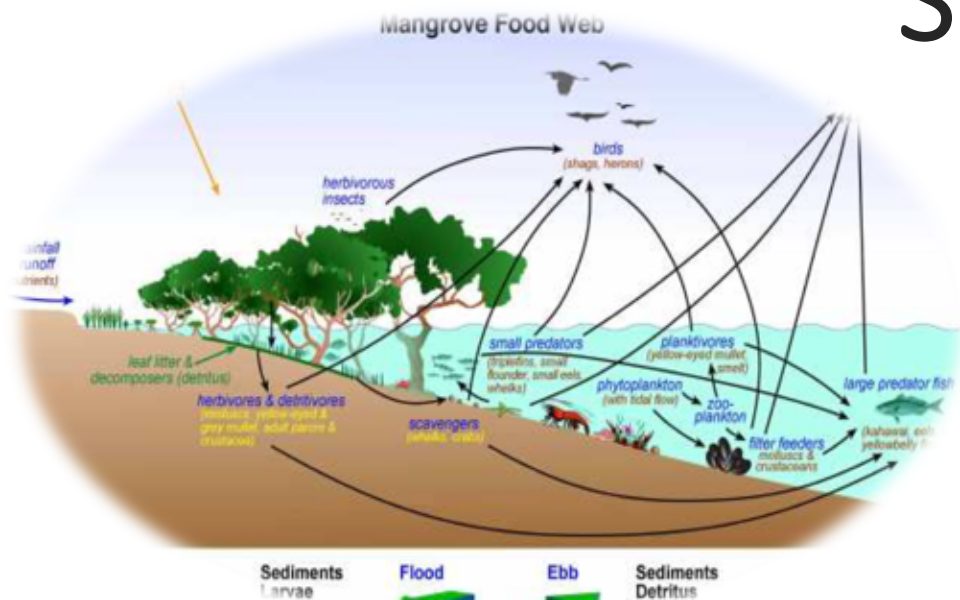


# Nutrients( $\text{PO}_4$ , $\text{NO}_3$ ) concentrations in porewaters of mangrove forests in South Florida







# **PROJECT GROUP 2**

**INSTRUCTOR**

**DR. MADELINE FOSTER-MARTINEZ**

**MEMBERS**

**FRED AHIATI**

**KELVIN KLOKPA**

**AUGUSTINE ABOTSI**

**EMMANUEL SANDY OFOSU**



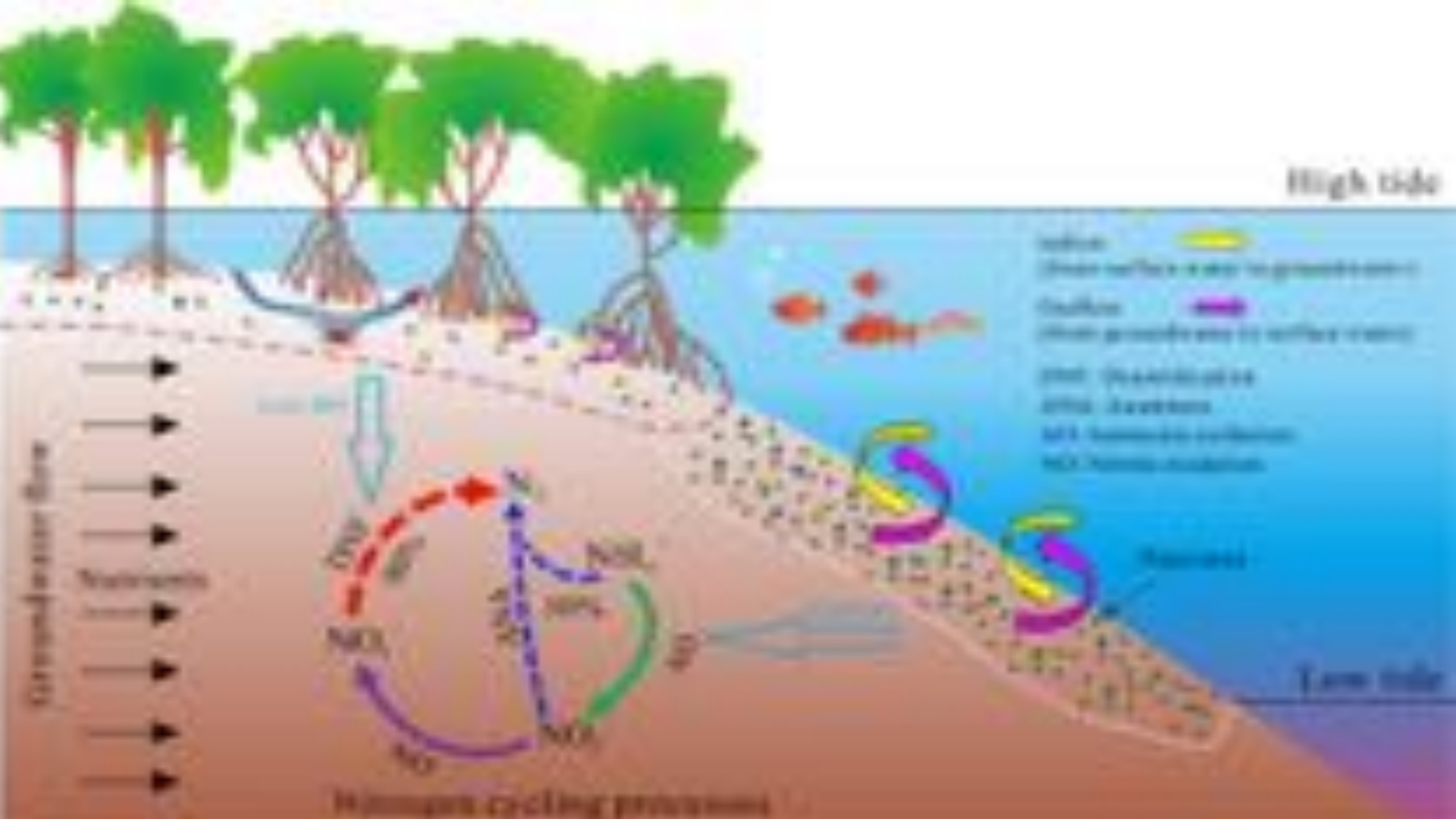
# INTRODUCTION

- **Mangroves are salt-tolerant trees, also called halophytes, and are adapted to life in harsh coastal conditions.**
- **Mangrove swamps (mangals) are found in tropical and subtropical tidal areas. Areas where mangroves occur include estuaries and marine shorelines.**

# OBJECTIVE

TO ANALYSE DATA FROM LONG TERM ECOLOGICAL RESEARCH(LTER) ON NUTRIENTS IN MANGROVE FOREST USING PYTHON PROGRAMMING.





# IMPORTANCE

- 1. Shoreline Protection**
- 2. Nursery**
- 3. Habitat**
- 4. Renewable Resource**
- 5. Carbon sequestration**
- 6. Flood reduction**
- 7. Erosion control**
- 8. Water treatment**





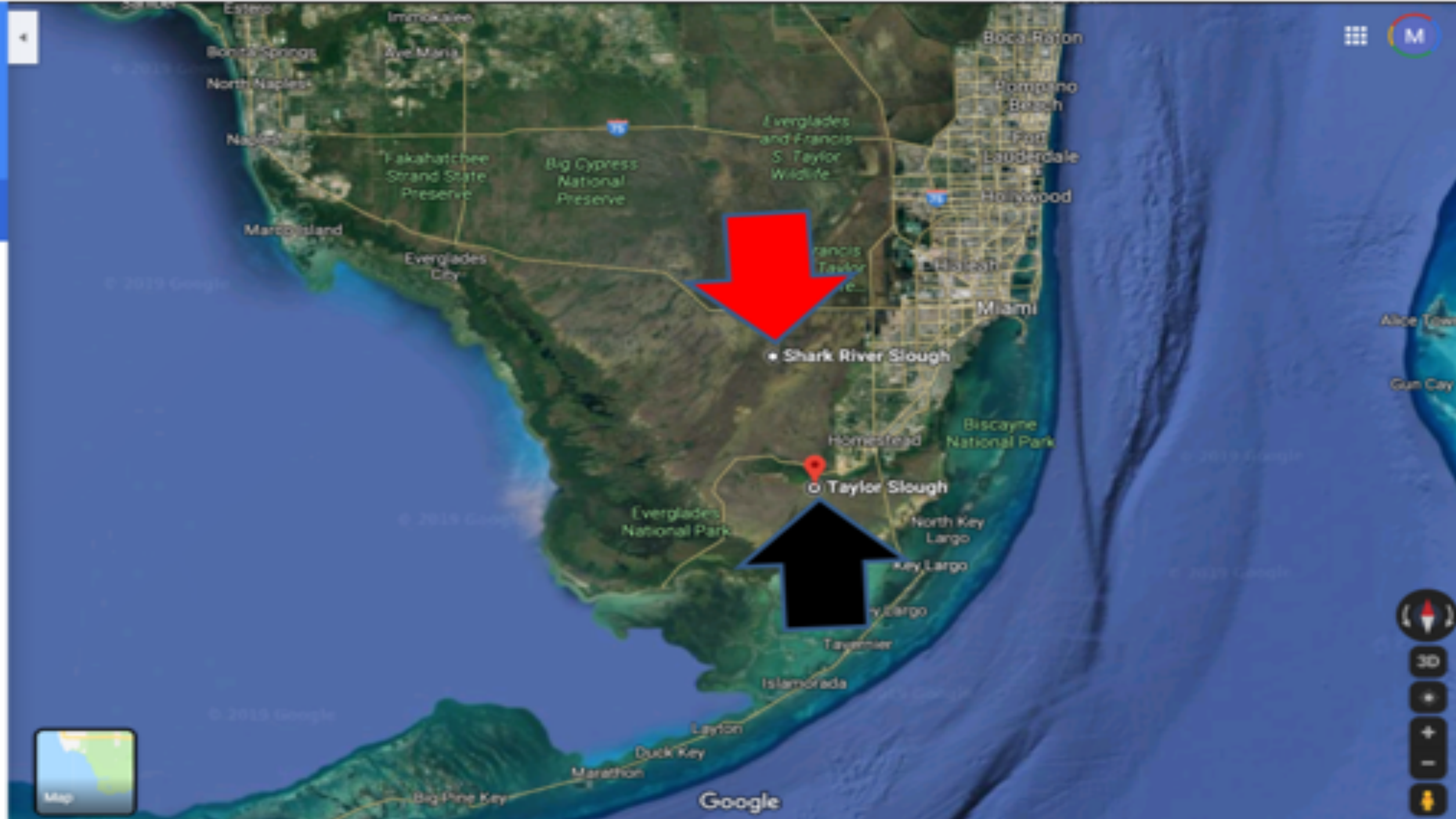
M. Foster-  
Martinez

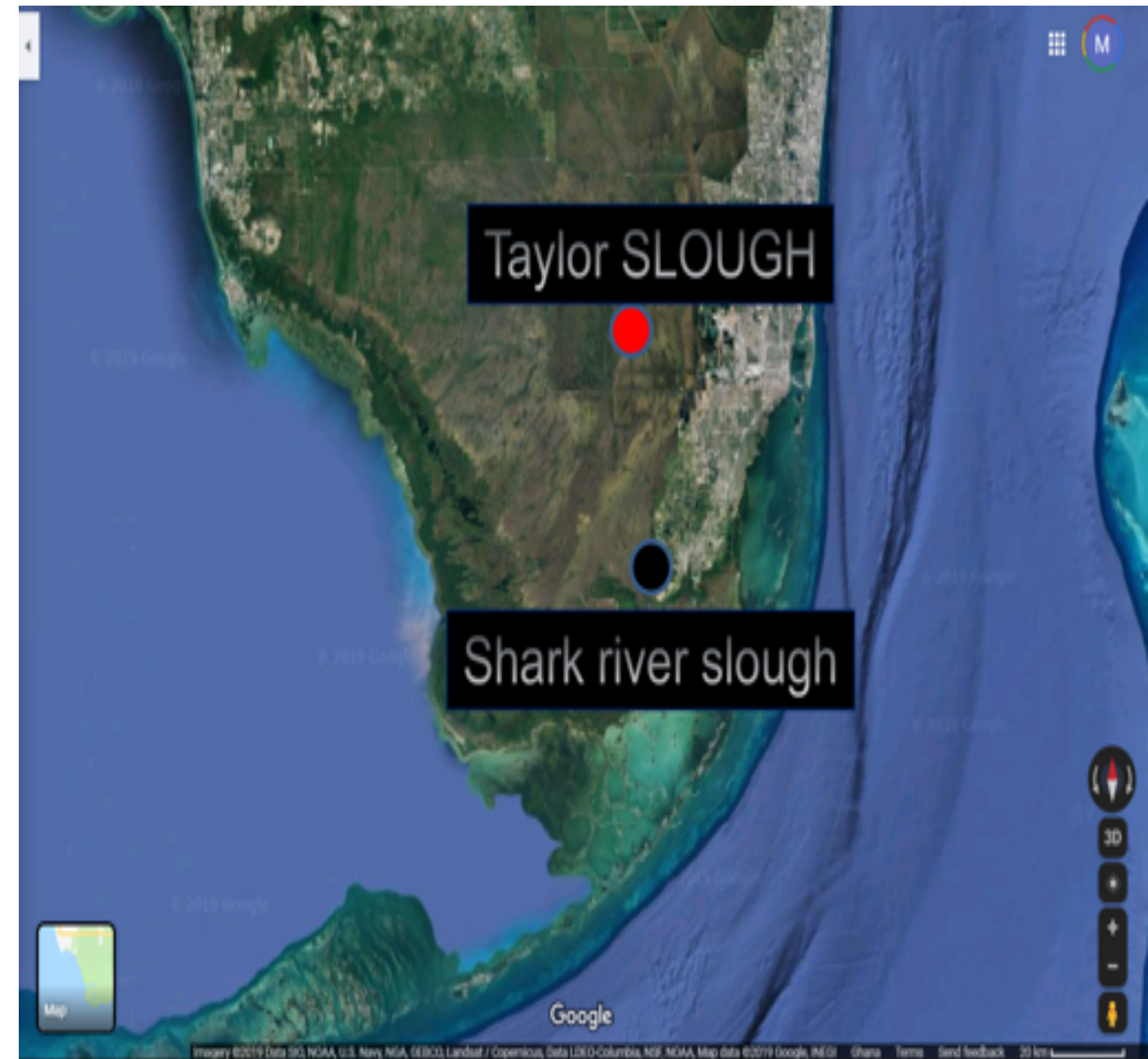
# Mangroves around the world



Source: Giri, 2016









```
localhost:8888/notebooks/Desktop/COESSING2019/COESSING_project_data/nutrients_mangroves/Untitled3.ipynb?kernel_name=python3#
jupyter Untitled3 Last Checkpoint: Last Thursday at 9:33 AM (autosaved) Logout
File Edit View Insert Cell Kernel Widgets Help Trusted Python 3
In [222]: # y = 2000
paige=0
key = []
plt.figure(figsize=(12,16))
yr = []
while y<2016:
    maddie = (data[(data['Porewater_PO4']>0) & (data['Season']=='wet') & (data['SITENAME']=='SR54') & (data['Date'].dt.year.val

    paige = np.average(data.Porewater_NO3[maddie].values)
    if np.isnan(paige):
        print("FRED")
    else:
        plt.subplot(211)
        plt.plot(year_array[y-2000],paige,'.',markersize=30,label=y)
        yr.append(str(y))
        y = y+1
        plt.xlabel('year', fontsize=30)
        key.append(paige)
        # print(key)

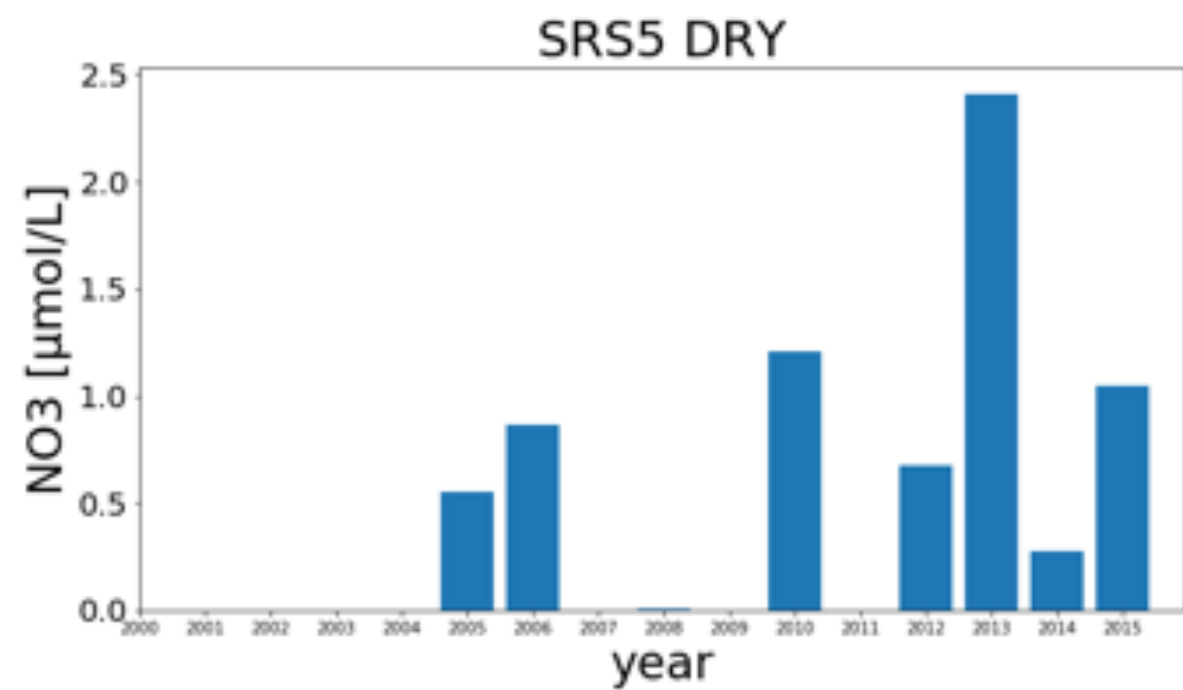
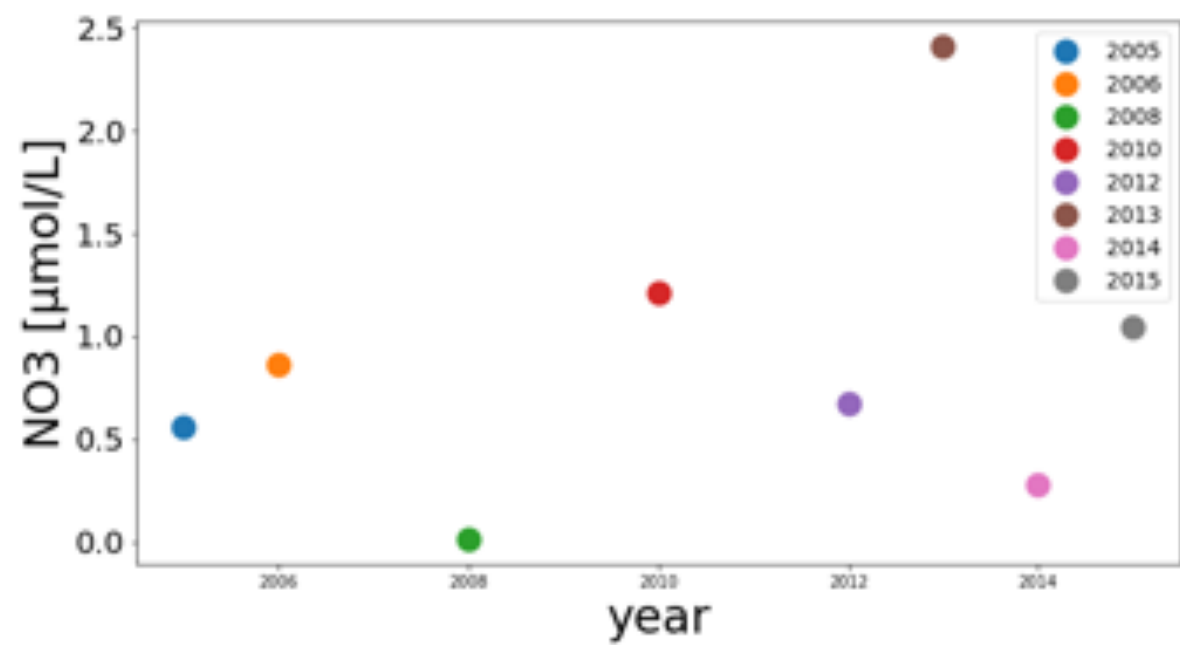
plt.ylabel('PO4 [\u00b5mol/L]', fontsize=30)
plt.rc('xtick',labelsize=30)
plt.rc('ytick',labelsize=30)
plt.legend(fontsize=14)

plt.subplot(212)
y_pos = np.arange(16)
plt.bar(y_pos,key)
plt.xticks(y_pos,yr)
plt.title("SR54 WET",fontsize=32)
plt.ylabel('PO4 [\u00b5mol/L]', fontsize=30)
plt.xlabel('year', fontsize=30)
```

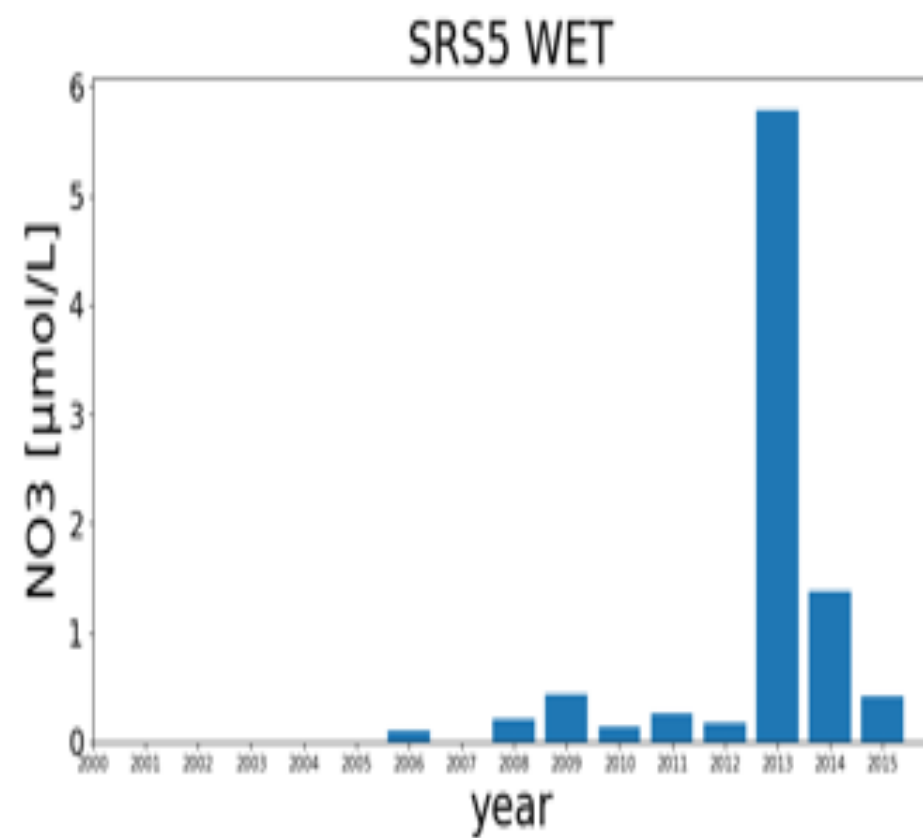
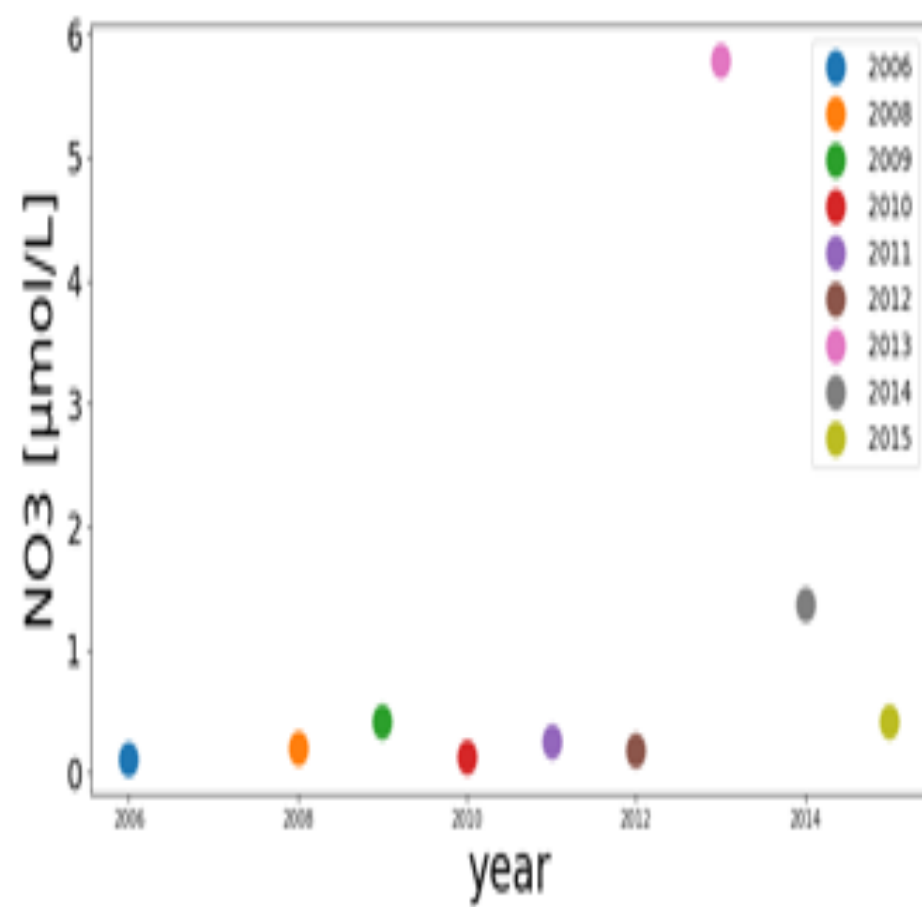
```
localhost:8888/notebooks/Desktop/COESSING2019/COESSING_project_data/nutrients_mangroves/Untitled3.ipynb?kernel_name=python3#
jupyter Untitled3 Last Checkpoint: Last Thursday at 9:33 AM (autosaved) Logout
File Edit View Insert Cell Kernel Widgets Help Trusted Python 3
In [208]: # y = 2000
paige=0
key = []
plt.figure(figsize=(12,8))
r = []
while y<2016:
    maddie = (data[(data['Porewater_NO3']>0) & (data['Season']=='wet') & (data['SITENAME']=='SR56') & (data['Date'].dt.year.val

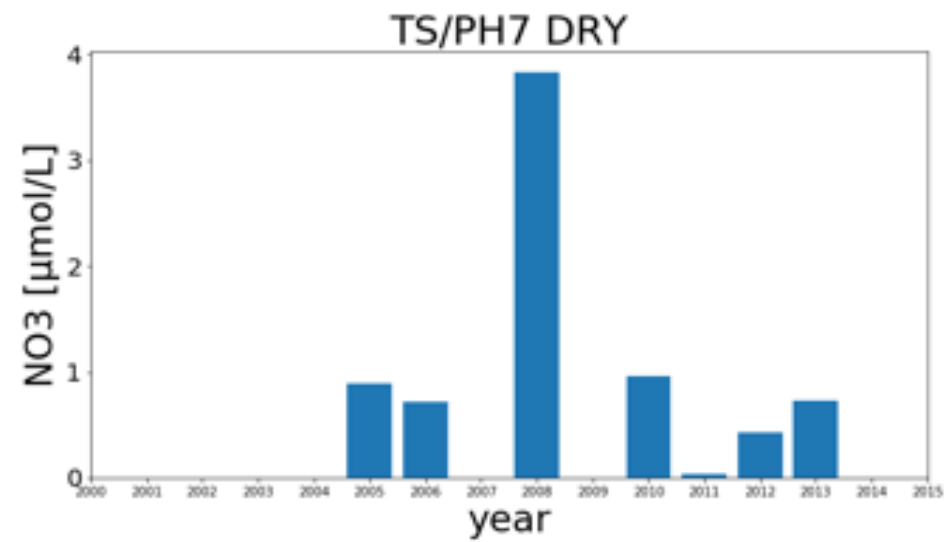
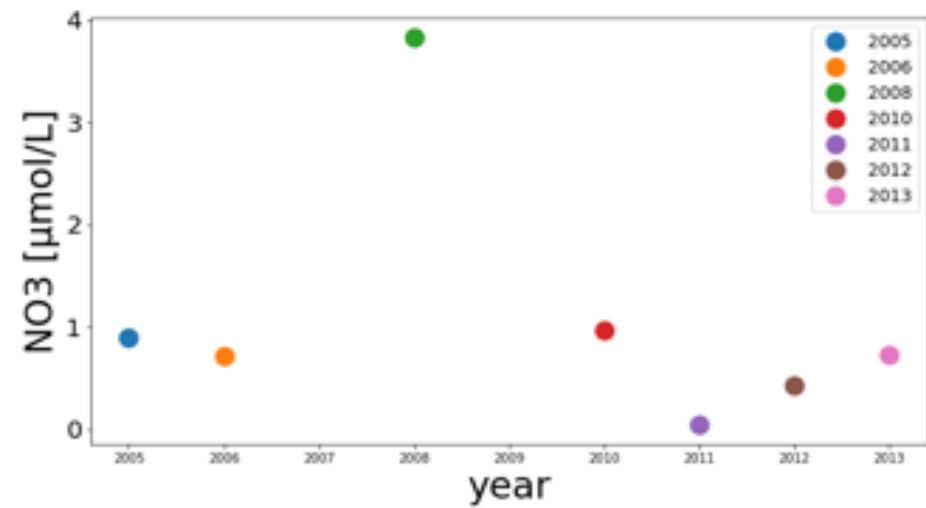
    paige = np.average(data.Porewater_NO3[maddie].values)
    if np.isnan(paige):
        print("FRED")
    else:
        plt.plot(year_array[y-2000],paige,'.',markersize=30,label=y)
        yr.append(str(y))
        y = y+1
        plt.xlabel('year', fontsize=30)
        key.append(paige)
        # print(key)

plt.ylabel('NO3 [\u00b5mol/L]', fontsize=30)
plt.rc('xtick',labelsize=30)
plt.rc('ytick',labelsize=30)
plt.legend()
plt.legend(loc='center', bbox_to_anchor=(0.5,-0.3), shadow=True, ncol=16)
plt.savefig('sandy.png')
plt.figure(figsize=(12,8))
_pos = np.arange(16)
plt.bar(_pos,key)
plt.xticks(_pos,yr)
plt.savefig('fredk.png')
```

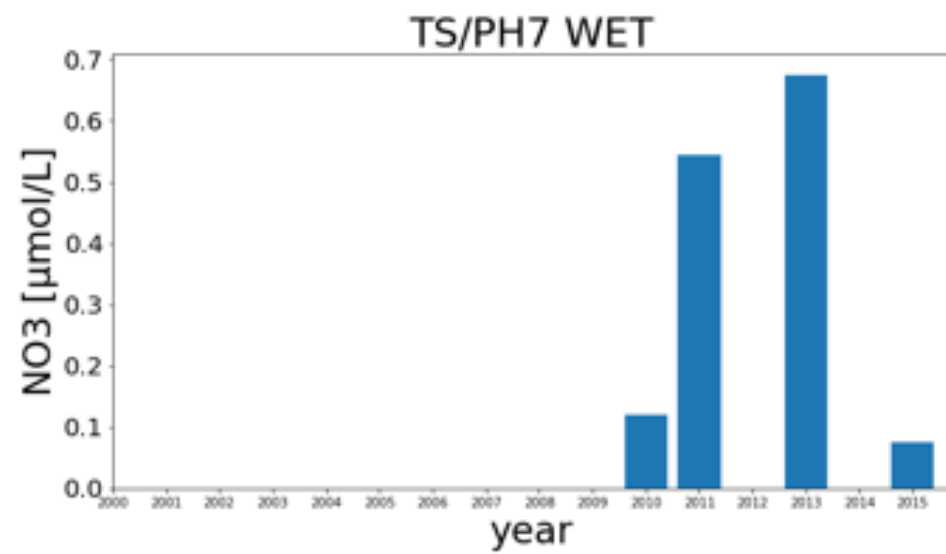
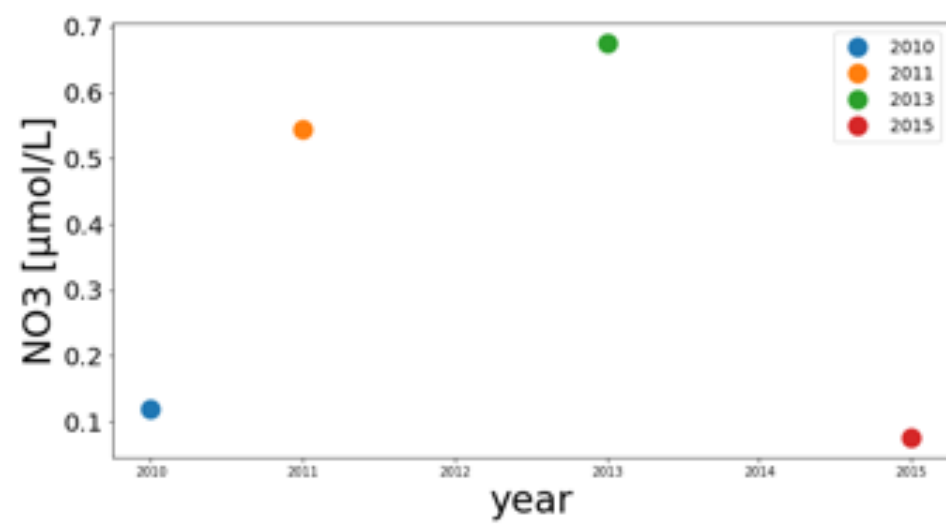


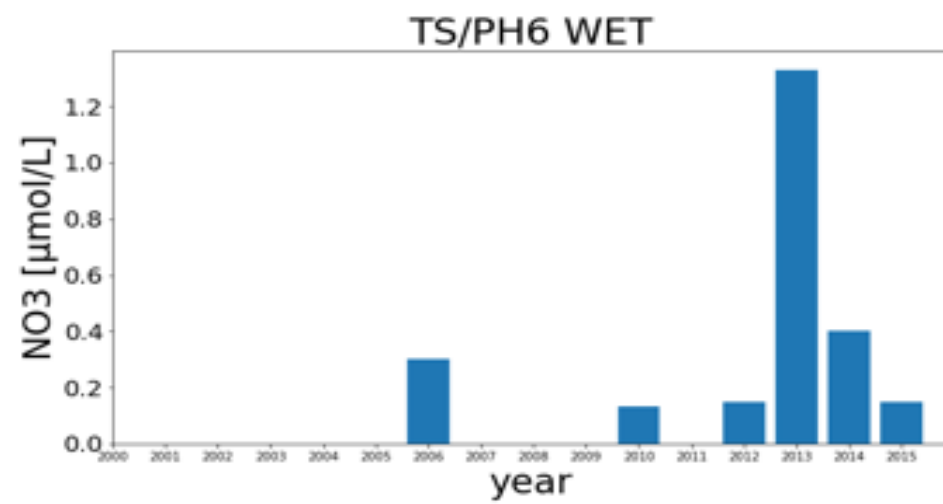
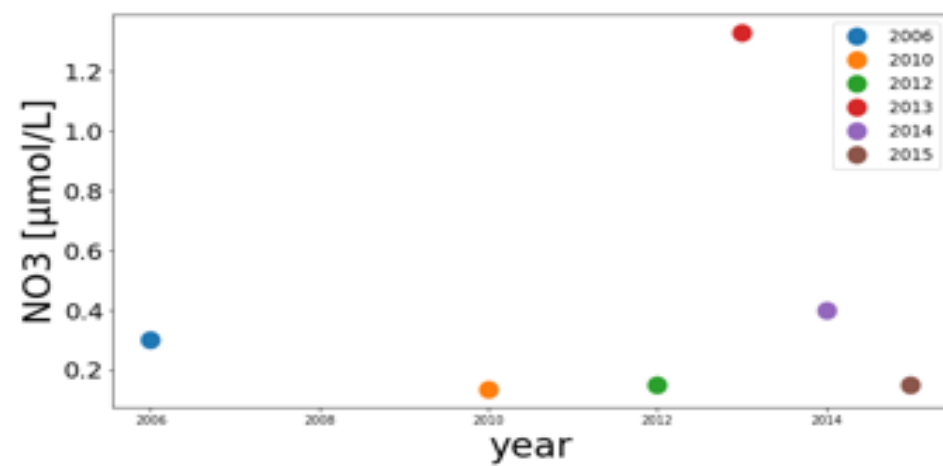






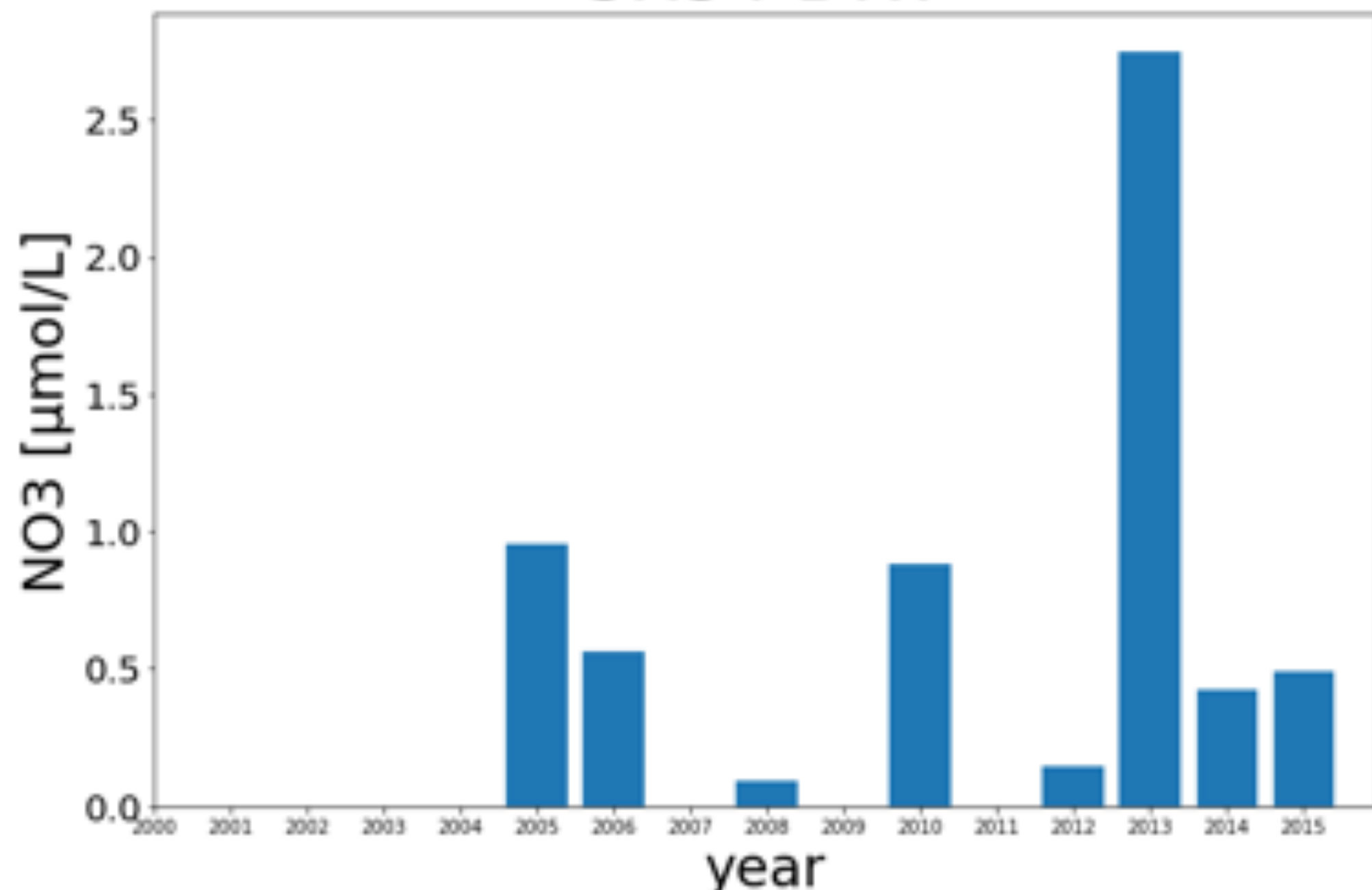








# SRS4 DRY



# CONCLUSION

INORGANIC NUTRIENTS ARE NUTRIENTS SUCH  $\text{PO}_4$  AND  $\text{NO}_3$   
THEY ARE ECOLOGICAL IMPORTANT IN DETERMINING  
THE LEVEL OF BIOLOGICAL PRODUCTIVITY IN AQUATIC ENVIRONMENT  
FROM THE DATA ANALYSED IT COULD BE SEEN THAT NITRATE CONCENTRATIONS  
SPIKED IN THE YEAR 2013 WHICH COULD HAVE A  
DELETERIOUS EFFECT ON THE SYSTEM

# Thank you

## **Data Citation:**

Rivera-Monroy V., E. Castaneda, R. Twilley. 2018. Monitoring of nutrient and sulfide concentrations in porewaters of mangrove forests from the Shark River Slough and Taylor Slough, Everglades National Park (FCE), South Florida from December 2000 to Present. Environmental Data Initiative.

<https://doi.org/10.6073/pasta/035fa41859dfc4541c04e20cadee1b84>.