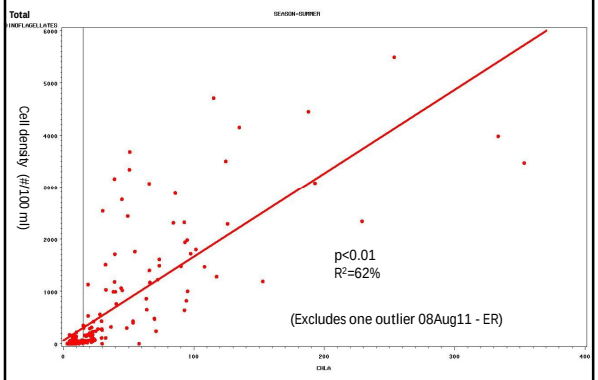
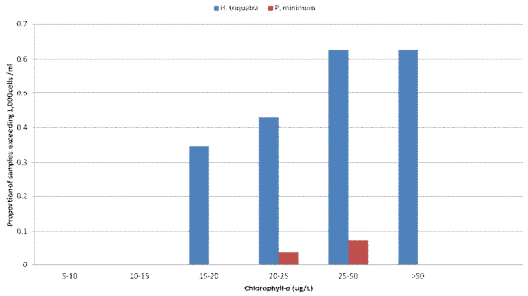


D. CHLA * Dinoflagellate cell density relationships (binned)

Proportion of samples exceeding 1,000 cells/ml by CHLA range

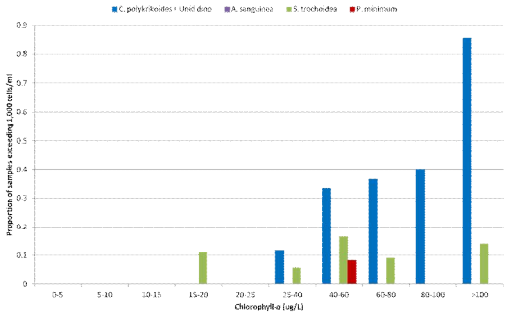
Season=Spring



Note: Cell density value of 1,000 / ml is used an example only – biological effects presently unknown.

Proportion of samples exceeding 1,000 cells/ml by CHLA range

Season=Summer



Note: Cell density value of 1,000 / ml is used an example only – biological effects presently unknown.

Acknowledgments

- Old Dominion University
- Department of Environmental Quality
- Hampton Roads Sanitation District
- Brown and Caldwell
- VIMS