

Capture Method Comparison for Red Drum (*Sciaenops Ocellatus*) using Python

SANDRA LEAL

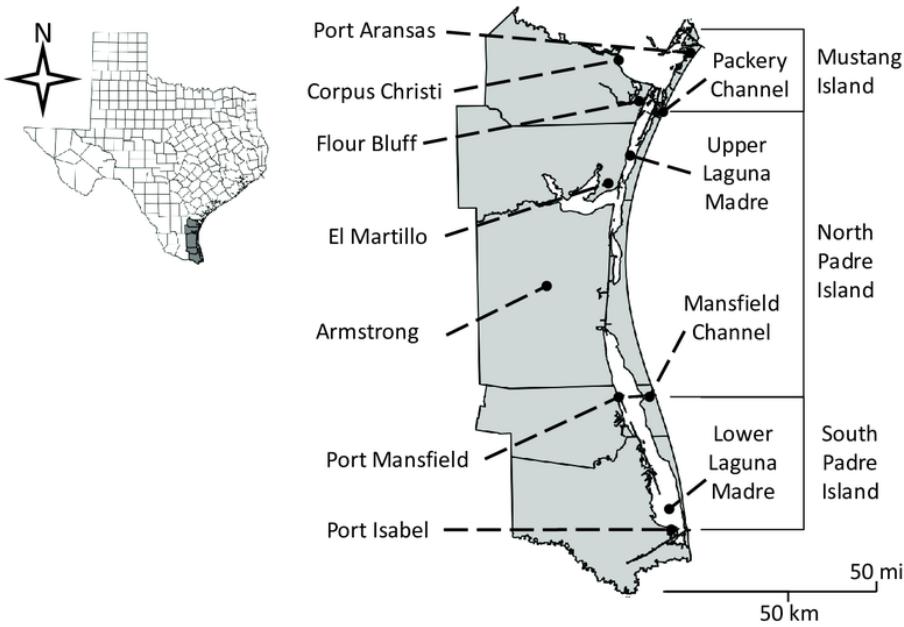
Introduction – Red Drum

- Also referred to as Red Fish
- Popular game fish in coastal waters
- Species of great recreational significance in South Texas
- Suffered population decline due to unregulated fishing
- State managed species
- Spawns primarily in the Gulf of Mexico

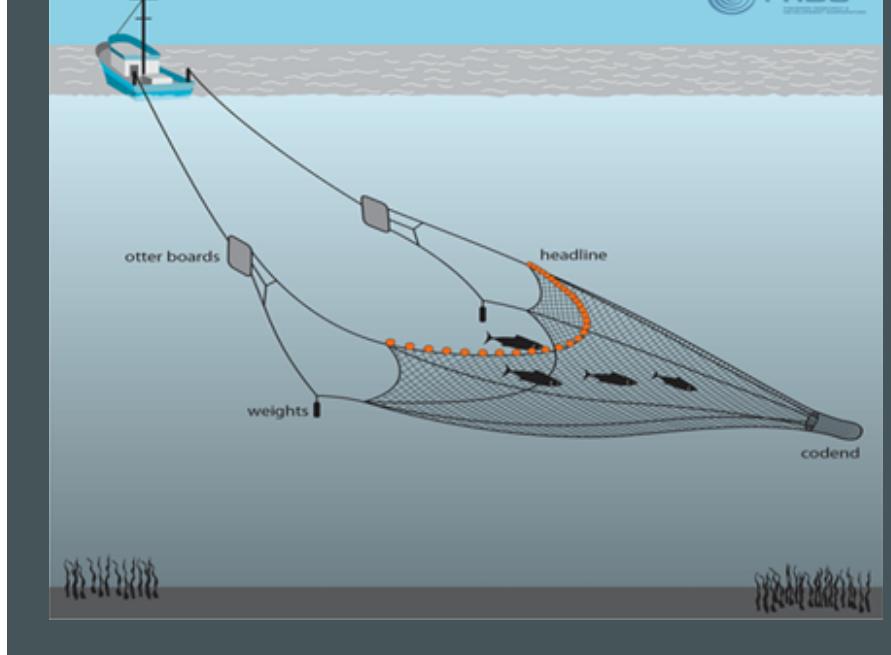
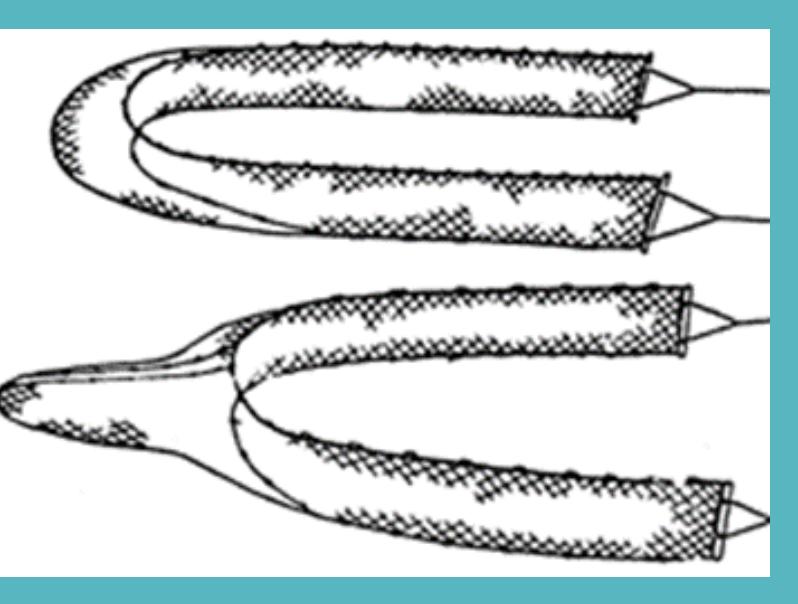


Introduction – Study Site

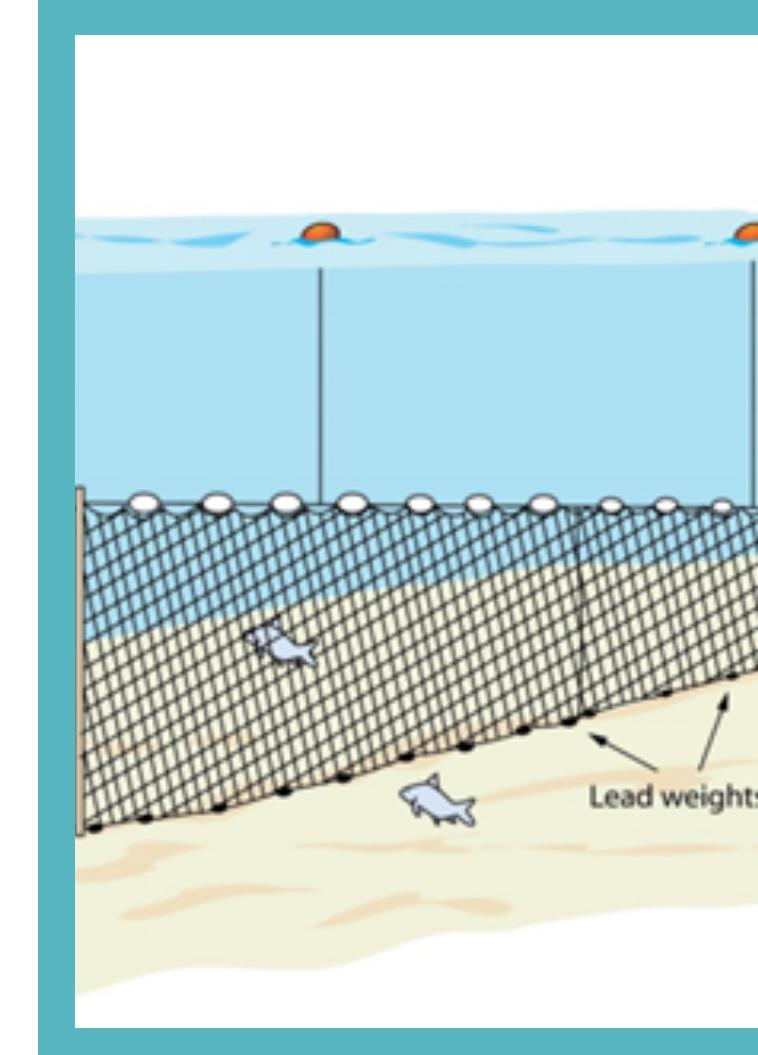
- Lower Laguna Madre (LLM), Tx
- Potential interest areas:
 - Holly Beach (lagoon system)
 - South Bay (bay system)



Introduction – Capture Methods



- Texas Parks and Wildlife Data
- Capture Methods Utilized:
 - Bag Seine
 - Gillnet
 - Bay Trawl





Introduction – Research Questions/Goal

- Compare capture methods
- Identify most effective capture method
- Visualize distribution of Red Drum in LLM water systems
- Identify peak aggregation months/sites
- Potentially re-evaluate sample sites

Methods - Extraction

- Texas Parks and Wildlife Grids
- Latitude/Longitude Data Extraction
- KMZ (Google Earth) to KML



Methods - Pandas

- Modify data in excel sheets
- Upload into pandas
- Visualize data
- Scatter Plots
- Histogram age class

```
In [10]: import pandas as pd  
import matplotlib.pyplot as plt  
%matplotlib inline
```

```
In [11]: data = pd.read_excel (r'C:/Users/Sandra/Desktop/Final_Project/Red_Drum_Data.xlsx')
```

```
In [12]: data.head() #checking to see if loaded properly
```

Out[12]:

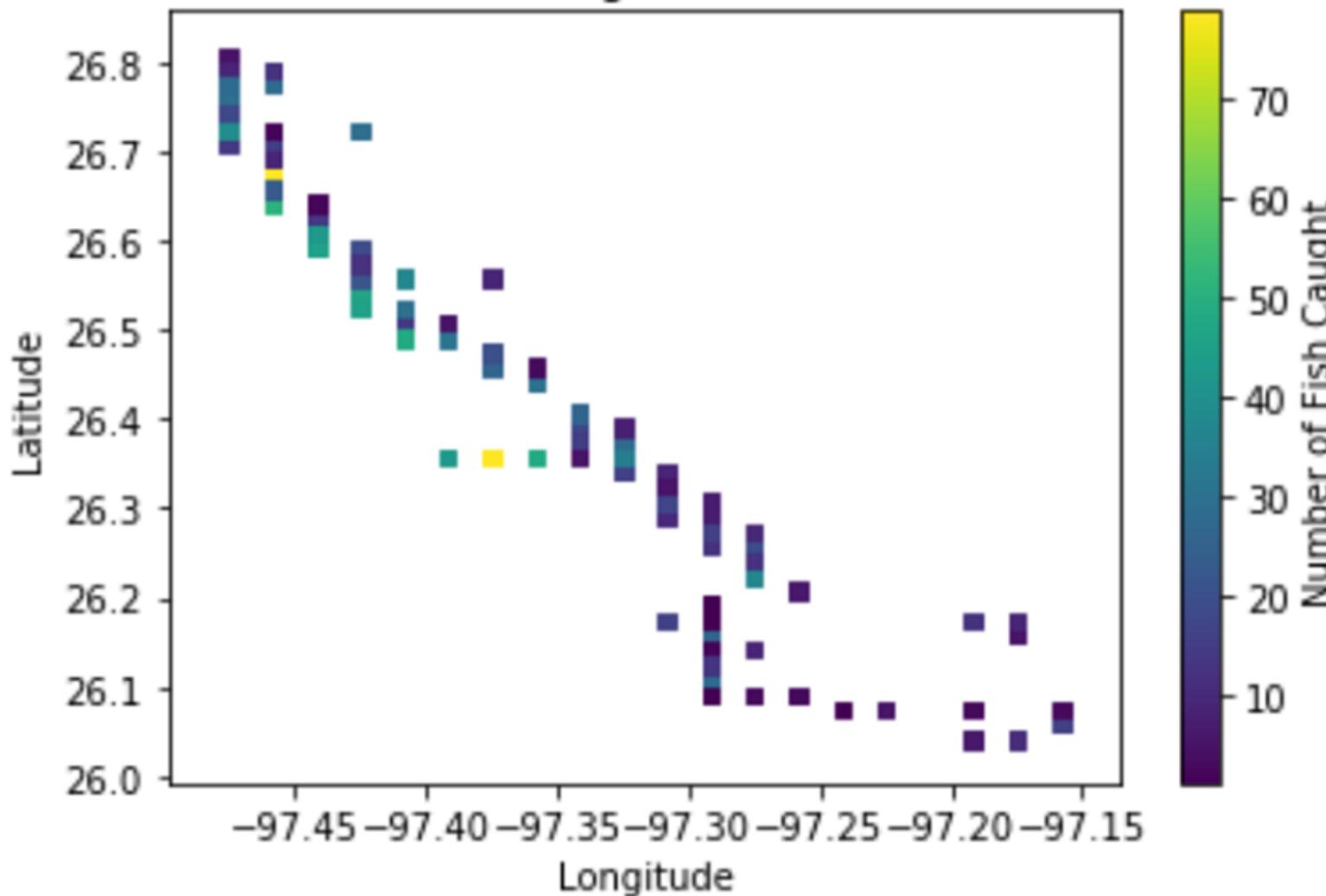
	major_area_code	completion_dttm	year	month	station_code	gear_stratum_code	hydro_id	mesh_size_num	species_code	start_salinity_num
0	8	2008-01-03 11:20:00	2008	1	31	7	21000000254006	13	629	35.2
1	8	2008-01-03 11:20:00	2008	1	31	7	21000000254006	13	629	35.2
2	8	2008-01-03 11:20:00	2008	1	31	7	21000000254006	13	629	35.2
3	8	2008-01-03 11:36:00	2008	1	15	7	21000000254007	13	629	35.7
4	8	2008-01-03 11:36:00	2008	1	15	7	21000000254007	13	629	35.7

Methods- Scatterplots

```
In [2]: import pandas as pd  
  
In [3]: from matplotlib import pyplot as plt  
  
In [5]: data = pd.read_excel(r'Bag\RedYearBag.xlsx')  
  
In [6]: data2 = pd.read_excel(r'Bay\RedYearBay.xlsx')  
  
In [7]: data3 = pd.read_excel(r'Gill\RedYearGill.xlsx')  
  
In [8]: df = pd.DataFrame(data, columns= ['station','Number of Fish Caught','Latitude','Longitude'])  
  
In [9]: df2 = pd.DataFrame(data2, columns= ['station','Number of Fish Caught','Latitude','Longitude'])  
  
In [10]: df3 = pd.DataFrame(data3, columns= ['station','Number of Fish Caught','Latitude','Longitude'])  
  
In [11]: fig, ax = plt.subplots()  
df.plot(kind="scatter", x="Longitude", y="Latitude", marker='s', c="Number of Fish Caught", cmap="viridis", ax=ax);  
plt.title("2008-2018 Bag Seine Red Drum")  
....
```

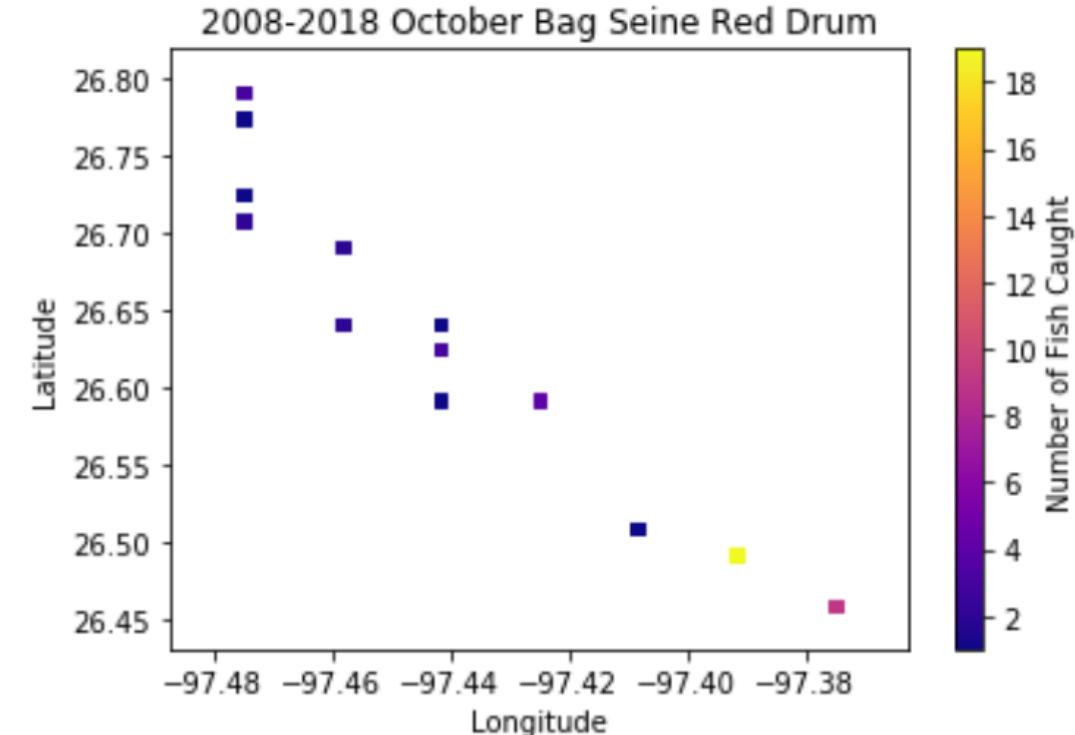
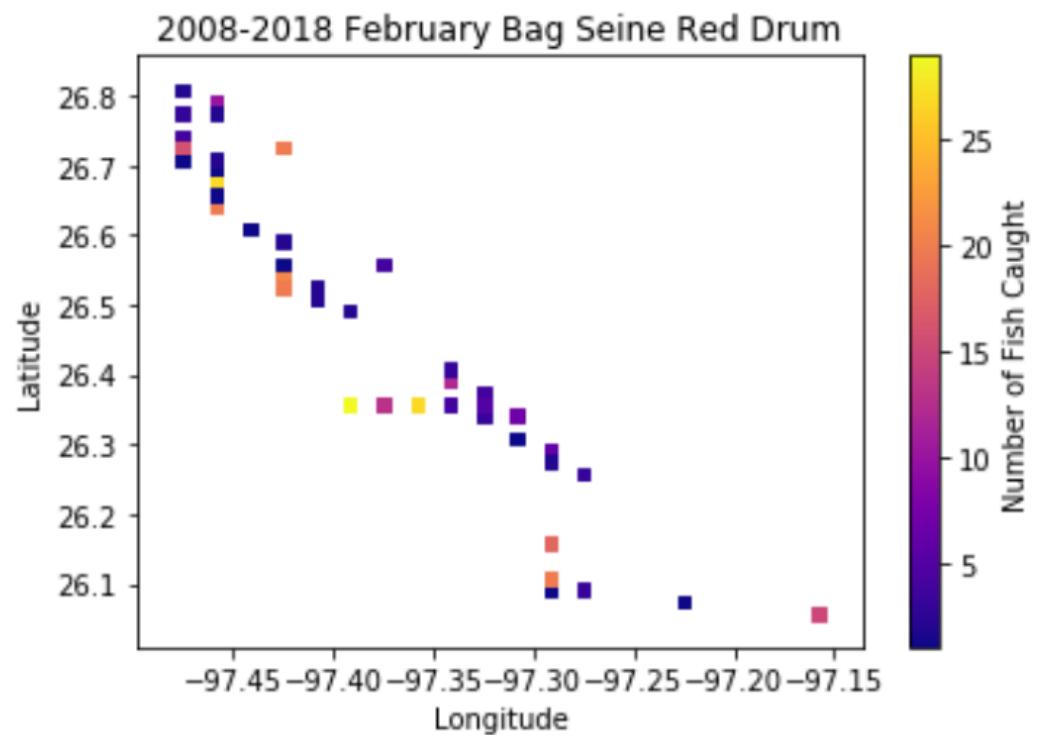
- Two types of scatterplots per capture method
- Total fish summed from 2008-2018
- Fish grouped by month and summed from 2008-2018
- Three capture methods:
 - Bag Seine
 - Gillnet
 - Bay Trawl

2008-2018 Bag Seine Red Drum



Results

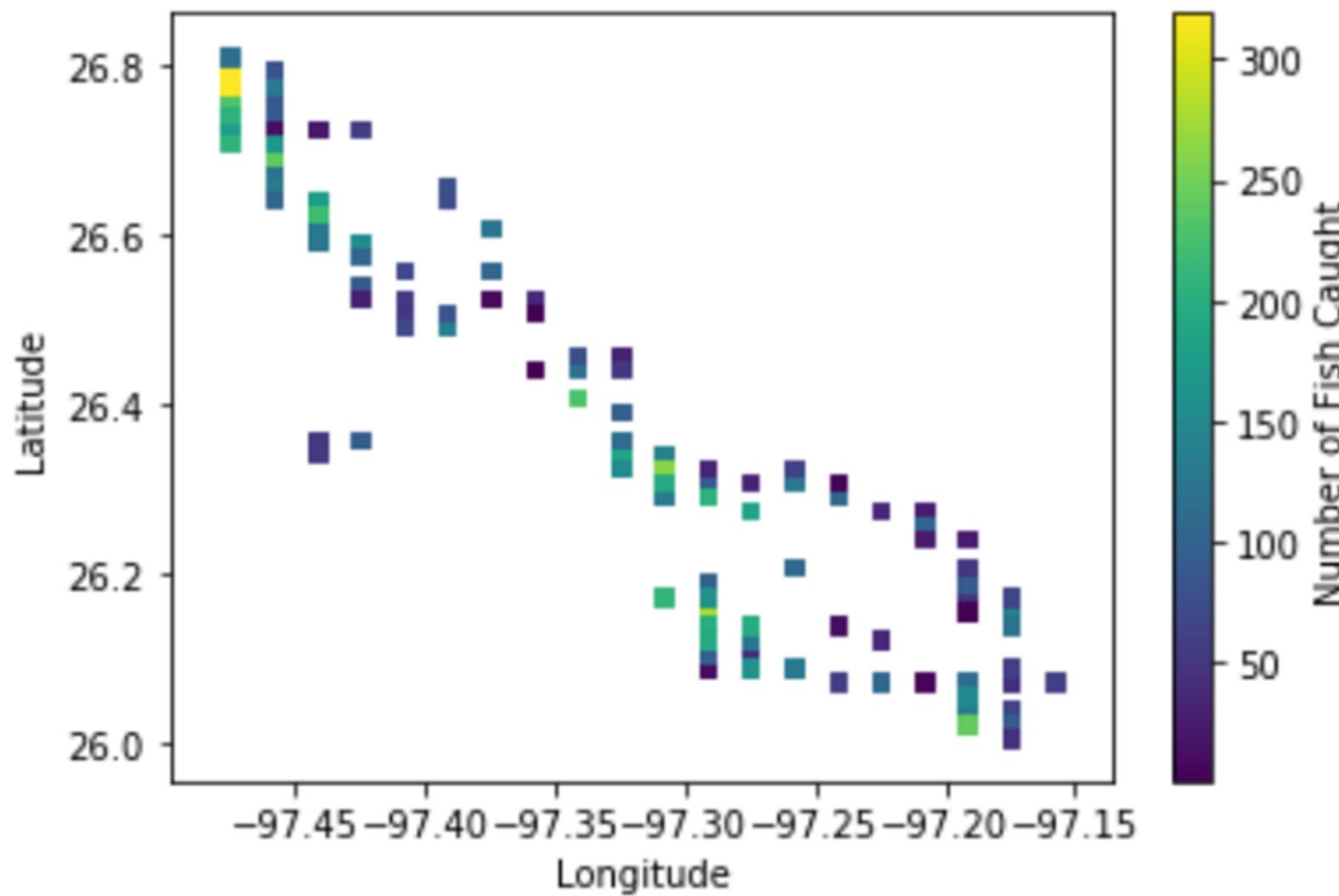
Figure 1. Scatterplot of Red Drum Capture utilizing Bag Seine method summed over total timeseries



Results

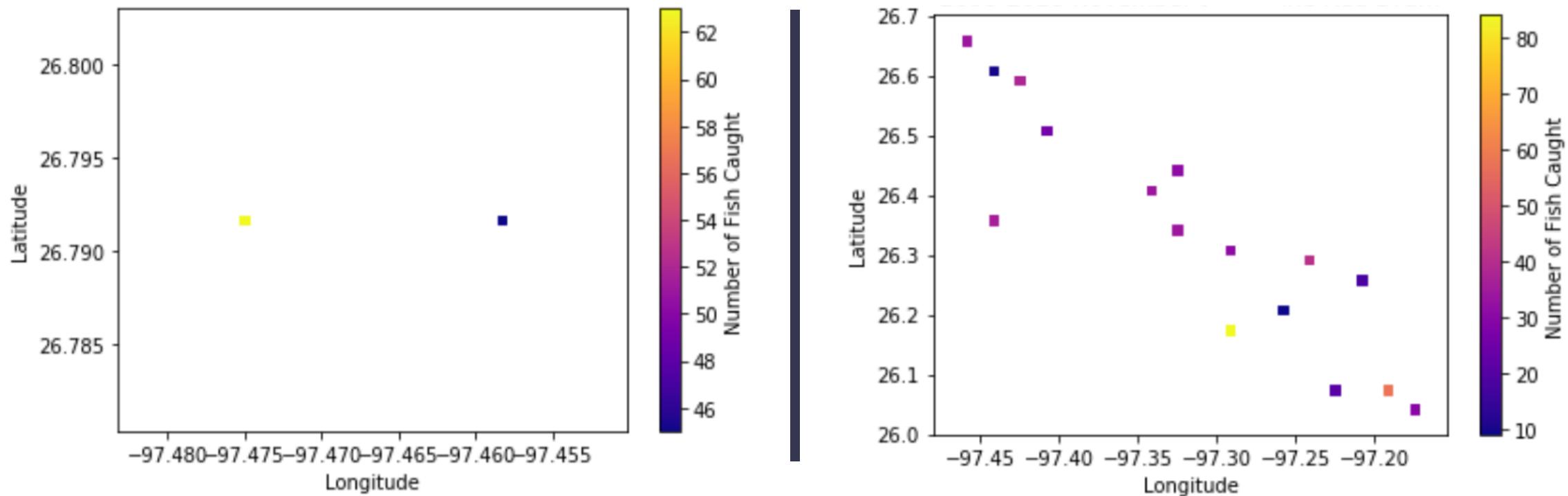
Figures 2, 3. Scatterplots of fish caught grouped by month and summed from 2008 to 2018

2008-2018 Gill Net Red Drum



Results

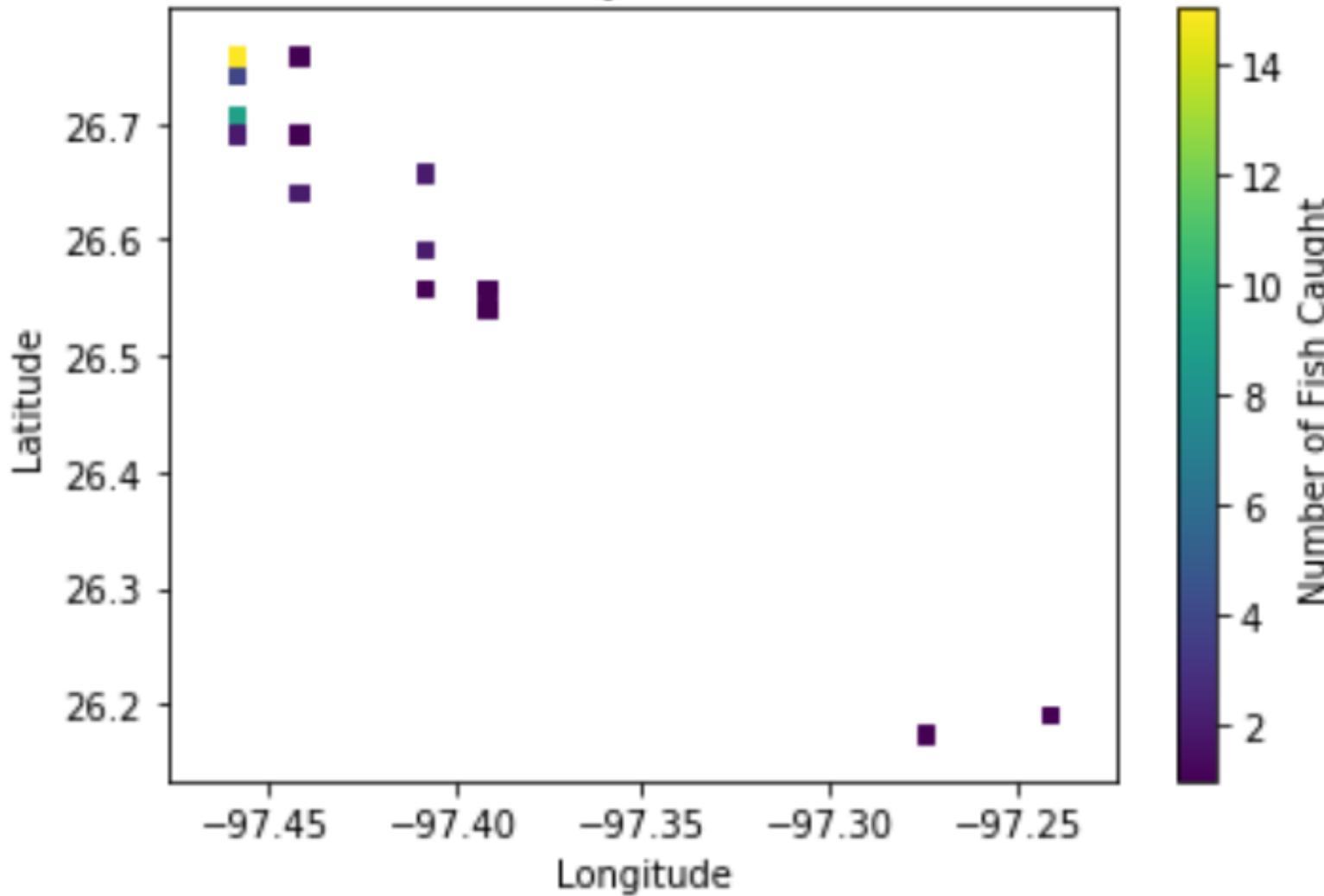
Figure 4. Scatterplot of Red Drum Capture utilizing Gill Net method summed over total timeseries

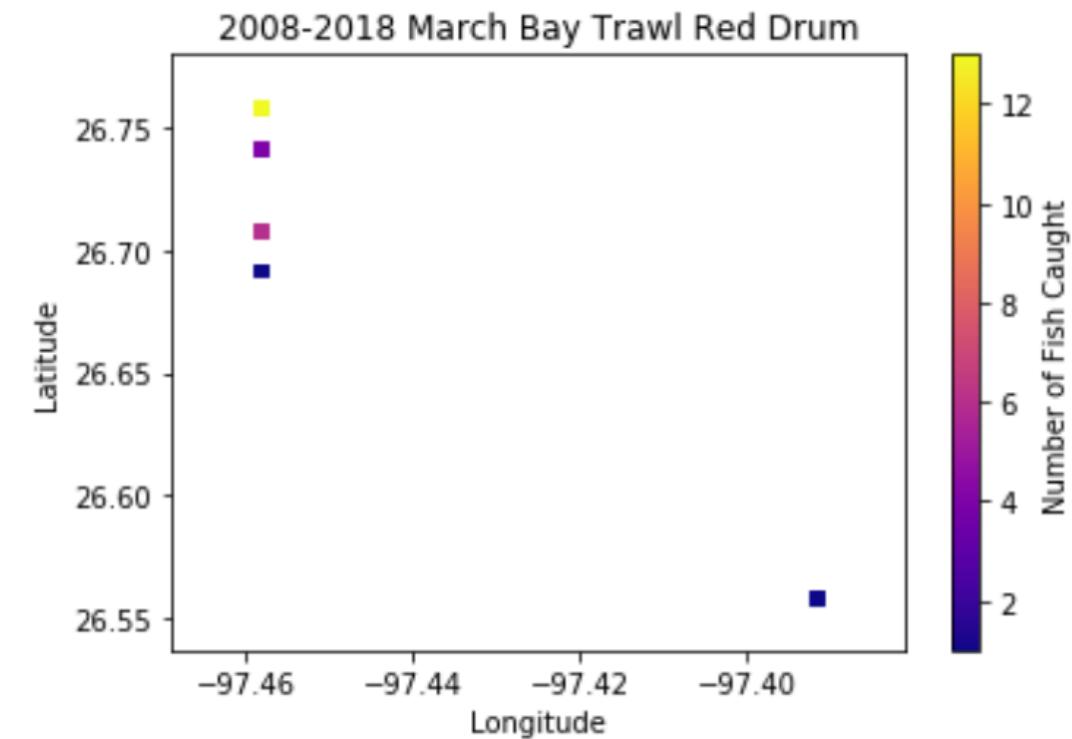
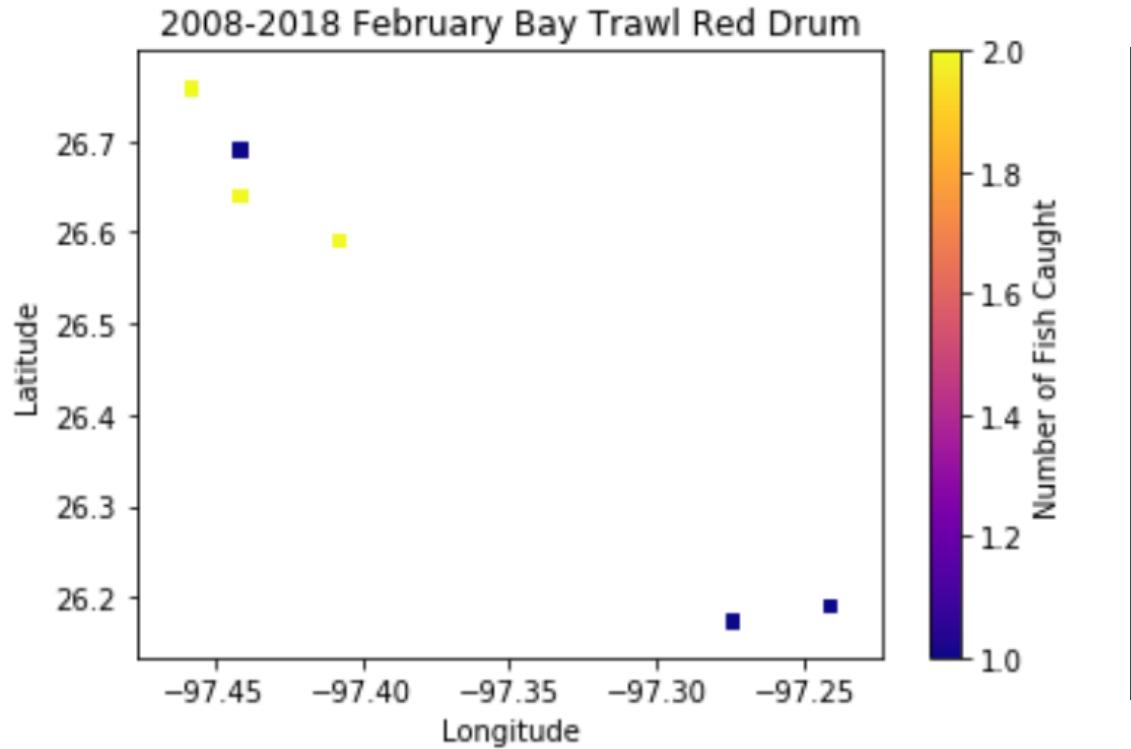


Results

Figures 5, 6. Scatter plots of fish caught grouped by month and summed from 2008-2018

2008-2018 Bay Trawl Red Drum





Results

Figures 8, 9. Scatterplots of fish caught grouped by month and summed from 2008-2018

Results

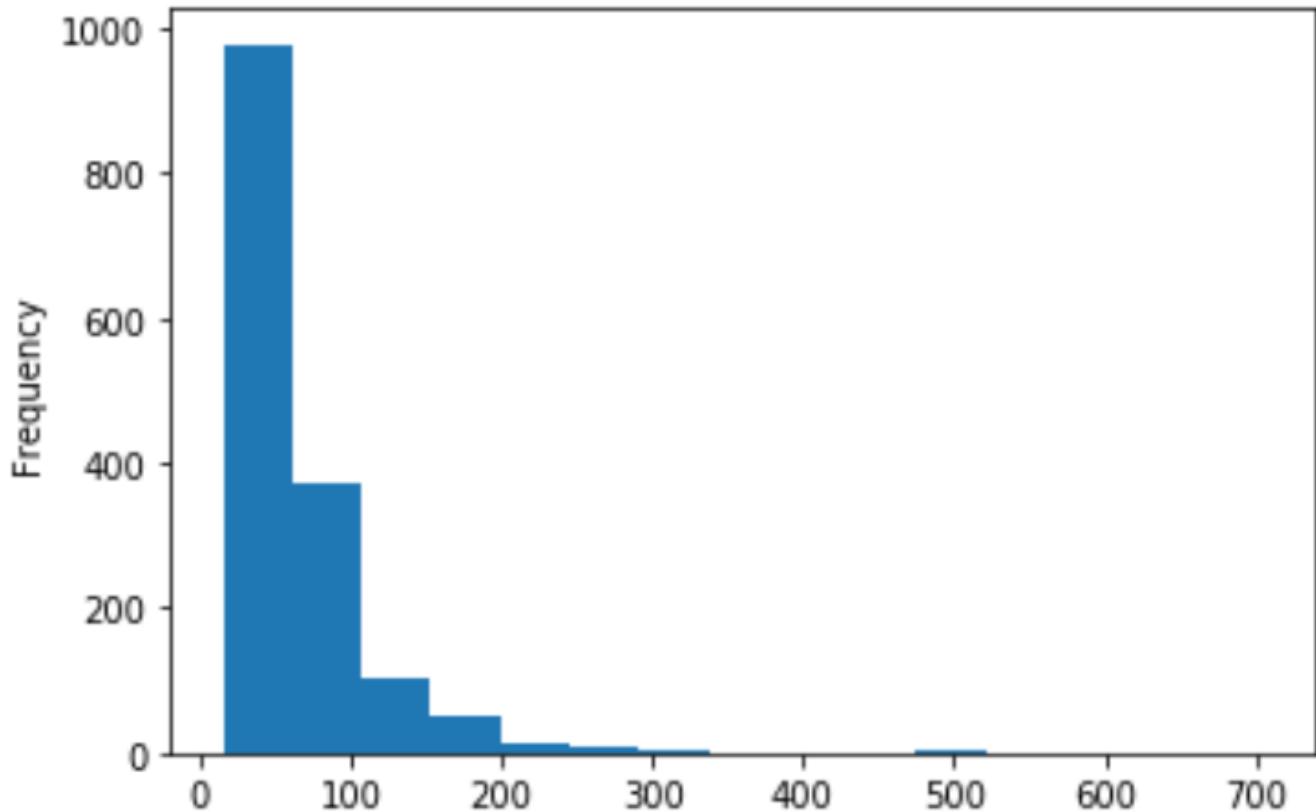


Figure 10. Histogram of Red Drum Bag Seine length classes



Discussion/Conclusion

- Most effective method of Red Drum capture was Gill Net
- Least effective method of Red Drum capture was Bay Trawl
- Popular aggregation sites:
 - Upper portion of LLM
 - Holly Beach
- Peak Months:
 - November
 - December
 - January
 - February

Black Drum and Gray Snapper

BLACK DRUM

- Most effective capture method was Gill Net
- Least effective capture method was Bay Trawl
- Popular aggregation sites:
 - Upper portion of LLM
 - Lower portion of LLM
 - South Bay

GRAY SNAPPER

- Most effective capture method was Gill Net
- Least effective capture method was Bag Seine
- Popular aggregation sites:
 - Lower Portion of LLM
 - South Bay



Gray Snapper and Black Drum

Questions?

