COASTAL AND MARINE LAB - FSUCML

Web-based tools to explore the stakeholder decision-making process

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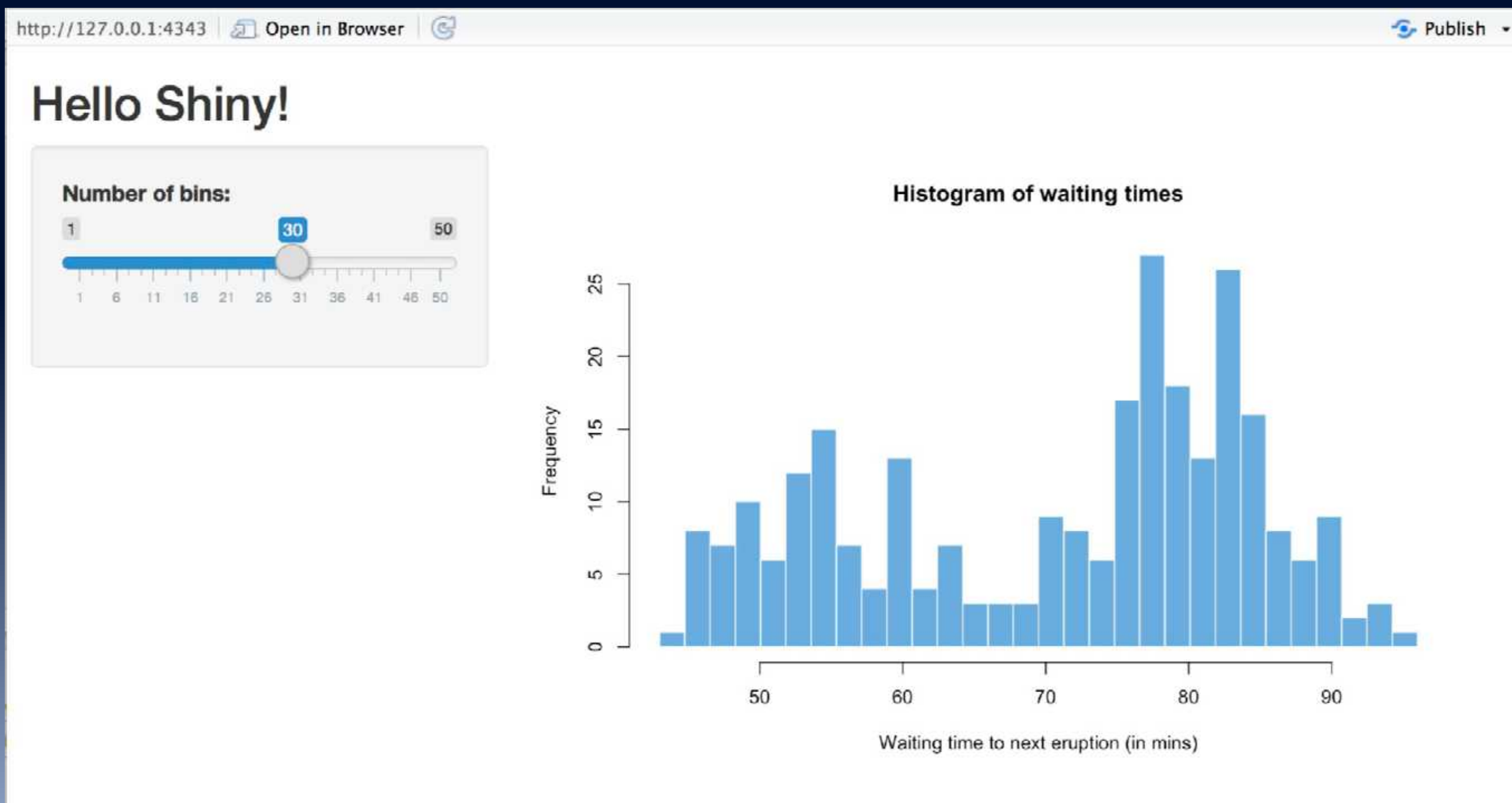
Presentation Overview

1) What's Shiny App?
2) Examples
3) Pros (Benefits)
4) Oyster Decision-Support Tool
5) Next Steps

Shiny
by RStudio

Web-based tool



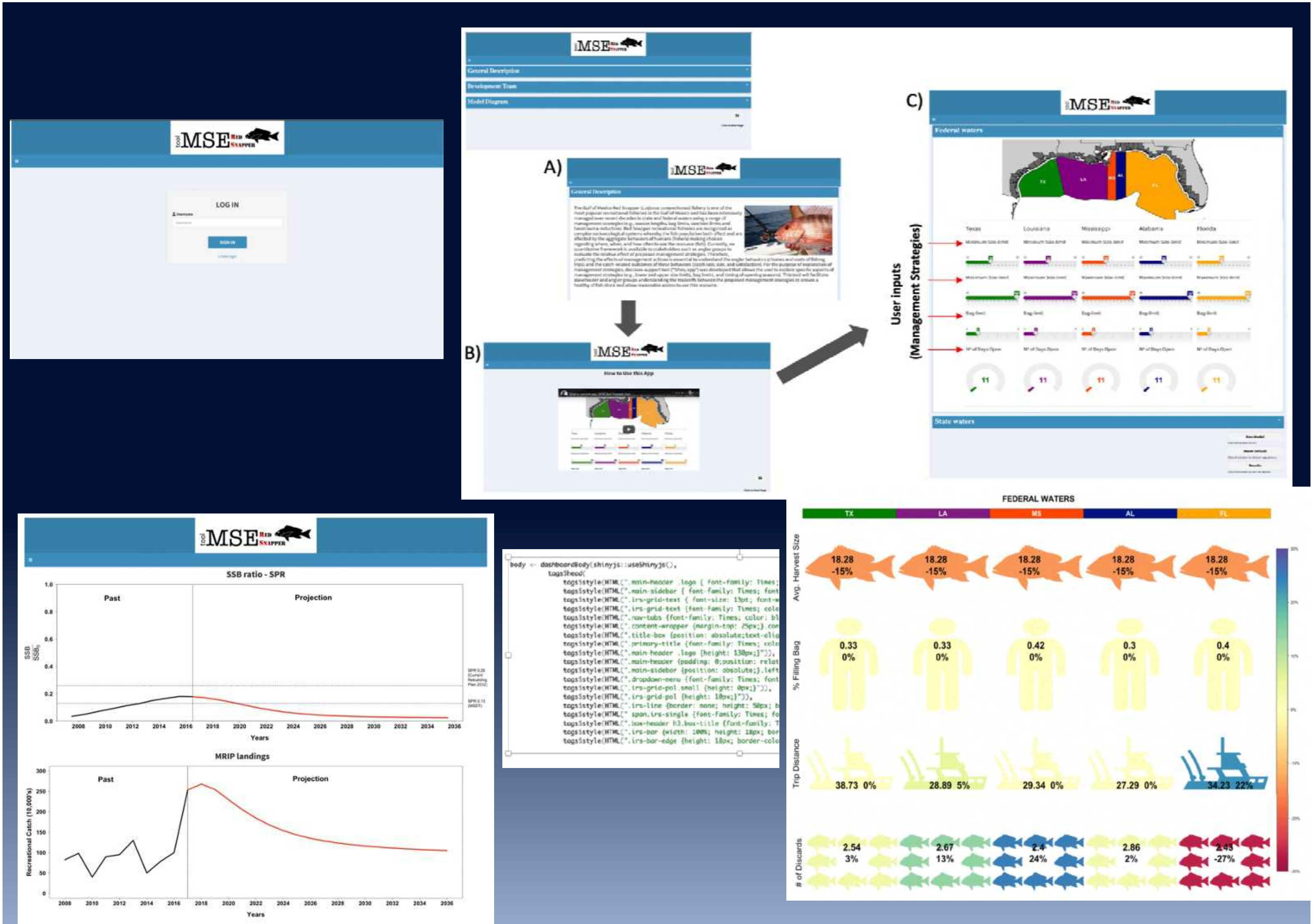
https://shiny.rstudio.com/

Structure

```r
# Define UI
ui <- fluidPage(theme = shinytheme("lumen"),
  titlePanel("Google Trend Index"),
  sidebarLayout(
    sidebarPanel(

      # Select type of trend to plot
      selectInput(inputId = "type", label = strong("Trend index"),
                  choices = unique(trend_data$type),
                  selected = "Travel"),

      # Select date range to be plotted
      dateRangeInput("date", strong("Date range"), start = "2007-01-01", end = "2017-07
                     min = "2007-01-01", max = "2017-07-31"),

      # Select whether to overlay smooth trend line
      checkboxInput(inputId = "smoother", label = strong("Overlay smooth trend line"),

      # Display only if the smoother is checked
      conditionalPanel(condition = "input.smoother == true",
                       sliderInput(inputId = "f", label = "Smoother span:",
                                   min = 0.01, max = 1, value = 0.67, step = 0.01,
                                   animate = animationOptions(interval = 100)),
                       HTML("Higher values give more smoothness.")
      )
    ),

    # Output: Description, lineplot, and reference
    mainPanel(
      plotOutput(outputId = "lineplot", height = "300px"),
      textOutput(outputId = "desc"),
      tags$a(href = "https://www.google.com/finance/domestic_trends", "Source: Google D
    )
  )
)
```

```r
# Define server function
server <- function(input, output) {

  # Subset data
  selected_trends <- reactive({
    req(input$date)
    validate(need(!is.na(input$date[1]) & !is.na(input$date[2]), "Error: Please provide
    validate(need(input$date[1] < input$date[2], "Error: Start date should be earlier t
    trend_data %>%
      filter(
        type == input$type,
        date > as.POSIXct(input$date[1]) & date < as.POSIXct(input$date[2]
        ))
  })


  # Create scatterplot object the plotOutput function is expecting
  output$lineplot <- renderPlot({
    color = "#434343"
    par(mar = c(4, 4, 1, 1))
    plot(x = selected_trends()$date, y = selected_trends()$close, type = "l",
         xlab = "Date", ylab = "Trend index", col = color, fg = color, col.lab = color,
    # Display only if smoother is checked
    if(input$smoother){
      smooth_curve <- lowess(x = as.numeric(selected_trends()$date), y = selected_trend
      lines(smooth_curve, col = "#E6553A", lwd = 3)
    }
  })

  # Pull in description of trend
  output$desc <- renderText({
    trend_text <- filter(trend_description, type == input$type) %>% pull(text)
    paste(trend_text, "The index is set to 1.0 on January 1, 2004 and is calculated onl
  })
}

# Create Shiny object
shinyApp(ui = ui, server = server)
```

Management Decision Support Tool



https://fcaltabellotta.shinyapps.io/RS_MSE_DecisionTool/?_ga=2.239803716.651583100.1

```r
##################################################################################

# Do Projection

observeEvent(input$doShiny,{

  theta <- list()
  theta$nsim <- 20
  theta$DO.st <- c(input$FL_DO_st,input$AL_DO_st,input$MS_DO_st,input$LA_DO_st,input$TX_DO_st)
  theta$DO.fed <- c(input$FL_DO_fed,input$AL_DO_fed,input$MS_DO_fed,input$LA_DO_fed,input$TX_DO_fed)
  ON <- input$effort.tracking_on
  theta$LSL.st <- c(input$FL_LSL_st,input$AL_LSL_st,input$MS_LSL_st,input$LA_LSL_st,input$TX_LSL_st)
  theta$LSL.fed <- c(input$FL_LSL_fed,input$AL_LSL_fed,input$MS_LSL_fed,input$LA_LSL_fed,input$TX_LSL_fed)
  theta$USL.st <- c(input$FL_USL_st,input$AL_USL_st,input$MS_USL_st,input$LA_USL_st,input$TX_USL_st)
  theta$USL.fed <- c(input$FL_USL_fed,input$AL_USL_fed,input$MS_USL_fed,input$LA_USL_fed,input$TX_USL_fed)
  theta$BL.st <- c(input$FL_BL_st,input$AL_BL_st,input$MS_BL_st,input$LA_BL_st,input$TX_BL_st)
  theta$BL.fed <- c(input$FL_BL_fed,input$AL_BL_fed,input$MS_BL_fed,input$LA_BL_fed,input$TX_BL_fed)

  withProgress(message = 'Calculation in progress', {
    for(i in 1:N){

      # Long Running Task
      Sys.sleep(0.20)

      # Update progress
      incProgress(1/N)
    }
    options(warn=-1)
    OM <- Full_OM_model(theta)
  })

  ##################################################################################
```

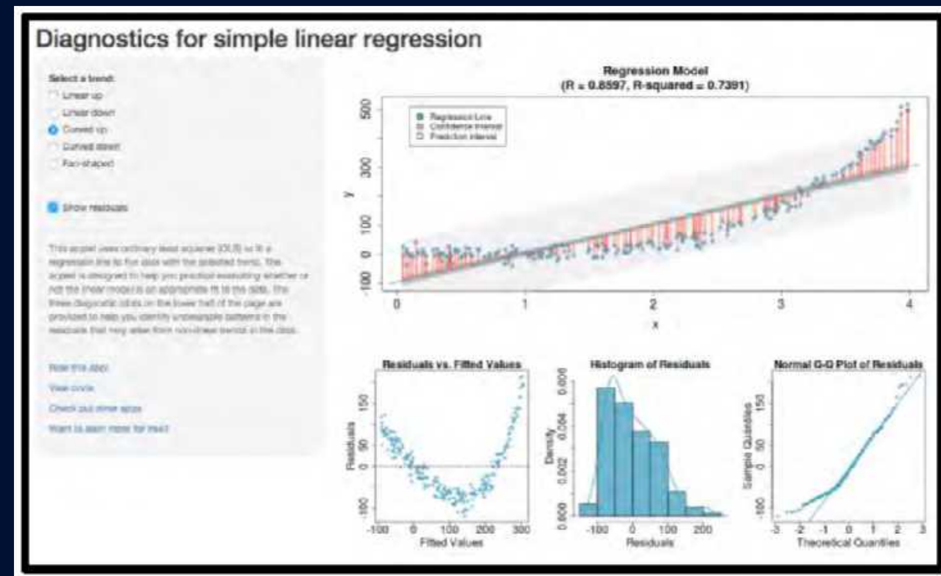
~ 500 lines of code

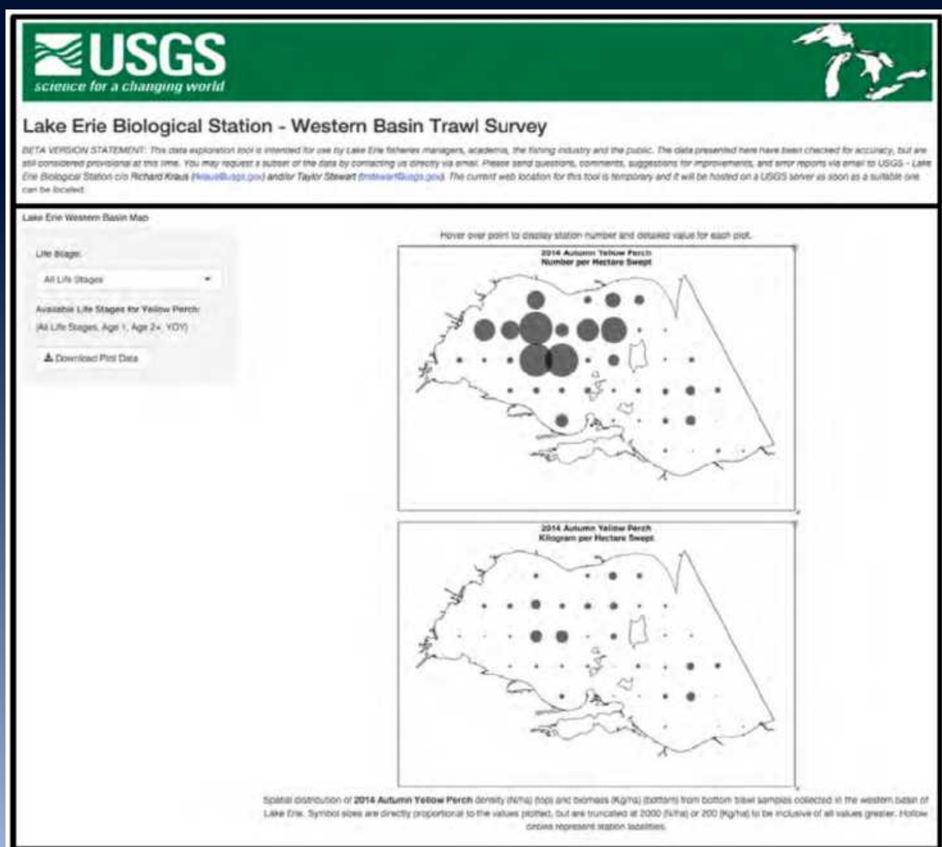
```r
Full_OM_model <- function(theta){
  ###---------------------------------------------------
  #        Parameterization
  ###---------------------------------------------------

  #-------
  # MRIP/R_Clsd EFFORT ALLOCATION
  #### MRIP.wt.fun takes arguments hab.fac, dist.wt, and power to control the gravity weights of the MRIP/R_Clsd fleet

  #MRIP and R_Clsd are conditioned on Trips (Effort) and use q to convert Effort to F. Needs a knob to increase or decrease effort as a function of days open

  #-------
  # KNOBS TO ADJUST EFFORT

    days_open_df <- data.frame(Area = rep(c("Federal","State"),5),
                               State=rep(c("Florida","Alabama","Mississippi","Louisiana","Texas"),each=2),
                               Days_open=NA)
    # fed_days is a knob for adjusting the federal days. It can either be one value to set all federal waters or can be a vector in order of FL, AL, MS, LA, TX to set a different number of days per state. If it is not set it is set at 2016 federal days open (11 days)
    days_open_df$Days_open[days_open_df$Area=="Federal"] <- theta$DO.fed
    # state_days is a knob for adjusting the state days. It can either be one value to set all state waters or can be a vector in order of FL, AL, MS, LA, TX to set a different number of days per state. If it is not set it is set at 2016 state days open (85, 66, 102, 272, 365 days)
    days_open_df$Days_open[days_open_df$Area=="State"] <- theta$DO.st

    #tack on to the effort and q
    rec_eff_ch_st$Days_open <- unlist(days_open_df[match(rec_eff_ch_st$State, days_open_df$State)+1, "Days_open"])
    rec_eff_ch_fed$Days_open <- unlist(days_open_df[match(rec_eff_ch_fed$State,days_open_df$State), "Days_open"])
    rec_eff_pr_st$Days_open <- unlist(days_open_df[match(rec_eff_pr_st$State,days_open_df$State)+1, "Days_open"])
    rec_eff_pr_fed$Days_open <- unlist(days_open_df[match(rec_eff_pr_fed$State,days_open_df$State), "Days_open"])
```

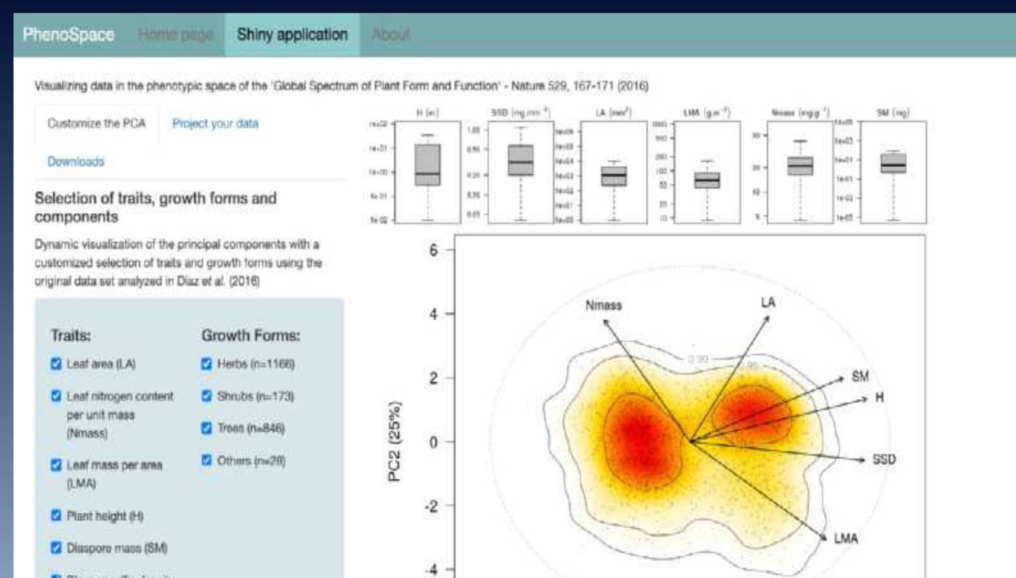
Outreach & Extension

https://fcaltabellotta.shinyapps.io/Marine-Science-Day-2021/


COVID-19 tracker
COVID-19 mapper
Region plots
SARS mapper
Outbreak comparisons
Data
About this site
621,852,344 cases
6,560,539 deaths
11 October 2022
NORTH AMERICA
SOUTH AMERICA
AFRICA
ASIA
Deaths per million
0 – 10
10 – 50
50 – 100
100 – 500
500 – 1,000
1,000 – Inf
NA
Select mapping date


Diagnostics for simple linear regression
Regression Model
(R = 0.8597, R-squared = 0.7391)
Residuals vs. Fitted Values
Histogram of Residuals
Normal Q-Q Plot of Residuals
Fitted Values
Residuals
Theoretical Quantiles


USGS
science for a changing world
Lake Erie Biological Station - Western Basin Trawl Survey
2014 Autumn Yellow Perch
Number per Hectare Swept
2014 Autumn Yellow Perch
Kilogram per Hectare Swept


PhenoSpace
Home page
Shiny application
About
Visualizing data in the phenotypic space of the 'Global Spectrum of Plant Form and Function' - Nature 529, 167-171 (2016)
Customize the PCA
Project your data
Downloads
Selection of traits, growth forms and components
Dynamic visualization of the principal components with a customized selection of traits and growth forms using the original data set analyzed in Diaz et al. (2016)
Traits:
Leaf area (LA)
Leaf nitrogen content per unit mass (Nmass)
Leaf mass per area (LMA)
Plant height (H)
Diaspore mass (SM)
Growth Forms:
Herbs (n=1166)
Shrubs (n=173)
Trees (n=846)
Others (n=29)
PC2 (25%)
Nmass
LA
SM
H
SSD
LMA

Pros (Benefits)

- **Interactive and engaging scientific products with existing skillsets and expertise (no HTML, Javascript)**
- **Stakeholders, managers, policy makers can explore and engage with scientific products without having to also be technical experts or install/acquire special software**
- **Public access to research results**
- **Interaction allows better science and better management**

ABSI

Oyster Decision Support-tool

https://fcaltabellotta.shinyapps.io/Oyster_Decision_Tool/

Next Steps

- **Implementation of Pre-Survey?**
- **Update the UI**
- **Update the Simulation Model**
- **Implementation of Pos-Survey?**

Thank you!

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