Land Utilization Rating Application (LURA)

User's Guide

2024 v2.2

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Introduction

The World Bank is finalizing a comprehensive set of global coal mine closure good practice technical standards that will enable the transition from “physical closure” to a more “sustainable” closure in the context of achieving a “Just Transition for All”. The good practice technical standards outline activities, regulatory implications, and policy issues that need to be addressed during planning, execution and post closure of coal mine sites.

The World Bank encourages and supports the use of tools to assess, evaluate, and classify resources which are at risk of losing value if the threat of environmental degradation and community safety are not addressed. Moreover, this approach recognizes the interconnected nature of the issues that confront operating companies at the time of mine closure and underscores the need for mine operators to develop a comprehensive resource management plan early in mine operation and periodically through closure and repurposing.

A tool (LURA) has been designed with risk-based, spatial planning capabilities and is aligned with new global standards for coal mine closure. This ensures that guidance / advice on planning and preparation for coal mine closure is aligned with a regulatory approach in which technical standards used to close a mine address legacy risk from surface and underground mine operations.

For surface or underground coal mine operations different biological, physical, chemical, socioeconomic and financial conditions are evaluated that may affect the closed mine or broader area during closure or many years after closure (post closure legacies). The aim is to characterize mine land for legacies, but at the same time consider possible repurposing scenarios and evaluate future repurposing potential in order to create a sustained development during mine closure operations.

A dedicated cloud based, simple to use **L**and **U**tilization **R**ating **A**pplication (**LURA**) has been developed to support stakeholders, organization or entities involved with post mine land transition management. This document provides the User’s Manual for LURA usage.

Accessing the Application

The application is accessed from any device such as a PC, laptop, tablet or smartphone if an internet connection is available. The application is available on https://lura.geosysta.com/ using any modern web browser. Users are greeted with the screen in Figure 1 will appear.

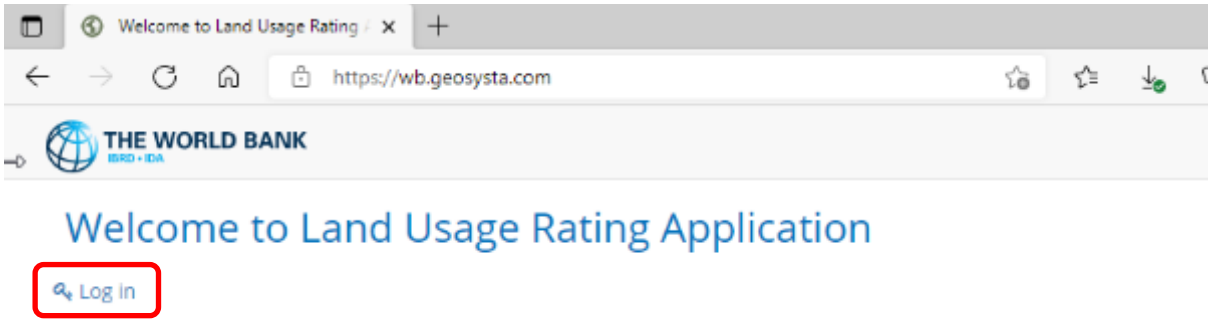


Figure 1: LURA welcome screen

When users click on "Log in" a form will appear as the one presented in Figure 2 in which users will be prompted to enter their username (e-mail) and password to get access to the application.

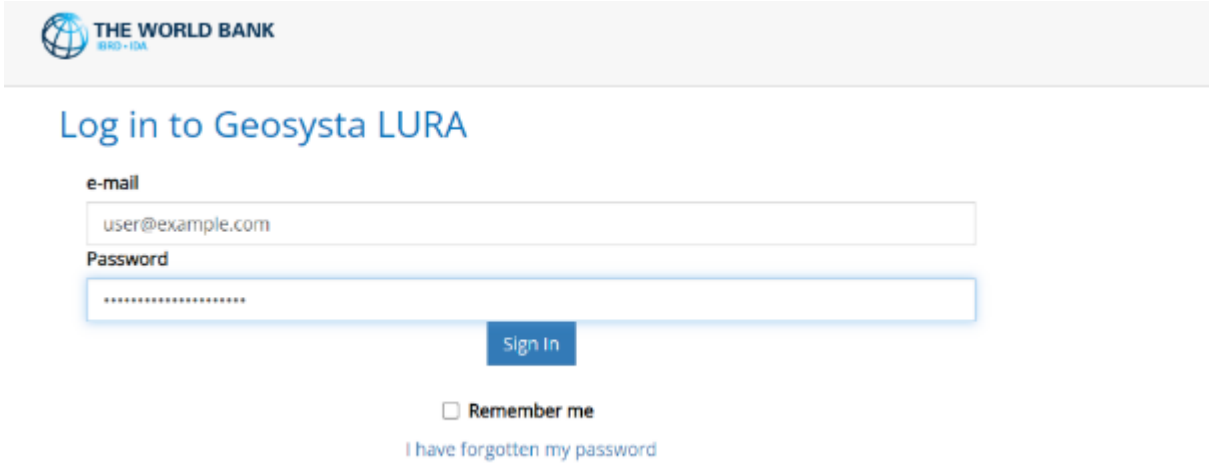


Figure 2: Log in form.

To get logged in, the user needs to have an account preapproved and created by the WB or the organization that is using LURA. If a user has forgotten their password, they can click on the "*I have forgotten my password*" option under the sign in form and an e-mail will be send that will enable the user to change their password and log in again.

Application Navigation Menu

Main menu

On the top of the application screen, the navigation menu is being displayed.

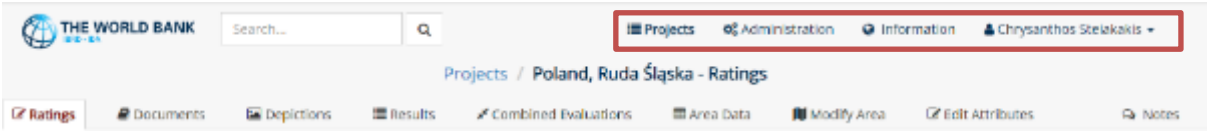


Figure 3: Application Navigation Main Menu

The navigation menu section contains four main sections. On the top right section of the menu area, the application main menu is being displayed. This contains links to application pages such as:

- Projects – A list of all the projects that the logged in user is associated with.
- Administration. The menu option appears only to users that have application administrator privileges assigned.
- Information – A link to basic information pages regarding issues such as basic lura usage, Managing Coal Mine Closure and Additional information on Land Repurposing
- (User Name) – This navigates to the user preferences page, where users can change their password, select the type of date format to be displayed (e.g. MM/DD/YYYY or DD/MM/YYYY) and the language that LURA is being displayed on, from the selection of available translations.

Search

On the top left section of the menu the search control is displayed

Figure 4: Search control in navigation section

Using the search control, the user can type a word, or a phrase and the application will look for it in the existing projects and ratings that the user can have access to. Once the provides the keywords to look for and clicks on the search icon, the application will display a list of the search results.

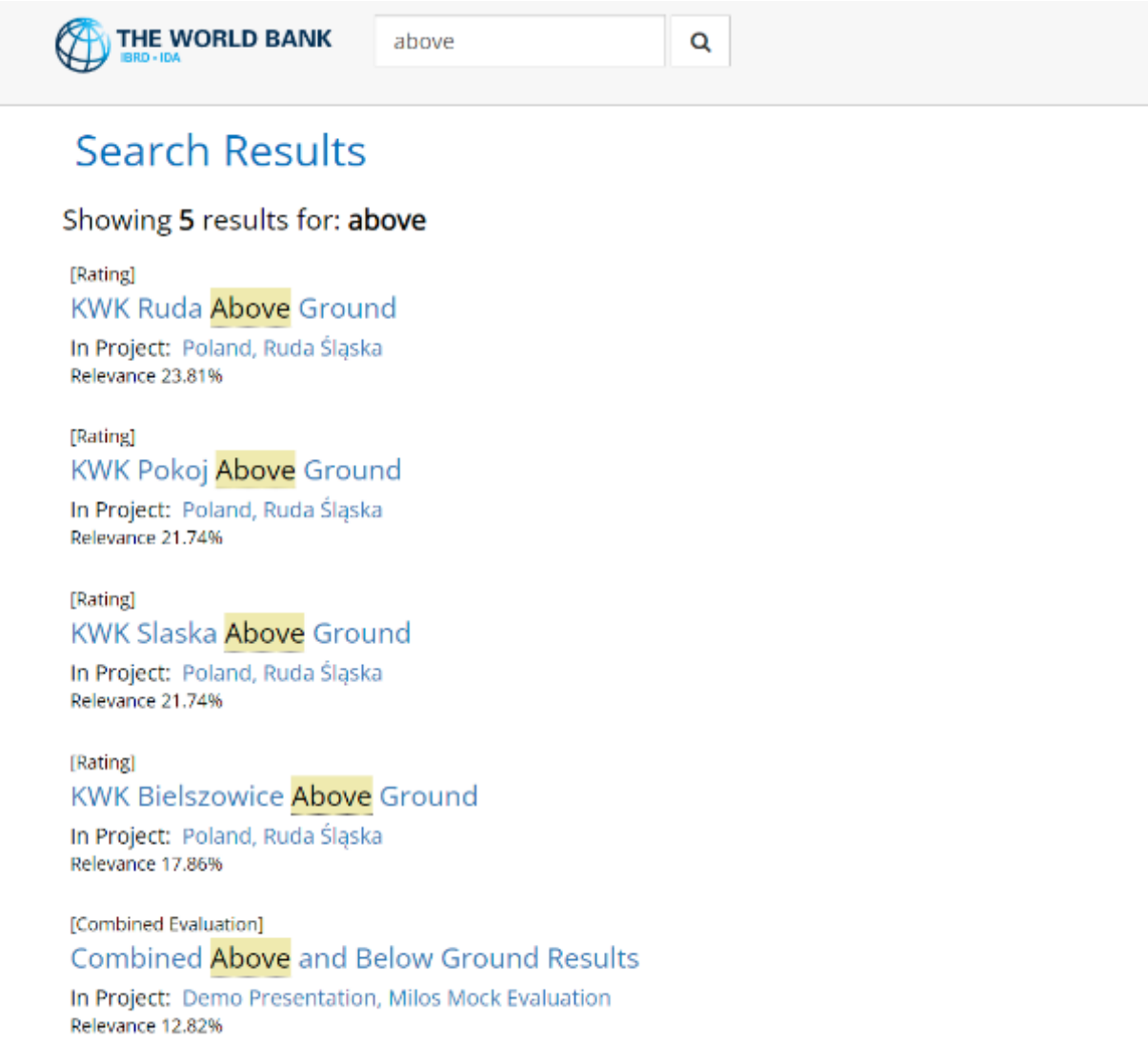


Figure 5: Search results

Each result has a clickable link that will navigate the user to the corresponding page that will show the details of the result item. Over each search result a label is displayed to signify the type of search result, e.g. “Project”, “Rating”, “Combined Evaluation” etc.

Navigation Path

On the center of the navigation section the “Path” is being displayed

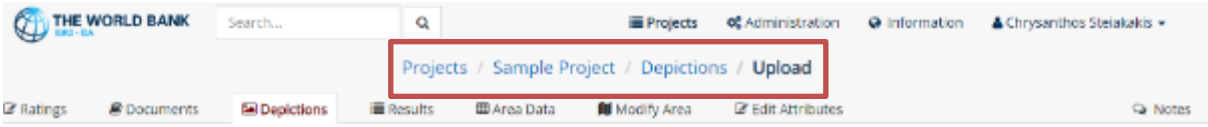


Figure 6: Navigation Path

This section displays the “path” that the user has followed to land to the current page. This is a set of clickable links separated by the “/” character. The right most title is the title or description of the current page that the user is on. All the previous labels are clickable links that the user can use to return to the referenced page. In the depicted example, on Figure 6*: Navigation Path*, if the user clicks on the project name for instance, they will be navigated to the main page of the project that lists the ratings for it.

This helps the user have a better understanding of where they are in the application, as well as an easy way to navigate back and forth to the various sections of the application.

Context Menu

And finally on the bottom section of the navigation menu the context menu is displayed.

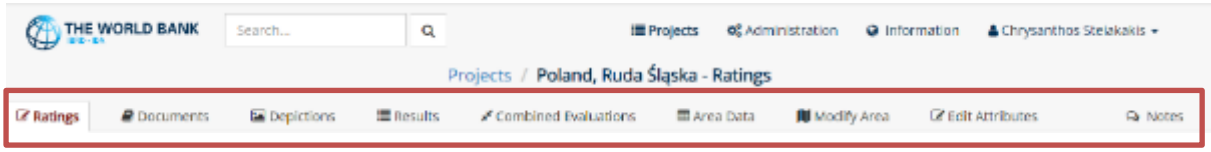


Figure 7: Search results

The menu being displayed in this section changes to be always in context with the section of the application the user is currently working on. In Figure 7 the menu displayed is the context menu for the project. The available options include:

- Ratings – This will take the user to the list of conducted/ongoing ratings taking place for the current project.
- Documents – Documents that have been attached to the project.
- Depictions – Design and/or photo images that are geolocated and can be displayed as layers on top of the rating map. Such depictions could be a topographical map, an underground room and pillar map, a hydrogeological map etc.
- Results – The evaluation results for the project, based on the ratings having been conducted.
- Area Data – Information about the project area. Area size, coordinates, segments etc.

- Modify Area – This gives the user the option to modify the project area. The user can either add extra separate areas to the ongoing project or adjust the initially configured area.
- Edit Attributes – Change/update the project's basic attributes such as its name, description etc.
- Notes – The user can see and or update the notes having been added during the ratings process. (see section "Collaboration and Tracking")
- Management – The user can manage the project team. Add/Remove users to the team and assign privileges. (only available to users marked as "Manager")

The menu depicted in Figure 8*: Rating Context menu* is the Rating Context Menu.

Figure 8: Rating Context menu

This menu displays all the available functionalities that have to do with the rating being processed by the user. The options include:

- Rating – the main rating page where the user can assign scores to the various criteria for each project area segment.
- Show Overall Report – A report with a map overview and the assigned categories, as well as aggregated results regarding the size of the area assessed, the distribution of categories assigned per area etc.
- Show Report per Segment – A detailed report that will show the scores and graph for each individual project area segment as it has been scored during the rating.
- Show Rating per theme – This will display a "heatmap" that shows the applicability of the areas particular to each of the Themes investigated in the ratings. This uses a color progress from red (least applicable) to green (most applicable)
- History – The edit history of each rated area segment with info regarding the changes that took place and the user that was responsible for those changes.
- Edit – Edit/update the basic information for the particular rating such as title and description and associated project areas.
- Publish – This option allows the user to give read-only access to the rating results to people who do not have a LURA account (described in section "Publish Rating")

Starting a New Project

To start rating a mine area the user first needs to create a new project or use an existing one. The way to create a new rating project is the following:

After logging in, the *Projects page* will be displayed (Figure 9), where the user can select an existing project or create a new one by clicking "**Start new project**" on the top left corner.

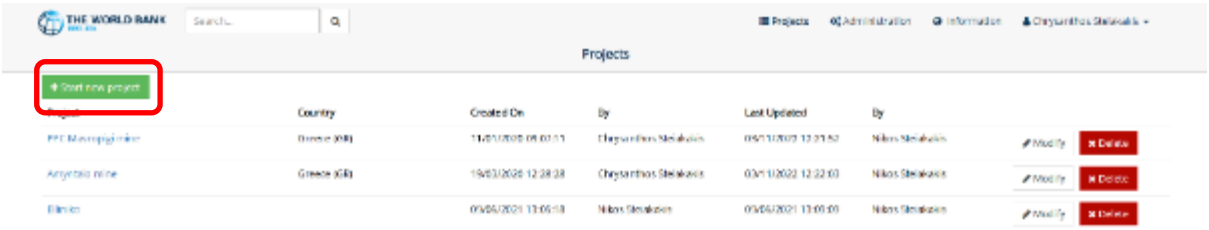


Figure 9: List of projects

When the user selects **"start new project**" the page shown in Figure 10 is displayed. In this page the user must first give the descriptive name of the project.

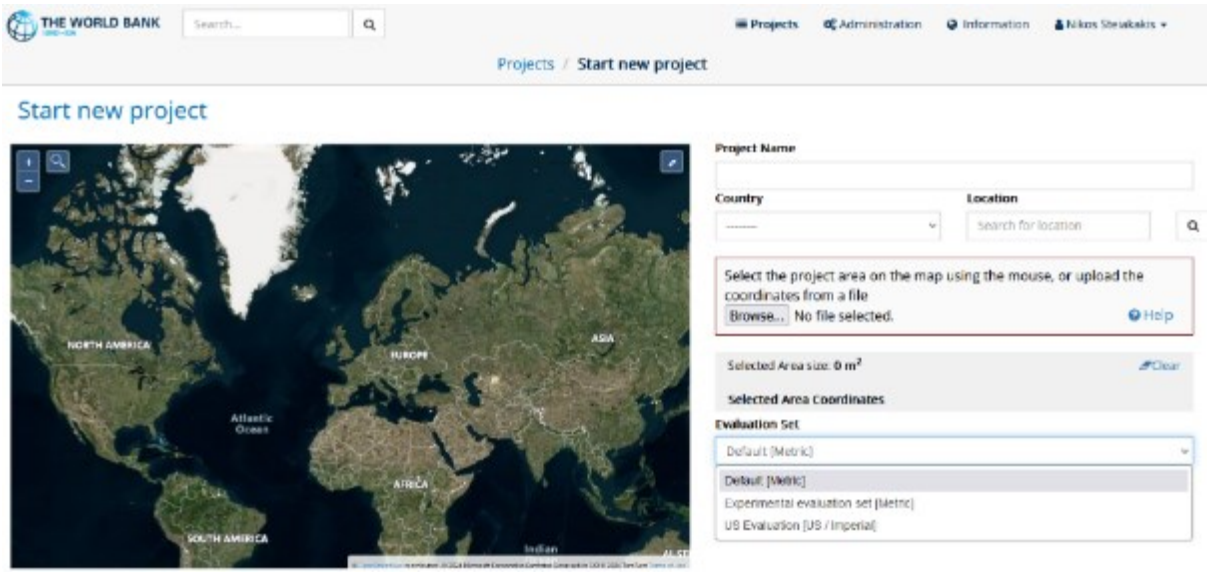


Figure 10: New project page

To find a mine land location the user can select the country in which the mine is located and either use the "Location" search box to look for the specific area of the mine or select the location from the world map (Figure 10). Using the mouse wheel, users can zoom in or out on the map. To navigate on the map, users can click and hold the left mouse button to pan the viewable area.

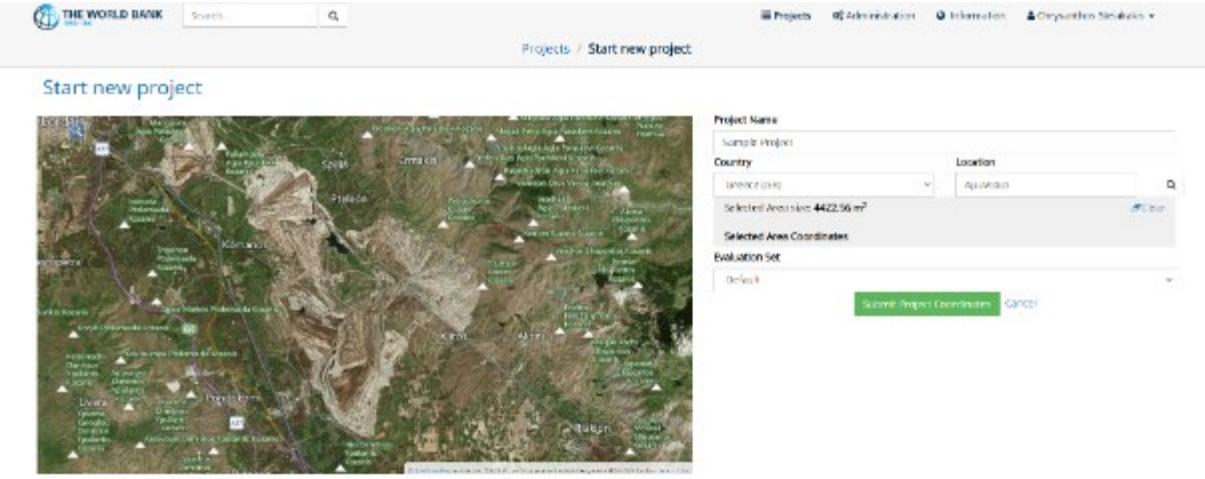


Figure 11: New project attributes

Selecting the Project Area

Using the mouse, the user can then select the area to be rated. The first node can be created by **clicking** the left mouse button **once**. Subsequent clicks on the left mouse button in other locations form a polygon (polyline) that encloses the study area change. As the user clicks the left mouse button and the polygon is created the already selected area is highlighted and the coordinates of each nodal point are displayed on the right side of the screen. When the selected area is finished the **submit button** at the bottom of the page should be clicked (Figure 12). A selection can be discarded by clicking on **cancel.**

The user can also import the coordinates of the area of the project from a Comma Separated Values (CSV) file. This can be applicable in cases for example where the user has exported the actual area coordinates from a GIS application.

In this case, instead of selecting the outline of the area with the mouse on the map, the user can select the import file and then click on “Submit Project Coordinates”. This will create the project area(s) using the coordinates specified in the import file.

For a CSV file to be applicable for import it must adhere to a specified format. The user can see what the proper format is by clicking on the “Help” link on the right of the file selection control.

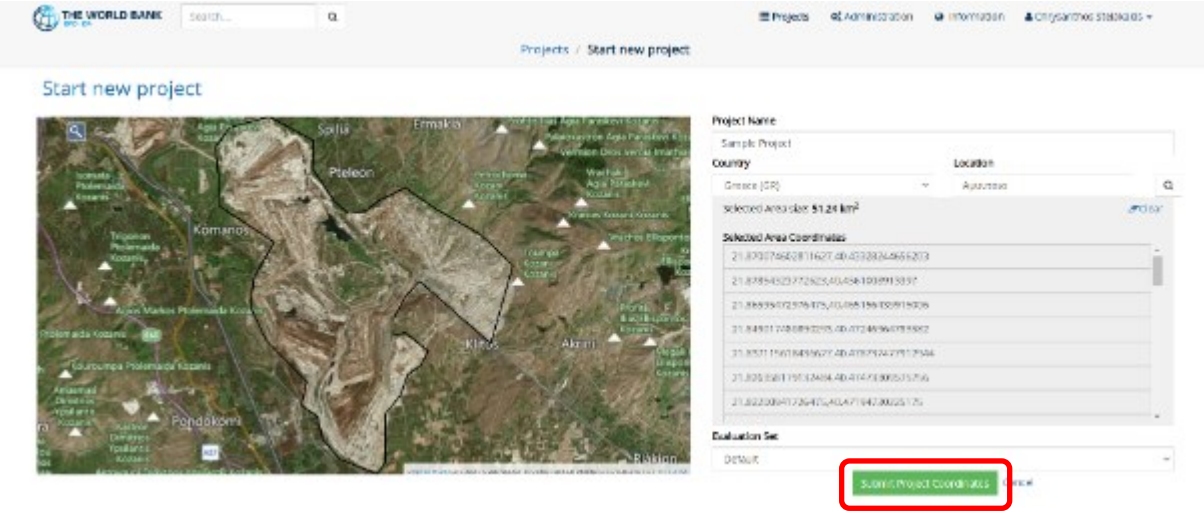


Figure 12: Submitting project coordinates.

The user can complete the polygon selection, either by **double clicking** on the map, or by **clicking on the starting point** of the selected polygon. The user can then **modify and enhance** the edges and lines of the polygon by placing the mouse pointer anywhere in the polygonal line and a new blue node will appear. Once the new node appears, clicking the left mouse button will create the node and allow the user to move it around. To discard the selected area and start the polygon creation again the user should click on **clear** from the right side of your form (Figure 13).

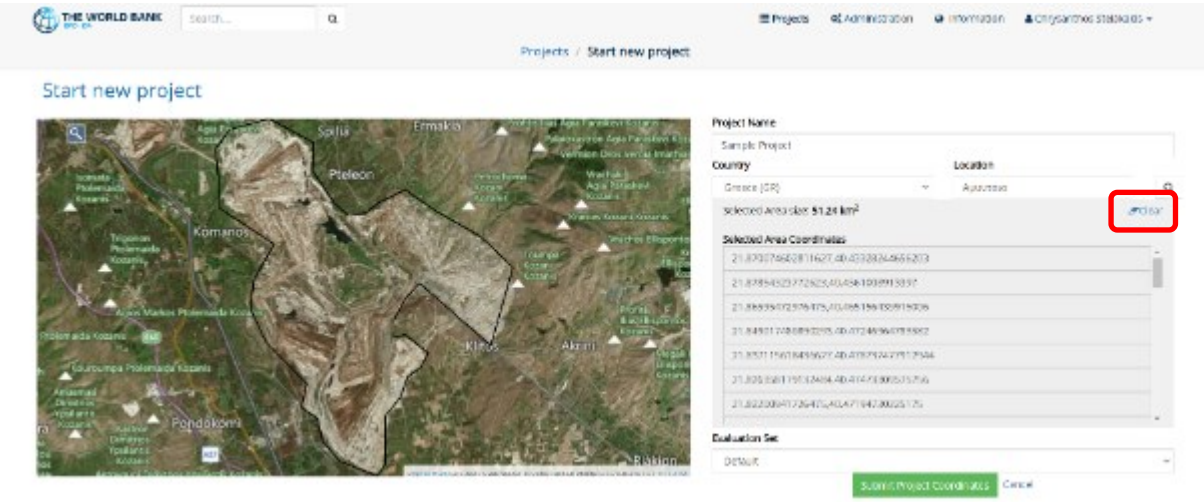


Figure 13: Clearing the polygon

When the polygon/area selection is completed, the user should click on **submit** and then they will be redirected to another page where the user can **define the cell size** and create the rating grid. A default value of 0.5x0.5km is shown (Figure 14). The user can select a different cell size and click on "**Set Cell Size on Grid**" to preview the change on the map.

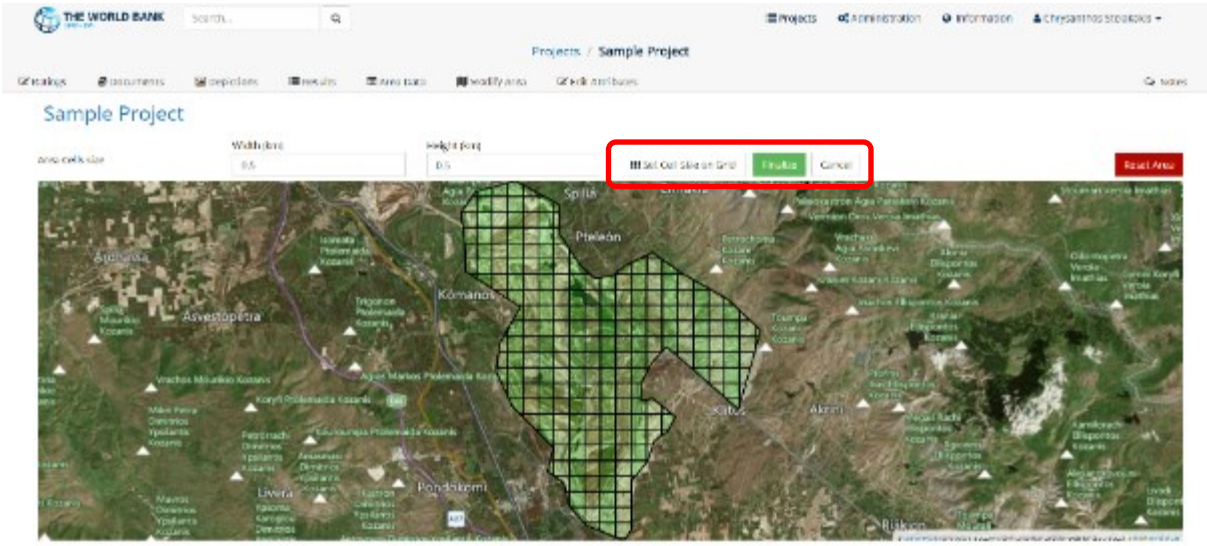


Figure 14: Sample project grid

Clicking on **Reset Area** (Figure 14) will clear the selection and allows the user start the selection again from scratch. In other words, this function will remove any selection from the map and will allow the user to make a new selection of the area to be rated. If the user unintentionally clicks on **Reset Area** they can click on the **back button** of the browser and go back to the original selection.

A user needs to enter a cell size preference and click on "**Finalize**" to complete the map selection (Figure 14).

Modifying / Extending the Project Area

An already selected project area can be easily modified and/or extended, with one or more additional area selections that might not even be adjacent to the original selection. To accomplish this, the user can click on "**Modify**" on the Projects list page (Figure 15).

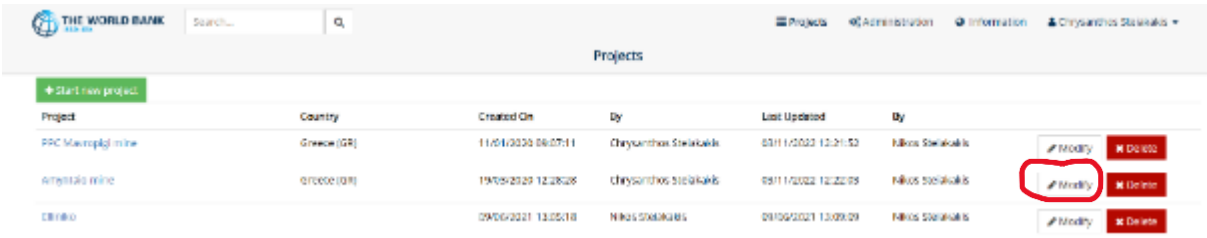


Figure 15: List of projects

Clicking on "**Modify**" will show the project area modification page. Clicking on "**Extend Project Area**" will allow a user to select an additional area on the map (Figure 15: List of projects).

Following the same procedure as when creating a new project, the user can select a new polygon area, assign an area name for more clarity and then confirm the selection by clicking on the "**Extend Project Area**" button.

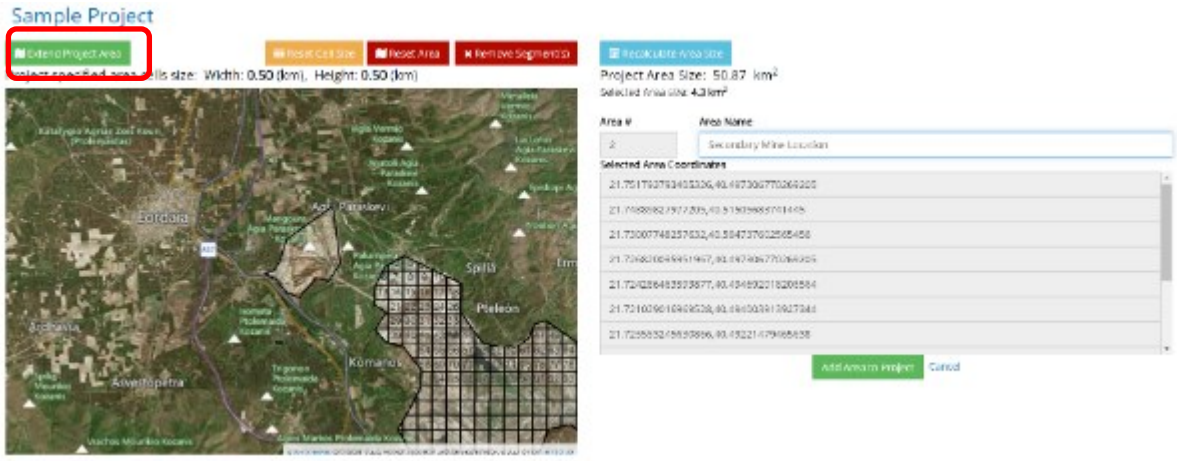


Figure 16: Extending a project area

With this feature a user can add additional land areas for rating on the same project as these lands become available or additional information becomes available for lands that were previously not included in the given project. For example, an underground coal mine has been rated and then additional maps or information become available for areas that have been mined but had not been known during the initial rating.

Areas that are not joined to each other can have different segment sizes. The width and height of segments is an attribute of each area in the project, not the project as a whole. Figure 17 shows an example of disjoined project areas with different segment size each.

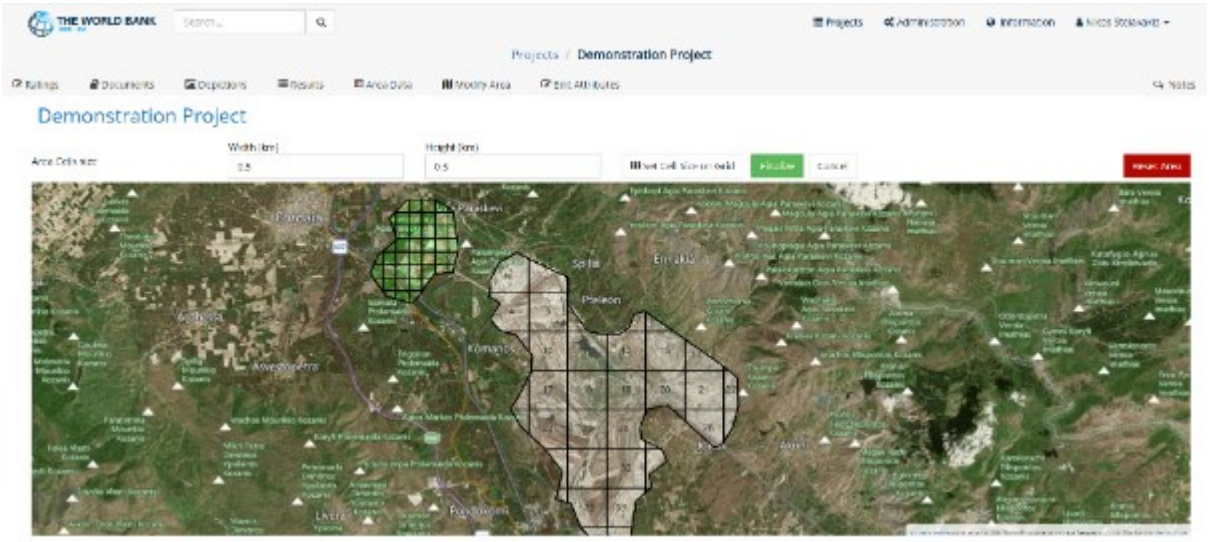


Figure 17: Project areas with different segment sizes

Subdividing Area Cells to Smaller Sections

Clicking on "**Modify**" on the projects list page (Figure 15), the user is once again presented with the project area modification page. By clicking on any grid cell on the area selection map, the size and coordinates of the cell will be displayed (Figure 18).

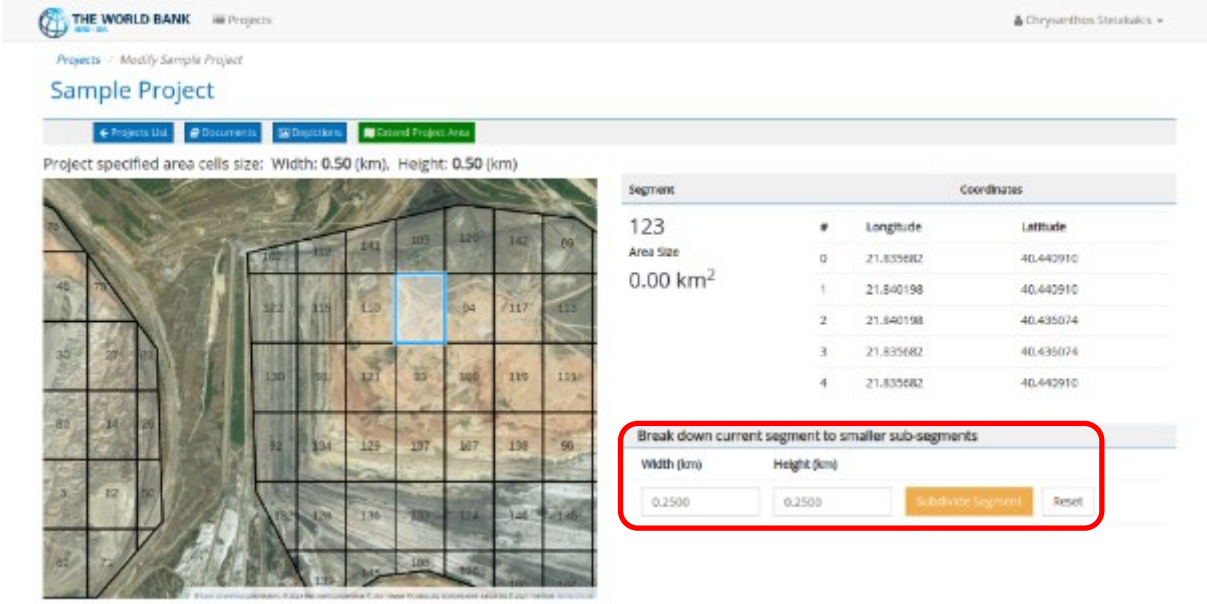


Figure 18: Displaying the size and coordinates of a cell

The user can then set the width and height of the sub-segments to break down the specific cell. Clicking on "**Subdivide**" this will present a preview of the newly created sub-cells of the particular area segment (Figure 19).

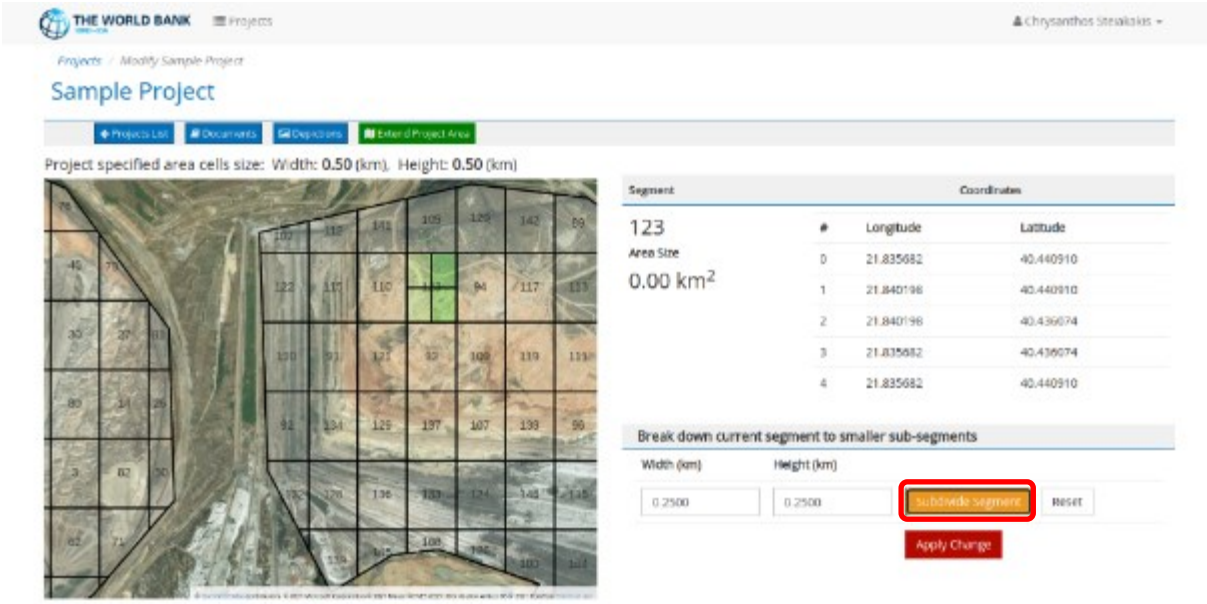


Figure 19: Subdividing cells

If different size needs to be applied, the values in the width and height input boxes can be changed and the "**Subdivide"** button should be clicked again.

By clicking on "**Apply Change**" the specific area segment will be permanently divided to the smaller segments selected.

On the right side of the screen (Figure 19), the cell information such as its ID number, its area size and its corner coordinates in the WGS system is displayed.

It is important to note that once an area cell is subdivided into smaller cells the change cannot be reversed. Subdivided cells cannot be merged back into the original cell.

Removing Segments from the Project Area

Sometimes there are areas within the overall project area that cannot or should not be evaluated as part of the Land Repurposing process. For such cases, LURA provided the functionality to exclude said segments from the project.

On the modify area page, the user needs to select the option “Remove Segments”. Then they will be presented with an overview of the project map and a form to select the range of segments to be removed.

Figure 20: Excluding area segments from evaluation

All area segments have been assigned with a distinct id number, so the user can select to remove segments 31-34 for example, and they will be deleted from the map and cannot be selected in the evaluation process.

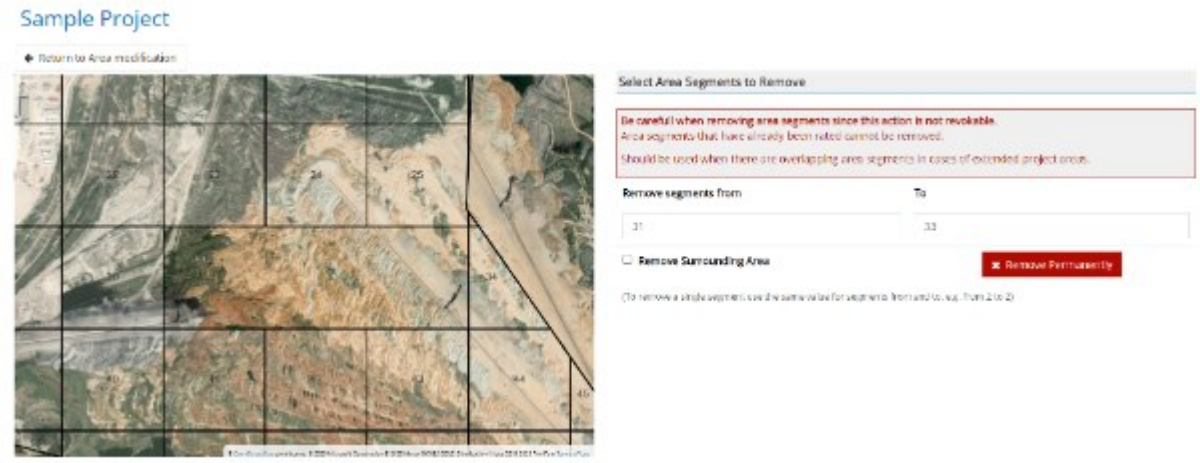


Figure 21: Excluding area segments from evaluation map

For instances where all the pixels for a particular area are selected for removal, the user can click on “**Remove surrounding area**” so that the complete outline of the selected area can be removed. This applies to disjointed areas that have been added to the project but have not been evaluated.

Segments that have already been evaluated cannot be removed.

Managing the project team

In this section, users assigned with the “Manager” privilege for the project, can add or remove users to the project team.

In order to add a team member, the user must input the e-mail address of the said user. This will check if the user account already exists in LURA and will directly associate it with the project being edited.

If the user account does not exist in LURA, the application will create a new account associate it with the project and send an automated e-mail to the new user with the required information on how to register and verify the account.

In order to remove any users from the project team, the manager will have to click the “Remove” button of the user. This will disassociate the user account from the project, but will not delete the user account. So, if the user is associated with other projects, they can continue working on them without any issues.

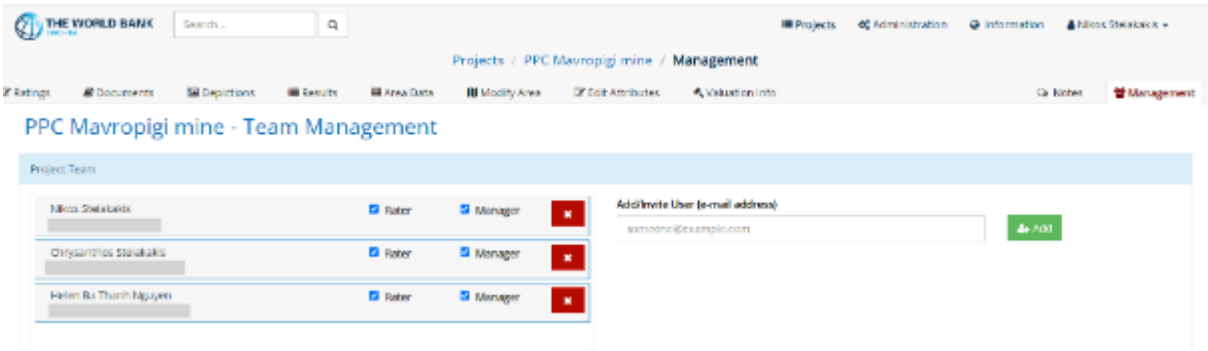


Figure 22: Project Team Management

Rating the Project Area

When the selected area and grid are finalized, the rating process can start. By clicking on the project name on the project list page (Figure 15) the user will be redirected to the project ratings page (Figure 23). To start a new rating, the user should click on **"Start new rating**" at the upper left corner of the project ratings page (Figure 23).

Figure 23: Project ratings

A new page is then opened which depicts the selected and subdivided area or areas of the project. A selected area could be either an open pit lignite mine (Above ground) or an underground coal mine (Below ground). When a selected area has both types of mines, an open pit mine that has become an underground mine or a combination of open pit and underground mines, then dual rating is possible.

Furthermore, in projects with more than one disjointed area, the user might have to evaluate each area separately.

In this case the user needs to start a new rating by clicking on "**Start new rating**", select the type of mine (above or below ground), select the areas of the project required and execute the rating. To execute a different type of mine rating the user needs to click on "**Start new rating**" again (for the same project) and select a different type of mine and/or area(s) selection.

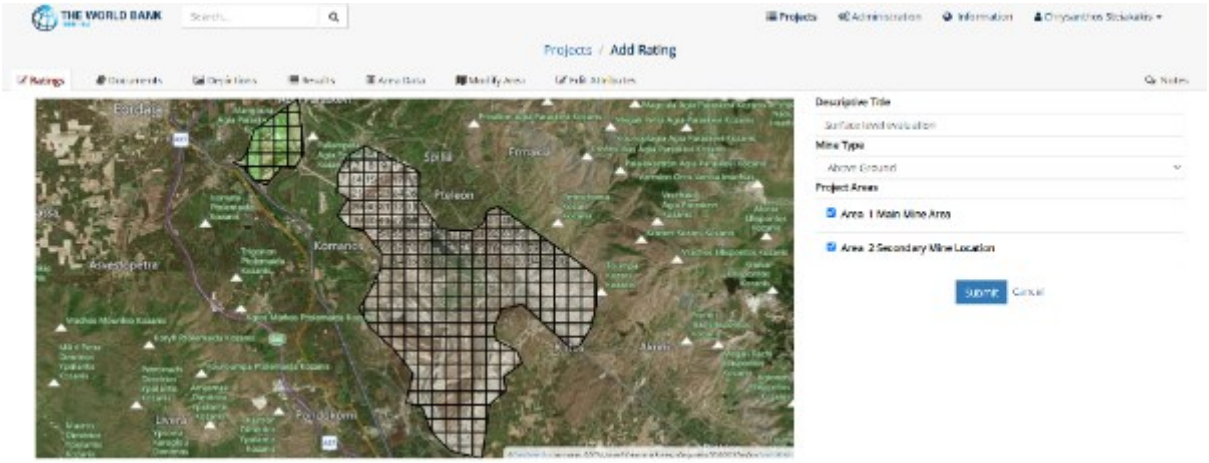


Figure 24: Project rating type and area selection

Furthermore, multiple ratings for the same type of mine can be performed by different users. For example, in an existing project which was a surface lignite mine that was created and rated by User XXX, a different user can click on "**Start new rating**" and start a completely new rating of the area. A different user can rate an area either with the same or a different type of mine. In the end, a list of different ratings is provided for the same project as can be seen in Figure 25.

For the selected project, the user can see how many ratings have been performed by inspecting the left column (Figure 25), the description of each rating, the mine type that was rated, when the rating started, by whom and when it was last updated. Also, a report can be extracted per rating by clicking on the Show button at the right side of the list.

Figure 25: Sample project ratings

To start a rating on a new project or to continue rating an ongoing project the user has to click on the rating title on the left. The application will navigate to the actual rating page (Figure 26: Rating an area segment).

This page shows a map of the selected and subdivided area and the satellite image below the grid. Each segment of the grid has a unique number that defines it. To start rating the user can begin from segment number 1 or they can choose any segment on the map. Figure 26 shows the rating process for segment number 110. Note that on the top of the map the different available land uses are presented. After each segment of the grid has been rated, a color will appear that will denote which land use is determined by the application to be optimal.

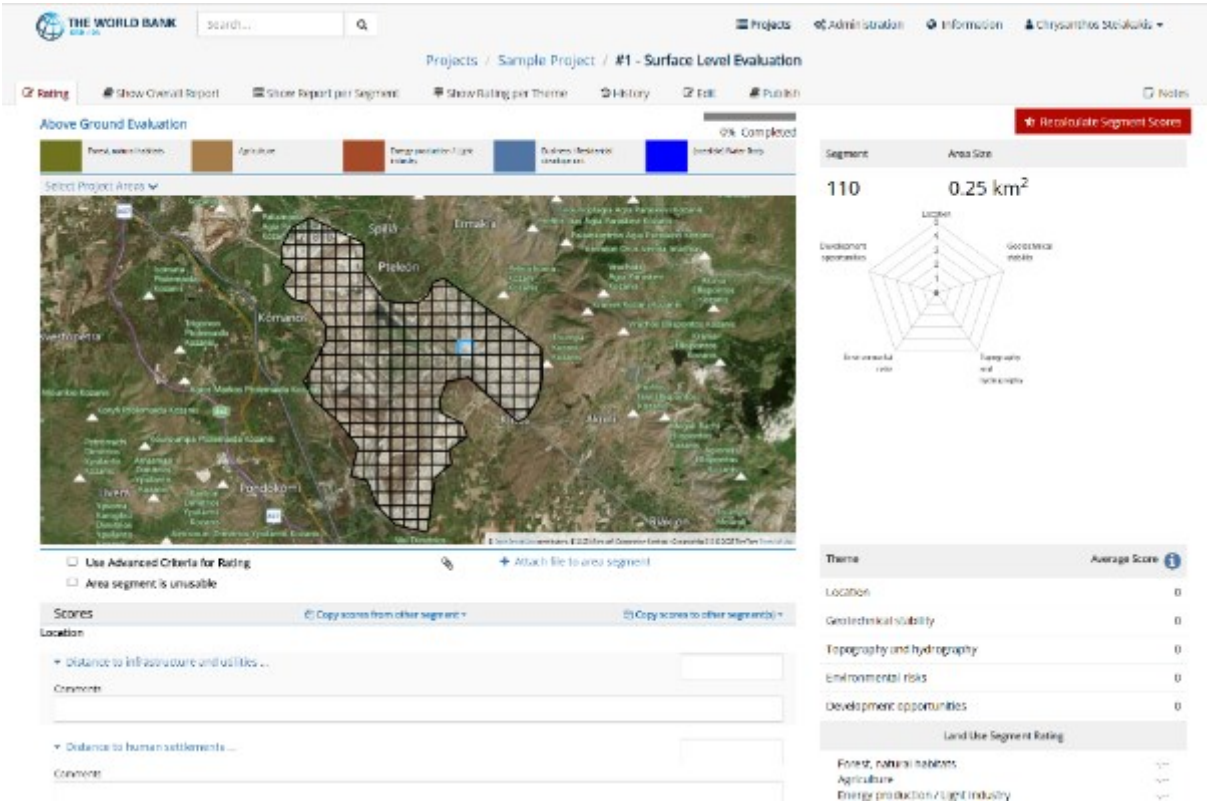


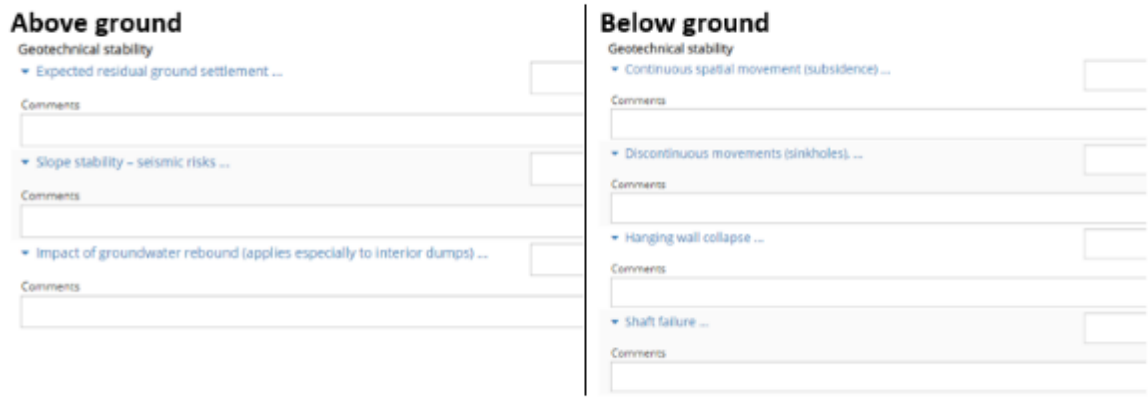
Figure 26: Rating an area segment

As soon as the user clicks on a cell grid with the mouse pointer, the appropriate scoring categories are displayed (Figure 27 and Figure 28). The scoring categories displayed depend on the **selected Mine Type**, which is shown at the top left side of the map display. The user can then assign score values to each category. On the top right side of the map displays the overall progress of the rating is being displayed using a progress bar. Each time an area segment is rated the progress bar updates automatically.

The rating themes for both above ground and below ground mine types follow the same logic. Irrespective of the mine type, (above ground or below ground), all the five themes shown in Figure 27 and Figure 28 should be rated.

1. **Location:**

2. **Geotechnical stability:**



3. **Topography and hydrography:**

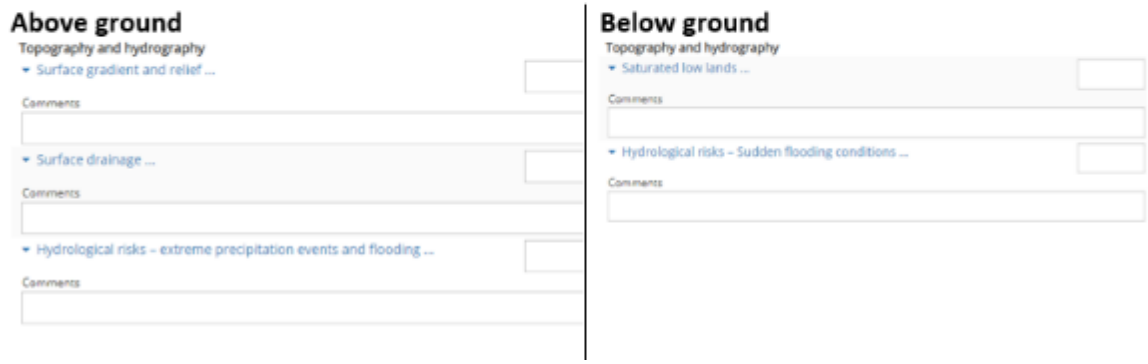


Figure 27: Rating criteria 1-3

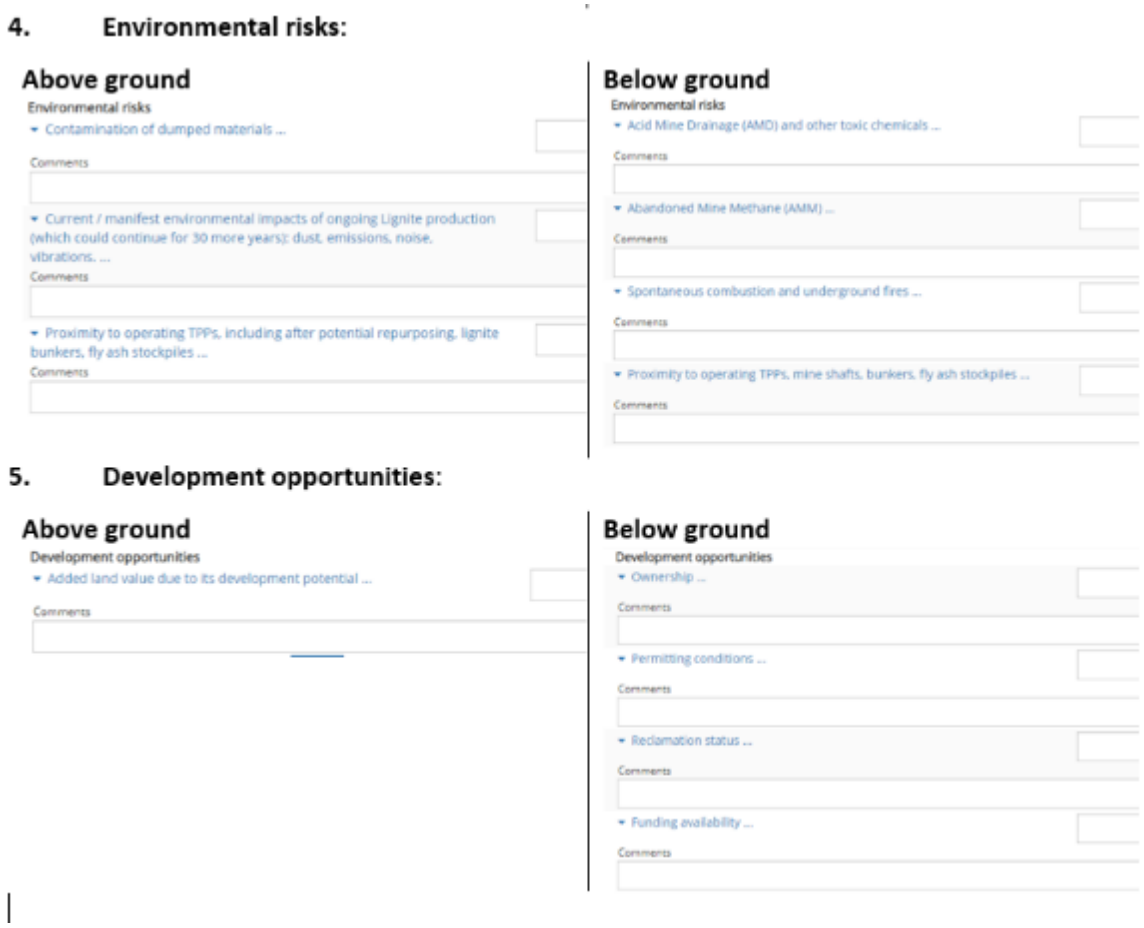


Figure 28: Rating criteria 4-5

Figure 29 presents the rating screen for an above ground mine type.

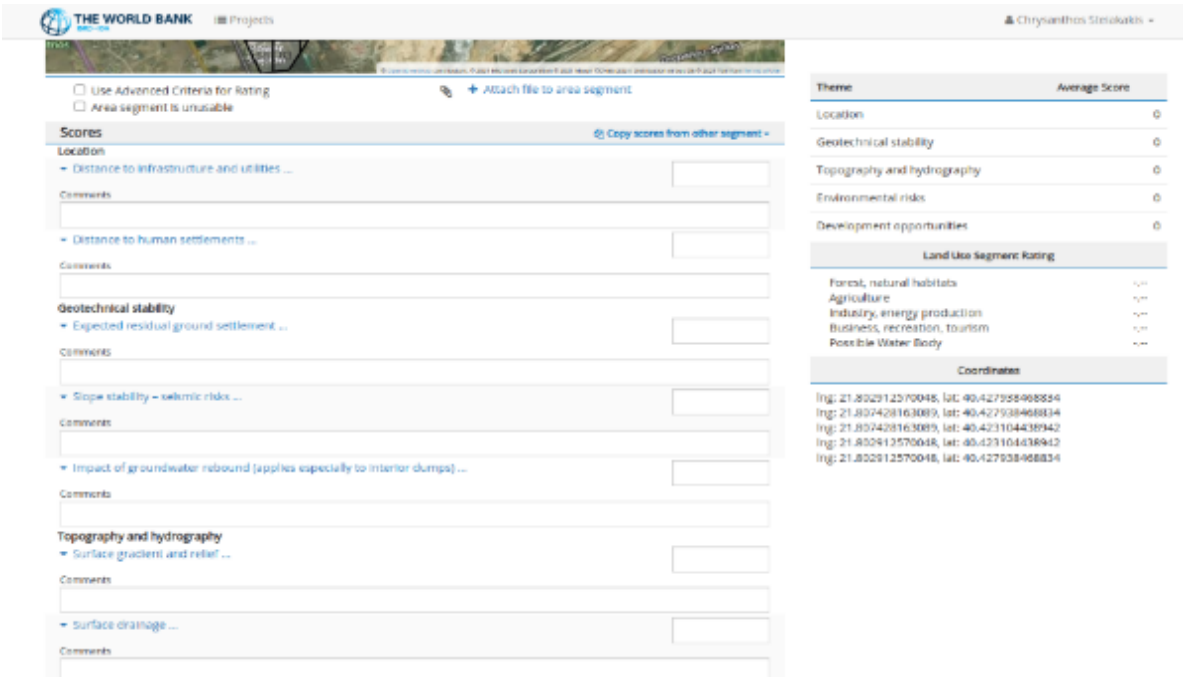


Figure 29: Rating for surface mines (above ground)

When rating an area or a cell, the segment (cell) number is displayed (i.e., 118) and the cell is highlighted (Figure 30). The user can zoom in or out of the study area map. The user can upload a different map for each study area, for example a topographic map or any other map. Under the selected cell the topographic map provided by the mine is overlain on top of the satellite image. On the right of the screen the segment number is displayed together with the area size and the spider graph of the rating for this segment.

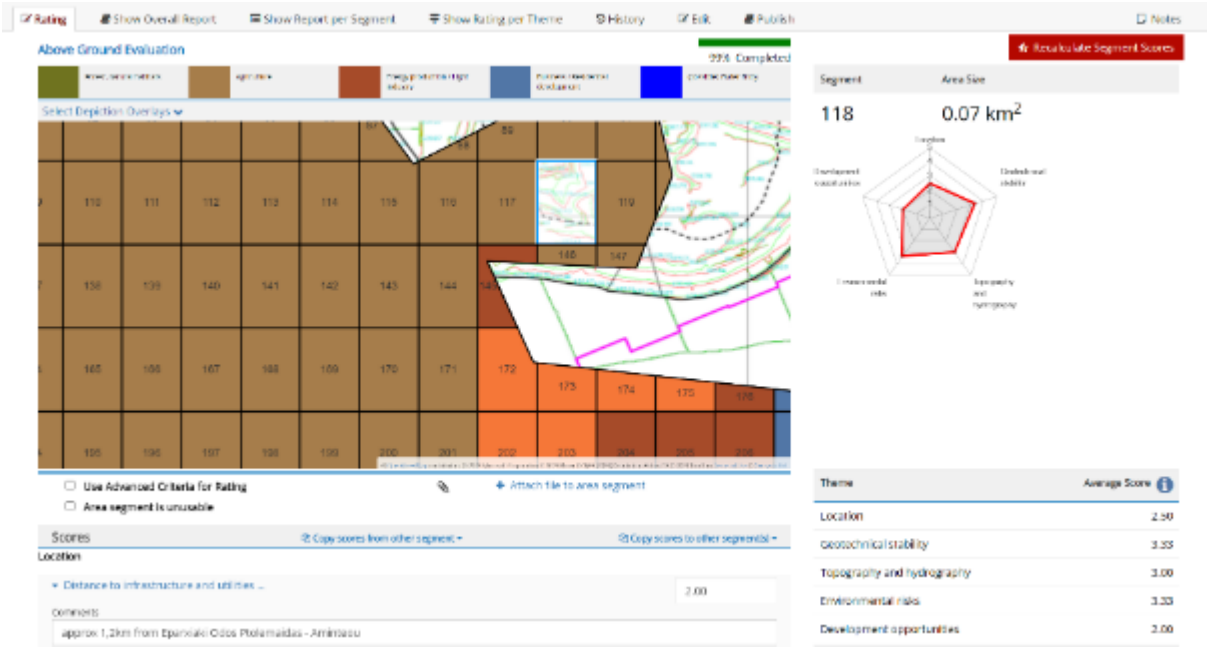


Figure 30: Highlighting the cell selected for rating

Underneath the map, right above the criteria scoring list, the user can select to use “Advanced Criteria for Rating” (by checking the appropriate checkbox) or even mark the cell as unusable by checking the “**Area segment is unusable**” checkbox. If the “**Area segment is unusable**” checkbox is checked a drop-down box appears in which different predefined land uses are assigned which can be given to the selected segment (Figure 31). For example, these land uses can include prohibited areas for any development due to archeological findings. The “unusable” segment is assigned a different color due to the predefined land use and is excluded from the rating procedure.

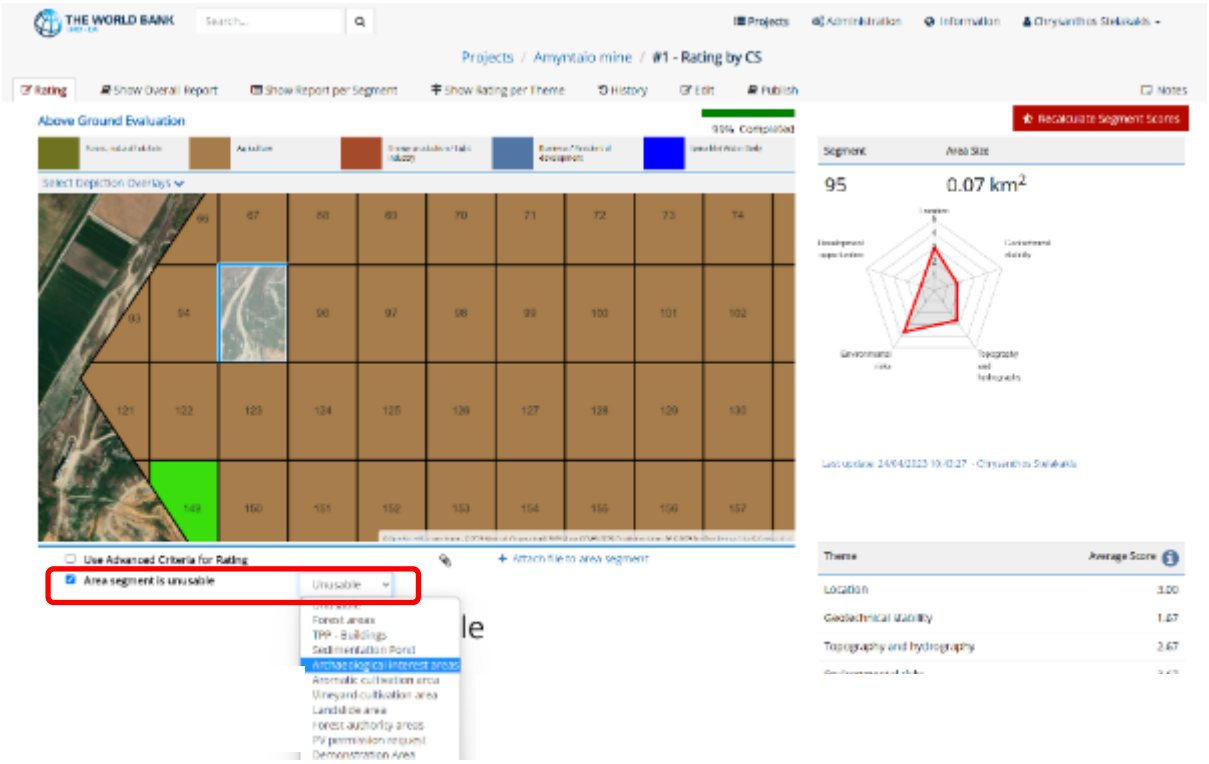


Figure 31: Reasons for rendering a cell "unusable"

If neither of these two special cases are selected, rating can be completed by utilizing the normal "simplified" criteria. When an area is rated based on a theme, a rating value can either be entered directly in the right-hand side score box or selected by clicking on the blue text corresponding to the appropriate rating information (Figure 32). Also, a comment regarding the rationale or the information behind the rating can be included under the rating values.

For example, when rating for the "Geotechnical Stability" theme for an above ground mine and the "expected residual ground settlement…" is evaluated for a waste fill, the user can use the predefined criteria such as the overburden height, the time of placement and the equipment used for placement. In this situation the user has the following information about the waste fill: "*The area has overburden between 50 and 70m and the waste material was placed 12 years ego, by a stacker*". This information places the rating between 2.00 and 3.00 so the user can manually enter "2.5" in the right box beside the criterion. This example is shown in Figure 32.

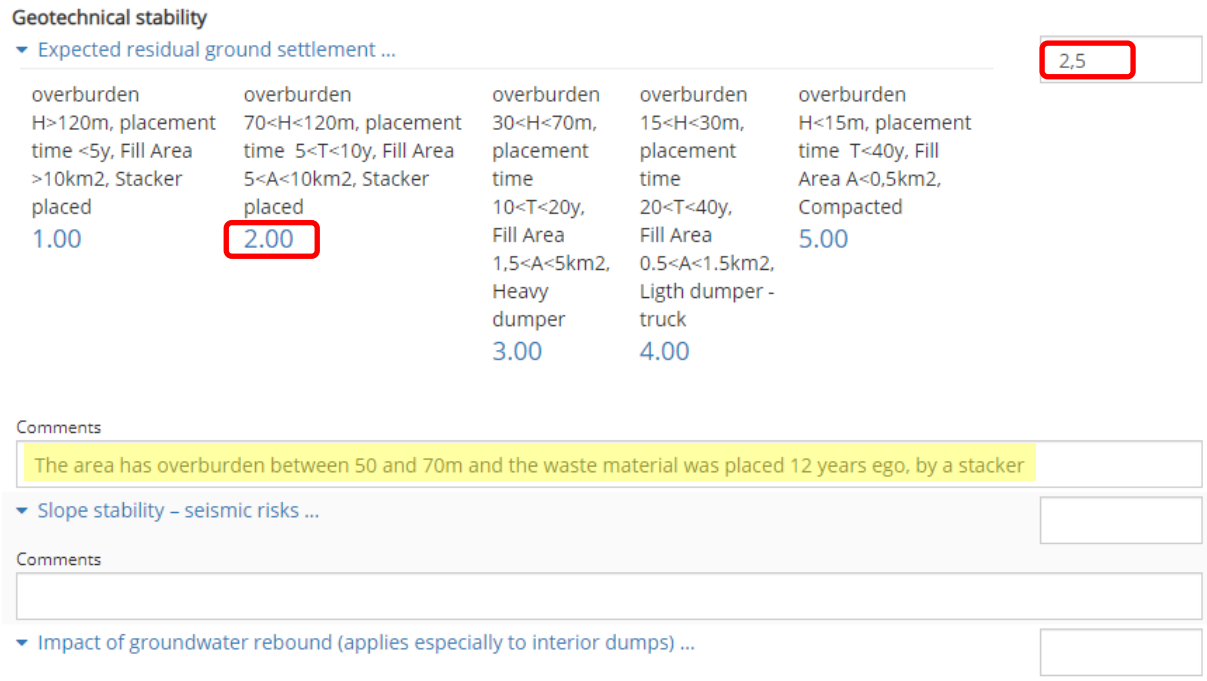


Figure 32: Rating for a specific theme

By clicking on the rating number under the appropriate criterion, the corresponding value will be entered as the rating for this criterion. The numerical value can be adjusted either by clicking and inserting a value from the keyboard or by using the up and down arrows. For example, if a score between 2 and 3 is needed, then the value of 2 can be selected and then adjusted to 2.5 which corresponds to a rating between 2 and 3.

Once the rating of a cell is completed and rating values have been assigned to all criteria, the rating should be saved by clicking the **save** button at the bottom of the screen (Figure 33). Once the rating values are saved, the rating will appear on the spider graph. Also, the average score for the different criteria is shown at the left bottom of the screen together with the assigned typology for the cell (Figure 34). The user can then click on "OK" at the bottom of the screen and can continue rating of a different cell.

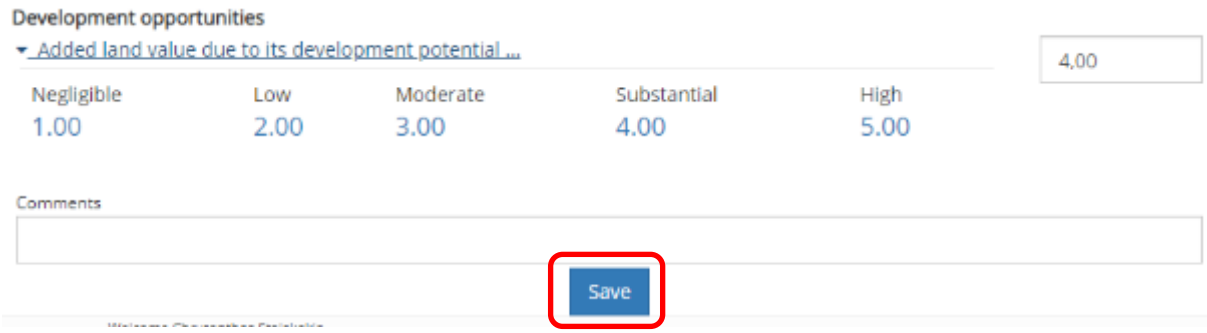


Figure 33: Completing the rating process

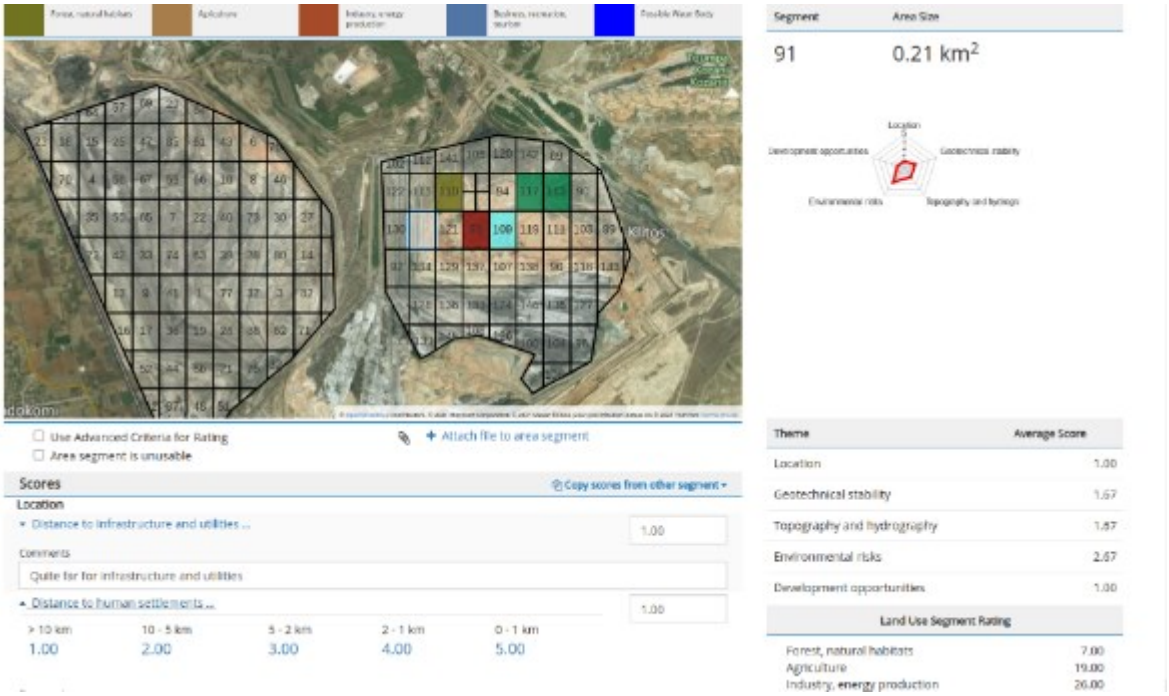


Figure 34: Displaying the rating of a cell

Copying Rating scores between area segments

Once rating of a cell is completed, the application will access the next cell by identified numerical order. At any time, the user can select a different cell.

If most of the rating scores of neighboring area segments/cell are similar, the application provides functionality to copy scores from/to other segments. The user can click on “Copy scores from other segment” or “Copy scores to other segment(s)” (Figure 35).

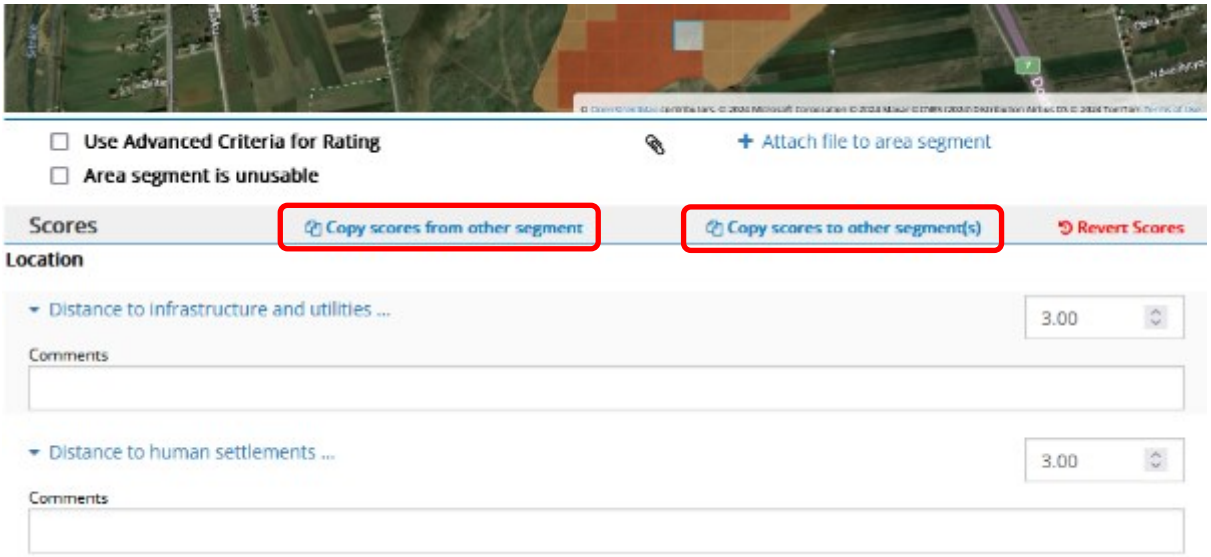


Figure 35: Copying ratings from previously rated cells

A pop-up dialog will then appear so that the user can enter the cell number(s) to or from which to copy the rating scores. (Figure 36).

Using this dialog, the user can select which of the criteria scores (or all of them) to copy, as well as the target segments to copy the values to.

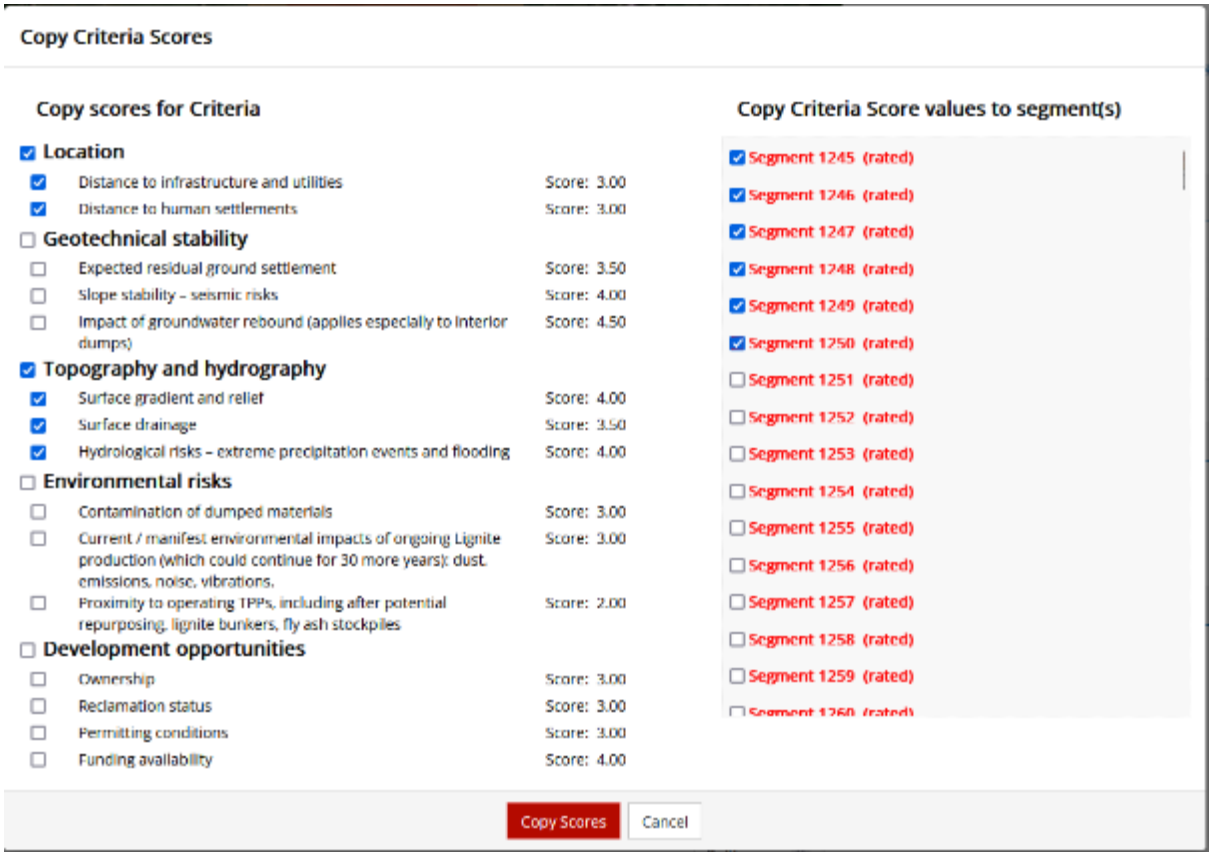


Figure 36: Select criteria scores to copy to other segments in the area

The application indicates if an area segment has already been rated to avoid score overwrites. The user will have to confirm the copy in case it overwrites the scores of other segments

Once the user has copied the scores to/from other cells they can adjust some of the scores to be more precise for a particular area segment. So, the user must select the specific area segment, adjust any scores that need to be adjusted and click on save. This saves the user time from having to go over all the score values that can be the same with the originally scored segment and allow them to only apply the score to the different score sections.

Reverting scores / Undoing changes

As described later on, in section "*Edit History and tracking*", LURA maintains records of all the changes that take place during the rating process of each area segment. Whether a full rating of the segment or just a single criterion score change, the application will keep track.

The application can utilize those records, to allow users to scores back to previous change sets. By clicking on "Revert Scores" a pop-up dialog will be displayed, showing the user a list of all the changes by date and user, and for each change set, the actual changes made.

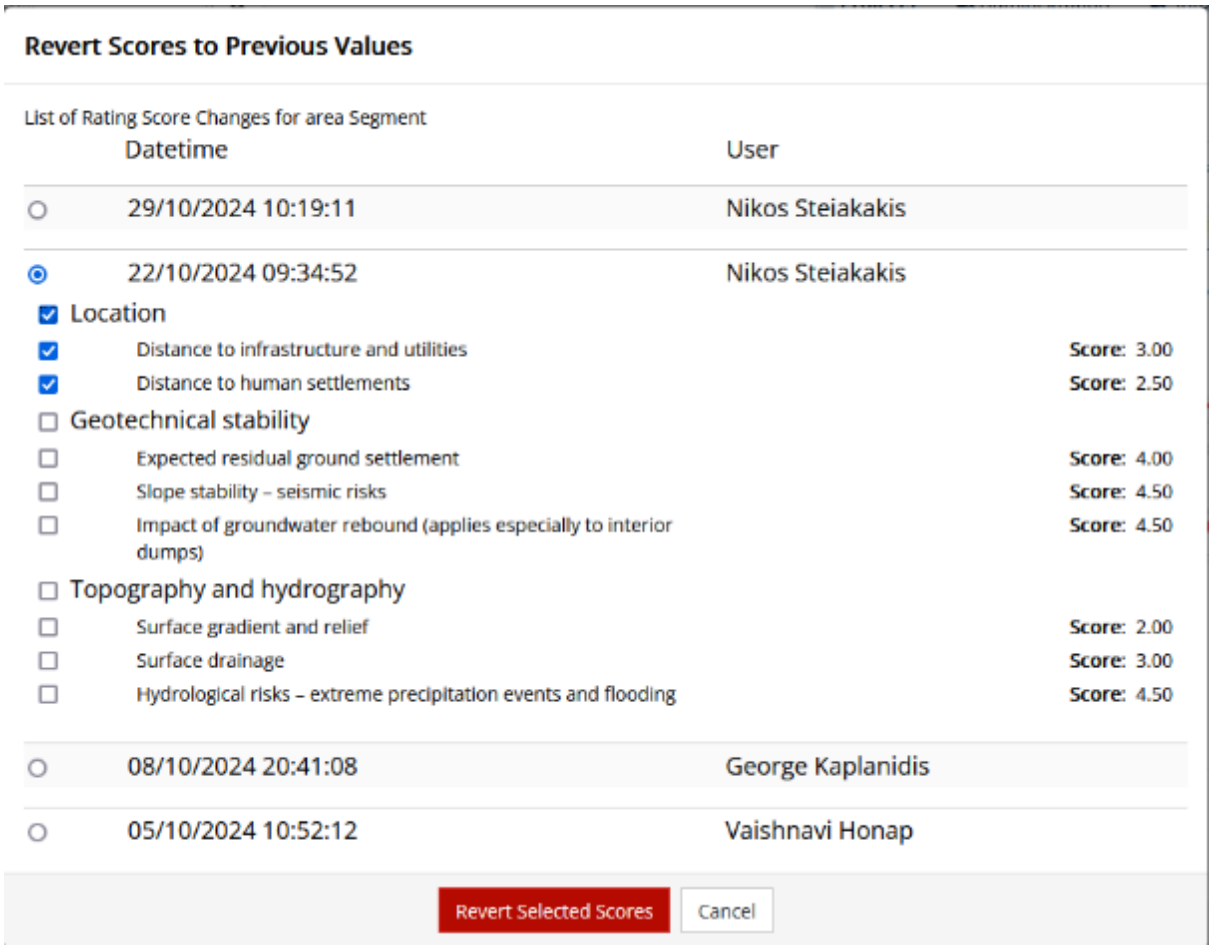


Figure 37 Revert scores to previous versions

As in the copy scores functionality, the user can select only a subset of changes to revert if needed, or even all the values that have been changed.

It must be noted that the revert functionality is not available to all users, only users with "Project Manager" privileges assigned to them. Also, even score rollbacks are being recorded as a change set to be used to revert to in the future.

Attaching Extra Documentation and Information

During the cell rating process, the user may upload a file which has been used for the rating decision, e.g. a borehole report, an environmental report, a photograph or any other file that includes additional information, and attach it to the cell being rated. This file is stored for that cell only and can be reviewed in a later stage and/or can be seen by other Raters who may be rating the same project.

To attach a document to a cell, click on **"Attach file to area segment**" which is located below the map and above the "Copy scores from other segments". In the form that appears (Figure 38) the user can select the file through the browse button and can also add comments regarding the uploaded file.

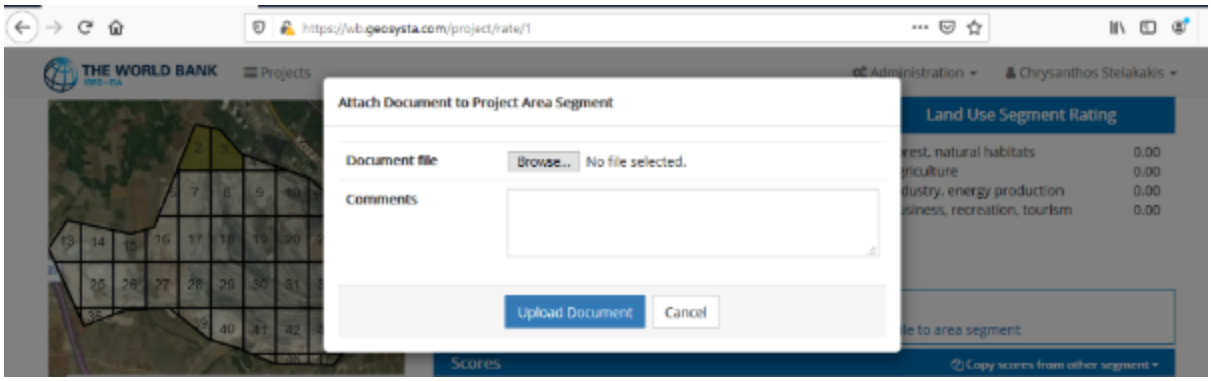


Figure 38: Attaching documentation to a project area segment (cell)

Rating Results and Reporting

As soon as the rating of the selected area is completed the colored typology map is displayed on the screen together with the spider graph for the selected cell. The user can then review any cell and modify the rating to new values (Figure 39).

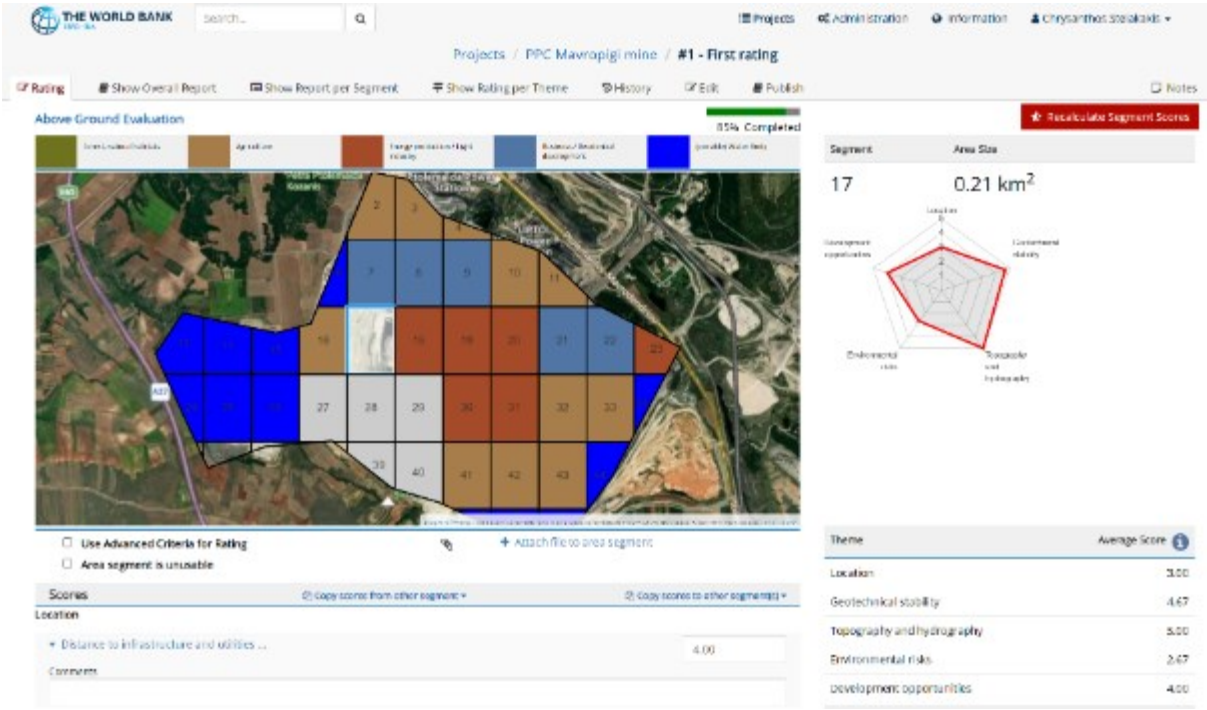


Figure 39: Completed rating

When the rating process is completed, or even during the rating process, the user can click the "Show Overall Report" tab on the navigation menu at the top of the screen.

The final outcome of the rating will then be displayed including the map with the different assigned typologies (Figure 40).

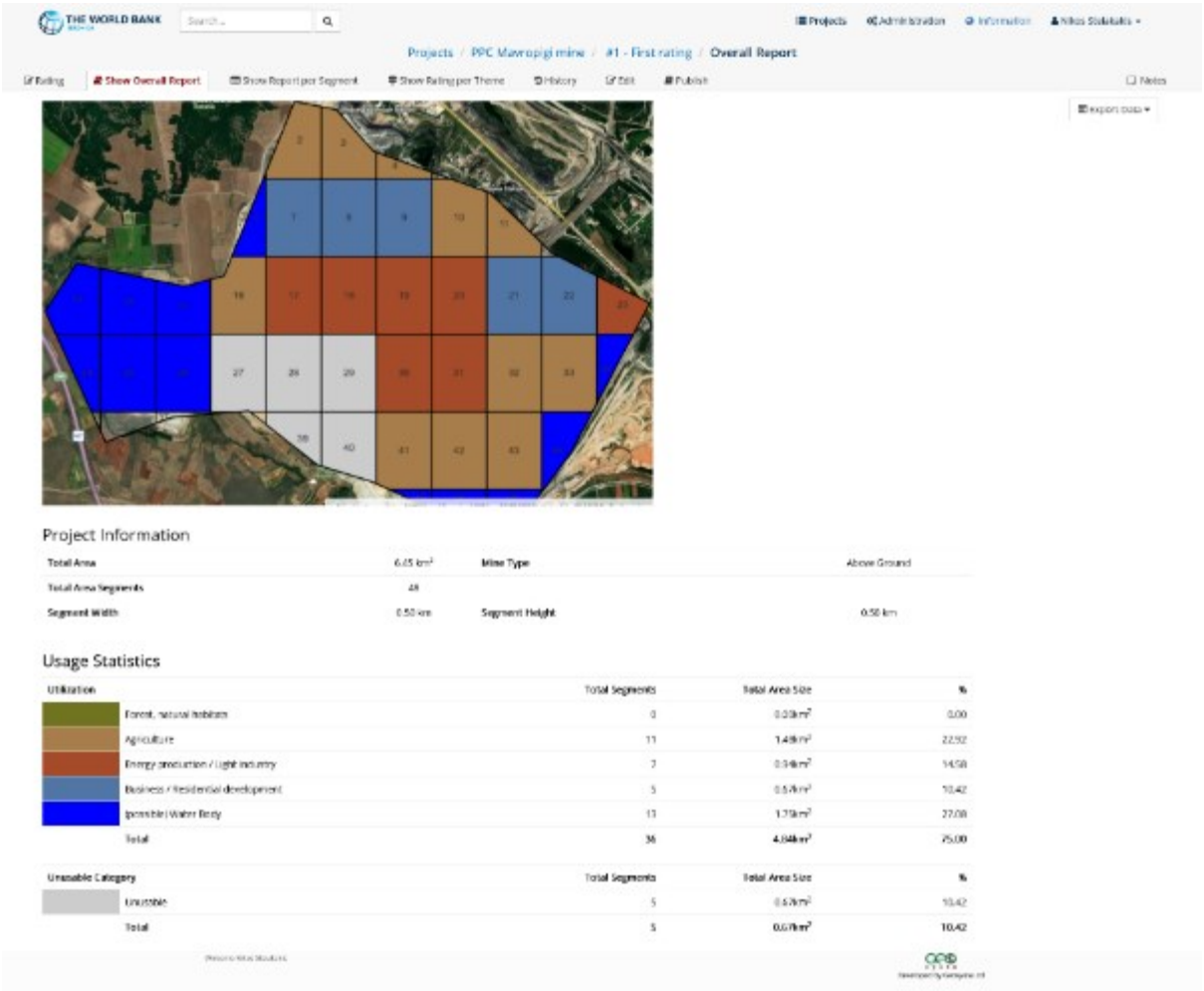


Figure 40: Final rating outcome

Under the map the project information is displayed including the total area that was selected for rating, the number of segments and the segment dimensions (Figure 41).

Project Information

Project Area	6.45 km^2	Mine Type	Above Ground
Total Area Segments	48		
Segment Width	0.50 km	Segment Height	0.50 km

Usage Statistics

Utilization		Total Segments	Total Area Size	%
	Industry, energy production	7	0.94km^2	14.58
	Business, recreation, tourism	5	0.67km^2	10.42
	Forest, natural habitats	0	0.00km^2	0.00
	Agriculture	11	1.48km^2	22.92
	Possible Water Body	13	1.75km^2	27.08
	Total	**36**	**4.84km^2**	**75.00**

Unusable Category		Total Segments	Total Area Size	%
	Unusable	5	0.67km^2	10.42
	Total	**5**	**0.67km^2**	**10.42**

Figure 41: Project rating outcome and statistics

The different typologies are then presented, including the number of cells with the same typology assigned and the percent of the total area that each typology covers (Figure 41)

From this page, users can also export data for the rating. The export functionality is available by clicking on the “Export Data” button on the top right, which in turn will display the export options.

Figure 42: Exporting report files

The export options available are:

- Export PDF Report -- A short one-page project report that is a printable/distributable form of this report page.
- Export Rating Data – An excel file that contains information regarding the rating such as area data, and the scores per area segment
- Export GIS Data – Exports a CSV file that contains the coordinates of each area segment along with the background color and the Utilization Category result. This file can then be imported to GIS applications such as QGIS for further use.

After the rating and reporting have completed the user may select to edit the existing rating or create a new rating project that pertains to the same or a different area in the same or different location / country.

When more than one ratings have completed for a specific project, an overview of each rating's outcomes can be displayed by clicking on the "**Results**" link in the Project Navigation Menu.

Figure 43: Overview of project ratings

This will show the utilization category percentages derived for each rating conducted, as well as some basic information about the rating, such as the user that created it, the time of last update and the Mine Type (Figure 44).

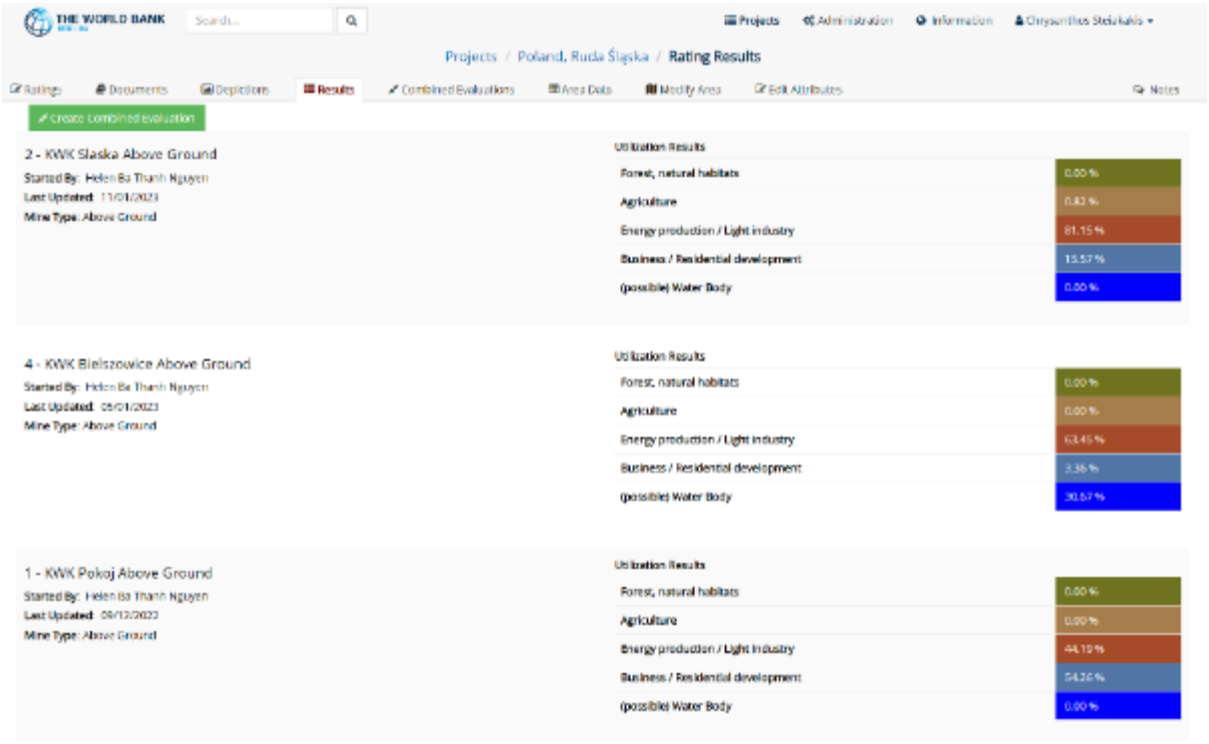


Figure 44: Summary of multiple ratings for the same project

Combined Evaluations

In the results overview, the user can generate combined evaluations that will use the data from a selection of the various existing ratings conducted. By clicking on "**Create Combined Evaluation**" they will be presented with a set of controls to assign a **title and description** for the combined evaluation as well as "**checkbox**" selections to choose which of the ratings will be considered. By default, all project ratings are selected. At least two ratings should be selected for the evaluation (Figure 45).

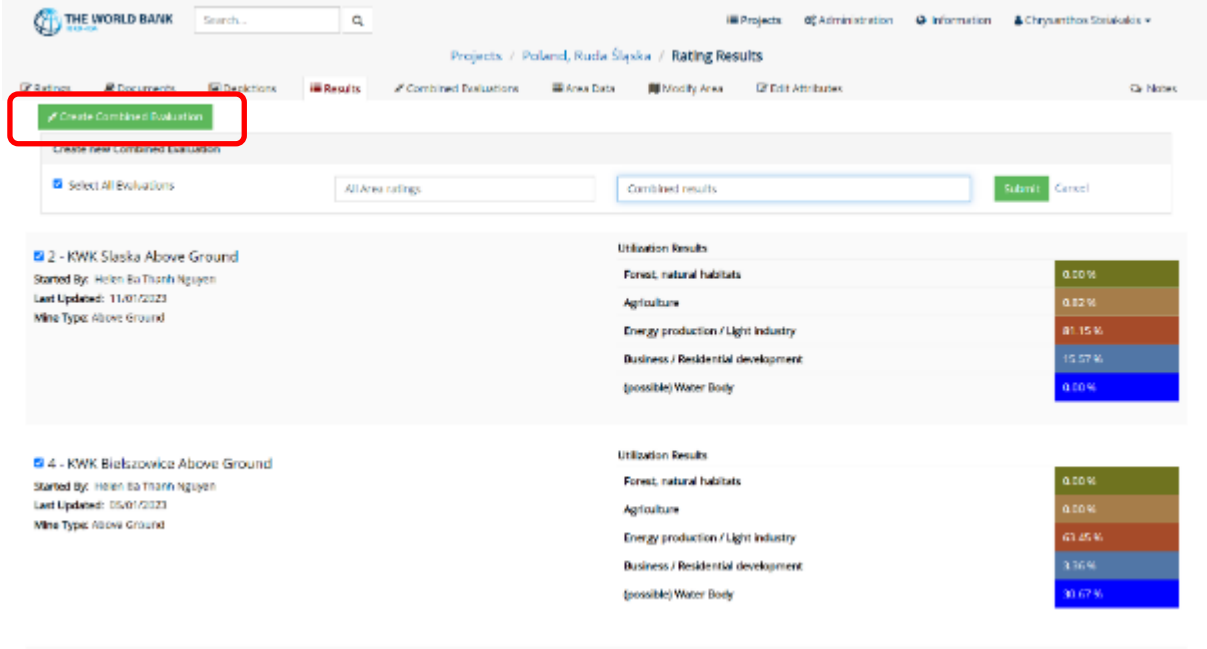


Figure 45: Creating combined evaluations

Once all the required inputs are provided, the user can click on "**Submit**" (Figure 45) and the combined evaluation will be generated. The "combined evaluation" compares every segment of the project that has a different typology regardless if it is an above or below ground rating and returns the typology with the lowest rating. For example, if five (5) ratings have been made for an area (and a segment), and three (3) ratings have produced an agricultural use and the other two (2) ratings have produced a residential development, the typology with the lowest value is assigned in the combined evaluation which for this case is agriculture. It must be pointed out that even if a large majority of ratings have selected a typology of high value, even one with low value, will be the dominant one.

Once the evaluation is completed the user will be presented with a view where a map of the evaluation results is displayed. By clicking on each cell, the user will be presented with the information regarding the values that were derived by each rating and the overall result based on the evaluation (Figure 46).

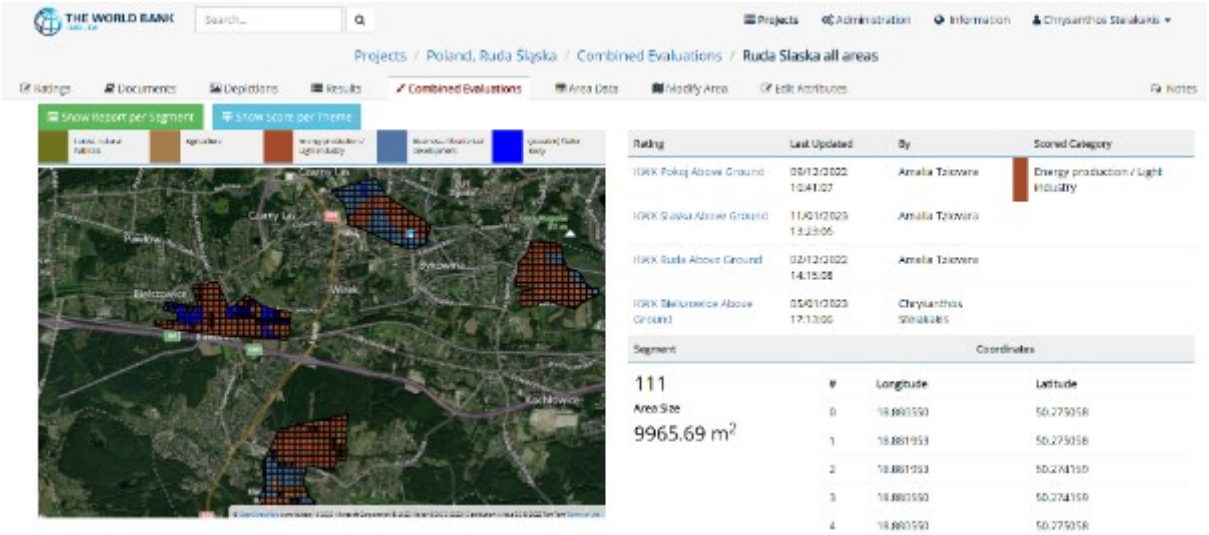


Figure 46: Presenting combined evaluations

The user can also click on "**Show Report per Segment**" to display a list of all area segments and their corresponding evaluation results as shown in Figure 47.

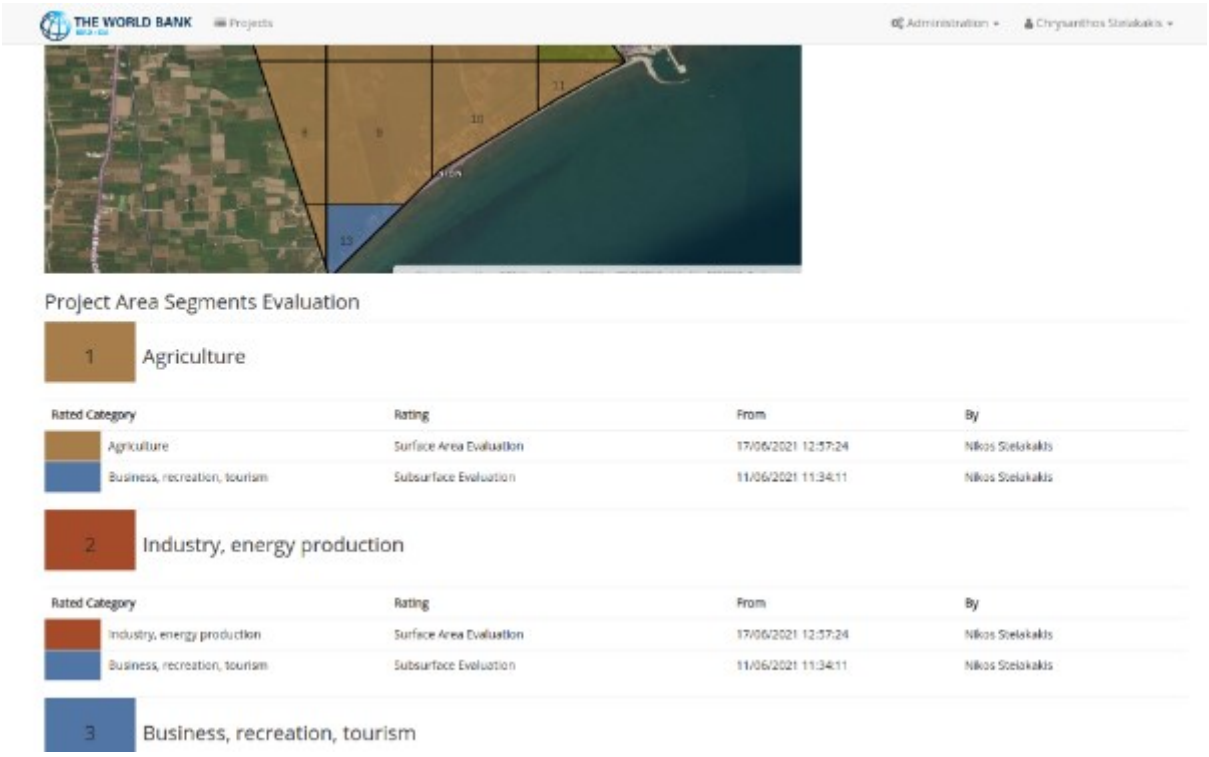


Figure 47: Combined evaluation ratings for a specific cell

The user can also create a PDF version of this report page by clicking on "**Create PDF Report**" at the top right-hand side of the page. The user can access all combined evaluations for a particular project by clicking on "**Combined Evaluations**" at the project navigation menu (Figure 48).

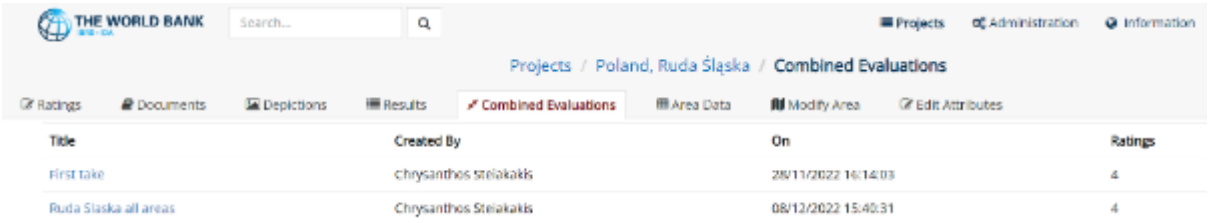


Figure 48: Combined evaluation options

Enhancing Project Views

Uploading Extra Depictions

The user can add extra layers to the project area map views. In the project navigation menu, click on "**Depictions**" (Figure 49)

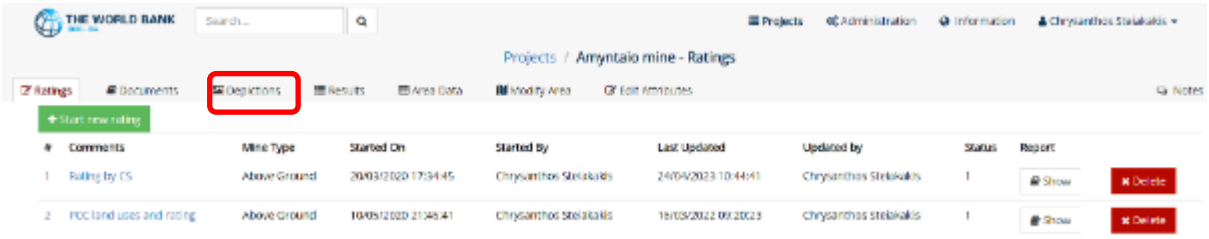


Figure 49: Depictions

This action will navigate the user to the "**Depictions**" upload page (Figure 50).

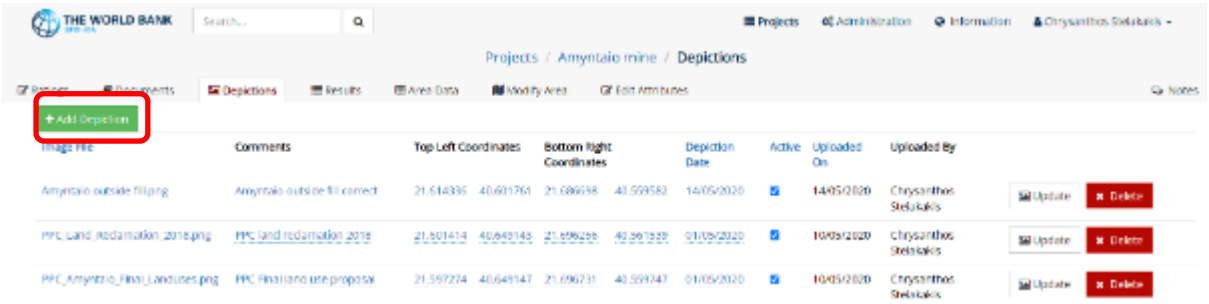


Figure 50: Depictions upload page

By clicking on "**Add Depiction**" the depiction upload form will be displayed. There the user can choose to upload any geolocated image that needs to be displayed as an overlay on the project area maps (Figure 51).

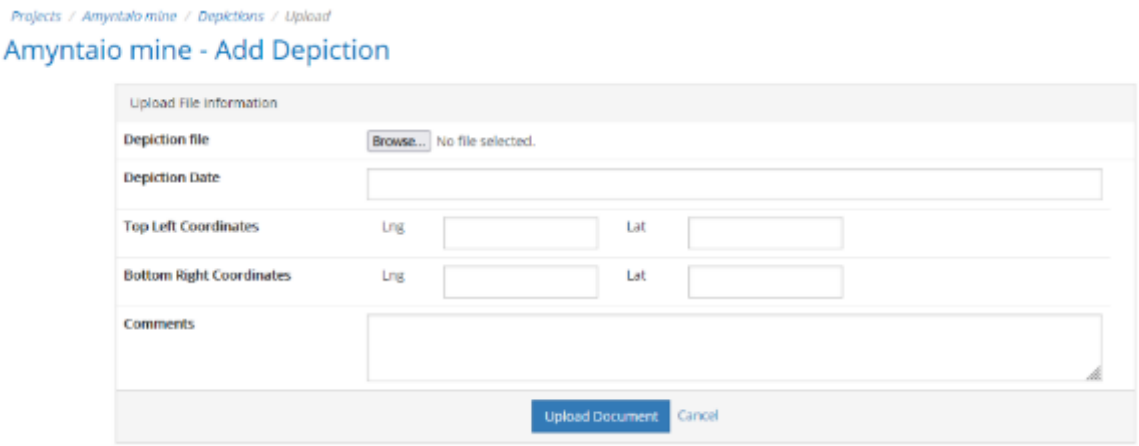


Figure 51: Adding a project depiction

The user must provide the top left and bottom right coordinates in WGS84 (GPS) format. This will enable the application to display the image in the proper position on the map. Multiple images or

maps can be uploaded for an area. These images include topographic maps, hydrogeological maps, water elevation contours, natural habitat areas, contaminated sites, restricted areas, etc. These can be used during rating for the user to be able to address the information per segment more easily.

Changing Depiction Views During Ratings

The depictions uploaded will be displayed as layers over the actual map but below the project area grid as shown in Figure 52.

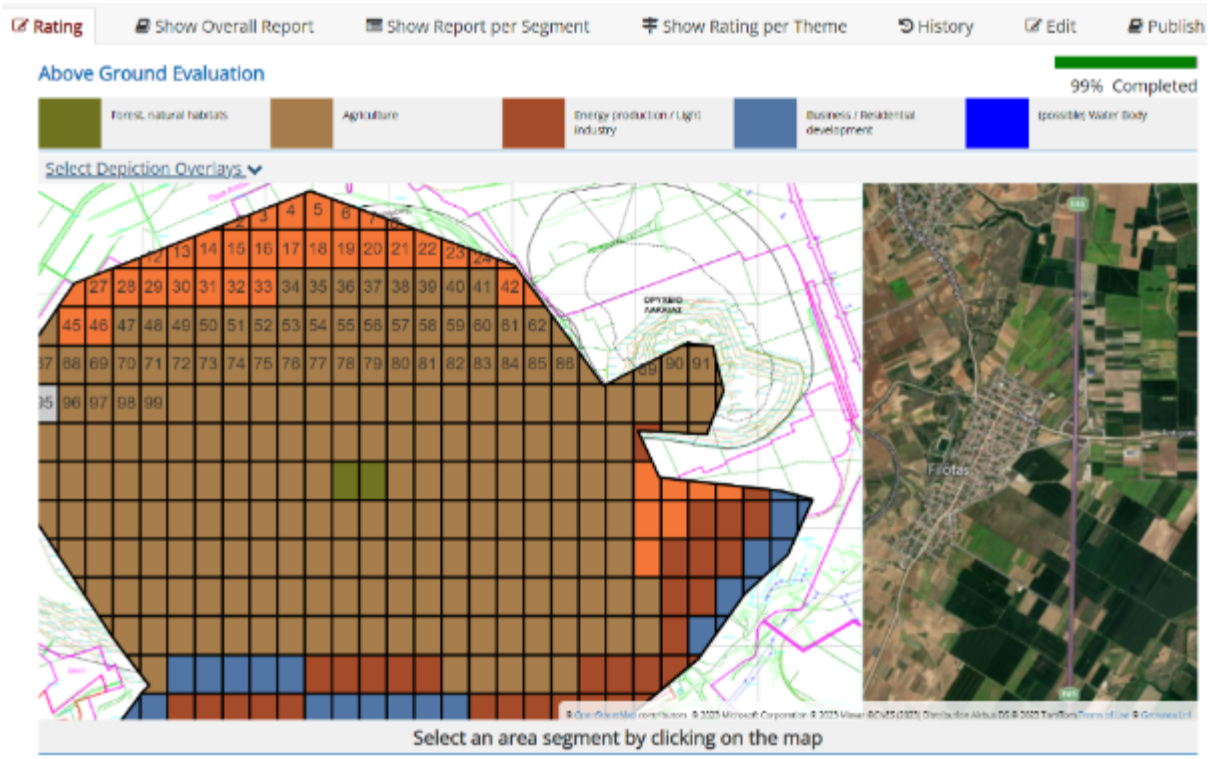


Figure 52: Depiction overlays

Uploaded depictions can be deactivated or re-activated from the "**Depictions**" list page (Figure 53).

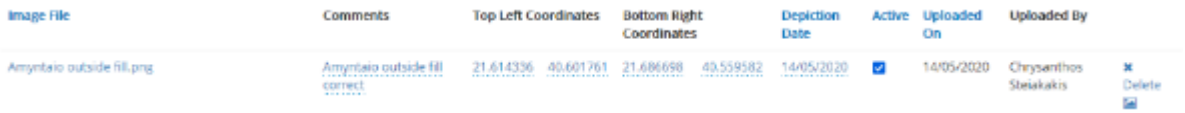


Figure 53: Activating and de-activating depictions

Depictions marked as active will be displayed on the map, while non-active depictions will not. While conducting actual ratings and evaluations, the user can easily toggle the visibility of each active depiction directly via the map. The option "**Select Depiction Overlays**" will be displayed on top of the map. When the user clicks on it, a list of the active depictions will be displayed (Figure 54).

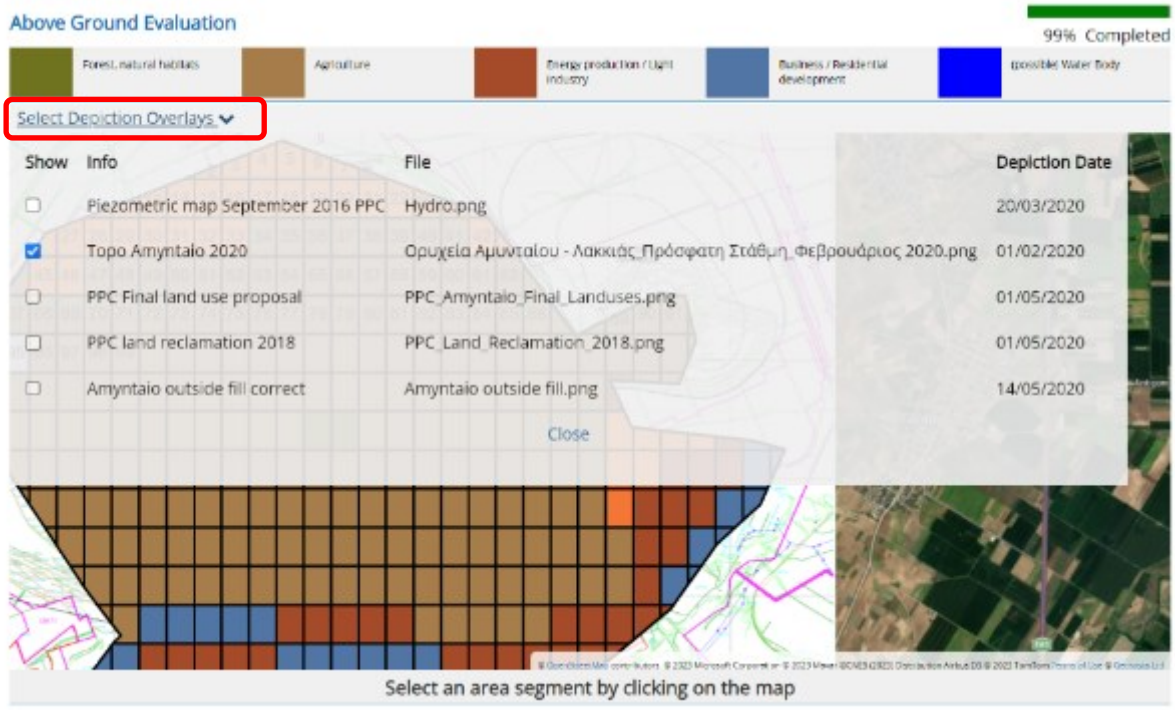


Figure 54: Selecting depiction overlays

The user can select to display only a subset, or even none of the available depictions. This will automatically hide any depictions that are not selected. This, however, does not change the status of a depiction being “Active” as in the previous step. This means that if other users are conducting ratings, they will be able to see the depictions and perhaps even choose a different subset of depictions without affecting one another.

Publish Rating

LURA provides functionality to share the results of a rating, or even it's progress up to that point with users that do not have LURA application accounts.

By selecting "Publish" on the rating context menu, the user is navigated to the "Publish rating page"

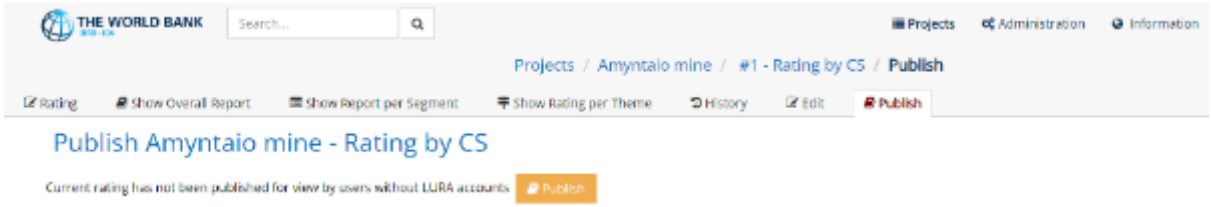


Figure 55: Publish rating to third-party users

By clicking on the "**Publish**" button the user will then be navigated to the publish attributes page. There, they will be able to provide all the required e-mail addresses of the third party users that the user conducting the rating wants to give read-only access to.

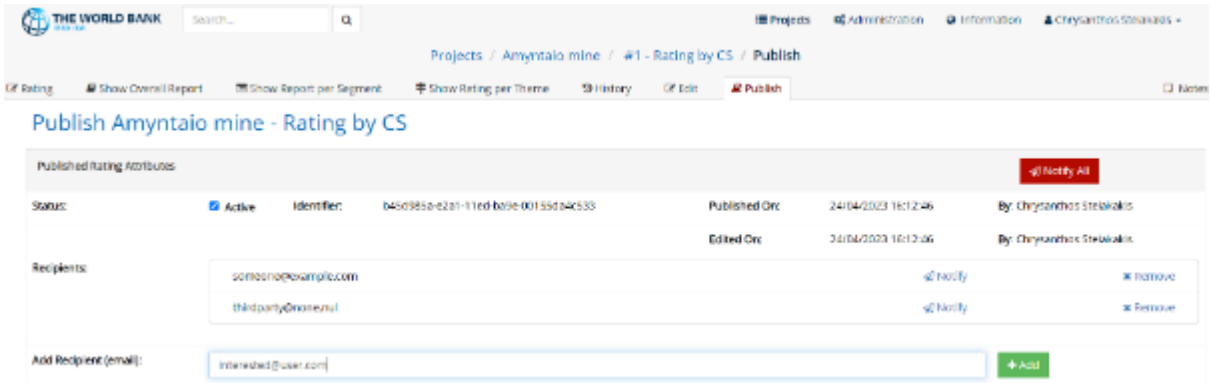


Figure 56: Publish rating to third-party users configuration

Once all required e-mail addresses are submitted, the user can then click on "Notify All". This will send an e-mail message to all the specified users with a link to the published rating view.

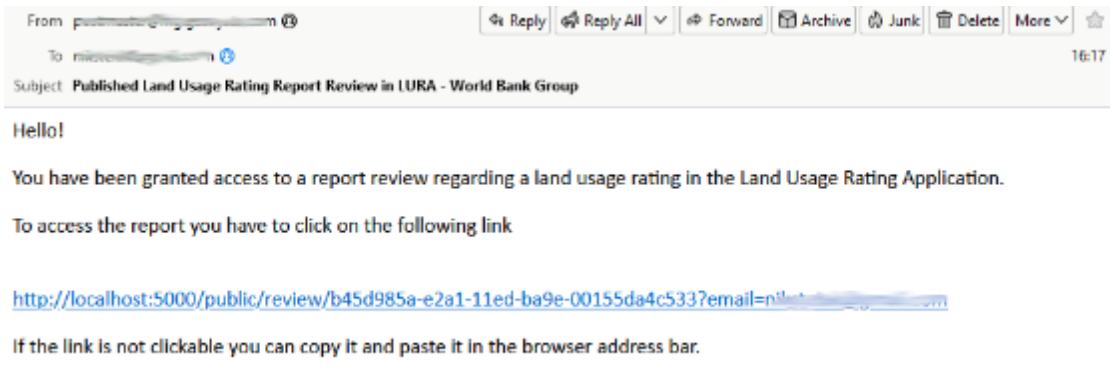


Figure 57: Sample third party read only access e-mail sent by LURA

After the configured users receive the email, they can click on the provided link and gain access to the rating in read only mode. On accessing LURA, these users will be able to see the “Overall Report” and “Report per Segment” sections for the published rating, in a read-only access mode, meaning that they will not be able to provide any kind of input to LURA.

This access can be revoked at any time by removing the email address of the required users from the “Publish” settings page that was used to provide the access in the first place.

Collaboration and Tracking

Notes

LURA provides collaboration functionality for users in the same project team. When conducting and/or supervising Land Ratings, team users can add notes that are accessible to all users in the project team and can be associated with the project and/or rating in a granular manner.

To see the notes provided or add new ones, the user must click on the “Notes” link on the context menu. Notes is available in both the Project context menu as well as the Rating context menu (see Context Menu)

Figure 58: Notes Navigation Option

This will pop-up the notes form that displays the notes for the current project.

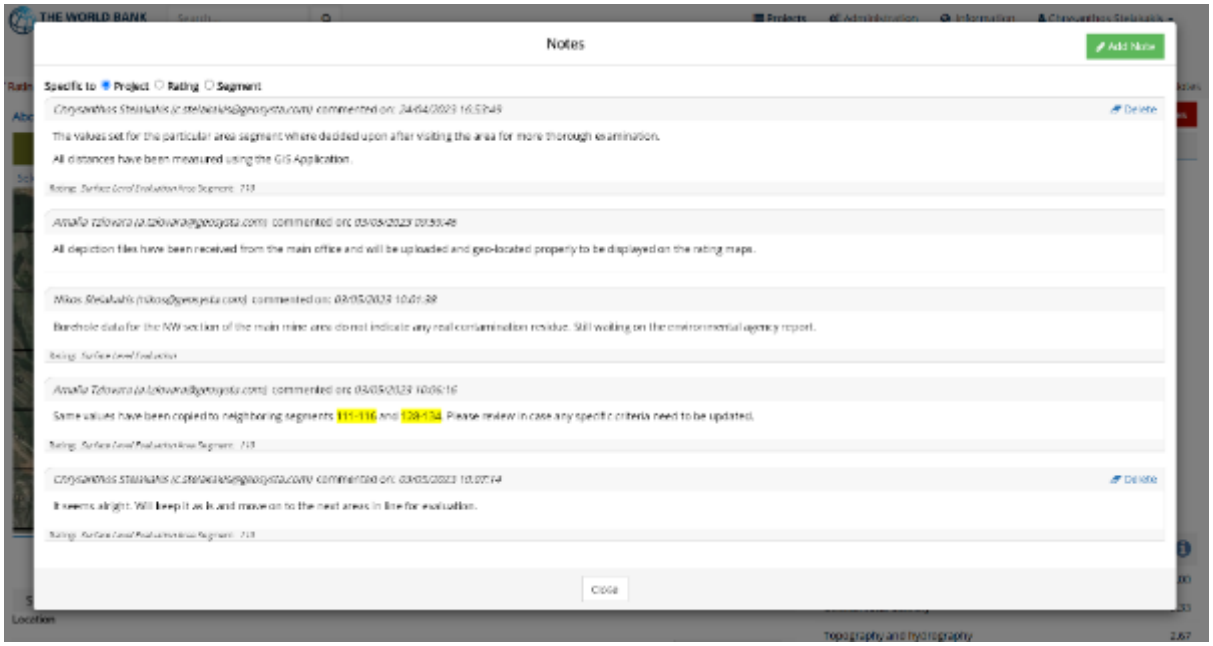


Figure 59: Project Notes display pop-up

To add a new note, the user will have to click on the “Add Note” button on the top right corner of the notes form.

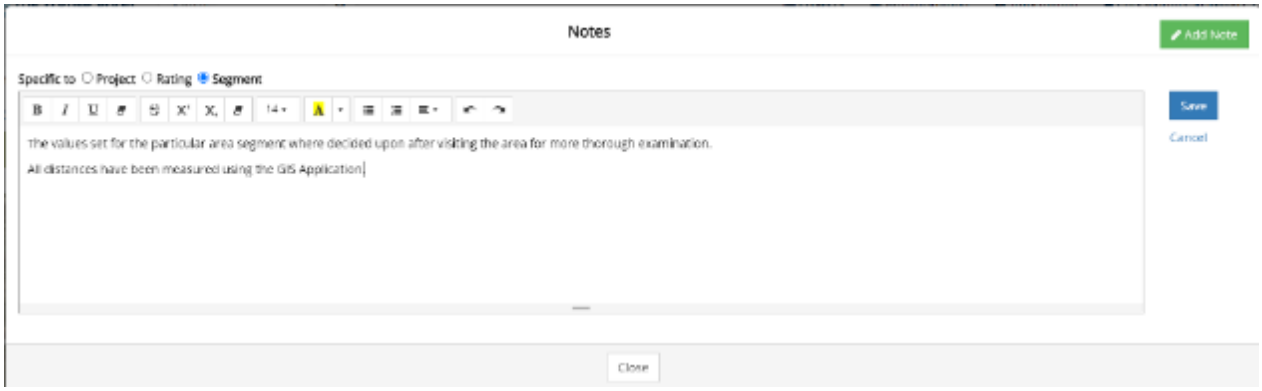


Figure 60: New note creation form

When adding a new note, the user can specify the scope of the note by selecting one of the three alternatives:

- Project – Any notes added with this scope selected will be visible to the project team, regardless to what page of the project and or rating is being displayed. This is the most generic scope for notes added.
- Rating – Notes added with this scope selected apply only to the current rating being conducted by the user. These notes will be visible to users only if they are accessing pages of the specific rating.
- Segment – This is the most specific scope available for Notes. Any notes added with this scope selected apply to the specified area segment for the specified rating. These notes are only visible if the user is accessing the rating and segment for which this note has been added.

When viewing the list of notes, the user can filter the list results based on the scope selected. If “Project” is selected, then all the notes of the project will be displayed. If “Rating” or “Segment” is selected, then notes results will be filtered based on the currently accessed rating and/or segment.

When working on a specific area segment, if any notes have been added for the segment, a notification will also display on the right, right beneath the area theme “Spider graph”.

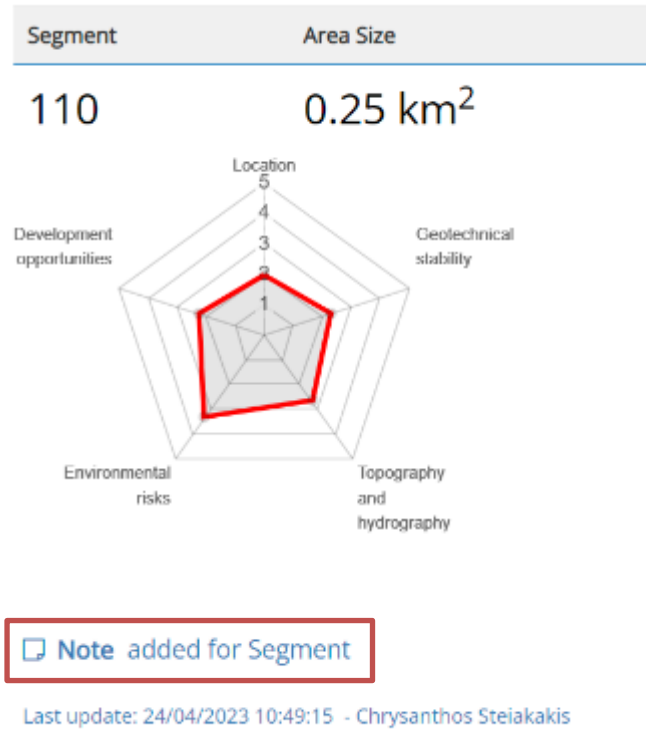


Figure 61: Area segment sideview with Note indication

By clicking on the notification, the note window will pop up and display the note along with any other notes regarding the selected segment.

Notes are an easy and straightforward way to allow the users of LURA working on the same project to collaborate.

Edit History and tracking

During evaluation of an area in LURA, the complete history of actions, changes and modifications are being kept in a log. In this log, the basic information about the action performed by the user, the date and time of the action as well as enough details about the action are being stored.

Users with view access to the rating can see a list of all the modifications by clicking on the “History” option on the navigation menu.

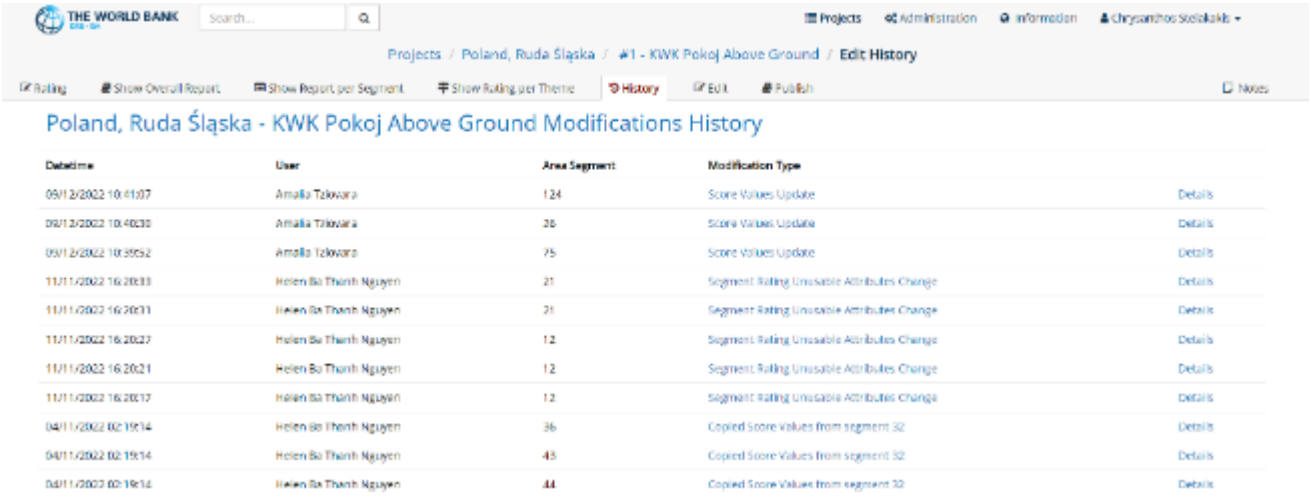


Figure 62: Evaluation actions history Log

The log shows the list of changes in an overview table with the following columns:

- Datetime – When the action was performed and recorded.
- User – The name of the user that performed the action.
- Area Segment – The numeric ID of the area segment the action has been performed for.
- Modification Type – The type of action performed. E.g., “Score values update”, “Score values copied”, “Attributes change” etc.

If the user clicks on the Modification type link of the specific event, the “Event Details” view will be then displayed. This contains more detailed information about the action. For example, if the user had set the scores for some criteria the values assigned will be shown.

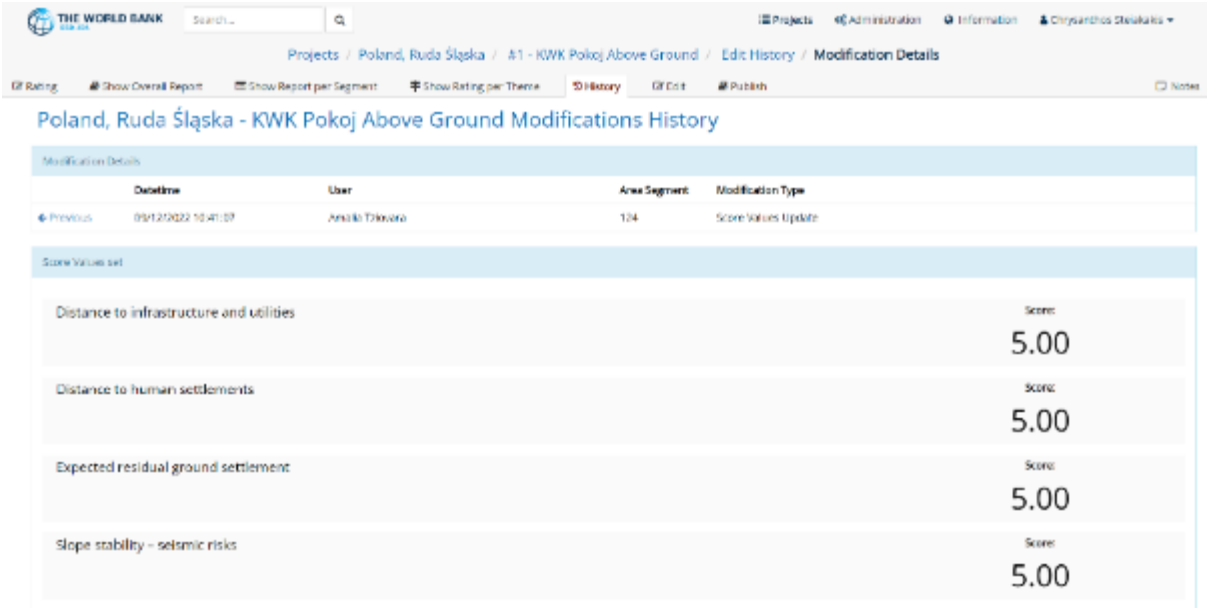


Figure 63: Modification action log item details

On the top section of the page, the basic event information is displayed (the same that was shown in the list) and the detailed view shows the value assigned to each specific criterion during that activity.

Links for the “Previous” and “Next” change are available on the left and right of the top section to allow the user to go over the various entries without having to go back and forth from the list to the details view constantly.

Land Valuation

In addition to the main Land Utilization and Repurposing assessments functionality, LURA also includes a Land Valuation module.

The purpose of the Land Valuation module is to combine the information produced by the repurposing assessments, along with area specific information and market valuations and produce a specialized estimate of the Land Value for the Repurposed areas. This is done using a combination of information gathering along with a specialized land valuation methodology.

Information Gathering

The initial stage of the land valuation process is to gather information such as Estimated land values from government sources (national and/or regional), market information based on past transactions, etc., that will help us introduce the potential market value for each Land Utilization Category.

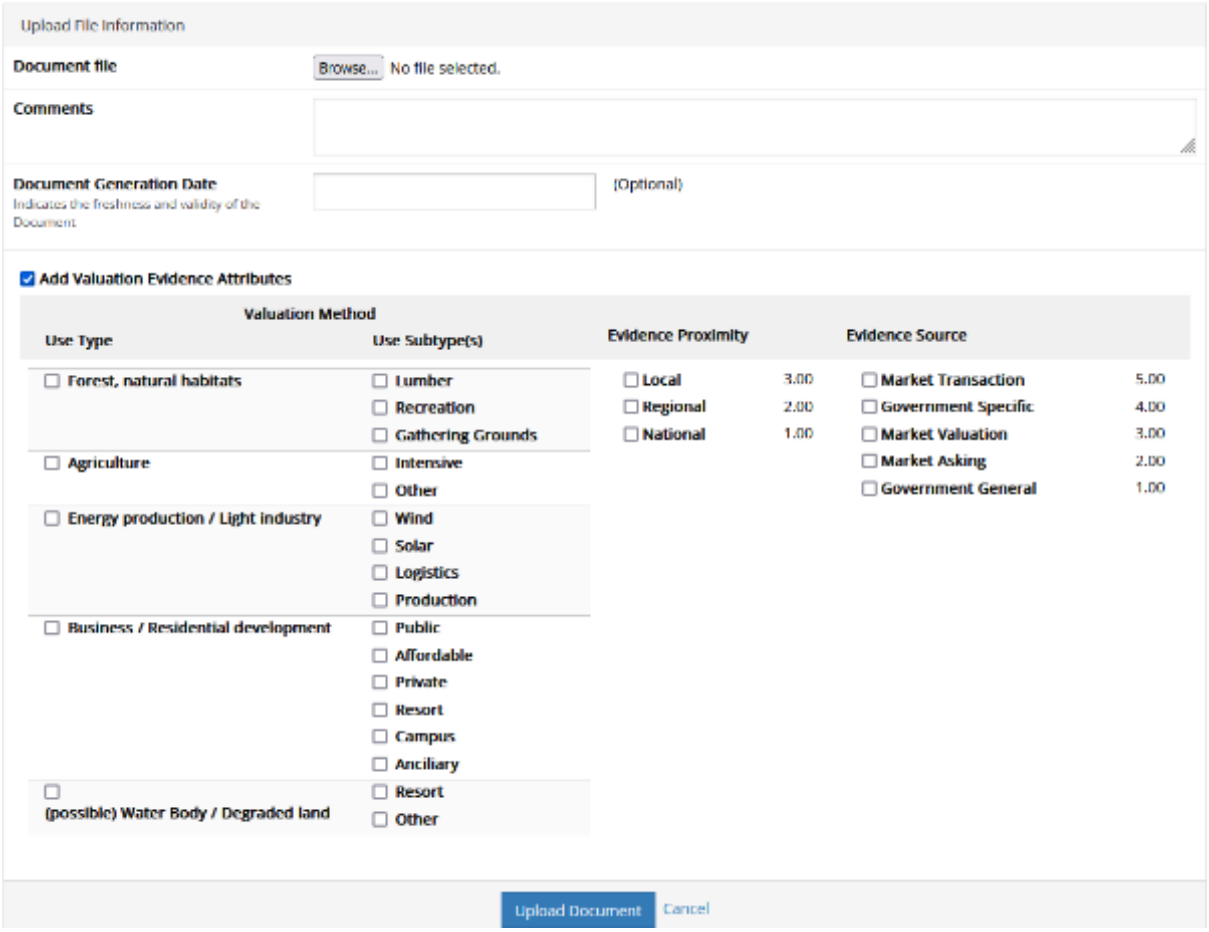


Figure 64 Evidence upload with Valuation Attributes

This information can be added to LURA using the document upload functionality provided, while including any required information to describe the applicability of the uploaded evidence in terms of Land Valuation.

Once the evidence is added, it is visible on the Valuation Modules Evidence matrix.

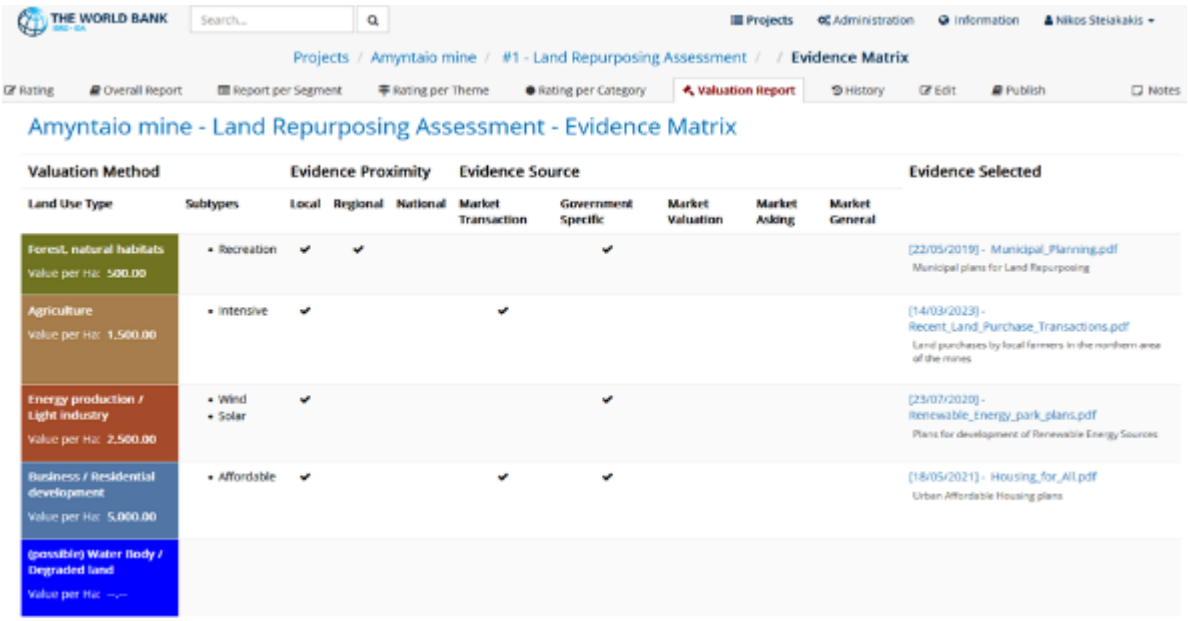


Figure 65 Evidence Matrix

Valuation Attributes and Configuration

Once all this information is gathered, we can introduce valuation information to the application. Specifically, we input the potential Value per hectare for each land use type, as well as the overall mitigation costs.

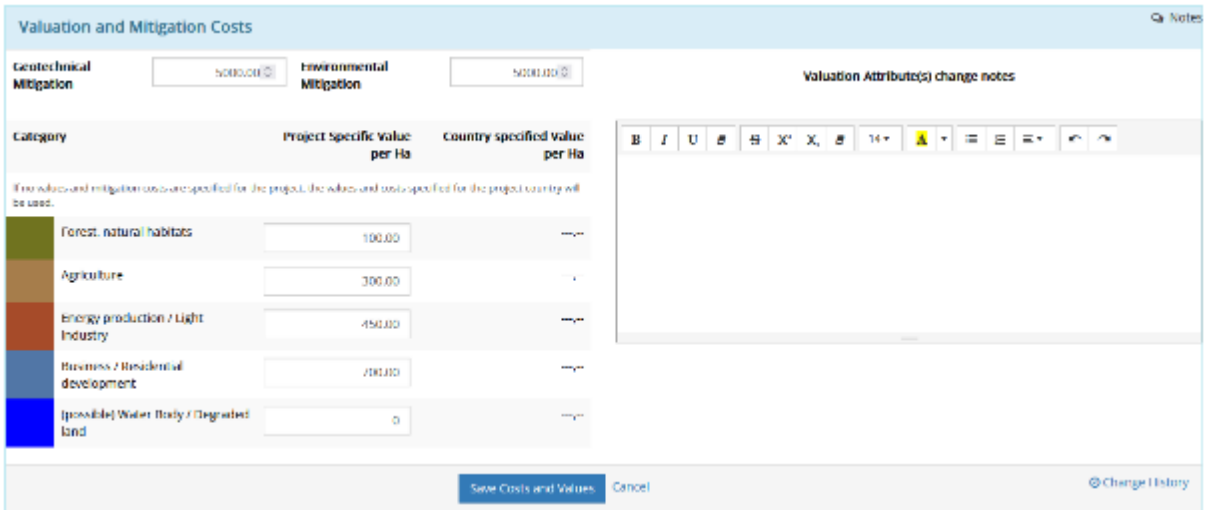


Figure 66 Valuation Attributes

This information will then be used as input for the valuation calculations to produce the Land Valuation Report.

Valuation Report

The Land Valuation Module works directly with the results of the Land Utilization and Repurposing assessments conducted using LURA.

The basic concept of the valuation module follows a methodology that is an extension of the Repurposing assessment. It distinguishes the land valuation attributes to five themes, namely Location, Topography/Hydrography, Geotechnical Stability, Environmental conditions and of course Development Opportunities, just as it does for the repurposing assessments.

Each of these themes pertain to more specific criteria, regarding the valuation, that are weighted in a scale of 1-3 with 1 being the least favorable and 3 being the most favorable. These weights are derived from the scores applied to corresponding criteria during the land repurposing assessment.
So, as an example, regarding the location aspect, an area segment that has been marked with a 5 in the repurposing assessment, as being close to infrastructure and utilities as well as human settlements, will be marked with a 3 in the land valuation criteria. Whereas if the same area is marked with a 1-2 score in terms of geotechnical stability in the land assessment, it will take a score of 1 for the land valuation.

Going over all the criteria in the assessment, the application produces a weight for each theme (location, geotechnical stability, etc) for each area segment. Using these weights, it then calculates the Overall Adjustment Factor, for the whole project/assessment area.

This adjustment factor is applied to the value per hectare for each of the Land Use Categories, as configured in the initial steps of the valuation. This way we have a better estimation of the value that could apply for each land use category.

Finally, combining this information with the results of the repurposing assessment, as for the total size of the area per each utilization category, the application then produces the Valuation Report.
The Valuation Report is comprised of 4 sections. The first section is the general information about the project area, such as total area size, segment width and height and total number of area segments.
The second section is the Valuation Information, showing the overall valuation information summary. Specifically, it includes:

- mitigation costs, geotechnical and environmental,
- the total unencumbered value for the whole assessed area,
- the adjustment value calculated using the assessment scores,

- the adjusted overall value,
- an overview/bottom line of the cost/profitability

The third section is the Detailed breakdown Table of the Valuation. This includes all the information regarding the valuation for each land use category. It includes:

- The total area segments and area size per utilization category
- The percentage of areas suggested for each utilization category
- The Value per Hectare for each utilization category
- The Unencumbered value per each utilization category
- The quantum factor is primarily an adjustment factor to reflect special suitability of the site for certain large scale uses that may not be able to be accommodated elsewhere in the local marketplace and which therefore may have an additional value - for example the potential to house a major multi modal logistics facility, a mega sized data center or extremely large solar farm.
  The quantum factor can also be used to reduce the values if this is deemed appropriate for any reason not already accounted for. It can also serve as a factor that can be used to further adjust the value for each type of utilization, to cover non-specific trends or estimates. If for example, market experts foresee an increase in demand for energy production areas, but do not have specific data to indicate this trend, the quantum factor can be used.
- The adjusted value overall per each utilization category
- Areas that have been marked as unusable, and thus cannot provide any further value.

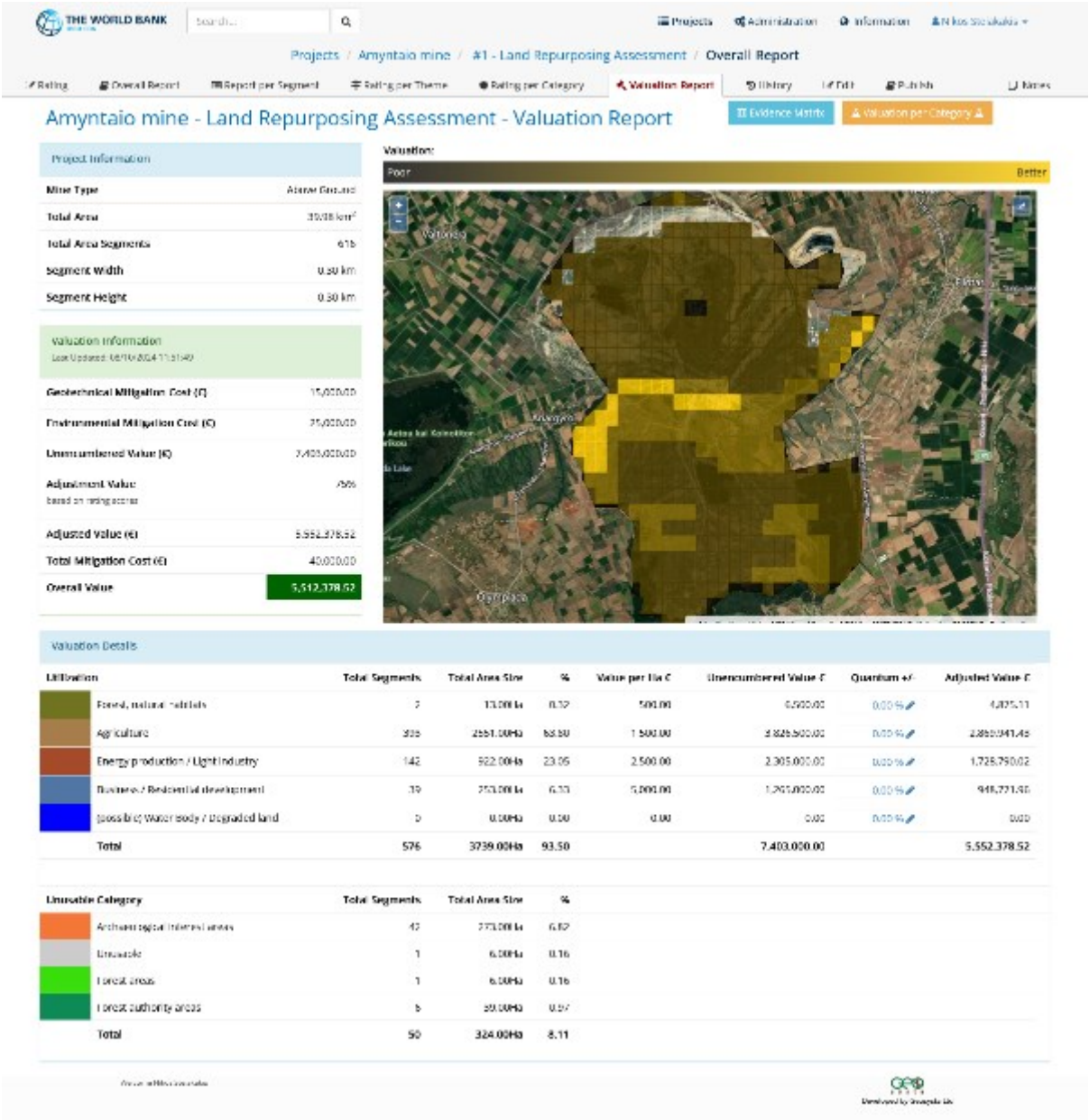


Figure 67 Land Valuation Report

The fourth and last section of the report is the color graded map of the assessment area. The purpose of this map is to provide the user with a quick glance of the value as assessed for the various parts of the assessed area.

The color grading stems from dark brown to gold indicating the potential value for the various parts of the project area. The brighter the color assigned to an area, the more the potential value estimated. To calculate the color to be assigned, the application uses the following formula:

$$\frac{Estimated\ Value}{Max\ Attainable\ Value} * 100$$

The “Estimated value” for a particular are segment is the adjusted value of value per Ha multiplied by the size of the segment in hectares.

The “Max Attainable Value” is the value per Ha for the Category with the highest value configured (e.g. Business and Residential development usually) multiplied by the size of the configured area segment size.

The percentage calculated is then applied as a weight factor to the color coding and is displayed on the map.

Application Administration

Advanced users with the **Administrator privilege assigned** also have access to the "**Administration**" section of the application where they can modify most of the predefined inputs for the system. If a user has been assigned administrative privileges the user will be able to see an "**Administration**" link on the top right of the page (Figure 68).

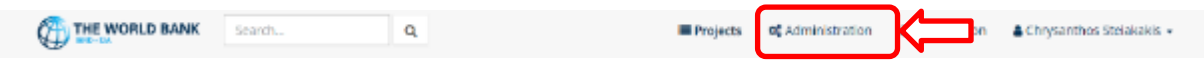


Figure 68: Administration option

This will take the user to the main page of the application Administration section.

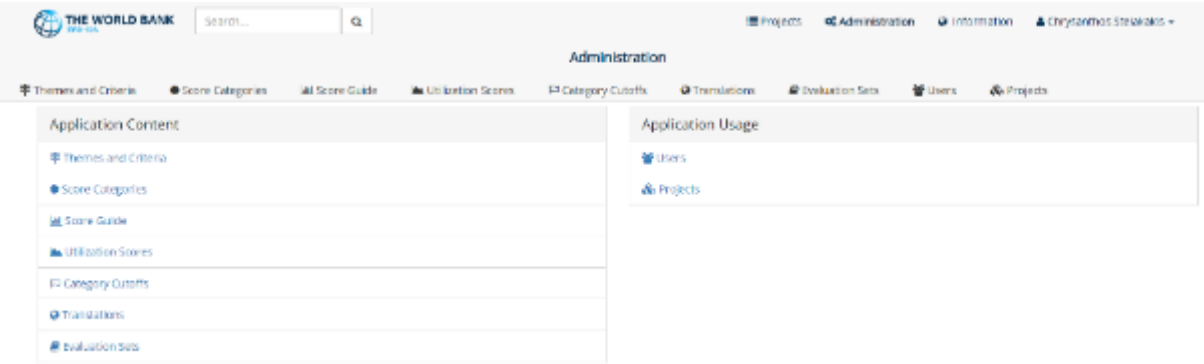


Figure 69: Administration menu

Themes and Criteria

If the first option, i.e. "**Themes and Criteria**", is selected, the descriptions for themes and criteria can be edited.

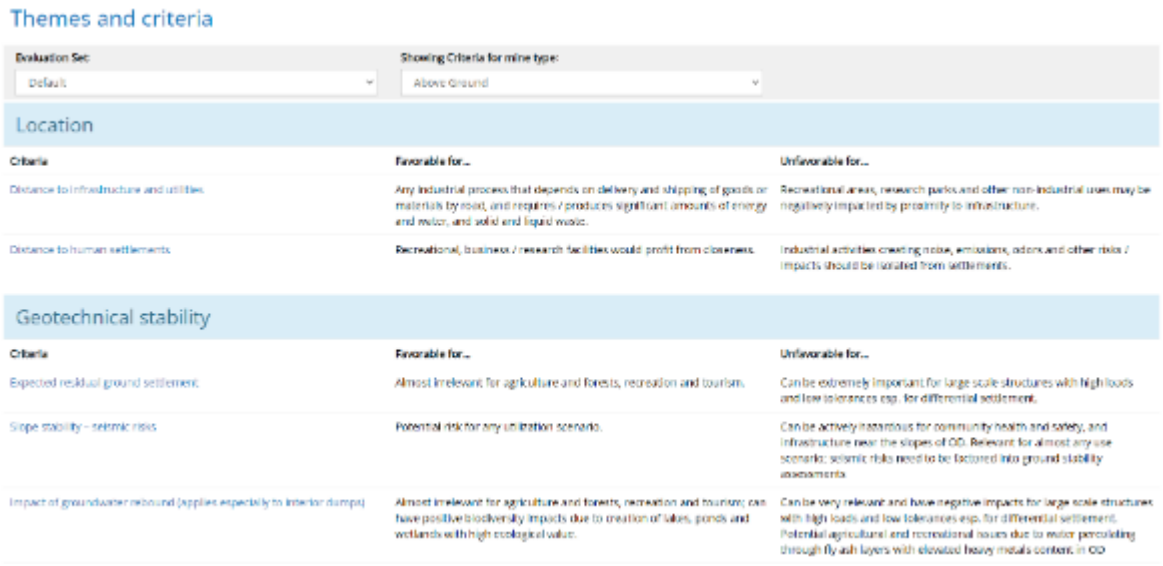


Figure 70: Administration of themes and criteria

The "Evaluation Set" drop-down list at the top left allows the user to select to edit the themes for any of the configured evaluation sets. (Described in Appendix 1: Evaluation Sets)

The "**Mine Type**" drop-down list next to it controls the criteria group that a user can edit, such as Above Ground mine type criteria or Below Ground mine type criteria.

By clicking on the criterion, the user can navigate to the corresponding edit page for that criterion (Figure 71).

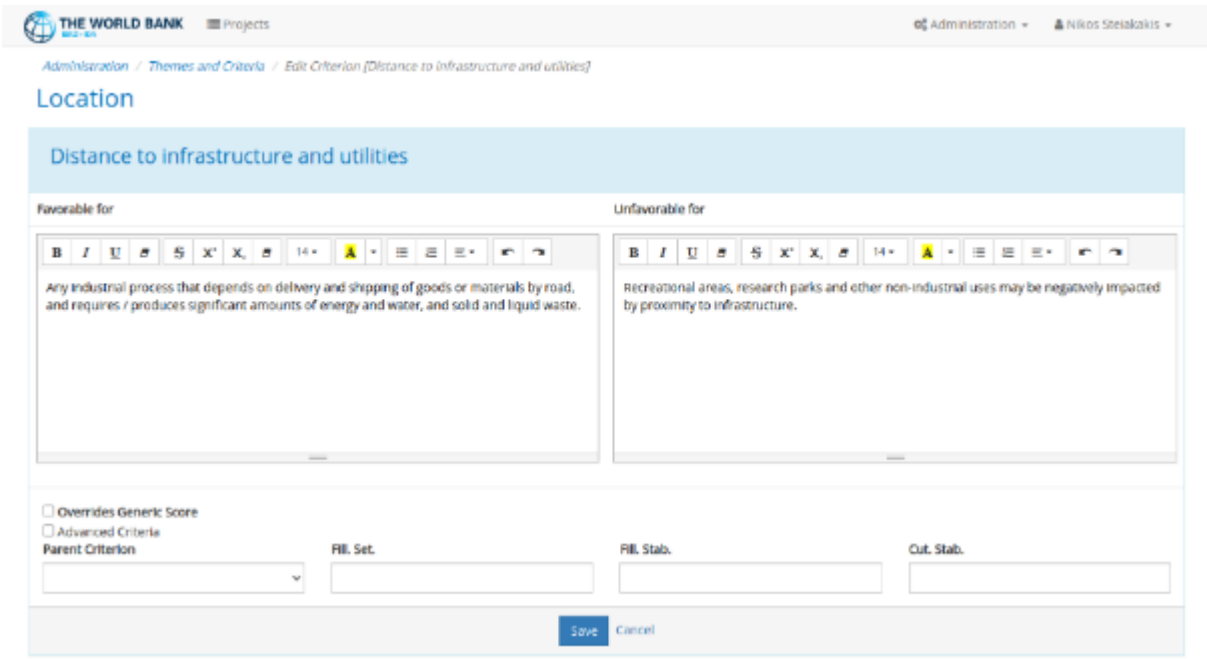


Figure 71: Editing the "distance to infrastructure and utilities" criterion

The edit page allows the user to edit the description text and format the text. At the bottom of the page, there are options to edit “Advanced Criteria” such as the criteria pertaining to slope stability.

Score Categories

If the “**Score Categories**” option is selected from the “**Administration**” menu, the user is allowed to modify the description and/or color of each Category (Figure 72). To accomplish that, the user should click the left mouse button on the blue colored text, and/or on the color icon that corresponds to each Category (Figure 72).

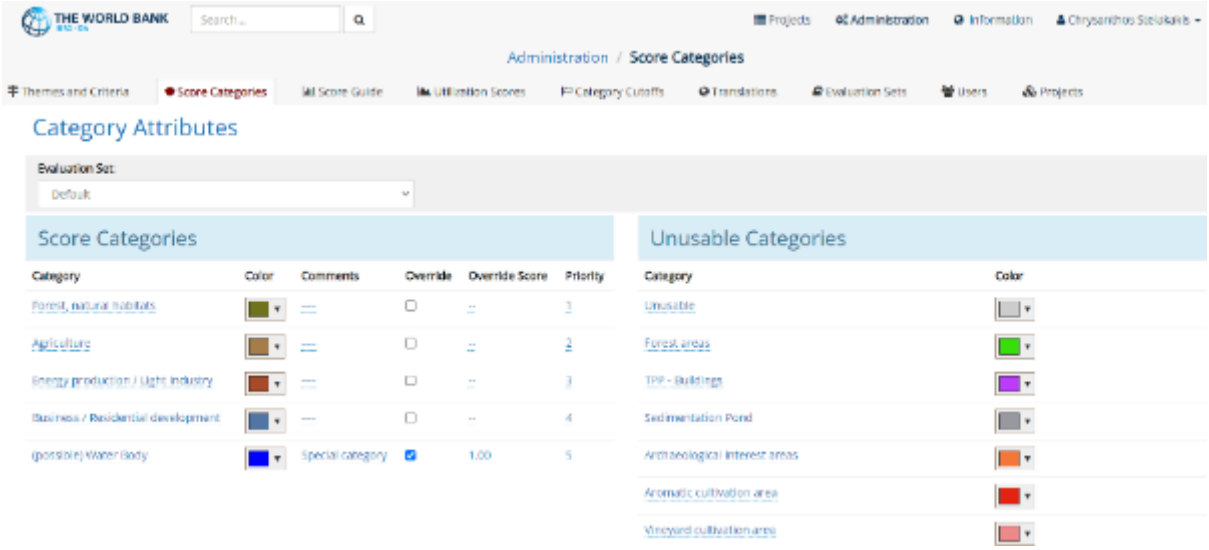


Figure 72: Editing category descriptions.

The user can also edit the Unusable Categories and change the respective color. The software allows the creation of more than one unusable category, since these categories may not be all known beforehand. The same or different colors can be assigned to different “Unusable Categories” that will eventually be displayed on the main map. The number of main categories cannot be increased or decreased because they are directly linked to the rating capability of the application.

Score Guide

In the "**Score Guide**" section of the "**Administration**" menu (Figure 69), the user is allowed to edit or modify the rating criteria scale. For example, by clicking on the "Edit" button on the right the value ">2.500m" can be changed to a different value, for example 5,000m (Figure 73).

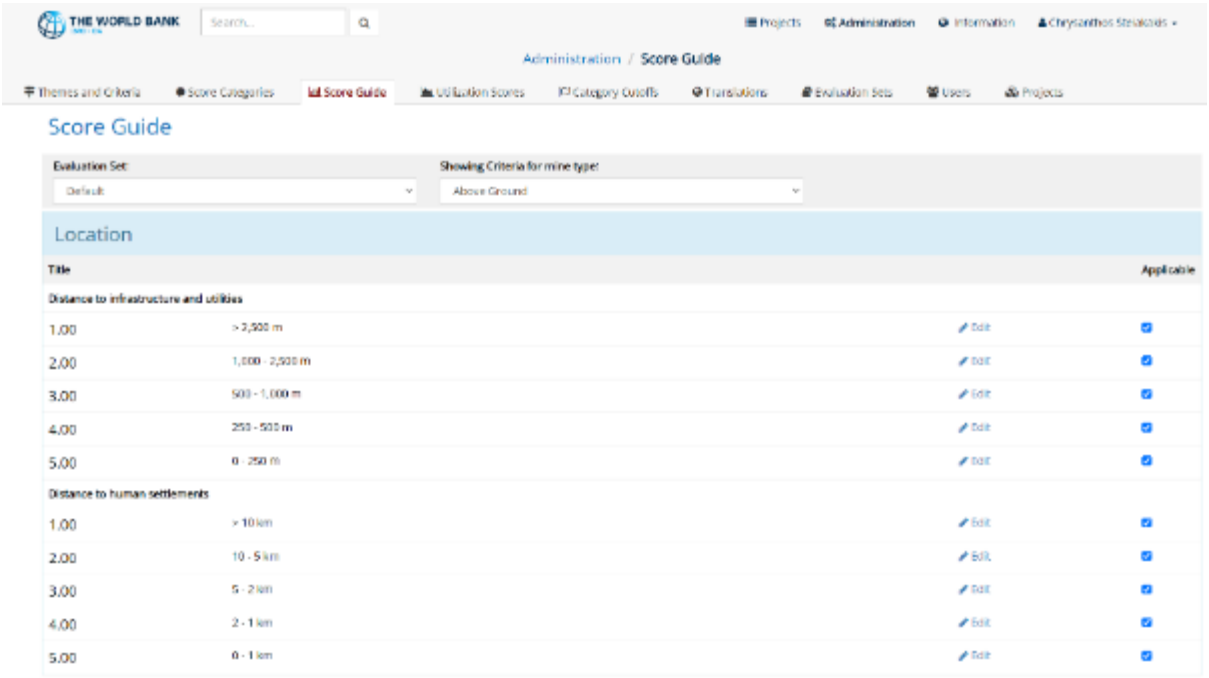


Figure 73: Editing the score guide

If "Applicable" is deselected (unchecked) for any criteria, those criteria will no longer be displayed in the online area scores selection form.

This for example is something that could be used with an alternative evaluation set that needs less criteria for evaluations to be conducted.

Utilization Scores

If the "**Utilization Scores**" option is selected from the "**Administration**" menu, the user is allowed to edit or modify the weighting coefficients for each criterion (Figure 74).

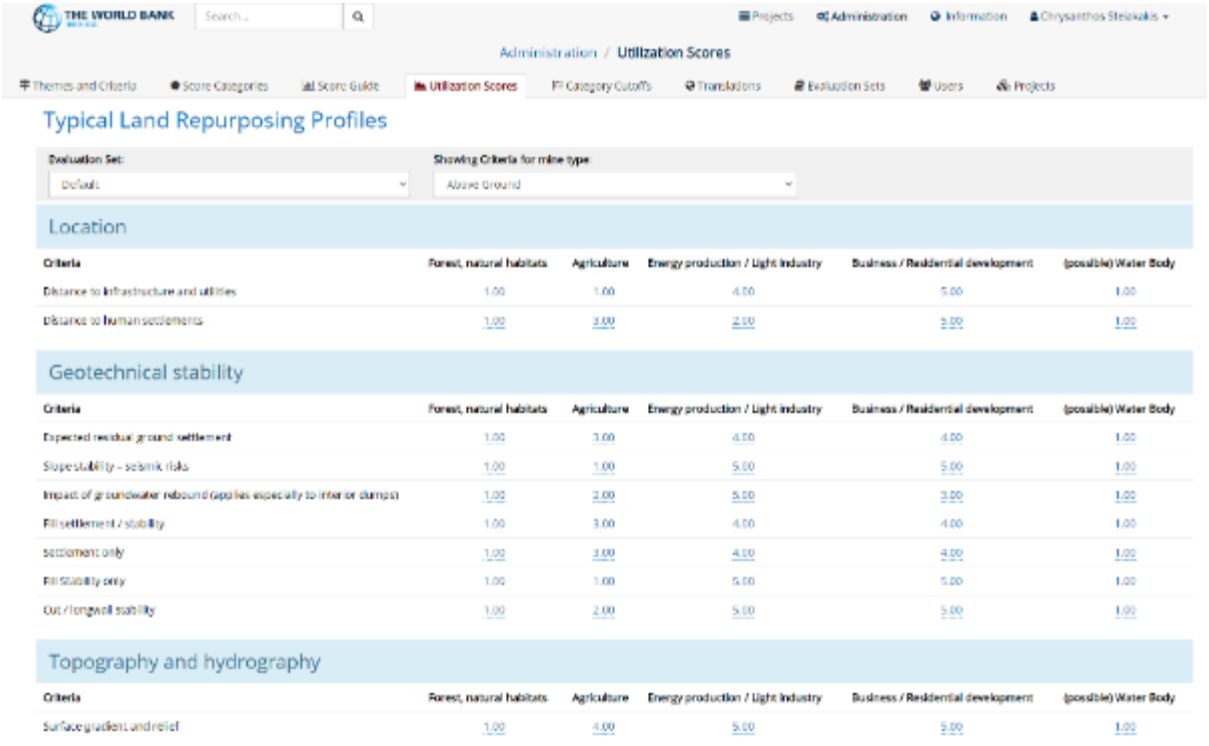


Figure 74: Editing the weighting factors for each criterion

The scores defined in this form (Figure 74) will be used for the calculation of the Land Usage Categories scoring based on the input provided by the users in each rating category. Users updating the utilization scores must be very thorough as this table enables the application to derive the proper utilization category of an area based on the rating value inputs. If, for example, any criteria have been assigned with inapplicable values (e.g., all 1s or all 5s) the results of ratings will be confusing and meaningless.

Category Cutoffs

In this section the user can specify the Cutoff values for each category, for the selected evaluation set.

Figure 75: Category Cutoff Values per Theme

These values set the cutoff point at which the area is no longer deemed as applicable for each category. If for example the user sets the value “2.00” to “Environmental Risks” for “Energy Production / Light Industry”, any areas that score less than 2.00 in the environmental risks criteria, the area will be marked as non-viable for “energy production.”

Any cases where the cutoff value is “0” means that no cutoff value applies for the combination of theme / category.

It is important to note that the cutoff values for an evaluation set significantly affect the outcome of the Evaluation Algorithm and should be configured with extreme caution.

Translations

LURA provides functionality to translate most of the texts shown in descriptions and titles of the various entities (Figure 76).

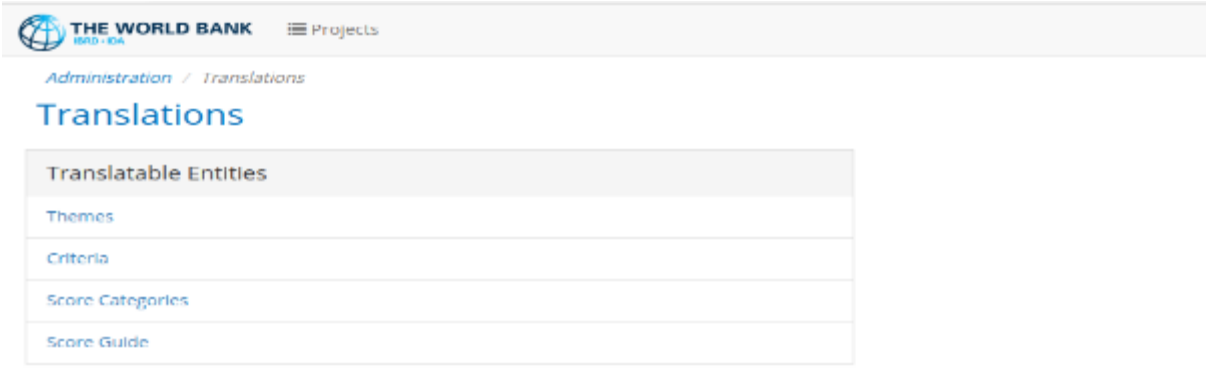


Figure 76: Text translation

Users with administrative privileges can update the available translations for each of the supported entities. The user is presented with the English texts in read-only form and the translations provided in an editable section (Figure 77).

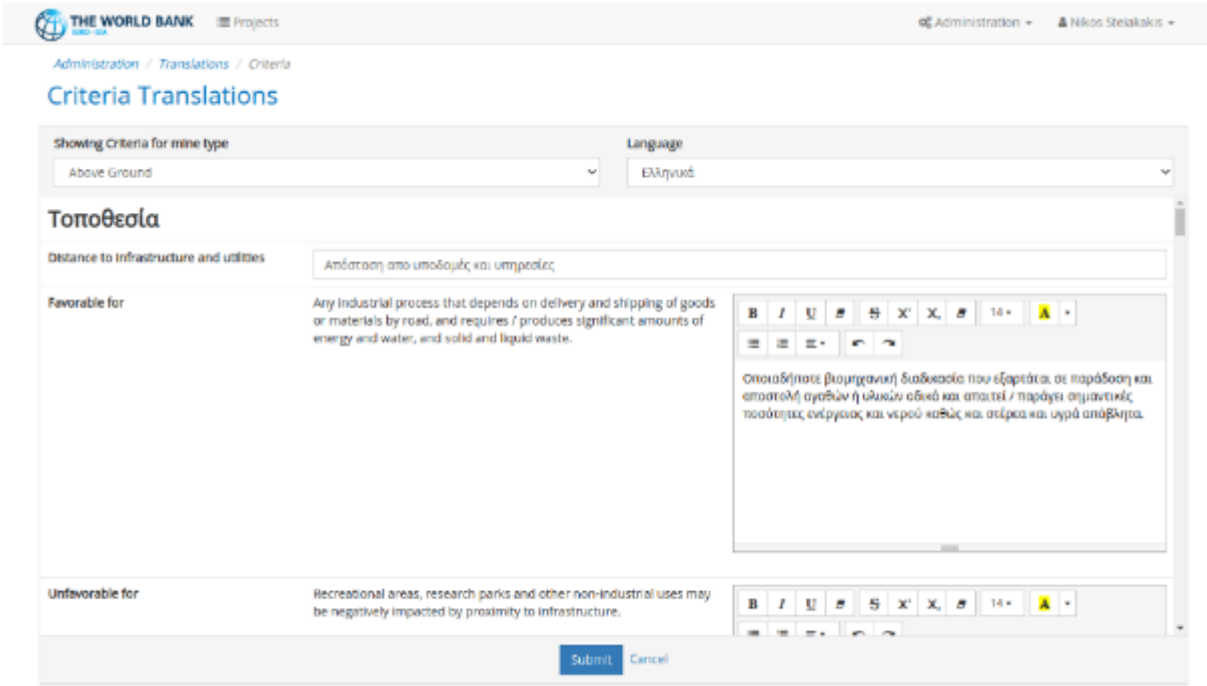
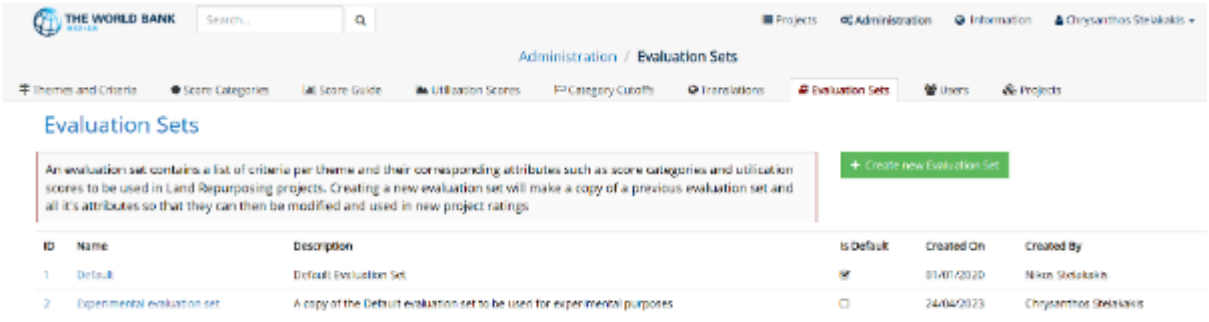


Figure 77: Translation form for each entity

Evaluation Sets

An evaluation set contains a list of criteria per theme and their corresponding attributes such as score categories and utilization scores to be used in Land Repurposing projects. Creating a new evaluation set will make a copy of a previous evaluation set and all its attributes so that they can then be modified and used in new project ratings.



Once a new evaluation set administrators can alter any of the criteria values, utilization scores, usage category attributes, etc. and start using the new evaluation set in Lang Ratings. However, once a project has started, the evaluation set cannot be changed. New evaluation set can only be used in new projects and are not interchangeable.

See section Appendix 1: Evaluation Sets for more information.

Users

If the "**Users**" option is selected from the "**Administration**" menu, the user (administrator) is allowed to register new users that can log in and use this application (Figure 78) or edit the account information of existing users.

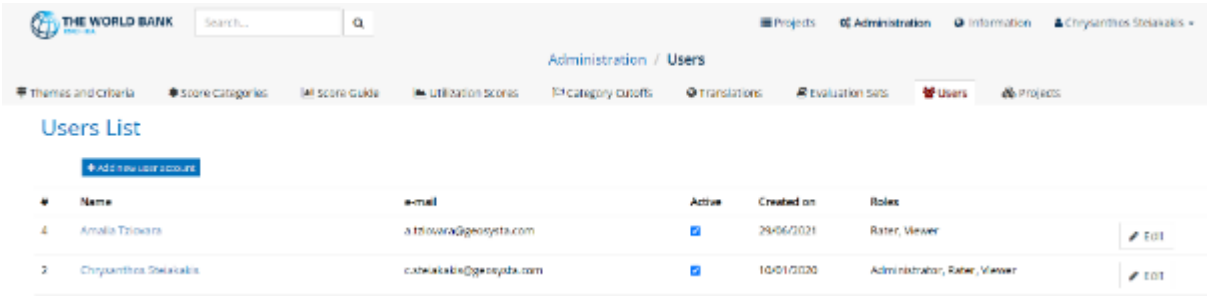


Figure 78: Editing the list of users

A user can be edited by clicking on the edit button on the right side (Figure 78). The user account information can be edited through the form shown in Figure 79.

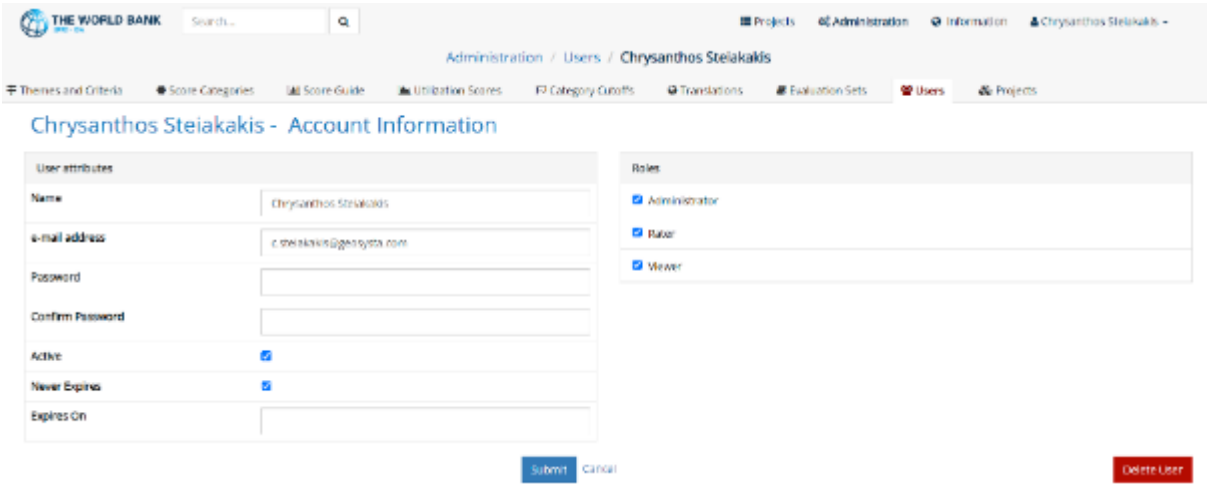


Figure 79: User account information

The name, email, password and the corresponding user authorization, i.e., "Administrator", "Rater" or "Viewer", can be modified (Figure 79). If an "Administrator" role is assigned to a user, that user has full access to the application, while a "Viewer" role allows just viewing of the map and the final rating.

Projects

When visiting the administration page for “Projects” all projects that have been created in LURA are displayed.

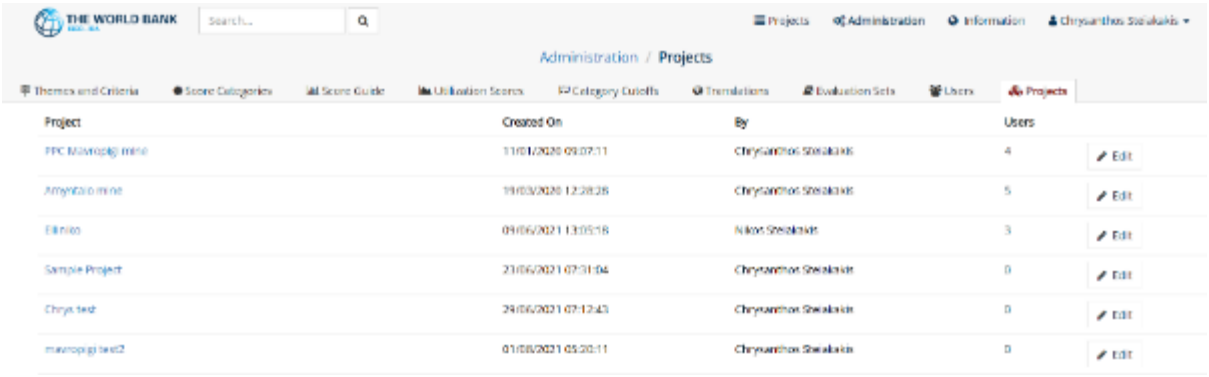


Figure 80: All Projects List

By clicking on the name of any project, the project administration page is shown.

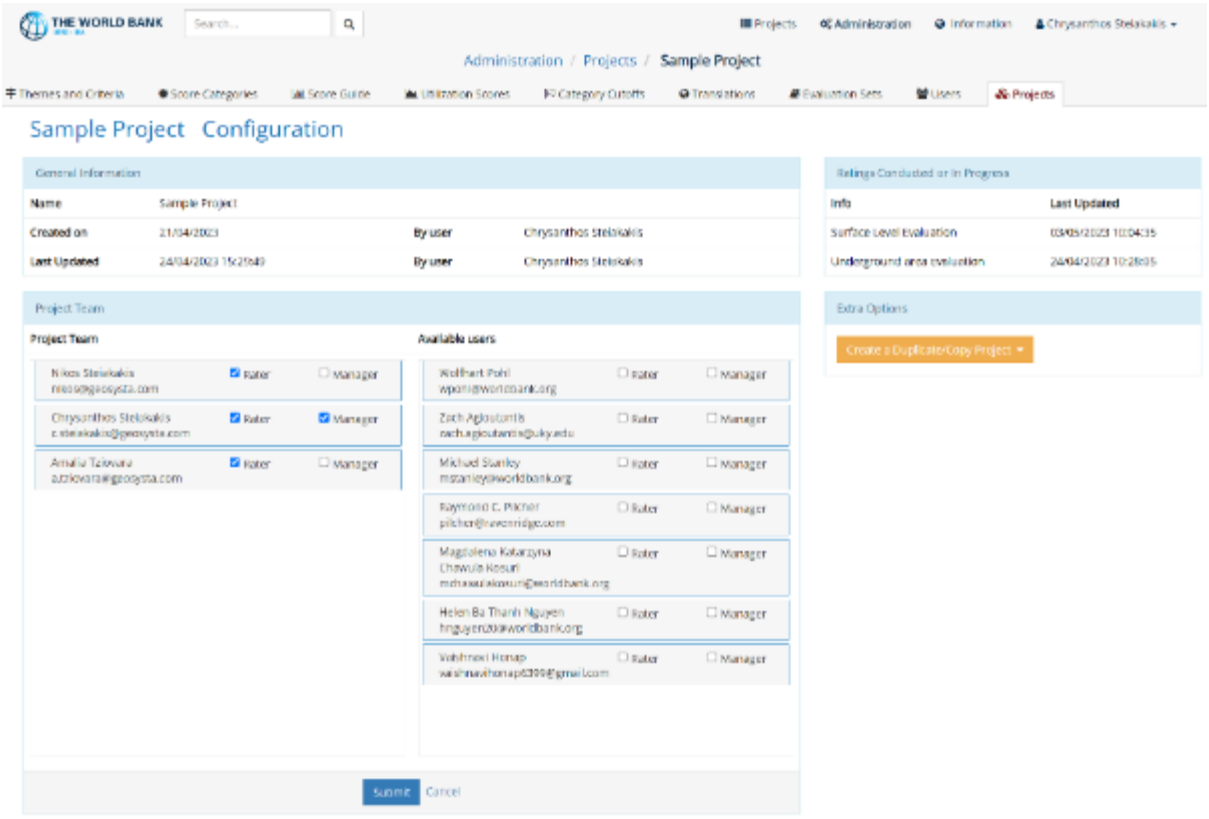


Figure 81: Project administration page

In this page the Administrator can change/update the project team and/or their corresponding privileges.

In the project team section of this page there are two lists. The list of project associated users (Project Team) and all the available users in LURA that have not been associated with the specific project. To

add a user to the team, the administrator must “drag” the user box from the available users list to the project team list. Then, the administrator can assign the required privileges to each user on the team. The available privileges are:

- Simple Viewer – If nor “Rater” or “Manager” are selected, then the user will have “read-only” access to the project and ratings. They will not be able to change anything nor conduct any ratings of their own.
- Rater – If the “Rater” checkbox is selected then the user will be able to work on existing ratings, start new ratings, add/edit documentation and depictions etc.
- Manager – If the “Manager” checkbox is selected, then the user will have some extra functionalities available such as the ability to “delete” ratings, complete projects, project documents and depictions.

Through this page the user also can create a duplicate copy of the project. If the user selects to create a copy, a new instance of the project will be created with all the ratings and scores that have been assigned to the original project. However, once a project copy has been created it is a completely distinct instance so changes on one project will not affect the other.

User Preferences

Users can change their password by selecting the "**Preferences**" option from the drop-down menu when clicking on their username at the top right-hand corner of the screen (Figure 82).

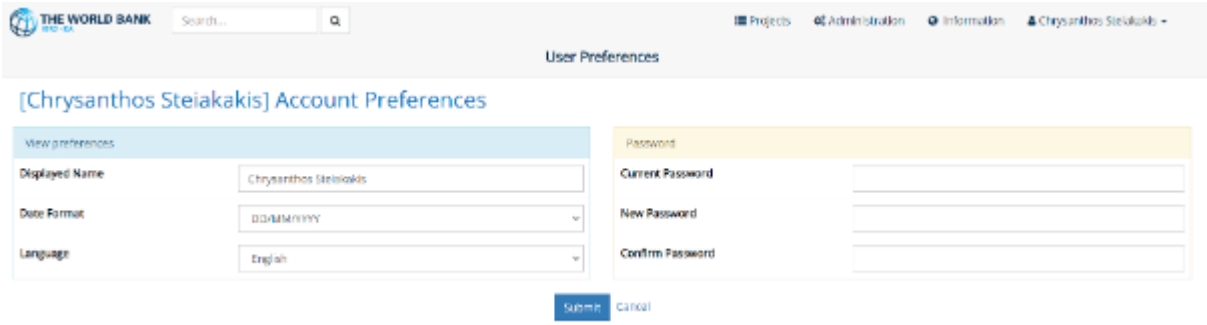


Figure 82: User preferences

On this page users can change their password if they want to. Furthermore, they can change the name being displayed for them, the date format to be used on date displays in the application (dd/mm/yyyy or mm/dd/yyyy) as well as the language of choice for displaying descriptions and other text.

Users can choose only from the list of supported languages. English is assigned as the default language.

Information

By clicking on the “Information” option on the main menu on the top right of the page, the user is navigated to the generic information section of the application.

Figure 83: General Information

This section contains information “About LURA”, some brief information regarding LURA use and a link to the LURA Usage Guide, Information on the World Bank Group’s methodologies on Managing Coal Mine Closure as well as Additional info on Land repurposing.

Appendix 1: Evaluation Sets

An evaluation set is the complete set of all the themes and criteria used in evaluations, the list of resulting land usage categories, the utilization score combinations, unusable categories list and Category Cutoff values. Furthermore, the evaluation set contains all the descriptions and translations of the score guides for the various themes and criteria used. In the earlier versions of LURA there was a single evaluation set which was used in all new projects. Each evaluation set is also associated with a specific unit system, i.e. Metric (S.I.) or US / Imperial. So, if a project is to be conducted in a country that officially uses the Metric system, an evaluation set with the specific unit system should be selected. This will display the various sizes using the corresponding units, eg. Meters/kilometers or feet/miles etc.

However, throughout the use of LURA in various countries and environments it became evident that for some criteria, the actual numbers and scores were quite diverse depending on the country and area that the evaluation was taking place. For example, in some more densely populated areas the distance to infrastructure and utilities can have very different scales as compared to larger more urban countries. Even though the logic behind them was the same, the actual distances displayed in the score guides were quite different.

To allow for more flexibility on evaluations when using LURA, the concept of "Evaluation sets" was introduced. So, instead of having just one evaluation set that is exactly the same for any evaluation taking place, indifferent to the actual country and it's particularities, application administrators can now introduce new evaluation sets in the system to be used.

Only Administrators can create new evaluation sets. The administrator can select an existing Evaluation set (e.g., the Default one) and create a copy of it and assign a different descriptive name. Creating a new evaluation set will make a copy of a previous evaluation set and all its attributes so that they can then be modified and used in new project ratings.

Once a new evaluation set is created, the Administrator can modify anything regarding the criteria, texts and descriptions, available categories, and utilization scores for conducting ratings based on that evaluation set. Even translations can be changed for the new evaluation set to properly apply with the requirements that it will need to address. Once the new evaluation set is properly configured it can be used for evaluations and ratings exactly like the default evaluation set was used in the earlier versions. Once the Project ratings start, however, the evaluation set cannot be changed.