Tool and Data Needs for Eutrophication Assessment and Management

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ERF 2005, Norfolk, VA

Acknowledgements: NOAA/NEEA, LOICZ, UMCES, Asif Iqbal, Jeremy Bartley, Percy Pacheco, Casey Smith

WANTED --- A classification system for US Estuaries

Preferably 5-6 categories, maximum 10



current conditions. Predictions are based primarily on projected population growth, coupled with susceptibility to nutrient inputs.

Ingredients/Needs -

- A consistent, relevant dataset for ~ all estuaries
 A structure for assembling and accessing the data
 Tools for comparison, grouping, visualization
- •Expert input

The Land-Ocean Interactions in the Coastal Zone (LOICZ) Project – an adaptable approach

- •Focus on biogeochemical fluxes (global and regional)
- •Approx. 200 calibration budget sites mostly estuaries
- •An internet-accessible global 0.5° environmental database
- •A linked, on-line geospatial clustering tool
- •Pathways and programs for community involvement

Following expert workshops to test concept and tools, assemble and refine data --- and an arduous search for funding --- the system is taking shape

UMCES supports an information website with extensive links to other estuary-oriented sites, and with an online survey and data entry form for community contributions. (<u>http://ian.umces.edu</u>)

Survey for Boston Harbor

This section contains the survey questions where you will provide the data which will generate the 'Survey Data Summary Resources'. Please carefully read the instructions for each entry field in the mouseover tooltips. You must click the Save/Submit button at the bottom of the survey to enter your responses in the NEEA database.



The KGS site serves data for on- or off-line analysis, and supports online tools – the usable prototype may be found at http://drysdale.kgs.ku.edu/estuary/hp_firststep.cfm

Ente		Estuaries									
		'Albemarle Sound','Altamaha River','Apalachicola Bay' ☞ Generate Disco Format File									
		ALL SELECTED VARIABLES *Check mark the "EXCLUDE NULL?" box if you don't want to include a no data value for that variable. *Use the operator drop down and criteria text to filter a variable by further criteria.									
	Unique system identific	"use the transform drop down box to select a transformation function (click the "?" for details).									
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		Area of estuary (calculated from NOAA shapefiles), Info	interval ·	Filter operator 💽 criteria	transform • ?						
		Volume of estuary, BEST ESTIMATE (see "best z," below), Info	interval ·	Fitter operator 💽 criteria	transform 💌 🤉						
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	Depth of estuary, mean	Precipitation directly into estuary (daily) Info	interval ·	Fitter operator Criteria	transform 💌 ?						
	Perimeter of estuary (e										
	Percent of estuary peri		Generate cluster data								
	Tide height (estimate),	Correlation Matrix and Cross plots									
	Tidal volume										
1	Tides per day										
	Tidal volume per day (
	Tide Ratio: tide height										
	Stratification Ratio: tot										
	Fresh water, percent o										
	Mixed zone, percent o										
	Sea water, percent of										

Average salinity (based

The on-line database front end offers the user tools for data evaluation, selection and editing

This calculator is a prototype version under development Please send corrections, suggestions, and other comments regarding this Calculator to <u>Asif Iqbal</u>

Form an expression to be calculated by either: 1. typing it into the first box using the variable names and operator symbols exactly as given, or 2. selecting a variable from the menu, clicking "add variable", clicking on an Operator, and so on.

Separate multiple expressions with a comma, or just click on "Add Another Expression" Help on How to Use the Calculator

Then enter variable names into the second box for the expressions in the first box, and click "Calculate." [Note: default variable names "CALC_VAR_1" etc. are assigned if none are entered]



Enter Variable names that you would like to be assigned to the calculated variables Seperate multiple variable names by commas for example var1,var2

The final step offers the user format and destination choices

11

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SUB_NAM ID

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EST_Y

EST_X

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d I	Maryland I	49	-75.0869	38.41908	54	1.04E+08	1.92	159	0.9	163000	26.04304	181111	1
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eal	Patuxent R	51	-76.5121	38.38493	142	5.37E+08	3.78	438	8.24	427000	42.23174	51820.	
eal	Potomac F	52	-77.0943	38.39602	1260	6.47E+09	5.13	1350	27.06	3640000	125.7998	134515	
eal	Rappahani	53	-76.8067	37.90541	377	1.41E+09	3.75	572	11.61	1120000	68.81221	96468.	
eal	York River	54	-76.7458	37.47516	206	7.86E+08	3.82	447	19.55	646000	50.8661	33043.	
eal	James Riv	55	-76.6446	37.12998	640	2.06E+09	3.22	921	33.74	2040000	89.65712	60462.	
eal	Chester Ri	56	-76.2659	39.10704	196	6.81E+08	3.47	359	0.6	578000	49.61613	963333	
eal	Choptank I	57	-76.269	38.69049	411	1.27E+09	3.09	815	1.38	1240000	71.84817	898550	
eal	Tangier/Pc	58	-75.9848	38.18789	1057	3.48E+09	3.29	933	0.81	2920000	115.2212	36049	
eal	Chesapeal	59	-76.176	38.23577	6974	5.11E+10	7.33	3581	15	20400000	295.9619	13600	
aq	Passamaq	60	-67.0547	44.99488	148	6.74E+09	45.57	461	43.65	443000	43.11473	10148.	
ma	Englishma	61	-67.4152	44.59307	225	2.57E+09	11.44	395	15.74	763000	53.16014	48475.	
ag	Narraguag	62	-67.7483	44.50743	206	2.03E+09	9.85	409	7.56	708000	50.8661	93650.	
B	Blue Hill B	63	-68.4575	44.34721	317	7.25E+09	22.87	365	3.52	1040000	63.09929	295454	
cot	Penobscot	64	-68.8636	44.40772	992	2.44E+10	24.64	997	36.08	3230000	111.6222	89523.	
gu	Muscongu	65	-69.3171	43.98063	201	2.47E+09	12.28	382	1.71	645000	50.245	3771	
scc	Damarisco	66	-69.5838	43.94174	53	6.79E+08	12.82	189	0.04	168000	25.80078	42000	
cot	Sheepscot	67	-69.6822	43.91883	107	1.92E+09	17.94	396	5.73	336000	36.65951	58638.	
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.... sent to the geospatial clustering tool, DISCO

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CatchY	interval 💌		1	meanAbsDev 💌	euclidean 💌	
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EstY	interval 💌		1	meanAbsDev 💌	euclidean 💌	
EstAkm2	interval 💌		1	meanAbsDev 💌	euclidean 💌	
EstVm3	interval 💌		1	meanAbsDev 💌	euclidean 💌	
bestz	interval 💌		1	meanAbsDev 💌	euclidean 💌	
EstPkm	interval 💌		1	meanAbsDev 💌	euclidean 💌	
pctopen	interval 💌		1	meanAbsDev 💌	euclidean 💌	
tideht	interval 💌		1	meanAbsDev 💌	euclidean 💌	
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tidesd	interval 💌		1	meanAbsDev 💌	euclidean 💌	
tidevd	interval 💌		1	meanAbsDev 💌	euclidean 💌	
tiderat	interval 💌		1	meanAbsDev 💌	euclidean 💌	
stratrat	interval 💌		1	meanAbsDev 💌	euclidean 💌	
pctfresh	interval 💌		1	meanAbsDev 💌	euclidean 💌	
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Where you can select variables and types of analyses The user controls not only the clustering parameters, but can also select sub-populations of points as well as variables, and can use the tool for non-geographic data visualizations



Cluster results in GIS provide not only additional visualizations and maps at various scales, but also additional tools for analysis.

Providing the user with enhanced data sampling through ArcIMS will expand cluster inputs, comparisons, and modeling.

One of the most promising versions is based on 5 simple physical descriptors



- 1. Mean depth;
- 2. % open mouth;
- 3. Tide height;

(35)

(21

6 (2)

- 4. log (freshwater flow/area);
- 5. Mean air temperature.

with means or static values provides encouraging results, but we still need: •Better data on timedependent processes (over a range of scales); •Easier integration of data with different native resolutions; and •ESPECIALLY, better definition of and data on eutrophication status.

System classification

A prototype visualization and data selection tool has been developed and will be linked to the database within the coming month



Remaining needs:

Quantitative data on responses and status Additional datasets with better resolution in space and time Expert judgment applied to hypotheses and analyses



Quantitative Chl-a data (seasonal and annual climatologies as well as time series) are being provided by NOAA (R. Stumpf, S. Dunham), but resolution limits the data to the larger estuaries.

Summary and Conclusions

A new generation of data management and analysis tools is being applied to estuary assessment and classification

Additional data are being added to the inventory, but more are needed

New pathways for two-way information flow and participation by a larger community are available

The biggest barriers to rapid progress are cultural and organizational

Thank you



