

COLLECT EARTH
ONLINE

Data Collection Manual

The CEO Team

Spring 2022





USAID
FROM THE AMERICAN PEOPLE



SERVIR 



Food and Agriculture
Organization of the
United Nations



openforis



SilvaCarbon



 Spatial Informatics Group

Google

GTAC

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Welcome to Collect Earth Online!

Collect Earth Online, or CEO, is a free and open-source image viewing and interpretation tool, suitable for projects requiring information about land cover and/or land use. CEO enables simultaneous visual interpretations of satellite imagery, providing global coverage from MapBox and Bing Maps, a variety of satellite data sources from Google Earth Engine, and the ability to connect to your own Web Map Service (WMS) or Web Map Tile Service (WMTS). The full functionality is implemented online; no desktop installation is necessary.

Collect Earth Online (CEO) is available at <https://collect.earth/>.

This manual focuses on information for data collectors to facilitate contributions to their institution's projects in CEO. Part 1 provides a quick overview of the Collect Earth Online platform, so users can set up their own accounts. Part 2 details how to join your institution. Part 3 & 4 discuss how to collect data for your institution's projects. Part 5 describes what to do if you encounter an error.

If you are interested in learning how create and manage an institution, set up a data collection project, or add imagery, please see CEO's **Institution & Project Setup Manual**.

This manual uses a few formatting standards for ease of use. Clickable links are shown **[like this]**. The names of pages, like the **Home** page, are bolded.

Finally, CEO is a live tool that is under continuous development. Workarounds for current issues are shown in boxes like the one below:

This describes a current challenge and how to work around it.

And planned features are shown in boxes like this:

This is a description of a planned feature.

Part 1: A Quick Introduction to Collect Earth Online

A. Setting up your account

1. In your browser window, navigate to <https://collect.earth/>. CEO supports Google Chrome, Mozilla Firefox, and Microsoft Edge.
2. Click **[Login/Register]** on the upper right.
3. To set up a new account, click on **[Register]** and follow the instructions. You will receive a welcome email if registration is successful.
4. You will need to validate your email upon registration.
5. When you have created an account, login with your email and password.
6. If you forget your password, click on **[Forgot your password?]** and follow the instructions.

B. Website features

1. You can access the **Home**, **About**, **Support**, and **Account** pages from the top menu bar.
 - i. The **Home** page includes information about institutions, published projects, and a map showing locations of existing projects.
 - ii. The **About** page summarizes information about CEO.
 - iii. The **Support** features Collect Earth Online Manuals, Tutorials, and a Collect Earth Online Demo. This page also includes links for bug reporting and forums to ask for help (also see Part 5).
 - iv. The **Account** page lists information such as user statistics and allows users to update their account settings.
 - v. There is a purple ? in the top right corner of the screen. Clicking on this will bring up the help interface, which provides information about CEO's features. These help interfaces are available for the Home page, for Data Collection and for Project Creation.

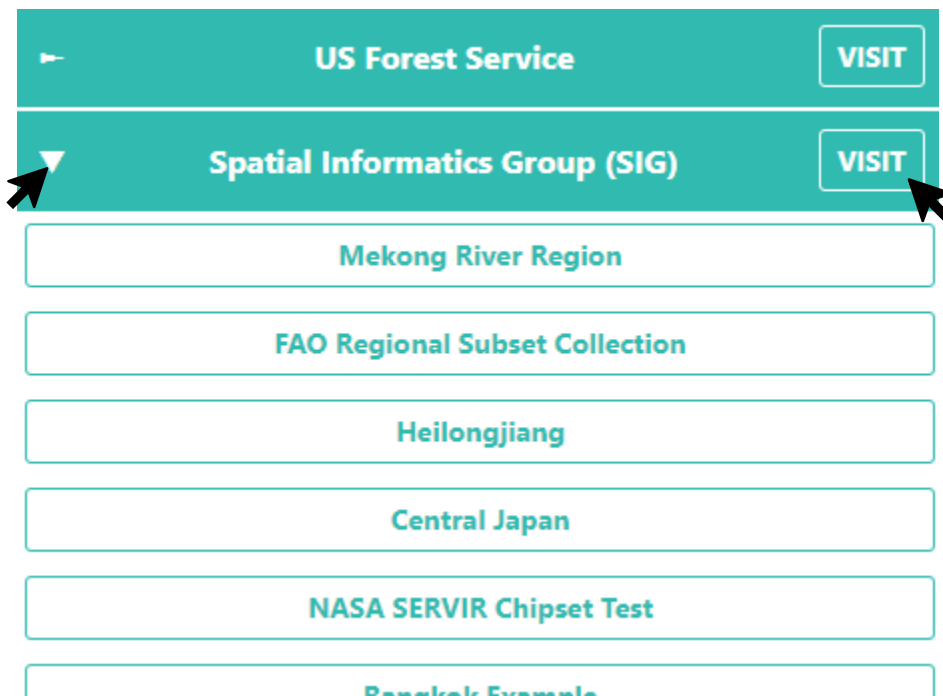


CEO will be adding dynamic “My Institutions/My Projects” tabs along with more detailed Account pages. This will make it easier to access your institutions and projects.

Part 2: Joining Your Institution

A. Navigating the list of institutions & institution pages

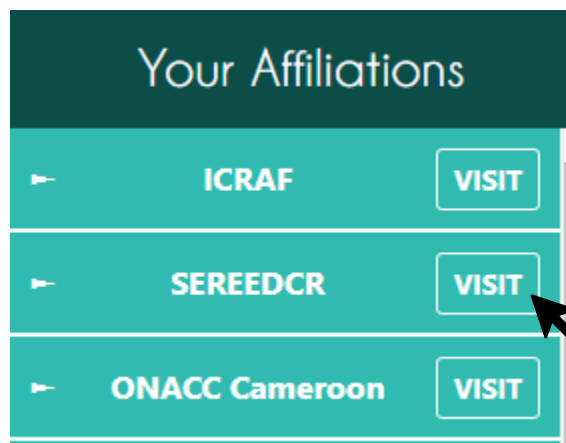
1. A list of all institutions is displayed on the **Home** page.
2. If you are logged in, this list is broken into two: **Your Affiliations** and **Other Institutions**. **Your Affiliations** are institutions to which you belong.
3. Clicking on an institutions' name expands a list of all active **Projects** for the Institution. Clicking on these projects will take you to the project's Data Collection page (see Part 4).



4. Next to each institution's name is a **[VISIT]** button. Clicking on this will open the **Institution** page.
5. On any Institution info page, you can find:
 - i. The institution's logo, which when clicked will take you to the institution's website link,
 - ii. The institution's name,
 - iii. A short description of the institution,
 - iv. Imagery feeds available to the institution,
 - v. The institution's projects, and
 - vi. A list of all registered users associated with the institution.

B. Request to join an institution

1. If your institution already has an account on CEO and you would like to request to be a member, start by navigating to the Institution page via the info button described in A.2-4 above.
2. The list of Users is contained under the **Users tab**. Click on this tab.
3. Click on the yellow **[Request Membership]** button to be considered to join the institution.
4. The institution's administrator will need to approve your application to the institution.
5. You will receive an email when you are added to the institution or if your role inside the institution changes (e.g. if you are promoted to admin).
6. Once you are part of an institution, the **Institution** panel on the **Home** page will show your institutions. This makes it easier to access these institutions and their projects.



Part 3: Preparing for Data Collection

Several publicly available mapathon projects are featured in the map window on the **Home** screen. Anyone with an internet connection can log into Collect Earth Online and begin collecting data for these projects.

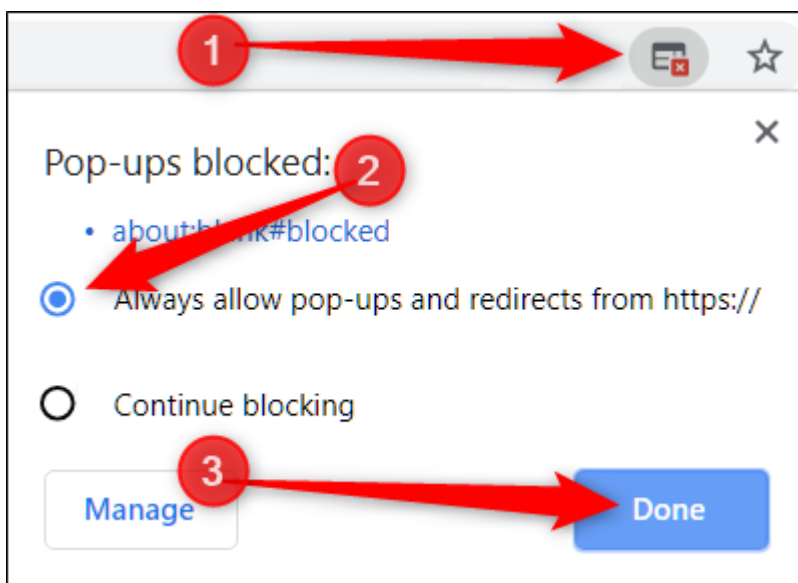
Other projects require users be a member of either an institution or a project. These security levels are pre-determined for each project by the project manager.

A. Allow pop-ups

1. If it is your first-time collecting data with Collect Earth Online, or you have switched computers, you may need to allow pop-ups from the CEO site. CEO uses pop-up windows to display additional, relevant information about each plot through the Geo-Dash interface.
2. How to enable pop-ups varies based on the browser you are using. The most used browsers are discussed below. However, if your browser is not covered, simply search online for your browser name + “allow pop-ups” and the search engine should return relevant results.
3. For Google Chrome:
 - i. Check the address bar. If it is marked with a Pop-up blocked icon (see image below), click on the **[popup blocked]** warning.



- ii. In the popup window that appears, select **Always allow pop-ups from https://collect.earth/**. Then click **[Done]**.

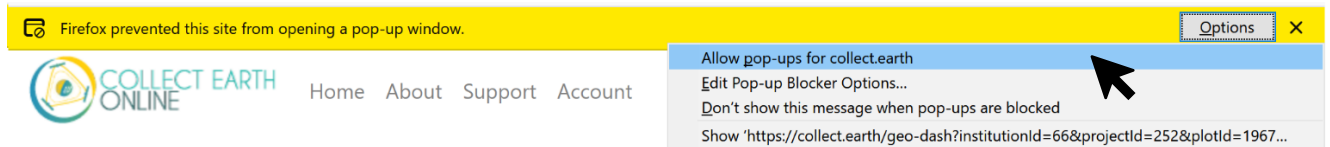


iii. If there is no icon, follow the directions here:

<https://support.google.com/chrome/answer/95472>

4. For Mozilla Firefox:

i. Check for a yellow bar below the address bar (see image below). If there, click on the **[Options]** button.

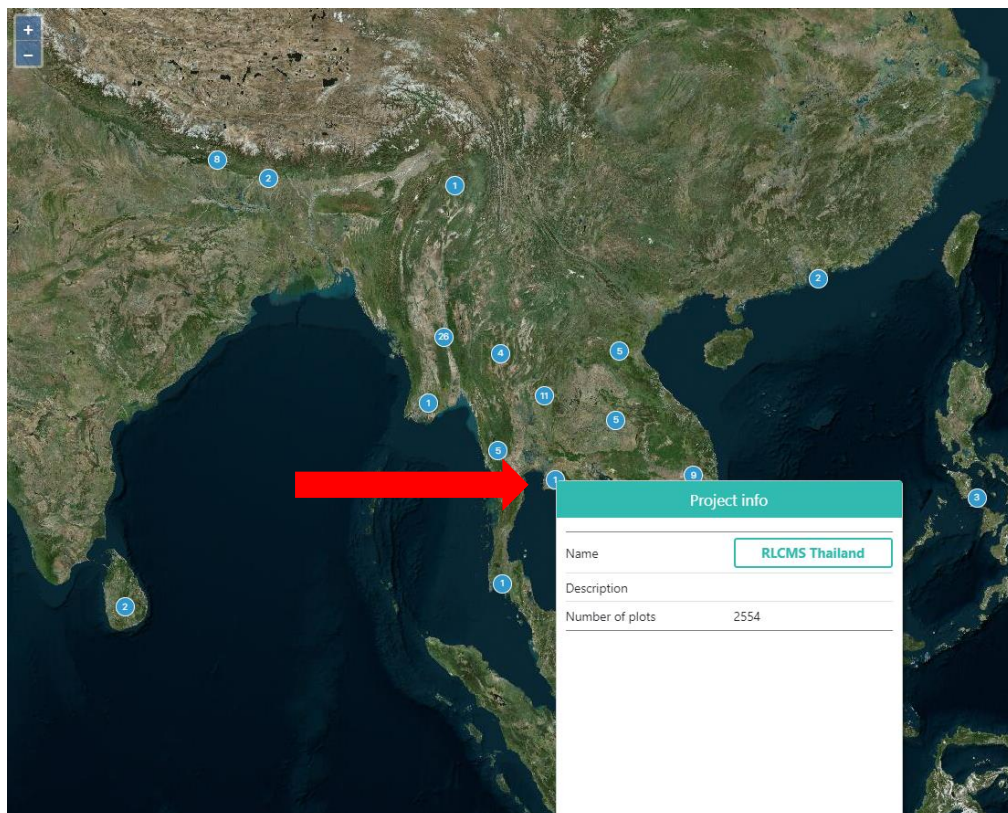


ii. In the popup window that appears, select **Allow pop-ups for collect.earth**.

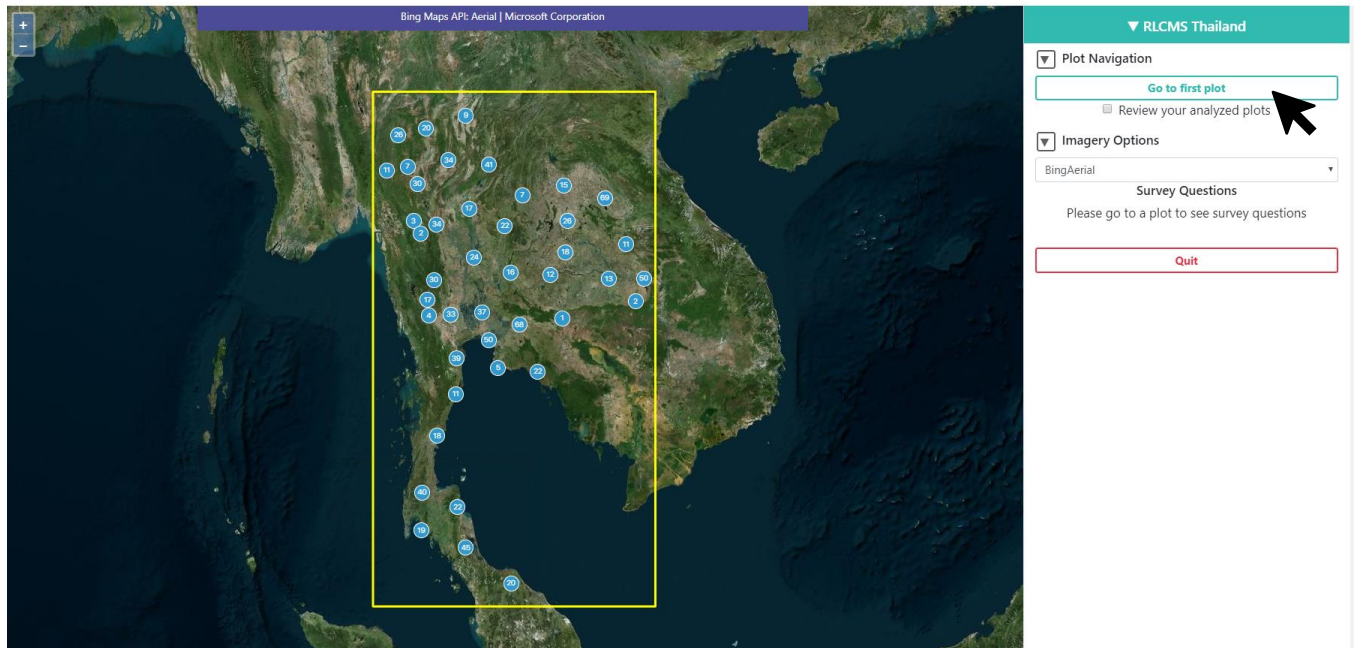
iii. If there is no icon, follow the directions here: https://support.mozilla.org/en-US/kb/pop-blocker-settings-exceptions-troubleshooting#w_pop-up-blocker-settings.

B. Option 1: Work on a public project

1. From the **Home** page, you can begin collecting data on public projects. There are map pins representing each project at the project location.
2. Select a project by first clicking on a map pin. Then from the pop-up **Project info** menu, click on the name of one of the projects in the pop-up window.



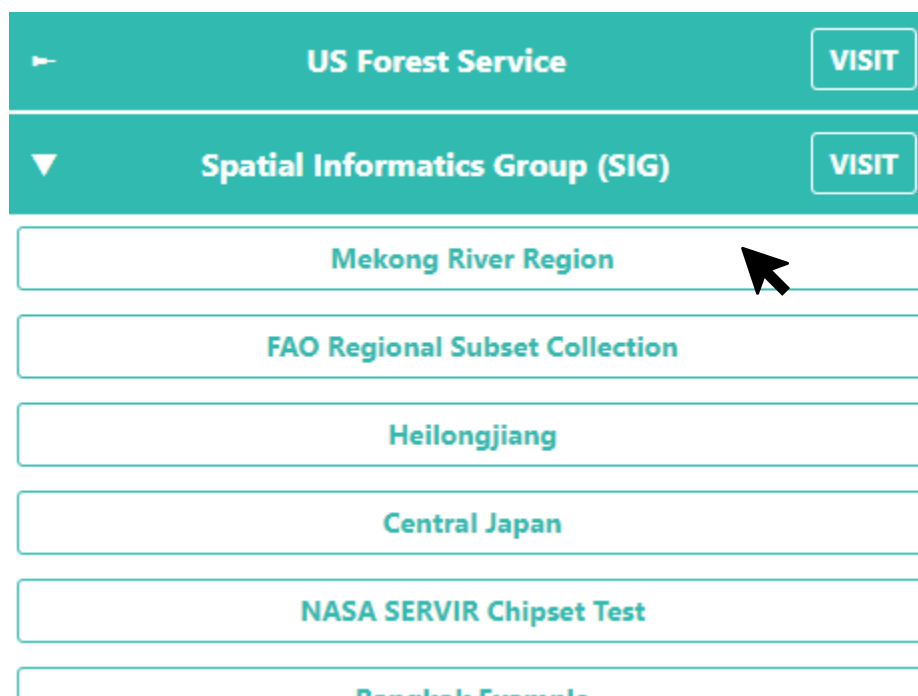
3. This will take you to the **project's homepage**, a screen that shows a **Map** of the whole study region on the left & the **Data Collection Toolbar** on the right.



4. Under **Plot Navigation**, Click the green **[Go to first plot]** button to begin collecting information.

C. Option 2: Select a project from an institution

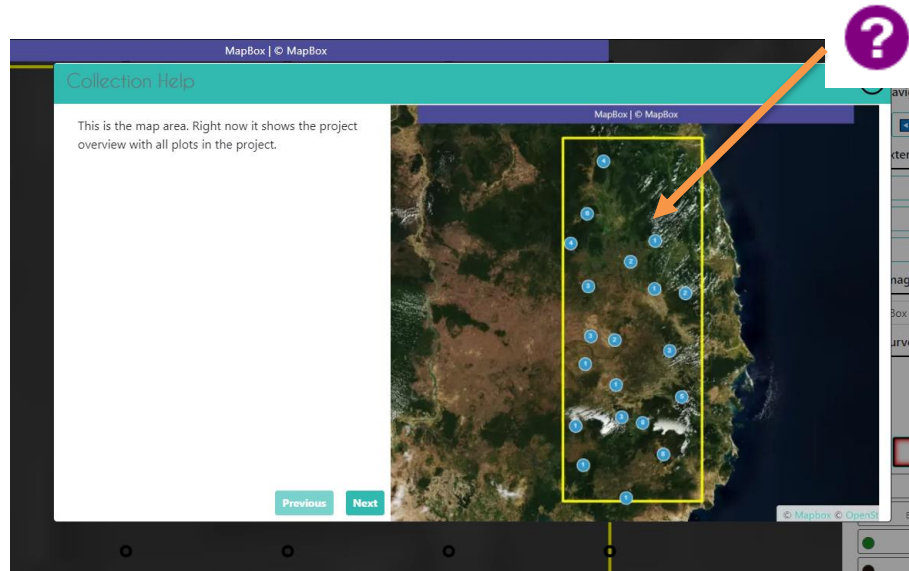
1. If your institution has a specific project you want to work on, make sure you are logged in and then click on your institution's name on the left-hand side of the **Home** page. You may want to use the **Enter text to filter** box to find your institution.
2. A drop-down list of the institution's available projects will open. Select the project of interest by clicking on the project's name.



3. This will take you to the project's home screen as described in B.3 above.
4. Click the **[Go to first plot]** button to begin collecting information.
5. You can also go to a project through the **Institution's** page via the **info button** described in A.2-4 above.
 - i. There are three colors of projects on the **Institution** page. Blue-green highlighted project names have completed data collection.
 - ii. Yellow project names are partly collected.
 - iii. Red project names have no data collected.

D. The analysis screen

1. You can access help for the analysis screen at any time by clicking on the purple ? in the top right hand corner of the screen. The help function will point out important features of the data collection page.



2. First, make sure you clicked the **[Go to first plot]** button.
3. Familiarize yourself with the analysis screen. On the left hand side is the map window:
 - i. Your **sample plot** will show up as a yellow circle or square in the map window. The sample shape is dependent on how the project has been designed.
 - ii. Each **sample point** is identified with a black circle until it is assigned a label.



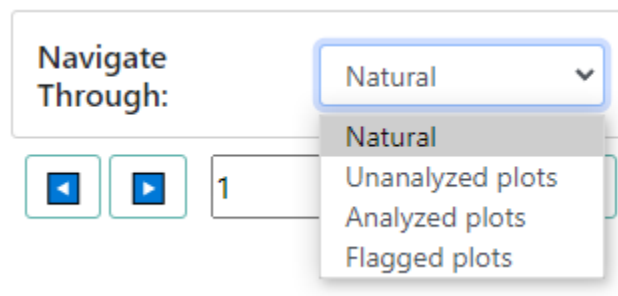
You can change the color of the unassigned sample points from black to white by selecting the corresponding color radio button next to “Unanswered Color” on the right-hand panel.

- iii. You can zoom in and out using the blue + and – buttons in the upper left-hand corner of the map window, or by scrolling your mouse wheel.
- iv. Information about the imagery source is shown at the top of the screen.

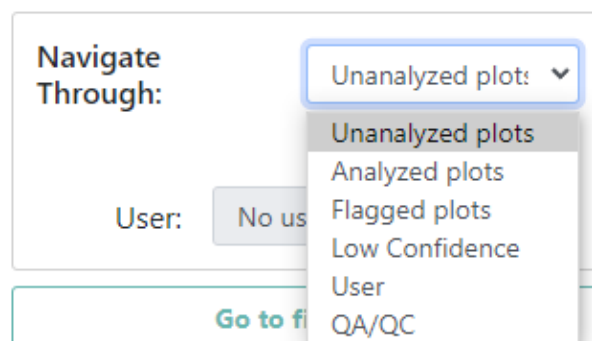
4. On the right-hand side are all of the navigation, imagery, and survey options.

5. **Navigation** options:

- i. As an institution Member, the **Navigate Through** dropdown menu allows you to choose between:
 - (a) **Default:** This will navigate through plots assigned to you and any available unanalyzed plots. In general, you will not need to switch the navigation mode from this option.
 - (b) **Unanalyzed Plots:** This option allows you to collect data on unanalyzed plots to contribute to your project.
 - (c) **Analyzed plots:** Review your previously analyzed plots. This option will allow you to correct mistakes etc. for previously analyzed plots.
 - (d) **Flagged plots:** Review plots you have flagged (see Part4 A below).



- ii. As an institution Administrator, the **Navigate Through** dropdown menu ALSO allows you to choose between:
 - (a) **Analyzed plots:** Examine plots analyzed by any user.
 - (b) **Flagged plots:** Examine plots flagged by any user.
 - (c) **Low Confidence:** Examine plots with low plot confidence.
 - (d) **User:** Examine plots collected by any user. A dropdown menu allows you to choose which user.
 - (e) **QA/QC:** Examine plots where the collected answers have more than a specified level of disagreement. You can also click the **View Disagreements** button to examine user's responses side by side in a separate window. See the Institution and Project Creation manual for more information.



- iii. Under this dropdown menu is the **Plot ID number**.
- iv. The navigation menu contains blue **forward** and **backward** buttons to navigate to different plots, as well as a text box where you can enter a plot ID number and then click **[Go to plot]** to navigate to a specific plot.

Navigate Through: Unanalyzed plots ▼

◀ ▶ 4081426 Go to plot

External Tools

Re-Zoom Geodash

Download Plot KML

Go to GEE Script [Optional]

6. External Tools options

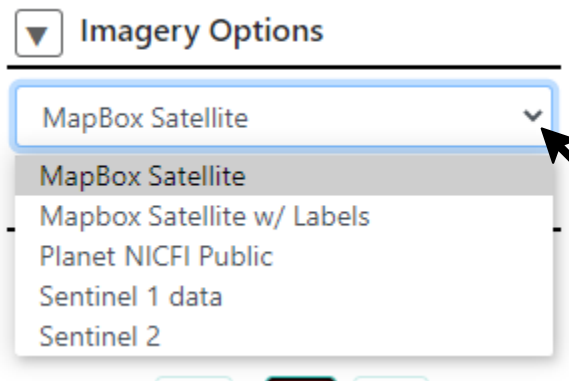
- i. Click **[Re-Zoom]** to return your focus to the focus plot
- ii. Click **[Geodash]** to open the **GeoDash** pane with additional information about the plot (described in Part 4).
- iii. You can click **[Download Plot KML]** to download a KML file with the plot information. .
Downloading the KML allows you to transfer the plot information to another program, such as Google Earth. Importantly, the KML functionality allows users to determine the coordinates (latitude and longitude) at which points of interest are located.
- iv. The **Go to GEE Script** button may or may not be present on your dashboard. If it is present, it will take you to an Earth Engine Apps website displaying additional data about the plot.
 - (a) This screen will have 6 panels. On the far left, there is a Sentinel 2 composite of the last 12 months. They are colored as infrared color composite (near infrared, mid infrared, red). Reddish brown is forest, agriculture, grass, and shrubs are a lighter shade of orange. Water is purple, and urban areas are shades of blue and green.
 - (b) In the center are Landsat 8 and Landsat 7 Color Yearly mosaics, with a slider so you can choose between years.
 - (c) On the right are NDVI graphs of the plot from MODIS, Landsat 7/8, and Sentinel 2. For the Landsat 7/8 and Sentinel graphs, you can click a point on the graphs to load specific images in the left and center panels.

7. Imagery Options

- i. Using the dropdown under **Imagery Options**, you can change the background image by selecting between different imagery on the drop-down list.

- ii. Different images are helpful for comparing different points in time and/or where one imagery source does not have enough detail to answer the **Survey Questions**. Some imagery options also include the names of towns, villages, etc.
- iii. You may need to click [**Update Imagery**] to update the imagery when you select a new imagery source.

Some imagery servers are slow. Please be patient when switching to sources like Planet Daily, since their servers take about 30 seconds to respond to queries sent by the CEO platform.



8. Survey Questions

- i. This is the area to answer the project's **Survey Questions**.
- ii. Each project has a different set of numbered survey questions (in the example below only "1" question is in the project).
- iii. You can navigate between questions using the forward and back arrows or the numbers.
- iv. The **Unanswered Color** radio button changes the color of the survey points.
- v. Your project may have a **confidence slider**.
- vi. The **Save** button will save your survey answers and move on to the next point (it only becomes active when all points have been interpreted).
- vii. **Flag Plot** is used when a survey question cannot be answered, either because the imagery is not of high enough quality or there is another problem; this will advance to the next plot. When you flag a plot, a text box will appear so that you can type in why you flagged the plot. For example, you might write "Cloud" if there is a cloud in the imagery over the plot.
- viii. **Clear All** erases all your survey question answers for this plot.
- ix. **Quit** will return you to CEO's **Home** page. If you try to leave the page without saving your answers, you will receive a warning and reminder to save your answers if appropriate.

Survey Questions

Unanswered Color
☒ Black
☐ White

<

1

>

-

LULC

Built Surface	Shrub
Built Veg. (non-tree)	Grass
Built Tree	Crop
Mining	Aquaculture Pond
Mudflat/Beach	Aquatic Veg. Other
Barren Other	Water
Tree Plantation/Orchard	Snow & Ice
Tree Mangrove	Unknown
Tree Other	Other

Flag Plot

Clear All

Save

Quit

9. Survey questions with user-drawn samples

- Your project may have been set up to allow for user drawn samples.
- If so, you will see two icons under **Survey Questions**, a question mark and a pencil.
- When you have the question mark selected, the Survey Question interface will work as we just discussed.

Survey Questions

Unanswered Color
☒ Black
☐ White

<

1

>

-

What land cover?

Water	Agriculture
Forest	Other
Urban	

- iv. However, if you select the pencil icon, you will see the options that allow you to draw different points, lines, and polygons on the map.
- v. You can switch between the different shapes by clicking on their respective icons. Note that your project administrator may have restricted the types of geometries (point, line, polygon) that you can create.

Survey Questions



Point tool



LineString tool



Polygon tool

How To:

- To modify an existing feature, hold ctrl and click to drag
- To delete a feature, hold ctrl and right click on it
- To save changes, switch back to question mode and answer remaining questions

10. The **GeoDash** pop-up window will also open with information about the plot if it has been configured for the project. This window contains information to help identify land cover and land use attributes compiled from Google Earth Engine. Depending on the project, Geo-Dash can include plots of time series data (such as how NDVI values have varied over time), Landsat image chips, and more. See Part 4 for more information.

E. Familiarize yourself with satellite imagery & photo identification

1. The landscape looks very different from above than it does from the ground! If you have been on a plane, think about how the world looks from that height. If not, imagine yourself slowly rising higher and higher above the ground. Each person soon becomes a spot, you can only see the shape of the roof of each building, trees turn into circular green blobs (or spindly brown, depending on the season). Consider looking at where you live with satellite imagery first. Use your local knowledge to see what roads, buildings, lakes, trees, and more look like.
2. Here are some sample images illustrating different land uses. All images are courtesy of Bing Maps.
 - i. Forest



(a)

Conifer forest



(b) Deciduous Forest
(Temperate)

ii. Pasture



(a) Canada

iii. Agriculture



(a)

Western US (arid)



(b)

(temperate)

Midwestern US

iv. Water-Lake



Myanmar

v. Water-River



Guatemala

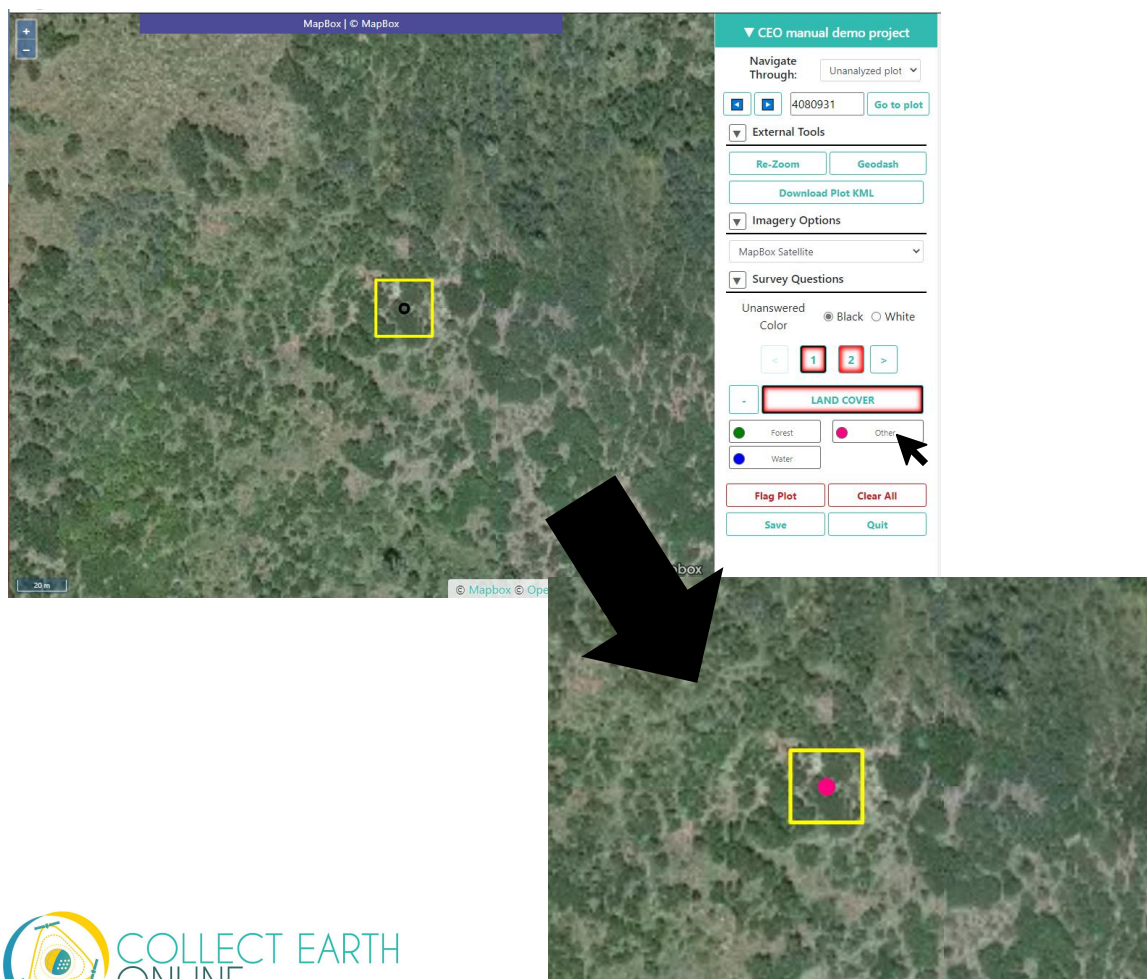
3. Remember that depending on the study region, seasons may change how the landscape looks.
4. Here are some additional resources to help you learn how to visually interpret forests, grasslands, buildings, and more.

- i. <https://earthobservatory.nasa.gov/features/ColorImage>
- ii. <https://www.amnh.org/research/center-for-biodiversity-conservation/capacity-development/biodiversity-informatics/remote-sensing-guides>
- iii. <https://www.amnh.org/research/center-for-biodiversity-conservation/capacity-development/biodiversity-informatics/remote-sensing-interactives>

Part 4: Start Collecting Data!

A. Analyze some plots!

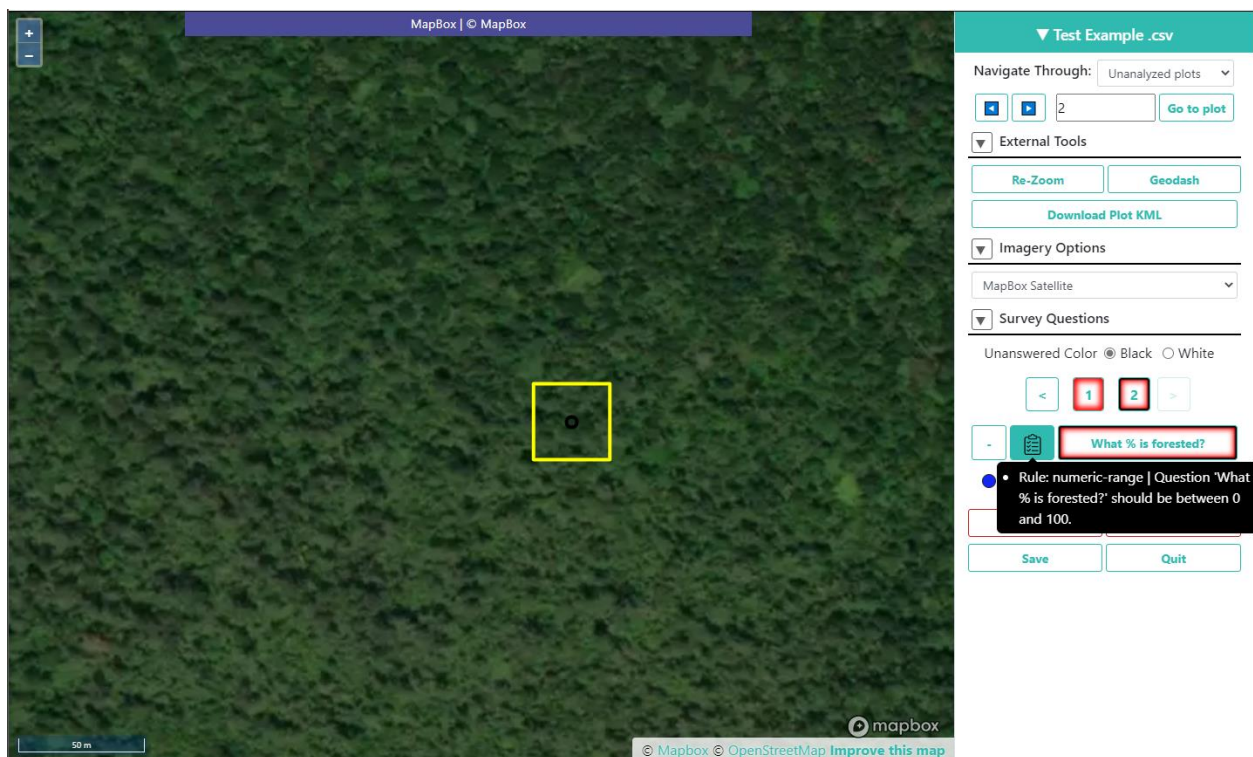
1. Now it is time to contribute to the project.
2. Read the first Survey Question and the possible answers.
3. If you want to assign the same class or answer to ALL points in the plot (prior to having applied an answer to any of the points), you can just click on the answer without first needing to select the points.
4. If you want to assign different classes or answers to points in the plot, you will first select your sample points. When sample points are selected, they turn blue.
 - i. To select a single sample point, click on it with the left mouse key.
 - ii. To select several sample points, click on them while keeping the Shift key pressed down.
 - iii. To select all points in the sample or all points in a rectangle, hold down Ctrl, then click, hold, and drag in the map window to draw your rectangle.
5. When your sample points are marked in blue, you can assign them a sample value by clicking on the suitable value in the legend to the right of the map window. The sample points are then marked in the color of the value class. Here, these sample points are not forest (shrubland), so we select Other.

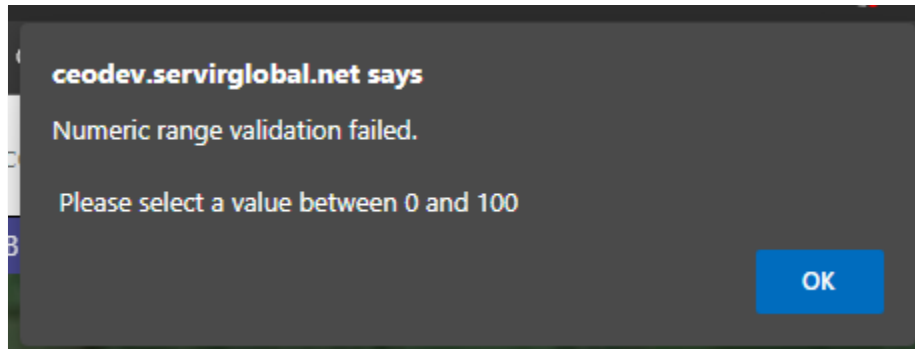


- i. If it is hard to answer the question because the basemap imagery does not provide enough detail, try changing the imagery as described in Part 3 D.2.ii above.
 - ii. You may also want to change the basemap to check for seasonal effects (See also Part 4 B.2 below).
 - iii. Try zooming out to gather context clues from the landscape (See also Part 4 B.3 below).
 - iv. If you make a mistake and assign the wrong value to a point or points, you can reselect the points & change the assigned sample value.
6. If there is a second survey question, click on “2” or press the **Right arrow**. Read this question & the answers, reselect the points and assign them the correct secondary attributes.

Your project may have “rules,” which help ensure that all answers are logically consistent.

- i. If your project has rules for a survey question, there will be a clipboard icon next to the question text.
- ii. You can hover over the clipboard icon to see the rules.
- iii. If you violate the rules, there will be a popup explaining what is wrong with your answer.



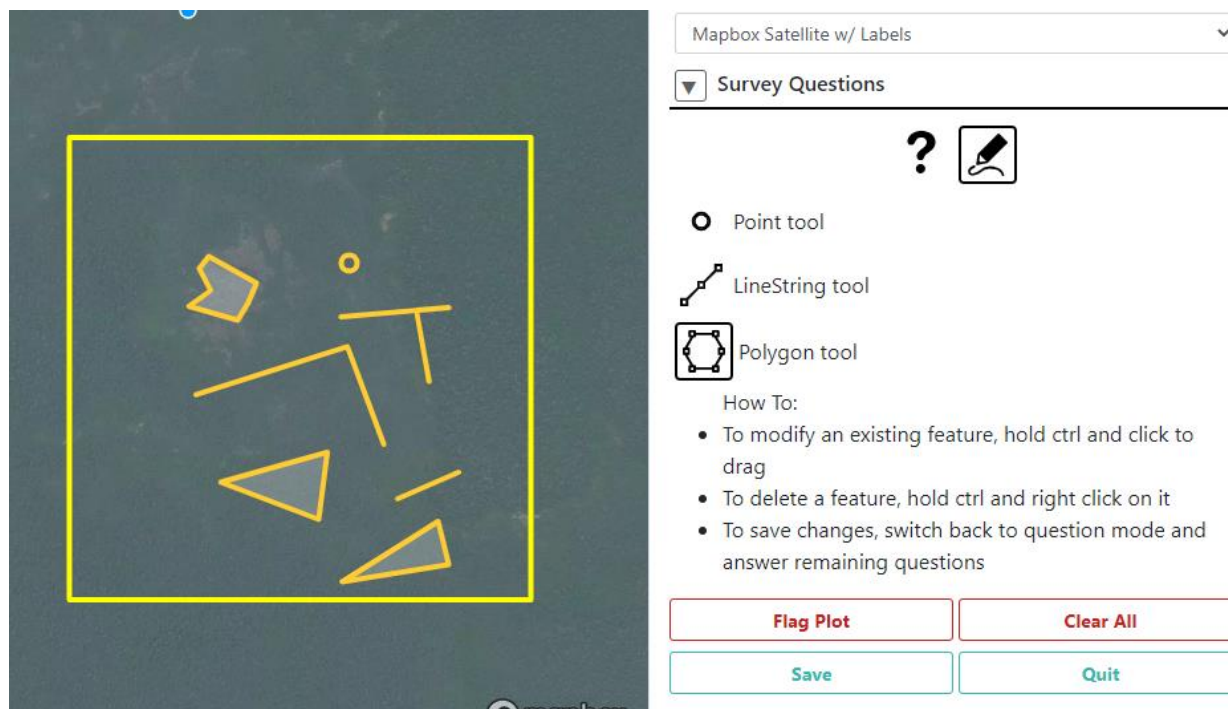


7. Your project may have a confidence slider. If this feature is enabled, simply choose the percentage value that best represents your confidence in your answers, where 100 is totally confident.
8. Continue until all sample points have been assigned a value for all survey questions.
9. Then, click on **SAVE**. You will receive an error message if you have not answered all of the questions.
10. The next plot for analysis shows up automatically.
11. When all plots are classified, a pop-up window appears to inform you that all sample plots of your project are analyzed.

B. User-drawn samples

For projects with user-drawn samples, you will need to first draw your samples before you can answer questions about them. Note that your project administrator may have limited the types of geometries (e.g. points, lines, or polygons) you can draw.

1. First, select the pencil icon.
2. Now, select Point, Line, or Polygon tool as needed for the project.
3. To start drawing, simply click on the map.
 - i. For points, click once for each point you would like to add.
 - ii. For lines, click once for each vertex you would like to draw. To complete the line, right click or double click.
 - iii. For polygons, click once for each vertex you would like to draw. To complete the shape, click on your first vertex or double click.
4. To modify an existing feature, hold CTRL and click to drag
5. To delete a feature, hold CTRL and right click on it
6. To save your drawn shapes, switch back to the question mode.



C. Geo-Dash interface

For some projects, a second page or tab will open automatically when you go to your first plot. This is the **Geo-Dash interface**. Many different elements can be displayed on this interface, depending on what the Institution has set up.

Some of the most commonly used indexes are described here. If your Institution has set up the project with a more complicated **Geo-Dash interface**, contact them for more information on how to use the information provided to assist data collection and photo interpretation.

The normalized difference vegetation index (NDVI) is used to determine if an area contains live green vegetation. In map based representations, dead plants and inanimate objects are represented in one color, while live healthy plants are represented as another color. Which colors these are depends on how your institution has set up the project you're working on. You can use the slider on the NDVI widget to compare the NDVI values with satellite imagery. In numerical representations (e.g. time series graphs) of most natural environments, values below 0 represent dead plants or inanimate objects, 0-0.33 represents unhealthy plants, 0.33-0.66 represents moderately healthy plants, and 0.66-1 represents very healthy plants.

The enhanced vegetation index (EVI) and two-band EVI (EVI 2) are optimized vegetation indexes. They are designed to have higher sensitivity in high biomass regions (e.g. along the equator). As with NDVI, dead plants and inanimate objects are represented in one color, while live healthy plants are represented as another color. Which colors these are depends on how your institution has set up the

project you're working on. You can use the slider on the EVI widget to compare the EVI values with satellite imagery. The index varies between 0-1, with 0 representing dead plants and 1 representing very healthy plants.

The normalized difference moisture index (NDMI) is used to determine the water content of vegetation. Values near -1 indicate plants with low moisture while values near 1 indicate plants with high moisture.

The normalized difference water index (NDWI) is also related to plant water content and plant water stress. Values near -1 indicate low water content and vegetation cover and values near 1 indicate high water content and vegetation cover.

Some projects may set up imagery from two time periods, so you can easily view them side by side.

D. Geo-Dash degradation tool

Your institution may have set up the forest degradation tool in the Geo-Dash interface. This tool provides time series information on forest degradation from selective logging, fire, and other large and small disturbances. Broadly, you can use this tool to observe sharp and gradual changes in the NDFI metric (shown in the bottom panel) and click between the date points to visually confirm the change via imagery (shown in the top panel).



More specifically, the **top panel** is the imagery panel. Imagery will display here over the OpenStreetMap data when you select a specific date in the **bottom panel**. The **slider bar** allows you to choose the opacity of your imagery. Under **Band Combination**, 321 stands for true color composite (R,G,B) and 543

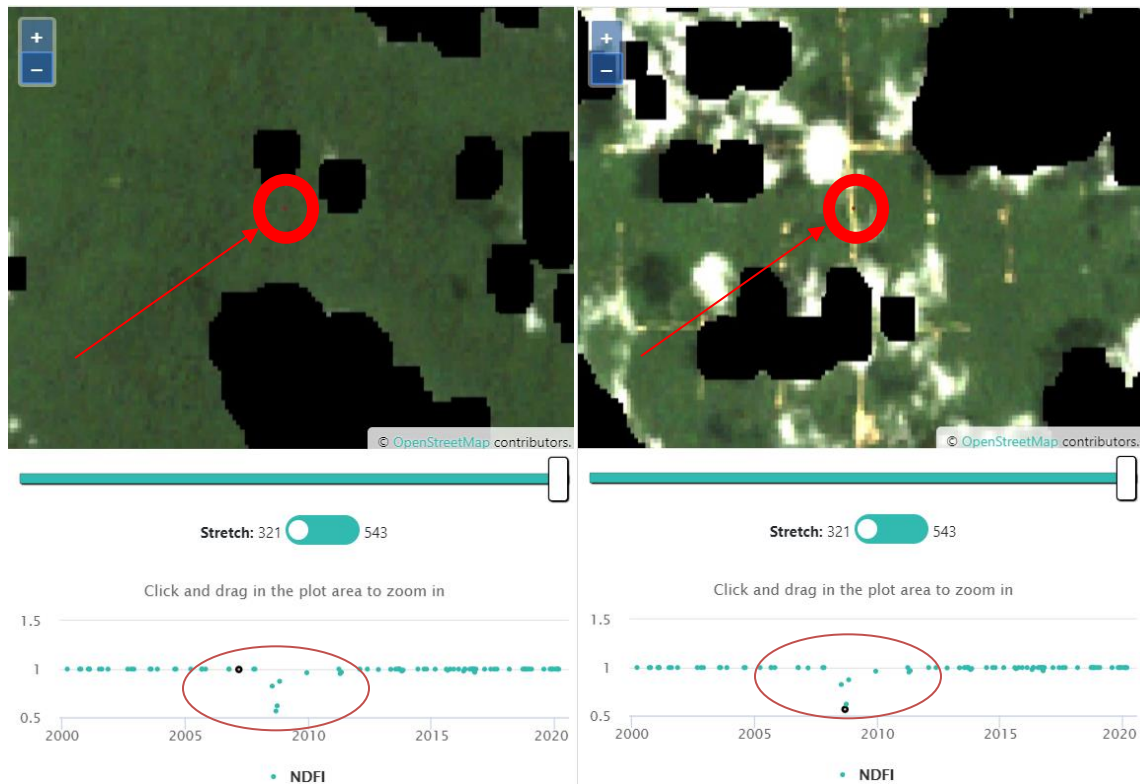
stands for false color composite (SWIR, NIR, R). Using the **Data** toggle, you can choose between Landsat or SAR data.

The **bottom panel** shows a time series graph of NDFI (most common) or another metric. Values of NDFI between -1 and 0 generally indicate areas that have been logged (and burned, most likely). Values of NDFI near +1 indicate intact forest. Values near .5 suggest selective logging or diffuse canopy damage. Each dot represents one time period where there are data for your sample plot.

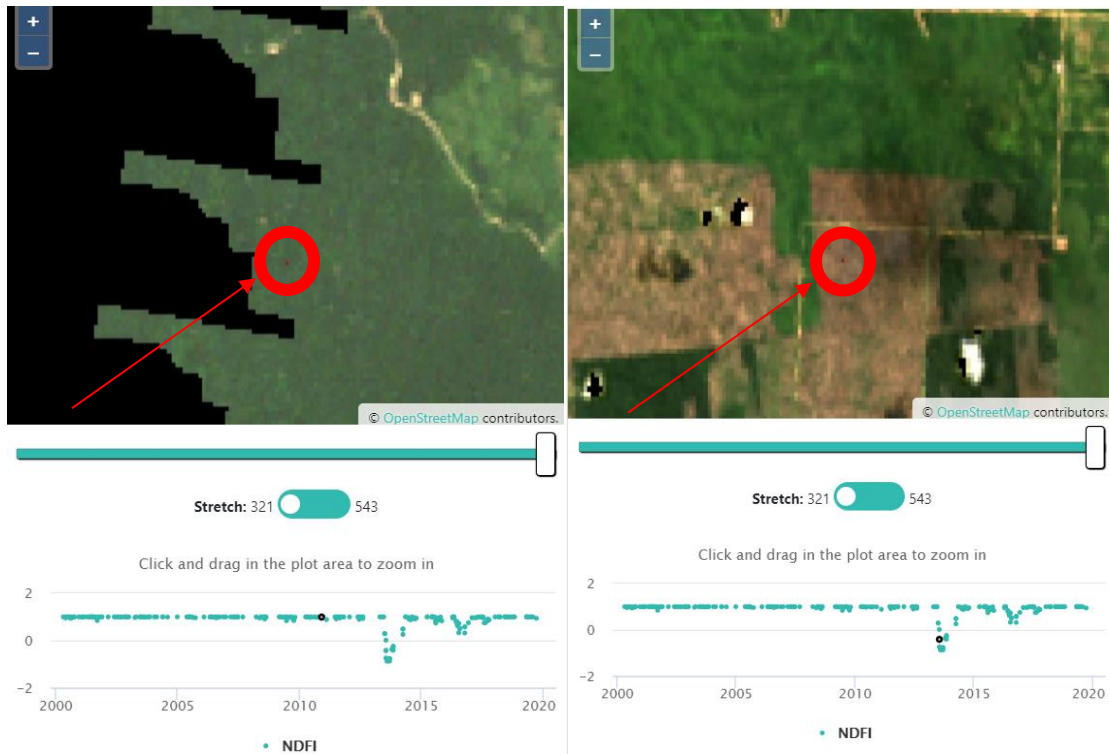
To use this tool:

1. Move the toggle to the imagery **Data** you would like to see: LANDSAT or SAR.
2. If you have chosen LANDSAT, choose the **Band Combination** you would like.
3. Pause while the time series graph loads.
4. Examine the time series graph for any cyclical patterns (indicating seasonal changes). These are present in deciduous forests, but might not be present (e.g. in the Amazon rainforest).
5. Then, look for any abrupt changes (usually sharp decreases) or gradual changes (usually gradual increases). These indicate potential degradation & recovery events.
6. Click on an individual date (blue circle) on the graph in order to bring up imagery for that time period. You may have to wait for the imagery to load.
7. Click between different dates on and around your suspected event to visually confirm that an event happened and determine the type of event. Here are some examples:

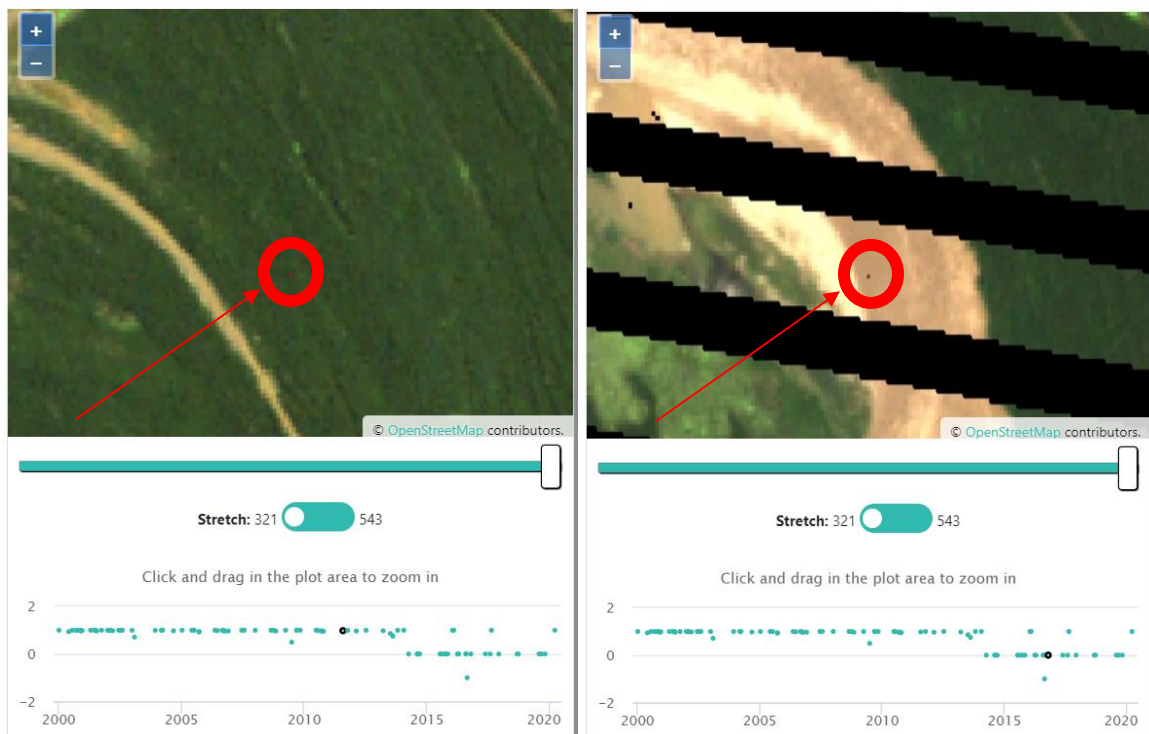
A sharp decrease in NDFI (often accompanied by a gradual recovery) may indicate selective logging. The left panel shows the landscape before; the right panel is after the event. We can see that at our sample plot, a road has been created. This would be a degradation event around 2009 with a recovery lasting 2-3 years.



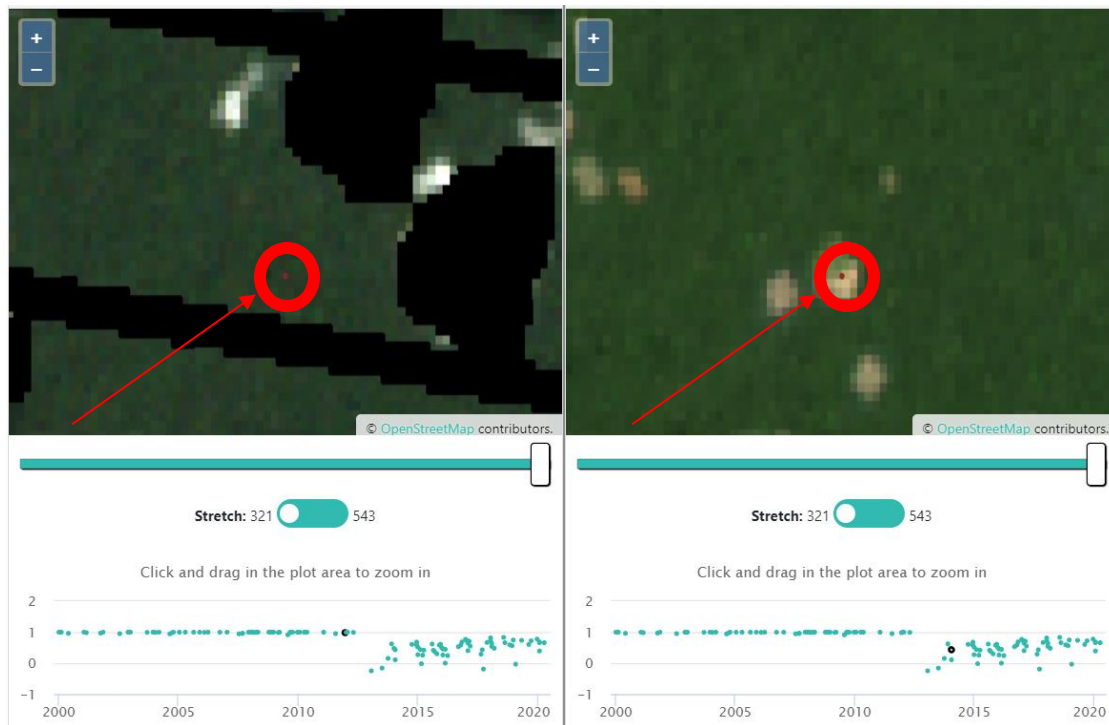
A sharp decrease in NDFI might also indicate a fire.



An abrupt shift down with no recovery might indicate the migration of a river canal::



An abrupt shift down followed by a strong seasonal pattern (regular increase/decrease) may be forest clearing for agriculture.



E. Advanced plot analysis

1. For analyses comparing two time periods, toggle between imagery from two different dates.
 - i. You may need to click **[Update Imagery]** when toggling between different imagery sources.
 - ii. Your institution should have set up the project with two labeled imagery options for the time periods of interest.
 - iii. Click the **drop-down menu** under **IMAGERY OPTIONS** and select the earlier of the two time periods.
 - iv. Then, repeat this for the later of the two time periods.
 - v. Some imagery options allow you to enter imagery start and end dates.

Start Date

01/01/2019

End Date

02/01/2019

- vi. Some imagery options also allow you to choose a feature profile for the imagery. This is essentially a filter that the imagery provider puts on their data. For example, the Cloud Cover Profile filters out imagery with too much cloud cover.

Cloud_Cover_Profile

- vii. For the Planet Daily data, you will see a list of checkboxes pop up just to the left of the **Imagery Options**. You can use these checkboxes to refine the dates of the map data you want to see displayed. Planet Daily imagery is received as a stack of images. CEO displays the imagery and the checkboxes in the same order that Planet Daily provides this imagery stack. That is, the top date is also the top layer in the imagery stack. If you turn the top image off by unchecking the box, you will see the next date's image is now on top. It is like looking through a stack of photographs, removing the top one reveals the photo underneath.

☒ 2019-01-04 ^

☒ 2019-01-18

☒ 2019-01-13

☒ 2019-01-20

☒ 2019-01-25

☒ 2019-01-06

☒ 2019-01-11

☒ 2019-01-02

☒ 2019-01-03

☒ 2019-01-05 v

- viii. If your project uses SecureWatch Imagery, you will be able to select a range of dates (under **Select Range**) or specific dates (under **Select Dates**). Your institution will have set a default range of dates when the project was created. The list of **Available Dates** will automatically populate with the available dates for the sample plot you are looking at. When you answer a

question, the date or range of dates will be recorded. Please refer to any specific instructions your institution has given you regarding which imagery options to use for SecureWatch.

Imagery Options

SecureWatch2

☐ Select Range

Start Date

01 / 01 / 2014

End Date

05 / 05 / 2020

Feature Profiles

Default

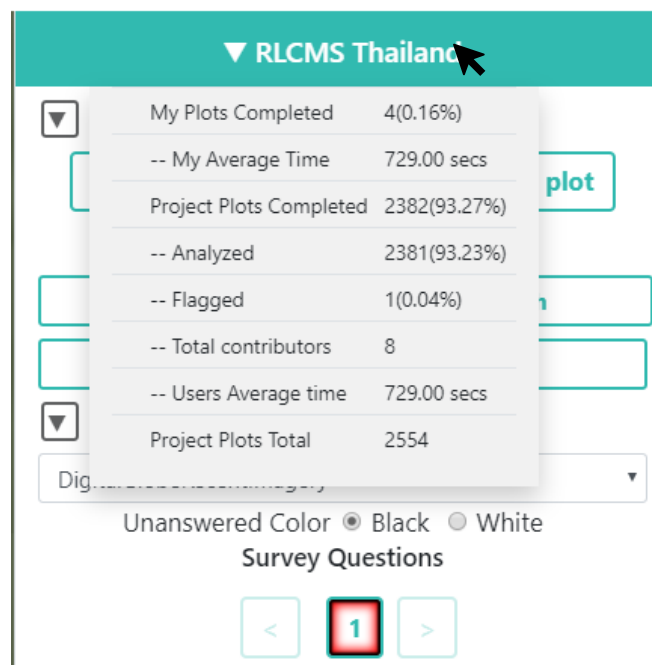
☒ Select Dates

Available Dates

-- select a date --

- ix. Make sure you also refer to the second tab, where the Geo-Dash information is presented. The time series information that is presented in the Geo-Dash window is also helpful in determining if change has occurred on the landscape.
 - x. If both images look the same, no change occurred, so we select all points and label them as no change or stable.
 - xi. If there has been change, select the appropriate change option.
 - xii. Repeat for all Sample Value categories.
2. Seasonality issues can occur when different land uses appear different between seasons. For example, a grassland might be bright green in spring but look brown in the summer. If you saw just the brown imagery, you might think the brown is dirt and incorrectly classify the grassland as barren dirt.
- i. To avoid this issue, try switching between different imagery that is available to you. Look to see if there is imagery available from different seasons to help with your decision.
 - ii. You can also look at the Geo-Dash page for the plot to see if there is any NDVI or other additional information that could help you.
 - iii. You can also click on **Download Plot KML** to download a .kml file to view in Google Earth. Google Earth has multiple current and historic imagery sources that can help you identify a plot.
3. Zooming in and out to gather contextual clues from the landscape is important for multiple land use and land cover types. For example:

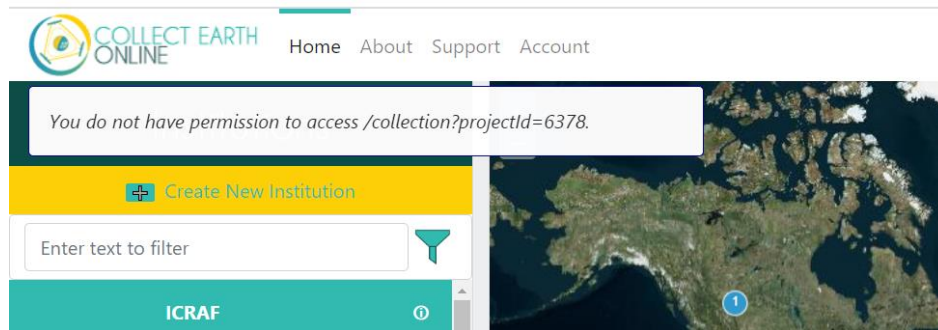
- i. Water in larger waterbodies often appears black or dark until you zoom out.
 - ii. Tree plantations may look like forests until you zoom out and see the regular pattern of planted trees.
4. You can click **[Flag Plot]** if the imagery is insufficient (missing, low resolution, etc.) to accurately label the plot attributes. It will automatically reload the next plot for your project.
 - i. **Flag Plot** will delete any attributes that have been assigned to the points/plots.
 - ii. Using **Navigate Through** set to **My Analyzed Plots** you can return to the flagged plot and try to answer the questions again. The **flag plot** button will be disabled because the plot has already been flagged and you cannot flag it again.
 - iii. Your responses will be recorded, and the plot will be unflagged if you click **Save**.
 - iv. Plots can either be flagged or saved by a user, but not both.
5. Sometimes plots are hard to interpret, even with good imagery! These plots can only be reliably and accurately classified by having knowledge of local agricultural systems, local vegetation types, and landscape patterns.
 - i. Try making use of the surroundings of the plot to glean as much information as you can before making a best guess.
 - ii. If different users identify the plot differently, it will be flagged internally as a difficult plot.
 - iii. If you do not feel comfortable interpreting the plot, you should click **[Flag Plot]**.
6. At any time, you can skip a plot for later analysis by clicking the **[Next Plot Arrow]** in the **Plot Navigation** tab. Alternatively, click on **[Previous Plot Arrow]** to revisit the previous plot
7. If you click on the project name, it will show the number and percent of plots completed, the number and percent of plots flagged as bad, and the total number of plots. An accuracy score based on the project's training data will also be available soon.



Part 5: Troubleshooting

A. Analysis troubleshooting

1. If you try to access a project and receive an error message saying you do not have permission (as below), access to the project is limited to institution members. You will need to join your Institution per the steps in Part 2: B.



2. If you are on a **project's homepage** and click on a plot and get an error window (e.g. if the plot is not found or if that plot has already been classified), after you click through the error there will be no plots on the map. You can either click on Go To Plot and have the first plot for analysis show up or reload the page to get all the survey plots back.
3. While collecting data, if you try to return to a previous plot you analyzed to review it and receive an error message, make sure you have the **Navigate Through** dropdown set to **My Analyzed Plots**.
4. If the background is completely black, the imagery resolution might be too low for the automatically set zoom level. Alternatively, the plot might be in a large waterbody. Zoom out until you see some more map context to confirm whether the issue is imagery resolution or a waterbody.
5. If the background of a new plot is grey, green, brown, or any solid color, the imagery resolution is too low for the automatically set zoom level. Zoom out a bit to display the imagery.
6. If the background of a new plot is white, the currently selected imagery does not exist for the current plot. Choose a different imagery.

B. Advanced troubleshooting

1. Interpreting time period represented by Map Box, Bing Maps and other dateless sources. . Map tiles provided by these sources are created from multiple different satellite images captured over multiple days, months, or years. This means that the image does not represent a specific point in time. For this reason, CEO does not display one date for these imagery sources.
2. Browser cache clearing

- i. You may get the message “This plot has already been analyzed” in error when you know that the plot has not been analyzed (e.g. it is a new project).
 - ii. If this happens, try clearing your browser cache. Instructions will change based on your browser.
 - (a) For Chrome: <https://support.google.com/accounts/answer/32050?co=GENIE.Platform%3DDesktop&hl=en>
 - (b) For Firefox: <https://support.mozilla.org/en-US/kb/how-clear-firefox-cache>
 - (c) For Edge: <https://support.microsoft.com/en-us/help/10607/microsoft-edge-view-delete-browser-history>
3. Image cache clearing.
- i. Clear the local storage from the browser console line to remove the cache.
 - ii. You can do that by opening the browsers console and running: **localStorage.clear()**
4. Geo-Dash is opening in the same tab when opening a new plot.
- i. This is usually caused if you are copy and pasting URLs in your browser, and you cut and paste a new link into the ‘Geo-Dash’ tab. This tab is labeled by the browser as the Geo-Dash tab, so when you go to the new tab, CEO tells your browser to put the new plot’s Geo-Dash in the Geo-Dash tab.
 - ii. If you copy your CEO URL (e.g., for the collection page) into the "_geodash" tab, then when you try to visit a new plot, CEO will disappear and the Geo-Dash widgets will be displayed in that same tab. CEO uses a named "_geodash" tab to keep the Geo-Dash widgets in one place. Otherwise, they would spawn a new tab for every single plot that you visit.
 - iii. All you need to do to avoid this situation is to not copy your CEO URLs into an open Geo-Dash tab.

C. Report an issue and request new features

When you click on the **[Support]** page on the menu bar, there is a link to the GitHub issues page. This page is also available at: <https://github.com/openforis/collect-earth-online/issues>.

If you discover any of the Collect Earth Online functions are not working properly or would like to suggest an additional feature, you can use this page to log an issue or suggestion. Once logged, these messages go directly to the Collect Earth Online developer team.

You will have to either log in or set up a GitHub account in order to log an issue. By logging in, the development team can contact you in case they need additional information to provide a solution to the issue or feature suggestion. Alternatively, if you are unable to register an account with GitHub, you can ask questions on the OpenForis forum, which is available here <http://www.openforis.org/support>.

1. When you have a GitHub account, [navigate to the CEO GitHub Page](#).
2. To log an issue or request a new CEO feature, simply click on the green **[New issue]** button in the upper right-hand portion of the screen.
3. Type in a title that conveys the topic of the issue or request.
4. Then below, type in a detailed message summarizing the issue you have encountered or the additional functionality you would like to see in CEO.
5. Once you have finished providing the details, click the green **[Submit new issue]** button. This will log your request.