# Legacy

## Loxahatchee Impoundment Landscape Assessment

# LILA (Loxahatchee Impoundment Landscape Assessment)

- Located at Arthur R. Marshall Loxahatchee National Wildlife Refuge
- 80-acre model of the Everglades
- Living Laboratory designed to test restoration techniques on a small scale before implementation


Cynthia Saavedra Hannah Brown

# Long Term Goals of LILA

- Restore ridge and slough landscapes
- Increase wading bird nesting
- Increase water quality
- Provide healthy tree islands

Cyntia Saavedra Hannah Brown

# The Legacy Project and the ESA

- Field based research opportunities for Students
- Multi-year data collecting and analysis
- First hand experience with Everglades habitats
- Insight into career options

McCall

# Dissolved Oxygen

- Indicator of the health of water in the ecosystem.
- 
- Required by all aquatic organisms (respiration).

- Factors Effecting D.O. Levels:
  - Water temperature.
  - How well the water is mixed.
  - Amount of oxygen produced by plants.
  - How much oxygen is used by abiotic or biological processes such as respiration or the decomposition of organic matter.

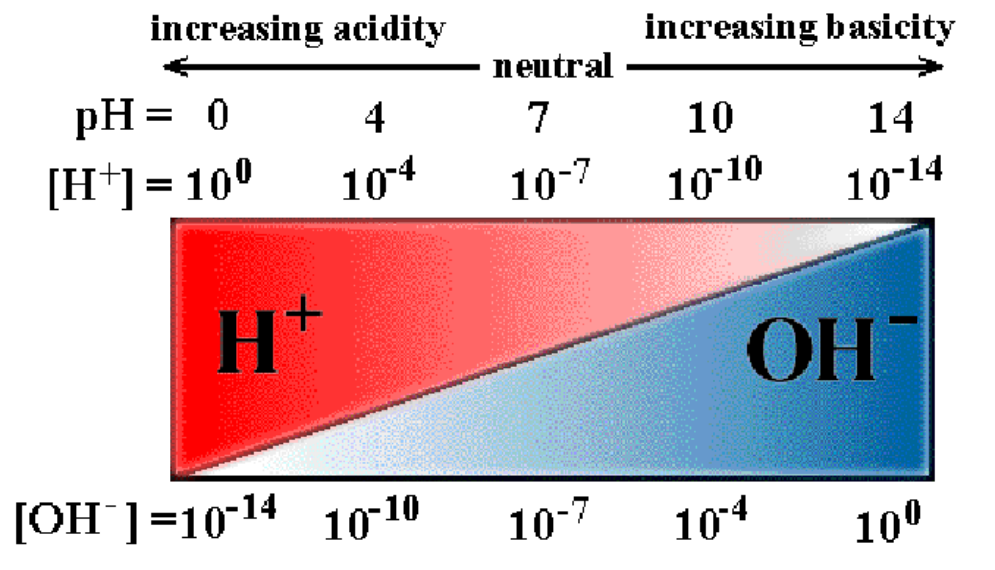
Tiffany Blandon

# Dissolved Oxygen

- Why is it important?
  - Low dissolved oxygen levels can impair organism growth and reproduction.
  - Anoxic situations can cause mortality in aquatic organisms.

Tiffany Blandon

# What is pH? Why is it important?




- pH is the measure of $H^+$ and $OH^-$ ions in a solution.
- The higher the $H^+$ concentration the more acidic.
- Balanced pH levels are necessary; extremely high or low levels make water unsuitable for organisms.

Michelle Tylus

# Macroinvertebrates

- Invertebrate:  animals without a backbone
- Macroinvertebrates – mixture of adult and juvenile insects and other organisms. Tend to live on rocks, logs, sediments, debris, and aquatic plants.
- They give us reliable information on the water quality.


Ostracod


Dragonfly Nymph


Crayfish


Water Beetle


Fishing Spider

Jenefer Cerda

# Study Sites

- Macrocosom 2 (M2) - Flow Impoundment
  - Water movement is simulated using pump station.
- Macrocosom 3 (M3) – Non-Flow Impoundment
  - Stagnant water, with no artificial water flow.

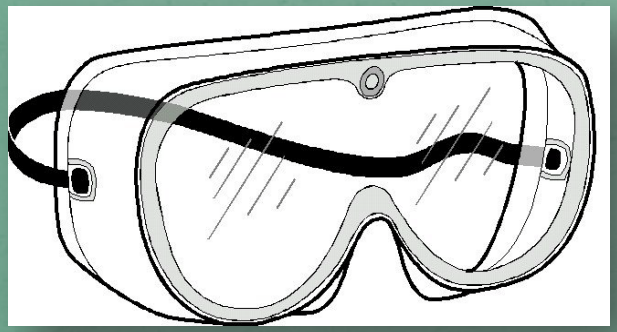
Patrick Schlachter

# Study Sites


M2
M3
47 m
26°29'21.32" N 80°13'01.27" W elev 4 m
Eye alt 167 m
©2010 Google

# Lab safety Guidelines

- Lab Coat
- Goggles
- Gloves
- First Aid Kit
- Adult supervision

Alexandra Blandon

# Field Equipment

- LaMotte D.O. and pH kits
- LaMotte D.O. Water Sampler
- Dip nets
- Buckets
- Sample containers (with magnification)
- Field scopes
- Identification books and guides

Aidan Arruza

# Sampling methods

- LaMotte testing kits included detailed procedures.
- pH was determined using a colorimetric scale.
- The D.O. Sampler prevents the exchange of air in the water sample at depth.
- D.O. is determined through a titration method.


Aidan Arruza

# Sampling Methods

- Sampling Diversity
  - Fill collection bucket with clear water.
  - Sample the same area each trip
  - Three students sampled each site per visit
  - Each student “vacuumed” the bottom with net 4 times.

Aidan Arruza

# Day #1: 10/28/10 - M2 (Flow)

| Species Found | |
|---|---|
| 1 | Water Scorpion |
| 2 | Fresh Water Shrimp |
| 3 | Mosquito Fish |
| 4 | Water Scavenger Beetle |
| 5 | Water Mite |
| 6 | Ostracod |
| 7 | Least Killfish |

| Parameters | Electronic Meter | Chemical Kit Readings |
|---|---|---|
| Temperature | 27.3° c | N/A |
| Dissolved Oxygen | 2.8ppm | 3.4ppm |
| pH | N/A | 6.5-7.0 |

| Parameters | Conditions |
|---|---|
| Weather | Slightly cloudy |
| Wind | Light breeze |
| Water Conditions | Vegetation, Algae |

Blair Tolbert Leah Parker

# Day #1: 10/28/10 - M3 (Non-Flow)

| | Species Found |
|---|---|
| 1 | Glass Shrimp |
| 2 | Minnows |
| 3 | Water Flea |
| 4 | Fishing Spider |
| 5 | Water Beetle |

| Parameters | Electronic Meter | Chemical Kit Readings |
|---|---|---|
| Temperature | 27.8°c | N/A |
| Dissolved Oxygen | 1.85ppm | 1.8ppm |
| pH | N/A | 7.3 |

| Parameters | Conditions |
|---|---|
| Weather | Partly cloudy |
| Wind | Light breeze |
| Water Conditions | Vegetation, Algae |

Blair Tolbert Leah Parker

# Day 2: 1/20/11 – M2 (Flow)

| Species Found | |
|---|---|
| 1 | Crayfish |
| 2 | Dragonfly nymph |
| 3 | Fish (unidentified) |
| 4 | Fish (mosquito Fish) |
| 5 | Shrimp |
| 6 | Amphipod |
| 7 | Mayfly larva |
| 8 | Physid Snail |

| Parameters | Electronic Meter | Chemical Kit Readings |
|---|---|---|
| Temperature | 21.5° c | N/A |
| Dissolved Oxygen | 5.0ppm | 5.0ppm |
| pH | N/A | 7.0 |

| Parameters | Conditions |
|---|---|
| Weather | Sunny |
| Wind | None |
| Water Conditions | Vegetation, Algae |

Charla Gilfus Mirella Fierro

# Day #2: 1/20/11 – M3 (Non-Flow)

| | Species Found |
|---|---|
| 1 | Shrimp |
| 2 | Dragonfly nymph |
| 3 | Unidentified worm |
| 4 | Fish (unidentified) |
| 5 | Mayfly larvae |
| 6 | Crawfish |
| 7 | Water beetle |

| Parameters | Electronic Meter | Chemical Kit Readings |
|---|---|---|
| Temperature | 21.1°c | N/A |
| Dissolved Oxygen | 2.06ppm | 2ppm |
| pH | N/A | 7-7.5 |

| Parameters | Conditions |
|---|---|
| Weather | Sunny |
| Wind | Light Breeze |
| Water Conditions | Vegetation, Algae |

Charla Gilfus Mirella Fierro

# Day 3: 2/24/11 – M2 (Flow)

| Species Found | |
|---|---|
| 1 | Water mite |
| 2 | Snail |
| 3 | Amphipod |
| 4 | Shrimp |
| 5 | Damselfly nymph |
| 6 | Crayfish |
| 7 | Fish (Unidentified) |

| Parameters | Electronic Meter | Chemical Kit Readings |
|---|---|---|
| Temperature | 32° c | N/A |
| Dissolved Oxygen | 4.1ppm | 2.4ppm |
| pH | N/A | 6.8 |
| Phosphate | N/A | 1ppm |

| Parameters | Conditions |
|---|---|
| Weather | Partly Cloudy |
| Wind | Medium Breeze |
| Water Conditions | Vegetation, Algae |

Maylin Santiago Kristina Wilson

# Day #3: 2/24/11 – M3 (Non-Flow)

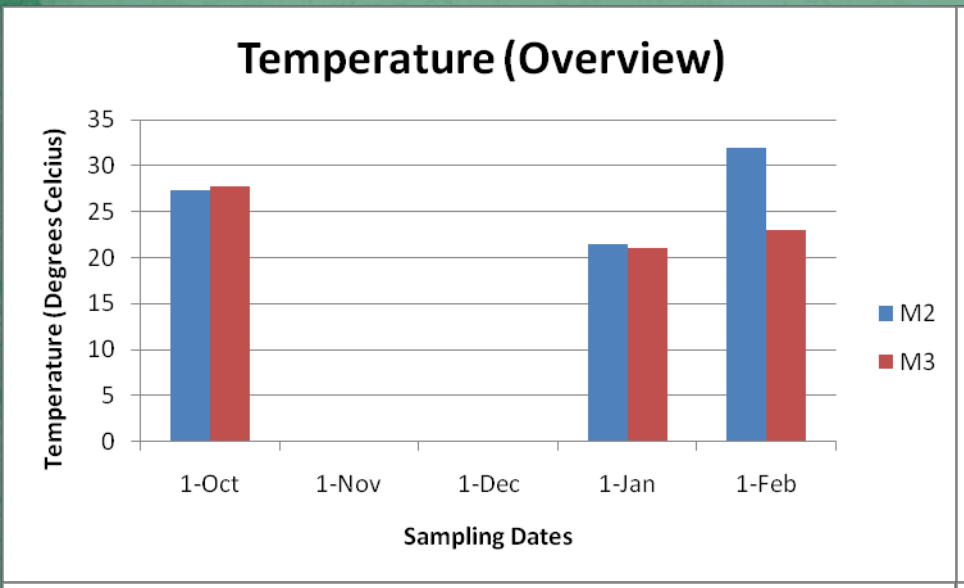
| Species Found | |
|---|---|
| 1 | Fishing spider |
| 2 | Tad pole |
| 3 | Crayfish |
| 4 | Mosquito Fish |
| 5 | Fish (Unidentified) |

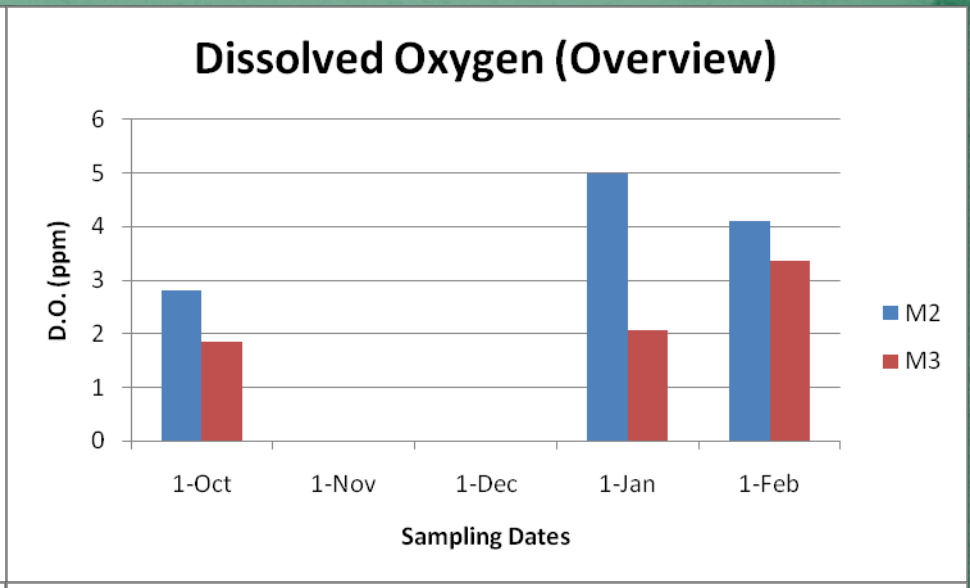
| Parameters | Electronic Meter | Chemical Kit Readings |
|---|---|---|
| Temperature | 23° c | N/A |
| Dissolved Oxygen | 3.35ppm | 1ppm |
| pH | N/A | 7 |
| Phosphate | N/A | 1ppm |

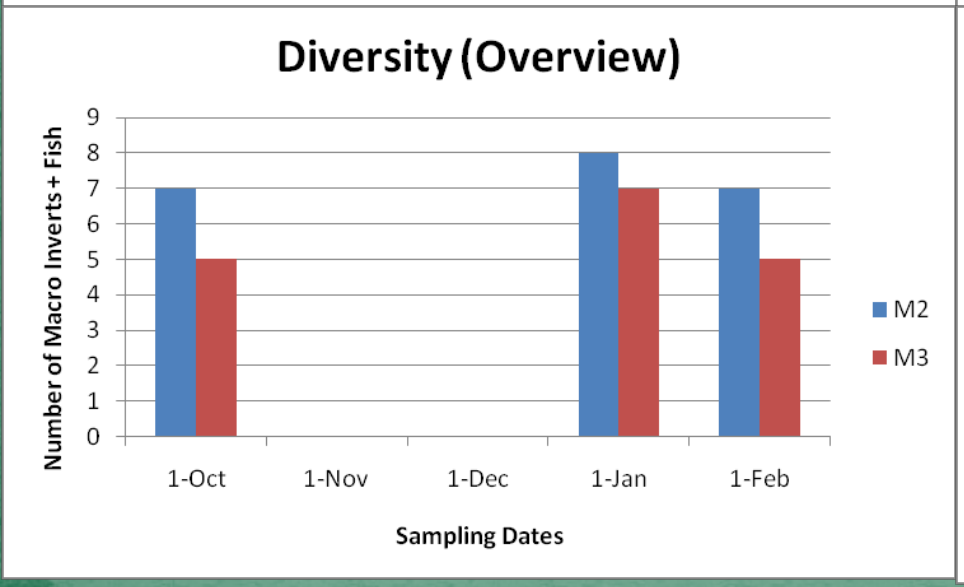
| Parameters | Conditions |
|---|---|
| Weather | Partly Cloudy |
| Wind | Medium Breeze |
| Water Conditions | Vegetation, Algae |

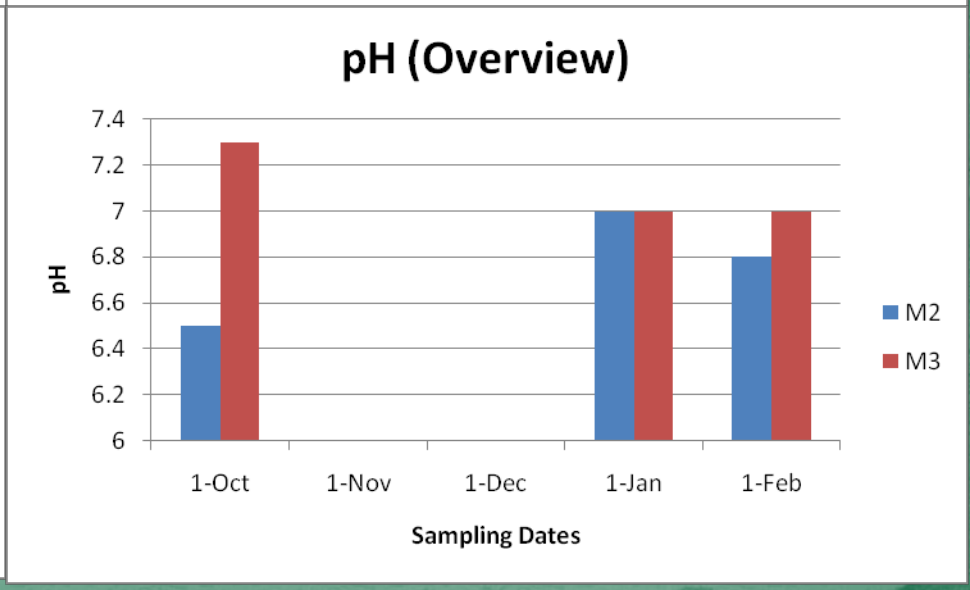
Maylin Santiago Kristina Wilson

# Overview




Sanjay Poonaisingh Fernando Varela

# Future Goals

- Increased number of sampling dates.
- Increase accuracy when identifying macro invertebrates.
- Incorporation of vegetation.
- Document actual weather conditions (Temperature, wind speed, humidity, etc).
- Student-to-student training.

Nelson Gil

# Visiting the ARMLNWR

- Nature Center
- Cypress Swamp Boardwalk
- Wildlife viewing

Carina Covert

# Legacy at LILA – Year One

The ESA staff and student body would like to thank the members of the Legacy at LILA team for all their hard work and dedication!