Collect Earth Online Module 3

Creating Your Own Project in Collect Earth Online

SERVIR Science Coordination Office
Curriculum Development Team
Micky Maganini
Contact: mrm0065@uah.edu

Prepared for “From Data to Geo-Information for Natural Resources Management” at ITC
Quartile 2 2022-2023

Table of Contents

Prerequisites and Requirements

Requirements

Before taking this module, you will need the following:

- A basic understanding of optical remote sensing
- A computer
- Connection to the internet
- A Collect Earth Online Account
- Membership of the “ITC: NRM2” Collect Earth Online Institution

Prerequisites

- Collect Earth Online Module 1 (Getting Started with Collect Earth Online). Click here to view CEO Module 1.
- Collect Earth Online Module 2 (Base Imagery Sources in Collect Earth Online). Click here to view CEO Module 2.

Learning Objectives

By the end of this module you will...

- Understand what an image interpretation project is
- Understand what a sampling design is
- Understand what a response design is
- Have a completed workflow outlining the objectives, imagery, end product, sampling design, and response design for your image interpretation project
- Have implemented the above workflow in a Collect Earth Online project

Chapter 1: Project Theory

In this chapter, we will explore the theory behind image interpretation projects. We will start by defining and providing examples of interpretation projects, before walking through the process of formulating an image interpretation project.

What is an Image Interpretation Project?

Image interpretation refers to the process of viewing and labeling high resolution satellite imagery. Image interpretation is generally used to support two kinds of projects:

(1) to support inventory projects, or
(2) the production of maps generated with machine learning.

In inventory projects, sample-based inventories make observations of a fraction of the entire area of interest. These samples are then used to estimate trends about the entire area of interest. For maps generated with machine learning (i.e. supervised classifications), image interpretation projects are used to both train the model and validate the result.[1]

Organizations across the world use Collect Earth Online for their image interpretation projects for a variety of different purposes. For example, the Central American Commission for Environment and Development (CCAD) and the German Corporation for International Cooperation (GIZ) recently completed a pilot study in El Salvador where CEO was used to study land use trends from 2000 - 2018.[2]

Image interpretation projects usually involve analyzing a large number of images at specific locations, and require substantial thought and effort to formulate the process before any action is taken. These involve designing a workflow, classification schema, response design, and sampling strategy. We will walk through each of these steps together in the remainder of Chapter 1.

---

[1] Patterson, M.S., McCallum, Kimberly; "Project Development Manual for Collect Earth Online, Geospatial Technology and Applications Center. https://www.collect.earth/wp-content/uploads/2022/11/CEO_Theoretical_Manual.pdf

[2] Patterson, M.S., McCallum, Kimberly; "Project Development Manual for Collect Earth Online, Geospatial Technology and Applications Center. https://www.collect.earth/wp-content/uploads/2022/11/CEO_Theoretical_Manual.pdf

Project Planning

The first step in project planning is determining the objectives of the project. This will usually be determined by your end users or stakeholders if working with a specific community. If you are conducting an independent project, these objectives will be defined by yourself. From there, you or your team can identify an ideal end product – usually a map – that will help you or your stakeholders realize your/their objectives. For example, if your team's objective is to better quantify land cover change between 2015 and 2020, your end product may be a land cover map for 2015 and a land cover map for 2020. This end product could be generated using a machine learning model, using data from Collect Earth Online to train the model.

Once you have the objectives and end product, you then must determine the imagery that is needed to accomplish these objectives. There are three components central to this question:

1. What spectral resolution/range is needed?
2. What spatial resolution is needed?
3. What temporal resolution/range is needed?

Will the default imagery provided in Collect Earth Online be adequate to achieve your end product? Or will you need additional imagery? To answer this question, consult page 5 of Collect Earth Online Module 2, which contains a description of the default base imagery sources available within Collect Earth Online. Click here to view CEO Module 2.

The next step in planning a project is determining a classification schema. A classification schema is a list of the different land cover or land use classes as well as the criteria needed to classify each point as that class.

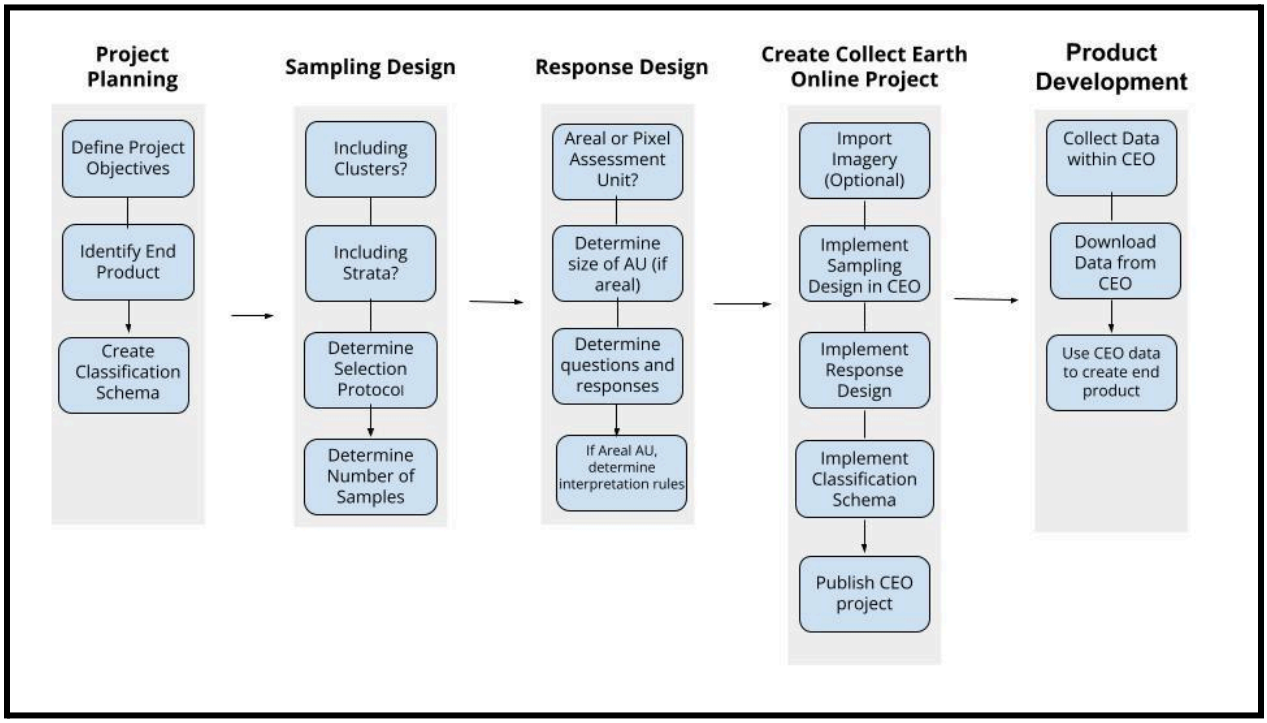
Finally, you must create a sampling design and response design for your project. A sampling design refers to how you go about selecting your *assessment units*, which are the locations at which our image interpretation data will be collected.[3] These are sometimes

[3] Stephen V. Stehman. "Sampling designs for accuracy assessment of land cover", *International Journal of Remote Sensing (2009)*, 30:20, 5243-5272.

referred to as sampling units in the land cover community. The term *response design* refers to the set of rules used to determine the land cover classification of each assessment unit.[4]

We will cover each of these steps in more detail in the following sections. But first, let's look at the workflow of an image interpretation project. Workflows are often used by the earth observation community to visually represent a sequence of steps taken to produce an end product.

Below you can find a standard workflow for an image interpretation project.



Designing a Classification Schema

After determining the objective and end product for your image interpretation project, you must settle on a classification schema. A classification schema (also referred to as a classification system) is defined as a set of clear definitions for the landscape elements you wish to identify in your project.[5]

---

[4] Stehman, Stephen V., and Raymond L. Czaplewski. "Design and analysis for thematic map accuracy assessment: fundamental principles." *Remote sensing of environment* 64.3 (1998): 331-344.

[5] Patterson, M.S., McCallum, Kimberly; "Project Development Manual for Collect Earth Online, Geospatial Technology and Applications Center. https://www.collect.earth/wp-content/uploads/2022/11/CEO_Theoretical_Manual.pdf.

Your first step in determining a classification schema is deciding whether a land cover or land use schema is better suited to your objectives. Land cover describes the biophysical nature of a landscape, or what elements make up the landscape. Land use, on the other hand, refers to the way humans are using the land.[6] For example, the land cover type of a certain area may be vegetation, but the land use type for that same area may be pasture.

When developing your land cover classification system, it is important to consider that a good classification schema will be both exhaustive and exclusive[7]. Exhaustive means that all areas in the study area can be assigned to a category and exclusive means that all areas in the study area can be placed in only one category. As with most steps in your project, you should consider your objectives when developing your classification schema. If your objective is to quantify cropland in your area of interest, then it may not be necessary to have different classes for different types of forest, but rather one class for each type of crop and one background class (i.e. non-cropland). However, if you aim to make a general land cover map, you may want to have a more specific classification schema.

Another important factor to consider when creating your classification schema is whether the spatial resolution of the imagery being used for the project is adequate to distinguish between the classes in your schema.

Finally, you may not have to develop your classification schema independently. Often projects will adopt classification schemas that are already in use by their stakeholders or end users for ease of interpretation.

After considering these factors, create your classification schema, which should consist of your land cover or land use classes of interest alongside your definitions of those classes. You can see an example of a land cover classification schema shown below, which was used for a project focused on defining forest types, and is slightly modified from the Intergovernmental Panel on Climate Change (IPCC) six class system.

---

[6] FAO/UNEP, 1999: Terminology for Integrated Resources Planning and Management. Food and Agriculture Organization/United Nations Environmental Programme, Rome, Italy and Nairobi, Kenya.

[7] Patterson, M.S., McCallum, Kimberly; “Project Development Manual for Collect Earth Online, Geospatial Technology and Applications Center. https://www.collect.earth/wp-content/uploads/2022/11/CEO_Theoretical_Manual.pdf.

Land Cover Class	**Definition**
Deciduous Forest	Areas with ≥ 30% tree cover and trees > 3 meters in height, with > 50% of tree cover being deciduous
Evergreen Forest	Areas with ≥ 30% tree cover and trees > 3 meters in height, with > 50% of tree cover being evergreen.
Woodlands	Areas with ≥ 10% but <30% tree cover, tree cover may be deciduous or evergreen.
Grassland	Non-range or pasture areas, may include non-grass vegetation such as herbs and brush. < 10% tree canopy cover.
Cropland	Area > 50% covered with agricultural land, including rice fields.
Wetlands	Land that is >50% covered or saturated by water for all or part of the year (e.g. peatlands) and that does not fall into the Forest Land, Cropland, Grassland or Settlements categories.
Settlement	Areas with ≥ 30% developed land, including transportation infrastructure and human settlements.
Other Lands	Bare soil, rock, ice, and all land areas that do not fall into any of the other five categories

Table 1: An example Land Cover Classification Schema adapted from the Intergovernmental Panel on Climate Change six-class schema.

After creating a land cover/land use classification schema, image interpretation projects will often create an interpretation key. These keys show what each of the land cover classes will look like in the imagery being used. These keys exist to limit the opportunity for two data collectors to have two different interpretations of the same point, as most projects do not have one person collect all of the data. Since you will be the only person collecting data for

your project, we will skip this step for the purposes of our course. Write your classification schema out on a sheet of paper.

Designing a Sampling and Response Design

Sampling Design

Our next step is to create a sampling design. A sampling design or sampling approach refers to how you go about selecting the locations at which our image interpretation data will be collected.[8] We refer to these locations where we collect image interpretation data as "assessment units". Assessment units can either be pixel-based assessment units or areal-based assessment units.[9] In pixel-based assessment units, the data collector classifies the pixel as one of the available land use or land cover classes. In areal-based assessment units, the data collector must classify the assessment unit as a whole as one of the available land use or land cover classes. There are three factors that one must consider when designing a sampling approach: (1) whether or not to incorporate clusters, (2) whether or not to incorporate strata, and (3) what selection protocol to employ.[10] We will define and explain the different options one has for each of these decisions below.

Clusters

In cluster sampling, spatially contiguous pixels are grouped into clusters (e.g. 5x5 pixel blocks), which are referred to as sampling units[11]. There can be multiple stages of clustering employed in a sampling design. In one-stage cluster sampling, primary sampling units are created throughout the study area via a selection protocol (Click here to read about different selection protocols). In two stage cluster sampling, primary sampling units are created throughout the study area, after which secondary sampling units are created within each primary sampling unit.

There are several reasons for grouping pixels into clusters. The first is that it greatly reduces the expense of collecting ground truth data. The second is if you are collecting data

---

[8] Stephen V. Stehman. "Sampling designs for accuracy assessment of land cover", *International Journal of Remote Sensing (2009)*, 30:20, 5243-5272.
[9] Stephen V. Stehman. "Sampling designs ..."
[10] Stephen V. Stehman. "Sampling designs ..."
[11]Stephen V. Stehman. "Sampling designs ... "

that will be used to train a machine learning model, clustered sampling may be used to target the class of interest.

While cluster sampling is useful for training a model or obtaining ground truth data, if you plan to use Collect Earth Online to produce a land cover inventory, the use of clusters is not recommended. This is because the goal of a land cover inventory is to collect data on a fraction of the study area, and use that data to make inferences about the area as a whole. In order to make that leap (i.e. to say that this sample of the study area represents the study area as a whole), one should employ an equal probability sampling design. An equal probability sampling design means that each element of the population has an equal probability of being selected in the sample.[12]

Strata

After determining whether or not you will include clustering in your sampling design, your next step is to determine whether or not you will incorporate stratification in your design. Strata are groups of pixels that are both exhaustive and exclusive (similar to your classification schema).[13] Recall that exhaustive means that each pixel can be assigned to one strata and exclusive means that each pixel belongs to only one strata. Strata are most often constructed based on land cover class or based on the spatial location of each pixel.

Stratification is often used to allocate a disproportionate sample size to land cover classes which are uncommon in the study area as a whole in order to precisely estimate user accuracy for each land cover class. For example, if you are attempting to map a land cover class that is extremely rare in your study area via a machine learning model, you would likely employ a stratified (by land cover) sampling approach in order to provide your model with enough examples of what the target class (the class you're trying to map) looks like.

Selection Protocol

The final step in designing your sampling approach is to determine the manner in which your assessment units will be distributed within your cluster or strata (or – if neither clustering or stratification were employed – in your study area as a whole). We call this manner of distribution your selection protocol. The most common selection protocols are random selection and systematic selection. In random sampling, samples are randomly

---

[12] Stephen V. Stehman. "Sampling designs for accuracy assessment of land cover", *International Journal of Remote Sensing (2009)*, 30:20, 5243-5272.
[13] Stephen V. Stehman. "Sampling designs …"

distributed within the assessment unit. In systematic sampling, samples are distributed in an evenly spaced grid. Systematic sampling offers the advantage of having spatial balance, which leads to producing better precision estimates. Both systematic sampling and random sampling are equal probability sampling designs.

Each of these three decisions (e.g. clusters, strata, and selection protocol), can be made independently, and thus many different permutations of sampling designs can be implemented. That is, one could include both clustering and stratification in their sampling design, or neither.

For example, when SERVIR developed a machine learning model in order to map the extent of rice in the country of Bhutan, we made a decision to incorporate both clusters and stratification into our sampling design. After a two-stage clustering process was employed, we were left with 500 secondary sampling units which each measured 1 ha in size. Within each of these sampling units, stratification by land cover class was used via a pre-existing land cover product. This way, there would be an even amount of pixels within each land cover class that appeared within a given secondary sampling unit. Then, within each strata, a random selection protocol was undertaken, where “N” pixels were sampled within each land cover class.

Sample Size

The final decision you must make when organizing your sampling design is the sample size. The sample size refers to the total number of assessment units that you will analyze. There are a number of factors that influence the selection of the sample size that are beyond the scope of this module, including the acceptable margin of error and the estimated proportion of units in the land cover class of interest compared to the total population. For a more detailed and quantitative method of determining a sample size, see Section 3.2.2 of OpenMRV’s article on“sampling design for estimation of area and map accuracy”. Click here to read the OpenMRV article.

Response Design

Now that you have determined your sampling design – which will govern how you obtain your assessment units within your study area – you must now decide upon a response design, which is a set of rules outlining how you will classify your assessment units.

Recall that our assessment unit can either be pixel-based or areal-based. For both types, you must define a spatial support unit. The spatial support unit refers to the area around the pixel that the data collector (you) will consider when classifying that pixel.

For an areal-based assessment unit, you must make a decision of how to classify the area as a whole. This is because you may encounter assessment units which have multiple land cover types appearing within them. For example, you may decide that your assessment unit must have a majority (i.e. >50%) of one type of land cover class in order to be classified as that class, otherwise you will ignore that point.

Congrats! You are now ready to create your image interpretation project in Collect Earth Online. You have defined your project objectives and end product, added imagery to our CEO institution to meet those objectives using CEO Module 2 (optional), and developed a land cover classification schema. Then, you planned out your sampling strategy by deciding whether or not to include clusters and strata, what selection protocol to use, and the sample size you should lose. Finally, you drafted a response design, determining how you will classify your assessment units based on your classification schema. Before you implement your sampling and response design in Collect Earth Online, write out the decisions you made on a sheet of paper.

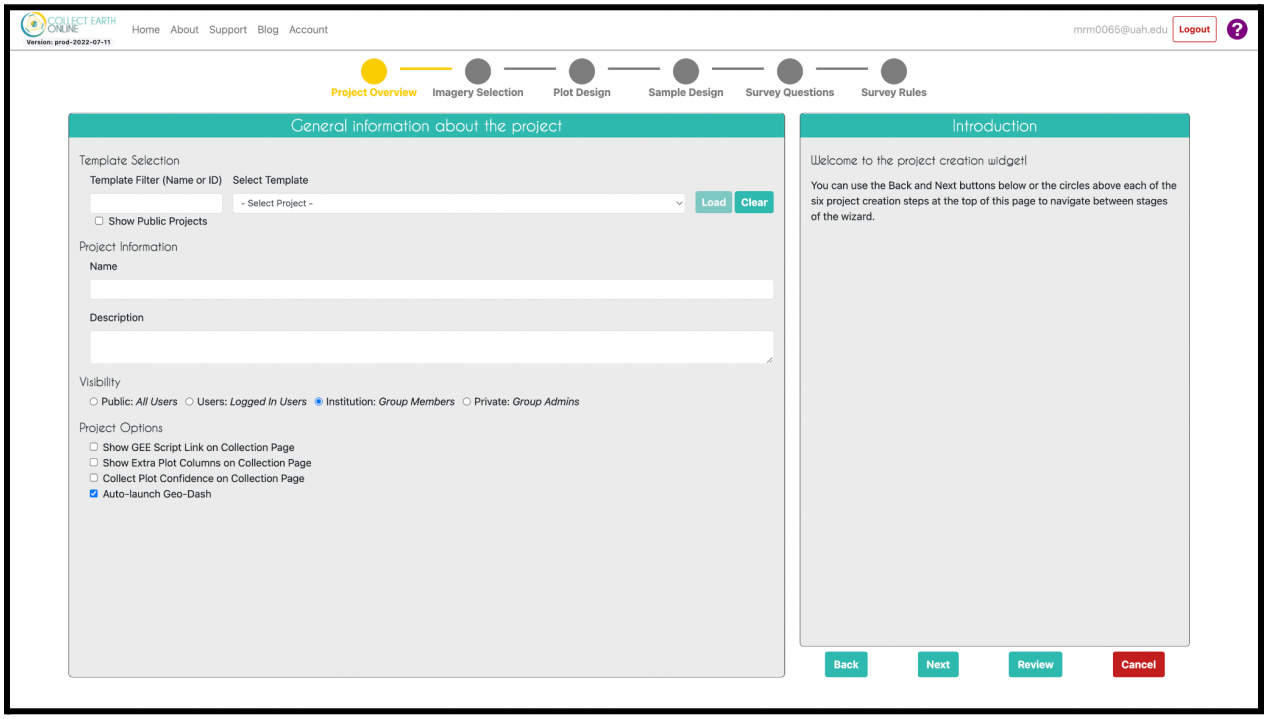
Chapter 2: Project Creation

Now that we have planned out our image interpretation project, we are ready to implement it within Collect Earth Online. Our first step is to navigate to the “ITC:NRM2” institution homepage. Click here to visit our institution homepage. If you cannot access our institution’s page, you may not be a member of this institution. If you have not yet requested access to our institution, follow the instructions in SERVIR’s Collect Earth Online Module 1. Click here to access CEO Module 1.

Once you are on the Institution homepage (which looks similar to the screenshot shown below), click on the **“Create New Project”** button, which is indicated by the arrow in the image below.

Step 1: Project Overview

After clicking on the **“Create New Project”** button on the “ITC:NRM2” institution homepage, you will be taken to a screen that looks similar to the screenshot shown below.



You can see at the top of the screen that there are six steps to creating a new CEO project: the project overview, imagery selection, plot design, sample design, survey questions, and survey rules. In this chapter we will walk through each of these steps individually. We are currently on Step 1 – the project overview.

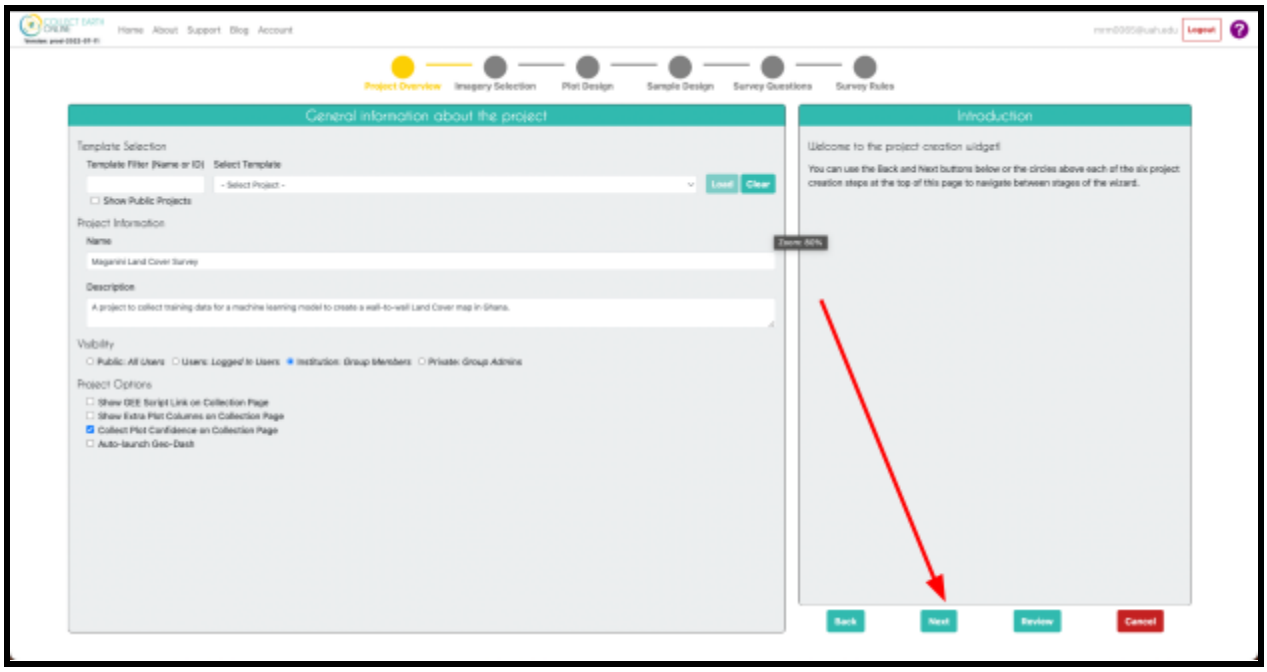
Under the text that says **“Template Selection”**, we are able to create a CEO project from a pre-existing project. Since you are creating a project from scratch, you can leave this section blank.

Under the text that says **“Project Information”** there is a space to enter a name for your project under the text that says **“Name”.** Enter in a name for your image interpretation project, starting with your last name. Next, under the text that says **“Description”,** enter a description of your image interpretation project.

Under the text that says **”Visibility”,** there are options to change who can view and collect data for our project. This can be very helpful if you are implementing a large scale project where you are asking partners to help with the data collection process. Since you will be collecting all of the data yourself, you can leave this section as its default setting, which is **“Institution: Group Members”**.

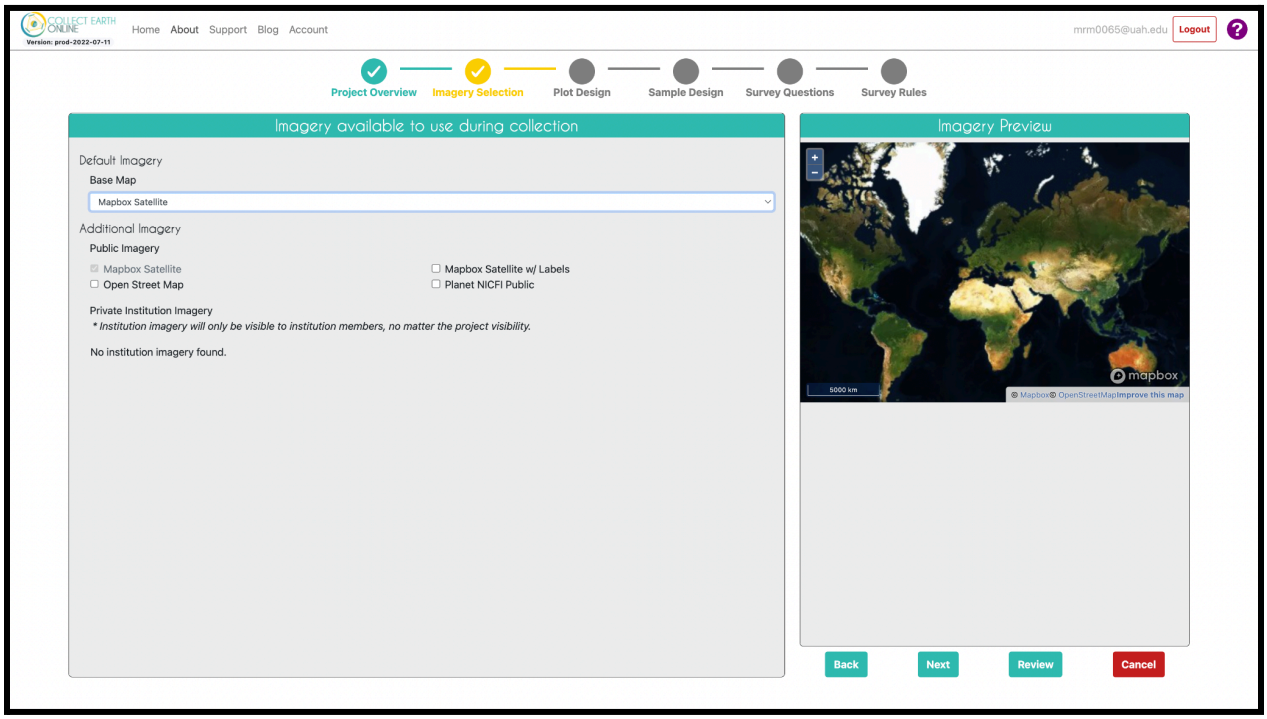
Next, you must decide if you want to include ancillary information in your project. Ancillary information, such as vegetation index time series plots, provide another data source to check your interpretation of the image against. These ancillary datasets are provided in CEO via Geo-Dash. If you plan to include vegetation index information in your project, make sure the box next to **“Auto-launch Geo-Dash”** is checked (this option is under the project that says **“Project Options”) .** If you do not need ancillary information for your project, uncheck this box. Next, click the box next to the text that says **“Collect Plot Confidence on Collection Page”.**

After following these steps, your screen will look similar to the image shown below (your entries in the **“Name”** and **“Description”** fields will be slightly different. Once you are satisfied with your entries, click the green **“Next”** button towards the bottom right of the screen (indicated by the red arrow in the image below).



Step 2: Selecting Imagery

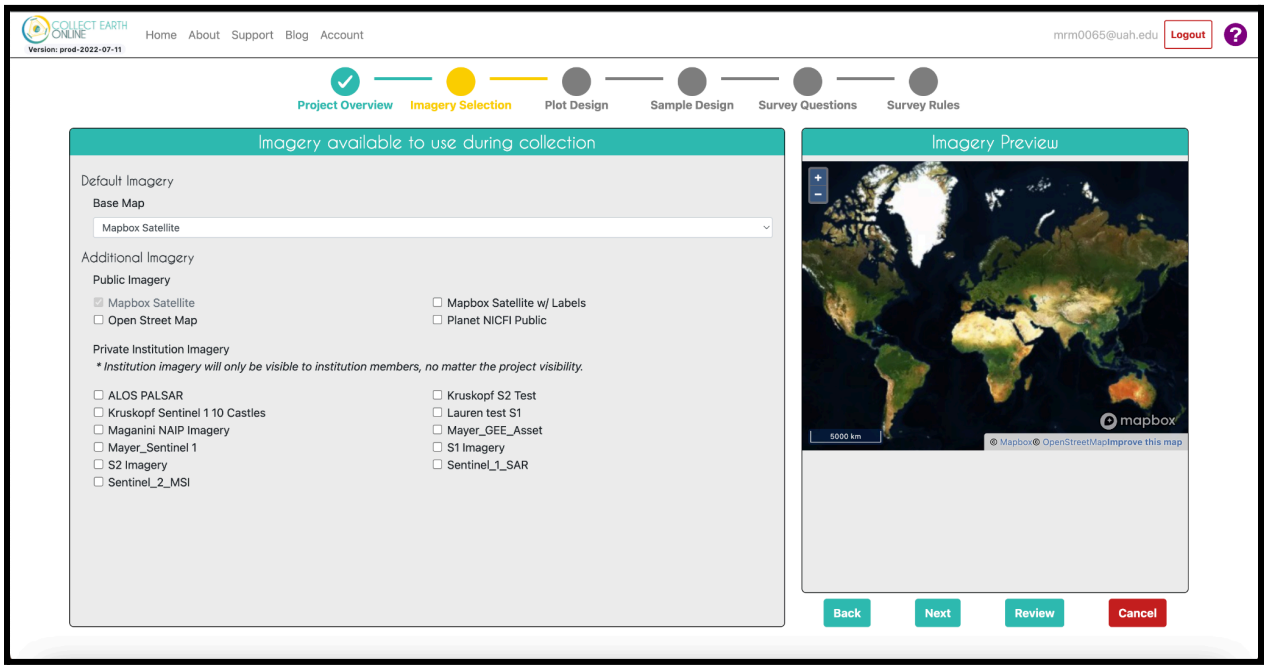
Now, your screen should look similar to the image below.



Under the text that says **“Base Map”**, select the imagery that you wish to automatically display when collecting data for your image interpretation project. Do this by opening the dropdown menu by clicking the text that says **“Mapbox Satellite”** and click the imagery that you would like to use as your basemap. Then, under the text that says **“Additional Imagery”**, click the boxes next to the imagery you would like to use in your project. Finally, under the text that says **“Private Institution Imagery”,** click the box(es) next to the private imagery you want to use. To review the public imagery sources available in Collect Earth Online and to see how to add your own private institution imagery, visit SERVIR’s Collect Earth Online Module 2. [Click here to see Collect Earth Online Module 2.]

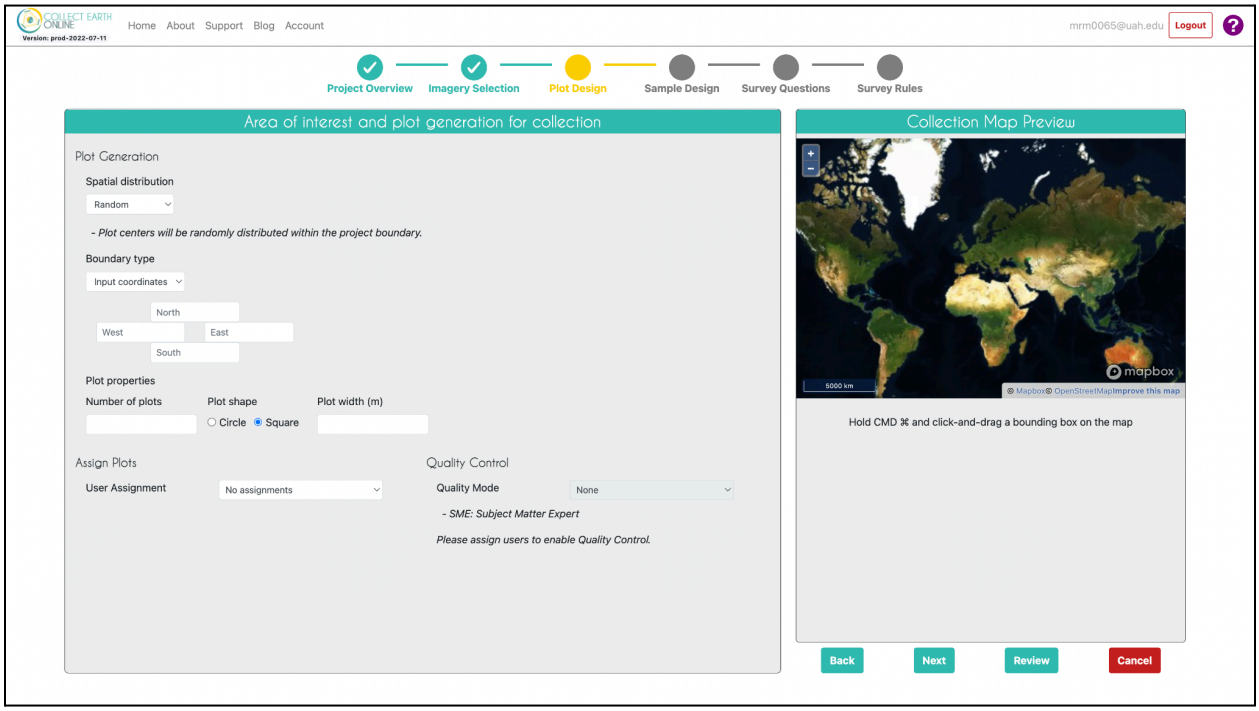
It is recommended that you use **“Mapbox Satellite”** for your basemap imagery, and add **“Planet NICFI Public”** in the “additional imagery” section, along with any personal imagery you wish to include.

After completing the fields in Step 2, your screen will look similar to the image shown below. Now, click the green **“Next”** button towards the bottom right of the screen.



Step 3: Plot Design

Your screen will now look similar to the screen shown below.

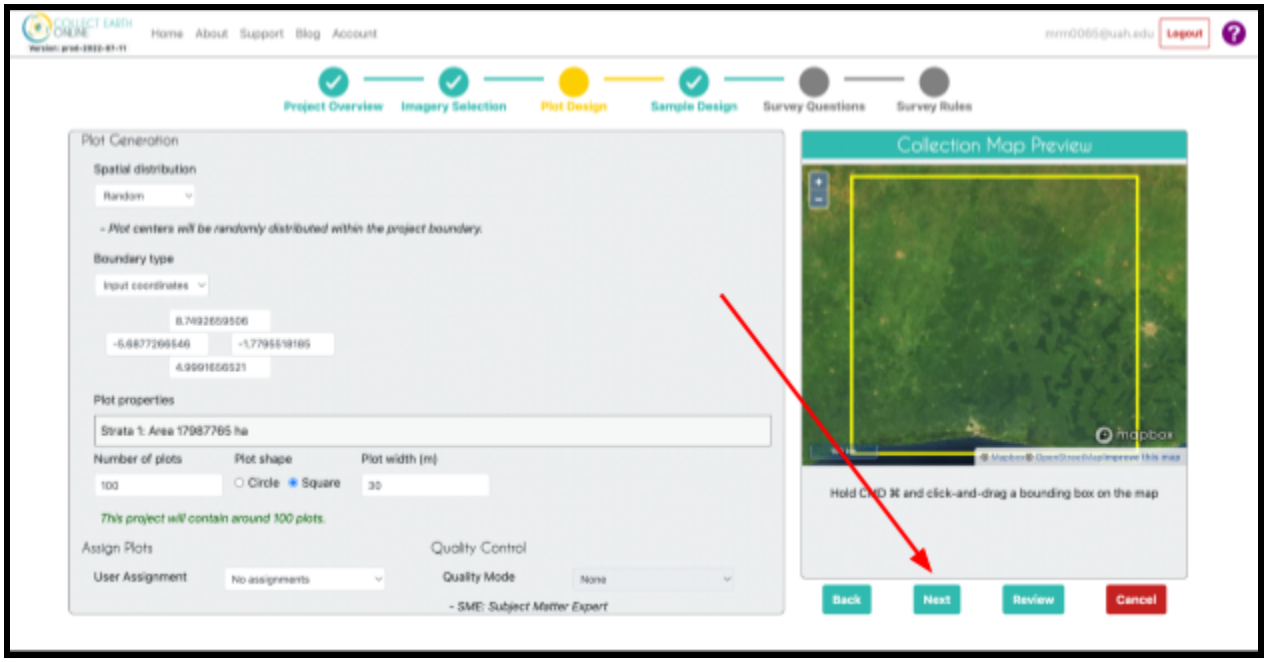


First, under the text that says **“Spatial Distribution”**, open the dropdown menu by clicking on the text that says **“Random”**, and select from the following options: **“Random”**, **“Gridded”**, **“CSV file”**, or **“SHP file”**. If you are not implementing clusters or strata in your sampling design, and are using a random selection protocol (i.e. you are using a simple random sampling design), click **“Random”**. If you are not implementing clusters or strata in your sampling design, and are using a systematic selection protocol (i.e. you are using a simple systematic sampling design), click **“Gridded”**. If you are incorporating clusters and/or strata within your sampling design, you will have to create a CSV file or SHP file containing the coordinates of your sample assessment units. Instructions for how to fill out the Plot Design screen for each of these spatial distribution options (i.e. random or gridded) are shown below.

Random

Select this option if you are implementing simple random sampling. Under the text that says **“Boundary Type”,** we will input the coordinates of our area of interest. Click in the box where it says **“North”,** and type in the maximum latitude of your study area. Then, click in the box where it says **“South”,** and type in the minimum latitude of your study area, Next, click in the box where it says **“West”,** and type in the minimum longitude of your study area. Finally, click in the box where it says **”East”,** and type in the maximum longitude of your study area. Your value for longitude should be between -180 and 180, and your latitude value should be between -90 and 90. Alternatively, zoom into your study area and use Control + click-and-drag (Command + click-and-drag on Mac) on the collection map preview to draw a bounding box on the map.

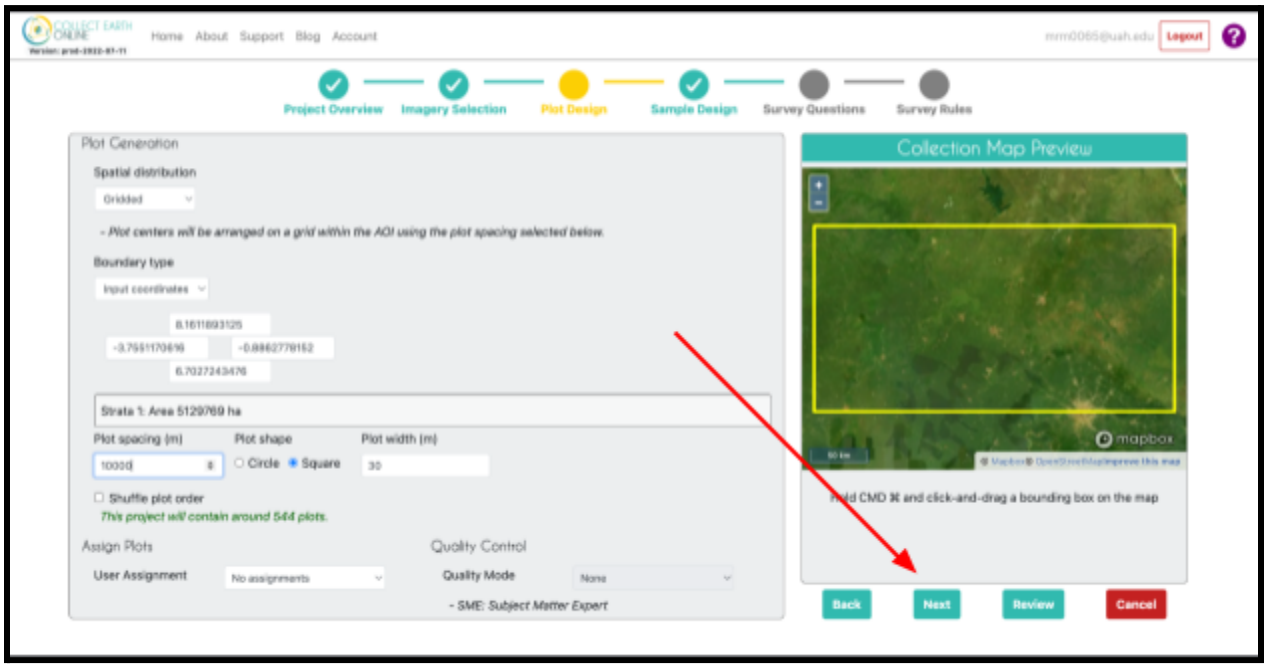
Then, under the text that says **“Number of Plots”,** enter in the number of assessment units you plan to include in your project. Next, under the text that says **“Plot width (m)”,** type in the desired width of your plot. Your screen should now look similar to the screen shown below. Then, hit the green **“Next”** button in the bottom right of the screen (indicated by the red arrow in the image below). You are now ready to proceed to Step 4: Sample Design. Click here to jump to Step 4: Sample Design



Gridded

Select this option if you are implementing simple systematic sampling. Under the text that says **“Boundary Type”,** we will input the coordinates of our area of interest. Click in the box where it says **“North”,** and type in the maximum latitude of your study area. Then, click in the box where it says **“South”,** and type in the minimum latitude of your study area, Next, click in the box where it says **“West”,** and type in the minimum longitude of your study area. Finally, click in the box where it says **”East”,** and type in the maximum longitude of your study area. Alternatively, zoom into your study area and use Control + click-and-drag (Command + click-and-drag on Mac) on the collection map preview to draw a bounding box on the map.

Then, under the text that says **“Plot Spacing”,** type in the spacing (in units of meters) you want between each assessment unit. Next, under the text that says **“Plot width (m)”,** type in the desired width of your plot. Your screen should now look similar to the screen shown below. Then, hit the green **“Next”** button in the bottom right of the screen (indicated by the red arrow in the image below). You are now ready to proceed to Step 4: Sample Design.
[Click here to jump to Step 4: Sample Design]



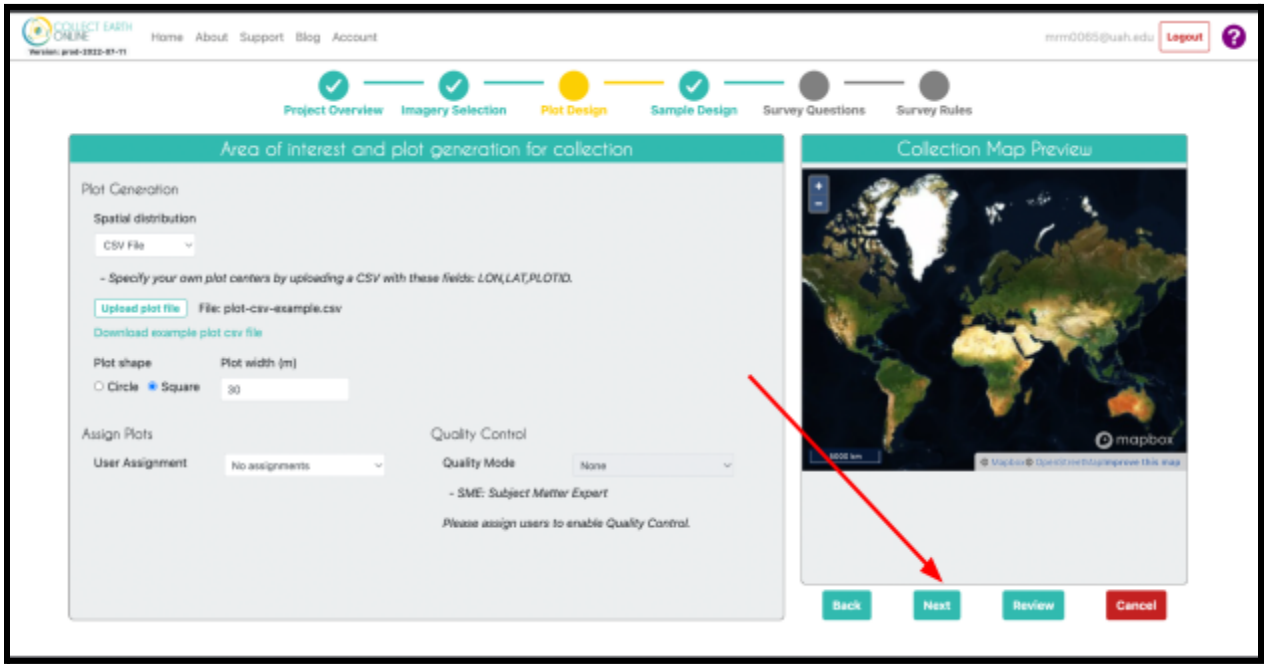
CSV File

Select this option if you are implementing clusters and/or strata in your sampling design. Click the button that says **“Upload plot file”.** This will display the files on your computer. Navigate to the CSV file you wish to upload. *Your file must have one column titled “PLOTID”, one column titled “LAT, and one column titled “LON”.* The column titled “PLOTID” must have integers in each row (e.g. 1, 2, 3, 4). The column titled “LAT” should contain the latitude of that point and the column titled “LON” should contain the longitude of that point. You can download an example of a CSV file that can be uploaded to CEO [by clicking this link.]

Collect Earth Online will then create plots centered on the coordinates of the points specified in your CSV. To make circular plots, click the circle next to the text that says **“circle”** under the text that says **“Plot Shape”.** If you would like square plots, you can leave the default setting as is.

Next, under the text that says **“Plot width”,** type in a value. This will be the width or diameter of your plots. Leave all other settings as their default values.

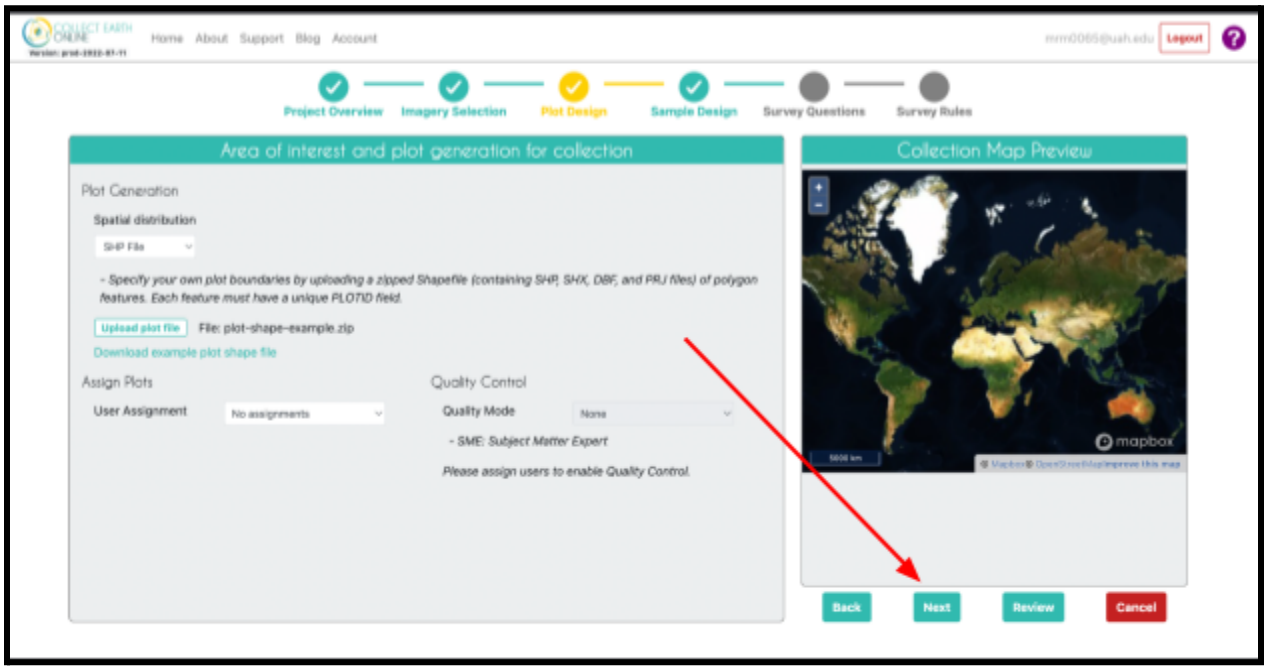
Finally, hit the green **“Next”** button in the bottom right of the page, indicated in the image below with a red arrow. You are now ready to proceed to Step 4: Sample Design. [Click here to jump to Step 4: Sample Design]



SHP File

Select this option if you are implementing clusters and/or strata in your sampling design. Click the button that says **“Upload plot file”.** This will display the files on your computer. Navigate to the .zip folder you wish to upload. Then click the file you wish to upload; this will highlight the file in blue. Next, click **“Open”** in the bottom right. You will now see your file name displayed next to the **“Upload plot file”** button. The zipped shapefile should contain SHP, SHX, DBF, and PRJ files of polygon features, each with a unique PLOTID field.

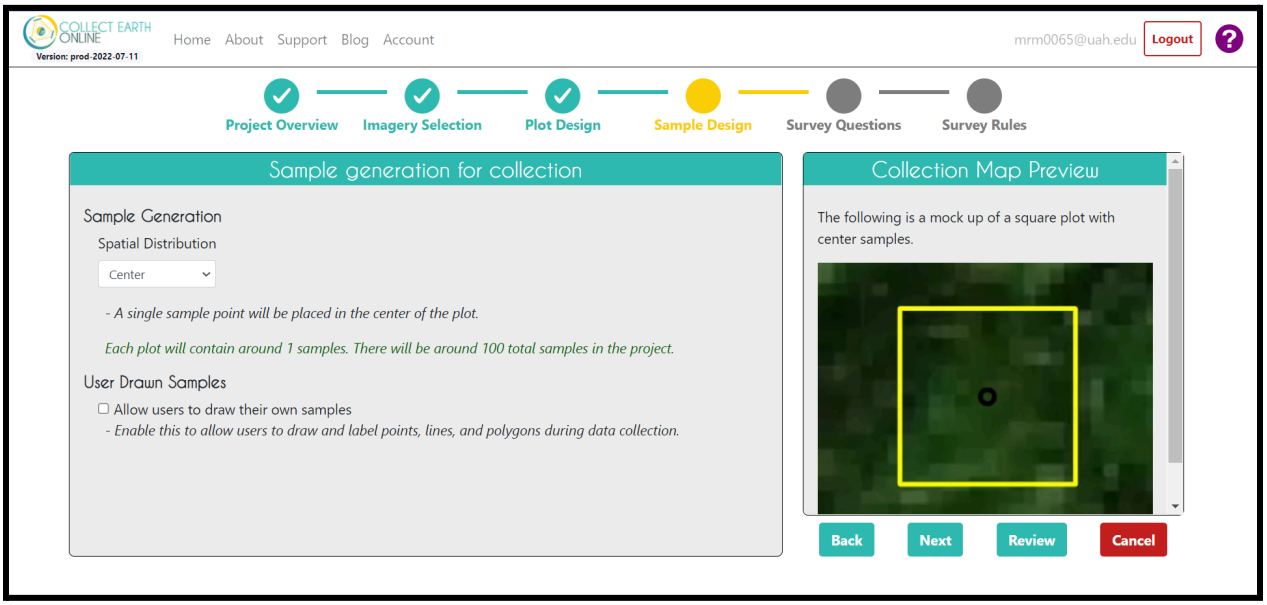
Next, hit the green **“Next”** button in the bottom right corner of the screen, indicated by the red arrow in the image below. You are now ready to proceed to Step 4: Sample Design on the next page!



Step 4: Sample Design

In this step, you will implement your response design. In other words, ***how will you go about classifying your assessment units – which we created in step 3 – based on your classification schema?*** Recall that there can be areal-based assessment units, where you interpret a polygon, or pixel-based assessment units, where you interpret a point.

If you are implementing a pixel-based assessment unit, open the dropdown menu under the text that says **"Spatial Distribution"**, and click **"Center"** (as shown in the image below). If you are implementing an areal-based assessment unit, open the dropdown menu and select either **"gridded"** or **"random"**, depending on your response design.



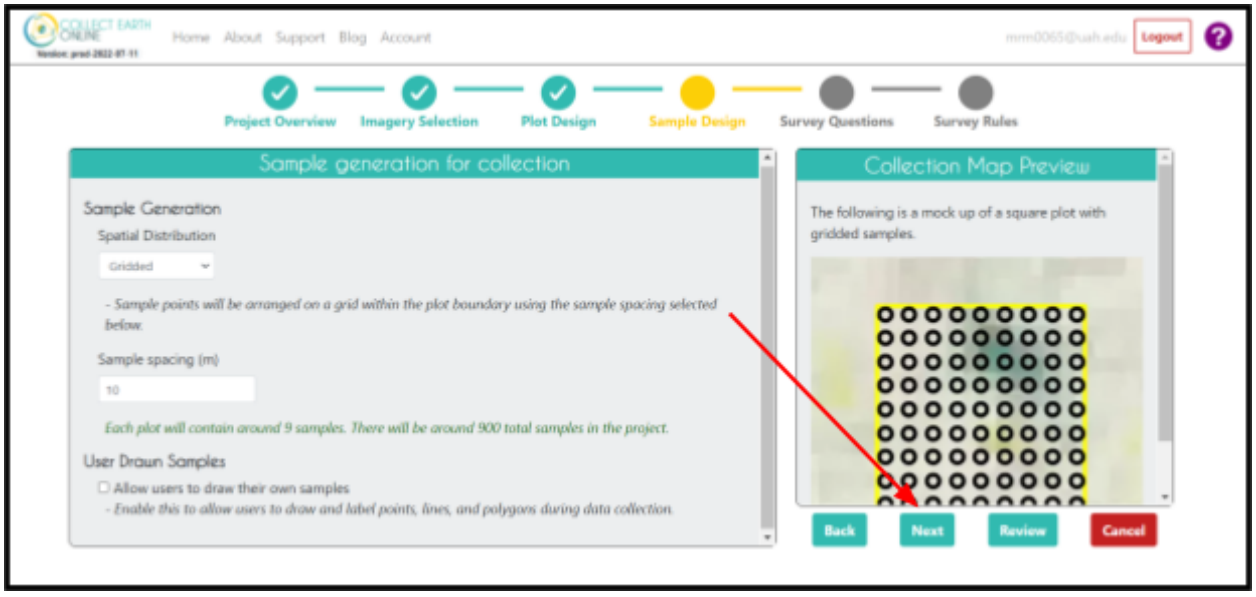
For example, let's say we designed our response design in the planning phase as follows:

- assessment unit that is a square of size 30 meters by 30 meters.
- Within the assessment unit, there will be an evenly spaced grid of 9 points
- We will determine the land cover classification based on our schema at each of those 9 points.
- If five or more of those points are interpreted as one land cover class, then we will consider the entire assessment unit to be that land cover class.

To implement the response design described on the previous page, we would select the following options in this step:

1. Under the text that says **“Spatial Distribution”,** open the dropdown menu and click **“Gridded”**.
2. Under the text that says **“Sample Spacing”**, type into **“10”**. If you set the size of your assessment unit to be a square with side length 30 meters in Step 3: Plot Design, this will create a grid of nine evenly spaced points

Your screen will now appear similar to the screenshot below.



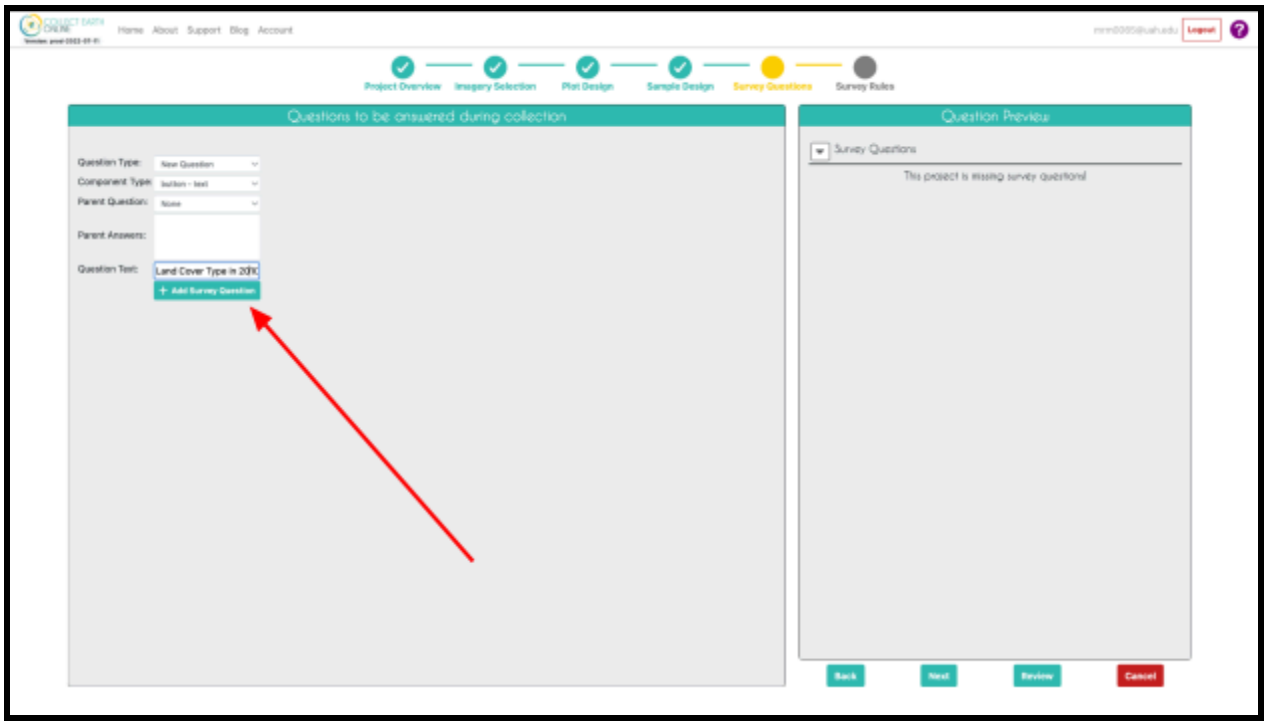
Now that you’ve seen how to implement an example response design, do the same with your own response design! After you are done, click the green **“Next”** button towards the bottom right of the screen (as shown by the red arrow in the image above).

Step 5: Survey Questions

In this step, you will finish implementing your response design by entering the questions and possible responses you want the data collectors (which in this case is just you) to answer. If you are conducting a land cover survey, you will just have one question: “Which Land Cover Class is in this pixel”, and your possible responses will be each of the classes laid out in your classification schema. If you are conducting a land cover change analysis, you may have two questions, one for what the land cover class is in the initial year, and one for what the land cover class is in the final year of your study. As was the case in Step 4, it is up to you to implement the response design your study calls for.

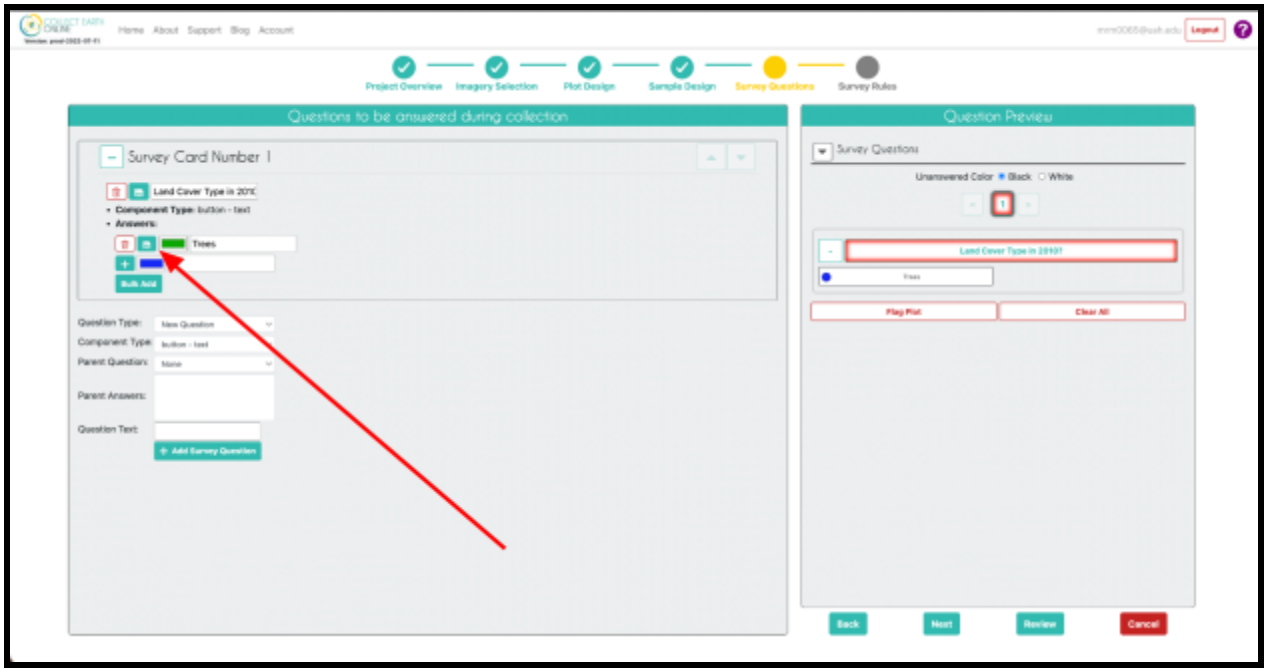
Let’s use an example. Let’s say we are doing a study to quantify forest cover change in Ghana between the years 2010 and 2020. We have selected a simple binary land cover classification schema, consisting of “trees” and “non-trees”. In order to implement this study, we will create two questions. The first question will be “What is the land cover class in 2010 for this assessment unit? The second question will be “What is the land cover class in 2020 for this assessment unit? For both questions, the possible responses will be “trees” and “non-trees”. Below are the steps we would take to implement this project in Collect Earth Online.

1. To the right of the text that says **“Question Text”**, type in “Land Cover Type in 2010”
2. Click the green button that says **“+ Add Survey Question”** (as shown in the picture below).

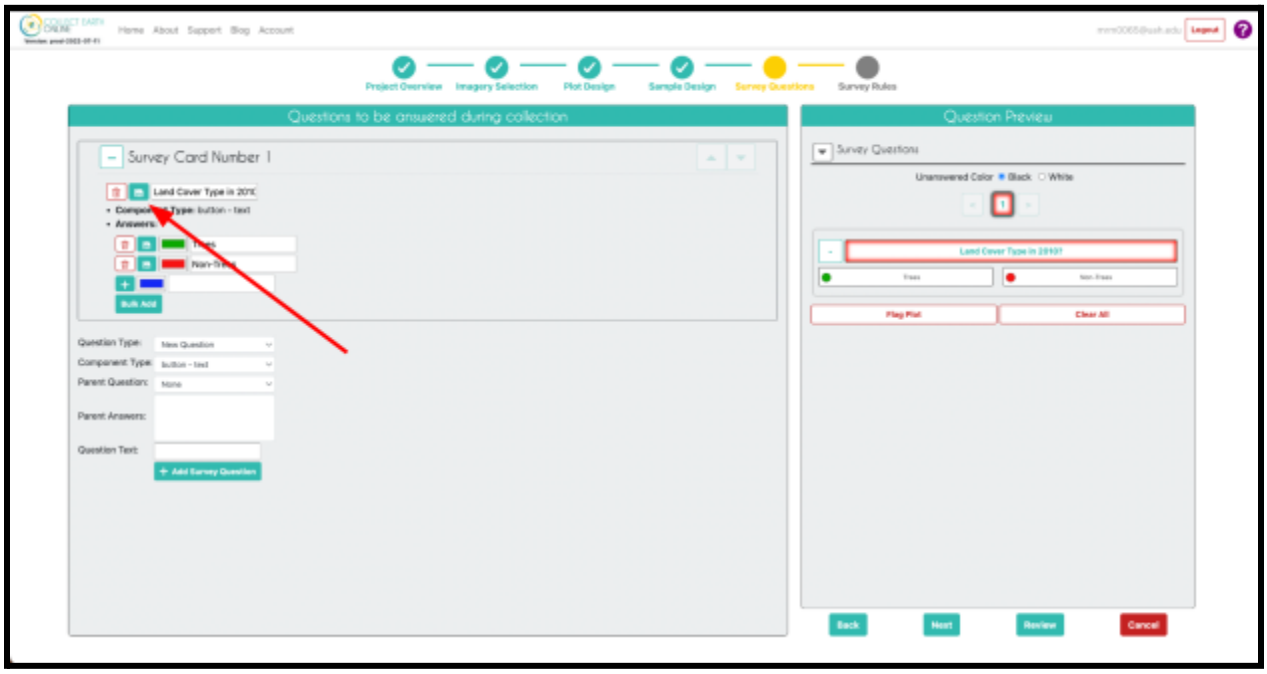


After following step 2, a new display will appear towards the top of the screen that says **"Survey Card Number One"**.

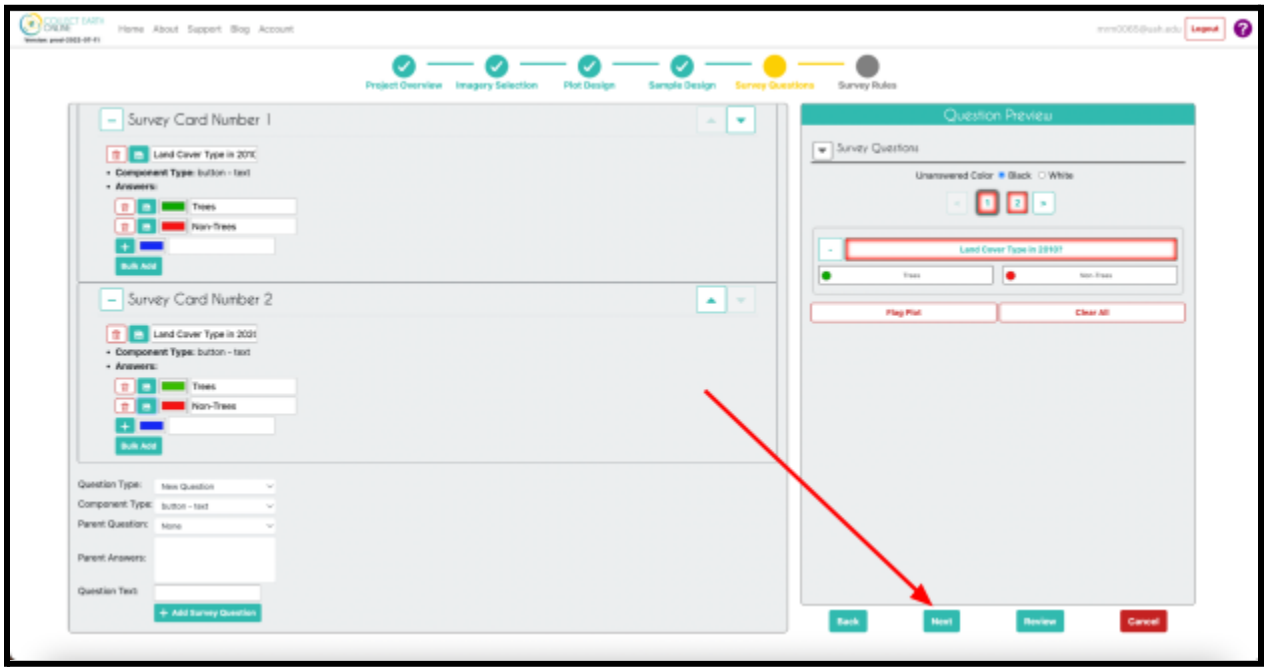
3. Under the text that says **"Answers"**, type the first possible response into the entry field. In this case we will type "trees".
4. To the left of the entry field, there is currently a blue rectangle. You can click this rectangle and then select a color. This will be the color that the response appears as when we collect the data.
5. Hit the green **"+"** to the left of the color selector.
6. After following step 5, you will see a green save icon and a red trash icon to the left of your first answer. Click the green save icon (indicated by the arrow in the image below).
7. There will now be another space to enter in your second answer below the first answer. ***Repeat Steps 3-6*** to enter in your entire classification schema for your first question.



8. **IMPORTANT:** After you have entered all possible answers for the first question, click the green save icon under the text that says **“Survey Card Number 1”**. This icon is indicated in the image below by the red arrow.

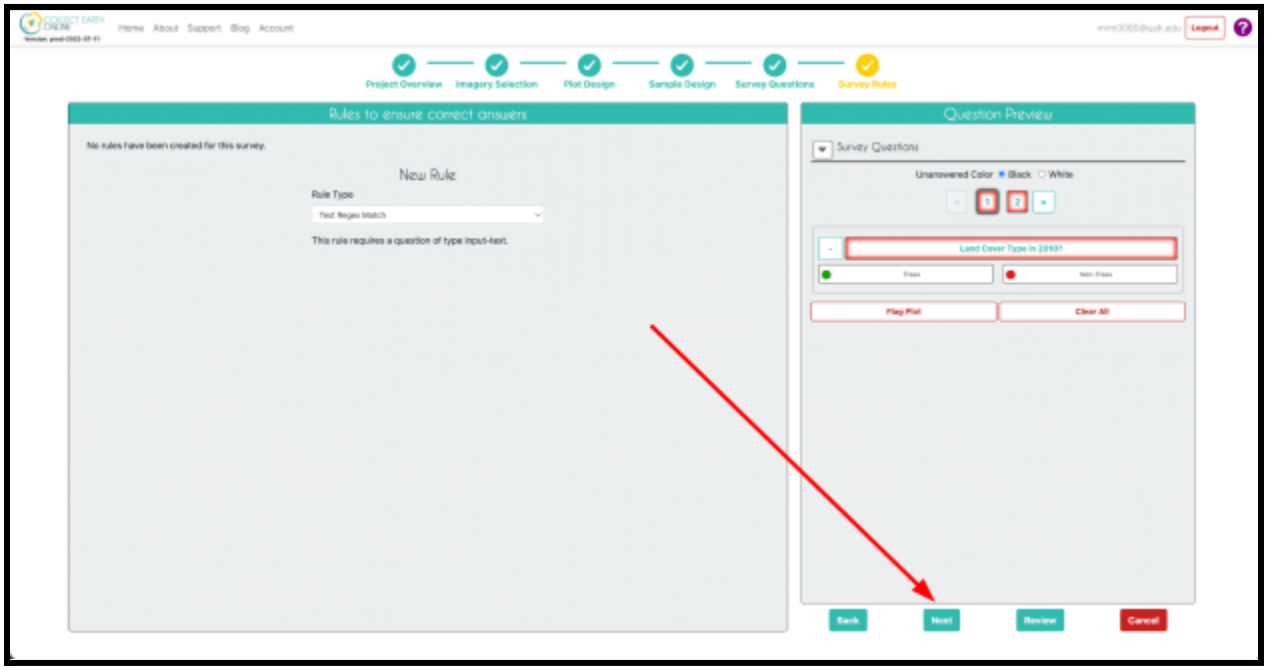


9. Repeat Steps 1-8 for your remaining questions.
10. After you have completed this step, your screen should look similar to the image below. Click the green **"Next"** button towards the bottom right of the screen (indicated in the image below) to proceed to the next step.



Step 6: Survey Rules

On this page, we can create rules for our survey. Rules are a quality control step commonly used when you have a large number of data collectors. Since there is only one data collector (i.e. you) for this project, we will skip this step. Click the green **“Next”** button (indicated by the arrow in the image below) towards the bottom right of the screen.



Step 7: Project Management

After following Steps 1-6, your screen will now appear similar to the screen below. Click the box to the left of the text that says “I agree to the Terms of Service”, which is indicated by the red arrow in the image below. Then click the white button that says **“Create Project”** directly underneath the box.

You will then see a popup asking you if you really want to create this project. Click **“OK”**.

Step 8: Geo-Dash Widget Addition

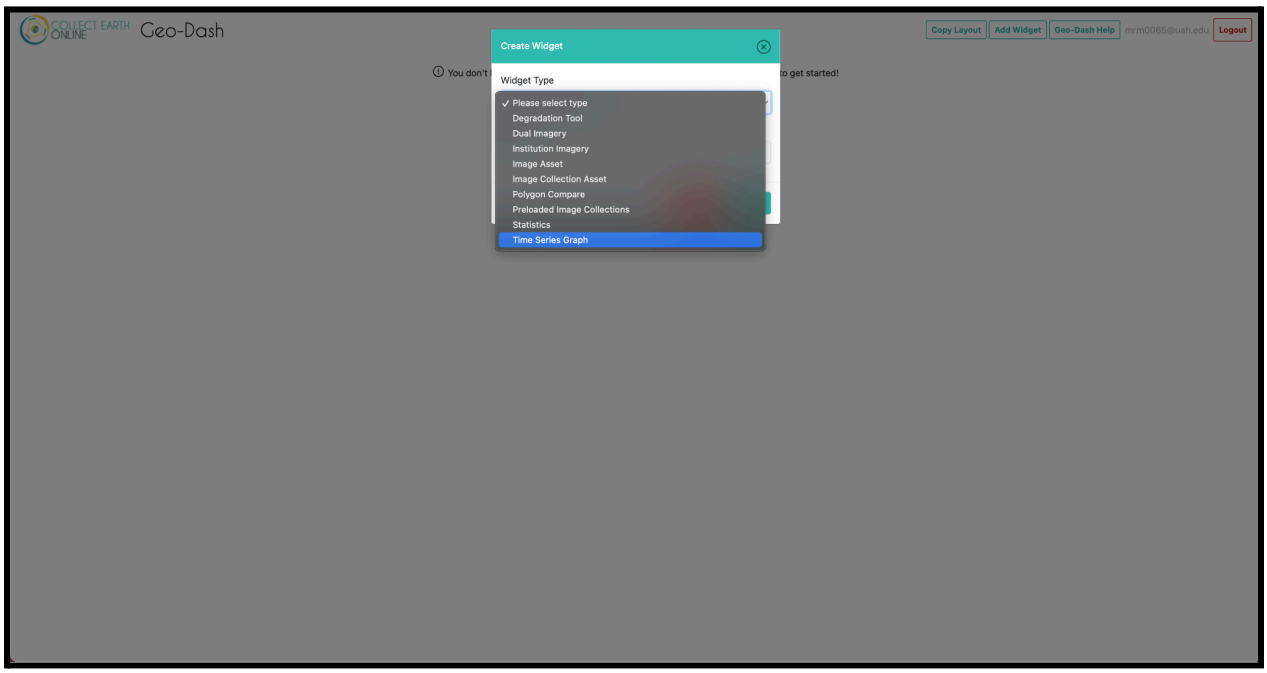
After completing Step 7, your screen will look similar to the screen shown below. In this step, we will cover how to add Geo-Dash Widgets to your project. These widgets allow you to view NDVI (Normalized Difference Vegetation Index), EVI (Enhanced Vegetation Index), EVI2 (Enhanced Vegetation Index 2), NDMI (Normalized Difference Moisture Index), and NDWI (Normalized Difference Water Index) in time series graphs as an additional reference to aid in your interpretation of the imagery.

If you do not wish to include Geo-Dash widgets in your project, you may proceed to Step 9. Click here to jump to "Step 9: Publishing Your Project." If you wish to include Geo-Dash widgets in your project, follow the instructions below.

1. Click the white **"Configure Geo-Dash"** button on the right side of the screen, indicated by the arrow in the image below.

2. This will open a separate tab in your browser. Towards the top right of this new screen, click the **“Add Widget”** button, as indicated by the arrow in the image below.

3. This will create a popup window. Under the text that says **“Widget Type”**, open the dropdown menu by clicking where it says **“Please select type”**, then scroll down and click **“Time Series Graph”**, as shown in the image below.



4. Under the text that says **“Title”**, type in a title for the Geo-Dash widget. This will be the text that Collect Earth Online displays when you are collecting data.
5. Under the text that says **“Data Type”**, open the dropdown menu and select the index that you want to display.
6. Under the text that says **“Select the Date Range you would like”**, select a start date and end date.
7. Click the green **“Create”** button towards the bottom right of the popup window.

You will now see a preview of your widget shown in the GeoDash, as shown in the image below. You may now close this tab, and return to your Collect Earth Online Project Management webpage.

Step 9: Publishing your project

Your screen will now look similar to the screenshot shown below. If you want to make any changes to your project, click the white button with red text that says **"Edit Project"** towards the top right of the screen. *Note that after you publish your project, you are not able to edit your project any further. Thus, it is strongly suggested that you collect some data before publishing your project to see if you need to alter your project design in any way.*

If you are satisfied with your project and are ready to start collecting your data, click **"Publish Project"**, indicated by the arrow in the image below. You will see a popup that asks you if you are sure you want to publish your project. Click the blue **"OK"** button.

Your project is now published! You can now see your project in the institution webpage, which will be named whatever you called it in Step 1: Project Overview.

You are now ready to start collecting data! Proceed to Module 4 by clicking here if you are ready to begin collecting data.

External Links

External Link 1: The Collect Earth Online Project Development Manual provides a more in-depth look at the workflow for planning a large scale image interpretation project. Click here to view the Collect Earth Online Project Development Manual.

External Link 2: The Collect Earth Online Institution & Project Creation Manual provides a more in-depth look at the workflow for implementing an image interpretation project within Collect Earth Online. Click here to view the Collect Earth Online Institution & Project Creation Manual.