Learning Objectives:

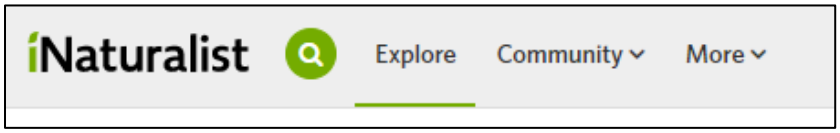
1. Describe key concepts like ecological succession and the intermediate disturbance hypothesis
2. Identify plant species that characterize Florida's wetland and upland habitats
3. Explain how environmental gradients and disturbance patterns influence plant community structure and succession

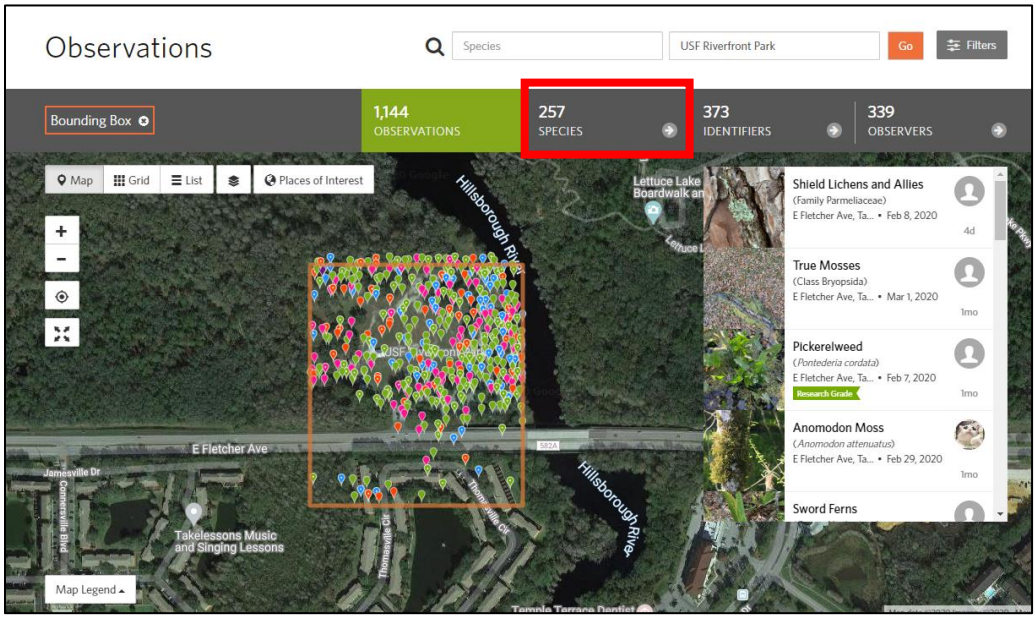
Lab Activities:

This lab has **three** parts. Use the timing guide provided at the heading of each section to help you complete the lab activities during the allotted class time. As always, you will have 72 hours to refine and submit your responses to the questions provided throughout for your post-lab report.

Part I: Introduction to Florida's plant communities (45 minutes)

1. Go to iNaturalist.org, select "Explore" and type USF Riverfront Park into the location search option (the map should zoom to USF Riverfront Park and place a boundary around that area (see the screenshots below).
2. Select the "Species" option at the top of the page.



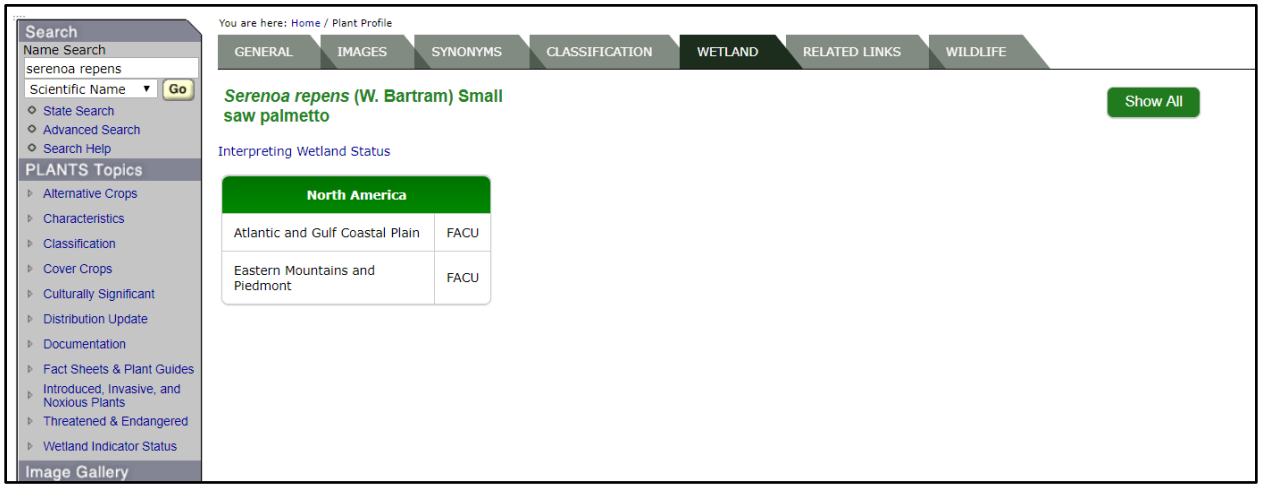


3. Scroll through the list of species and select five wetland (obligate or facultative) and five upland (obligate or facultative) species.
    a. To determine if a plant is upland or wetland, you can review the difference at this website under "Indicator categories" (main page, just scroll down a bit or check out the screenshot below).

b. You can also search within this website by scientific name and under the "Wetland" page, view what type it is.
c. Do **NOT** select any animal species, plants only!

Indicator categories

Indicator Code	Indicator Status	Designation	Comment
OBL	Obligate Wetland	Hydrophyte	Almost always occur in wetlands
FACW	Facultative Wetland	Hydrophyte	Usually occur in wetlands, but may occur in non-wetlands
FAC	Facultative	Hydrophyte	Occur in wetlands and non-wetlands
FACU	Facultative Upland	Nonhydrophyte	Usually occur in non-wetlands, but may occur in wetlands
UPL	Obligate Upland	Nonhydrophyte	Almost never occur in wetlands



4. Fill out the table below (10 pts) and include your selected species common or scientific name, their preferred habitat (based on your research), the number of observations of that species in Riverfront Park, and a picture of the plant from the iNaturalist website.
   a. You should also include a **brief** description. Here are some examples of what to consider: is it a shrub or a tree? A grass, fern, etc.? Does it have flowers? What color are they? Are the leaves round or linear?

5. Include this table in your post-lab report. Don't forget a caption!

Organism name (common or scientific)	**Habitat preferred (upland or wetland)**	**No. observations on iNaturalist**	**Brief description and picture**

QUESTION 1: Which two **plant** species have the highest number of observations in Riverfront Park (1 pt)?

QUESTION 2: Are those species native to any location outside of Florida (**Hint**: select the desired species and scroll down to view the map of the species' range; 1 pt)?

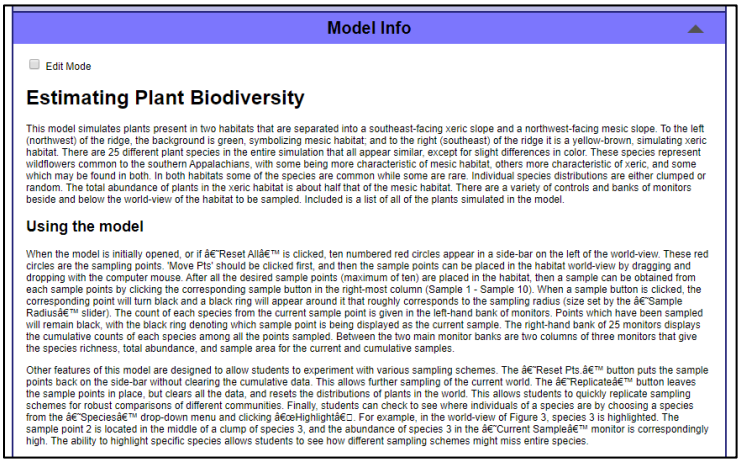
Part II: Types of sampling methods (75 minutes)

1. Go to this website to read about different sampling methods usually completed by ecologists to measure plant communities.
2. Complete the table below based on the above website (3 pts). Include this table in your post-lab report. Don't forget a caption!

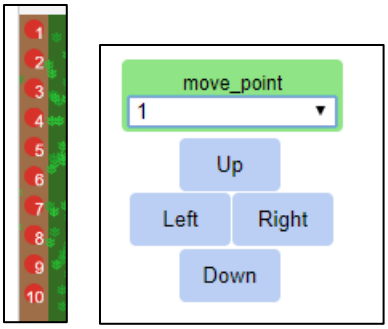
Sampling method	***Random sampling — quadrat sampling***	***Systematic sampling — line transect***	***Systematic sampling — belt transect***
Benefits of this method			
Drawbacks of this method			

QUESTION 3: If you were to sample an upland-to-wetland gradient in USF Riverfront Park, which sampling strategy might you use and why (2 pts).

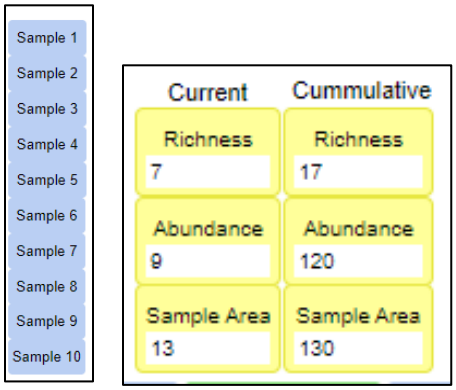
3. Launch this plant simulation. We will now measure plant diversity using some of the sampling methods described above. If you get confused by the following instructions, you can read more about how the model works at the bottom of the screen (see screenshot below).



4. We will start with **random sampling**. Start moving the sampling points (red circles on the left of the screen) by utilizing the up, down, left, and right arrows on the bottom right of the sampling site (see screenshots below). Move all the points (1–10) onto the screen in a "random pattern" (you can decide what is random).



5. Attach a screenshot of your field sampling site to your post-lab report. Don't forget to caption the screenshot.
6. Once you've moved all ten of the sampling points (red circles) on to the sampling site, you can select the "Sample" rectangles lined on the right of the field site. You need to select all of them to turn them "on" (**red circles should turn black**)
7. Note the species richness and abundance values on the bottom of the screen. The "current" window indicates the richness and abundance for only that particular sample (e.g., sample 4). The "cumulative" window indicates the total richness and abundance from that individual sample and all samples taken prior to that one (e.g., the cumulative window for sample 4 would include the species richness and abundances of individuals within sample 4's area as well as samples 1 through 3).



8. Include a screenshot of the current and cumulative windows for **sample 10**. Don't forget to caption the screenshot.
9. Reset your sampling area by selecting the "Reset all" button. Repeat the steps above except this time using a **line transect** sampling method (e.g., place all ten sampling points in a line across a gradient. Be sure to think carefully about what that gradient should be).
10. Attach a **screenshot** of your field sampling site to your post-lab report. Don't forget to caption the screenshot.
11. Include a screenshot of the current and cumulative windows for sample 10. Be sure to turn all your samples on first so that the cumulative window represents all 10 samples. Don't forget to caption the screenshot.

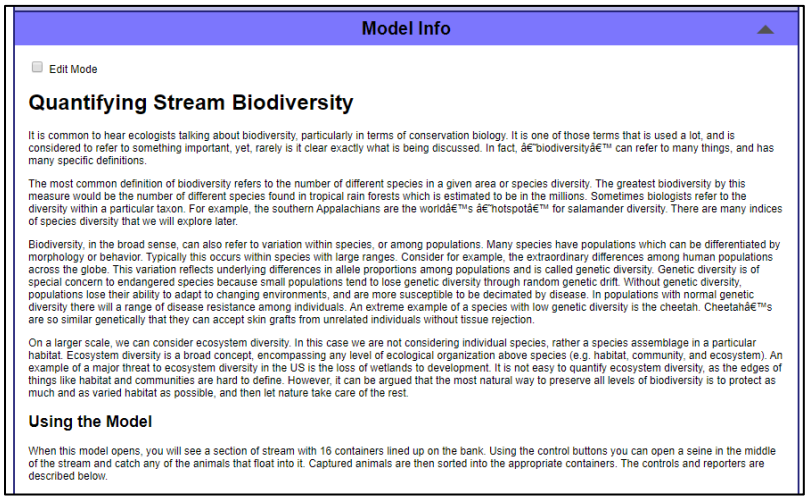
QUESTION 4: Was your first sampling method truly random? Explain why or why not and be sure to reference any relevant screenshots (1 pt).

QUESTION 5: Which sampling method do you think better captured the true diversity of the sampling site? Explain why you selected the method you did and be sure to reference any relevant screenshots (1 pt).

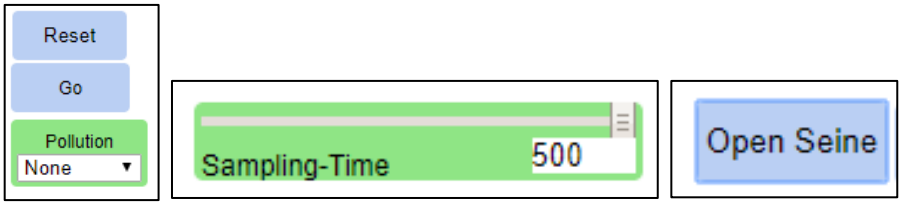
QUESTION 6: How do you think you could make both sampling methods more representative of the actual population of species in the sampling field (2 pts)? You can see where all the species are located if you select each one and click the "Highlight" button below the species richness tables.

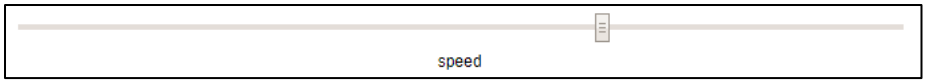
Part III: Influence of disturbance on biodiversity (60 minutes)

1. Launch this stream simulation. We will now measure stream diversity and discover how different levels of disturbance can alter species richness and abundance. Similar to the previous simulation, if you get confused by the following instructions, you can read more about how the model works at the bottom of the screen (figure below).

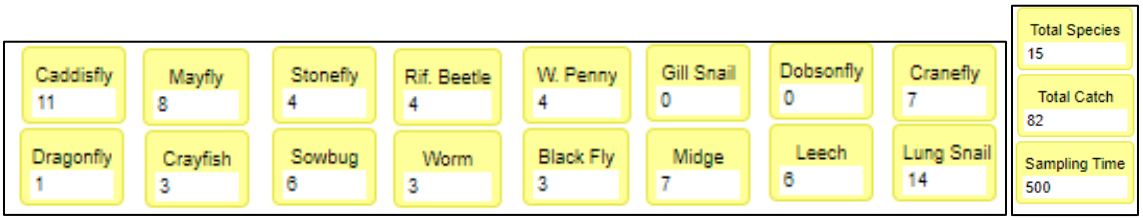


2. Before you start your first simulation, we need to update some of the settings. First, change the pollution level to **none**. Pollution will be our disturbance event, so we'll start with business-as-usual. You should leave your sampling time at 500 but can increase the speed bar at the top to make the time go faster. (**WARNING**: If you increase the speed too much, you may crash your computer!) Next, select the "Open Seine" button as that is the net that will be used to collect individuals from the stream. All set? Press go and watch all the creatures that get caught by your net!





3. Once the simulation is complete, you will have a table similar to the first simulation with your species richness and total abundance (total catch) calculated. You can view the abundance of each species in the boxes to the left of that table.



4. Attach a screenshot of your results to your post-lab report. Don't forget to caption the screenshot.
5. Run the simulation again, except this time change the pollution level to **moderate**. Do not change any other settings. Hit the reset button to release your captured organisms back into the stream and then press go!
6. Attach a screenshot of your results to your post-lab report. Don't forget to caption the screenshot.
7. Run the simulation one last time with the pollution level now set to **severe**.
8. Attach a screenshot of your results to your post-lab report. Don't forget to caption the screenshot.

QUESTION 7: Which simulation had the highest number species richness? What about abundance? Be sure to reference any relevant screenshots (1 pts)

QUESTION 8: Review the composition of species for each simulation. Were there one or two dominant species in any of the simulations (e.g., a species that had a much higher abundance than the other species)? Did those dominant species change between simulations? Explain your response and be sure to reference any relevant screenshots (3 pts).

QUESTION 9: Which simulation do you think had the highest diversity? Remember from your reading that biodiversity accounts for both species richness **AND** evenness. Explain your response and be sure to reference any relevant screenshots (3 pts).

QUESTION 10: Does your response to question nine support the intermediate disturbance hypothesis? Explain your response and be sure to reference any relevant screenshots (2 pts).

Post-Lab Report Submission Instructions

As you work through the online activities and simulations, complete questions 1-10 and submit your responses as a PDF file. You will also need to include all the requested screenshots and tables you filled out throughout the lab. There are no thought questions for you to complete. Title your file "LastName_CommunityEcology" and upload here. Each question or table has an allotted point value.