Macrosystems EDDIE:
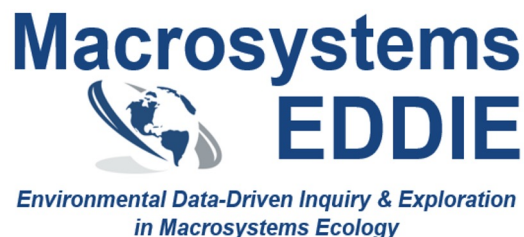# Getting Started + Troubleshooting Tips

Moore, T. N., Lofton, M.E., Carey, C.C., Thomas, R. Q. 03 July 2023.

Macrosystems EDDIE: Introduction to Ecological Forecasting.

Macrosystems EDDIE Module 5, Version 2.

http://module5.macrosystemseddie.org

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/module5/
  - 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://module5.macrosystemseddie.org.**

Module 5: Introduction to Ecological Forecasting | **Module Overview** | Presentation | Introduction | Activity A | Activity B | Activity C

🔗 Bookmark my progress

? Help

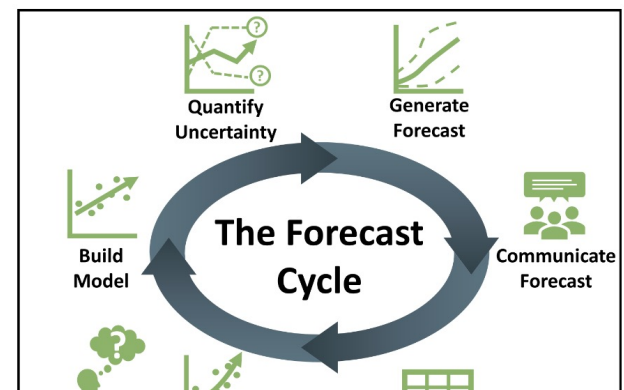*At any time, use this button to obtain a link that saves your progress.*

Introduction to Ecological Forecasting

Summary

Ecological forecasting is a tool that can be used for understanding and predicting changes in populations, communities, and ecosystems. 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. Ecological forecasters develop and update forecasts using the iterative forecasting cycle, in which they make a hypothesis of how an ecological system works; embed their hypothesis in a model; and use the model to make a forecast of future conditions. When observations become available, they can assess the accuracy of their forecast, which indicates if their hypothesis is supported or needs to be updated before the next forecast is generated.

In this module, students will apply the iterative forecasting cycle to develop an ecological forecast for a National Ecological Observation Network (NEON) site. Students will use NEON data to build an ecological model that predicts primary productivity in an aquatic ecosystem. Using their calibrated

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 provides an introduction to ecological forecasting, the steps in the iterative forecast cycle, and the ecological data and models used in this module.

What is a forecast?

- A forecast is a prediction of future conditions with uncertainty.

Why do we forecast?

- We forecast because it help us to make decisions and the information is used to plan for the future.

How do we generate a forecast?

- This module will guide you through the key steps within the forecast cycle and explain how we create ecological forecasts.

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

Key Slides

Click the arrows to navigate through the slides

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Module development supported by NSF DEB-1926050; NSF DBI-1933016

Interact with app

Select data table rows and click buttons

Interact with plots
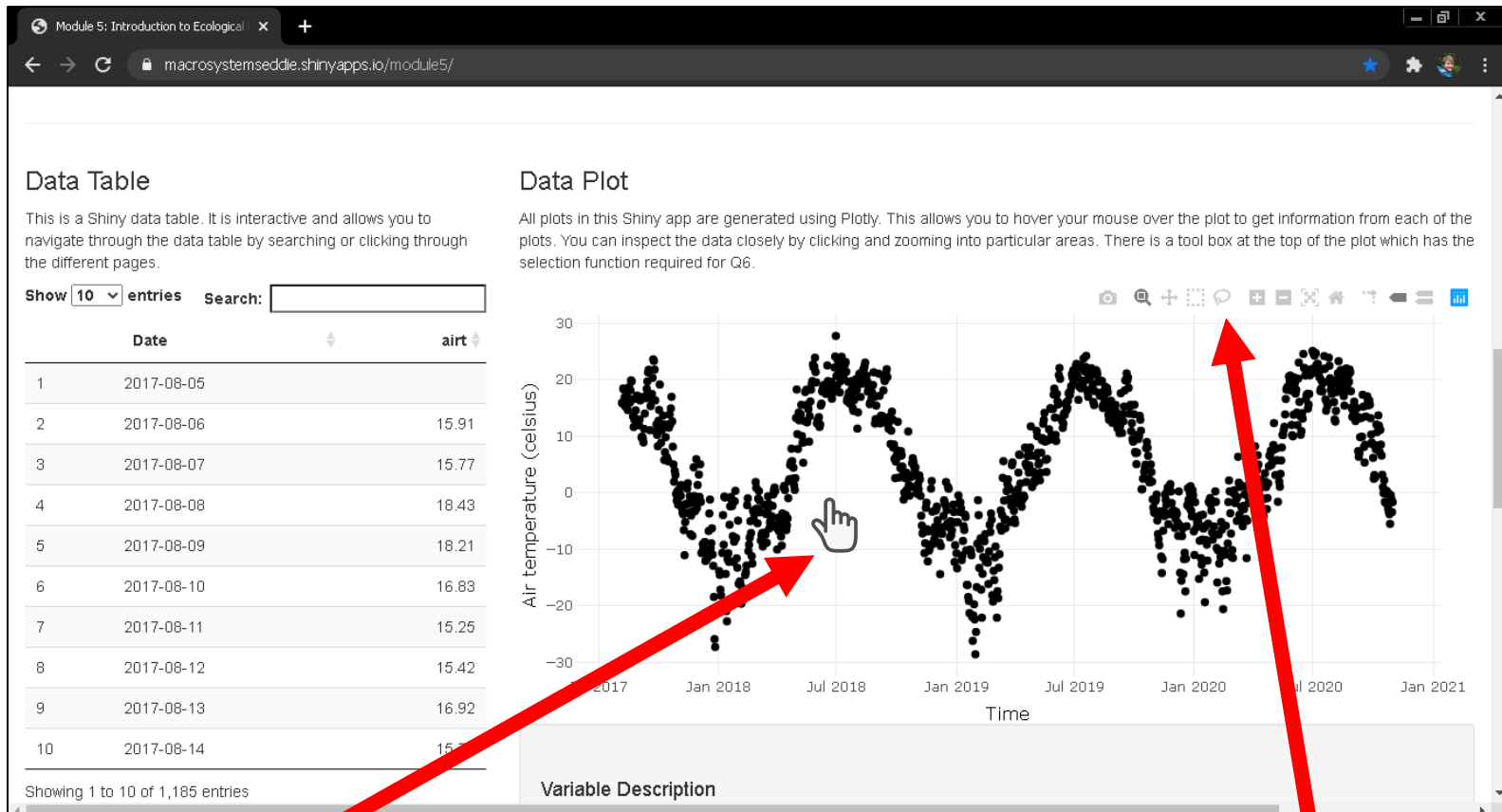
Hover cursor over points or click and drag to zoom in

Hover cursor over plot to bring up options

Saving plots

Calibrate Model

Now that we have explored the effects of initial conditions and parameters on your model, use the sliders below to obtain as good a calibration as possible to sensor observations.

When you have achieved an acceptable model fit, click 'Save model settings' to save your initial conditions and parameters for use in generating a forecast. Then, click 'Download plot' to download a plot of your best-fitting model for inclusion in your final report.

Initial conditions

Phytoplankton (ug/L)

0.38   10

0.01 1.01 2.01 3.01 4.01 5.01 6.01 7.01 8.01 9.01 10

Parameters

Mortality

Lower death   *Higher death*

0   0.71   1

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
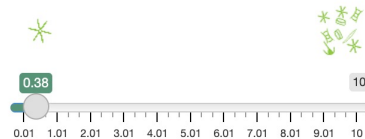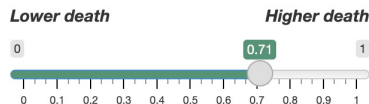
Maximum growth rate

Low growth   *High growth*

Primary Productivity
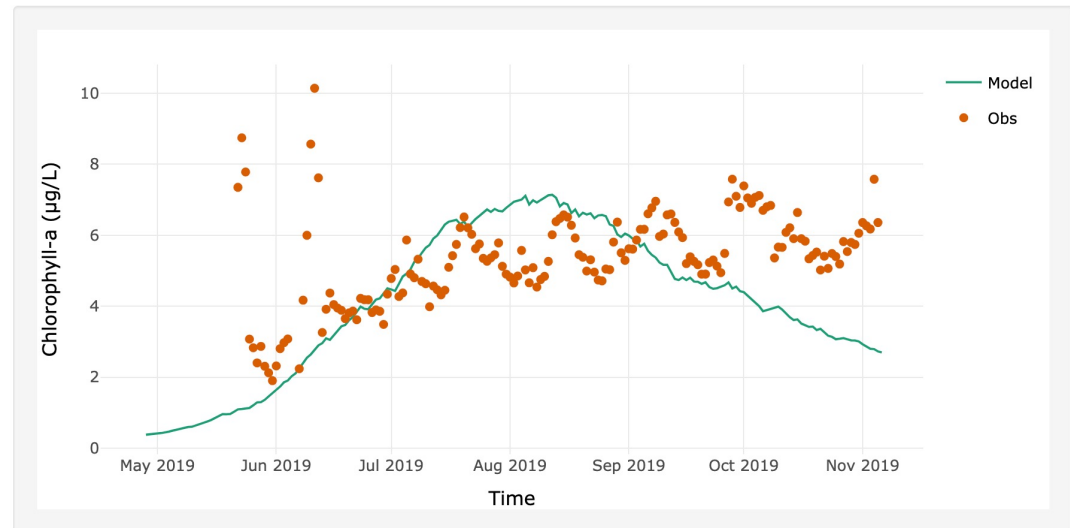
Add observations

☑ Add observations to the plots

⬇ Save plot

Model Settings

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.

Student Handout

Within the Introduction and Activities A, B and C tabs there are questions for students to complete as part of this module. These can be completed by writing your answers into the final report template, which can be downloaded as a Word document (.docx) below.

⬇ Download Final Report Template

Answer questions

Objective 9: Communicate forecast

Forecasts that are effectively communicated to the public and managers will be most useful for aiding decision-making. Here you will think about how to communicate your forecast to an end user.

20. How would you describe your forecast of primary productivity at your NEON site so it could be understood by a fellow classmate?

    Answer:

21. Examine the example forecast visualizations below.

    a. Which of these visualizations do you think most effectively communicates your forecast, and why?

       Answer:

    b. Download and copy-paste the visualization that you think best communicates your forecast into your final report.

       Answer:

       Please copy-paste your Q-21-visualization.png image here.

       Figure 4. A visualization of an ecological forecast for primary productivity at your selected NEON lake for the next 30 days. You selected this visualization to optimize forecast communication.

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.
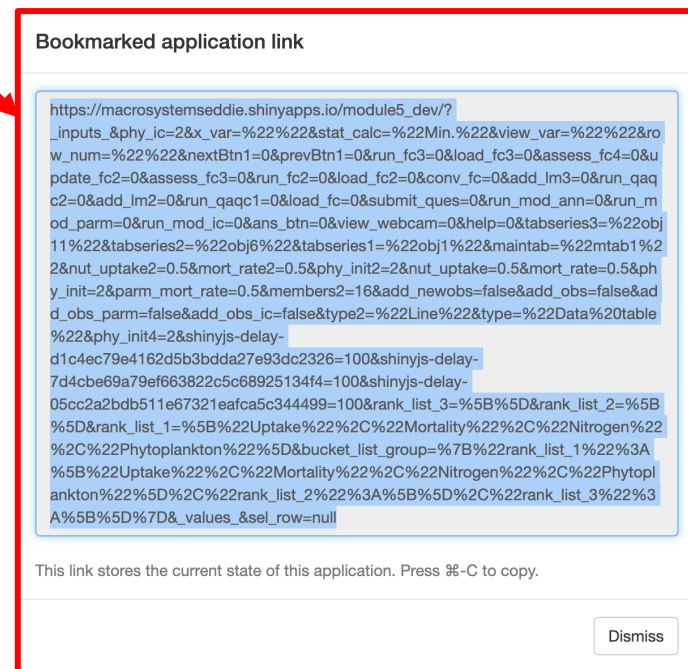3. Copy-paste the link and store it at the top of your final report.

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.

Teaching materials associated with this module can be found at http://module5.macrosystemseddie.org.

Module 5: Introduction to Ecological Forecasting Module Overview Presentation Introduct

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

⊘eddie
environmental data-driven inquiry & exploration

Introduction to Ecological Forecasting

Bookmarked application link

https://macrosystemseddie.shinyapps.io/module5_dev/?_inputs_&phy_ic=2&x_var=%22%22&stat_calc=%22Min.%22&view_var=%22%22&row_num=%22%22&nextBtn1=0&prevBtn1=0&run_fc3=0&load_fc3=0&assess_fc4=0&update_fc2=0&assess_fc3=0&run_fc2=0&load_fc2=0&conv_fc=0&add_lm3=0&run_qaqc2=0&add_lm2=0&run_qaqc1=0&load_fc=0&submit_ques=0&run_mod_ann=0&run_mod_parm=0&run_mod_ic=0&ans_btn=0&view_webcam=0&help=0&tabseries3=%22obj11%22&tabseries2=%22obj6%22&tabseries1=%22obj1%22&maintab=%22mtab1%22&nut_uptake2=0.5&mort_rate2=0.5&phy_init2=2&nut_uptake=0.5&mort_rate=0.5&phy_init=2&parm_mort_rate=0.5&members2=16&add_newobs=false&add_obs=false&add_obs_parm=false&add_obs_ic=false&type2=%22Line%22&type=%22Data%20table%22&phy_init4=2&shinyjs-delay-d1c4ec79e4162d5b3bdda27e93dc2326=100&shinyjs-delay-7d4cbe69a79ef663822c5c68925134f4=100&shinyjs-delay-05cc2a2bdb511e67321eafca5c344499=100&rank_list_3=%5B%5D&rank_list_2=%5B%5D&rank_list_1=%5B%22Uptake%22%2C%22Mortality%22%2C%22Nitrogen%22%2C%22Phytoplankton%22%5D&bucket_list_group=%7B%22rank_list_1%22%3A%5B%22Uptake%22%2C%22Mortality%22%2C%22Nitrogen%22%2C%22Phytoplankton%22%5D%2C%22rank_list_2%22%3A%5B%5D%2C%22rank_list_3%22%3A%5B%5D%7D&_values_&sel_row=null

This link stores the current state of this application. Press ⌘-C to copy.

Dismiss

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!