# Macrosystems EDDIE:
# Getting Started + Troubleshooting Tips

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Macrosystems EDDIE: Understanding Uncertainty in Ecological Forecasts.
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Macrosystems EDDIE
*Environmental Data-Driven Inquiry & Exploration in Macrosystems Ecology*

NSF | neon Operated by Battelle

SERC the Science Education Resource Center at Carleton College

# R Shiny Applications

- Statistical environment

- Interactive web app built using R.
  - Allows users to interact with data
  - Conduct their own analysis

**Check-in:**

- Can you access the Shiny app or this module?
  - Copy and paste this link into your browser: https://macrosystemseddie.shinyapps.io/module6/
  - If this is not working contact us at MacrosystemsEDDIE@gmail.com and we will help you resolve this issue.

# Landing Page of the Shiny App

**Teaching materials associated with this module can be found at http://module6.macrosystemseddie.org.**

Module 6: Understanding Uncertainty in Ecological Forecasts | Overview | Presentation | Introduction | Activity A | Activity B | Activity C

Bookmark my progress

*At any time, use this button to obtain a link that saves your progress.*

Help

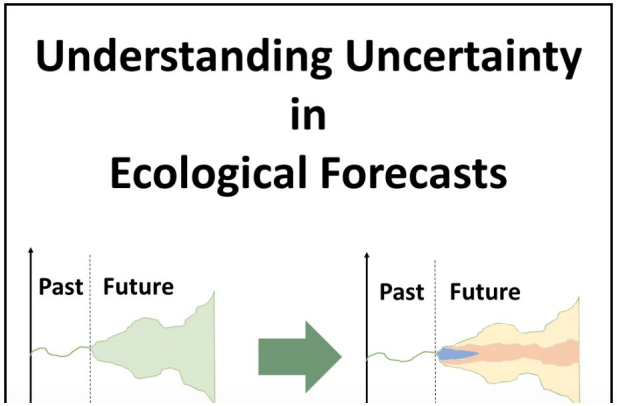
eddie
environmental data-driven inquiry & exploration

## Understanding Uncertainty in Ecological Forecasts

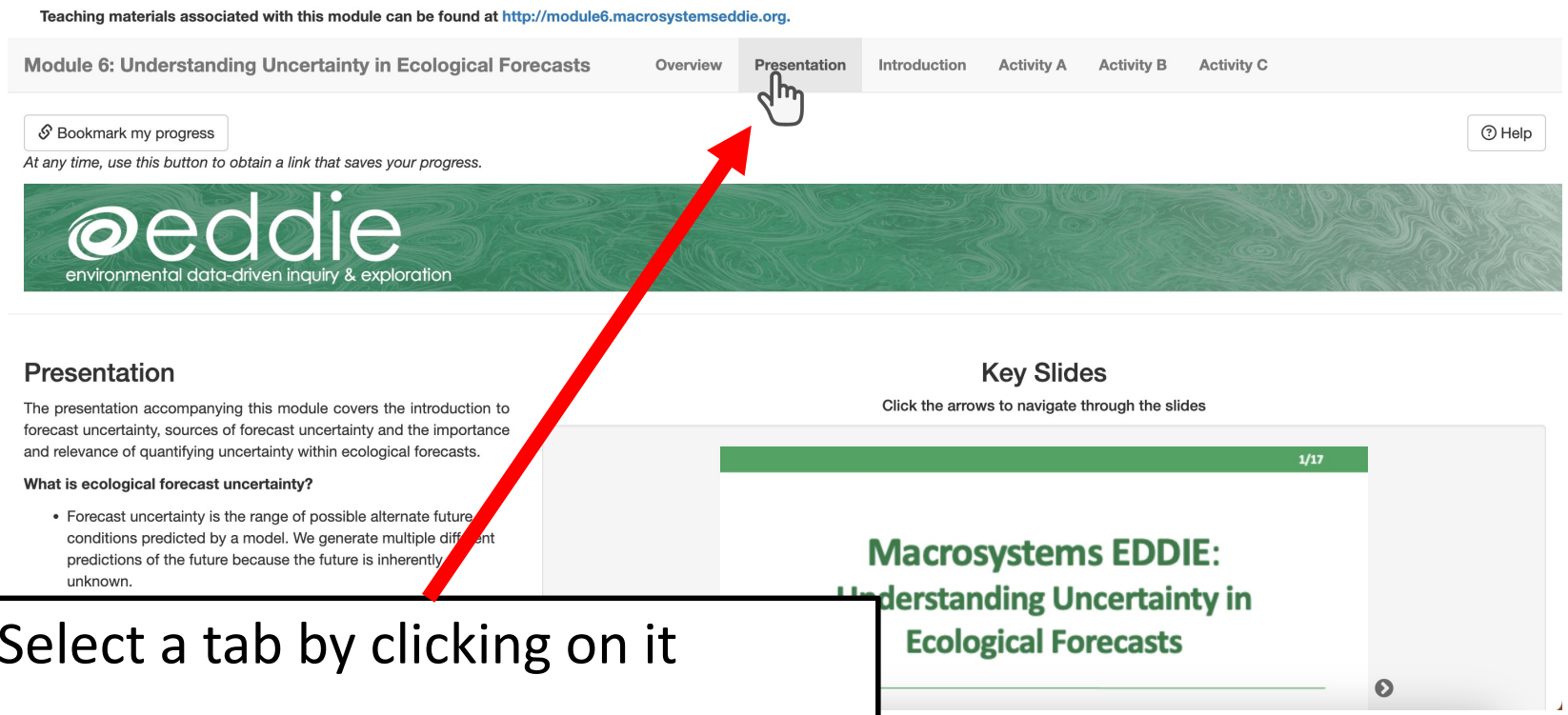
### Summary

Ecological forecasting is an emerging approach which provides an estimate of the future state of an ecological system with uncertainty, allowing society to prepare for changes in important ecosystem services. Forecast uncertainty is derived from multiple sources, including an ecological model's structure parameters, model input (driver) data, and uncertainty in the current, or initial, conditions in an ecosystem. Knowing the uncertainty associated with a forecast enables forecast users to evaluate the forecast and make more informed decisions. There are a number of approaches that forecasters can use to reduce uncertainty, including improving the structure of a model, collecting additional data, and improving the accuracy of environmental sensors and forecasts of model input (driver) variables.

This module will guide you through an exploration of the sources of uncertainty within an ecological forecast, how uncertainty can be quantified, and steps which can be taken to reduce the uncertainty in a forecast you



# Navigating the Shiny App




Select a tab by clicking on it

# Navigate slides

Advance slides by clicking on the arrows

## Presentation

The presentation accompanying this module covers the introduction to forecast uncertainty, sources of forecast uncertainty and the importance and relevance of quantifying uncertainty within ecological forecasts.

**What is ecological forecast uncertainty?**

- Forecast uncertainty is the range of possible alternate future conditions predicted by a model. We generate multiple different predictions of the future because the future is inherently unknown.

**Where does ecological forecast uncertainty come from?**

- Uncertainty comes from natural variability in the environment and imperfect representation of an ecological system in a model. When generating a forecast, uncertainty can come from the **structure** of the model used, the **initial conditions** of the model, the **parameters** of the model, and the **data** used to drive the model, among other sources.

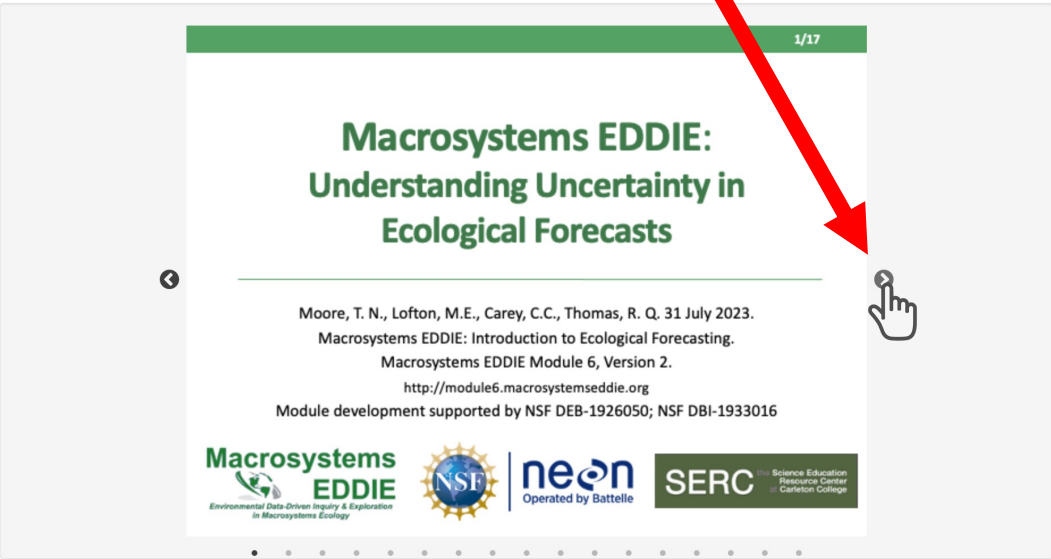
**Why is uncertainty important to quantify for an ecological forecast?**

- Knowing the uncertainty in a forecast allows forecast users to make informed decisions based on the range of forecasted outcomes and prepare accordingly.

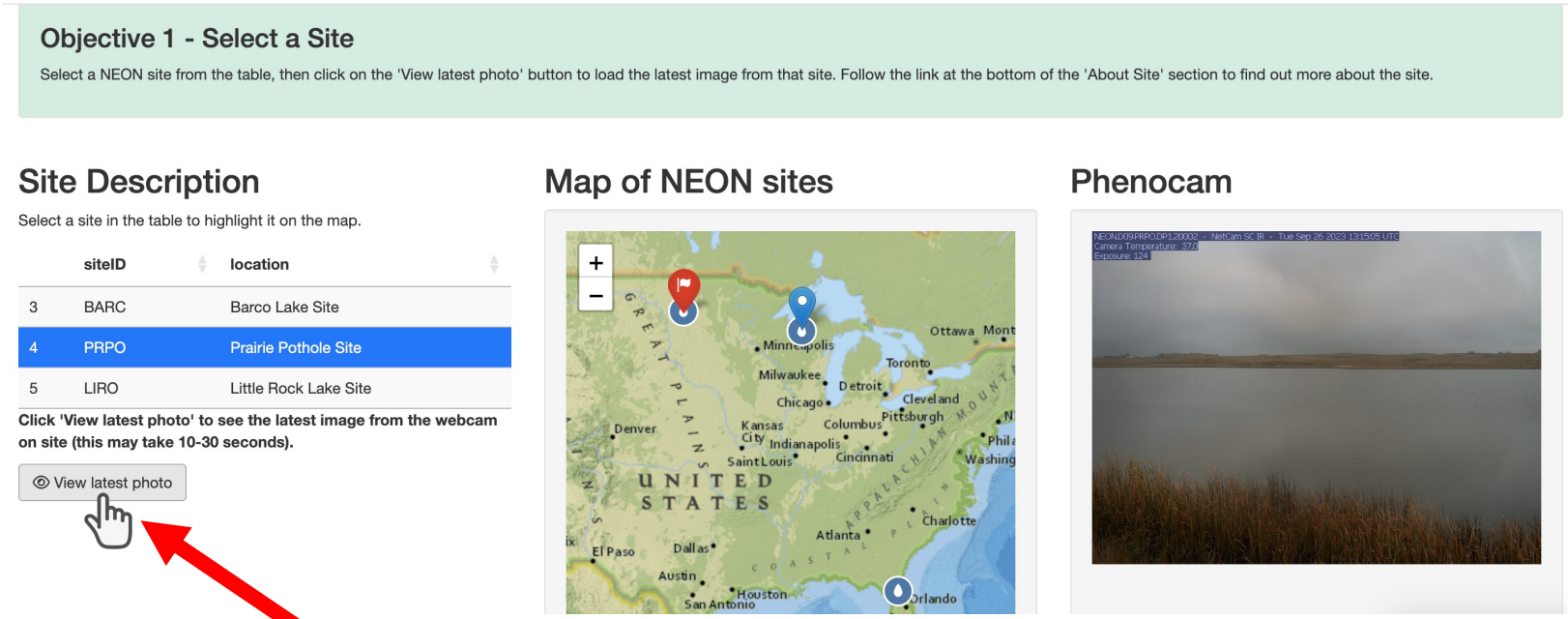
Click through the slides to recap some of the main points from the lecture.

## Key Slides

Click the arrows to navigate through the slides



# Interact with app




Select data table rows and click buttons

# Interact with plots

**Nice work! You've fit four models!**

## Question

**Q18. Assess the model fits.**

*a. Click 'Download plot' to download the timeseries of all model predictions and water temperature observations and copy-paste it into your report.*

*b. Which model do you think will produce the best forecasts of water temperature? Why?*


Hover cursor over points or click and drag to zoom in

Hover cursor over plot to bring up options

# Saving plots

**Nice work! You've fit four models!**

## Question

**Q18. Assess the model fits.**

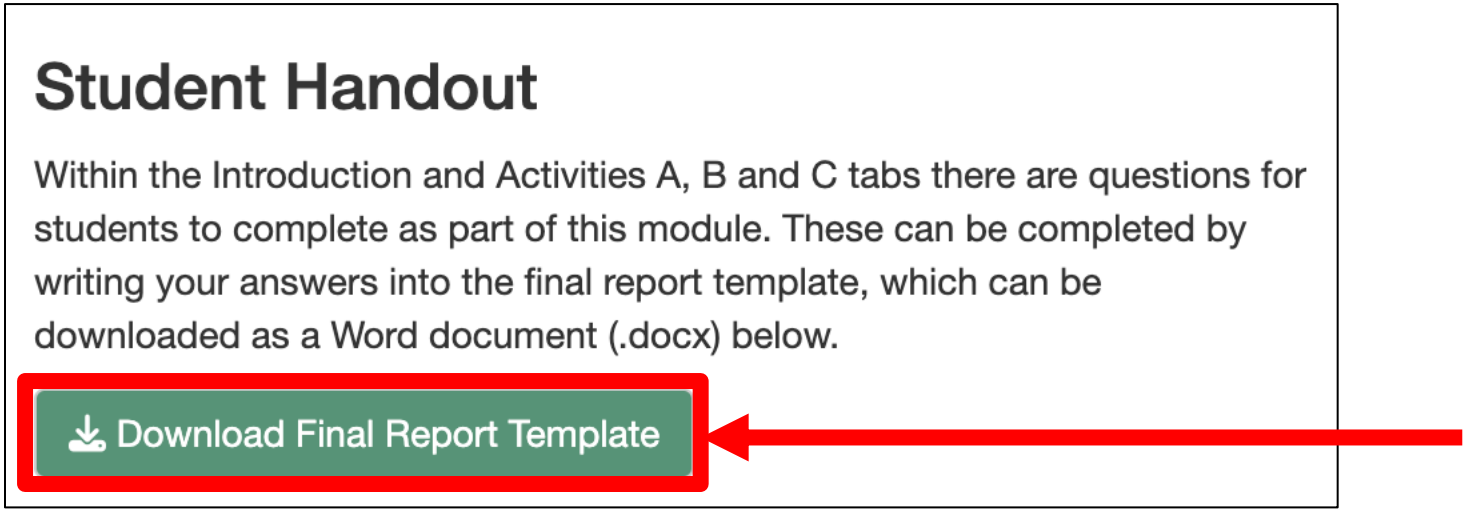
*a. Click 'Download plot' to download the timeseries of all model predictions and water temperature observations and copy-paste it into your report.*

*b. Which model do you think will produce the best forecasts of water temperature? Why?*


Download plots to copy-paste into your final report

# Downloading the Report

1. Navigate to the “Introduction” tab
2. Click on the “Download Final Report Template” button to download a Word document into which you can type your answers.



# Answer questions

Type your answers into the final report template

## Objective 8: Driver Uncertainty

Explore how driver uncertainty affects the different models when forecasting water temperature.

34. Assess the contribution of driver uncertainty across models.

    a. Click 'Download plot' to download the plot of forecasts with driver uncertainty and copy-paste it into your report.

    *Please copy-paste your Q-34a-plot.png image here.*

    *Figure 12. Water temperature forecasts with driver uncertainty for your selected NEON lake.*

    b. Why do only two of the models exhibit driver uncertainty in their water temperature forecasts?

    **Answer:**

35. You have learned that driver uncertainty arises because we cannot perfectly know what the future values of our model inputs will be. Knowing this, describe one way that you think driver uncertainty in our water temperature forecasts could be reduced.

    **Answer:**

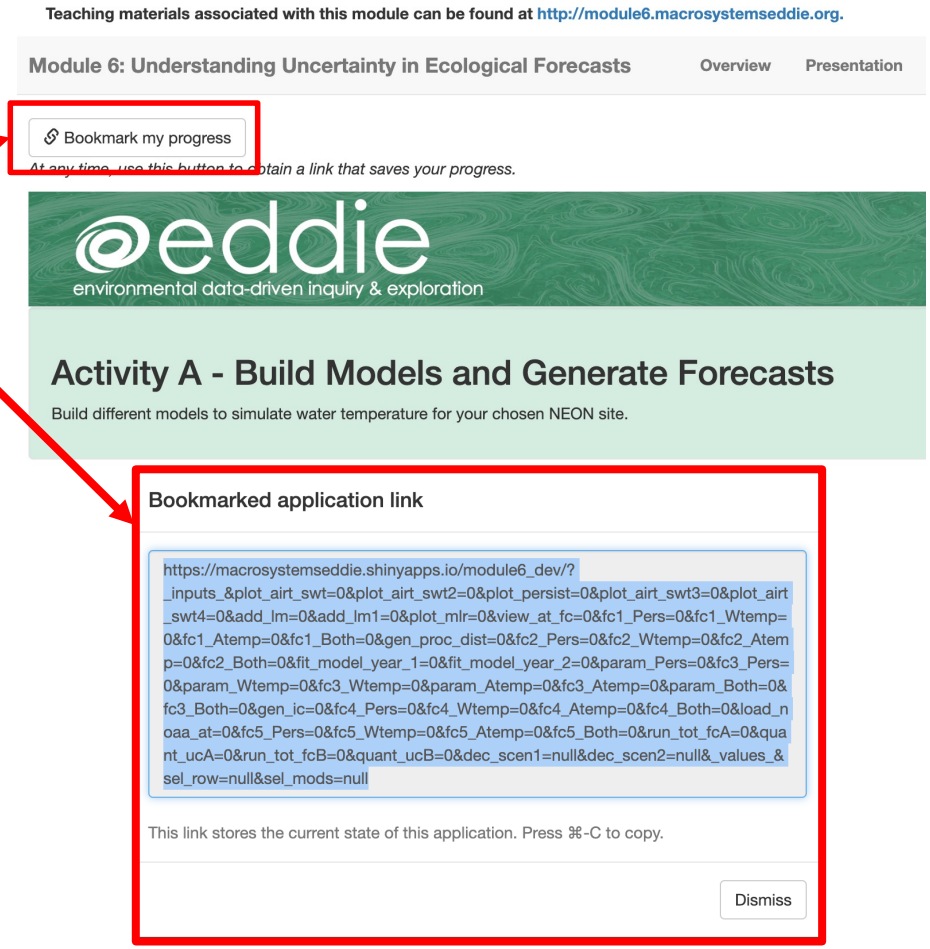
# Saving & Resuming Progress

## Saving Progress

1. Scroll to top of the page.
2. Click on the “Bookmark my progress” button. A pop-up window with a *very long link* will appear.
3. Copy-paste the link and store it at the top of your final report.

## Resuming progress

1. Open your browser.
2. Copy-paste the link into your browser.
3. As you navigate through the tabs in the module, your progress will reappear.



# We recommend that you save your progress often!

- Because the Shiny app can time out after inactivity (15 minutes) or disconnect if an internet connection is interrupted, we don’t want you to lose your work.

- Save your progress as you go, as well as every time you close your computer or close the Shiny app in your internet browser.

- After you save the link somewhere safe, you should be able to resume your progress where you left off!