

2007/2008 Pleasant Grove Wetlands Research Study

A Continuing Evaluation of our Wetland's Condition

Researchers: Courtney Abajian, Seth Allison, Ellis Avillone, Curtis Brittan, Kyle Farmer, Jacob Hanson, Jason Hogan, Katrina Houser, Max Madsen, John Mangel, Austin Mangelson, Michael Masters, Caleb Ramos, Troy Shea, Annie Strella, Shawn Winn.

Authors: Courtney Abajian (Conclusion), Ellis Avallone (Study Area and Methods), Max Madsen (Introduction, Discussion), John Mangel (Results, Discussion) Austin Mangelson (Title Page, Discussion) , Michael Masters (Acknowledgments, Literature Cited), Troy Shea (Abstract, Discussion), Shawn Winn (Discussion).

Abstract

During the 2007-2008 wetlands program we researched and identified many things in our wetlands. The first thing we did was soil characterization to find out the soil structure, soil color, and soil consistency. The next thing we did was water testing. We looked for chlorine, dissolved oxygen, nitrates, phosphates, and pH. After that we looked at microorganisms in water under the microscope and identified them. Our final activity was identifying bird species.

Introduction

The introduction section provides information on the 2007-2008 wetlands program sampling site. First off, some basic information on wetlands is needed. Wetlands are areas that hold water. The water that they hold can be very shallow, or almost two meters in depth ("Wetland Science", 1). Wetlands can be seasonal or year-round, and are vital to our ecosystem. They help in providing in flood control, and filter water.

Our wetland is located in Rescue, California, at 1,100 feet above sea level (Stuart, 1). Pleasant Grove Middle School was built on a wetland. Ever since the school was built, the health of the ecosystem has been dropping, and is still in danger. The wetland is on a gently rolling terrain, with oak woodlands (Stuart, 1). This wetland is important to our ecosystem and needs to be protected.

Study Area and Methods

Our study area was just behind the C-Pod at Pleasant Grove, near a drain pipe. We did our studies in October of 2007 and in April of 2008.

We have several methods for conducting our tests. Our method for testing the water for chemicals was the same in both the spring and fall. We would take five clear water samples from our testing site and we would drop a testing tablet into each one. The tablets would then change colors. The intensity of the colors would tell us the results. In the fall we did soil characterization. We tested and examined clumps of soil to find out its color, composition, and hardness. In both the spring and fall we collected muddy water samples and made slides, so we could look at the water under microscopes. Using the microscopes, we looked at the water to find and identify different microorganisms. Again, in both spring and fall we went out into the wetland to identify birds. We took a bird identification book and binoculars to help us identify them.

Results

Table 1: Soil Characterization (Fall- Oct. 3, 2007)

Soil Characterization	3' from Stream on North Side
Soil Structure	Granular-Blocky
Soil Color	75R 2.5/2, 10YR 2/2, 5YR 4/2
Soil Consistence	Friable-Loose
Soil Texture	Loamy Sand-Clay Loam-Silty- Silty Clay-Clay Loam
Free Carbonates	Slight-None

Table 2: Freshwater Pollution Testing (Fall-Oct. 17, 2007)

	Comparison Chart Results	Possible Pollution Sources	Possible Affects on Water Sources
Chlorine (parts per million)	0-0.5 ppm	Runoff	Kills organisms
Dissolved Oxygen (ppm)	2-4 ppm	-----	Provides oxygen for organisms
Nitrates (ppm)	0-6 ppm	Decaying leaves, Fertilizers, Animal excretion	Increases plant and algae growth, which drowns out other organisms
Phosphates (ppm)	2-5 ppm	Fertilizers, Water, Plants	Algae growth, which drowns out organisms
pH (scale 4-11)	7-8 ppm	Runoff	Rids water of carbon dioxide, which affects plant and animal life

Table 3: Freshwater Pollution Testing (Spring-April 2, 2008)

	Comparison Chart Results	Possible Pollution Sources	Possible Affects on Water Sources
Chlorine (parts per million)	0-1 ppm	Tap water and sprinklers	Kills organisms
Dissolved Oxygen (ppm)	1-7 ppm	-----	Supports organisms
Nitrates (ppm)	3-5 ppm	Decaying plants, fertilizers, sewage, atmosphere	Overpopulation of plants and algae
Phosphates (ppm)	2.5-4 ppm	Runoff, fertilizer, soap	Overgrowth of algae
pH (scale 4-11)	1.5-7	Runoff, algae, plants	Removes carbon dioxide, affecting plant and animal life

Table 4: Microorganisms in Water (Fall- Oct. 24, 2007)

Organism	Approximate Count	Description
Euglena	2	Small; curled
Biting Midge Larvae	3	Long; tube-like; spiral center
Eggs	8	Circular; grouped
Nematode Worm	4	Staying still; clear; hairy
Paramecium	4	Staying still; clear; oval-like
Stonefly Nymph	1	Moving; insect larva
Green Algae	Many	Staying still; green blob
Rotifer	1	Staying still
Daphnia	1	Moving quickly
Diatom	6	Floating; clear
Colpada	1	Moving quickly
Protist Spore	1	Spore
Cyclops	1	Moving quickly

Table 5: Microorganisms in Water (Spring-April 9, 2008)

Organism	Approximate Count	Description
Green Algae	Many	Green; common
Paramecium	3	Moving quickly
Water Mite	1	Small; insect-like
Daphnia	2	Moving slowly; small
Nematode Worm	1	Staying still
Diatom	1	Square
Larva	1	Worm-like
Cyclops	1	Small; silverfish-like
Colpada	1	Moving quickly

Table 6: Bird Identification (Fall-Nov. 7, 2007)

Common Name	Scientific Name
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
American Goldfinch	<i>Carduelis tristis</i>
Golden-Crowned Sparrow	<i>Zonotrichia atricapill</i>
Red-Winged Blackbird	<i>Agelaius phoniceas</i>
American Crow	<i>Corvus brachyrhynchos</i>

Table 7: Bird Identification (Spring-April 23, 2008)

Common Name	Scientific Name
Red-Winged Blackbird	<i>Agelaius phoeniceus</i>
Northern Rough-Winged Swallow	<i>Stelgidopteryx serripennis</i>
Red-Tailed Hawk	<i>Buteo jamaicensis</i>
Western Bluebird	<i>Sialia Mexicana</i>
Turkey Vulture	<i>Cathartes aura</i>
Hooded Oriole	<i>Icterus cucullatus</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
American Robin	<i>Turdus Migratorius</i>
Sharp-Shinned Hawk	<i>Accipiter Striatus</i>

Discussion

Soil Characterization

In our wetlands, the soil structure was blocky and granular. The soil color was 75R 2. 5/2, 10YR 2/2, and 5YR 4/2 and a consistence of loose and friable. The soils texture was loam, clay, silty, and sand. Free Carbonates were none or slight. We found no abnormalities in the soil (nasa, 1).

Water Pollution Part 1 Fall

In the fall we found 0-0.5ppm of chlorine, the possible sources are from water fountains, water from lawns, and PG resources can kill aquatic organisms. Dissolved oxygen had 2-4ppm. As a result, marine organisms can survive off the oxygen in the water. Nitrate was from 0-6ppm which was caused by algae and could kill other organisms. Phosphate levels were from 2-5ppm which is why that there are a lot of random plants close to the water (Freshwater, 2). With the pH scale the water turned out very good.

Water Pollution Part 2 Spring

In the spring we found 0-1ppm of chlorine, the possible sources are from tap water and sprinklers could poison and kill organisms in wetlands. Dissolved oxygen had 1-7ppm, which is ok for water. Nitrate levels were from 3-5ppm that could be caused by sewage, fertilization, decaying plants, and the atmosphere (Freshwater, 2). This amount of nitrate has a lot of algae choking out life and would be unfit to drink. Phosphate levels were to 2.5-4ppm. This is caused by fertilization, pollution, and wastewater. With a pH scale the water turned out slightly basic or neutral depending on location.

Microorganisms Part 1 Fall

In the fall we found euglenoids, biting midge larvae, eggs, nematode worms, paramecia, stonefly nymph, green algae, rotifer, daphnia, diatoms, protist spores, colpada and cyclops. The variety of life we saw shows that our wetlands can support the amount of life a normal wetland can.

Microorganisms Part 2 Spring

The organisms sighted in the spring are (greatest to least): green algae, parameciums, daphnias, water mite, nematode worm, diatom, larva, cyclops, and a colpoda. Although we didn't find as many things as we did in the fall, we found organisms that are supposed to be found in the spring. Algae were off the charts in numbers, which points to our phosphate problem. In total, we found nine different species and over ten organisms.

Bird Identification Part 1 Fall

During the fall, we saw *Euphagus Cyanocephalus*, *Carduelis Tristis*, *Agelaius Phoeniceus*, *Zonotrichia Atricapill*, and *Corvus Brachyrhynchus*. According to the Birds of North America, the reference we used, all these birds were expected to be seen in our wetlands habitat (Fahey, 1).

Bird Identification Part 2 Spring

We also did bird identification in the spring, and we found nine different birds! There were hawks, blackbirds, bluebirds, swallows, sparrows, vultures, orioles, and robins. This is definitely a good thing because in a very short period of time we found nine different types of birds, and many of each. This is a very diverse ecosystem. The scientific names of all the birds were *Agelaius phoeniceus*, *Stelgidopteryx serripennis*, *Buteo jamaicensis*, *Sialia mexicana*, *Cathartes aura*, *Icterus cucullatus*, *Passerculus sandwichensis*, *Turdus migratorius*, and *Accipiter striatus*. According to Birds of North America, which was the book we referred to, all these birds are very common birds in our area (Fahey, 1).

Conclusion

The results from this year were quite interesting. There weren't very many changes from spring to fall in the water. The soil structure was blocky and granular, the color was around 10yr 2/2, the consistency was friable, the texture was silty clay loam, and the free carbohydrates ranged from none to slight. We found lots of microorganisms in the water this year. In the fall, we found a lot of green algae, eggs, and diatom. In the spring, we found a lot of green algae, paramecium, and daphnia. We also found quite a few birds this year. In the fall, we saw many smaller birds such as the red-winged blackbird and the American goldfinch. In the spring, we saw a few birds of prey, such as the turkey vulture and the red-tailed hawk. We also saw many smaller birds such as the American robin and the savannah sparrow. We have learned some ways our school might pollute the wetlands. One way our school might pollute the wetlands is from the runoff from when we water the lawns. Another way the school might pollute the wetlands is from trash left by students. Next year we hope to conduct the same tests we did this year. We also hope to study the insects, plants, and larger animals of our wetlands.

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