

LandCART Alpha Testing V.A.3

LandCART is a NASA-funded collaboration between the BLM, UCLA, and the USGS.

2019.08.09

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LANDSCAPE COVER
ANALYSIS AND
REPORTING TOOLS

LANDCART

LANDSCAPE COVER ANALYSIS AND REPORTING TOOLS

ALPHA TESTING GUIDE (V.A.3)

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VERSIONS

LandCART V.A.1 released 14 June 2019

<https://bodaciouszhou.users.earthengine.app/view/landcartdemocombine3>

LandCART V.A.2 released 21 June 2019

<https://bodaciouszhou.users.earthengine.app/view/landcartdemocombine4>

LandCART V.A.3 released 9 August 2019

<https://bodaciouszhou.users.earthengine.app/view/landcartdemocombinez>

INTRODUCTION

Welcome to LandCART Alpha testing. This document provides detailed instructions on how to use the Alpha version of the NASA ROSES LandCART online mapping applications (henceforth, “the Apps”). This is a very skeletal version of LandCART – basically just separate Google Earth Engine (GEE) Apps (URLs) with no front-end at this point. We are sharing these Apps with you so that you can test their utility and find bugs and issues for us to fix. During the testing process, consider what you like or dislike about the Apps.

Use this document as a guide for testing each application. We have established a user forum into which you can enter questions/comments/ideas/etc. as you are testing each App. Please refer to this evaluation forum as you go through this guide and work with the Apps. Be as detailed as possible with your comments/bugs/issues/questions in this forum. We will endeavor to respond to your inquiries quickly and we hope to make updates on a daily basis. So the App you worked with yesterday might look a tiny bit different today! We want to produce an application that YOU will use, so let us know how to make it better for you!

LandCART V.A.1 – release date 2019.06.14

LandCART V.A.2 – release date 2019.06.21

LandCART V.A.3 – release date 2019.08.09

Alpha Testing Stage 1 – 2019.06.14 through 2019.08.09

Alpha Testing Stage 2 – 2019.08.09 through 2019.09.06

NOC On-site Meeting – 2019.10.16 and 2019.10.17

For any questions or comments that you have outside of the evaluation forum please contact:
Shannon Savage – ssavage@blm.gov – (303) 236-7342

ABOUT NASA ROSES AND LANDCART

NASA ROSES: Research Opportunities in Space and Earth Science
<https://science.nasa.gov/researchers/sara/grant-solicitations>

LandCART: Landscape Cover Analysis and Reporting Tools

The goals of the LandCART Project:

- Our collaboration intends to build on ideas already in work to provide the BLM with the ability to fuse AIM field data with remote sensing information to make predictions of AIM indicators in places and times where they were not measured.
- To create **maps of core indicators based on AIM field data using on-the-fly model making** with machine learning (Random Forest) and prediction using all available information.
- Analysis and data storage/serving by **Google Earth Engine**.
- **Sub-annual** (seasonal, monthly, bi-weekly) map-making and **inter/intra- annual time series capability**.
- Backed by rigorous analyses of the effect of training data from **different places and times** in production of relatively small-scale maps.
- With **spatial estimates of uncertainty/confidence** associated with predictions.
- Ability to output all necessary information to the **NEPA Administrative Record**.
- A tool created in response to **expressed needs by the end-user**.
- **Assess** the utility of this tool for the end-user.

Not your usual researcher-resource manager relationship:

- The NASA Applied Sciences Program promotes the discovery and demonstration of innovative and practical uses of Earth observations for **decision-making**.
- This Program funds applied science research and applications projects to enable near-term uses of Earth observations, formulate new applications, integrate Earth observations and related **products within practitioners' decision-making**, and transition the applications to **sustained use** by partner organizations.
- The goal is for these partner organizations to achieve **sustained use** of and benefits from the Earth observations.

Ecological Forecasting Element:

- *Remote Sensing as a Catalyst for Large-scale Conservation*
 - Effectively linking natural landscapes and seascapes for enhanced connectivity and large-scale conservation requires a "big-picture" perspective.
 - Satellite imagery can enable organizations to understand the broader contexts for conservation planning and assist in assembling integrated landscapes and seascapes.
 - Proposals to this topic should identify and describe a conservation challenge dependent upon enhancing connectivity and/or biological movement at spatial

scales sufficient for satellite remote sensing to have a positive impact. **Proposals must plan for the development—and deployment—of an Earth observations-based solution to this challenge.**

What made the LandCART proposal possible?

- Massive amounts of high-quality data collected over large areas in diverse ecosystems through many years
 - The Assessment, Inventory, and Monitoring (AIM) program!
- Availability of cloud-computing architecture with remote sensing data to perform analyses
 - Google Earth Engine
- The same forces have also made other, similar efforts possible, such as:
 - The Rangeland Analysis Program (RAP) – an online mapping tool
- There have been other, longer term efforts, such as:
 - Homer’s Western US Cheatgrass and Shrubland Monitoring program – large datasets covering the Western US available for download

PREPARATION FOR ALPHA TESTING

THE LANDING PAGE

Please always start your LandCART alpha testing day at this landing page:

landcart.org

This page will always have the most up-to-date Apps and any notes we want to send out to the testing group, for instance, when this user guide is updated and uploaded to the landing page. It also has a link to the [forum](#), where you can add comments and questions as you work through the Apps.

LANDCART: LANDSCAPE COVER ANALYSIS AND REPORTING TOOLS

Welcome LandCART Alpha Testers!

LandCART is a NASA-funded collaboration between the BLM, UCLA, and the USGS.

Bookmark this page!

This site is intended for chosen alpha testers of the LandCART tool. It will be updated periodically so that the latest version of the LandCART apps will be accessible through this site.

Always start at this page when working with LandCART, that way you know you are using the most recent version of the apps. This approach allows the LandCART team to make updates as quickly and invisibly as possible.

The site also provides access to a **FORUM** where you can provide feedback about LandCART, and where the LandCART team can respond to those comments.

Look below for updates and news about the LandCART alpha test.

Please use the forum. But if you'd like to send an email, click [here](#).

Request access to the Forum

Name: _____

The LandCART choose your own adventure:

This will change as we add more functionality. [Jump to Updates](#)

[Click here for a guide to the Apps](#)

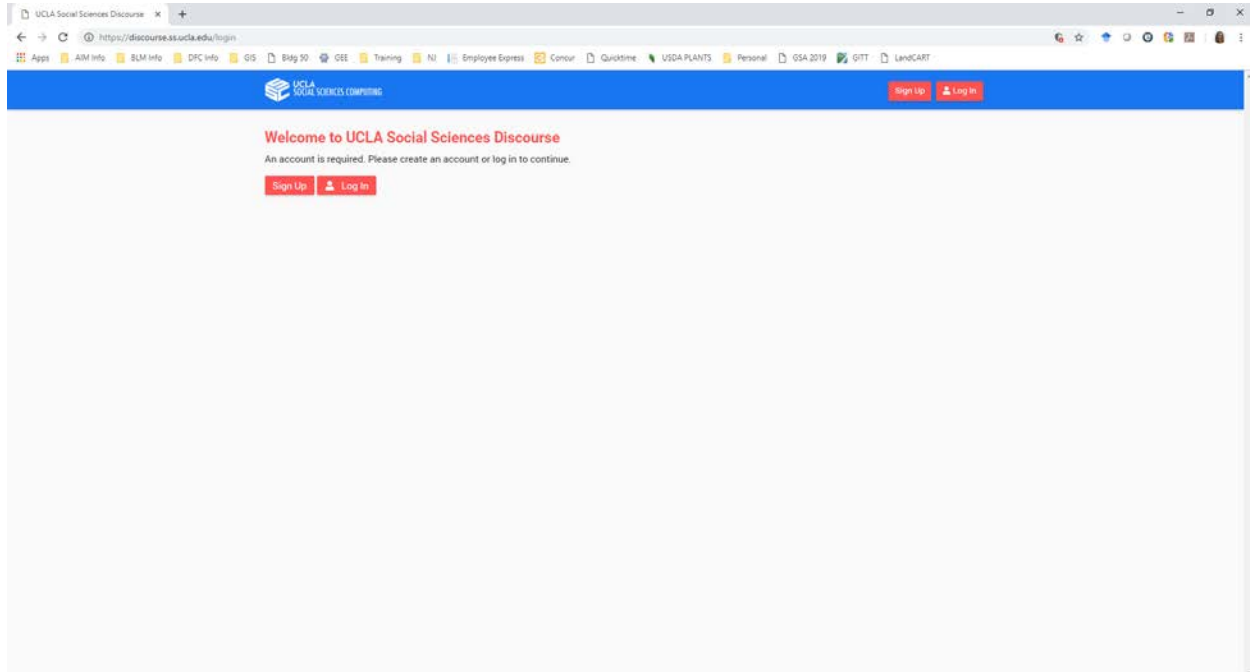
Do you want to:

1. **Map an AIM/LMF indicator for an area?** The LandCART Mapping Tool (ready for alpha testing) allows you to choose an Area of Interest (AOI) using multiple approaches. It produces simple summary statistics and a histogram for the indicator you have chosen, and allows you to download the result as a TIF file.
2. **Compare an AIM/LMF indicator for an area at different times?** The LandCART Cover Change Tool (experimental) calculates an AIM/LMF indicator for an area at two different times. It produces comparative histograms, conducts a Kolmogorov-Smirnov test of differences for the histograms, and calculates the 2nd, 50th and 90th percentiles of the differences. Please feel to use this tool, but it is not yet ready for testing. Use with caution. However, if you use it and have comments, please feel free to comment on the Forum.
3. **Calculate a timeseries of an AIM/LMF indicator?** The LandCART Timeseries Tool (experimental) calculates a time series for a chosen AIM/LMF indicator and calculates a Sen's slope test for trends. Please feel to use this tool, but it is not yet ready for testing. Use with caution. However, if you use it and have comments, please feel free to comment on the Forum.

ACCESS TO ALPHA TESTER FORUM

In order to gain access to the tester [forum](#), you will have to sign up to be able to log in and add comments. We ask that you actively participate in the forum. For example, if you see a new request posted and you also agree with the suggestion please reply with your support or reservation so that we will know if it is a common problem. Every day, we will rank the service requests by number of entries in order to make app corrections and improvements going down that list.

- a. Get to the forum URL (<https://discourse.ss.ucla.edu/login>):

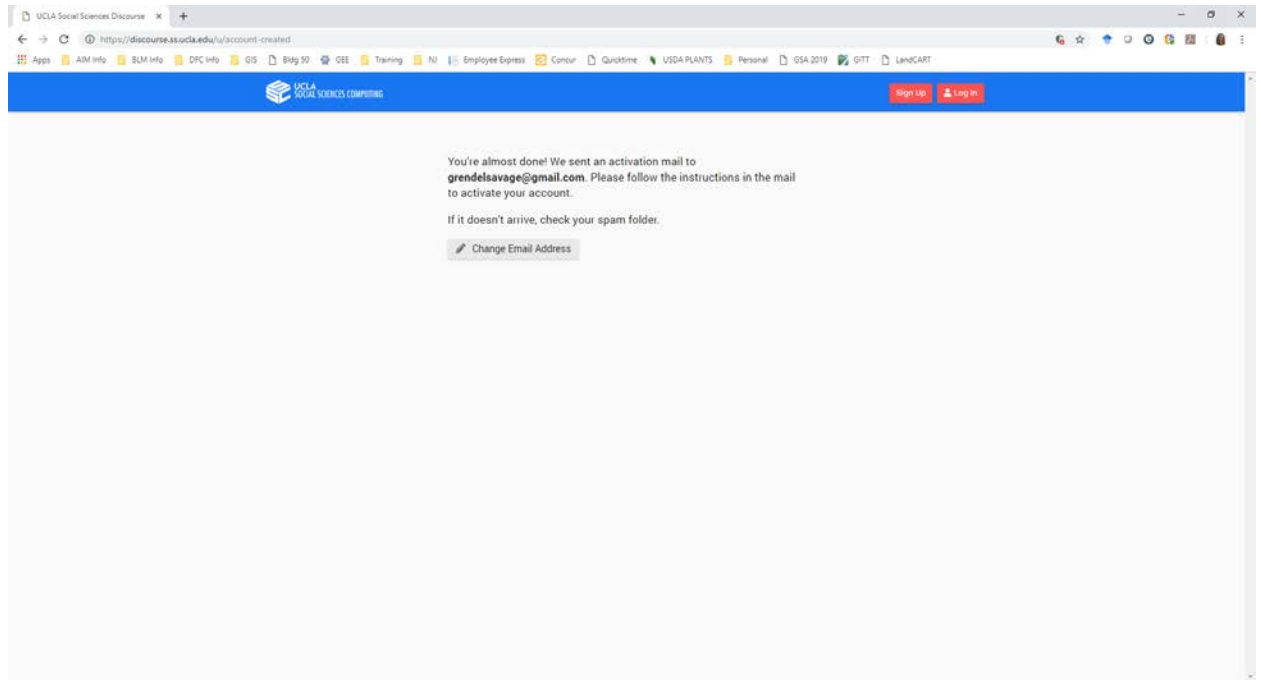


- b. Click on **Sign Up**
- c. A “Create New Account” window will pop up

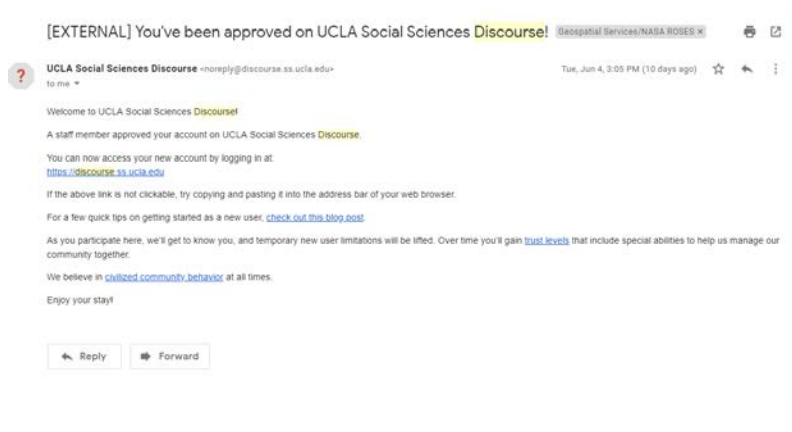
A screenshot of a 'Create New Account' form. The form has a title bar with 'Create New Account' and a close button. It contains several input fields: 'Email' (with a red border and a 'with Google' button), 'Username' (with a note 'unique, no spaces, short'), 'Name' (with a note 'your full name (optional)'), and 'Password' (with a note 'at least 10 characters'). At the bottom, there are two buttons: 'Create New Account' and 'Log In'. A small note at the very bottom states 'By registering, you agree to the privacy policy and terms of service.'

- d. Use your BLM email and create a user name that is recognizable (e.g., ShannonSavage, **not** CrazyLikeAFox...). You can add your full name if you want. And remember your password! Click on **Create New Account** and a window will pop up that looks like this:

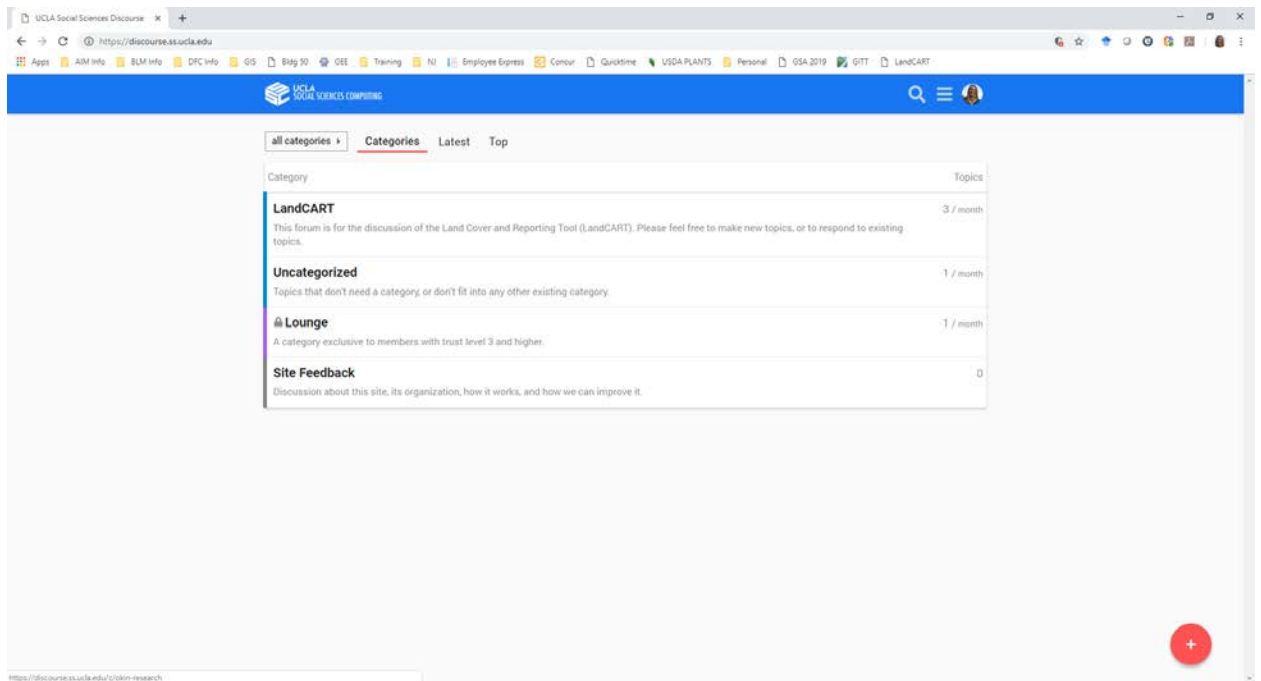
e.



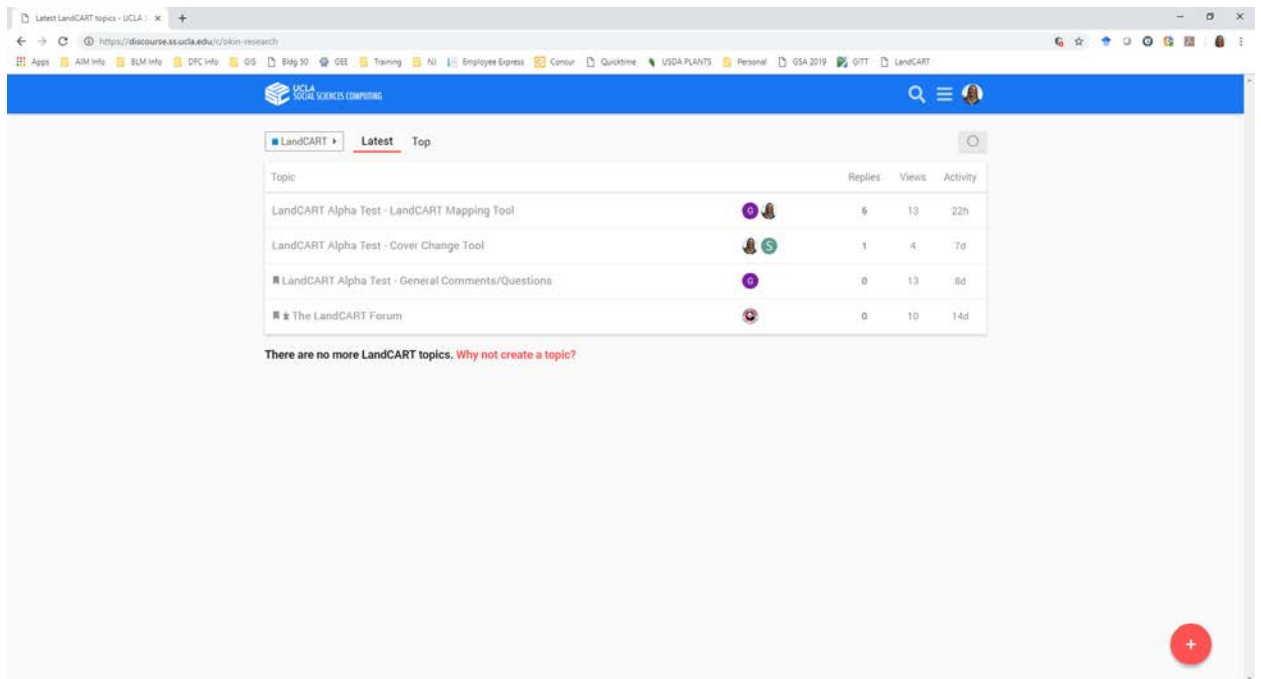
- f. You will receive an email from noreply@discourse.ss.ucla.edu that asks you to confirm and activate your new account.
- g. When you have been given access you will receive an email from noreply@discourse.ss.ucla.edu that looks something like this:



h. You may now go to the forum and add your comments and ideas!



i. Click on the "LandCART" category...



- j. Initially you will want to go to only two of these topics: (1) LandCART Alpha Test – LandCART Mapping Tool and (2) LandCART Alpha Test – General Comments/Questions. As more Apps come on line you will see topics for those Apps (LandCART Alpha Test– Cover Change Tool and LandCART Alpha Test – Time Series Tool, for instance).

Click on **LandCART Alpha Test – LandCART Mapping Tool** to enter specific comments about the App

Click on **LandCART Alpha Test – General Comments/Questions** to enter more general comments about the LandCART project and overall presentation.

- k. The very first message in the thread is from @gregokin. It explains how to enter info into the forum thread as follows:

This topic is for questions related to the LandCART Mapping

Tool: <https://bodaciouszhou.users.earthengine.app/view/landcartdemocombine3>

To get started ‘REPLY’ to this. Please allow notifications if you’d like to be informed of a response to your comment/question.

If you’d like to respond to someone’s question, please use the @ sign (i.e., @Shannon to respond to Shannon OR in most cases, use @bodacious to communicate directly with Bo - the GEE developer).

We ask that you actively participate in the forum. For example, if you see a new request posted and you also agree with the suggestion please reply with your support or reservation so that we will know if it is a common problem. Everyday, we will rank the service requests by number of entries in order to make app corrections and improvements going down that list.

Please remember to bookmark the URL for the LandCART Alpha site:
<https://landcart.org>

By always going to the LandCART alpha testing landing page, you will make sure you’re using the most current version of the LandCART Apps

- i. You can reply to that first message or you can reply to other messages within the thread – try to keep to the same topic! We have discovered that you can only add 5 consecutive replies until someone responds to your message – so we suggest taking notes on your thoughts and comments and put them all into one message in the thread. Using this forum for your feedback is also somewhat of a test – let us know if it is useful for you! We hope to respond to your comments quickly, but please be patient. Also, use the “@” sign to direct your comments to a specific person – for instance, if you are replying to something Shannon has commented on, please use @Shannon in the text so she sees your response.

ACCESS TO GOOGLE DRIVE

In order to upload your own Area of Interest (AOI) you will need to create a Google Fusion Table from a shapefile or a KML. You must have access to a personal Google Drive to do this (the BLM Google Drive does not allow this). So for now, we strongly suggest that you send a shapefile to Bo at bodacious@ucla.edu and he will convert it to a Fusion Table for you and send the ID to you for use in the Apps within a day or two.

APPS FOR ALPHA TESTING

THE APPS

For this first stage of Alpha testing we have developed 3 different Apps:

Ready for Alpha Testing:

1. [LandCART Mapping Tool – to Calculate Fractional Cover](#)

Experimental – NOT Yet Ready for Alpha Testing:

(you may look at these, but we aren't supporting them yet (as of 09 July 2019))

2. [LandCART Cover Change Tool – to Compare Two Dates on a Split-Panel Screen](#)
3. [LandCART Timeseries Tool – to Create a Time Series Chart and/or Video](#)

For this Alpha test you will have to select your AOI, TOI, and IOI within each App. When we get a front-end developed we expect you will only have to choose your AOI, TOI, and IOI one time and then you will be able to run the different Apps on that selection.

Abbreviation Definitions:

AOI – Area of interest

TOI – Time period of interest

IOI – Indicator of interest

GEE – Google Earth Engine

UI – User interface

I. LANDCART MAPPING TOOL

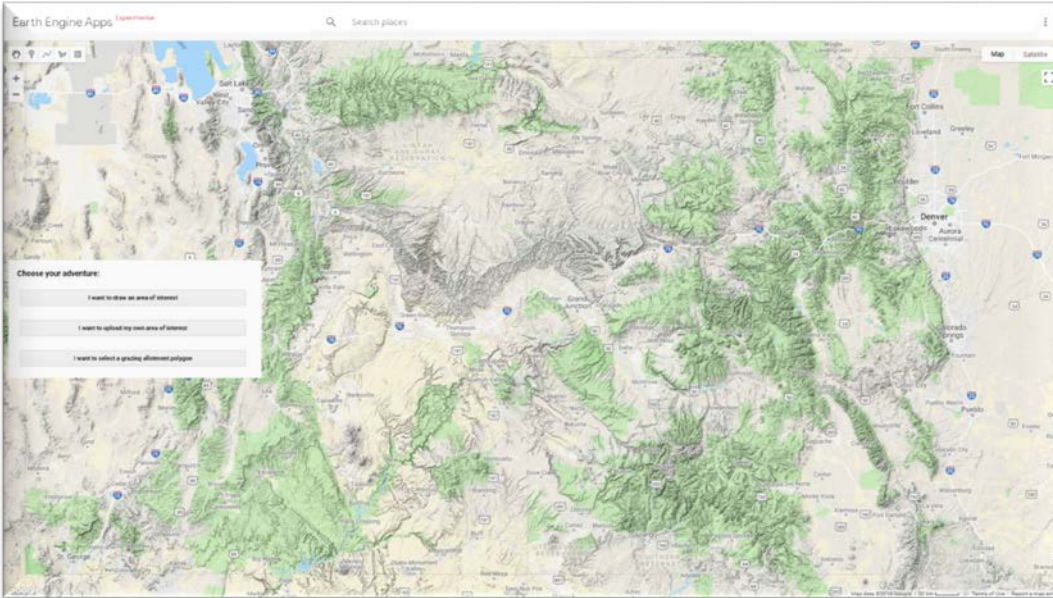
This app allows the user to predict a specified fractional cover AIM core indicator for a selected AOI and TOI. Current indicators are:

- Bare soil
- Canopy gaps greater than 25cm
- Invasive annual grass cover
- Non-invasive perennial grass cover
- Non-invasive shrub cover
- Non-invasive tree cover
- Sagebrush cover
- Total foliar cover

I.1 – DEFINE YOUR AREA OF INTEREST

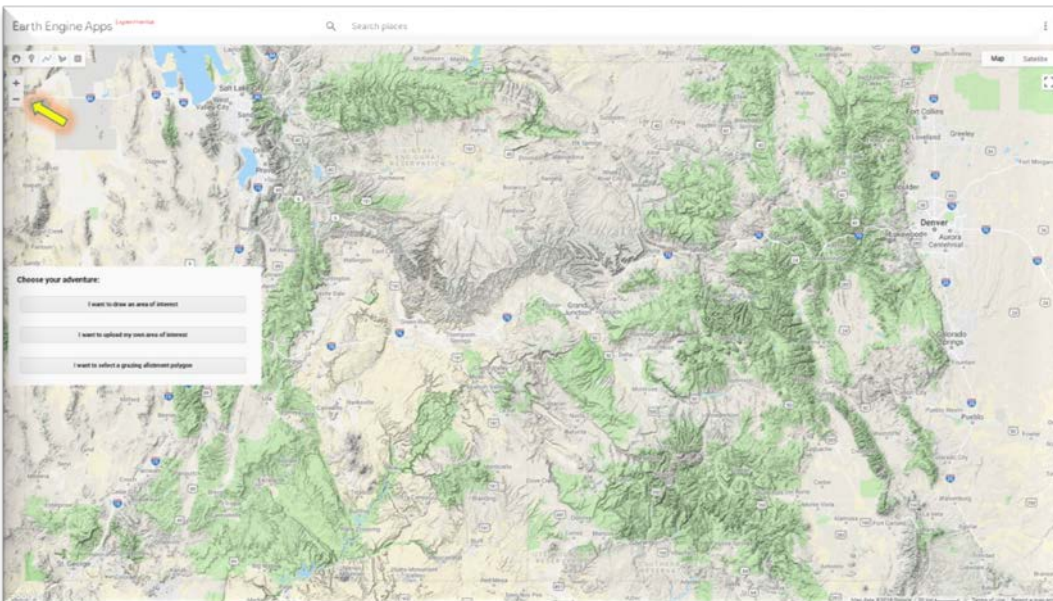
Where do you wish to visualize calculated data?

a. When you click on the link for [App1](#), your web browser will open to this screen:

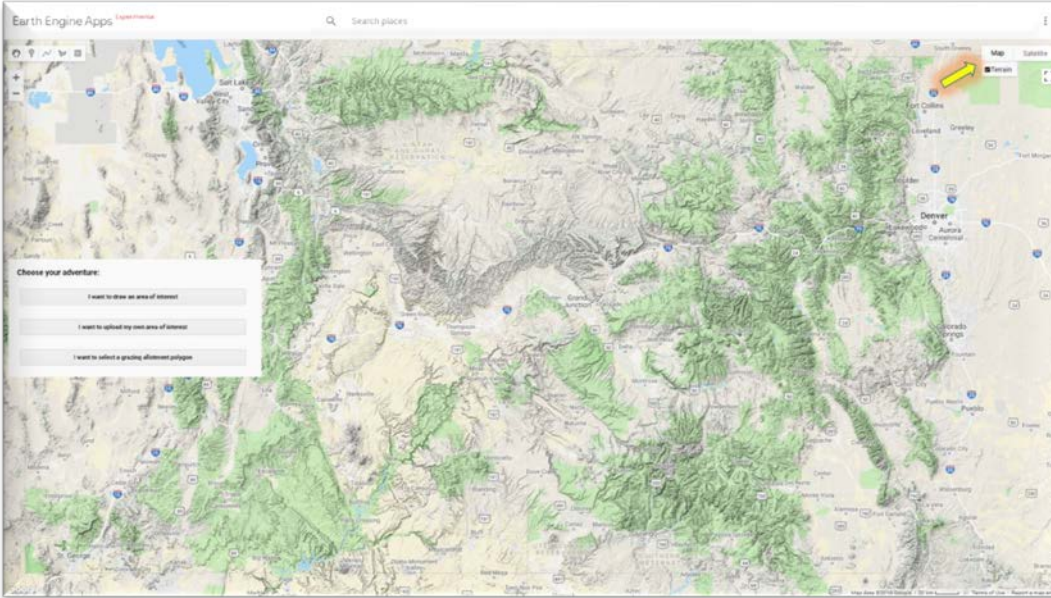


b. A map is centered on Grand Junction, Colorado.

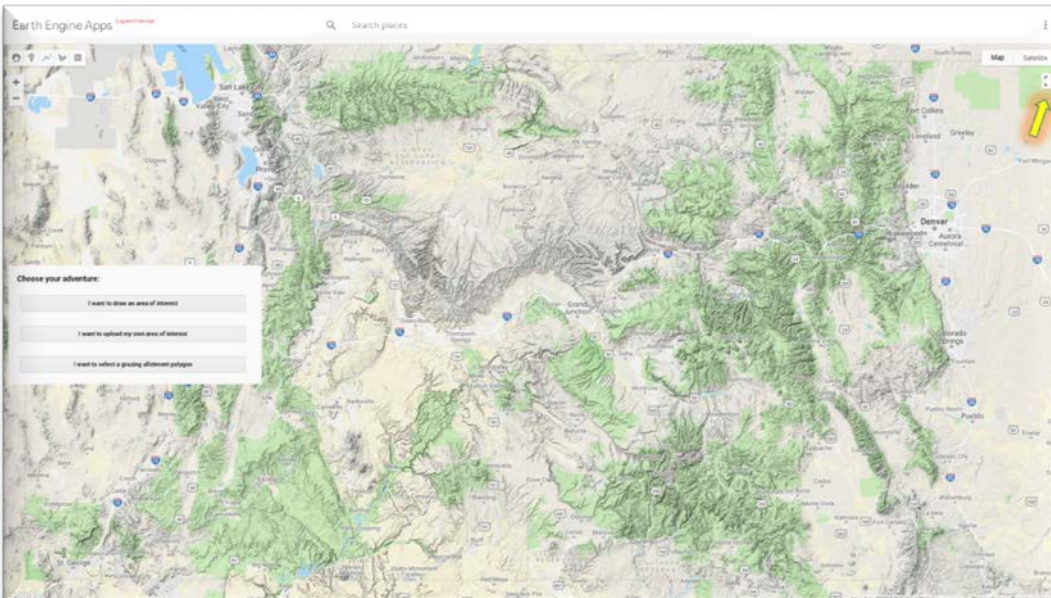
You can pan/zoom around the map using your cursor and the buttons at the top left:



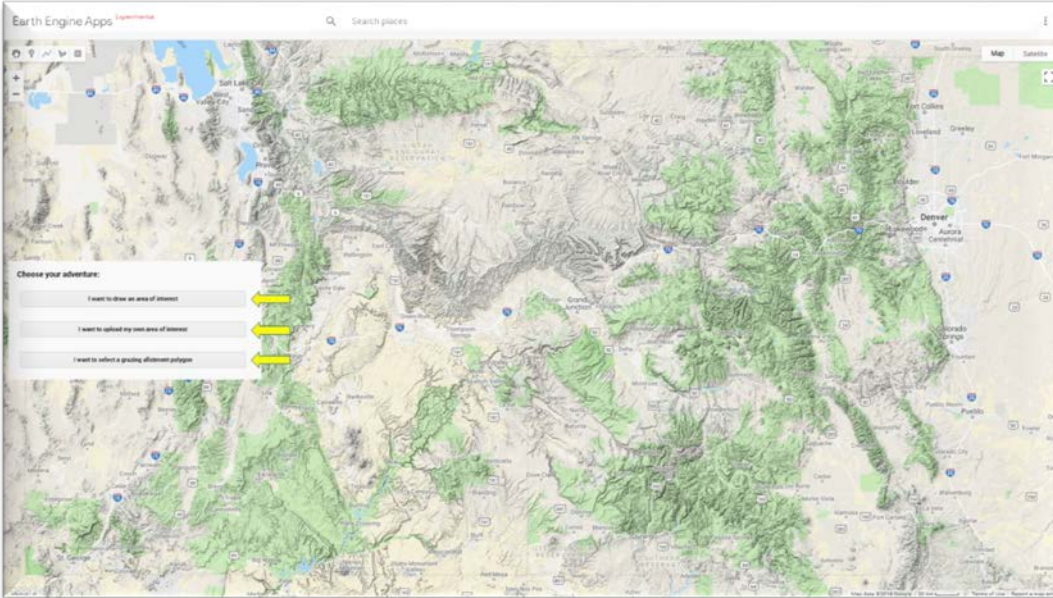
c. You can turn on satellite imagery if you prefer by clicking on the **Satellite** button at the top right of the map. And/or you can turn the terrain features on or off by clicking on the box next to Terrain under **Map**.



d. The square button beneath the Map/Satellite button allows you to expand the map to fill the screen.



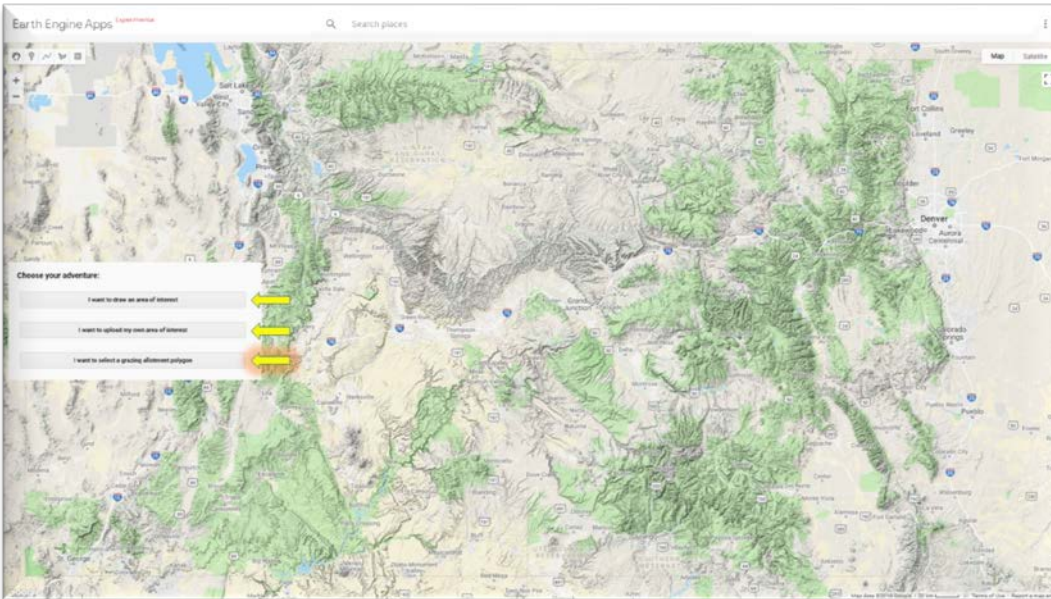
- e. You can choose how you want to select your area of interest (AOI):
 - a. Draw a polygon on-screen (section [I.1.B](#))
 - b. Upload your own area of interest(section [I.1.C](#))
 - c. Choose a BLM grazing allotment boundary (section [I.1.A](#))



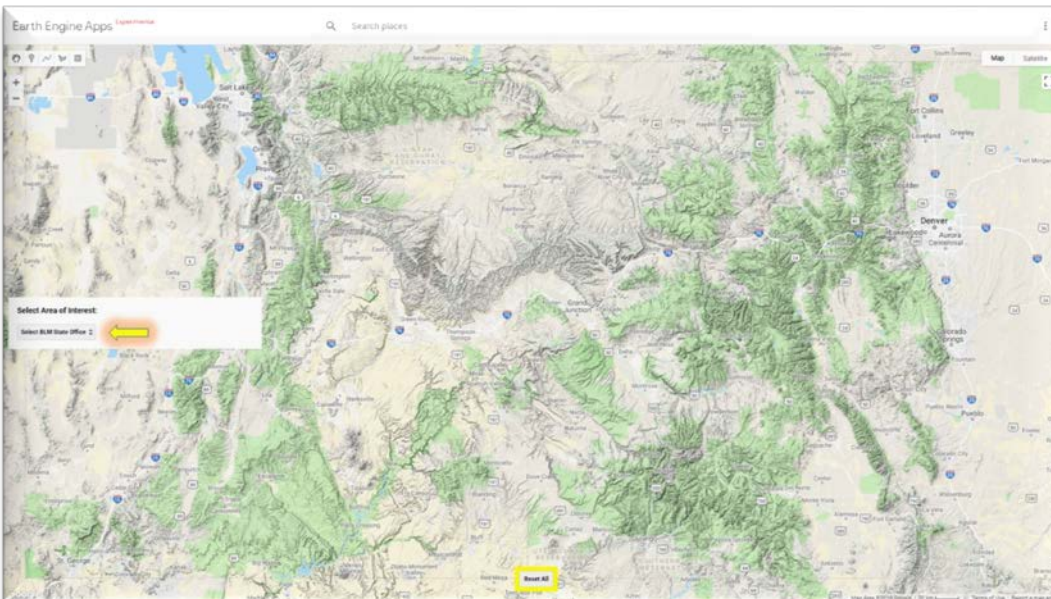
I.1.A – SELECTING A GRAZING ALLOTMENT AS AN AOI

If you have chosen your AOI from an uploaded file or by drawing a polygon, skip this section and move on to section [I.2](#). If you would like to upload a file for the AOI, please go to section I.1.C. If you would like to draw your own polygon, please go to section I.1.B.

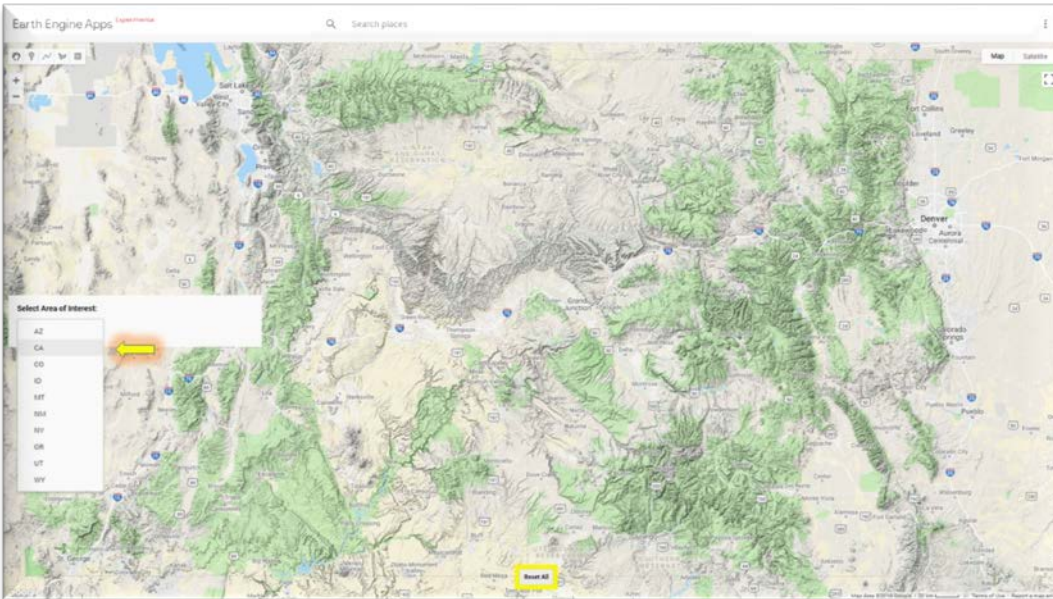
a. Click on the **I want to select a grazing allotment polygon** button at the bottom center of the map



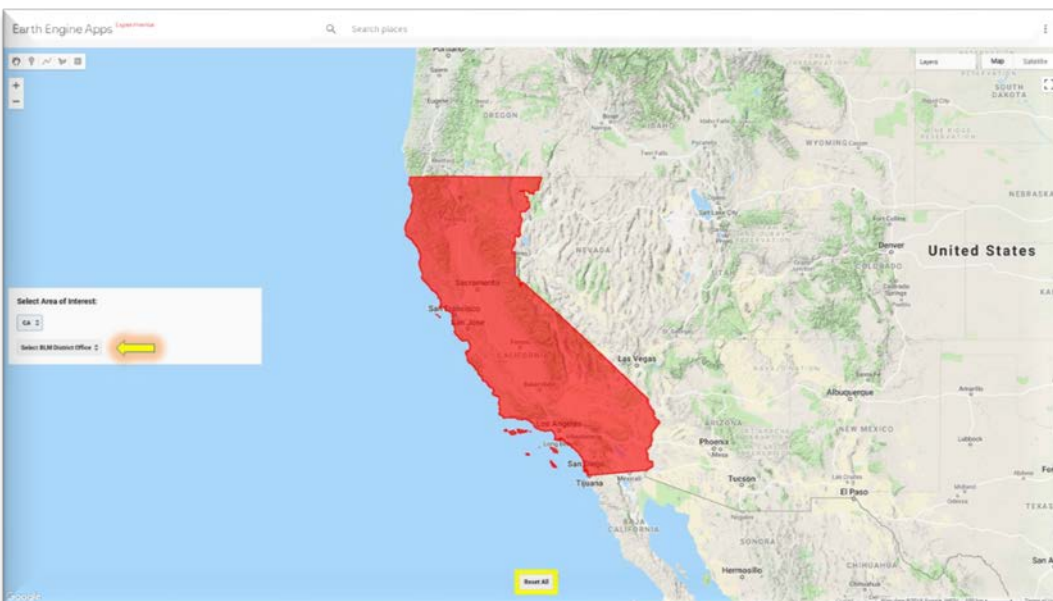
b. Click on the **Select BLM State Office** button.



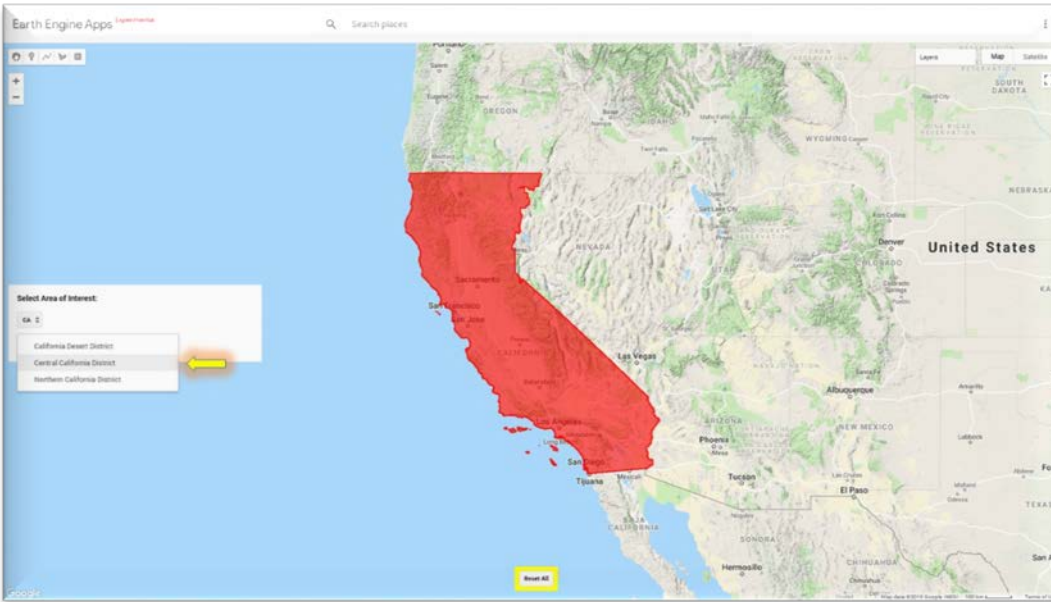
c. An alphabetical list of the state offices will be displayed. Choose a state office from the list (California in this example).



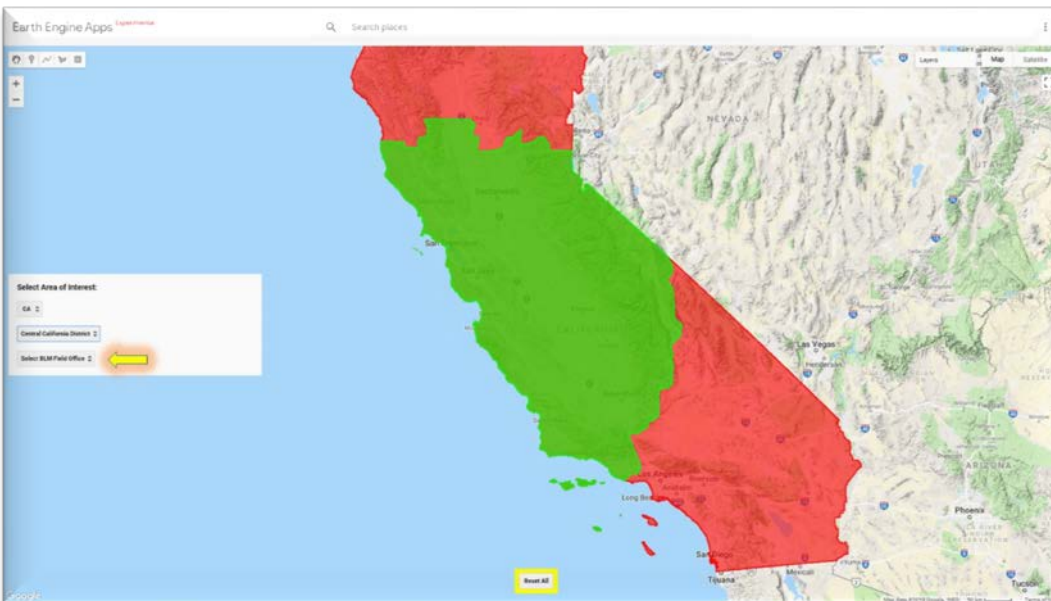
d. The map zooms to the state office boundary (displayed in red). These boundaries are not always just the state as can be seen with the Wyoming State Office boundary. Click on the **Select BLM District Office** button.



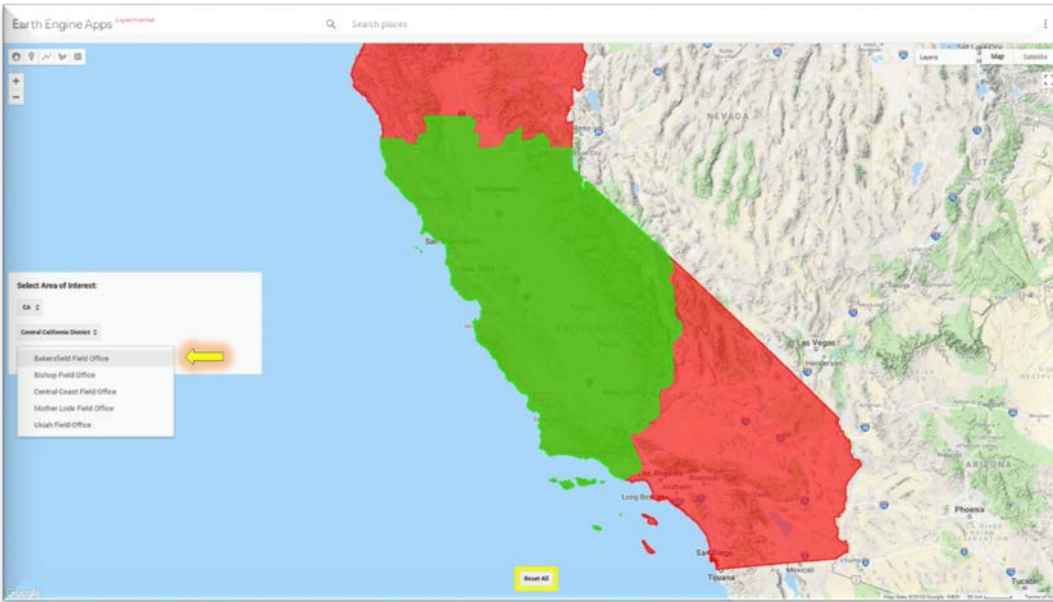
e. An alphabetical list of district offices within the selected state office Boundary will appear. Choose a district office from the list (Central California District in this example).



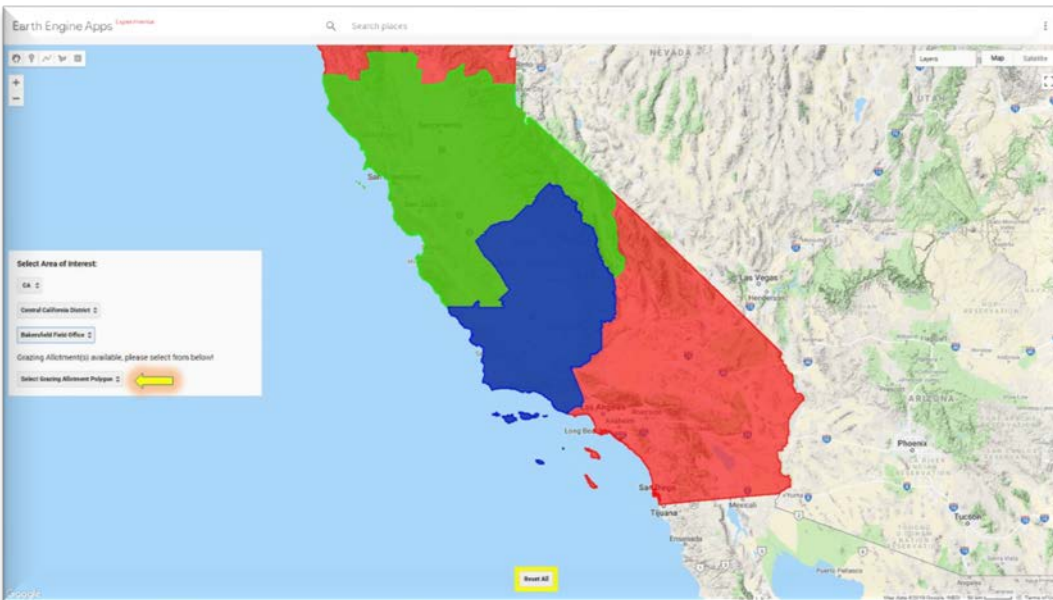
f. The map zooms to the district office boundary (displayed in green). Click on the **Select BLM Field Office** button.



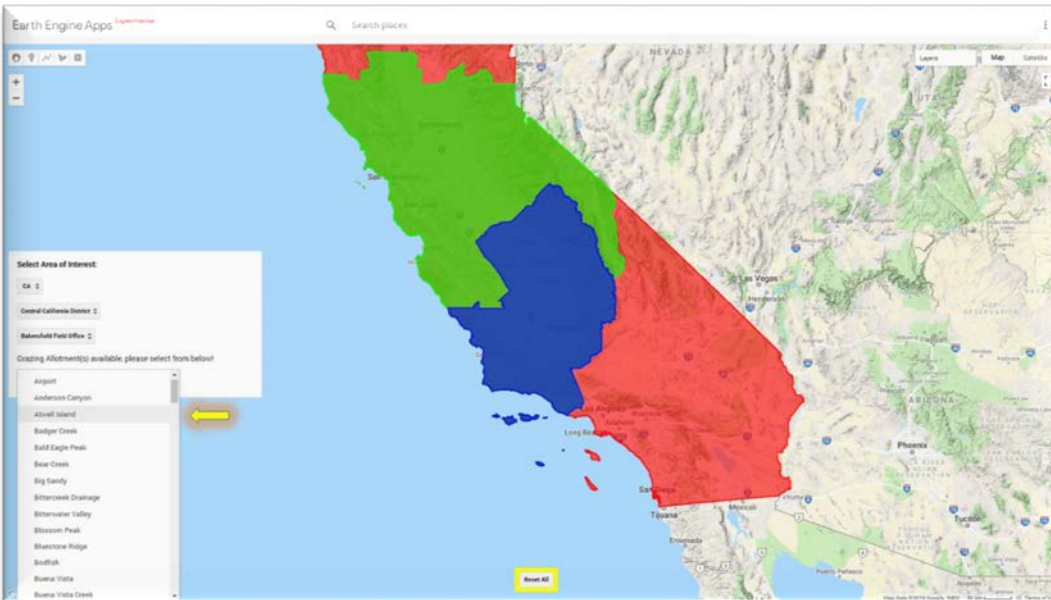
g. An alphabetical list of the field offices within the selected district office will appear. Choose a field office from the list (Bakersfield Field Office in this example).



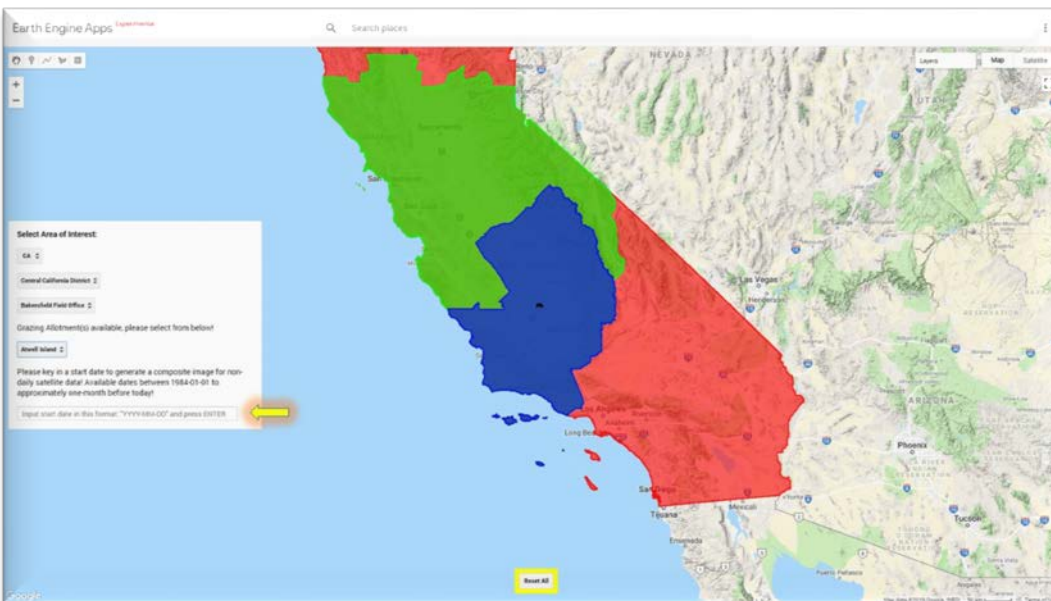
h. The map zooms to the field office boundary (displayed in blue). Click on the **Select Grazing Allotment Polygon** button.



- i. An alphabetical list of the grazing allotments within the selected field office will appear. This might be a very long list AND there might be allotments missing or named incorrectly – if you find an error like this, please let us know right away and we will try to fix it. Choose a grazing allotment from the list (Atwell Island in this example).



- j. The map centers on the grazing allotment boundary (displayed in dark blue).

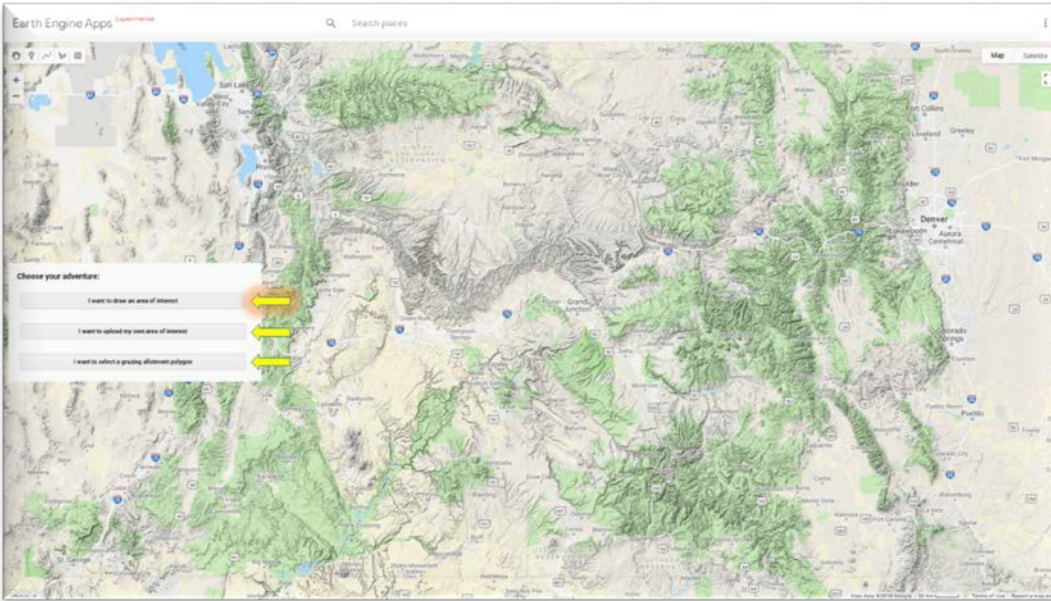


- k. You are now ready to select the time period and indicator you are interested in calculating (go to [Section 1.2](#)).

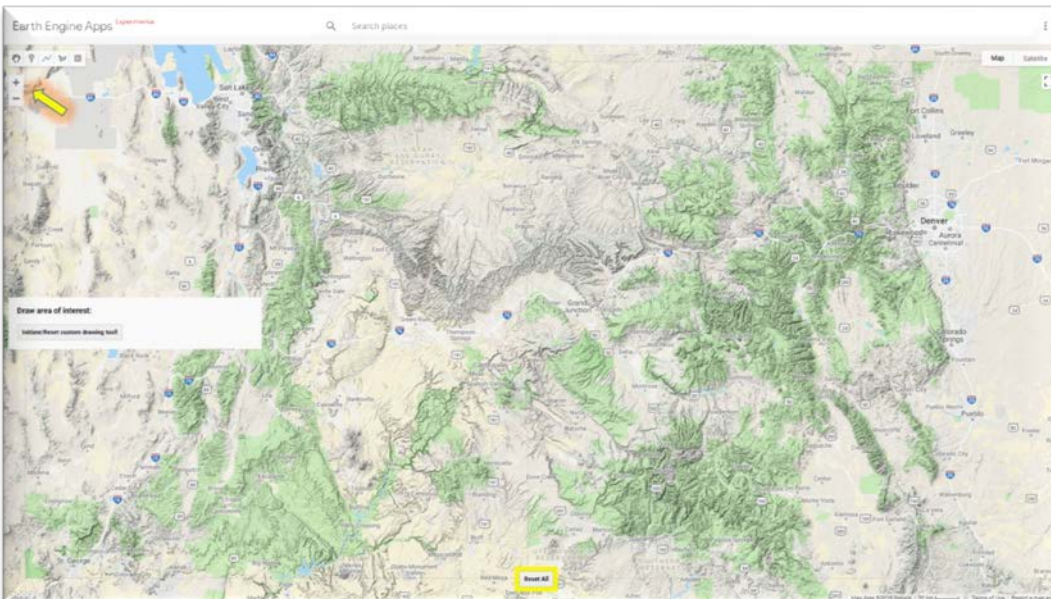
I.1.B – DRAWING A POLYGON AS AN AOI

If you have chosen your AOI from the grazing allotments or an uploaded file, skip this section and move on to section [I.2](#). If you would like to select a grazing allotment for the AOI, please go to section [I.1.A](#). If you would like to upload a file for the AOI, please go to section [I.1.C](#).

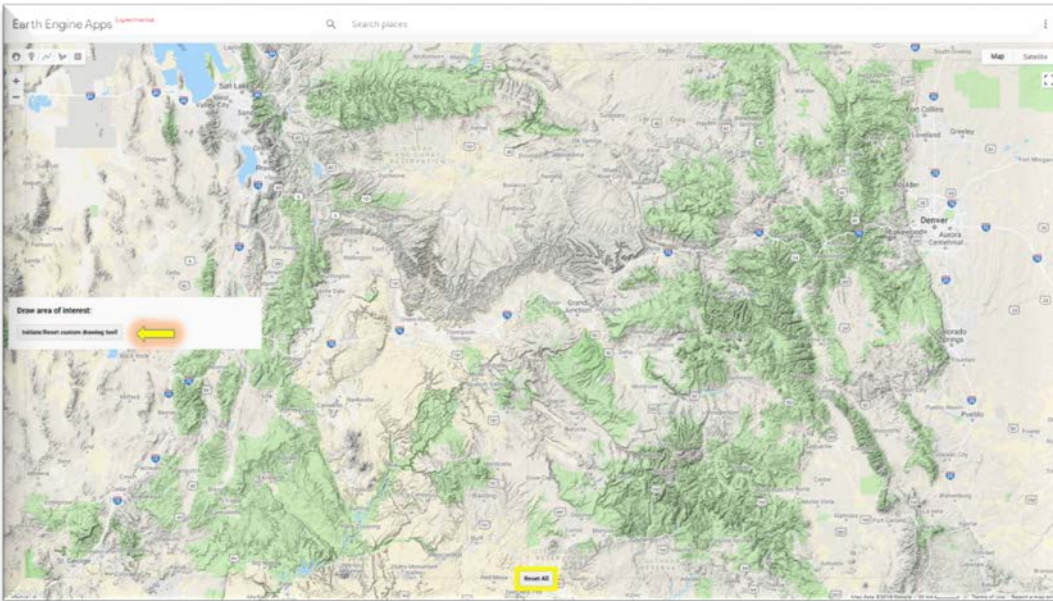
- a. Click on the **I want to draw an area of interest** button in the map.



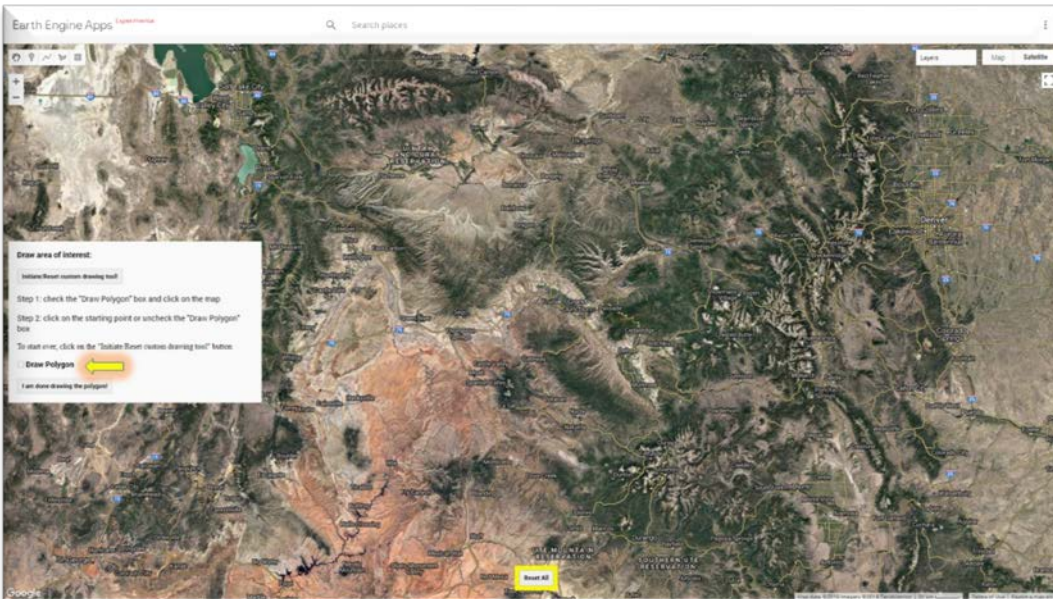
- b. use the pan/zoom buttons or the Search bar to go to your location of interest.



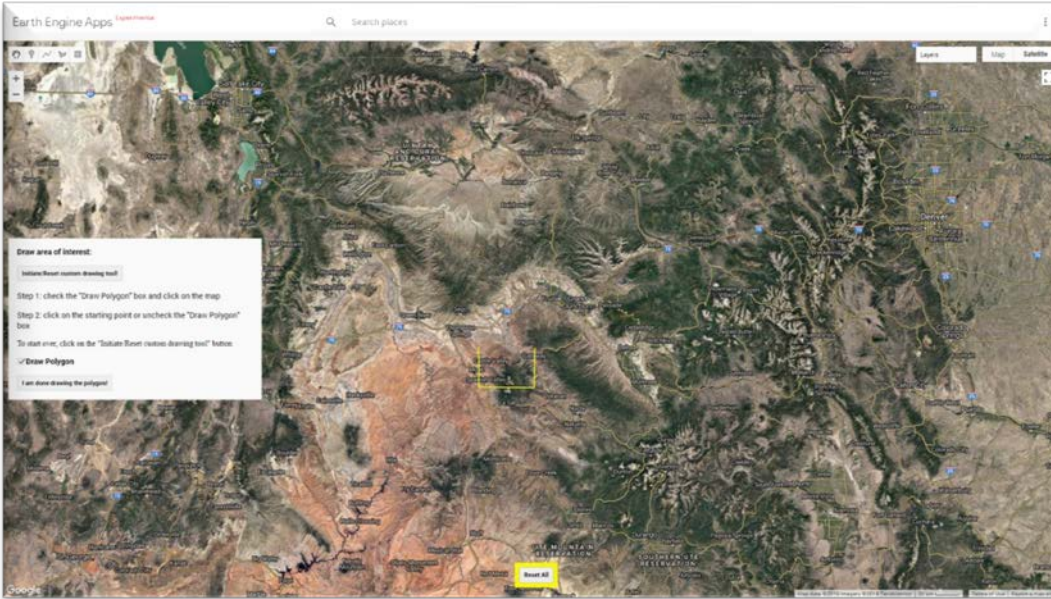
c. Click on the **Initiate/Reset Custom Drawing Tool** button



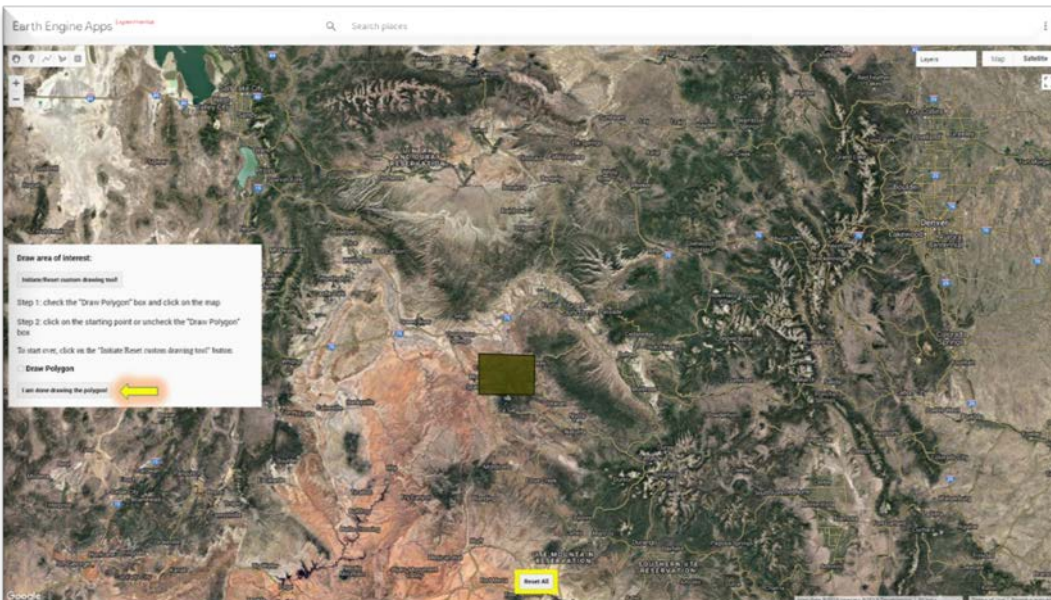
d. Click on the **Draw Polygon** button.



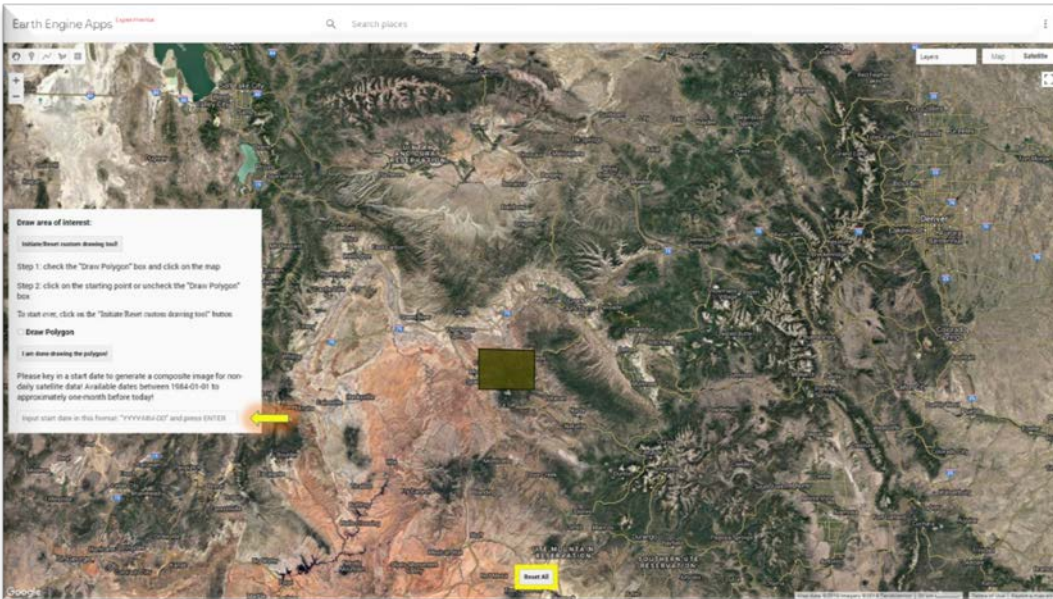
e. Using your mouse, draw a polygon by clicking at least 3 vertices and closing on the first vertex you drew (you might have to click OFF the **Draw Polygon** button).



e. When you are finished drawing click on the **I am done drawing the polygon** button in the UI panel.



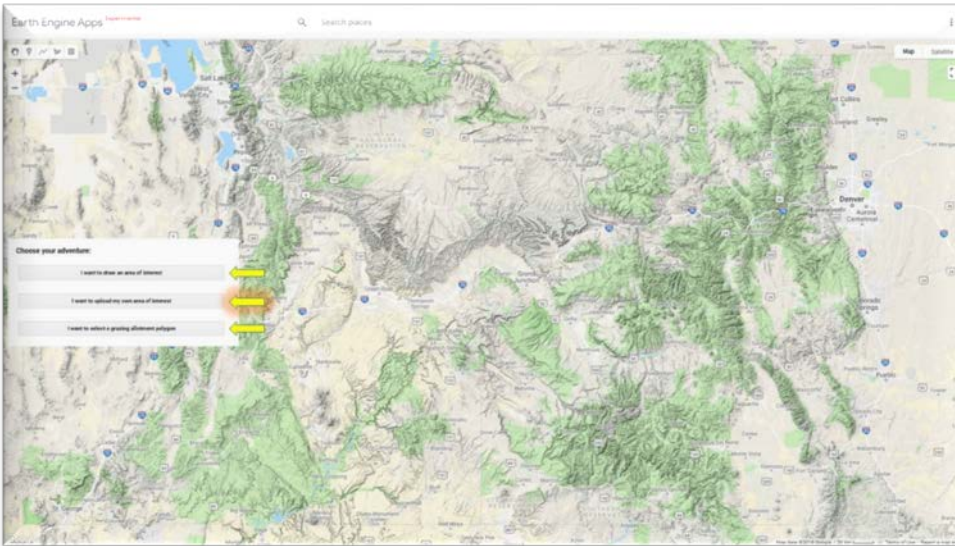
f. The map will center on your polygon AOI. You are now ready to select the time period and indicator you are interested in calculating (go to [Section I.2](#)).



I.1.C – UPLOADING A SHAPEFILE AS AN AOI

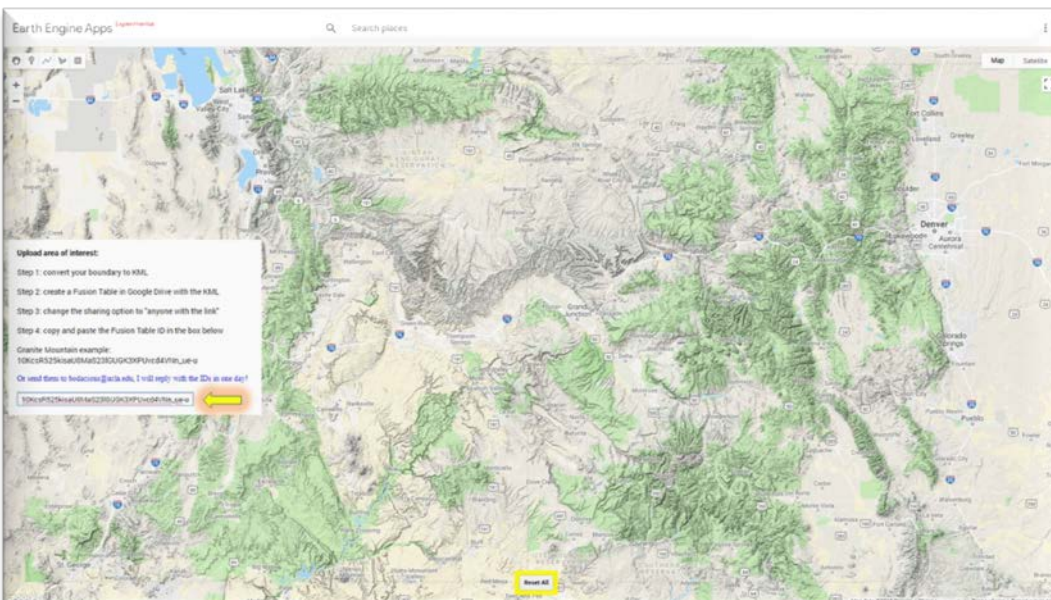
If you have chosen your AOI by drawing a polygon or selecting a grazing allotment, skip this section and move on to section [I.2](#). If you would like to draw your own polygon, please go to section [I.1.B](#). If you would like to select a grazing allotment for the AOI, please go to section [I.1.A](#).

a. Click on **I want to upload my own area of interest** button at the bottom center of the map.

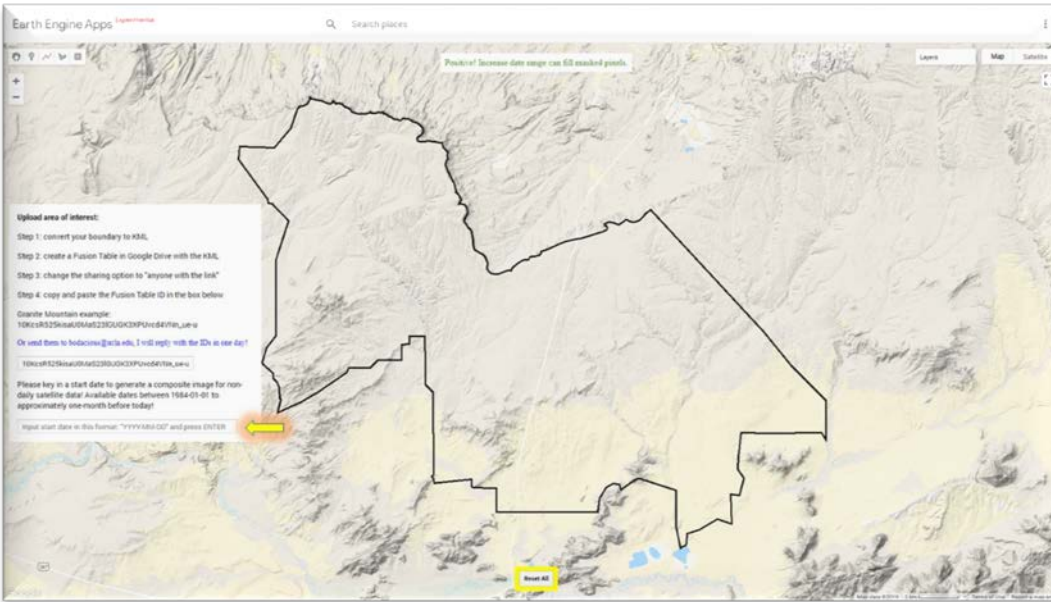


b. Enter a Fusion Table ID into the textbox in the UI panel. If you are unable to create a fusion table you can send your polygon shapefile or KML to Bo at bodacious@ucla.edu and he will create a fusion table ID for you within a day or two.

(Use [10KcsR525kisaU0MaS23IGUGK3XPUvcd4VNn_ue-u](#) as an example)



c. The map will zoom into your polygon AOI. You are now ready to select the time period and indicator you are interested in calculating (go to [Section I.2](#)).



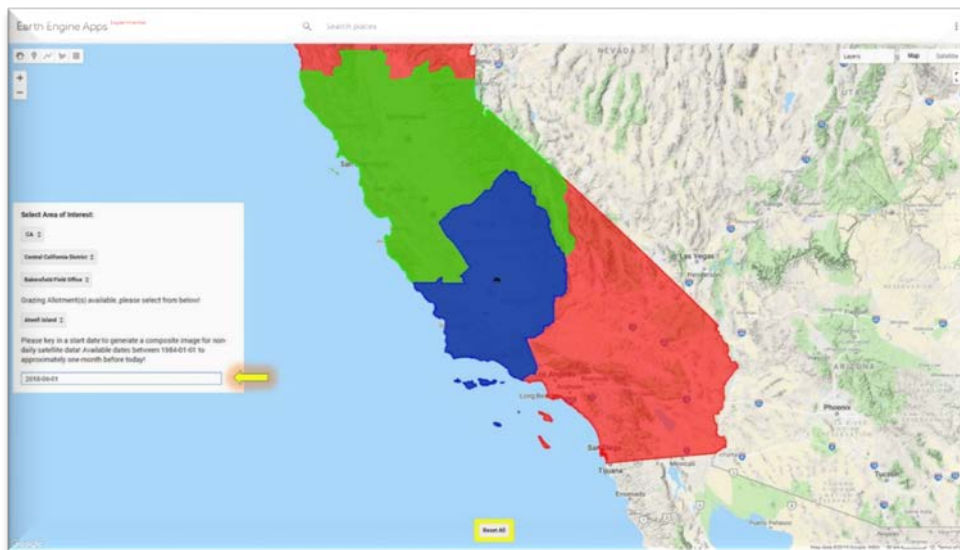
I.2 – DEFINE YOUR TIME PERIOD OF INTEREST

What time period do you wish to visualize?

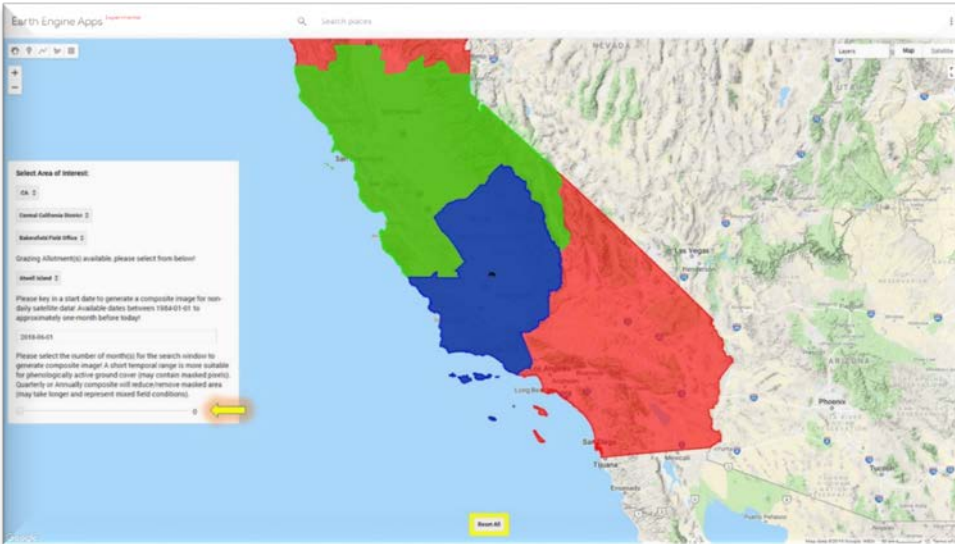
(The rest of the instructions apply to all the ways of defining your AOI – the screen captures are for the selecting a grazing allotment AOI)

The calculations are performed on a composite of imagery from the range of dates you define rather than on a single date. This helps to fill in data gaps as a result of clouds/smoke/scan line correct (SLC) gaps/etc.

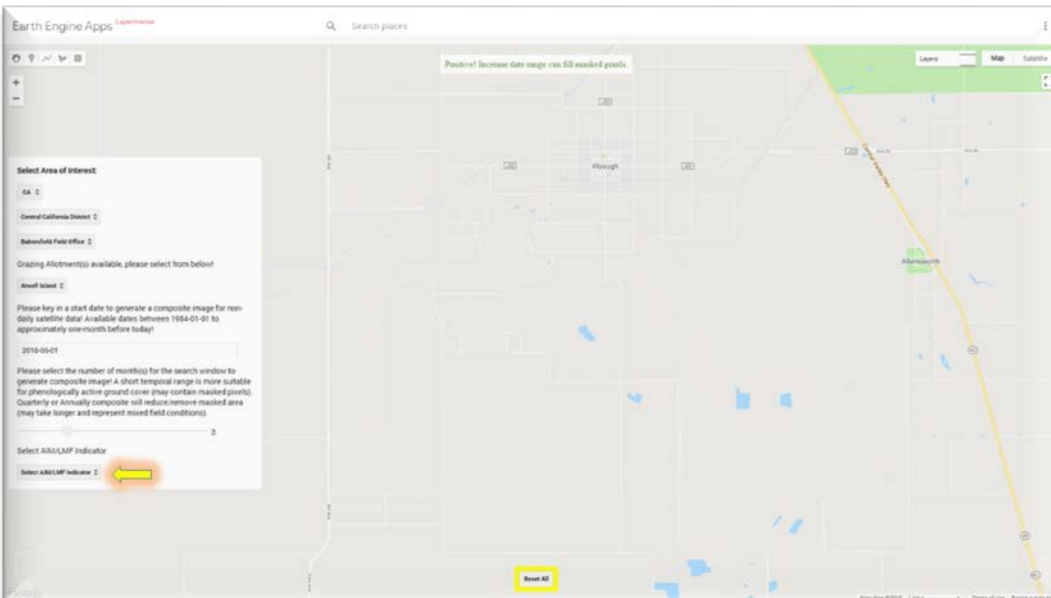
a. Enter the first date of a range of dates on which to create a composite Landsat image and calculate fractional cover – dates must be in the format YYYY-MM-DD (e.g., 2018-06-01):



b. Using the slider bar choose how many months you wish to include in the imagery composite (e.g., choosing the 3 months after June 1, 2018 will combine data from June, July, and August of 2018 into one composite image):



c. Now you can define your indicator of interest (go to [Section 1.3](#)).



I.3 – DEFINE YOUR INDICATOR OF INTEREST

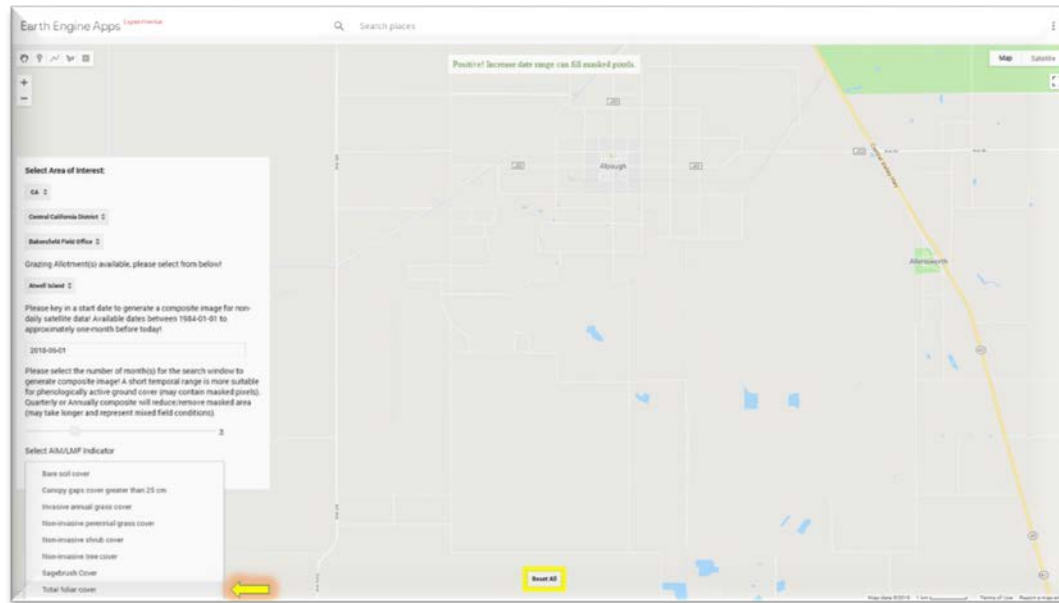
What LMF/AIM core indicator do you wish to have calculated?

(The rest of the instructions apply to all the ways of defining your AOI – the screen captures are for the selecting a grazing allotment AOI)

Click on the **Select AIM/LMF Indicator** button.

An alphabetical list of the available indicators will appear.

Choose an indicator from the list (Total foliar cover in this example).



Percent Bare Soil

Percent Canopy Gaps greater than 25cm

Percent Invasive Grass Cover

Percent Non-invasive Perennial Grass Cover

Percent Non-invasive Perennial Shrub Cover

Percent Non-invasive Perennial Tree Cover

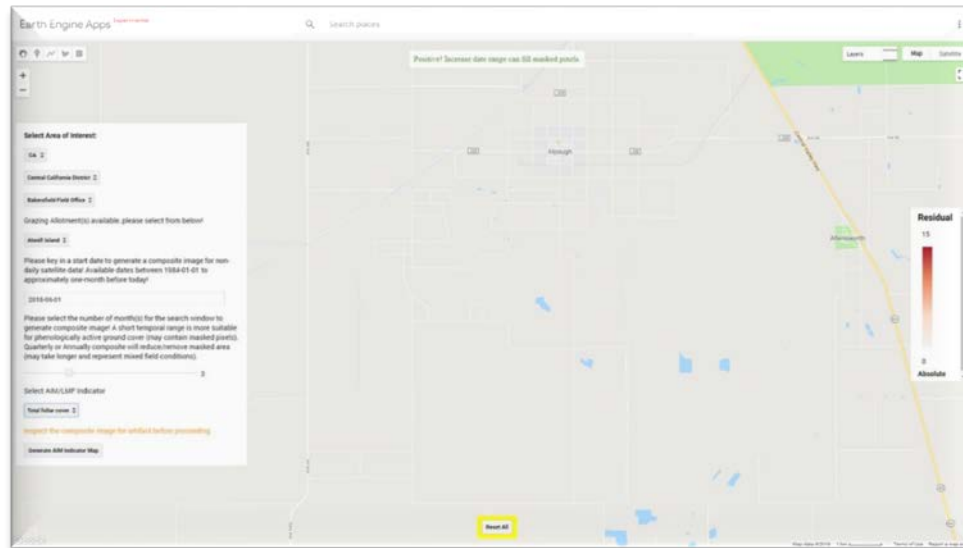
Percent Sagebrush Cover

Percent Total Foliar Cover

Go to [Section 1.4](#) to calculate fractional cover.

I.4 – CALCULATE FRACTIONAL COVER

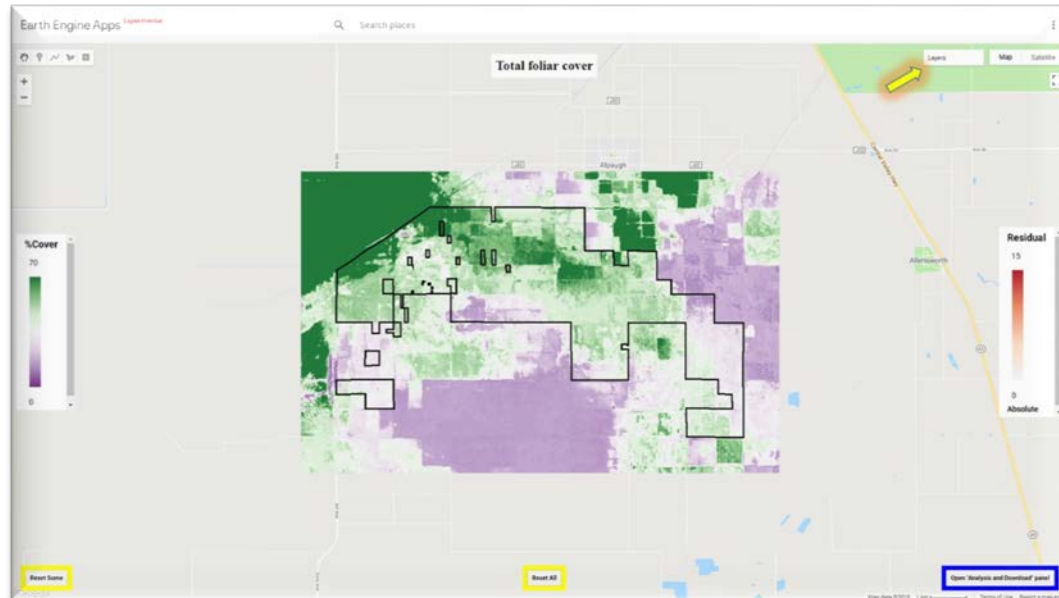
a. Click the **Generate AIM Indicator Map** Button. This might take some time, be patient!



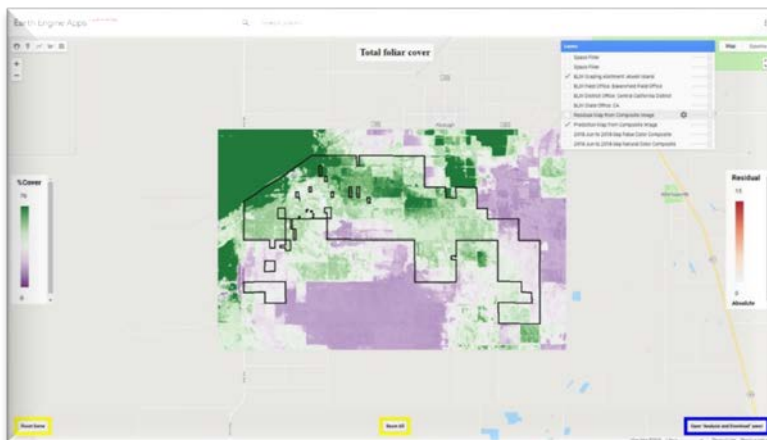
b. The map is cleared of all boundary data except for the selected AOI. Two legends open in the map: Percent Cover on the left and Residuals on the right. The map is titled with the selected indicator. Two reset buttons are available: **Reset Some** at the bottom left and **Reset All** at the bottom center. The Layers box at the top right shows drawing progress as well as allows you to choose what to display or not. PLEASE BE PATIENT! Sometimes the map drawing/calculating takes more than a few seconds (up to several minutes depending on network connectivity). The **Open “Analysis and Download” Panel** button on the bottom right will open a new panel on the right to visualize the data in different ways and download the predicted map and raw imagery. ***** Once this Analysis and Download button displays, the selected indicator data have been calculated and can be downloaded (This means that even if the imagery and/or predicted map/residuals map are not displayed on your screen, the data themselves are available to you via the Analysis and Download button). *****



c. In the map, a predicted map of the selected AOI and indicator will (eventually) be displayed. The Layers button (top right) allows you to toggle on and off different layers: the selected indicator, Landsat false color composite of the selected time, and the AOI boundary. Place your cursor over the **Layer** button in the upper right corner of the map.

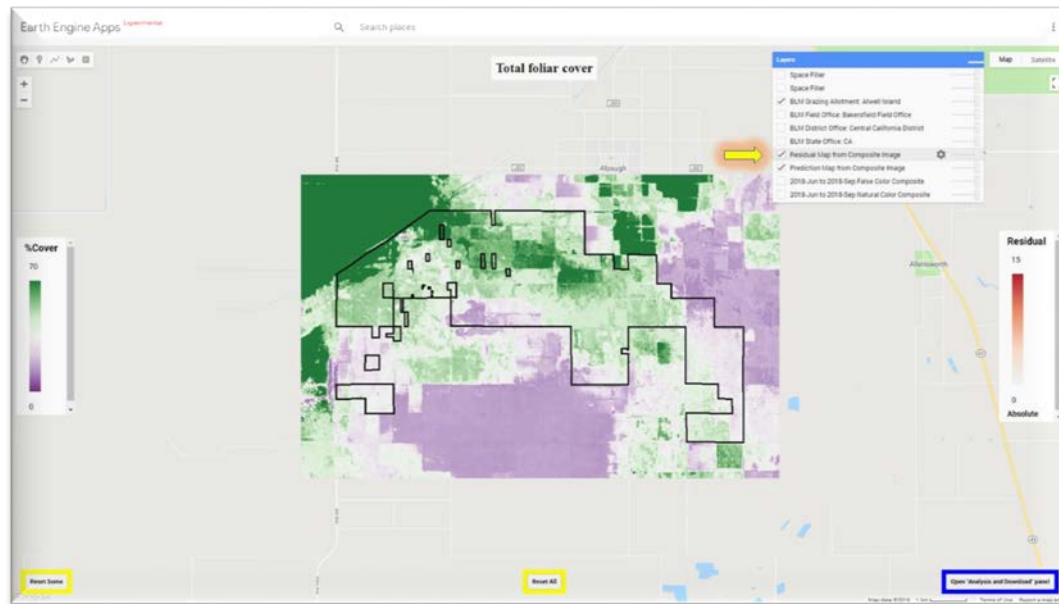


d. A list of layers appears: 4 boundary layers (State/District/Field/Grazing Allotment) or your user defined boundary, 2 image composites, the predicted indicator map, and the predicted indicator residual map. Initially, the defined AOI boundary and the predicted map are checked "on." The true color Landsat composite image displays Red, Green, and Blue bands. The false color Landsat composite image displays the Near Infrared, Red, and Green bands and shows green vegetation as red. The predicted indicator map is calculated on-the-fly in the background using random forest algorithms in Google Earth Engine (GEE); the pixel values are percent of the pixel that is covered by the selected indicator. The predicted indicator residual map shows errors spatially.

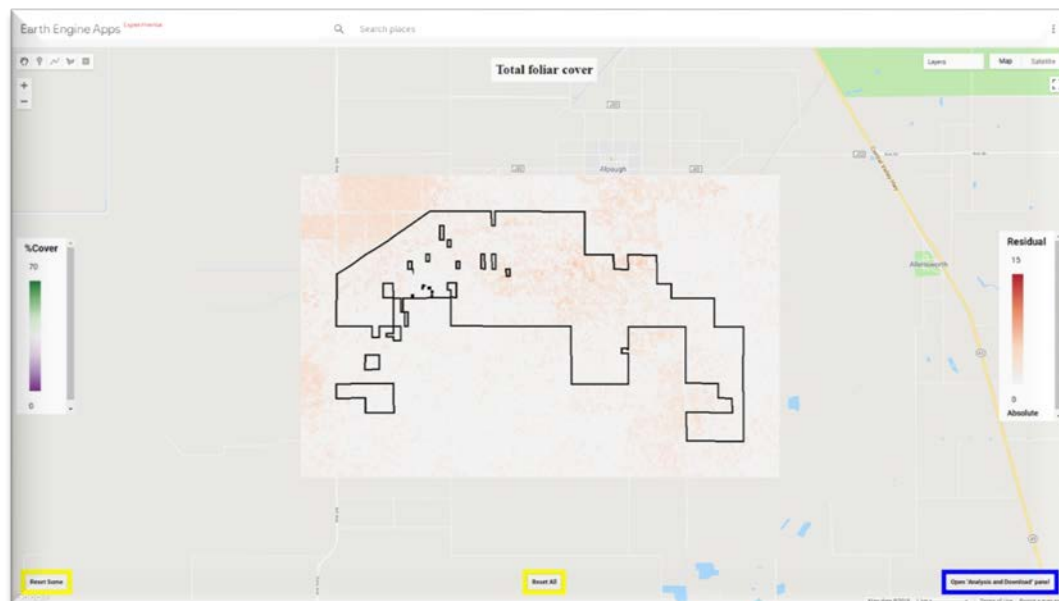


Grazing Allotment Boundary
Field Office Boundary
District Office Boundary
State Office Boundary
 or
User Defined Boundary
 Indicator Residual Map
 Indicator Prediction Map
 Landsat False Color Composite
 Landsat True Color Composite

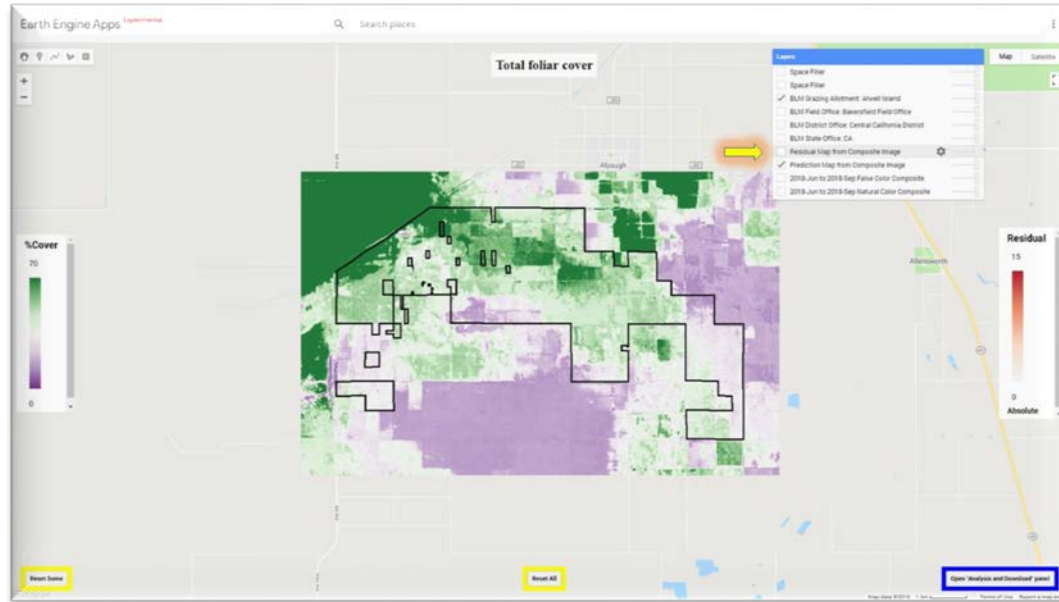
e. Click the checkbox next to the Residual Map in the Layers list to see the residuals. Be patient, this might take some time to draw. You can also change the display parameters for the layers by clicking on the cog wheel that appears when you hover the mouse over the layer name.



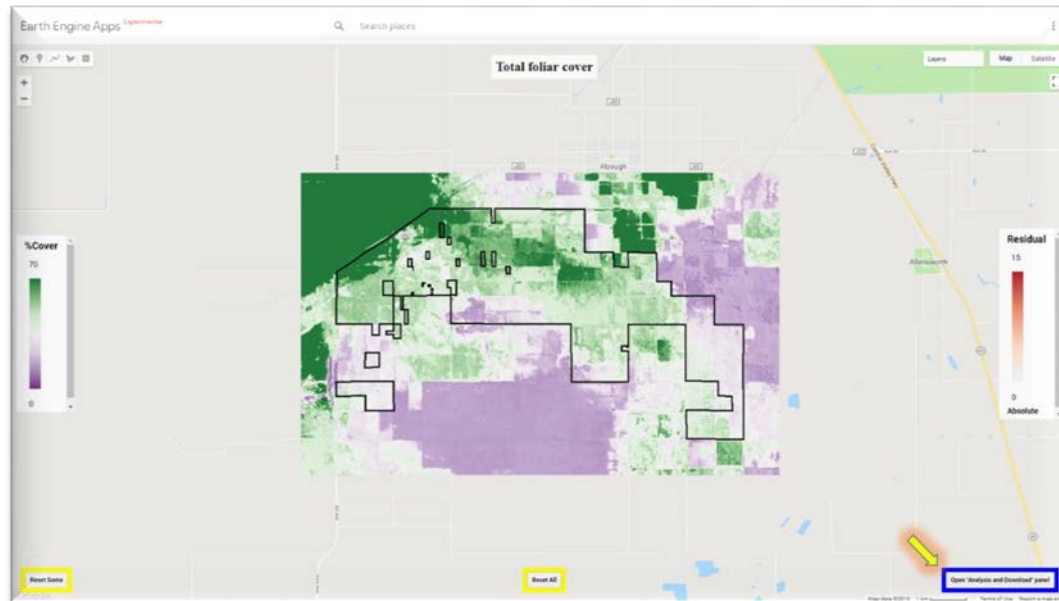
g. The predicted indicator and its residuals are calculated on-the-fly and displayed on your AOI. You can zoom in and pan around to explore this area now – remember that each time you move/zoom the prediction is recalculated, so it might take some time to redraw. You can also draw high-resolution satellite imagery in the background to compare to the Landsat-resolution predicted pixels (click on the **Satellite** button at the top right corner of the map).



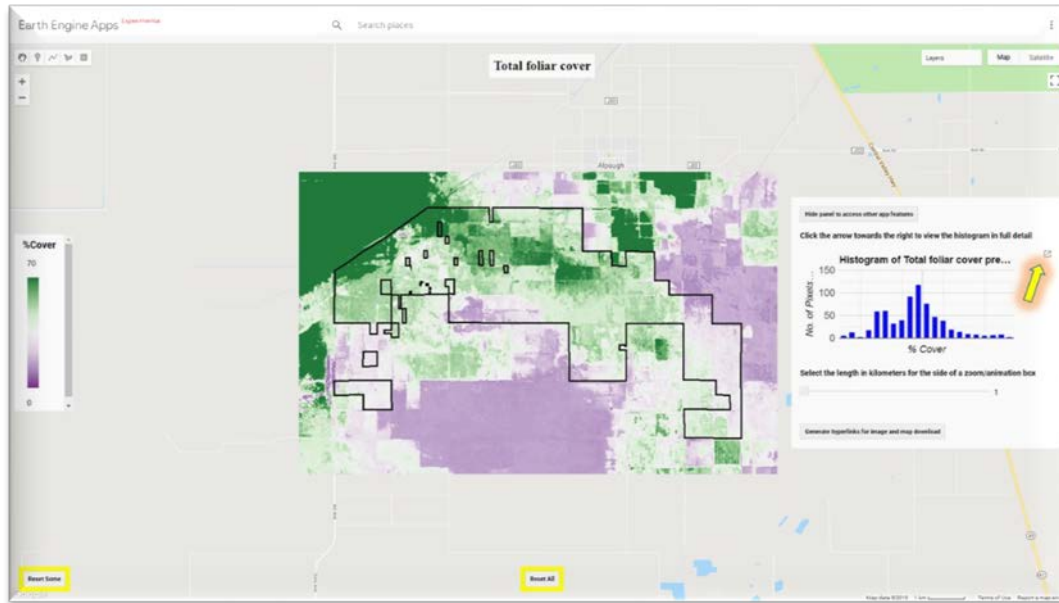
h. Hover over the layer button again to click the checkbox next to the Residual Map to remove it from the display.



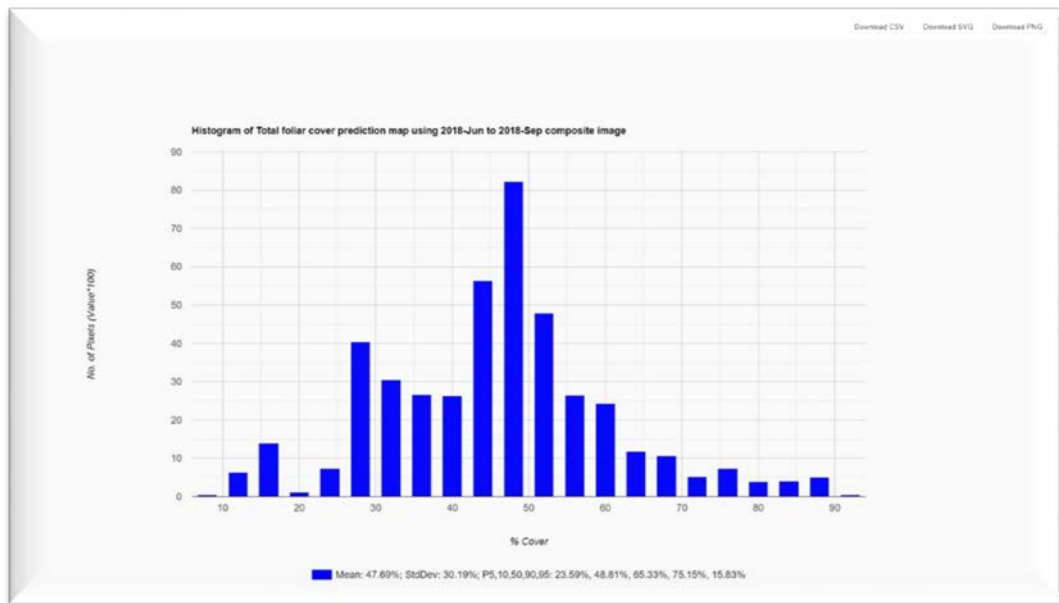
i. Click on the **Open “Analysis and Download” Panel** button.



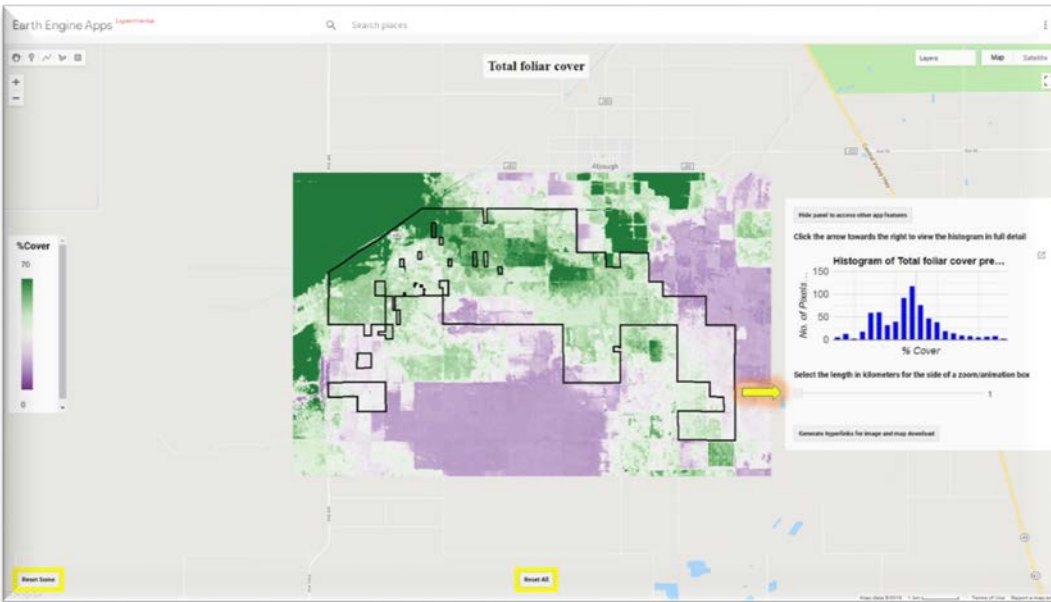
j. A frequency histogram of the number of pixels of different values of fractional cover is produced and displayed in the user interface (UI) panel. Click on the boxed arrow in the upper right corner of the chart to open in a new webpage that expands the chart.



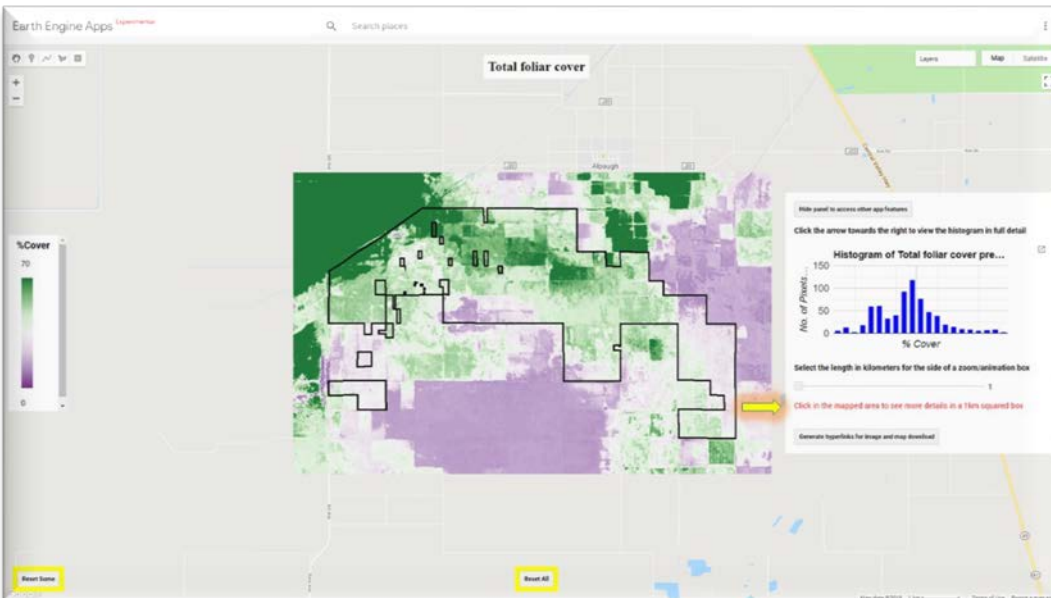
k. A new window opens up with the histogram and allows you to download the data from the histogram in a variety of formats. Some basic statistics about the predicted data are shown below the histogram. These statistics are for pixels that exist within the AOI boundary you selected/defined and does not include pixels shown on the map that are outside of your AOI boundary.

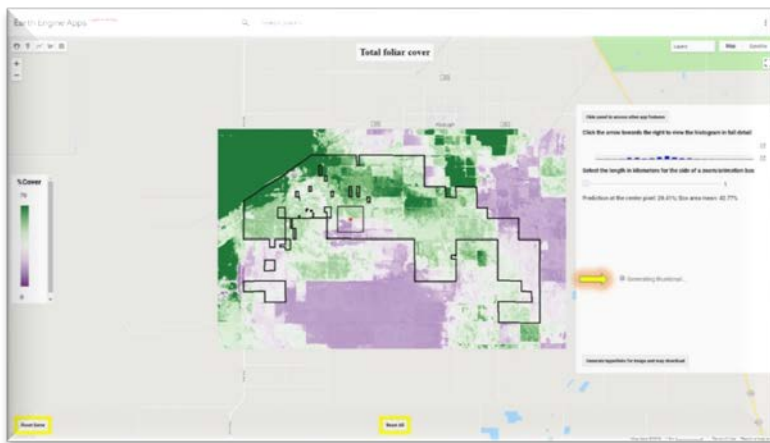
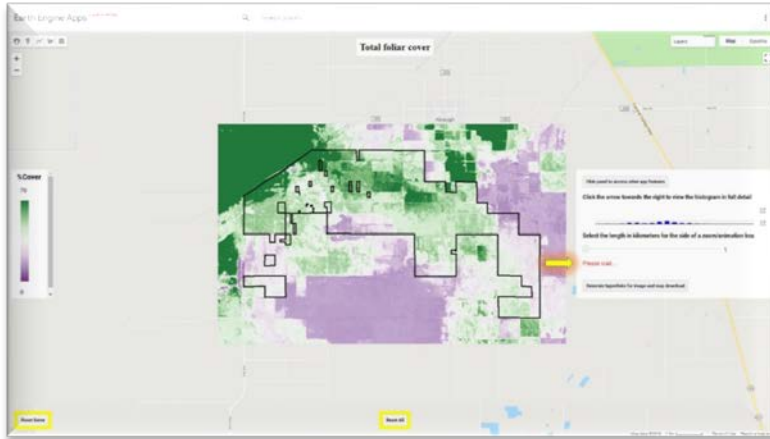


l. There is now a capability to zoom into a smaller window within your selected AOI and show an animation of the predicted map and the true color imagery. Using the slider bar in the analysis and download panel, choose the size of your zoom box (in kilometers).

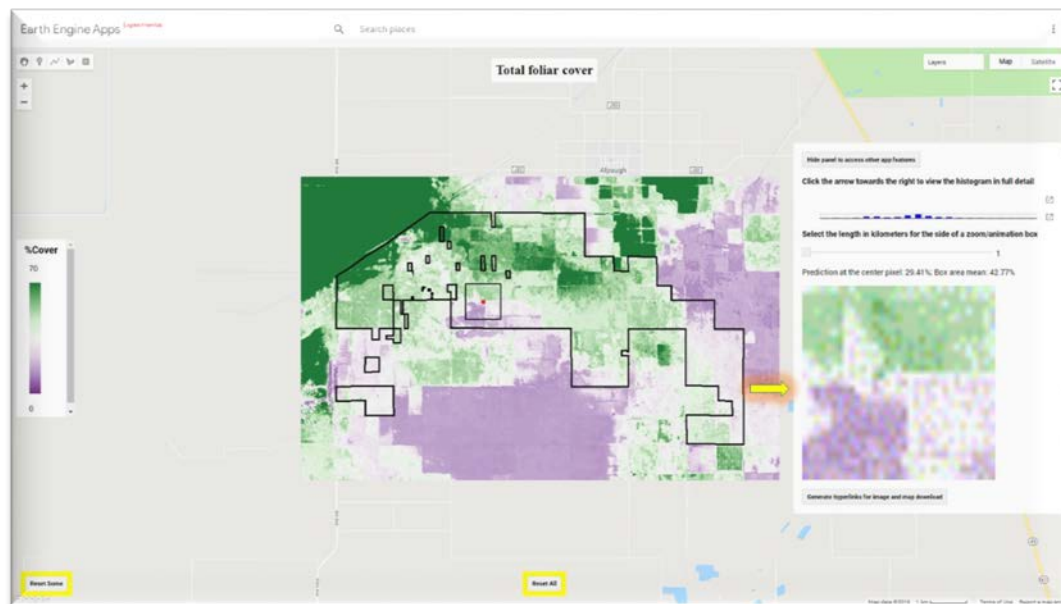


m. Click in your map (where there is predicted data) to open a zoom box at the scale you have chosen with the slider bar. After you have clicked in the map you will see a couple of messages in the panel: "Please wait..." and "Generating thumbnail...". Your zoom box will be drawn on the map with a red center point. Be patient!

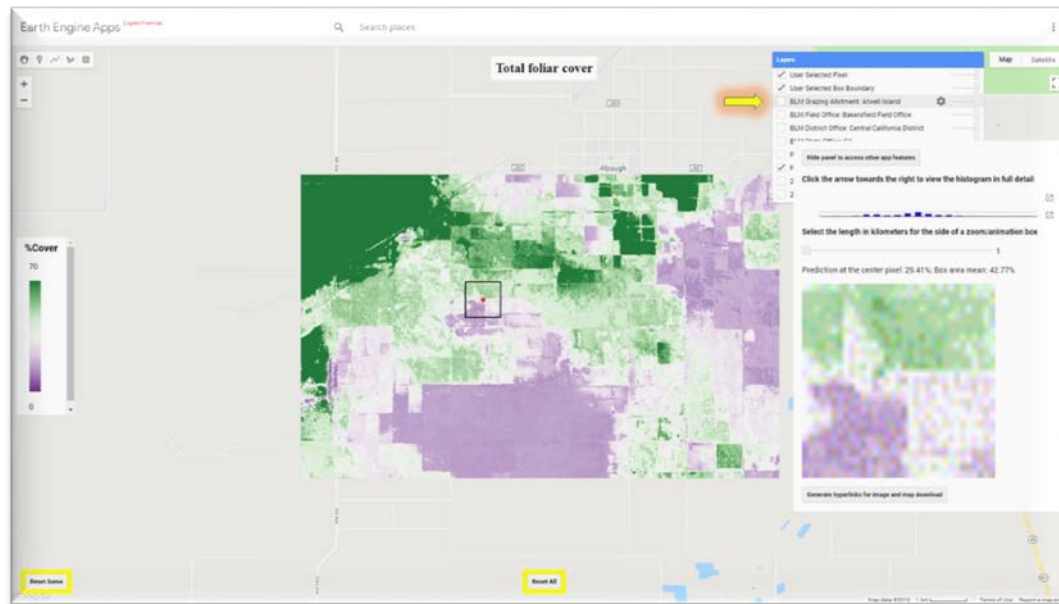




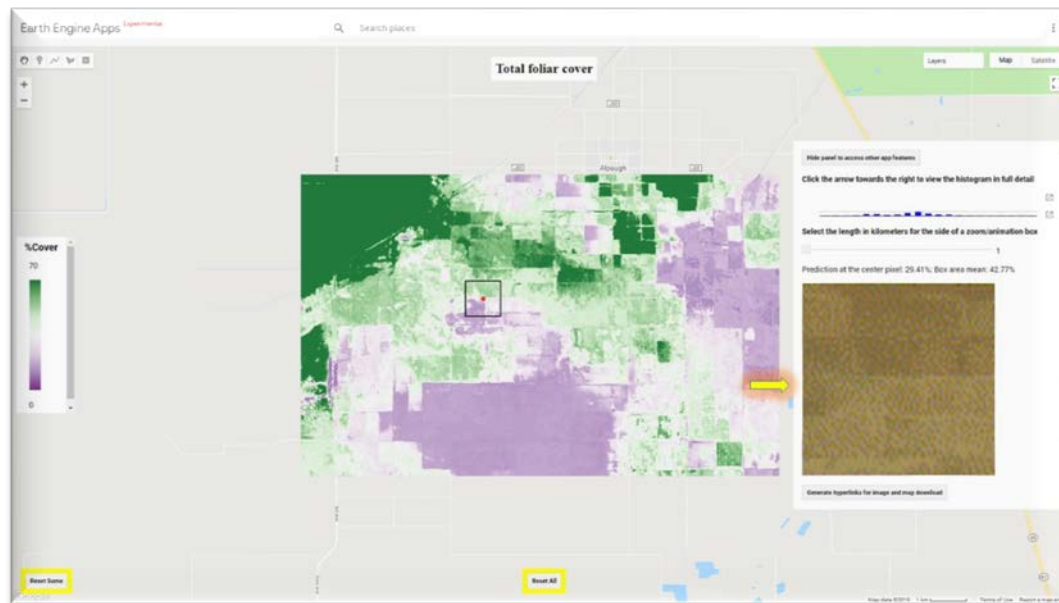
n. A zoom box/animation will appear in the panel.



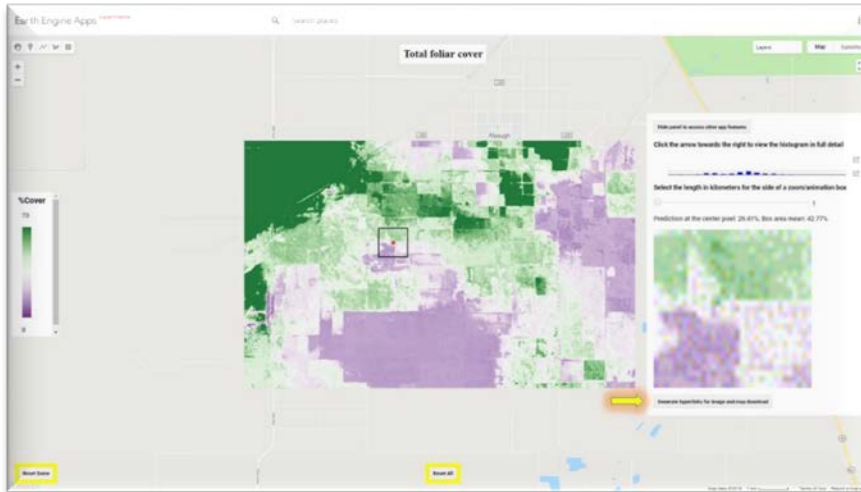
o. You can turn off the AOI boundary if it is too noisy while looking at the map by hovering your mouse over the Layers list on the top right and clicking off the Allotment/User defined boundary.



p. The zoom box will also show an animation of the predicted data then the true color imagery (flashing back and forth between predicted data and raw imagery).

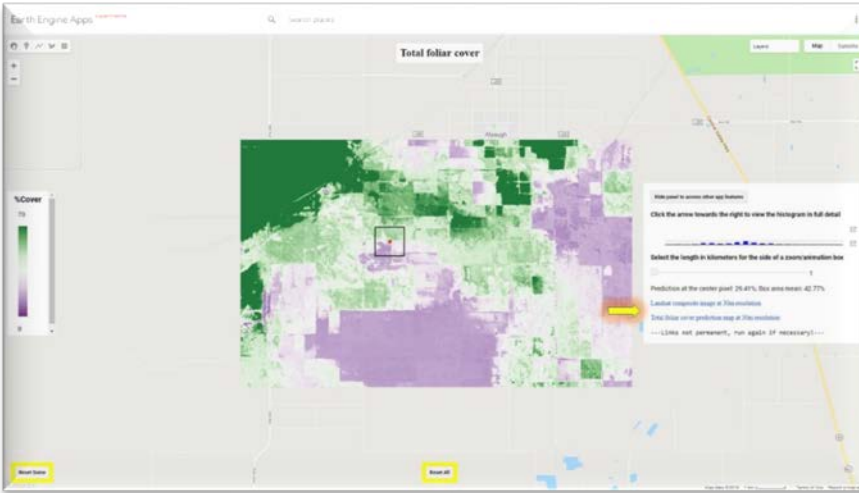


q. You can download the rectangular composite Landsat image (labeled as if the data are Landsat 8 OLI bands) and the predicted map/data that surrounds your AOI and shows on the map by clicking the **Generate hyperlinks for image and map downloads** button. A new tab will open in your browser and a zip file will automatically begin to download to your default download folder. Sometimes the data calculation or download will time out, so if you are unable to download the zip file immediately, just try the **Reset Some** button and recalculate. You can use 7zip to unzip this file and load the image(s) into ArcMap, ArcPro, Erdas Imagine, or the software of your choice.

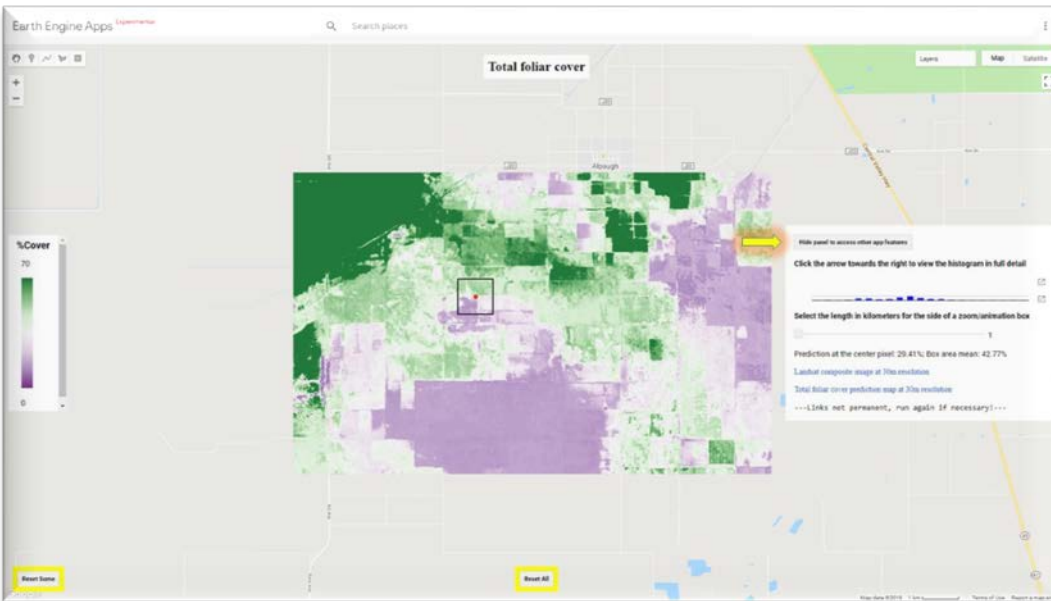


There will be six images in the “Landsat composite image at 30m resolution” zip file (called “Landsat_composite_.zip”) representing blue (B), green (G), red (R), Near Infrared (NIR), Short-wave Infrared 1 (SWIR1), and Short-wave infrared 2 (SWIR2). See <https://www.usgs.gov/media/images/landsat-8-band-designations> for more info on the wavelengths of these bands.

There will be one image in the “Indicator prediction map at 30m resolution” zip file (called “Map_.zip”) representing the predicted selected indicator for your area.



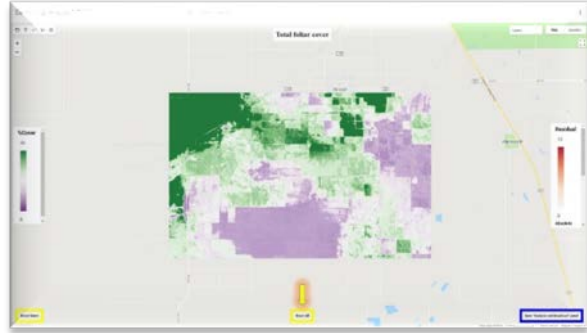
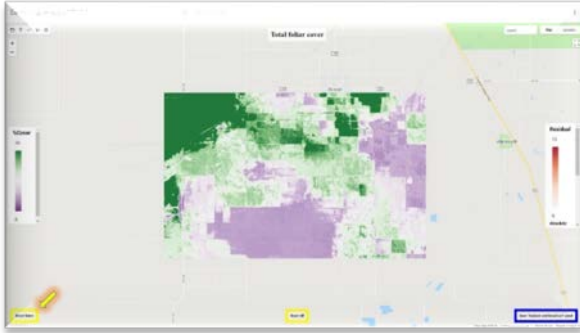
r. You may click on the **Hide panel to access other app features** button to continue... OR move to the next step.



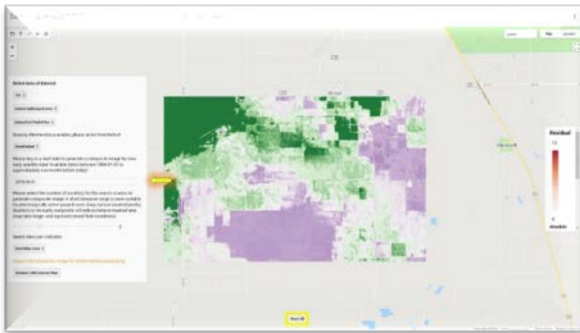
s. Now you can Reset Some of the parameters you are mapping or Reset All and start over.

Reset Some

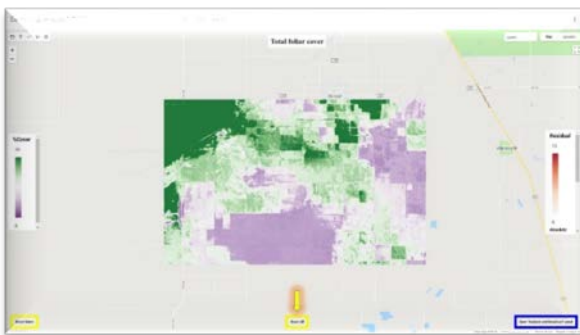
Reset All



Change parameters as needed.



When ready to start over, click **Reset All**



II. LANDCART COVER CHANGE TOOL – UNDER CONSTRUCTION

II.1 – DEFINE YOUR AREA OF INTEREST

Where do you wish to visualize calculated data?

II.1.A – SELECTING A GRAZING ALLOTMENT AS AN AOI

If you have chosen your AOI from an uploaded shapefile or by drawing a polygon, skip this section and move on to section [II.2](#). If you would like to upload a shapefile for the AOI, please go to section [II.1.C](#). If you would like to draw your own polygon, please go to section [II.1.B](#).

II.1.B – DRAWING A POLYGON AS AN AOI

If you have chosen your AOI from the grazing allotments or an uploaded shapefile, skip this section and move on to section [II.2](#). If you would like to select a grazing allotment for the AOI, please go to section [II.1.A](#). If you would like to upload a shapefile for the AOI, please go to section [II.1.C](#).

II.1.C – UPLOADING A SHAPEFILE AS AN AOI

If you have chosen your AOI by drawing a polygon or selecting a grazing allotment, skip this section and move on to section [II.2](#). If you would like to draw your own polygon, please go to section [II.1.B](#). If you would like to select a grazing allotment for the AOI, please go to section [II.1.A](#).

II.2 – DEFINE YOUR TIME PERIOD OF INTEREST

What time period do you wish to visualize?

II.3 – DEFINE YOUR INDICATOR OF INTEREST

What LMF/AIM core indicator do you wish to have calculated?

II.4 – COMPARE DATA AT TWO DATES

III. LANDCART TIMESERIES TOOL – UNDER CONSTRUCTION

III.1 – DEFINE YOUR AREA OF INTEREST

Where do you wish to visualize calculated data?

III.1.A – SELECTING A GRAZING ALLOTMENT AS AN AOI

If you have chosen your AOI from an uploaded shapefile or by drawing a polygon, skip this section and move on to section [III.2](#). If you would like to upload a shapefile for the AOI, please go to section III.1.C. If you would like to draw your own polygon, please go to section III.1.B.

III.1.B – DRAWING A POLYGON AS AN AOI

If you have chosen your AOI from the grazing allotments or an uploaded shapefile, skip this section and move on to section [III.2](#). If you would like to select a grazing allotment for the AOI, please go to section [III.1.A](#). If you would like to upload a shapefile for the AOI, please go to section [III.1.C](#).

III.1.C – UPLOADING A SHAPEFILE AS AN AOI

If you have chosen your AOI by drawing a polygon or selecting a grazing allotment, skip this section and move on to section [III.2](#). If you would like to draw your own polygon, please go to section [III.1.B](#). If you would like to select a grazing allotment for the AOI, please go to section [III.1.A](#).

III.2 – DEFINE YOUR TIME PERIOD OF INTEREST

What time period do you wish to visualize?

III.3 – DEFINE YOUR INDICATOR OF INTEREST

What LMF/AIM core indicator do you wish to have calculated?

III.4 – LOOK AT TRENDS OVER TIME

FUTURE USER INTERFACE

There is no front-end for the Alpha V1,2,3 testing – you will go to the links above to access the GEE experimental apps. After getting your comments from this first release, we will move on to a Beta testing stage with all of the Apps worked in to a single package with a beautiful front end. We envision a very simple map interface that allows you to choose your area of interest (AOI), then the time period of interest (TOI), then the indicator(s) of interest (IOI). From there you will be able to select from a variety of apps that will perform different calculations and produce data, charts, reports, metadata, etc. Figures 1 through 3 give examples of what this *might* look like.

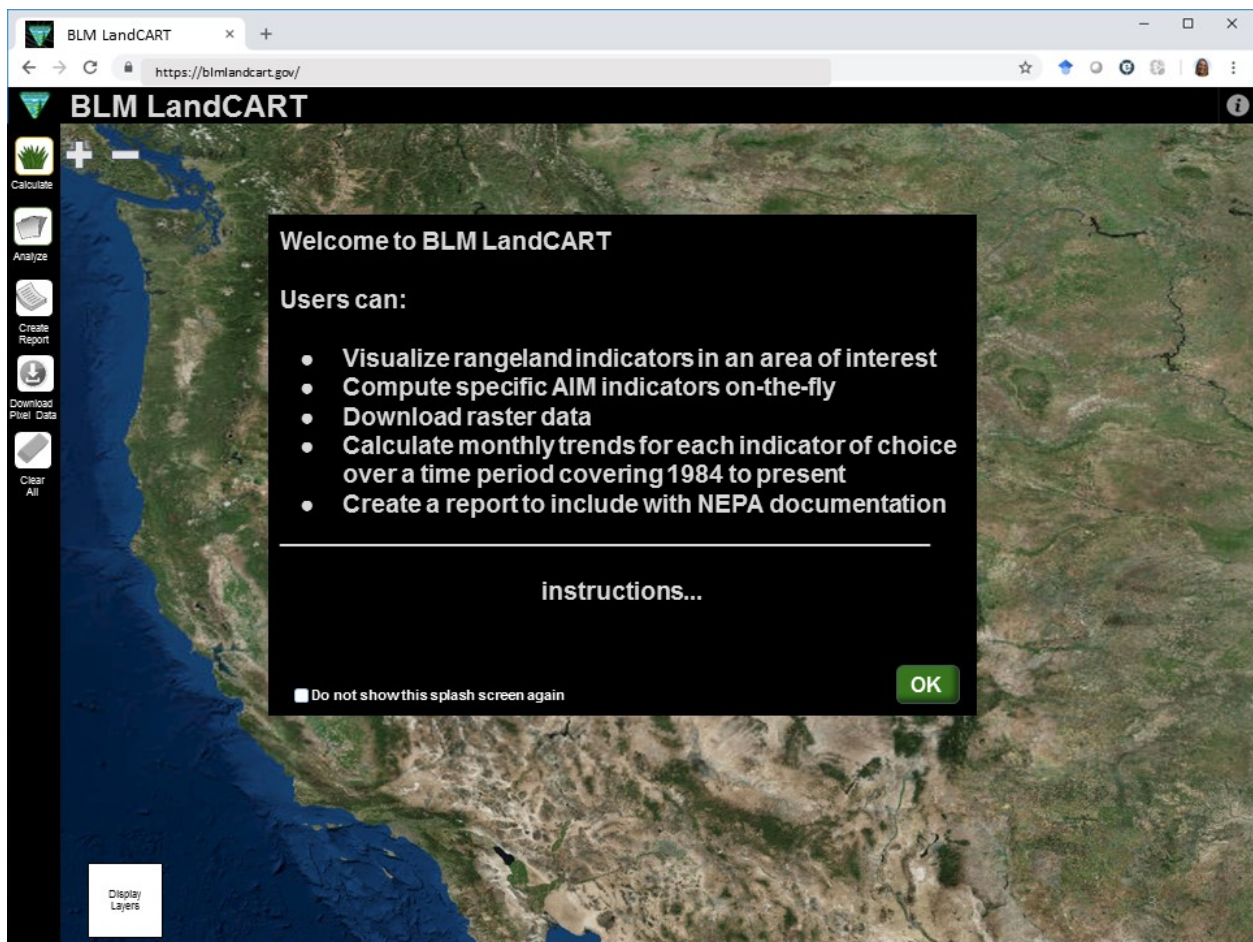


Figure 1: Example opening page of LandCART. After closing the splash screen, you are given the options to either display layers or click on the Calculate button in order to choose your area of interest (AOI), time period of interest (TOI), and indicator(s) of interest (IOI(s)).

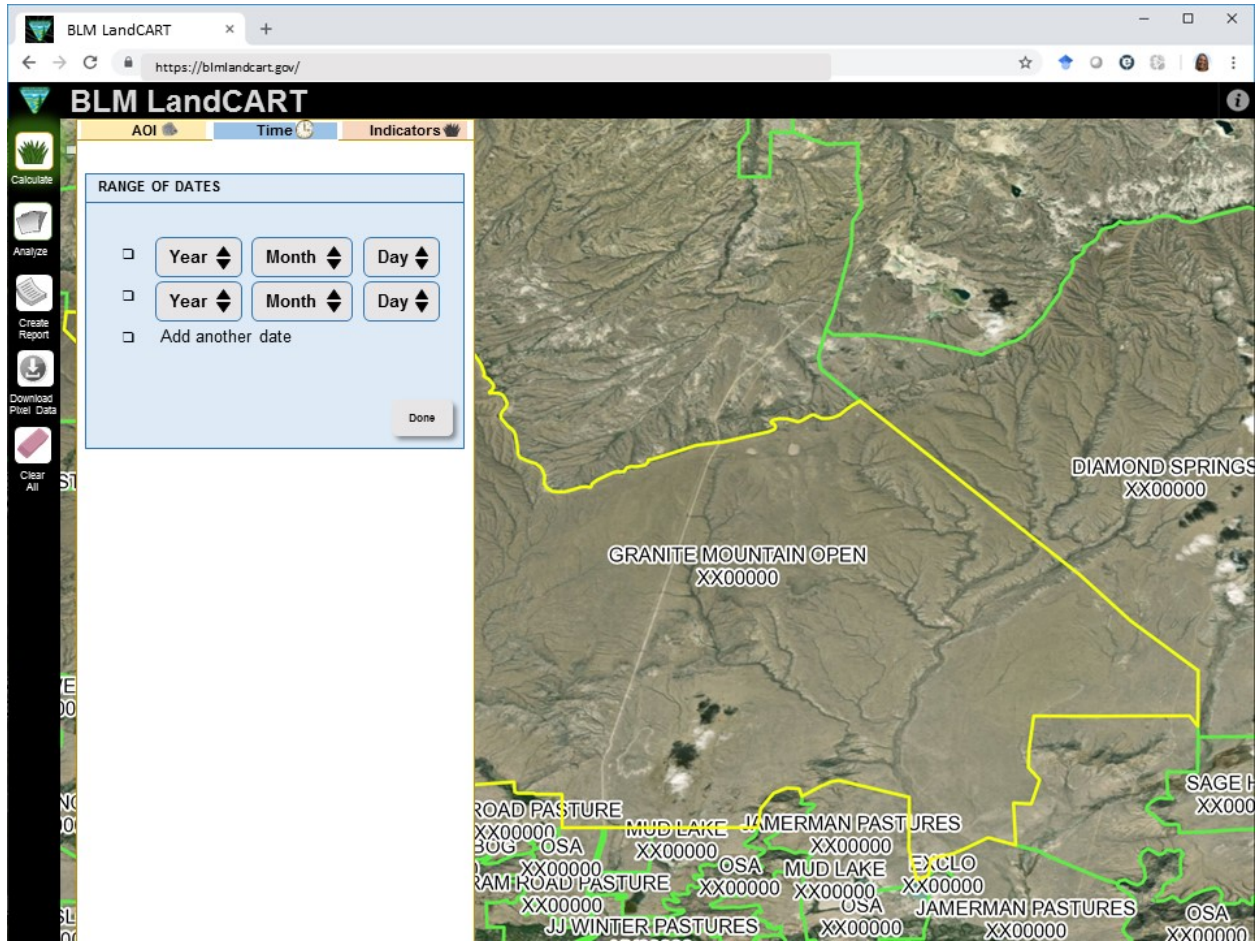


Figure 2: Example pop-up window that opens when you click on the Calculate Button. Three tabs allow you to define your area of interest (AOI), time period of interest (TOI), and indicator(s) of interest (IOI(s)).

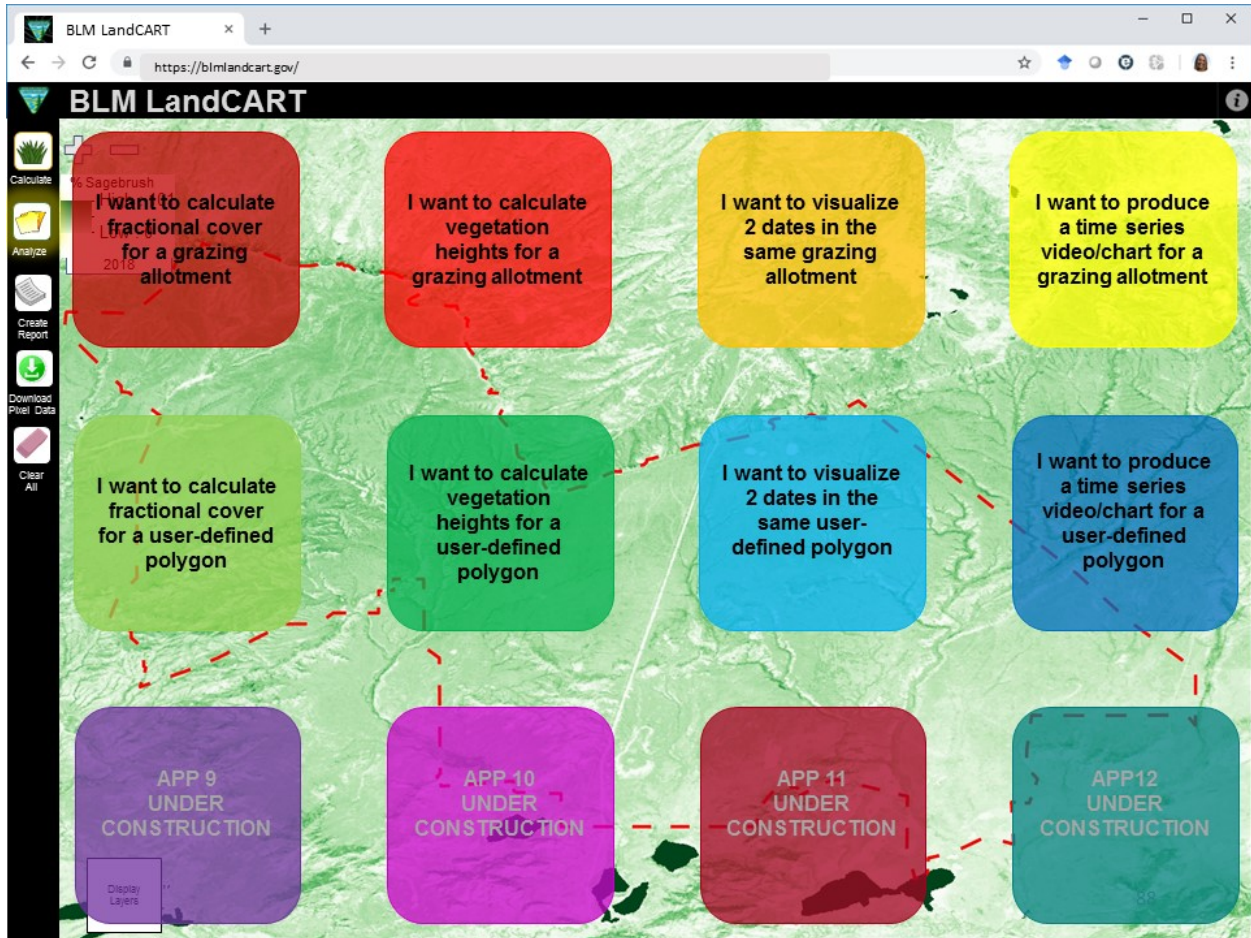


Figure 3: Example of clicking the Analyze button. You will be presented with many different Apps to choose from. These apps will be developed as we work with you during the Alpha and Beta testing periods.