

NELHA Biota Study

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January 2nd - January 30th

About Me

- Graduate HPA 2017
- Current MIT Sophomore
 - Major: Biological Engineering
 - Minors: Computer Science, Statistics
 - Dedon Lab: Cell culture

What is the biota data?

- Contracted reports
- Anchialine ponds, marine coral, marine fish communities
- Quarterly, then biannual, then annual
- Monitor NELHA's impact on the environment

Project Goals

- 4 Week Project
- Digitize all Biota Studies since 1989 (~ 1 Week)
- Analyze longitudinal data (~ 1 Week)
- Create a webpage for the public to access data (~ 2 Weeks)

Objective One: Digitize Data

Digitizing Data

- Adobe Acrobat to transform image PDFs to editable text PDF
- Tabula to extract tables
- Four boxes of reports!
 - Over 50 reports to digitize
- Blank and missing data



Objective Two: Analyze Data

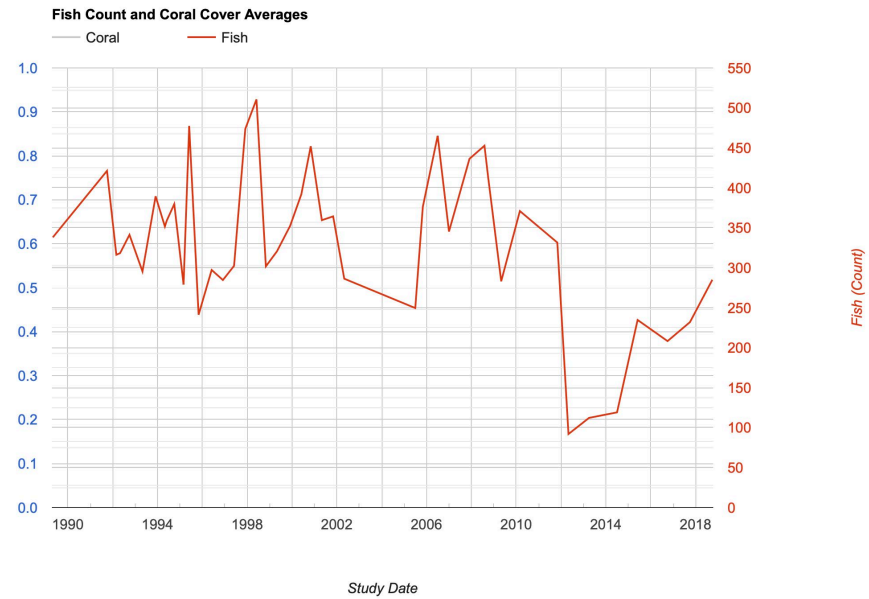
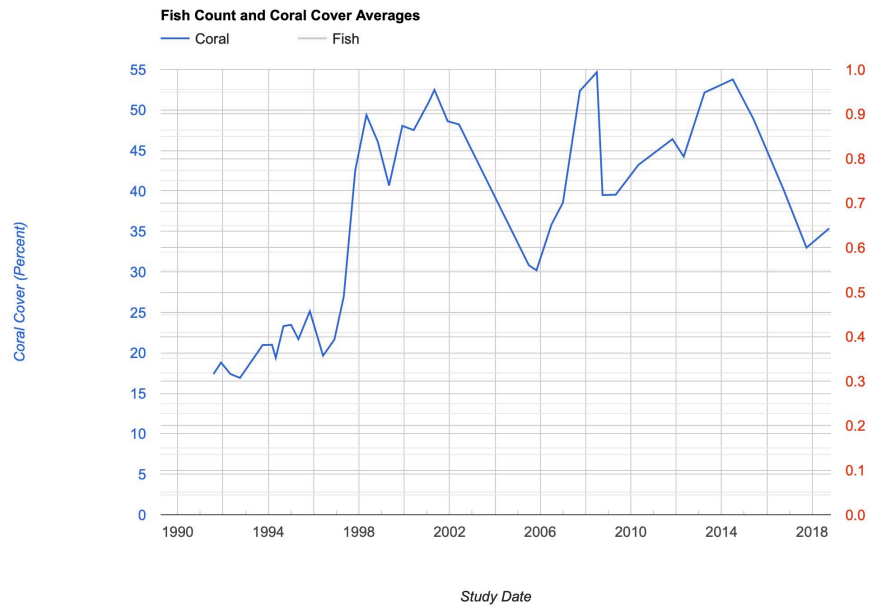
Data Analysis

- Analyzing coral coverage and fish counts
- Basic visualizations using excel
- Statistical analysis using R
 - Help from Professor John Burns from UH Hilo for statistical analysis



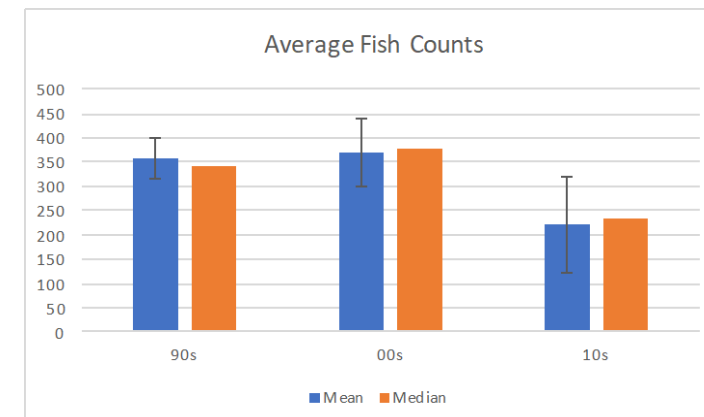
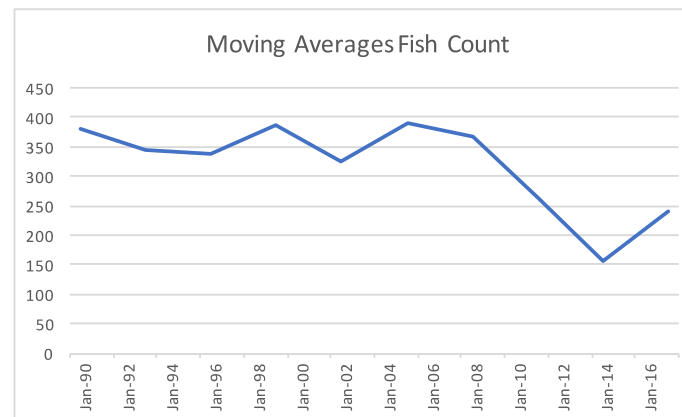
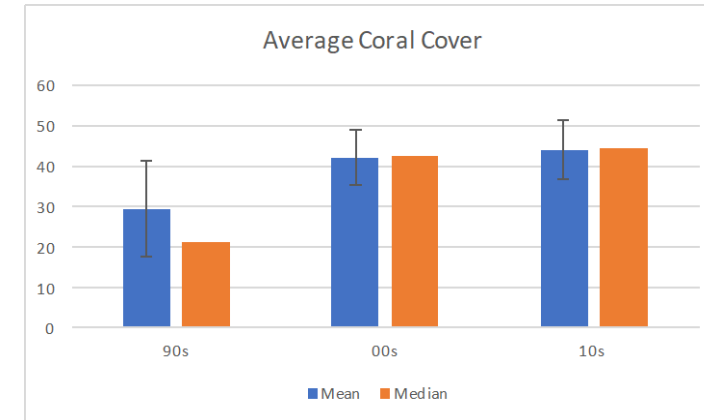
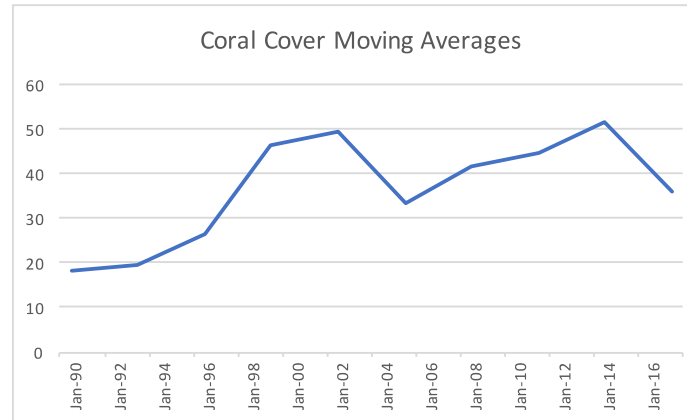
Findings

- Large variance year to year
- Diversity about the same
- Individual species of coral and fish similar to the mean



Statistical Analysis

- Analysis of decades
- Coral coverage and fish count have an opposite effect
- 90s significantly less coral
- 10s significantly less fish



Object Three: Presenting Data

Presenting Data

- Challenge: Presenting a large amount of data in a few digestible charts
 - Raw data
 - Decade averages
- Add interactivity
 - Goal: Explore data as much or as little as you want



Buttons and Dropdowns

- Anchaline Ponds
 - Opae Ula density plotted with the presence or absence of mosquito fish
 - 15 possible graphs
- Coral Cover and Fish Counts
 - Site
 - Depth
 - 47 possible graphs

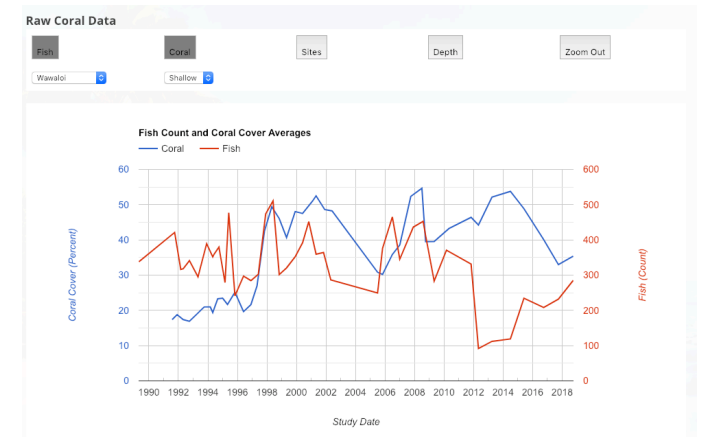
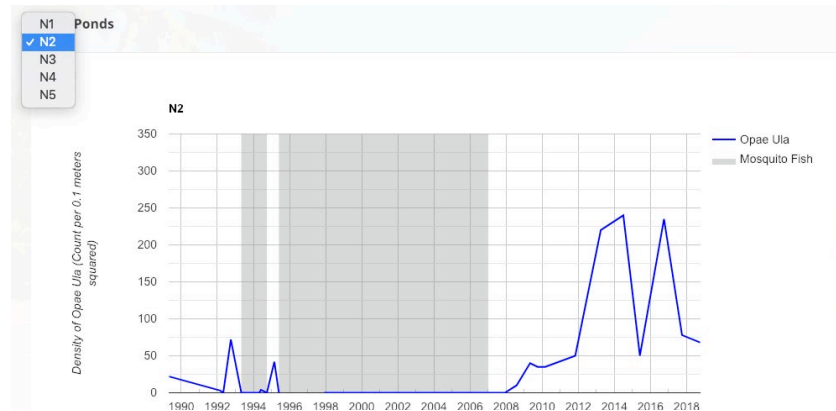
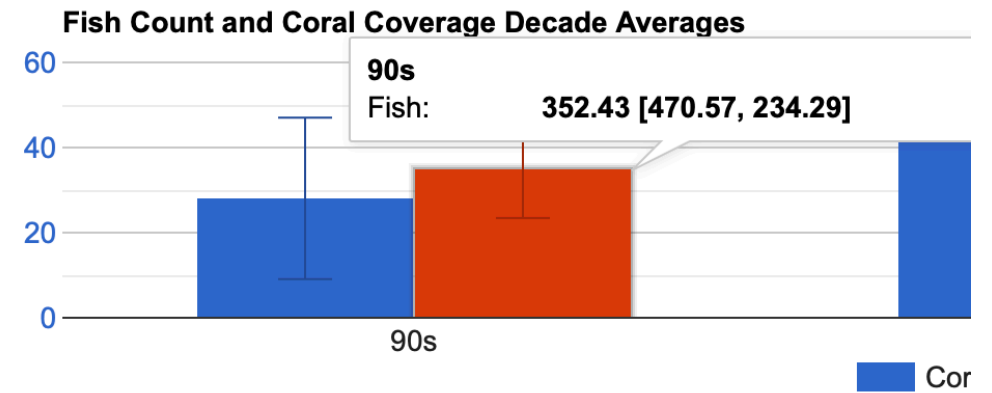
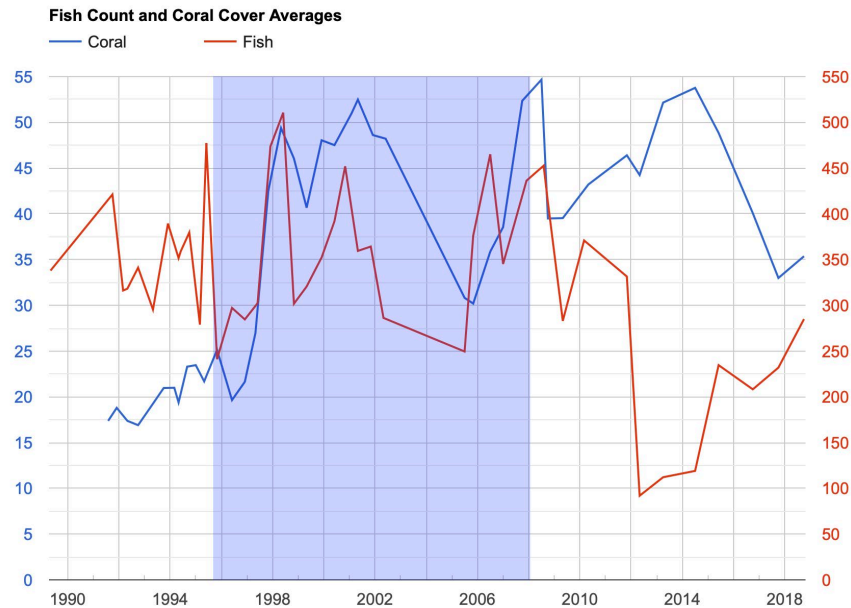


Chart Elements

- Toggle bars/lines using the legend
- Zoom option
- Can see the data at each point



Database on Google Sheets

- Raw data is self updating
 - Spreadsheet formulas
- Ensures longevity of project

Web Products

- NELHA Website:
<http://nelha.hawaii.gov/resources/library/nelha-lab-reports/sidney-biota/>
- Google Sheets:
https://docs.google.com/spreadsheets/d/1nv5Qf_DEMTfXAVj1qcYPDozzOYcJY6rST-A8zWYmqVQ/edit

Takeaways and Next Steps

Personal Takeaways

- First computer science project
- Web development
 - Coding in HTML, and Java Script
 - Working within Wordpress
- Science opportunities in Hawaii

Project Next Steps

- Website organization
- Create group of colors and patterns for the bar and line graphs
- Data analysis
 - Weather events (ie. Hurrigan Iniki (1992) and coral bleaching 2014)
 - Comparative analysis to other sites monitored

Questions? Suggestions?

Thank You

- Keith
- Pam
- Laurence
- Everyone else at NELHA



NELHA