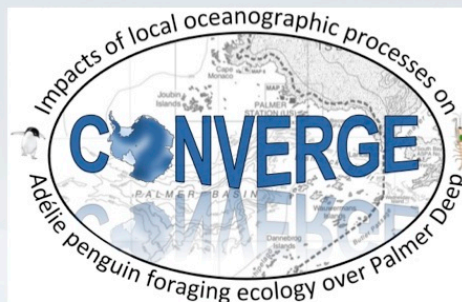


Project CONVERGE

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Sample Mini-Proposal for Science Investigation (Using Online Data)

Title: Patterns in the Average Amount of Chlorophyll Near Tuckerton, NJ by Season and Year from 2002-2014

Introduction

The topic area that we are interested in understanding more about is how chlorophyll levels change over time. To understand if there are seasonal differences in the amount of chlorophyll in the water and if chlorophyll levels overall are changing over time around Tuckerton, NJ we will use JCNERR Water Quality Data from 2002-2014 (<http://cdmo.baruch.sc.edu/get/export.cfm>). To make sure we have good data about seasonal changes, we will compare seasonal averages across twelve years. To make sure we have enough data to observe a long-term trend in chlorophyll we will compare annual averages across twelve years.

Testable Question & Hypothesis

Our testable question is: How does the average amount of chlorophyll differ between the seasons near Tuckerton, NJ? How has the overall amount of chlorophyll changed since 2012 near Tuckerton, NJ?

Our hypotheses are:

1. There will be more chlorophyll in the water in the spring and summer seasons, than in the fall and winter seasons.
2. There will be an increase in the amount of overall chlorophyll over the twelve years.

Materials

- JCNERR downloaded data
- Internet access
- Excel

Planned Procedure – Description of Data Collection

- How will data be collected? – Data will be downloaded from the National Estuarine Research Reserve System’s Centralized Data Management Office (CDMO) website.
- How will measurements be taken? – Data were selected for Buoy 139, one of the buoys in the JCNERR near Tuckerton, NJ that collects nutrient data and has data about chlorophyll in the water.
- What tools and methods will be used to collect the data? – Internet to submit a “Export Data” request and email to receive the exported data zip files.

- How often will data be collected and recorded? – The data is collected by JCNERR monthly at Buoy 139.
- How long will the investigation last? – The investigation will look at data from the start of the dataset in April of 2002 through 2014.

Planned Procedure – Investigation Design Table

<i>Independent Variable –</i>		<i>Background Questions –</i>	
<ul style="list-style-type: none"> • Time (seasonal average) • Time (annual average) 		<ul style="list-style-type: none"> • How are chlorophyll a samples taken from the buoy? • What is chlorophyll a used for in plants? • What factors influence how much chlorophyll a is in the water? 	
<i>Dependent Variable –</i>		<i>Constants –</i>	
<ul style="list-style-type: none"> • Amount of chlorophyll a. 		<ul style="list-style-type: none"> • Buoy. • Nutrient sensor. • Sampling location. 	
<i>Control Group –</i>	<i>Treatment Group #1 –</i>	<i>Treatment Group #2 –</i>	
Not applicable	Not applicable	Not applicable	

Planned Procedure – Description of Data Analysis

- What kind of data table will be used? – This is what the data table will look for the seasonal comparisons with the Avg XX columns will have the average amount of chlorophyll from that season. Winter – December (previous year)-February, Spring – March-May, Summer – June-August, Fall – September-November:

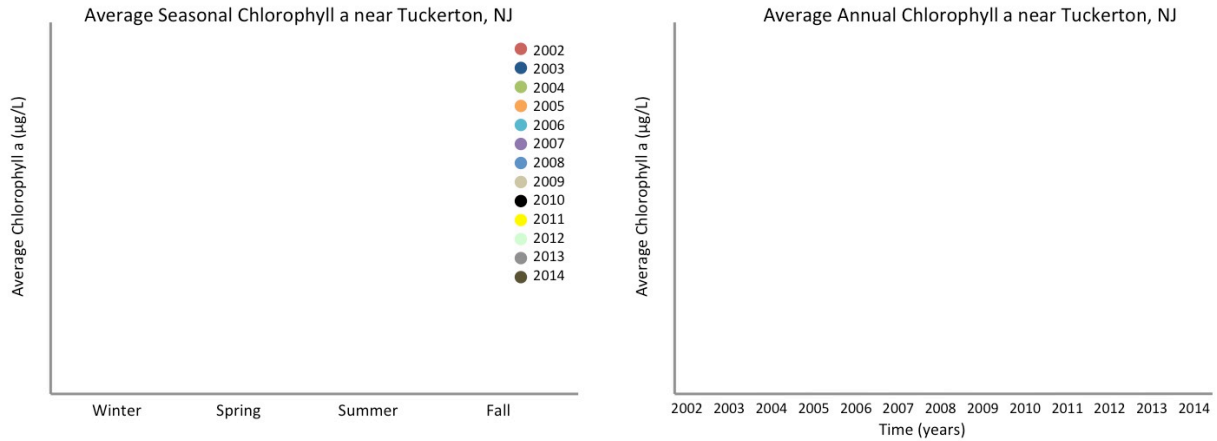
Year	Avg Winter	Avg Spring	Avg Summer	Avg Fall	Other Data Comments
2002					

This is what the data table will look for the annual comparisons:

Year	Avg Chlorophyll	Other Data Comments
2002		

- How will the data be reviewed for outliers? – The “Best Available Dataset” was requested from the CDMO website which means the data have already been reviewed to not include data that were flagged as outside the sensor limits or rejected.
- What tools will be used to interpret the data? –
 - To determine if there is a seasonal difference in the amount of chlorophyll, we will calculate and plot the average seasonal chlorophyll amount for twelve years. We will then visually compare the differences in average chlorophyll among the seasons.
 - To determine if there is a difference in the overall amount of chlorophyll over time, we will calculate and plot the average chlorophyll per year for twelve years. We will then visually compare the pattern (slope) of the overall amount of chlorophyll over time.
- What type(s) of figure(s) will be used to show the data?

- The average amount of chlorophyll will be plotted by season on a scatterplot using different colors to mark the different years being plotted.
- The average amount of chlorophyll will be plotted by year on a scatterplot.



- What type(s) of math or statistics will be used to interpret the data? –
 - The average amount of chlorophyll by season will be calculated for each year by adding up data from each month within a season and then dividing by 3 (or however many data points there are if some months of data are missing).
 - The average amount of chlorophyll by year will be calculated by adding up data from each month within the year and then dividing by 12 (or however many data points there are if some months of data are missing).