

Herbicide Spraying of Coleman Pond

A Study of Aquatic Herbicide's Impacts on a River Ecosystem.



View of the Guadalupe River, South of Coleman Avenue Overpass, San Jose, CA.
A.K.A. Coleman Pond.

Introduction

Photos and Text Copyright ©2013 Urban Wildlife Research Project
On the web: San Jose Ecology <http://urbanwildliferesearchproject.com/>



This document was prepared by Environmental Advocate and Wildlife Conservation Photographer, Greg Kerekez. The purpose of this study is to inform decision makers and the general public of the environmental impact observed after an herbicide application(s) on a river ecosystem. All Herbicides, wether EPA approved or not, harm the biodiversity of earth. The chemicals sprayed do not simply disappear and the herbaceous vegetation targeted, is the foundation of the food chain.

Contents



- Building a Portrait of Coleman Pond before the herbicide spraying (p.4-22)
- SCVWD Herbicide Spraying -8/12/2011 (p.23-28)
- Weeks Following Spraying-8/16-9/20 (p.29-40)
- Dredging of Coleman Pond 10/4/2011 (p.41)
- Before and After Comparisons (p.43-46)
- Data Analysis, Recommendations, Response (p.47-49)
- Annotated Bibliography (p.50)



South of Coleman Avenue along the Guadalupe River in San Jose, CA. The levy widens and aquatic plants have a chance to take root. This vegetation provides refuge and sustenance for a wide diversity of wildlife species year round. To build a portrait of the biodiversity of Coleman Pond before the herbicide spraying, we will start with the plants and work our way up the food chain.

Wildflower Survey 8/5/2011

On August 5th 2011, I saw many wildflowers in bloom. So I decided to photograph each species of flower that day. Plants are the basis of the food chain, every living creature depends on the Flora to sustain them. In Coleman Pond many types of plants can be found, some native to our valley and some non-native.



Native Seep Spring Monkey Flower

Native Wildflowers 8/5/2011



Watson's Willowherb



Hooker's Evening Primrose



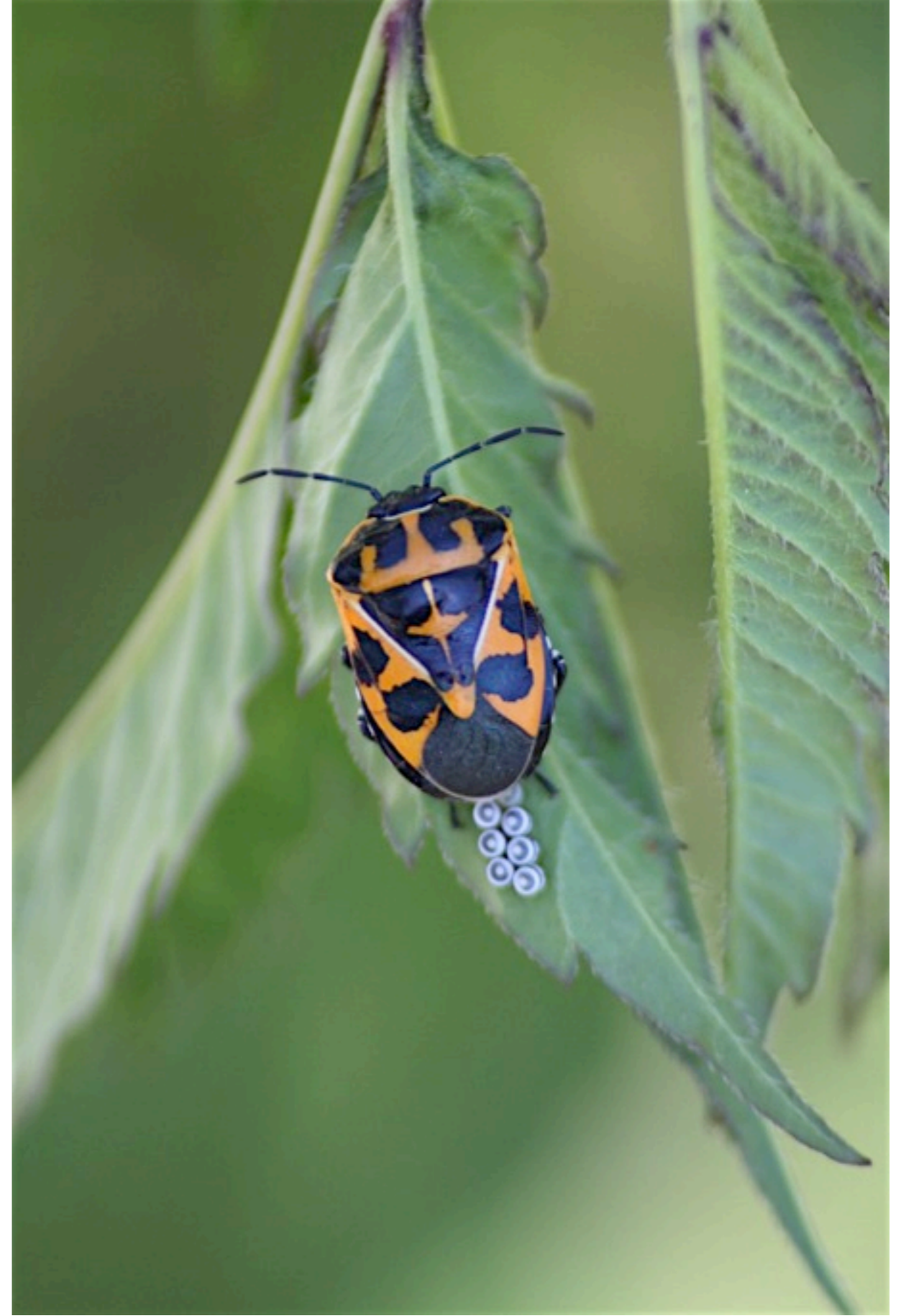
Cabbage Butterfly on Lady's Thumb flowers

Plants and Insects Support the Ecosystem



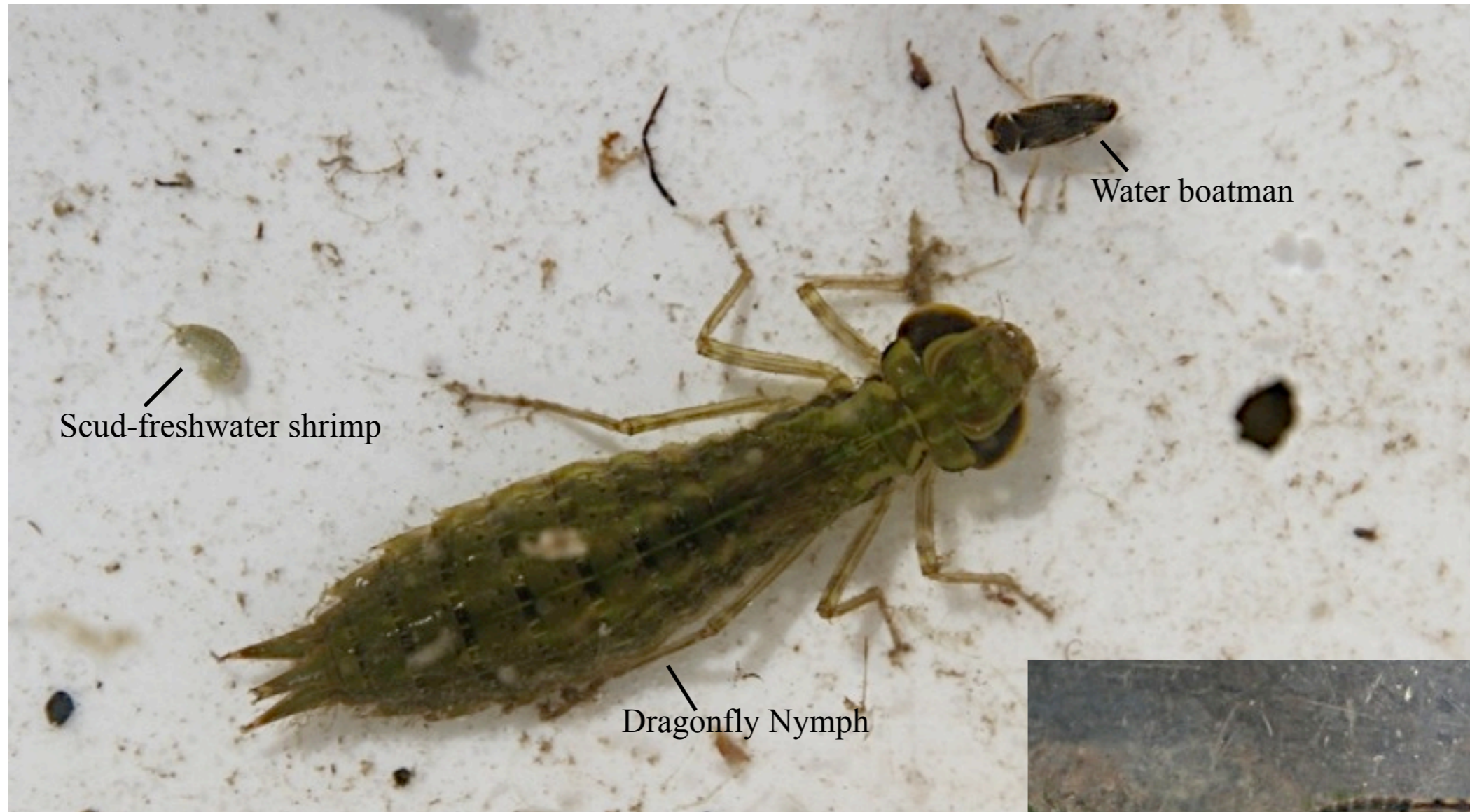
Since 2010, I've recorded 8 dragonfly and 17 butterfly species in Coleman Pond. On a hot mid-summer day you can see many dragonflies dancing on the water, laying eggs. The dragonfly larvae, like many other insects/aquatic invertebrates, rely on herbaceous vegetation, the plant types usually targeted by herbicide. The insects use these plants for food, shelter, and to raise their young. They are the building blocks to our valley's diverse ecosystems. Healthy insect populations are essential to a diverse habitat(Epstein)





Insect reproduction on herbaceous vegetation

Aquatic Invertebrates



These are some of the species of aquatic invertebrates that were collected from Coleman Pond by one of the many field trip groups, from a local elementary school, at Guadalupe River Park Conservancy. Some of the students first steps in a river is in Coleman Pond.

These water bugs feed on the aquatic plants and other insects. They are a food source for reptiles, amphibians, fish, birds and mammals.



Damselfly Nymphs

Amphibians: Salamanders, Toads, and Frogs.



Slender and Arboreal Salamanders, Western Toads, Tree Frogs, and Bull Frogs use Coleman Pond to lay their eggs and forage for food. New tadpoles feed on the algae and insects in the slow moving water. Most tadpoles emerge from the water in August.

As our valley's streams become more channelized, it becomes more difficult to find the slow moving water amphibians need to mature.



Reptiles of Coleman Pond



Gopher Snake



Western Fence Lizard

The Western Pond Turtle is a Federally Threatened Species. This means that the turtle's populations are a small fraction of what they use to be and they are at risk of becoming endangered. These turtles and their habitat have protections under federal law.





All living organisms rely on food, water, and shelter provided by their environment. These California Roach Minnows need abundant aquatic plant and invertebrate populations. They all rely on clean, safe, healthy water and ecosystems, to maintain healthy populations(Freedman).

Coleman Pond is Steelhead Trout and Chinook Salmon Habitat



This 16 inch Steelhead Trout(left) is also a Federally Threatened Species. It was caught and released just north of the Coleman Pond overpass during the last week of the fishing season in 2012. This 36" female Chinook Salmon(right) was found in Coleman Pond in the fall run of 2014. Coleman Pond has the right size cobblestone for salmonid spawning. Young, four to six inch, Steelhead fry have also been caught in Coleman Pond. They use this area to feed, as it has an adequate amount of aquatic vegetation and large cobble rock for invertebrates to hide in.

Pacific Lamprey



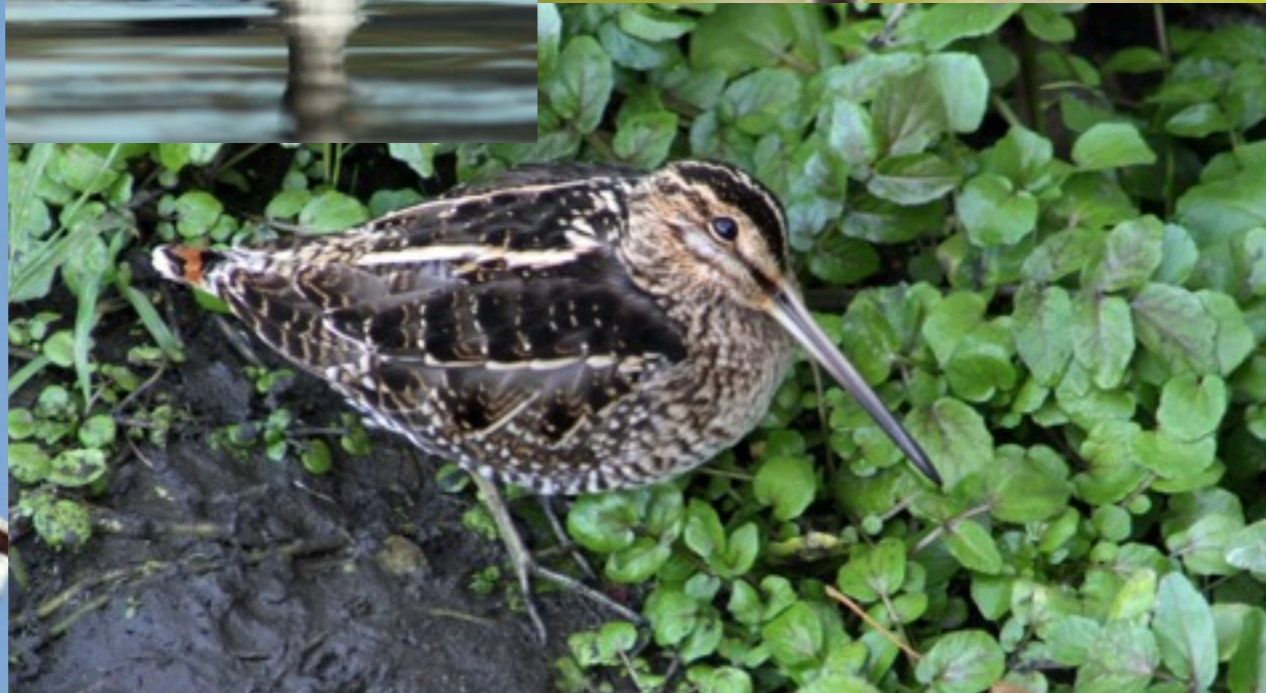
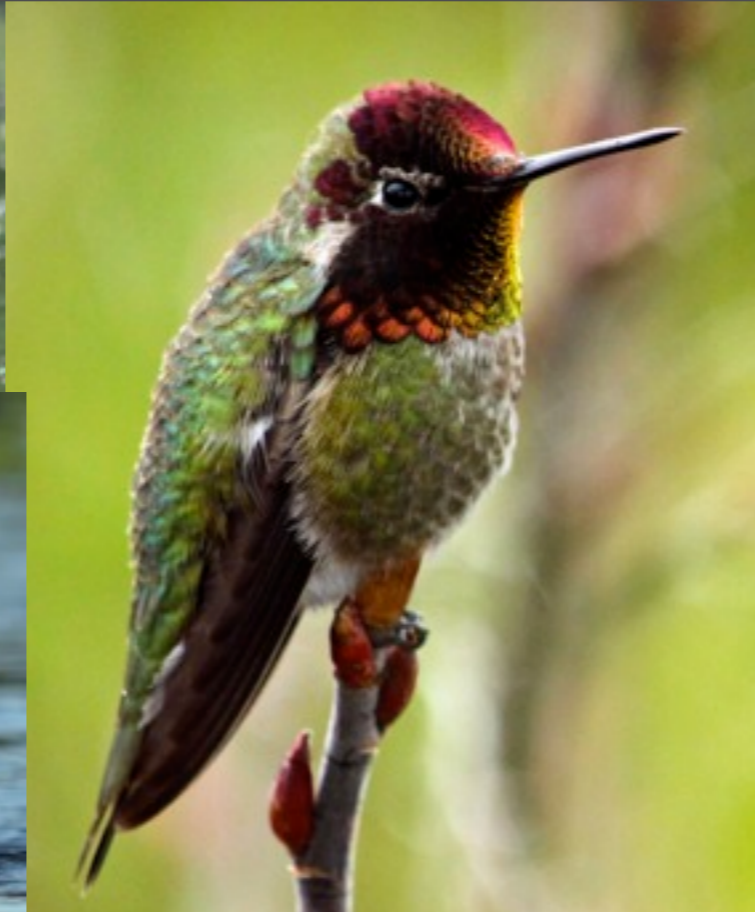
Pacific Lampreys are federally listed as a Species of Concern, they have been recorded in 2011 and 2012 spawning in Coleman Pond's channel. This parasitic fish has a gasket at the top of the head so it can suction itself onto rocks or other animals to feed.

They create a basketball sized pit in the gravel to lay their eggs in. Hatchling Pacific Lamprey live in the cobble rock river bottom for many months, surviving on small invertebrates. They are anadromous fish, once mature, they take off to the Pacific Ocean and return to our rivers to spawn years later, just like Salmon and Steelhead.



Some of many fishing birds at Coleman Pond.





Due to the Guadalupe River's connection to the Pacific Migration Flyway, Coleman Pond is a refuge for numerous bird species migrating from all over the world. **100** species and counting.

Nesting Avians

In the past four years, fifteen species of bird were recorded using Colman Pond, to nest and raise their young each spring and summer. The shallow water and fresh vegetation allows ducklings and fledglings to forage easily while having easy access to cover from predators. (Next slide: Mallard ducklings in spring.)





Tuesday, March 14, 2017



I have observed this female Common Merganser raise a flock of her own, each spring for the past five years.
Her chicks' first swim down the Guadalupe River is through Coleman Pond.

Mammals

Many different species of mammal utilizes Coleman Pond to forage for food. The list includes the common urban residents such as the Opossum, Skunk, Raccoon, in addition both Gray and Red Foxes pass through Coleman Pond. The willow and reeds growing from the concrete mat and river bank provide a great food stock for Muskrat and Beaver.



Beaver Chewed Tree at Coleman Pond.



Gray Fox crossing bypass channel just North of Coleman Pond.
Fox tracks and Scat have been found in Coleman Pond.



Beavers colonized downtown San Jose stretch of Guadalupe River.



Common Merganser: Mother and 4 month old chicks.
8/5/11 spotted during wildflower survey, this was the last time I saw the family at Coleman Pond.
Why did they leave?

Herbicide Spraying of 8/12/11

One August morning at 7:30am, I noticed a Santa Clara Valley Water District(SCVWD) truck and employee in a white suit, spraying a dark green herbicide all over Coleman Pond. This was the same location where I completed the wildflower survey less than a week before. I witnessed insects flying off plants being sprayed and observed herbicide being applied directly to the water's surface.



The spray operator is not wearing a filtering mask which most herbicide product labels recommend and should be best practice for employee health and safety.



There was NO clear indication of which chemical was being sprayed.

The bucket on the SCVWD truck says "RoundupPRO." Caution sign has 3 different Herbicide Labels on it: Rodeo, Pendulum AquaCap, RoundupPRO. Which is it?

Caution sign says "Sprayed today! Stay off until product has dried"



Five Hours after Spraying



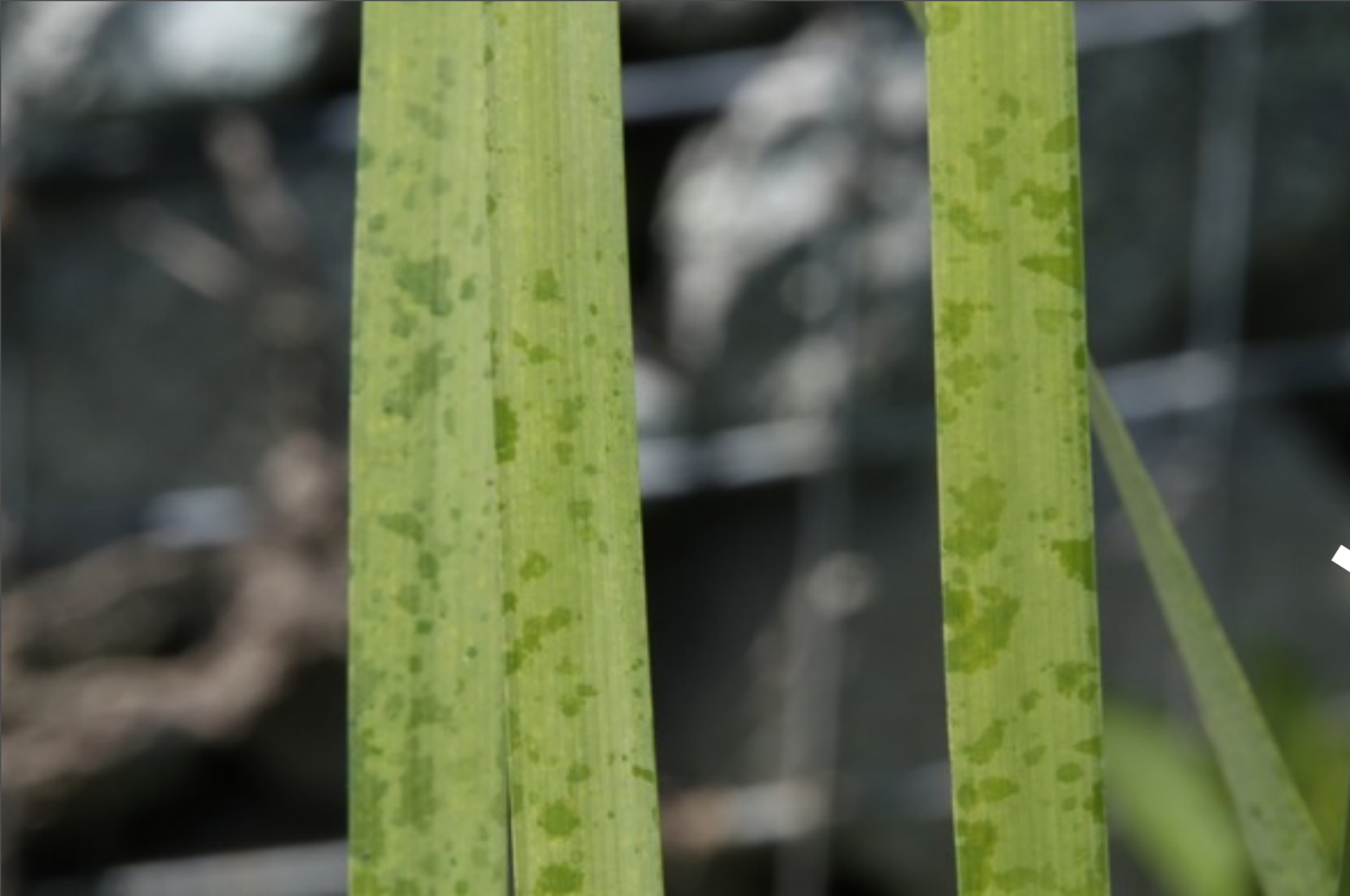
8/12/11 at 1:00pm, I returned to assess Coleman Pond. The caution sign was gone, so I entered the sprayed area. I quickly noticed that the herbicide was **not dry**, posing a safety hazard to myself and other trail users. This spot is commonly used by nature educational classes, dog owners and families wanting to explore the waters edge.

After Herbicide Application



Above is healthy algae(left) and algae soaked with the green herbicides(right), some application was directly onto the water, Herbicides travel to other areas via air and water currents, the herbicide not only affects the ecosystems they are sprayed in, they affect the entire world (Michigan).

Next slide: Herbicide on cattail reeds, pools of herbicide collected in leaves of plants.





12. ECOLOGICAL INFORMATION

This section is intended for use by ecotoxicologists and other environmental specialists.

Aquatic toxicity, fish

Rainbow trout (*Oncorhynchus mykiss*):

Acute toxicity, 96 hours, static, LC50: 5.4 mg/L
Moderately toxic.

Bluegill sunfish (*Lepomis macrochirus*):

Acute toxicity, 96 hours, static, LC50: 7.3 mg/L
Moderately toxic.

Aquatic toxicity, invertebrates

Water flea (*Daphnia magna*):

Acute toxicity, 48 hours, static, EC50: 11 mg/L
Slightly toxic.

Avian toxicity

Mallard duck (*Anas platyrhynchos*):

Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet
Practically non-toxic.

Bobwhite quail (*Colinus virginianus*):

Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet
Practically non-toxic.

Arthropod toxicity

Honey bee (*Apis mellifera*):

Oral/contact, 48 hours, LD50: > 100 µg/bee
Practically non-toxic.

Soil organism toxicity, invertebrates

Earthworm (*Eisenia foetida*):

Acute toxicity, 14 days, LC50: > 1,250 mg/kg soil
Practically non-toxic.

Similar formulation

Aquatic toxicity, algae/aquatic plants

Green algae (*Selenastrum capricornutum*):

Acute toxicity, 72 hours, static, EbC50 (biomass): 12.4 mg/L
Slightly toxic.

Product information was found:
<http://www.cdms.net/LDat/mp07A005.pdf>

This is a clip from page 6 and 7 of Monsanto's Safety Data Sheet for Roundup Pro. One of the chemical labels found on the bucket in the SCVWD truck and on the sign. The Herbicide is toxic to Aquatic fish, invertebrates, plants, and to birds like the Mallard, Arthropods(bees), and soil invertebrates(worms).



One week later, this female Mallard is sifting through herbicide soaked algae with dead foliage surrounding her. An herbicide, like Roundup Pro, effects on Mallards is dietary toxicity for approximately 5 days. It is not determined what kind of herbicide was used in this spraying event; the labels on SCVWD sign were unclear and misleading.



Photo taken 8/16/11: plants beginning to turn yellow and wilt.



8/16/11 Chemically burned foliage.
The burnt leaf curl is consistent with the affects of herbicide application.
Following slides depict damaged and dead habitat from 8/16-8/24/11.



Tuesday, March 14, 2017



Tuesday, March 14, 2017



Tuesday, March 14, 2017



Cabbage Butterfly Egg

I witnessed egg laying of insects (butterflies and dragonflies) on the days after the herbicide spraying. This plant has just been sprayed and will soon die. Hatching larvae will have little to nothing to feed on. Therefore, the next generation of insects declines, which negatively impacts the river ecosystem as a whole.



9/13/11- One month later, these Green Darner Dragonflies are mating on herbicide soaked algae. Dragonflies were also seen laying eggs August-September. By September, I documented that most of the vegetation in Coleman Pond was dead and insect/fish habitat dissolved. Once again, these dragonfly's larva will have no habitat or food if they hatch.

One Month Later



This panorama was taken on 9/13/11, one month after the herbicide application. Dead plants can be recognized by the red and brown burnt foliage, in the foreground and background. Dark green, herbicide soaked algae can be seen along the waters edge. Fishing birds were absent from my observations of Coleman pond from date of spray 8/12/11 to 9/13/11.

No Plants= No Fish Habitat= No Fishing Birds.



9/13/11: Location of wildflower survey, one month later. Once alive and green now dead and brown. SCVWD sprayed in the middle of the Guadalupe River's channel. This is where the native Spring Monkey Flower and Hookers Evening Primrose occurred. This herbicide application effectively extirpated the native Monkey Flower from Coleman Pond. During the Spring and Summers of 2012 and 2013 no Monkey Flowers were observed. Herbicide sprayings can have a negative affect on the biodiversity of an area.

9/13/11

The plants crunched beneath my feet, as I searched for signs of life at Coleman Pond. No fish or dragonflies were spotted.

(Left) Buckeye Butterfly perched on a dead plant, no flowers in sight.

(Below) Snowy Egret forages with no success and quickly moves up stream. It seemed as though this habitat was still unsuitable for the fish.



Yearly Dredging of Coleman Pond



Late September-Early October 2011, Coleman Pond was cleared of its plant matter and sediment with heavy machinery. This area of concrete mat is a flood conveyance measure so high flows won't flood city streets and erode the stream banks. The SCVWD is mandated to clear this area of sediment to prevent flooding.



The environment is slow to recover, above is a shot from February 2012, six months later. If SCVWD saw a need to clear this area with heavy machinery, why did they decide to spray herbicide first? Did they survey for the wildlife present at the site before spraying? As you can see, even 6 months after the spraying and clearing, Coleman Pond is still not a suitable habitat for wildlife.

Before and After



Cattails 8/12/11



Cattails 9/13/11



Cattails 2/16/12

Before and After



May 2011, 2 week old mallard ducklings forage in a blanket of Brass Buttons.



Herbicide soaked Foraging habitat 8/12/11



Foraging habitat 9/13/11



Foraging habitat 2/16/12

Before and After



8/5/11



9/13/11



10/4/11



2/15/12

Before and After



8/5/11



2/15/12



Tuesday, March 14, 2017

Coleman Pond Data Analysis

Analysis based on research on the affects of herbicide on plants and wildlife, photographic records and personal observations of Coleman Pond over a 3 year period(Dec2008-Feb2012). Data from wildflower survey and affects of herbicide was collected on 8/5, 8/12, 8/16, 8/21, 8/24, 8/31, 9/13, and 9/20 in the year of 2011. Long term photographs collected at least once a month, until August 2013.

- Herbicide was sprayed on the habitat of at least four federally protected species: Steelhead Trout, Chinook Salmon, Western Pond Turtle, and Pacific Lamprey.
- Herbicide spraying decreased plant, insect, fish, and bird populations in the sprayed area. In the effected area, the ecosystem's food chain broke down and the area was void of its' daily residents. The Merganser family, for example, swam up stream and made a rocky patch, between St. John and Santa Clara Street, their new foraging location. The family was seen hissing at two other female Mergansers as they established Santa Clara street as their new territory. Loss of habitat increases competition and stress on wildlife populations(Villeneuve).
- Herbicide and bulldozing also disrupted the natural cycle and seasonal availability of plants and animals. Herbicide was sprayed during insect and amphibian reproductive seasons. Plants that were in bloom, during the spraying, never matured to seed the next generation. Seedlings which could have provided a food source later in the year, were sprayed and bulldozed, affecting the ecosystem through a change of seasons.
- Native vegetation was also sprayed and as of August 2013 there is still no sign of Seep Spring Monkey Flower or Hooker's Evening Primrose in Coleman Pond. The non-native vegetation has taken over that area. Herbicide spraying can increase the amount of invasive vegetation and damaged native plant diversity. The area that was sprayed with herbicide and bulldozed/dredged needs longer than 2 years to recover to its' pre-sprayed state.
- Lack of plant cover negatively affects the wildlife populations. Without vegetation, wildlife cannot take cover from predators, human activity is less invasive when wildlife have cover. Coleman pond had a greater amount and diversity of wildlife before the spraying when compared to after the spraying.

Conclusion

Urban sprawl has vastly reduced aquatic habitat in our valley, our streams have been paved over with concrete and channelized. Spraying herbicide reduces habitat further until some areas seem vacant of life. Poor invasive vegetation management with herbicides can damage the biodiversity of our valley. I've noted that, herbicide applications mainly occur in the summer, a time when it is most critical for the flora and fauna to interact to prepare for winter hardships. I've witnessed herbicide sprayings timed poorly and conducted after invasive grasses and plants have seeded, ensuring that next year there will be more grass to spray. Herbicide spraying can sometimes be a perpetual cycle of vegetation management and environmental degradation. Each year the environment is stunted and populations of wildlife are impacted. In disturbed urban environments, insects have adapted to invasive plants in the lack of their native host plant. For example the native Gray Hairstreak butterfly lays its egg on the European Mallow, which is an invasive plant targeted for herbicide applications. Herbicide, or any substance ending in the suffix -cide (denotes an act of killing), and is harmful to our world's ecosystems. There are many alternatives to harmful man made chemicals, one of which would be to remove the concrete and return the river to a natural cobblestone river bottom. Removing concrete from streams is a notion catching on around the nation which benefits people and wildlife.

If vegetation **must** be removed in certain areas, herbicide should not be used. An alternative option would be to make an amendment to the Adopt a Creek requirements to include permission for people to remove unwanted invasive vegetation under SCVWD supervision and the replanting of native vegetation. Instead of one employee spraying herbicide, they could supervise a group of volunteers to hand pull vegetation and help build the river stewards of tomorrow.

I see the spraying of herbicide as not inline with SCVWD's Taking Care of Streams Initiative as stated on the Natural Flood Protection page on the SCVWD website: <http://www.valleywater.org/services/NaturalFloodProtection.aspx>

"Years ago, providing greater flood protection often resulted in straight, concrete channels where natural creeks once meandered. A growing environmental ethic has changed all that. Nowadays, the water district works to protect homes and businesses from flooding while protecting the natural creek habitat..."

Considering how herbicide affects the world's ecosystems, a discontinued use of herbicide could positively impact the public's view of SCVWD's environmental ethics and help further success of SCVWD's mission of river stewardship. We owe it to the wildlife and ourselves, to maintain the beauty and diversity of our few remaining wild places, by using sustainable natural products, practices and procedures.

SCVWD Response

After completing this document I presented it at board meetings of the Santa Clara Valley Audubon Society(SCVAS), Sierra Club, Guadalupe River Park Conservancy(GRPC) and a plan was made to approach Santa Clara Valley Water District to begin to question their vegetation management practices. I along with Shani Kleinhaus of SCVAS and Leslee Hamilton of GRPC talked about the herbicide spraying at a Water District board meeting in 2012. Certain members of the board were quite concerned and the board set up a meeting for us with SCVWD staff of the Guadalupe Watershed and Vegetation Management crew.

During our meeting with staff, I showed them an earlier draft of this document, and we talked of alternatives other than Herbicide spraying. The Vegetation management crew was receptive of our concerns and relayed the reasoning for spraying the area. The area of Coleman pond is a flood conveyance area, which moves large amounts of water during flood events. Because the river bottom throughout Coleman Pond is Concrete, it needs to be maintained to a certain standard according to flood conveyance mandates. So annually they sprayed the vegetation and bulldozed/dredged out the plants and sediment.

We understood the flood mandates and asked if they could skip the herbicide spraying process and just bulldoze the plants when needed. We also asked them to change their vegetation management of the area, to every other year. Shani of SCVAS spoke of the impact of herbicides to wetland bird species and Leslee Hamilton of GRPC expressed concern for the wildlife of the river but also for the safety of the school children that they take down to the river for educational classes. Leslee asked for SCVWD to notify her before any spraying occurs in her park boundary.

Months after that meeting SCVWD began to spray a section of river north of Coleman avenue and did not notify Leslee of GRPC, that day the conservancy had classes scheduled along the river and meadow where they were spraying. This lack of communication has happened a number of other times over the years. They let it grow for a few years 2012-2014 and it became a functioning wetland ecosystem and attracted a new nesting bird species, the Song Sparrow, and a Beaver. In 2014 a SCVWD Vegetation Management Crew came and hand removed a large amount of vegetation in Coleman Pond and then they brought in a bulldozer to remove the sediment and remaining vegetation as per flood conveyance requirements. A report put out by SCVWD in 2012 on the vegetation management program reveal that they used over 1000 gallons of herbicide on our watersheds each year. They found it easy to appease us in this one area but SCVWD is still seen spraying all over our county's creeks. Roger Castillo of Guadalupe-Coyote Resource Conservation District has also documented herbicide being sprayed directly on to the waters surface in numerous locations around the county. I believe it is possible to maintain this large landscape with out the use of herbicides, by engaging the public, corporations, and conservation organizations for assistance in vegetation management and native restoration of our valley's diverse watersheds. Herbicide use must stop!

Annotated Bibliography

- Baldwin, Paul. *Monsanto Herbicide could damage ecosystems*. <http://www.guardian.co.uk/science/1999/oct/13/gm.food>
“Environmental campaigners last night demanded a Europe-wide ban on the world's biggest selling weedkiller (Roundup) - the bulk of which is supplied by US biotechnology firm Monsanto - after warnings that it could kill insects and spiders vital to agricultural ecosystems.”
- Epstein, Paul R. *Climate, Ecology and Human Health*. 1997. <http://www.gcrio.org/CONSEQUENCES/vol3no2/climhealth.html>
“Rodents, insects, and algae are thus key biological indicators of ecosystem health. Their populations and species compositions respond rapidly to environmental change--”
- Freedman, Bill. *Environmental Effects of Herbicide Use*. <http://science.jrank.org/pages/3305/Herbicides-Environmental-effects-herbicide-use.html>
“By changing the vegetation of treated sites, herbicide use also changes the habitat of animals such as mammals and birds. The effects can be severe for some species.”
- Meadows, Robin. *Common Herbicide Lethal to Wetland Species*.
“Roundup affected tadpoles directly by killing many of them, including all leopard and gray tree frog tadpoles .”
- Monsanto. *RoundUp Pro Herbicide Data Sheet*. <http://www.cdms.net/LDat/mp07A005.pdf>.
“RoundUp Pro: Toxic to fish, bees, birds, and soil invertebrates.”
- University of Michigan. *Human Impact on the Great Barrier Reef*. <http://sitemaker.umich.edu/gc2sec7labgroup3/pollution>
“...pollution has made significant impacts on the Great Barrier Reef and its struggle for survival. Human based pollution that has caused such harm to our reefs needs to be stopped or reduced significantly if we wish to save this fragile ecosystem. This type of pollution includes fertilizers, herbicides, pesticides, human derived sewage, and large amounts of sedimentation from costal land development.”
- Villeneuve, A. Larroude, S. Humber JF. *Herbicide Contamination of Freshwater Ecosystems*. http://www.intechopen.com/source/pdfs/13016/InTech-Herbicide_contamination_of_freshwater_ecosystems_impact_on_microbial_communities.pdf
“Herbicides can also have an indirect impact on the species composition of these communities by modifying the equilibria between species and also the interactions between them (as a result of effects on potential competitors or