Sample First Drafts of Plankton Report Introduction
Bio 451W

Student 1: First Draft

Beginning in 1949, waters off the central and southern coast of California have been regularly surveryed for hydrographic variables by the Californian cooperative oceanic fisheries check capitalizations investigations (CalCOFI) and since 1985, the coast has been surveyed each season using a grid pattern composed of 66 stations (Hayward and Venrick, 1998). The variables measured have changed over the years, but current measurements include but are not limited to temperature, salinity, chlorophyll fluorescence, dissolved oxygen and nutrients such as nitrate, nitrite, phosphate, and silicate. CalCOFI was originally founded to better understand the oceanographic patterns affecting local fisheries and now the program serves the vital function of providing consistent, long term data about the coastal waters near the California Current. Previous studies have found differences in the measured variables within this grid and these differences have been associated with water column depths, distance from shoreline, seasons, and particular time points of the el niño southern oscillation.

This twenty four hour investigation was designed to study how hydrographic measurements and plankton communities vary along the San Diego coast. Three stations were chosen that each have distinct horizontal distances to the coastline and varying depths of the water column. On top of measuring hydrographic variables and collecting plankton samples at three different physical locations, these three stations were each sampled at eight hour intervals over a twenty four hour time period. The null hypothesis states that the hydrographic conditions and spatial and temporal differences between the three stations have no effect on the structure of the plankton communities at the stations. The conditions measured for this study include conductivity, temperature, depth, and chlorophyll fluorescence along the vertical length of the water column from surface to ocean floor. Surface, horizontal plankton tows were completed at each station and designed to capture net plankton (includes megaplankton, macroplankton, mesoplankton and some microplankton).

Student 2 First Draft.

The ocean is a vast environment supporting millions of organisms and their corresponding ecosystems. When one thinks of the ocean, large nekton such as whales, sharks, and fish come to mind. Rarely does one think of plankton. Though these creatures can only be seen under a microscope and sometimes the naked eye, they play a vital role in function, stability, and success in oceanic ecosystems. Plankton are necessary for the success of food webs because many are primary producers. Without their autotrophic abilities, ocean communities would suffer.

Plankton communities are highly diverse and consist of autotrophs, heterotrophs, and mixotrophs. Unlike on land, many different species can coexist at one time. This is known as the "paradox of the plankton." The rapid change in oceanic condition results in a constant shifting of species dominance. Events such as upwelling and blooms generally alter the species composition in a given area even in just a few days. The appearance of more nutrients stimulates growth and production of certain species. Eventually, the blooming species will be controlled by an increased grazing pressure from larger plankton and the dominant species will change in a given area.

Plankton species composition in a given area can also drastically differ depending on time of day. Diel migration, in which some plankton sink to lower depths during the day and return to surface waters at night (this can also happen in reverse, depending on the species) can result in diverse plankton patches. It is proposed that plankton do this to avoid predation and damaging light intensity. Also, because of Ekman transport, the lower in the water column you go, the less it moves from surface winds. If plankton sink, they move less than the surface waters and can return to the surface in a different "patch" with hopefully more nutrients.

It is clear that plankton species composition in a given area can change daily and as a result of blooms and upwelling, but how different are communities that stand ?? only a few miles apart? This paper aims to explore species compositions at three different CALCOFI stations in the Southern California Bight to determine how hydrographic conditions and time of day can affect communities.

Student 3 First Draft

Plankton are an essential part of the marine food chain (Gasol 1997). Phytoplankton are the primary producers and Zooplankton are the secondary producers of the ocean. The amount of plankton in one area and their diversity and distribution greatly affect the amount of energy and carbon transferred to each successive trophic level (Brown, et al. 2008). It is important to understand how oceanic conditions and geographical conditions affect the planktonic community in order to understand how these conditions affect all life in the ocean. Diversity and biomass of plankton are greatly affected by the conditions of the ecosystem that influence plankton diversity and biomass (Beaugrad 2005). Planktonic communities in the Southern California Bight are of great interest because of that area's unique conditions. The structure of the Southern California Bight is such that it causes a section of the California Current to circle back around creating the Southern California eddy and an area of near-shore productivity (Mantayla 2008). The objective of our research was to explore the diversity and distribution of the near-shore plankton communities of the Southern California Bight. We used Shannon-Wiener diversity and Simpson's evenness indices to determine the diversity and abundance of plankton. Any differences in diversity were then compared to geographical location and oceanic conditions to see the affects of geography and conditions on biodiversity and abundance of phytoplankton and zooplankton in the Southern California Bight off the coast of San Diego

My Comments to each draft:

Student 1….

Your intro doesn't support your discussion well. Link what the various studies have shown about the SoCal Bight to what you are going to show in your results. E.g. shallow thermoclines, relatively productive, etc. ….You have some good statements in the discussion that would certainly bear including here as well to set up your study. Provide some intro to the factors that influence plankton community diversity and biomass.
-check capitalizations

I don't understand why you are beginning your intro with such an extensive review of CaCOFI. If you are going to mention this program it should be connected in some way with your study. Your intro should focus on plankton community structure and characteristics that influence it. Too much detail about methods. Your intro needs more focus on diversity and factors influencing plankton abundance and distribution.

Student 2….

First paragraph too general and subjective for the audience of scientists your paper would target.

Restate your objectives in a more narrow and specific way. Remember that our main rationale behind the choice of stations was distance from shore and depth, not time.
At this point the intro is a general view of plankton in a textbook perspective. Focus introduction more toward factors that influence species diversity and abundance and some specific features of the general area we sampled.
References missing…

Student 3…

In general this is a good basic introduction. The statements are a bit short, disconnected and choppy. Try to use more transitions between ideas and perhaps connect some of the sentences or expand the ideas a bit. Add more information about conditions that affect diversity and abundance.
Also, check your citation format because you don't seem to be acknowledging where there's more than one author.

expand these ideas and relate to the specific conditions of the ecosystem that influence plankton diversity and biomass (in regards to diversity and biomass section of paragraph 1)

The objective of our research was to explore the diversity and distribution of the near-shore *plankton communities (we didn't measure productivity)* of the Southern California Bight *in relation to what*? My comments in italics for last paragraph.

[restate this last part of the intro (objectives) with less emphasis on methods

Student Final Drafts of the Introduction

These are the final drafts that the same students submitted after revising their first drafts.

Student 1 Final Draft Introduction:

The plankton ecosystem is commonly referred to as the paradox of the plankton (Hutchinson, 1961) because it is one of the few natural systems that allows for the coexistence of many species competing for several of the same resources. Plankton community structure is complex and dynamic. Plankton communities vary spatially; there can be plankton differences in surface and subsurface water layers as well as differences between coastal and offshore waters. Plankton communities can also vary temporally on either a short term scale, like diel migrations or long term due to seasonal fluctuations or patterns of succession. Nutrient poor waters have been characterized by plankton communities dominated by species with small biomasses while eutrophic waters often support larger sized species. The presence and abundance of plankton species in a given community also depends on biological factors such as their competitive ability to absorb light, intake nutrients, and tolerate local water temperatures.

The California coast has previously been described as rich in biodiversity and it has also been broken down into smaller regions based on similarities in local conditions. Characteristics of the southern California coastal region that differentiate it from both the northern coastal region as well as the offshore region include shoaling of the nutricline, less developed seasonality and typically lower surface chlorophyll concentrations compared to the northern regions, however it is possible to see high near surface chlorophyll (Hayward and Venrick, 1998). In this study we measured hydrographic conditions and conducted surface plankton tows at three stations with varying water column depths that all lie within ten miles of the southern California coast. The goal of this study was to investigate how the surface plankton diversity in the Southern California Bight changes with local hydrographic conditions, the horizontal distance to the coastline and the depth of the water column.

This study shows that across the three relatively closely located stations there are variations in hydrographic conditions that influence the overall structure of the local plankton community. Data from plankton tows show patchy distribution of plankton species as well as coastal to offshore trends in species diversity. Trends in phytoplankton and zooplankton community composition indicate that although there seems to be some differences in nutrient concentrations among the stations, all three stations have a relatively high level of nutrients.

Student 2 Final Draft Introduction

Plankton communities are highly diverse and consist of autotrophs, heterotrophs, and mixotrophs. Unlike on land, many different species can compete and coexist at one time. This is known as the "paradox of the plankton." (Hutchinson 1961) The rapid change in oceanic condition results in a constant shifting of species dominance. This is resultant from physical oceanic process and their effect on nutrient availability (Mantyla, Bograd, and Venrick 2007) Vertical advection and mixing of nutrients is a major source of enrichment for plankton and can quickly change hydrographic conditions (Hayward and Venrick, 1998). Wind driven events such as upwelling and shoaling can cause blooms which generally alter the species composition in a given area even in just a few days. The appearance of more nutrients stimulates growth and rapid uptake. Eventually, nutrients will be restricted and growth for certain species will slow and they will sink to lower depths with more nitrate (Mantyla, et al., 2007). This creates a shift in species composition of surface and near surface layers (Widdicombe et. al, 2002).

The compositions of plankton biomass pyramids are not constant. In areas of high production, the biomass is dominated by phytoplankton and thus a normal biomass pyramid is observed. When a phytoplankton bloom occurs, an increase in zooplankton biomass shortly follows, inverting the biomass pyramid (Gasol, del Giorgio, and Duarte, 1997). The increased grazing pressure from the zooplankton can quickly alter the species composition and the dominating species. (Widdicombe et al, 2002). Interactions among plankton as well as change in hydrographic conditions are continually creating new niches. Niches are quickly filled by various types of species, ubiquitous or atypical. This ensures high planktonic diversity. (Widdicombe et al. 2002).

It is clear that plankton species composition in a given area can change in a short amount of time as a result of wind driven events, but how different are communities that are located only a few miles apart? This paper aims to explore species compositions at three different stations in the Southern California Bight to determine how hydrographic conditions, distance from shore, and depth can affect communities within a three mile radius of each other and the shore.

Student 3 Final Draft Introduction

Plankton are an essential part of the marine food chain, with phytoplankton and zooplankton acting as primary and secondary producers in the ocean (Gasol, et al. 1997). The amount of plankton in one area and their diversity and distribution greatly affect the amount of energy and carbon transferred to each successive trophic level (Brown, et al. 2008). Thus, it is important to understand how oceanic conditions and geographical conditions affect the planktonic community in order to understand how these conditions affect all life in the ocean. Diversity and biomass of plankton are greatly affected by the conditions of the ecosystem, including light, nutrients, and temperature. Plankton cannot photosynthesize without light or nutrients and the rate of photosynthesis depends on the temperature of the water. As plankton go deeper in the water column, the water gets cooler and there is less light so the rate of respiration soon exceeds the rate of photosynthesis. Physical forces like eddies and wind, which utilize Ekman transport to cause localized upwelling of colder, more nutrient-rich water, can also affect these variables and increase production (Hayward and Venrick 1998).

Planktonic communities in the Southern California Bight are of great interest because of that area's unique conditions. The structure of the Southern California Bight is such that it causes a section of the California Current to circle back around creating the Southern California eddy and an area of near-shore productivity (Mantayla 2008). The objective of our research was to explore the diversity and distribution of the near-shore plankton communities of the Southern California Bight. We measured biodiversity and abundance of the plankton and compared any differences in diversity to geographical location and oceanic conditions to see the effects of geography and conditions on biodiversity and abundance of phytoplankton and zooplankton in the Southern California Bight off the coast of San Diego.