ARUP

Southern California Association of Governments (SCAG)

SoCal Greenprint

User Guide and Case Studies

Issue | June 2, 2026

Job number 296346

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Contents

Figures

Appendices

1. Introduction to the SoCal Greenprint

SCAG's SoCal Greenprint is a strategic web-based mapping tool that informs land use and infrastructure decisions and helps users identify priority conservation areas. As directed by Connect SoCal 2020 and its corresponding Program Environmental Impact Report (PEIR), SCAG shall provide the SoCal Greenprint as a publicly available tool to assist local jurisdictions, transportation agencies, and stakeholders identify priority conservation areas and work with county transportation commissions to develop advance mitigation programs for future projects. This tool is one element of SCAG's Regional Advance Mitigation Program (RAMP) initiative.

RAMP is a process for expediting project delivery by planning required mitigation earlier in the planning process and at a wider scale. In cases where compensatory mitigation is needed, advance mitigation can help agencies purchase larger parcels for mitigation at a lower unit cost to offset anticipated impacts. Further, RAMP can result in better collaboration between regulatory and infrastructure agencies, better project delivery, and better mitigation outcomes.

2. Acknowledgements

The development of the SoCal Greenprint would not have been possible without input and collaboration from SCAG staff, the RAMP Advisory Task Group, the Greenprint Technical Advisory Committee, the SCAG Energy and Environment Committee, and the SCAG Regional Council.

3. Disclaimer

Prior to key interactions, the following disclaimer will be displayed to users:

The SoCal Greenprint is an informational data mapping tool created by the Southern California Association of Governments (SCAG) that provides third party users with the ability to create interactive maps and customized reports by selecting and combining data layers from publicly available and pre-existing data sources.

SCAG makes no representation or warranties regarding the accuracy of the SoCal Greenprint data sources nor assumes any liability for its use—the user assumes all risk of use. SCAG does not intend for SoCal Greenprint data to supersede any local land use information; SCAG has no land use authority to impose the use of SoCal Greenprint data.

All maps and reports created by users:

1. *Are purely informational and reflective of data that is already existing and public information.*
2. *Carry no regulatory weight or authority.*
3. *Should not be relied on or used as a definitive source of all information that may be available about a location (SCAG defers to local jurisdictions which may have more complete information). If you understand and agree to these terms, Connect to SoCal Greenprint.*

The key interactions during which this disclaimer language will appear are as follows:

1. When users first access the SoCal Greenprint.
2. When users click on the **Share Your Map** button.
3. When users click on the **Add Data** button.
4. When users click on the **Download Data** button.
5. When users click on the **Terms and Conditions** link in the navbar.

In the case of interactions 1-4, users must click on a checkbox to agree to the disclaimer language before continuing.

4. Using the Application

4.1 Purpose of the Tool

SoCal Greenprint is a web-based mapping application that helps municipalities and transportation agencies make land use and transportation decisions; conserve natural and farmlands; and identify potential environmental impacts early. With these goals in mind, the SoCal Greenprint is defined as follows:

- A strategic web-based conservation tool with scenario visualizations.
- An easily accessible resource.
- Uses the best available scientific data.
- Helps inform advance mitigation programs at the local level.
- Helps municipalities, conservation groups, developers, and researchers prioritize lands for conservation.
- Helps cities, counties, and transportation agencies make land use and transportation infrastructure decisions and conserve natural and farmlands.

4.2 Accessing the Tool

To access the SoCal Greenprint, users must first send an email to SupportSCAGGreenprint@arup.com. In the email, users must provide their first and last name. Users are then required to follow an onboarding process for authentication to the necessary data systems. The onboarding process is outlined in the following section.

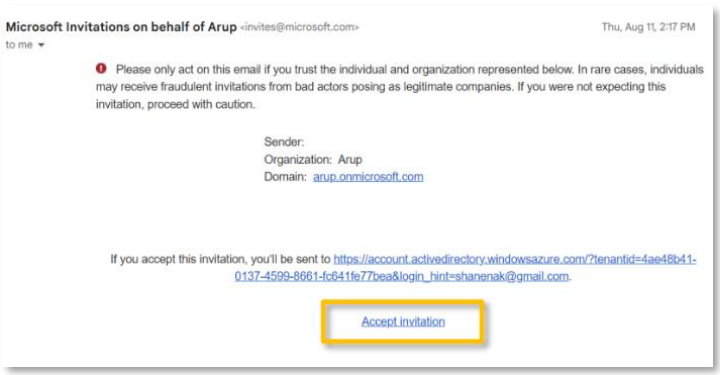
4.2.1 Onboarding

4.2.1.1 Invitation

New users should expect an email from **Microsoft Invitations on behalf of Arup**. Users should check the "Other" tab in their Inbox, or the Junk Mail or Spam folders.

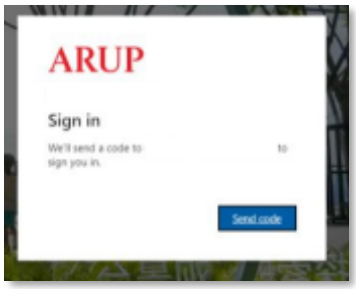
[1] At the bottom of this email, press **Accept Invitation**

This invitation is unique to you—please do not share it with anybody else.



4.2.1.2 Verify email

Follow the steps on the login screens to verify email and grant permissions from your email account.



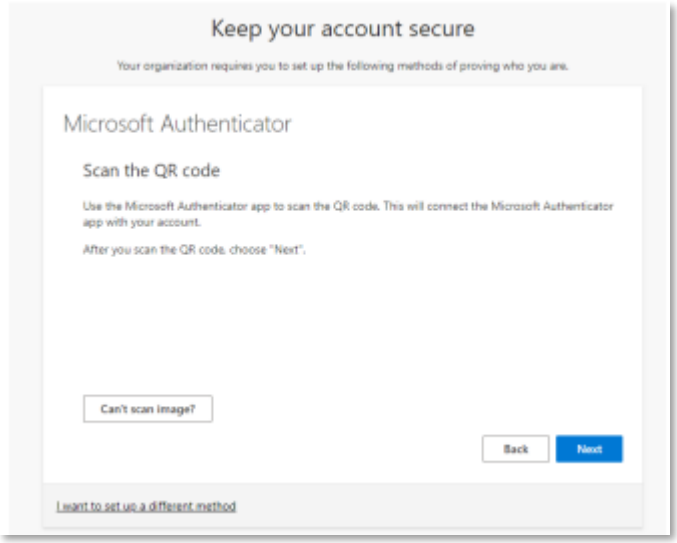
4.2.1.3 Set up Microsoft Authenticator app

If Microsoft Authenticator is not yet installed on your phone:

[2] Install the **Microsoft Authenticator** application on your phone to conduct the two-step sign-on process (refer to Section 3 below).

Once Microsoft Authenticator is installed on your phone:

[3] Create a new account on your phone to conduct the two-factor authentication (refer to Section 4.2.2 below).



4.2.2 SoCal Greenprint access

4.2.2.1 Navigate to web application

Navigate to the link below:

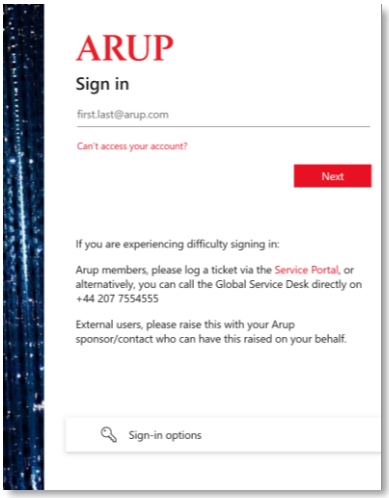
[4] SoCal Greenprint application link: https://scag.ca.gov/regional-advance-mitigation-planning.

4.2.2.2 Sign in to Arup Atlas

Click the button to sign in to the Arup Atlas Portal.

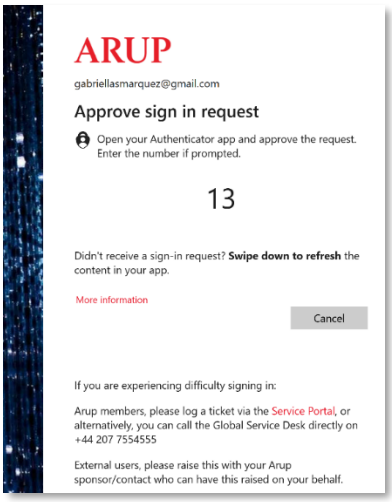
4.2.2.3 Sign in to your Microsoft account

Enter your login credentials to sign into your Microsoft account.



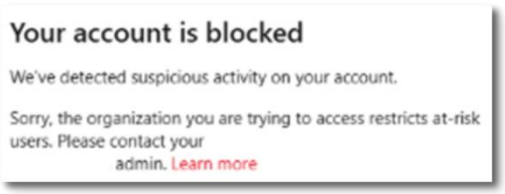
4.2.2.4 Authenticate

Approve the sign-in request by entering the number shown on the screen in your Authenticator application.



4.2.3 Troubleshooting

4.2.3.1 Suspicious activity warning

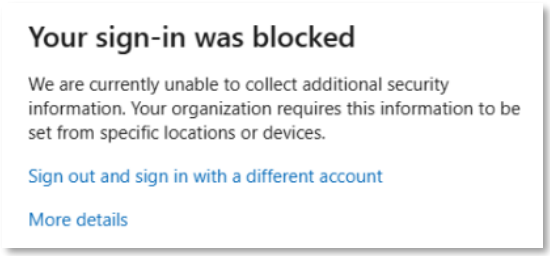


If you see a "suspicious activity" warning, this means that Microsoft has labeled your account with an "at risk user" status. This status is managed by **your organization**.

Steps to resolve:

- Contact your organization's IT team to resolve the "at risk user" status.
- After clearing the "at risk user" status from your Microsoft account, contact Arup to reset your Multi-Factor Authentication (MFA).
- Arup will contact you once your MFA is reset.
- Follow the onboarding steps in this document starting from Step 1.

4.2.3.2 Unable to collect additional security information



This means that certain Microsoft account details could not be read by Arup's Microsoft resources.

Steps to resolve:

- Contact Arup (see email contact below) to reset your Multi-Factor Authentication (MFA).
- Arup will contact you once your MFA is reset.
- Follow the Onboarding steps in this document, starting from Step 1.

4.2.3.3 Other issues

If you have any other problems accessing the application, please send an email to: SupportSCAGGreenprint@arup.com.

4.3 Features and Functionalities

The SoCal Greenprint provides a variety of functional elements to visualize and interact with data. The following sections outline features from the user interface developed to enable these elements.

4.3.1 Visualize Page

This is the main dashboard page under the **Visualize** navigation option. The two tabs on the right-hand side of the page point to several tools to customize the map: **Map Layers** and **Filter. The legend is available on the bottom left of the Visualize Page.** (see Figure 1).

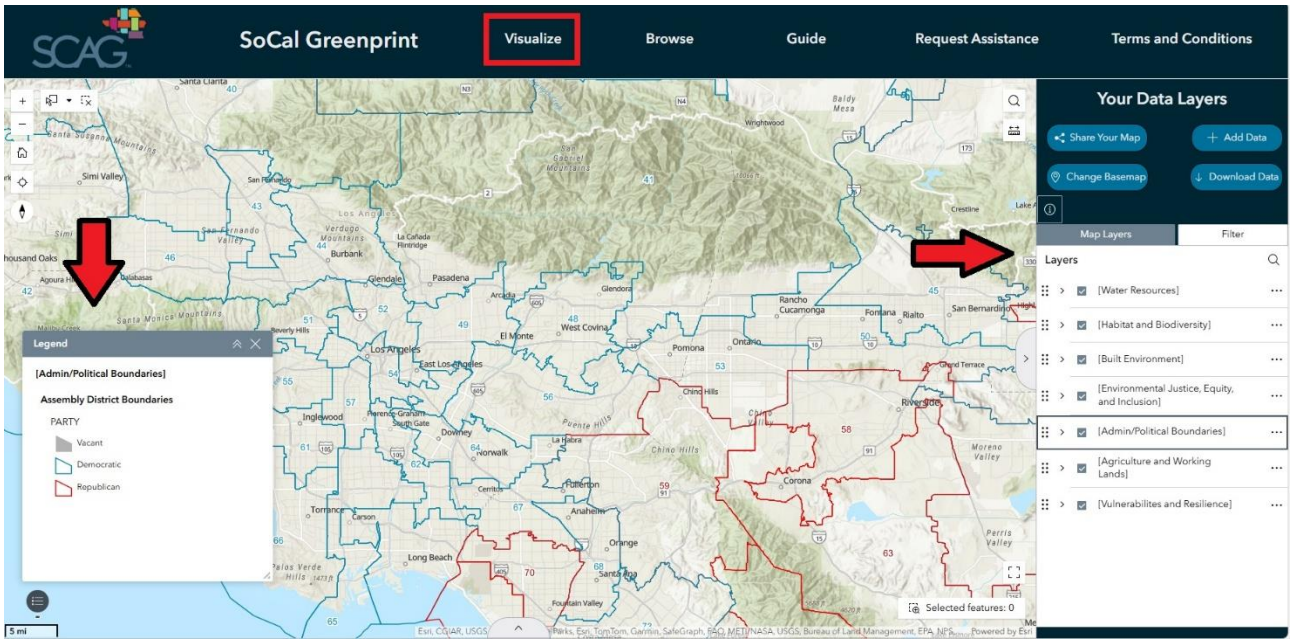


Figure 1 Visualize page sidebar tabs

From this visualize page, the following features can be accessed:

1. Map Layers.
2. Layer Options.
3. Add to Table.
4. Create Filter on Layer.
5. Select Data on Map.
6. Change Basemap.
7. Share Link.
8. Export to PDF.
9. Download Data.
10. Add Data.

4.3.2 Map Layers

Layers are grouped into categories. Click the arrow icon to the left of a category to view the layers within each category. Click the visibility icon (checkbox) to show/hide a layer (see Figure 2).

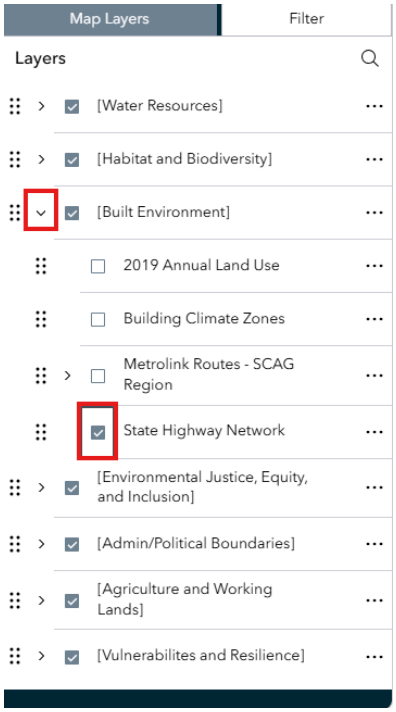


Figure 2 Toggling a data layer's visibility

4.3.3 Layer Options

Users can customize layer settings and explore the properties of individual layers within the layer list of the map. Click the **three dots icon** (options button) of any layer in the layer list to open a menu with different layer tools, these include (see Figure 3):

11. **Zoom to** - adjust the map to layer extent.
12. **Transparency** - adjust layer transparency.
13. **Details** - view layer source metadata.
14. **Set filter** - create a query to filter data records.
15. **Calculate statistics** - display layer statistics such as count, avg, min, max.
16. **Add to table** - add layer to the table accessible below the map.
17. **Export** - download layer.

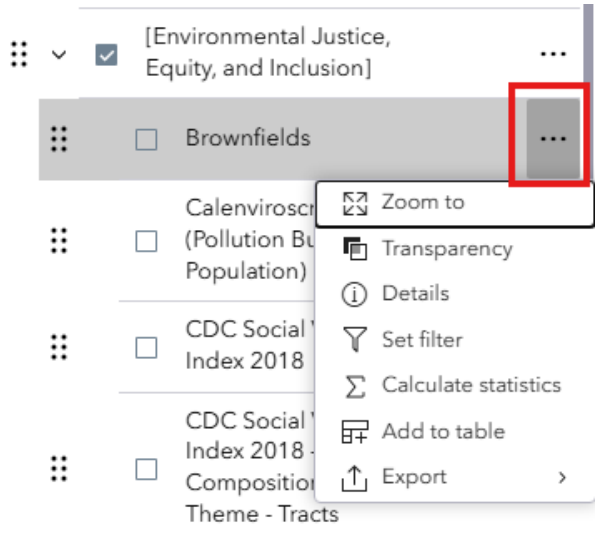


Figure 3 List of available layer options

4.3.4 Add to Table

This action allows the user to customize which table(s) they would like to explore in the frame below the map (see Figure 4):

1. Click the arrow button in the bottom center of the map to expand the table frame.
2. Click again to collapse the table frame.
3. From the 3 dot (options) button of a layer from the layer list, click **Add to table** to display the layer in the table.
4. From the table view, users can explore the dataset by interacting with the table widgets (available on the top right of the table).
    a. These widgets include filtering records based on selection, hiding/revealing columns in the dataset, filtering records by map extent, zooming to selected records, and setting a custom filter on the data.

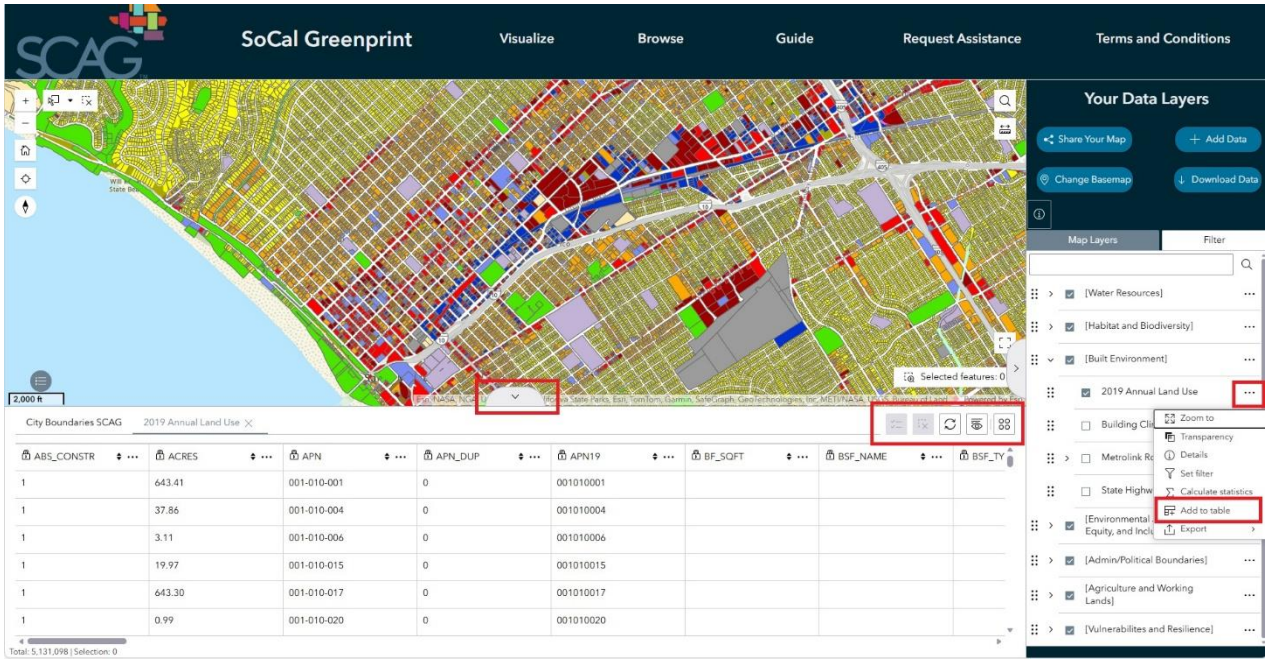


Figure 4 How to add a table to the Visualize Page viewer

4.3.5 Create Filter on Layer

This feature allows the user to create a filter. This filter limits the elements shown on the map from a select data layer based on user-defined criteria. To do this:

1. Click the three dots next to the layer to filter in the layer list and select **Set Filter**.
2. Click the **Add** button in the Set Filter pane.
3. Build one or more clause(s) based on the attribute(s) of interest for your filter (see Figure 5).
4. Toggle the slider option on the top right of the clause builder to **on**. View the filtered output data in the map (assuming the layer is turned on).

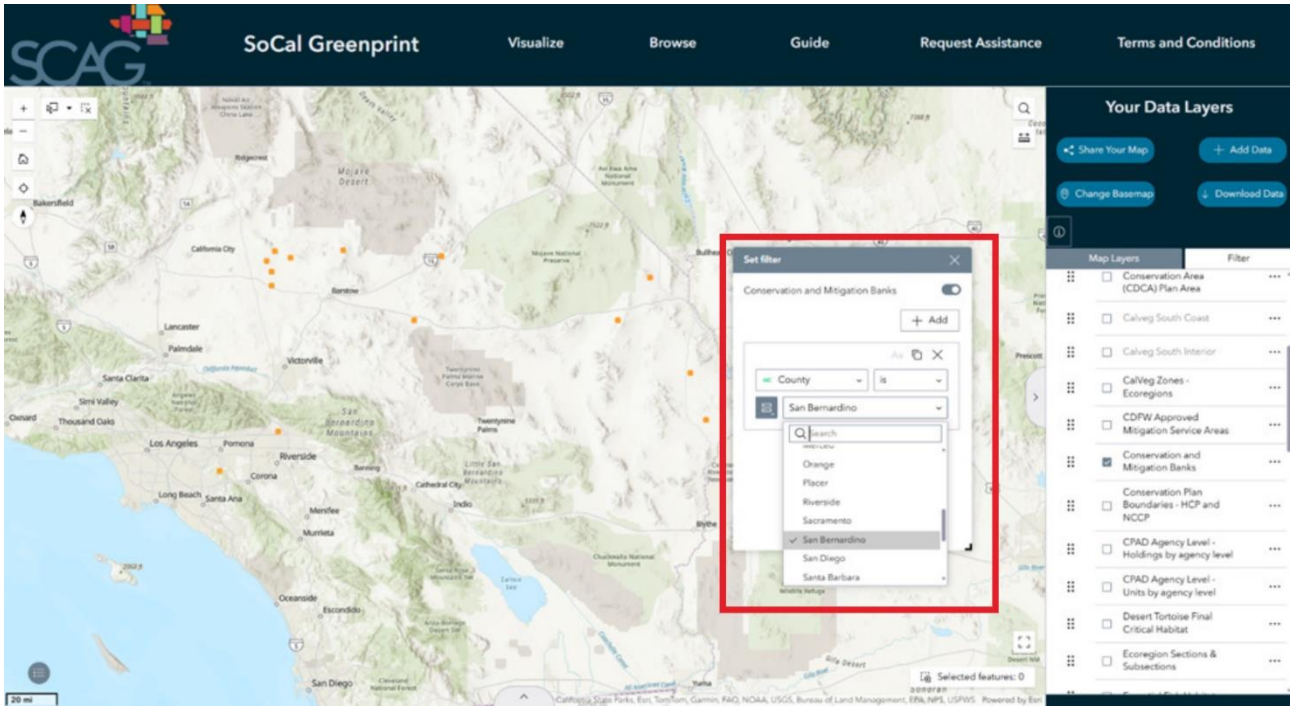


Figure 5 An example of how to build a clause

4.3.6 Select Data on Map

This tool allows the user to select features from one or more datasets interactively on the map interface. To do this:

1. Click the select tool arrow in the top left of the map and choose one of the options: Rectangle, Lasso, Circle, Line, Point.
2. Make sure the layer that you want to select data from is toggled on.
3. Select the feature(s) of interest and note the highlighted border of the feature and the highlighted selection in the data table, if activated (see Figure 6).
4. To clear all selected data, click the **clear selection** button to the right of the select tool.

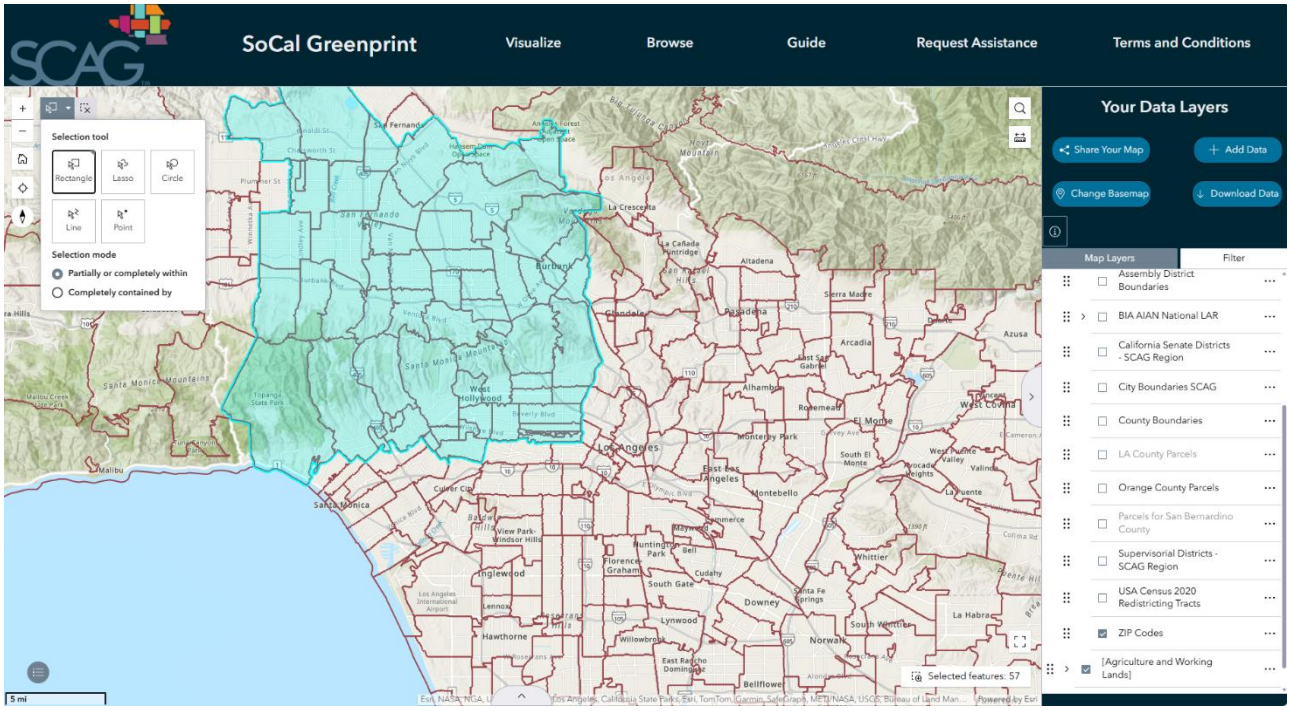


Figure 6 Example of highlighted features when selected using one of the Selection Tools

4.3.7 Change Basemap

From the button options in the top-right corner of the **Visualize** page, users can click the **Change Basemap** button, which will display a window of alternative basemaps as options to display. (see Figure 7):

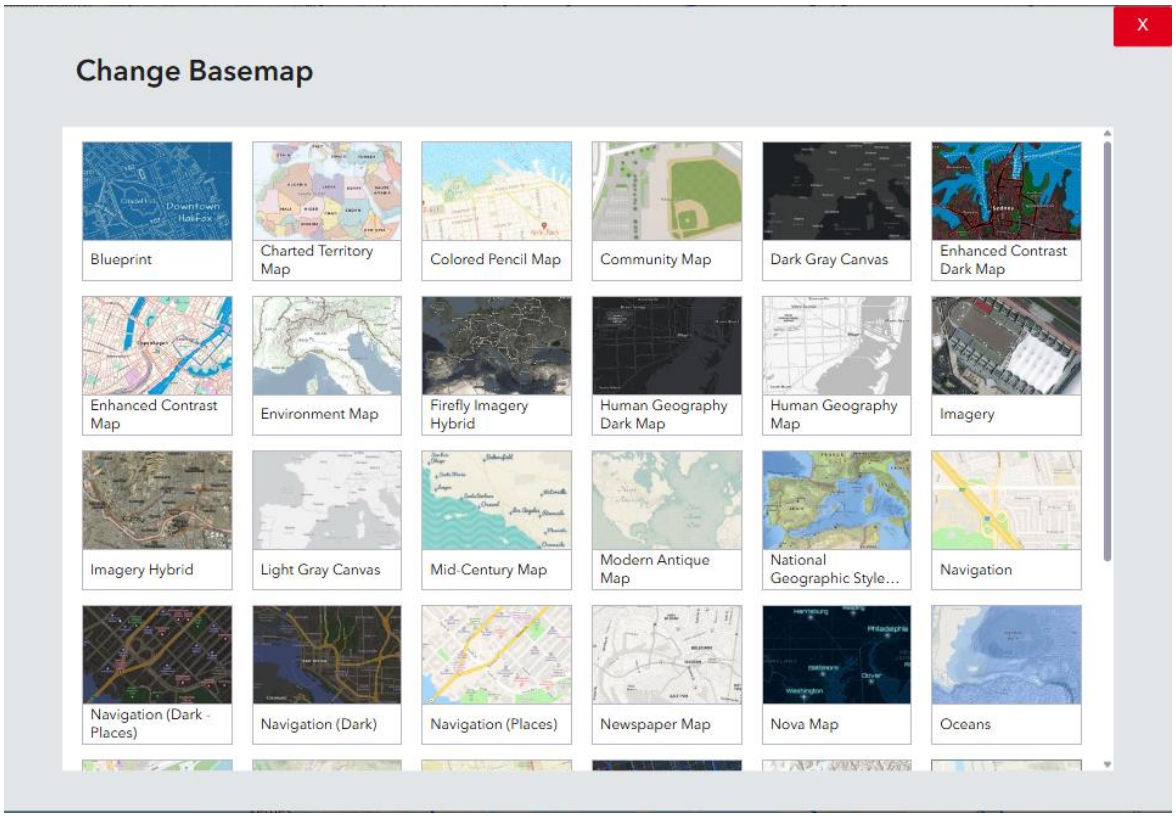


Figure 7 Options for changing the basemap of the SoCal Greenprint.

4.3.8 Share Link

Within the **Share Your Map** option, the setting **Include URL parameters** allows for all map customizations (layers shown, transparencies, extent, etc.) to be saved in the shared map accessed by the created link (see Figure 8).

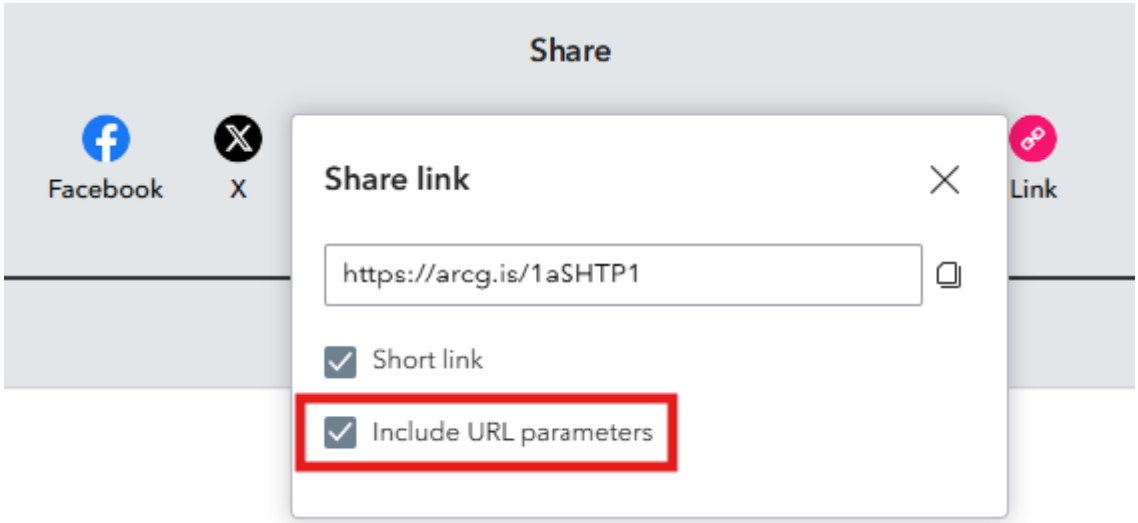


Figure 8 The "Include URL parameters" option must be checked for your active layers to be shown when shared.

4.3.9 Export to PDF

Within the **Share Your Map** option, users can also generate a PDF export of their current map extent on the **Visualize** page. To do this, under the **Export Map** section, a user can input their desired export parameters under the **Print Template** tab and then click the **Print** button (see Figure 9). Once the export is ready to be downloaded, the option will appear under the **Results** tab.

Several advanced features exist in the export tool for map customization including customization of the map scale, author and copyright information, an option to include or not include the map legend, and an option to change the unit of measure in the map scale bar. When any of these parameters are set under the 'Advanced' settings of the tool, the changes will apply in the output PDF map.

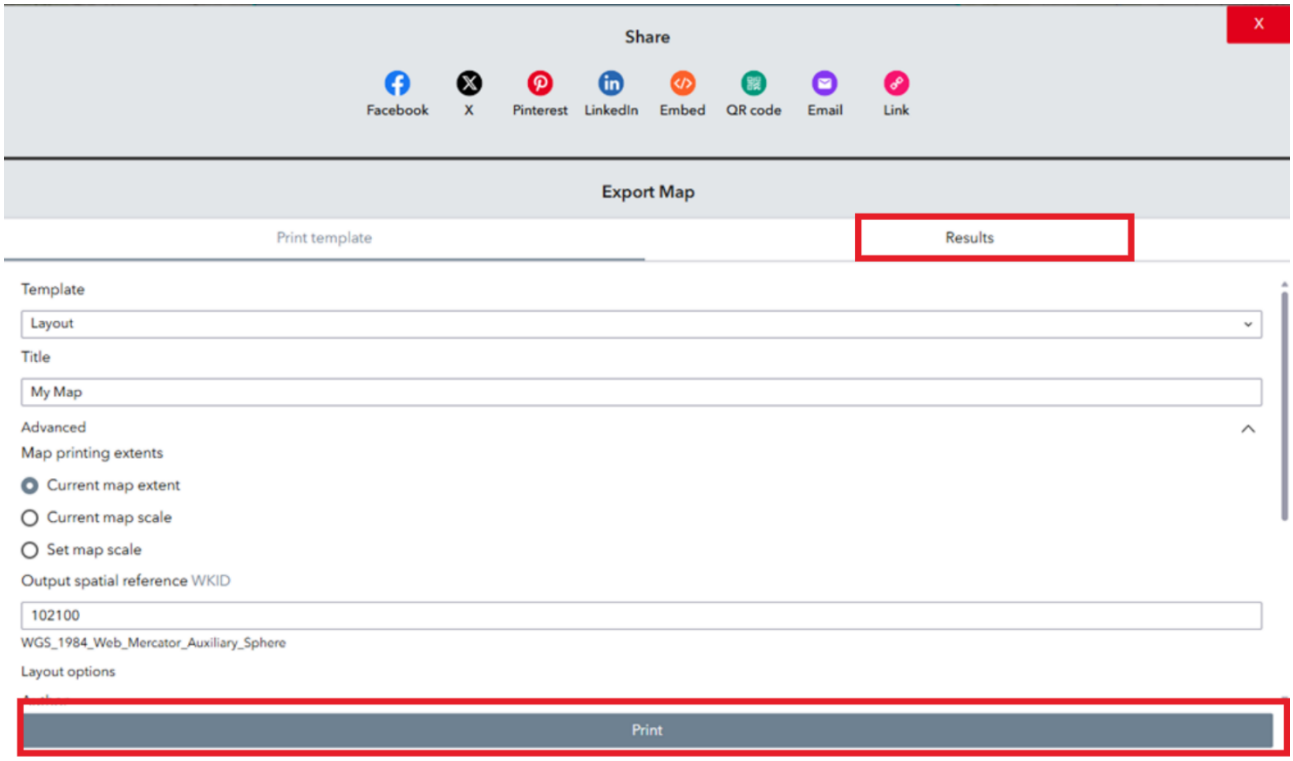


Figure 9 The export map feature appears on the bottom half of the "Share Your Data" pop-up. Clicking the “Print” button will generate a PDF that can be downloaded from the “Results” tab.

4.3.10 Download Data

This action allows the user to download (or bulk download) layer(s). The user selects an output file type, selects dataset(s), and clicks download to receive a .zip file containing the data. If desired, users can also access SCAG’s Regional Data Platform to download additional data layers not available directly from SoCal Greenprint (see Figure 10).

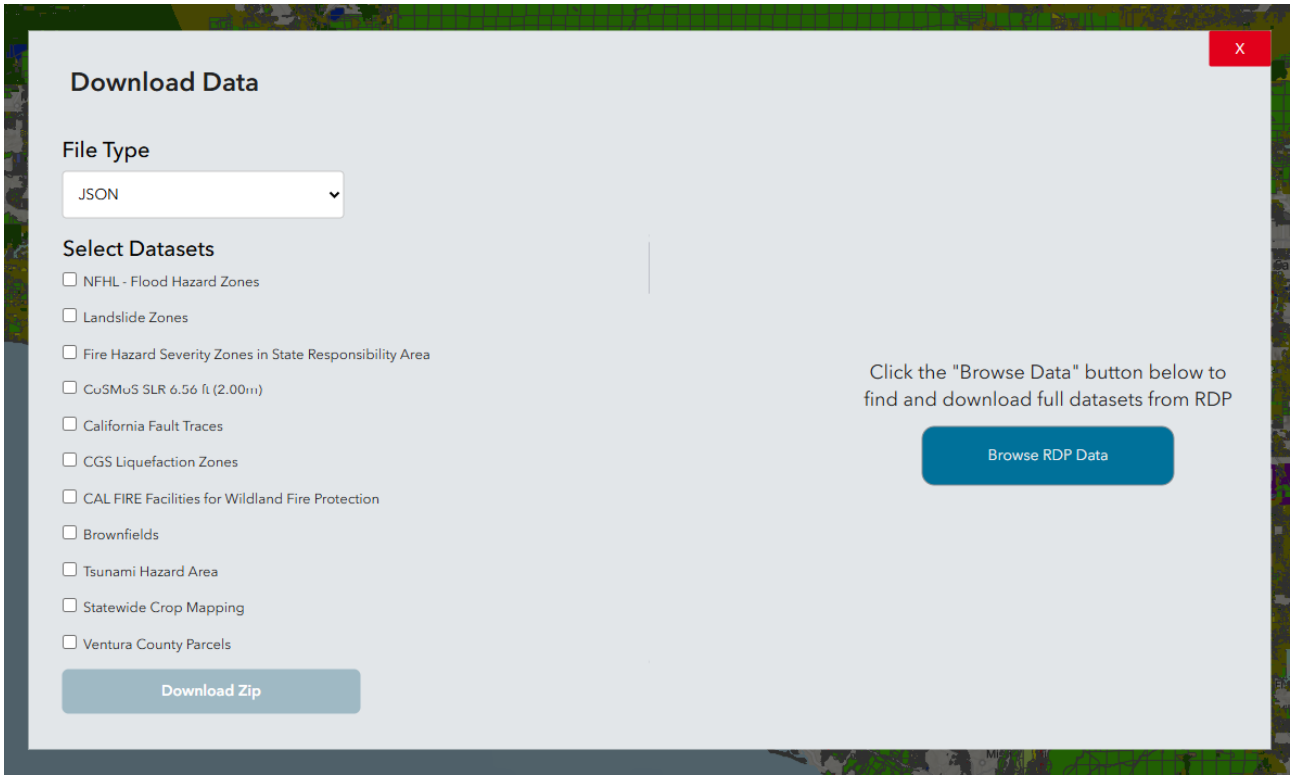


Figure 10 The download data pop-up where users can download data directly from the SoCal Greenprint or access other layers available on SCAG's Regional Data Platform.

4.3.11 Add Data

By clicking the **Add Data** button in the top-right hand corner of the **Visualize** page, users will be given the option to add data layers to the tool (see Figure 11). They can do so in one of three ways:

1. By searching for data layers available through ArcGIS online.
2. By pasting a URL to an existing data layer hosted online by a third-party.
3. By directly uploading a geospatial data file (supported formats: Shapefile, CSV, KML, GeoJSON, GPX, and FGDB).

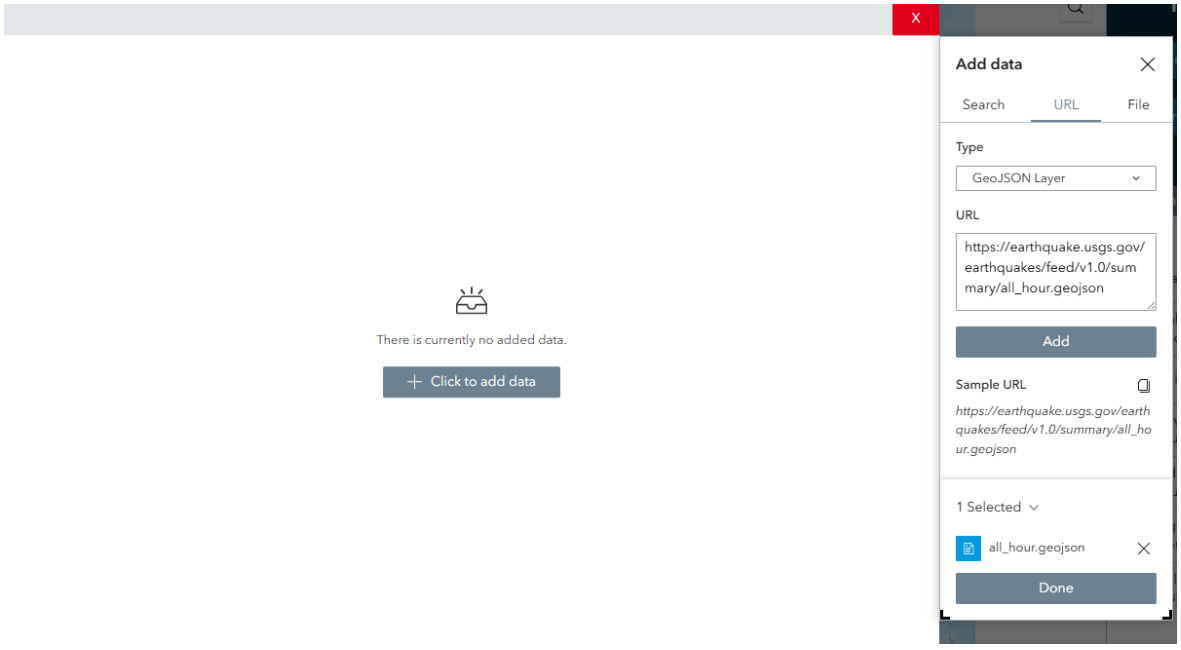


Figure 11 The pop-up that appears after the "Add Data" button on the top-right corner of the “Visualize” page is clicked.

After adding the data, confirmation should appear below the **Add Data** sidebar. Once users click **Done,** they will be able to customize the layer name and optional filter on the layer to be added to the map (see Figure 12). This can be done by clicking the 'Rename' and 'Actions' buttons to the right of the layer name in the Add Data window. After customizing the layers and exiting the window, the data should then appear as a layer at the top of the **Map Layers** tab in the **Visualize** page.

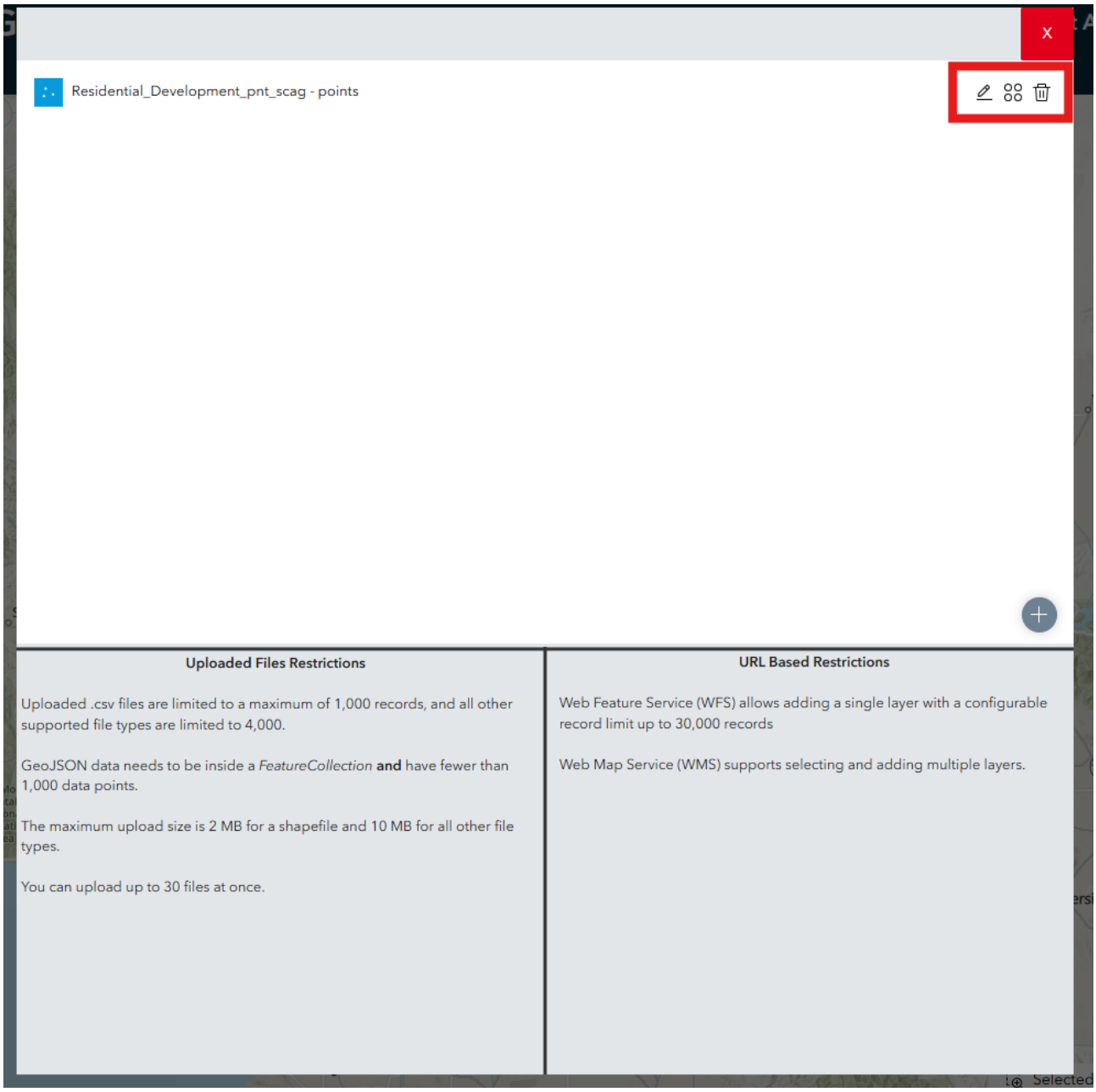


Figure 12 Once a data layer has been added to the SoCal Greenprint, users will be able to rename, filter, and delete the added layer from the "Add Data" pop-up

4.3.12 Browse Page

Users can explore metadata for individual layers within the Browse Page. First, users can select a dataset category on the left side of the page. Then, they can select a layer from dropdown menu. Scroll or use the navigation bar on the right side to view content that doesn't fit on the page. Layer metadata details are displayed. Information about the layer, such as regional coverage, source organization, and year, can be found in the **Key details** section (see Figure 13).

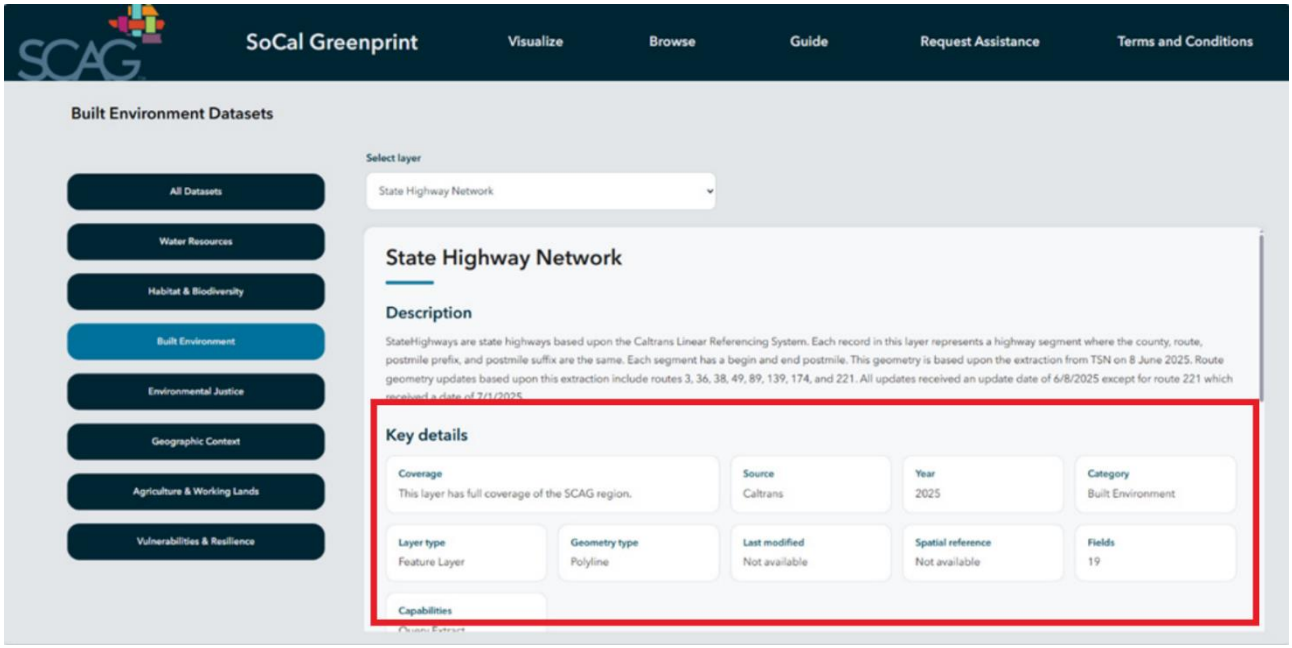


Figure 13 To display the metadata for a specific layer, users should first select the category of the data layer they are looking for, then they can choose the exact data layer from the dropdown at the top of the page

4.3.13 Request Assistance

Users can submit any questions about tool functionalities or data using the Request Assistance tab. This tab allows the user to specify a category, description, and contact email (see Figure 14). Once the **Send Request** button is clicked, the user's default mailing application should open with a pre-populated mailing template.

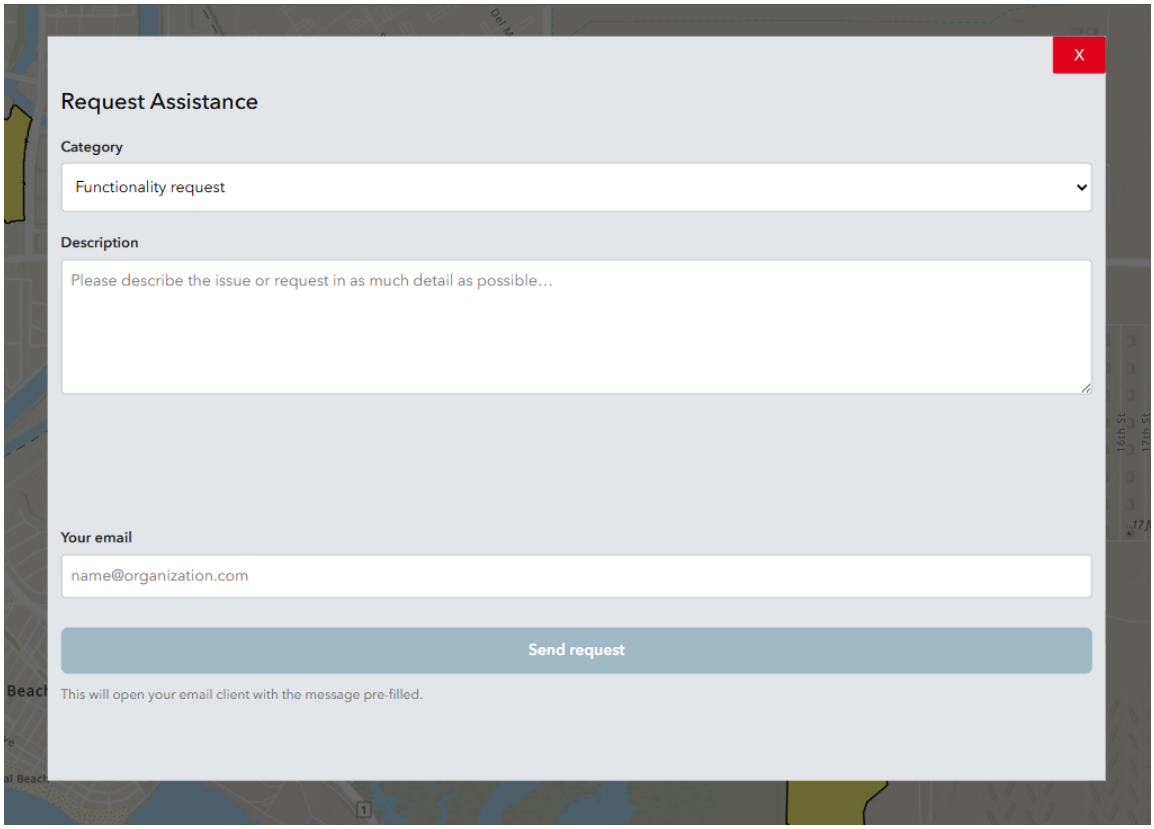


Figure 14 Fields which users can populate in order to generate an email to the SoCal Greenprint support team

4.4 Limitations

While the SoCal Greenprint provides a diverse range of data, it does not provide data on every environmental resource category as mandated by Appendix G in the California Environmental Quality Act guidelines. Users can access more SCAG data under the **Download Data** feature discussed in Section 4.3.9, where there is a link to SCAG's Regional Data Platform and additional datasets can be downloaded and subsequently added to the tool to enhance tool use. Users are also free to add geospatial data they find on their own to the tool for their individual use.

5. Use Cases

This section describes two use cases for the SoCal Greenprint and how users can leverage the data, functionality, and other features described above.

5.1 Use case #1: Environmental Mitigation Following the RAMP Process

5.1.1 What is the problem or need that the SoCal Greenprint can help address?

New infrastructure and development projects proposed within the SCAG region could impact sensitive biological resources such as habitats, wildlife corridors, and areas of high ecological value. To address these impacts and streamline project approval, project sponsors must identify appropriate mitigation measures early in the planning process. The SoCal Greenprint supports this need by helping agencies and project sponsors identify geographic areas with concentrated biological resources that are candidates for inclusion in Regional Advanced Mitigation Program (RAMP) planning.

By visualizing and analyzing landscape-scale biological data, SoCal Greenprint enables agencies to proactively identify priority mitigation areas where impacts from multiple planned projects could be addressed collectively. This information supports the formation of RAMP programs by guiding the selection of biologically significant areas for advance mitigation, allowing mitigation needs to be addressed earlier, more strategically, and more efficiently during project planning and environmental review.

This use case describes how a project sponsor or agency might use the SoCal Greenprint to identify areas of biological resource concentration and support RAMP program development to advance infrastructure projects while meeting environmental requirements.

5.1.2 Assess Existing Conditions

To support RAMP formation, users must first assess existing biological conditions across the landscape to understand where sensitive resources are concentrated and where advance mitigation would be most beneficial. On the Visualize Page (see 4.3.1 Visualize Page), users can explore available data layers related to natural resources, habitat, biodiversity, and resilience. Relevant layers—such as habitat types, conservation lands, species occurrence data, or ecological connectivity—can be overlaid to identify areas with high biological value (Figure 15). Existing conditions can be assessed at multiple geographic scales, including region, county, city, census tract, or user-defined distances, allowing agencies to evaluate biological resources across broad planning areas or within specific project footprints. Users may also upload a shapefile representing planned infrastructure corridors or project areas using the Add Data feature (see 4.3.11 Add Data) to understand how proposed projects intersect with sensitive biological resources.
In this context, the SoCal Greenprint helps users identify clusters of biological resources that might be appropriate for advance mitigation planning, supporting early decision-making about RAMP boundaries, mitigation priorities, and conservation strategies.

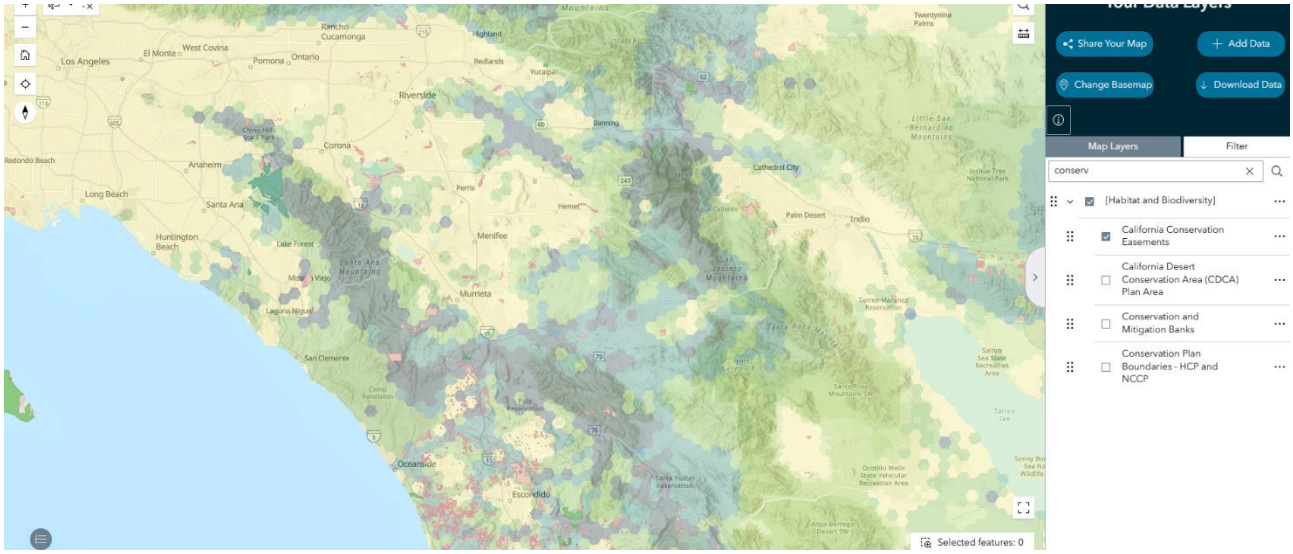


Figure 15 An example of a map which could be created in the SoCal Greenprint showing Residential Developments near Liquefaction Zones.

5.1.3 Aggregate Data and Share Information

Once biological resource concentrations and potential mitigation areas have been identified, users can aggregate relevant data layers into custom maps to support RAMP planning and environmental documentation. These maps may be exported and included in California Environmental Quality Act documents, RAMP program materials, or interagency coordination efforts to clearly communicate how mitigation areas were selected based on biological resource data. The Export to PDF feature (see 4.3.9 Export to PDF) allows users to share consistent, data-driven visuals that document existing conditions and support the rationale for advance mitigation strategies (Figure 16). By providing a shared, transparent view of biological resource concentrations, the SoCal Greenprint helps agencies align mitigation priorities, facilitate collaboration, and advance RAMP program development alongside infrastructure planning.

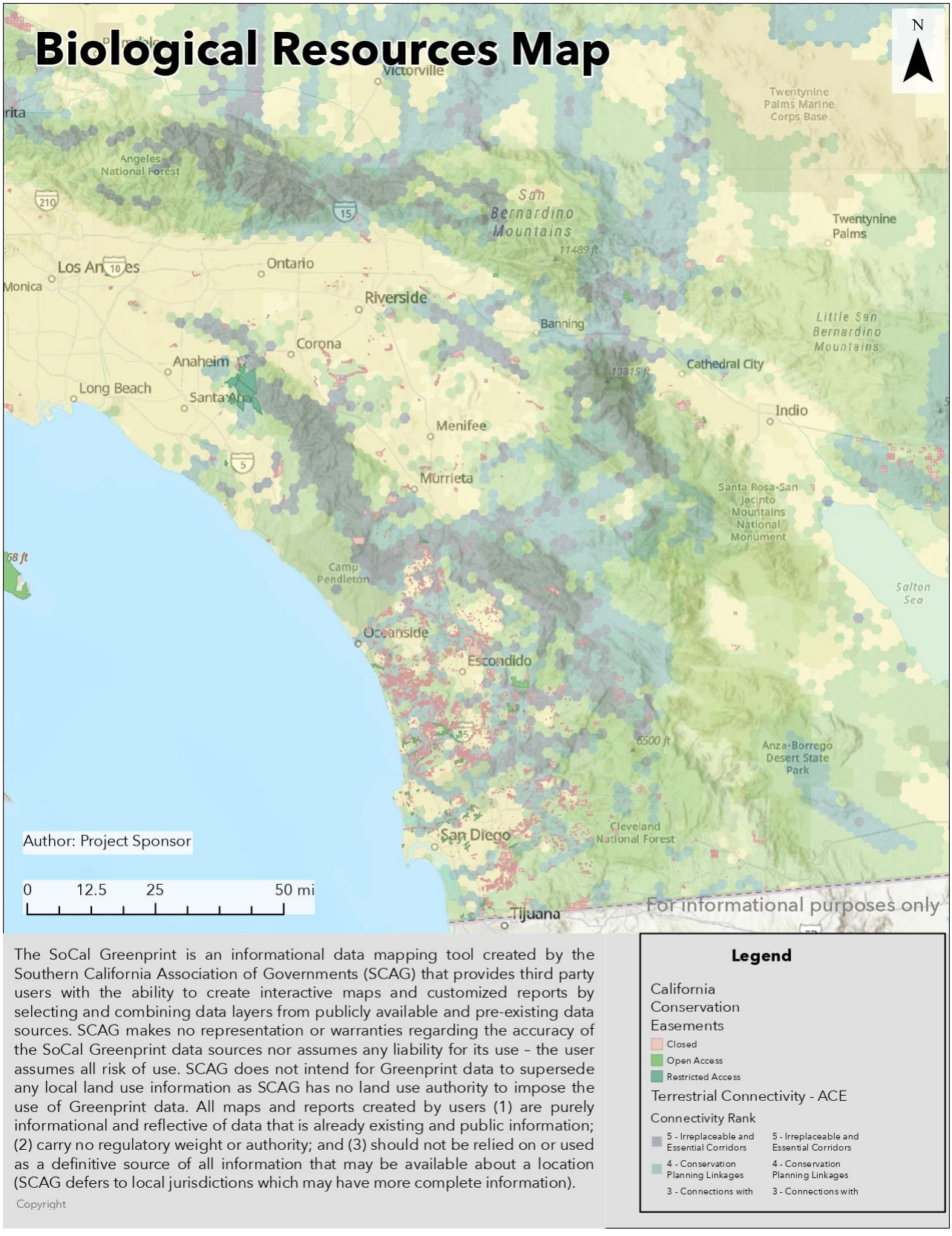


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Figure 16 An example of what the map export for this use case may look like.

5.2 Use Case #2: Grant Applicants

5.2.1 What is the problem or need that the SoCal Greenprint can help address?

The SoCal Greenprint can be used to provide data to support grant applications at the local, state, or federal level by staff from government agencies, conservation and community nonprofit organizations, land developers, researchers and academics, or other community groups. For example, someone may use the SoCal Greenprint when putting together an application to the Caltrans Sustainable Transportation Planning Grant Program, a competitive grant program aimed at helping establish a safe and reliable transportation networks for all people while also advancing environmental sustainability. In the context of a grant application, mapping can help demonstrate risk and address community needs, determine which layers address grant requirements, and show how funding can support risk reduction. To illustrate such a use of the SoCal Greenprint, the steps in the following section outline those that might be taken by a user of the SoCal Greenprint to demonstrate that their application meets some of the Sustainable Transportation Planning Grant requirements.

5.2.2 Identify SoCal Greenprint layers that inform how the project will support grant objectives

As part of the grant application process, a user might need to identify applicable SoCal Greenprint layers that inform how the project would support grant objectives for the purposes of developing relevant map visualizations. Users can browse available data by theme using the tool's **Browse** page as discussed in section 4.3.12 Browse Page. As an example, a user interested in exploring natural and green infrastructure planning to aid wetland restoration near or adjacent to transportation corridors would be able to browse and review the metadata for layers under the "Water Resources" and "Built Environment" categories to find which layers they might wish to develop map visuals around. They may also be interested in community-related impacts which might be found in data under the Environmental Justice, Equity, and Inclusion category such as the Calenviroscreen Factors (Figure 17).

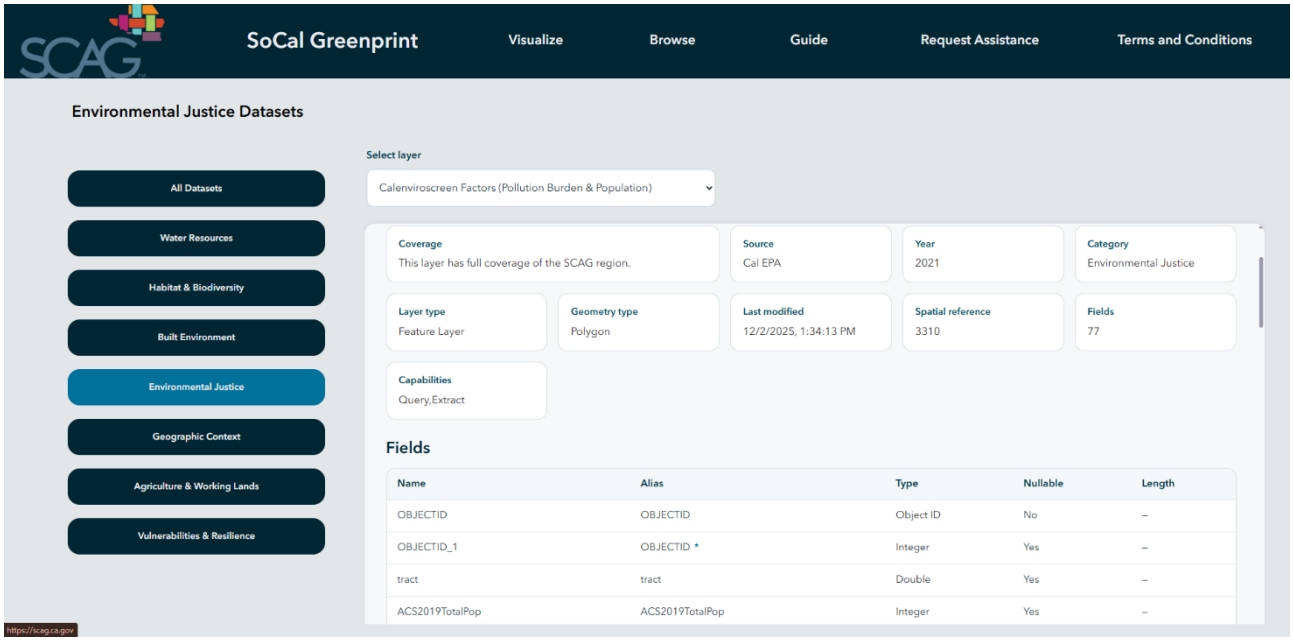

Figure 17 From the Browse Page, a user can review the layers under the Environmental Justice category to find which layers could be added to the map to show community-related impact.

5.2.3 In the SoCal Greenprint, collaboratively develop map(s) that help to illustrate how the project supports grant objectives

Once appropriate SoCal Greenprint data layers have been identified, the user can begin the process of developing maps using the tool's **Visualize** page (see 4.3.1 Visualize Page). For example, the user with an interest in the wetlands restoration mentioned in the previous section would be able to toggle on relevant data layers, such as the "Caltrans State Highway Network," the "Calenviroscreen Factors," the "California Water Boards Impaired Waters," or the "U.S Fish and Wildlife Service Wetlands" layers. Users can then change the ordering and transparency of the layers to create a map showing wetlands near highways (Figure 18). They can also change the basemap using the **Change Basemap** feature (see 4.3.7 Change Basemap) to show more relevant geographical elements.

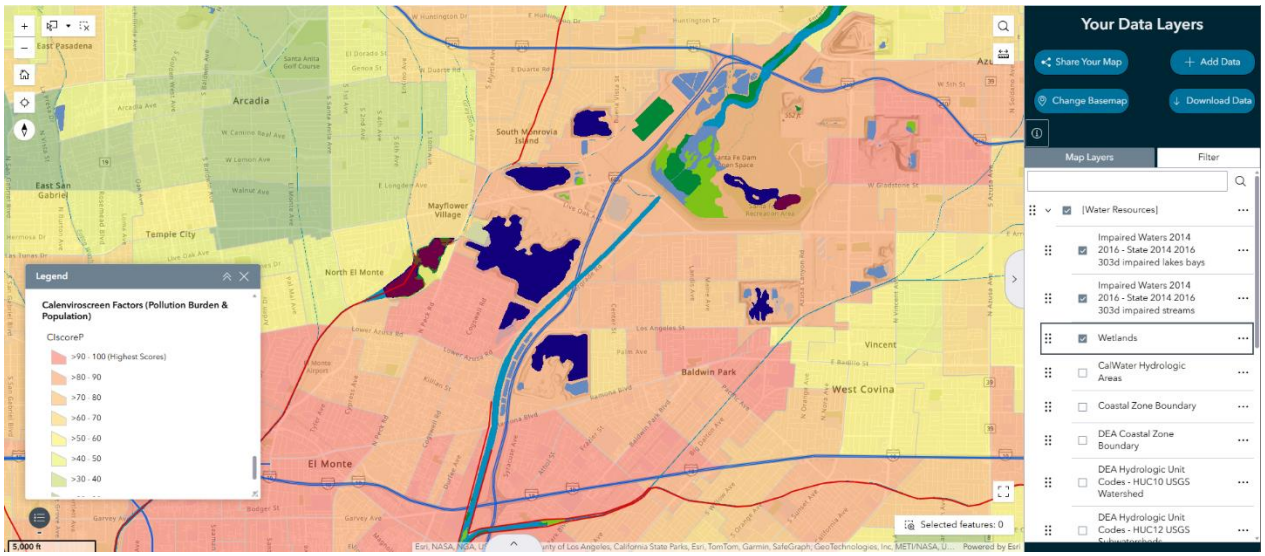

Figure 18 An example of a map which could be created in the SoCal Greenprint showing wetlands / impaired waters near highways and the pollution burden on nearby communities.

The produced map visualization could then be shared via URL to fellow grant collaborators using the **Share Link** feature described in section 4.3.8 Share Link. This would allow for collaborators to build from the original map by finding and toggling on more of the available data layers or by uploading their own data using the **Add Data** feature (see 4.3.11 Add Data).

5.2.4 Export SoCal Greenprint maps for use in grant narrative to demonstrate how the proposed planning project meets grant objectives

Once prepared, maps created by the grant applicant users can be exported for inclusion as supporting material for their applications (Figure 19). This can be done using the Export to PDF feature described in section 4.3.9 Export to PDF.

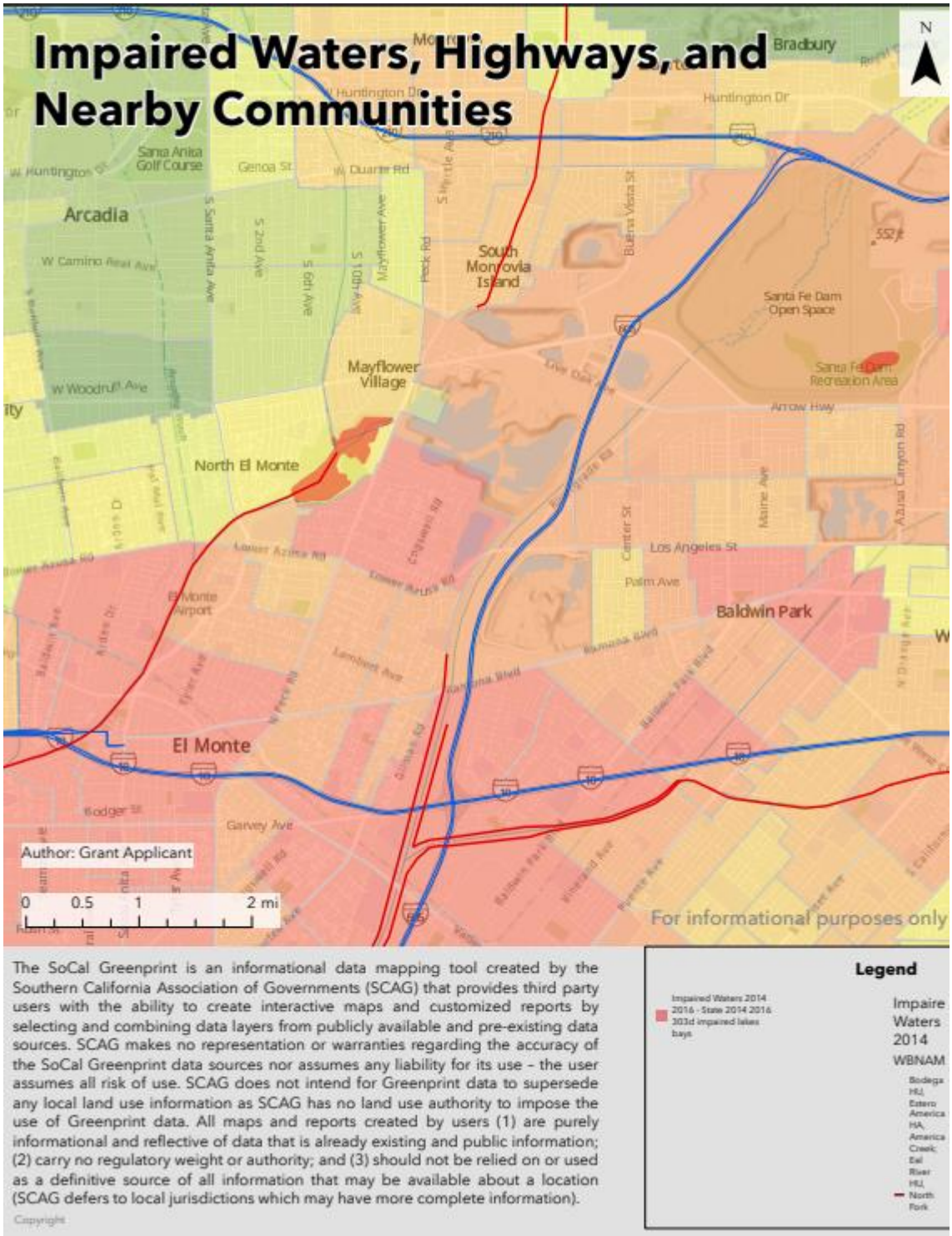

Figure 19 An example of what the map export for this use case may look like.

Appendix

1. Frequently Asked Questions

Q1: A layer is grayed out, what does this mean?

A: This means that the layer is invisible at the current scale. Try zooming in to make the layer visible.

Q2: A layer says “This layer is unavailable”

A: The layer is temporarily inaccessible. This could be due to maintenance or an update to the layer. If this issue persists, consider contacting the organization that is maintaining the layer. Note that layers are sourced directly from authoring agencies and users should consider contacting the organization maintaining the layer, which can be found using the **Key Details** feature in the **Browse** page.