



The BIMS Handbook



The Biodiversity Information Management System.
Kartoza Pty (Ltd.) and the Freshwater Research Centre
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1 Biodiversity Information Management System

Welcome to the Biodiversity Information Management System (BIMS) home page!

BIMS is a platform for managing and visualising biodiversity data.

All of the source code for the platform is open source, and it uses popular open source tooling such as Postgres/PostGIS, GeoServer, Django, Python as building blocks for the platform.





1 Instances

1.1 FBIS





1.2 RBIS





1.3 ORBIS





1 User Documentation

You can find the user manual for the freshwaterbiodiversity.org instance of BIMS [here](#).





1 Administrator Documentation

1.1 Biodiversity Data

1.1.1 Administration of biodiversity data

This section provides a guide for biodiversity data administrators to mobilize and ingest biodiversity data. The steps outlined are sequential and each provides details on the process and key considerations.

 **Note:**

Only registered users with super user status, typically the site administrators, are able to view the administration sections and undertake the following steps related to the mobilization and ingestion of biodiversity data.

The sections covered include:

- [Preparing and checking a Master List of Taxa before uploading](#)
- [Preparing and checking an Occurrence Data File before uploading](#)
- [Uploading a new Taxon Group \(Module\) and adding a Master List of Taxa for the Taxon Group](#)
- [Uploading Occurrence Data](#)
- [Harvesting GBIF Data](#)
- [Managing taxa in Taxon Management](#)





1.1.2 Preparing and checking a Master List of Taxa before uploading

A taxonomic Master List is a list of all species and /or taxa within a particular group such as birds, fish, invertebrates, wetland plants, algae, etc. This section highlights issues and specific checks to improve accuracy of the Master List. The format of the Master List is important to ensure consistency for ingestion of data into the information system. The columns included in the Master Lists are detailed in the Data Management Guidelines.

Note:

Only registered users with super user status are able to do this, typically the administrators .

Creating a Master List

A taxonomic Master List is a list of all species and /or taxa within a particular group such as birds, fish, invertebrates, wetland plants, algae, etc. For some groups a species list is easy to produce as species level is commonly identified in studies (e.g. birds, fish). For other groups, the taxonomic level (family, genus, species etc) varies considerably from study to study, and thus it is recommended that the lowest taxonomic level is used and that Taxon is used in preference to Species (e.g. invertebrates, algae).

The purpose of the Master List is threefold:

1. To provide a comprehensive and up to date list of species/taxa for a specific group in a specific region. This needs to be done during the initial development of an information system such as FBIS or FBIS, but once the system is up and running, then the further updating of the Taxonomic backbone is done using GBIF and user-defined taxonomic uploads.
2. To facilitate downloading of data from the Global Biodiversity Information Facility's (GBIF), thereby ensuring that the correct taxa are included on the information system.
3. To provide the taxonomic hierarchy for taxa not yet on GBIF.

The generation of a Master List requires consultation with available resources, relevant publications and experts. A Master List is intended to be an updatable resource, improved and added to as new data and studies are published, or new taxa are described. If no species lists are available for a country then the GBIF Taxonomic Master List may be generated by extracting data from GBIF. This Master List should then ideally be checked and validated for accuracy by the FBIS team.





The format of the Master List is important to ensure consistency for ingestion of data into the information system. The following columns are included in the Master Lists, provided as excel file template that will be used for each FBIS group (FBIS Master List of Taxa Template.xlsx). It is recommended that all columns be populated, with black compulsory and blue optional (explanations given in parenthesis):

- On GBIF (Yes or No if the taxon is on GBIF)
- GBIF URL (link to GBIF taxon)
- Country records (Yes, No, unknown – records in the country of interest)
- Comments (Details such as other countries if unknown or No above)
- Source (Details of the publication source for this taxon)
- Taxon Rank
- Kingdom
- Phylum
- Class
- SubClass
- Order
- Family
- SubFamily
- Genus
- Species
- SubSpecies
- Taxon
- Scientific name and authority
- Origin (Native, Non-native, Unknown)
- Endemism (Endemism categories):
 - Micro-endemic level 2 (Endemic to a single river or wetland)
 - Micro-endemic level 1 (Endemic to less than 5 rivers or wetlands)
 - Regional endemic level 2 (Endemic to a single primary catchment)
 - Regional endemic level 1 (Endemic to a single Freshwater Ecoregion (e.g. CFE), more than one primary catchment)
 - National endemic (Endemic to South Africa, occurs in more than one Freshwater Ecoregion within SA)
 - Subregional endemic (Endemic to southern Africa)
 - Widespread (Occurs beyond southern Africa)
 - Unknown (Endemism is unknown)
- Conservation status (Global) - The IUCN Red List of Threatened Species website (IUCN Red List, 2020)) classifies species into six main categories based on their extinction risk.
 - Extinct
 - Critically Endangered
 - Endangered
 - Vulnerable
 - Near Threatened
 - Least Concern
 - Data Deficient
 - Not Evaluated
 - Common name
 - Former scientific names

A separate Master List of Species / Taxa needs to be created for each group for which biodiversity data are served on FBIS. The Master List is ideally created before the consolidation of data so that the correct GBIF Taxonomic Backbone (<https://www.gbif.org/dataset/d7dddbf4-2cf0-4f39-9b2a-bb099caae36c>) is used for the data consolidation files. The taxonomy from GBIF should be used when the taxon is on GBIF. The FBIS team can check if the taxon is on GBIF using the following link: <https://www.gbif.org/species/1> and insert the relevant species, genus, family etc. in the “Select a species” box.





Taxa that are not on GBIF may be included in a Master List but the Source (Details of the publication source for this taxon) needs to be provided. Unfortunately several taxa may be missing from GBIF which, while it is the best available, is not always 100% correct.

There is also another platform that is useful, the Freshwater Animal Diversity Assessment (FADA) Project (<http://fada.biodiversity.be/>). FADA is the taxonomic backbone for its Freshwater Biodiversity Data Portal. One is able to consult and download FADA data, although it is not always up to date.

It is important that the correct Taxon Rank should always be used to ensure correct ingestion of the data files into FBIS.

Note: It is recommended that significant time and resources are used to generate and refine the master list for each group (birds, fish, invertebrates etc) as much as possible before proceeding with data collation. This is the list around which all of the occurrence data will pivot: the more accurate it is at the start, the more time you save in the long run when collating the biodiversity data for those taxa.

1.1.3 Checking a Master List for accuracy

To ensure the Master list is accurate, several steps should be taken before uploading taxonomic data. After consolidating the master list, you should check the following:

Apply filters for checking the data by highlighting the header row, clicking Data, Filter. All columns should be checked for consistencies and typos. Systematically work from column A to W. In particular, check consistency of the Taxon Rank and taxonomic hierarchy (Kingdom, Phylum, Class, Order, Family, Genus, Species, SubSpecies, Taxon).

It is important to check the GBIF taxonomy for accepted names and synonyms. For example, in the avian master list, *Ardea alba* - is the accepted name, whereas *Casmerodus albus* is the synonym. Preferably only accepted names should be included in the Master List of Taxa.

Species	Accepted name <i>Ardea alba Linnaeus, 1758</i>
	Synonym \equiv <i>Casmerodus albus</i> (Linnaeus, 1758)

Taxa should be checked for duplicates by highlighting the Taxon column, and from the Home Menu, selecting Conditional Formatting, Highlight Cells Rules, Duplicate Values.



A screenshot of Microsoft Excel 2016. The ribbon at the top has tabs for Home, Insert, Page Layout, Formulas, Data, Review, Developer, Help, and Search. The 'Developer' tab is selected. The main area shows a table with columns A through H. Cell A1 contains the formula '=IF(OR(\$B\$1=\$B1,\$C\$1=\$C1,\$D\$1=\$D1,\$E\$1=\$E1,\$F\$1=\$F1,\$G\$1=\$G1,\$H\$1=\$H1), "Yes", "No")'. The status bar at the bottom right shows 'Editing' and 'Cell A17'. The taskbar at the bottom includes icons for File, Home, Insert, Page Layout, Formulas, Data, Review, Developer, Help, and Search.

Note: All taxa can be updated after ingestion through the Taxon Management section.

Delete blank rows and columns. Lastly, ensure that there are no extra blank rows or columns, by deleting them.

Adding additional attributes for a specific taxon group.

It may be desirable to add attributes for specific taxon groups such as "Water dependence" (Highly dependent, Moderately dependent, Minimally dependent, Terrestrial). These additional attributes are assigned to each taxon during the uploading of the master lists as long as the additional attribute is added in Taxon Management before uploading.

This is done in the Edit Module form, Add attribute. The attribute needs to match the attribute column header in your Master List for uploading.

Edit Module ×

Label:

Logo:  Browse... No file selected. Add Attribute + Water dependence -

Close Save



1.1.4 Preparing and checking an Occurrence Data File before uploading

To ensure that data are accurate, several steps should be taken before uploading occurrence data. After consolidating the occurrence data in the data file, you should check the following.

Apply filters for checking the data by highlighting the **header row**, clicking **Data, Filter**

A1	B1	C1	D1	E1	F1	G1	H1	I1	J1	K1
1	UUID	Original Wetland Name - Original Site Co.	RIBS Site Co.	Site Description	Refined Geomorphological Zone	Latitude	Longitude	Sampling Date	Habitat	Phyto.
2	2e0d2a52-4f42-4173-8000-000000000000		Nepal			-1.44569	29.4946	2021/1/1/1		
3	9ebf2bc4-5384-4bf3-8705-5050b1a51af1		Nepal			-1.44575	29.4946	2021/1/1/1		
4	0dd54ff1-42f1-4bf3-8705-5050b1a51af1		Nepal			-1.44581	29.4946	2021/1/1/1		
5	3a0a5aef-5384-4bf3-8705-5050b1a51af1		Nepal			-1.44579	29.4946	2021/1/1/1		
6	d4d4ff9f-975a-4bf3-8705-5050b1a51af1		Nepal			-1.44585	29.4946	2021/1/1/1		
7	4a545aef-5384-4bf3-8705-5050b1a51af1		Nepal			-1.44589	29.4946	2021/1/1/1		
8	54332aef-61a2-4bf3-8706-5050b1a51af1		Nepal			-1.44594	29.4946	2021/1/1/1		
9	3bea5999-6131-4bf3-8706-5050b1a51af1		Nepal			-1.44598	29.4946	2021/1/1/1		
10	3bea5999-6131-4bf3-8706-5050b1a51af1		Nepal			-1.44603	29.4946	2021/1/1/1		
11	9e0fbfce-000b-4bf3-8706-5050b1a51af1		Makalu			-1.44102	29.5457	2021/1/1/1		
12	3bea5999-6131-4bf3-8706-5050b1a51af1		Makalu			-1.44098	29.5457	2021/1/1/1		
13	13495017-5a51-4bf3-8706-5050b1a51af1		Makalu			-1.40359	29.5457	2021/1/1/1		
14	3bea5999-6131-4bf3-8706-5050b1a51af1		Makalu			-1.40358	29.5457	2021/1/1/1		
15	3bea5999-6131-4bf3-8706-5050b1a51af1		Makalu			-1.40357	29.5457	2021/1/1/1		
16	28164519-5a51-4bf3-8706-5050b1a51af1		Makalu			-1.40347	29.5457	2021/1/1/1		
17	3bea5999-6131-4bf3-8706-5050b1a51af1		Makalu			-1.40346	29.5457	2021/1/1/1		
18	5ad93848-61a2-4bf3-8706-5050b1a51af1		Makalu			-1.40345	29.5457	2021/1/1/1		
19	97a5aef-61a2-4bf3-8706-5050b1a51af1		Kalirai			-1.40340	29.5457	2021/1/1/1		
20	3bea5999-6131-4bf3-8706-5050b1a51af1		Kalirai			-1.40361	29.5457	2021/1/1/1		
21	1f9e3131-4bf3-8706-5050b1a51af1		Kalirai			-1.39681	29.5453	2021/1/1/1		
22	3bea5999-6131-4bf3-8706-5050b1a51af1		Kalirai			-1.39680	29.5453	2021/1/1/1		
23	43d4505b-5a51-4bf3-8706-5050b1a51af1		Rajgir			-1.39552	29.4839	2021/1/1/0		
24	43d4505b-5a51-4bf3-8706-5050b1a51af1		Rajgir			-1.39413	29.4839	2021/1/1/0		
25	3bea5999-6131-4bf3-8706-5050b1a51af1		Rajgir			-1.39403	29.4839	2021/1/1/0		
26	3bea5999-6131-4bf3-8706-5050b1a51af1		Rajgir			-1.39424	29.4839	2021/1/1/0		
27	3bea5999-6131-4bf3-8706-5050b1a51af1		Saral			-1.40362	29.4839	2021/1/1/0		
28	3bea5999-6131-4bf3-8706-5050b1a51af1		Saral			-1.40353	29.4839	2021/1/1/0		

UUID. This is a unique code for each occurrence record. It needs to be copied and pasted so that the formula used to generate it is saved as a number.

See this video clip for guidance. <https://docs.rbis.kartoza.com/batch-importing-taxon-occurrence-data-bims/dealing-unique-identifiers/>

The UUID formula is available here:

 Code:

```
=LOWER(CONCATENATE(DEC2HEX(RANDBETWEEN(0,POWER(16,8)),8),"-",  
,DEC2HEX(RANDBETWEEN(0,POWER(16,4)),4),"-", "4",DEC2HEX(RANDBETWEEN(0,POWER(16,3)),3),  
"-",DEC2HEX(RANDBETWEEN(8,11)),DEC2HEX(RANDBETWEEN(0,POWER(16,3)),3),  
"-",DEC2HEX(RANDBETWEEN(0,POWER(16,8)),8),DEC2HEX(RANDBETWEEN(0,POWER(16,4)),4)))
```

Systematically check each column using the dropdown arrows, and look for inconsistencies. Some common issues include, #num in UUID column instead of the UUID, incorrect spelling in the Site description column (e.g. Gakiriro wetland, Gakirirowetland), latitude with missing “-” (e.g. 2.60059 as latitude is incorrect – should be -2.60059), longitude.

Also check that all sites fall withing the country boundary so that Site Codes may be generated correctly and geocontext data harvested for each site.





The screenshot shows two Microsoft Excel spreadsheets side-by-side. The left spreadsheet contains a list of taxa with their descriptions and collection details. The right spreadsheet contains a list of refined geomorphological zones with their coordinates and sampling dates. A dropdown menu is open over the left spreadsheet, showing options like 'Sort by Color' and 'Text Filters'.

Check that all taxa are correct and are present in the Master List. If the drop-down of master taxa list was used then this should not be an issue. Check that the Taxon rank is correct.

The screenshot shows a detailed view of the 'Original Site Cox - RBS Site Cox' table in Microsoft Excel. A dropdown menu is open over the 'Taxon' column, listing various taxonomic ranks from 'Species' to 'Kingdom'. The menu also includes options like 'Sort by Color' and 'Text Filters'.

Check presence is all "1", check sampling method is correct.



Check Collector/Owner and Collector/Owner Institute. Ideally CAPITALS should not be used, First name Surname if known. Do not use middle initial and punctuation.

Preparing and checking an Occurrence Data File before uploading png 7

Check the metadata (Author(s), Year, Source, Title, Reference category, URL, DOI, Document Upload Link). For each study reference type, you need to populate the following columns:

- Peer-reviewed scientific article (Collector/Owner; Collector/Owner Institute; Author(s); Year; Source; Title; DOI or URL (if DOI is not available). For Peer-reviewed scientific article the Source is the Journal, For Peer-reviewed scientific article the Title is the title of the article.
- Published report (Collector/Owner; Collector/Owner Institute; Author(s); Year; Source; Title; URL or Document Upload Link). Note the Document Upload Link is obtained after the report is added.
- Thesis (Collector/Owner; Collector/Owner Institute; Author(s); Year; Source; Title; URL or Document Upload Link)
- Database (Collector/Owner; Collector/Owner Institute; Author(s); Year; Source)
- Unpublished data (Collector/Owner; Collector/Owner Institute; Author(s); Year; Source)

Check format of Author(s). It needs to be: Surname + Initials, no punctuation. (e.g. Tumushimire L, Mindje M, Sinsch U & Dehling JM not Lambert Tumushimire, Mapendo MINDJE, Prof. Ulrich Sinsch & Julian Maximilian Dehling). It is important to get the authors correct (e.g. Sinsch Ulrich and Dehling, J. Maximilian, Lümkemann Katrin, Rosar Katharina, Christiane Schwarz should be Sinsch U, Lümkemann K, Rosar K, Schwarz C & Dehling M as per the doi).

Check the Date: This is the publication date (so 2012-2013 should be 2019 as this is when the article was published - Ecology and Evolution. 2019. Same with all other data from this study).



Check the Source. Please note when to include source or not, and what to include. (e.g. Mindje, M., Tumushimire, L., & Sinsch, U. (2020). Diversity assessment of anurans in the Mugesera wetland (eastern Rwanda): impact of habitat disturbance and partial recovery. *Salamandra*, 56, 27-38. Should be *Salamandra*)

- For Peer-reviewed scientific articles - the Source is the Journal.
 - For Published Reports and Theses - the Source is the publisher of the Report.
 - For Unpublished Data - the source is the title of the study.

File Home Insert Page Layout Formulas DATA Review View Developer Help Acrobat Search  Advanced                                         <img alt="Print Preview Area icon" data-bbox

Check the Title. For Peer-reviewed scientific article the Title is the title of the article, for Published reports or theses, it is the title of the thesis. Unpublished data don't need a title.

Check all Reference Categories are correct: options include:

Database Peer-reviewed scientific article Published report Thesis Unpublished data

Preparing and checking an Occurrence Data File before uploading png 12

Check URL and DOI. Use a DOI if it is available, URL - only needed for Peer-reviewed scientific article if there is no DOI. For the DOI you only need to include the number part, so 10.1080/15627020.2012.11407524, not <https://doi.org/10.1080/15627020.2012.11407524>.



Check the document upload link is correct. Note the Document Upload Link is obtained after the report is added. Reports are only uploaded when there is no DOI or URL to link the data to. See section on Source References.

Checking for duplicate occurrence records. Use this formula for checking for duplicates. This is a combination of Site description, latitude, longitude, sampling date, Taxon, sampling method, author, year, source and title. Copy and paste the formula below into a new column at the end and name it "Duplicate check".

Code:

```
=CONCATENATE(E2,G2,H2,I2,Q2,T2,W2,X2,Y2,Z2)
```

Then copy and paste the formula down to the end of the data rows. Then Highlight the column, and from the Home menu, select Conditional Formatting, Highlight Cells Rules, Duplicate Values.

Any duplicates will be highlighted. Check and delete duplicate occurrence records. Then delete the Duplicate Check column.

Delete blank rows and columns. Lastly, ensure that there are no extra blank rows or columns, by deleting them.



The screenshot shows two instances of Microsoft Excel running side-by-side. The top window has its title bar set to 'RBS Amphibian Data 2020_10_09 Draft for RBS Value - Excel'. The bottom window also has a similar title bar. Both windows show a grid of data with various columns labeled (e.g., A, B, C, D, E, F, G, H, I). In both windows, a context menu is open over the first row of data, specifically over the range A1:I1. The 'Delete' option is clearly visible in the menu. The data in the cells appears to be numerical values.

Remove the data filter, save the file in excel, and save the file as csv file.

The screenshot shows the 'Save As' dialog box from Microsoft Excel. The left sidebar lists options like 'Recent', 'OneDrive', 'This PC', 'Add a Place', and 'Browse'. The main area shows a list of save formats, with 'CSV (UTF-8, Comma delimited) (*.csv)' currently selected. At the top right of the dialog box, there is a 'Save' button. The status bar at the bottom indicates the file path as 'C:\>A\Work>Freshwater Research Centre>Projects Current>JRS Rwanda Collaboration>Data Management>Amphibian data'.











1.1.5



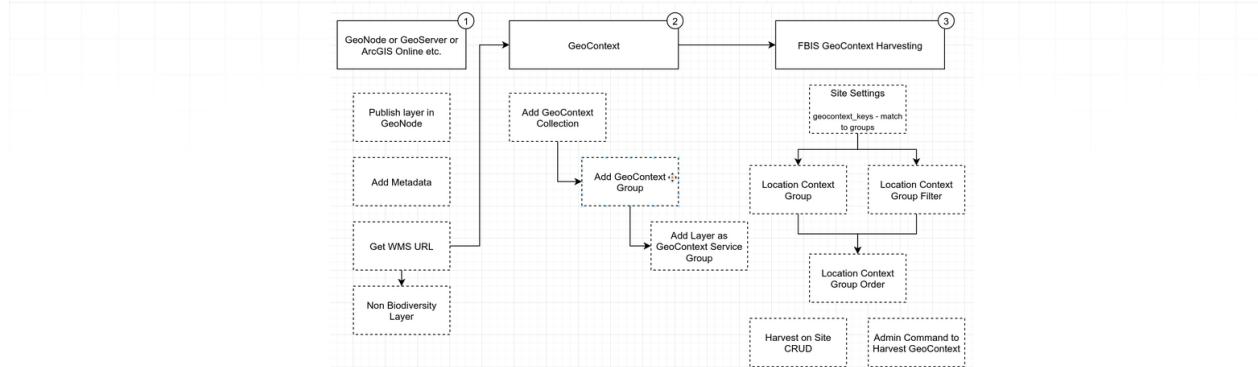


1.2 GIS Data

1.2.1 Overview of GeoContext Management

In this guide we will explain the high level concepts of the GeoContext subsystem which is used to derive location related data for each occurrence record added to RBIS.

GeoContext is an independent service, available at <https://geocontext.kartoza.com/>. The purpose of GeoContext is to harvest data for point locations from a range of online databases. GeoContext allows you to register WMS/WFS/WCS layers in groups which in turn can be registered in a collection. You can then pass it a point locality and it will query every layer in the collection, returning a set of values, one for each layer under the point location.



As you can see from the above diagram, the workflow consist of three parts:

- 1) Publishing layers under e.g. WMS
- 2) Registering layers, groups and collections in the GeoContext service
- 3) Registering the GeoContext service(s) with BIMS

This tutorial will lead you through all of these steps. We expect that you are already familiar with platforms such as GeoNode, GeoServer and concepts such as OGC services. We also expect that you are familiar with and understand the basic operations and management of BIMS.

The following YouTube video walks through the steps described in this section of the documentation in detail with examples. If you are viewing this as a PDF or on the web, you can click on the image below to open the YouTube video.

Working with GeoContext layers in FBIS



OPEN SOURCE GEOSPATIAL SOLUTIONS

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1.2.2 Publishing GeoContext and Visualisation Layers

This subsection describes how to publish layers as WMS (Web Mapping Services) for use by GeoContext or as Visualisation layers. BIMS deploys with an instance of GeoNode that can be used for publishing these layers, but you can use any standards compliant web mapping server for this purpose.

GeoNode or GeoServer or
ArcGIS Online etc.

1

First let us define the terms 'GeoContext Layer' and 'Visualisation Layer':

1. **GeoContext** layers are layers that you publish online as an OGC web service with the explicit intention that these layers are harvested by the <https://geocontext.kartoza.com> GeoContext service.
2. **Visualisation** layers are used in the layer selector in BIMS and allow the user to add map overlays in the BIMS map view - for example to show soil types or catchment boundaries on the map.

In the next steps we will show you how to publish both of these types of layers.

Publishing a layer in GeoNode

This article gives a short explanation of how to publish a layer in GeoNode. This is one way to provide a layer in GeoContext yourself.

GeoNode or GeoServer or
ArcGIS Online etc.

1

Publish layer in
GeoNode

To publish a layer from GeoNode you can follow this guide : https://docs.geonode.org/en/master/usage/managing_layers/uploading_layers.html

Adding metadata to your published layer

The guide shows you how to add metadata to the layer you have published.





1

GeoNode or GeoServer or
ArcGIS Online etc.

Publish layer in
GeoNode

Add Metadata

To add metadata to the layer in GeoNode please follow this guide : https://docs.geonode.org/en/master/usage/managing_layers/layer_metadata.html.

Discovering the WMS URL for a published layer

In this guide we show you how to find out the WMS URL for a published layer so that the layer can be published in GeoContext or as a GeoContext layer.





1

GeoNode or GeoServer or
ArcGIS Online etc.

Publish layer in
GeoNode

Add Metadata

Get WMS URL

Discovering the WMS URL for a map service requires that you have a platform where you can browse the services. This could be done through a GIS client such as QGIS or on a web interface such as GeoNode or GeoServer. For this example we will show you the workflow in GeoNode.

First browse to the map layer in GeoNode that you want to publish in BIMS:

LULC_2018_

Info Attributes Share Ratings Comments Favorite

Title: LULC_2018_
License: Not Specified
Abstract: No abstract provided
Publication Date: Aug. 25, 2020, 1:46 p.m.
Type: Raster Data
Keywords: GeoTIFF, LULC_2018_, WCS
Regions: Global
Responsible: immaurice

Download Layer
Metadata Detail
Editing Tools
View Layer
Download Metadata

Legend
A raster style

Maps using this layer
This layer is not currently used in any maps.

Create a map using this layer
Click the button below to generate a new map based on this layer.

Create a Map

Styles
The following styles are associated with this

Next click on the metadata detail button to view the metadata for the layer.





Metadata Detail

On the metadata page you will see a long list of information about the layer. First make a note of the "Title" of the layer e.g.:

 **Note:**

LULC_2018_

Now scroll down until you find the section called "References" and then look for the heading "OGC WMS: geonode Service". Right click on the service link and choose "Copy link location" from your browser's context menu.

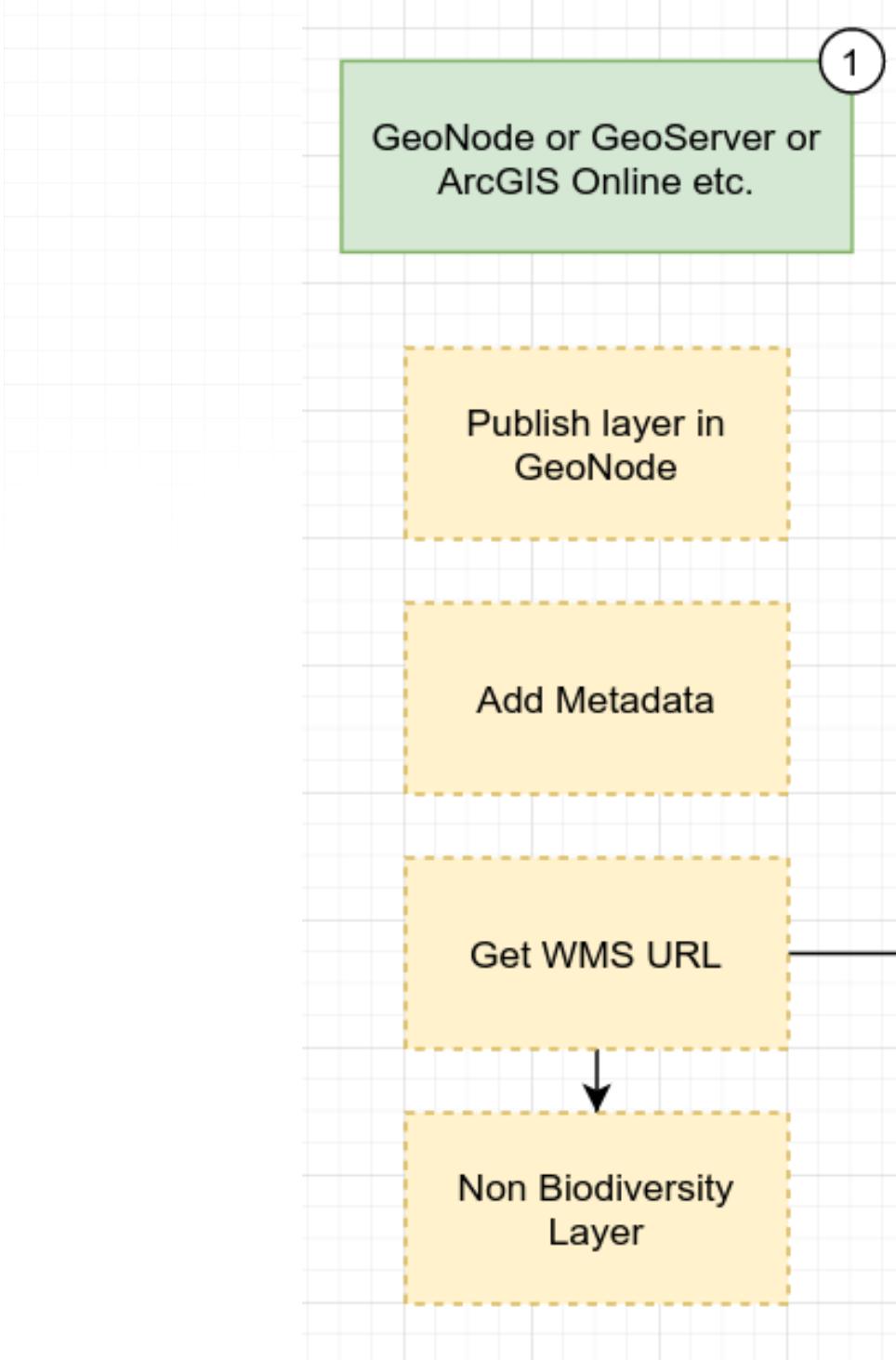
Save the service URL that is now in your clipboard e.g.:

<https://geonode.rbis.kartoza.com/geoserver/ows>

Adding a non-biodiversity layer to FBIS

In this guide we will show you how to publish a non-biodiversity layer in RBIS. Non-biodiversity layers can be displayed on top of the base map in RBIS to provide insights about the spatial situation of collection sites.





In order to add a layer to the RBIS, follow these steps :

- Go to admin page
- Click non biodiversity layer section
- Click Add non biodiversity layer button at the top right
- Fill out these required fields (see Discovering the WMS URL for a published layer):
 - Name - The name of the layer, will be displayed in the Layer Selector
 - WMS url - WMS url for this layer (if you're using GeoNode to host the layer you can try following link : {geonode_url}/geoserver/wms)
 - WMS layer name - Layer name from layer provider (e.g. geonode:layer_name)
 - WMS format - Format of the wms, default is in image/png
 - Get feature format - Output format of the GetFeature function, the default is in text/plain
- Click Save button at the bottom right
- To set the order in which the layers are displayed on the filter click these buttons :

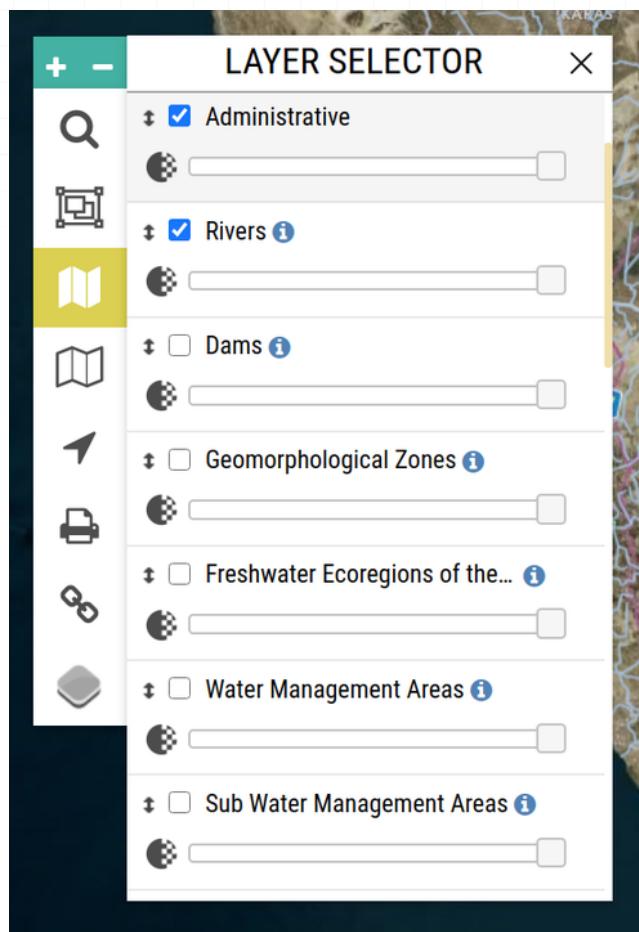




Non biodiversity layers

Order		Name	Wms url	Wms layer name	Move
1		Rivers	https://maps.kartoza.com/geoserver/wms	kartoza.sa_rivers	
2		Dams	https://maps.kartoza.com/geoserver/wms	kartoza.dams500g	
3		Geomorphological Zones	https://maps.kartoza.com/geoserver/kartoza/lems	kartoza.geomclass	
4		Freshwater Ecoregions of the World	https://maps.kartoza.com/geoserver/wms	kartoza.freshwater_ecoregions_of_the_world	Move up the layer Move down the layer
5		Administrative Provinces	https://maps.kartoza.com/geoserver/wms	kartoza.sa_provinces	
6		Water Management Areas	https://maps.kartoza.com/geoserver/wms	kartoza.water_management_areas	

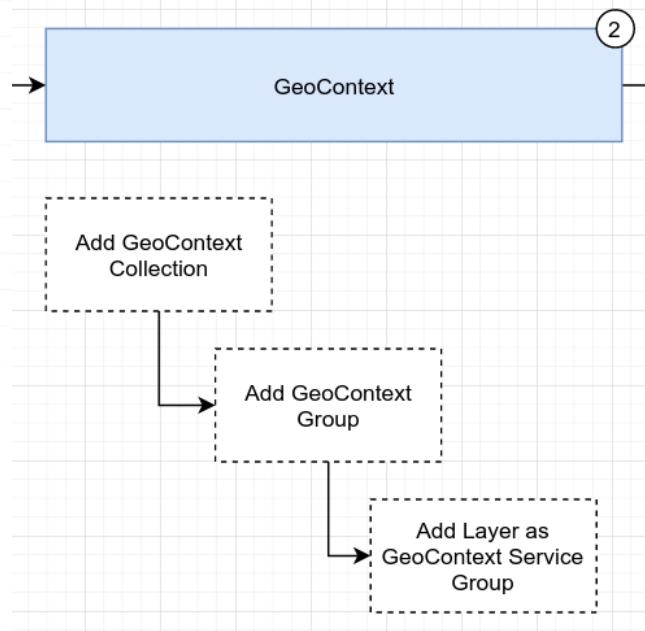
These layers will appear in the Layer Selector on the map page.





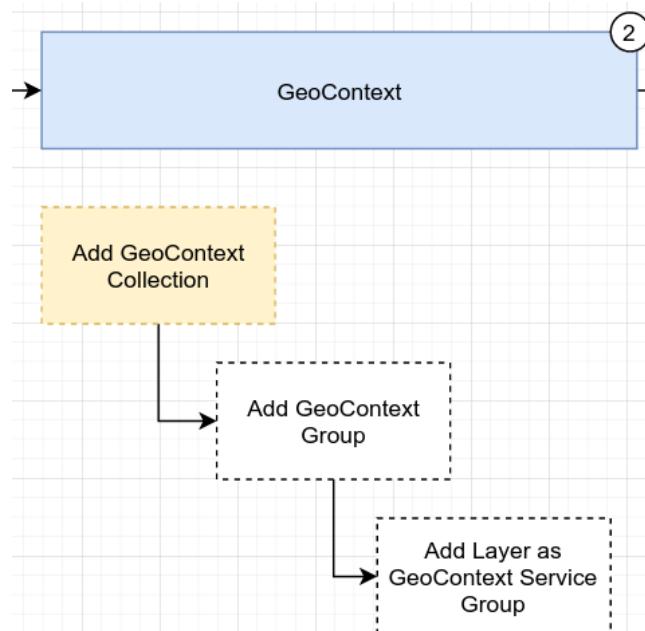
1.2.3 Working with GeoContext Data

In this article we explain the concept of the GeoContext platform and how layers are published to it in BIMS.



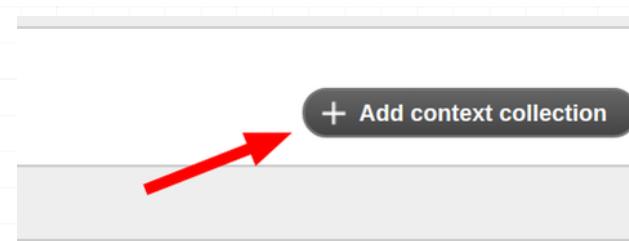
Creating a GeoContext Collection

A GeoContext collection is a set up web map services that can be queried in order to discover habitat or other relevant spatial data for a site.



From GeoContext collection [admin page](#) click **Add context collection button** to create a new collection





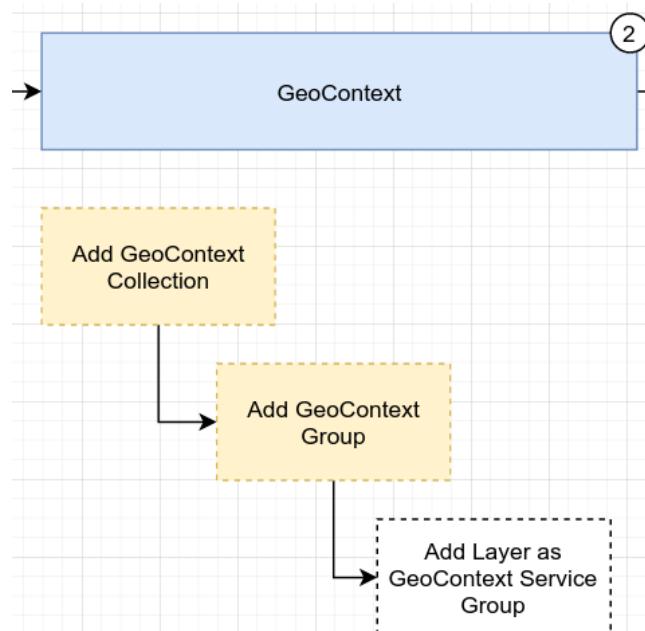
Fill out the required fields :

- Key - Key of the collection
- Name - Name of the collection

Click **Save** when you're done

Adding a GeoContext Group

A GeoContext group is a subset of layers from a GeoContext collection that form a logical group, usually based around a theme such as temperature, political regions etc.



Adding groups to existing collection

- From the [GeoContext Collection](#) admin page, open the collection that you want to add groups to.
- From the Context groups section click **Add another collection group** link
- Find existing group that you want to add to the group.
- If you want to create a new group, click + sign next to the dropdown. See **Adding new Group** to learn how to create a new group from scratch.

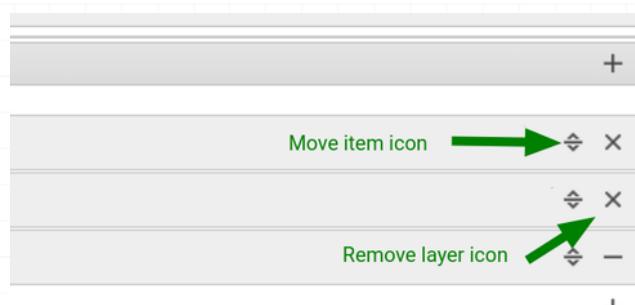
Collection groups		
Context group	Order	
Administrative Boundary	0	<input type="button" value="x"/>
Cadastre	1	<input type="button" value="x"/>
-----	0	<input type="button" value="x"/>
Add another collection groups Create a new group		

You can arrange the group order as follows:

- Update the order text manually
- Or move the group by dragging the move item icon that is located on the far right before the x sign

* In order to remove group from the group just click the x sign





Adding a new Group

You can create a new group from the context group page or directly from layer admin page.

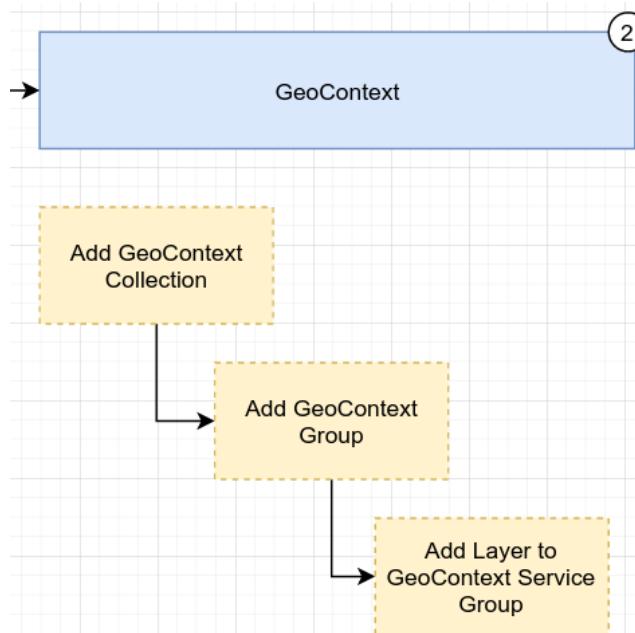
In order to create new group you need to fill out the required fields:

- **Key** - Key of the context group, this will be used in the bims to fetch the GeoContext data via API
- **Name** - Name of the group
- **Group Type** - Type of the group to determine the UI, choose Graph if this group depicting data over a time period. (e.g. monthly average temperature)

See other existing groups for guidance.

Adding a layer to a GeoContext group

In this section we describe how you add a layer to a GeoContext group. A layer is a Web Mapping Service intended to make spatial information available over the internet, covering a specific thematic topic e.g. average annual temperature in March



Adding Layers to an Existing GeoContext Group

- From the [GeoContext group](#) admin page, open the group that you want to add layers to.
- From the Context group services section click **Add another context group service** link
- Find existing layer that you want to add to the group.
- If you want to create a new layer, click + sign next to the dropdown. See **Adding new Layer** to learn how to create a new layer from scratch.





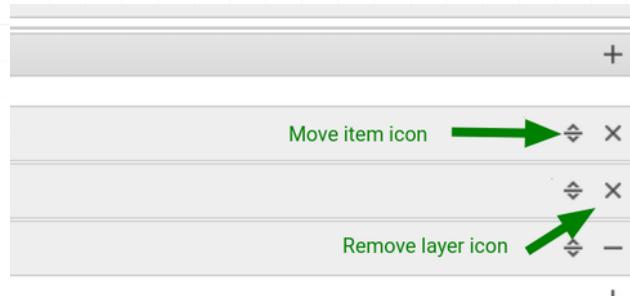
Context group services		Order
Context service registry	Rwanda Catchments Level 2	0
Context service registry	Rwanda Catchments Level 1	1
Context service registry	0

Add another context group services

You can arrange the layer order as follows:

- Update the order text manually
- Or move the layer by dragging the move item icon that is located on the far right before the x sign

In order to remove layer from the group just click the x sign



Click **Save** when you're done updating the group.

Adding a new Layer

You can create a new layer from the context group page or directly from layer admin page.

In order to create new layer you need to fill out the required fields:

- **Key**
- **Name**
- **Url** - Url of the layer service, e.g. if you use Geoserver then you can try following link :
`{geoserver_host}/geoserver/wfs`
- **Query Type** - Query type of the layer, usually we use WFS
- **Result Regex** - Regex to retrieve the desired value.
- **Layer typename** - Layer type name to get the context.
- **Service version** - Version of the service (e.g. WMS 1.1.0, WFS 2.0.0).

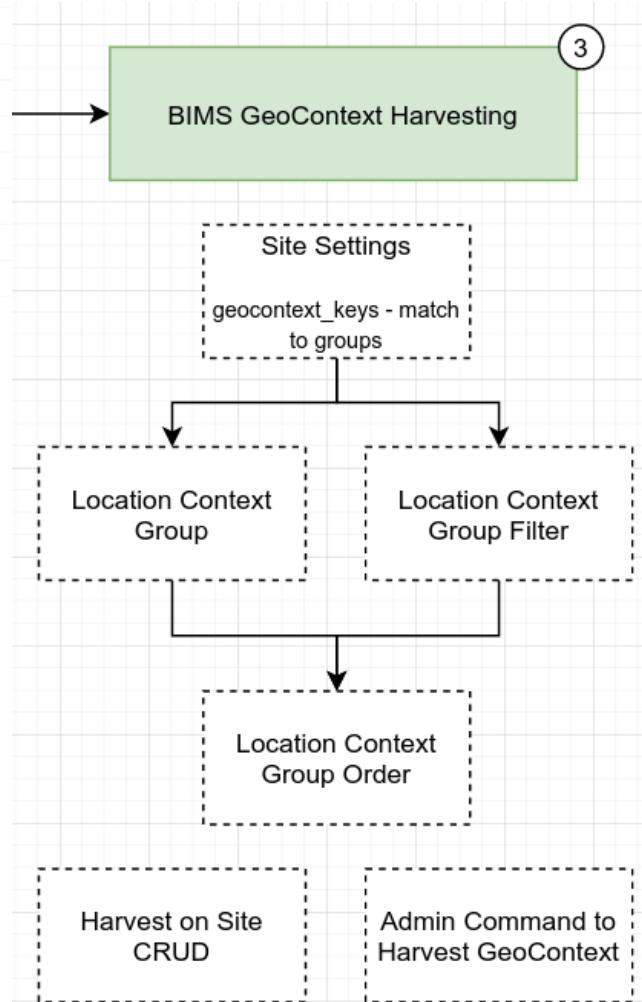
See other existing layers for guidance.





1.2.4 Harvesting GeoContext Data in BIMS

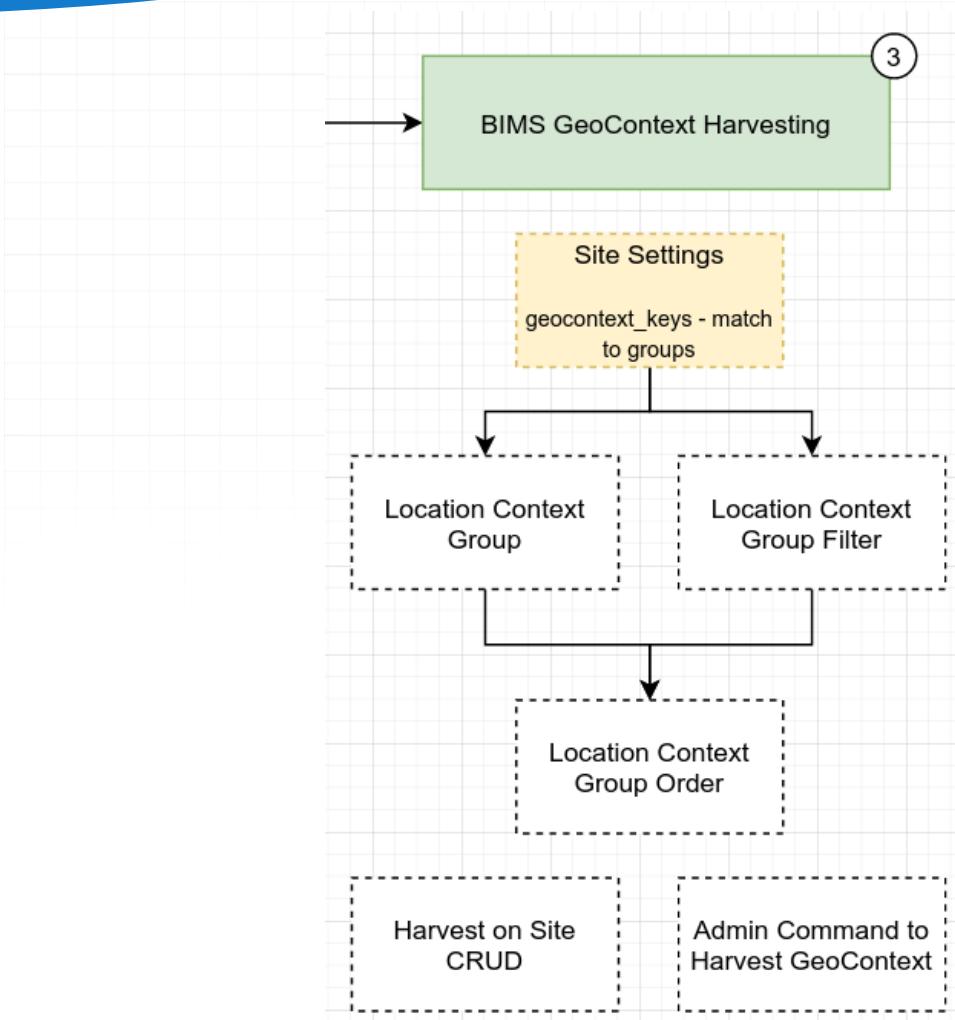
In this section we explain the process of configuring BIMS to harvest GeoContext data from a GeoContext server for a collection of layers.



Configuring site settings for GeoContext

This section describes how to configure your site settings to harvest GeoContext data for each site.





Open site settings in admin page Find Geocontext keys field

A screenshot of a web form showing a single input field labeled "Geocontext keys". The value "rwanda_catchments" is entered into the field. Below the input field is a small note: "Default location context group keys that will be fetched from Geocontext, separated by commas."

- Add the GeoContext group keys in this field, use commas to separate multiple keys
- Click **Save** when you're done
- Now the system will check these keys to fetch GeoContext data for new sites

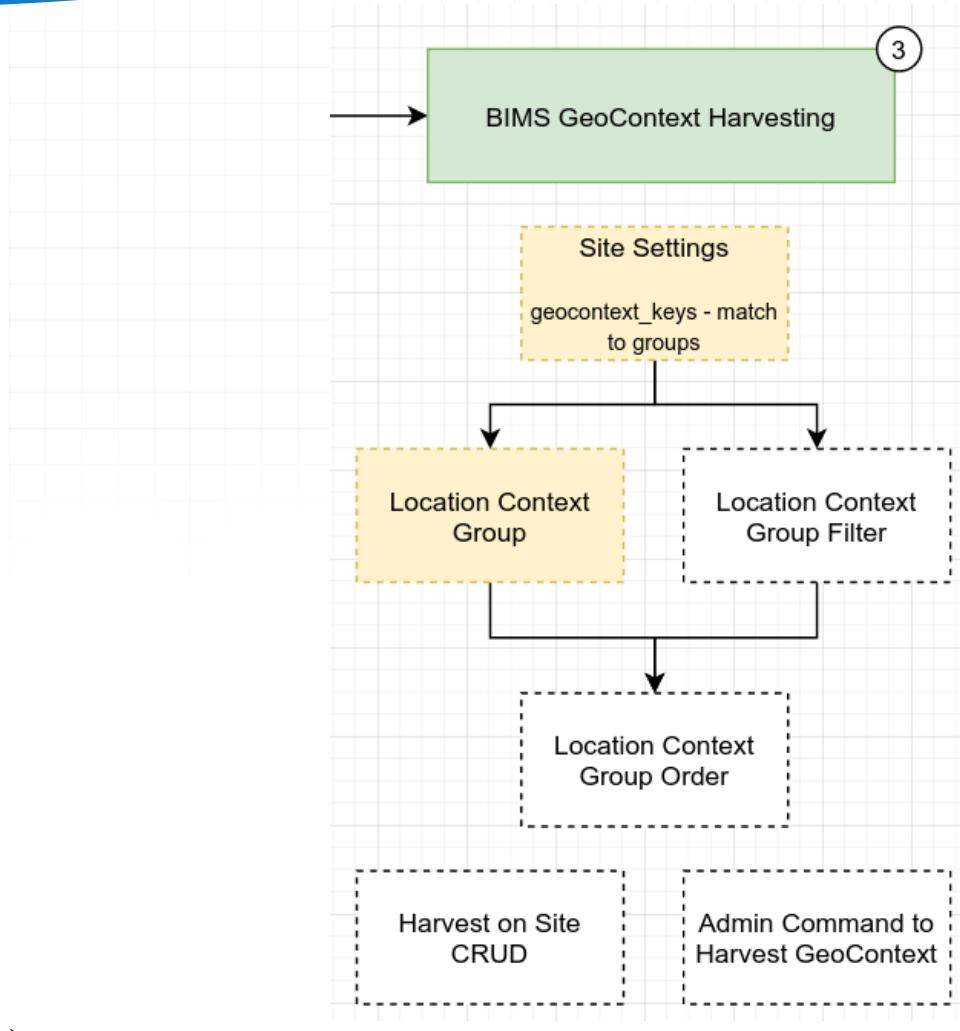
Note:

Make sure that the key exists in the GeoContext, to check you can use this api : https://geocontext.kartoza.com/api/v1/geocontext/value/group/1/1/{geocontext_key}/ change the geocontext_key in the url with the key you want to check

Creating a Location Context Group in BIMS

In this section we explain how to create a location context group in the django admin interface for BIMS.





)

To create a Location Context Group in BIMS, you need to know what layers are returned from the GeoContext group.

For instance, we want to create Location Context Group for Rwanda Catchments.

First, check the output from GeoContext with this API : https://staging.geocontext.kartoza.com/api/v2/query?registry=group&key=river_catchment_areas_group&x=24&y=-29&outformat=json

Note : Change river_catchment_areas_group in the url with GeoContext group you want to add.

You will receive this data from GeoContext :





Generic Api

Geocontext API V2 endpoint for collection queries. Basic query validation, log query, get data and return results.

```
HTTP 200 OK
Allow: GET, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

[{"key": "river_catchment_areas_group",
  "name": "River Catchments in South Africa",
  "description": "Layer that depicts the various categories of river catchments in South Africa",
  "group_type": "text",
  "service_registry_values": [
    {
      "key": "primary_catchment_area",
      "value": "Region C",
      "name": "Primary Catchment Area",
      "description": null,
      "query_type": "WFS"
    },
    {
      "key": "secondary_catchment_area",
      "value": "CS",
      "name": "Secondary Catchment Area",
      "description": null,
      "query_type": "WFS"
    },
    {
      "key": "tertiary_catchment_area",
      "value": "CSII",
      "name": "Tertiary Catchment Area",
      "description": null,
      "query_type": "WFS"
    },
    {
      "key": "quaternary_catchment_area",
      "value": "CSIII",
      "name": "Quaternary Catchment Area",
      "description": null,
      "query_type": "WFS"
    }
  ]
}
```

There are two service registry values (layers), so you need to add them both to the Location Context Group to display all those layers in the filter.

To add those layers please follow these steps :

Note : We will use this data for the following steps

```
{
  "key": "rwanda_catchments_level_1",
  "value": "3",
  "name": "Rwanda Catchments Level 1",
  "description": null,
  "query_type": "WFS"
}
```

- Open Location Context Groups admin page
- Click Add location context group button at the top right corner
- Fill out these fields :
- **Name** - Name of the layer, Rwanda Catchments Level 1
- **Key** - Layer key, rwanda_catchments_level_1
- **Geocontext group key** - Group key from GeoContext, rwanda_catchments
- Click **Save**

Then you need to do the same thing for other layer.

Add location context group

Name	<input type="text"/>
Key	<input type="text"/>
Geocontext group key	<input type="text"/> Group key from geocontext
Layer name	<input type="text"/>
<input type="checkbox"/> Verified	

```
{
  "key": "rwanda_catchments",
  "name": "Rwanda Catchments Data",
  "graphable": false,
  "service_registry_values": [
    {
      "key": "rwanda_catchments_level_2",
      "value": "6",
      "name": "Rwanda Catchments Level 2",
      "description": null,
      "query_type": "WFS"
    },
    {
      "key": "rwanda_catchments_level_1",
      "value": "3",
      "name": "Rwanda Catchments Level 1",
      "description": null,
      "query_type": "WFS"
    }
  ]
}
```

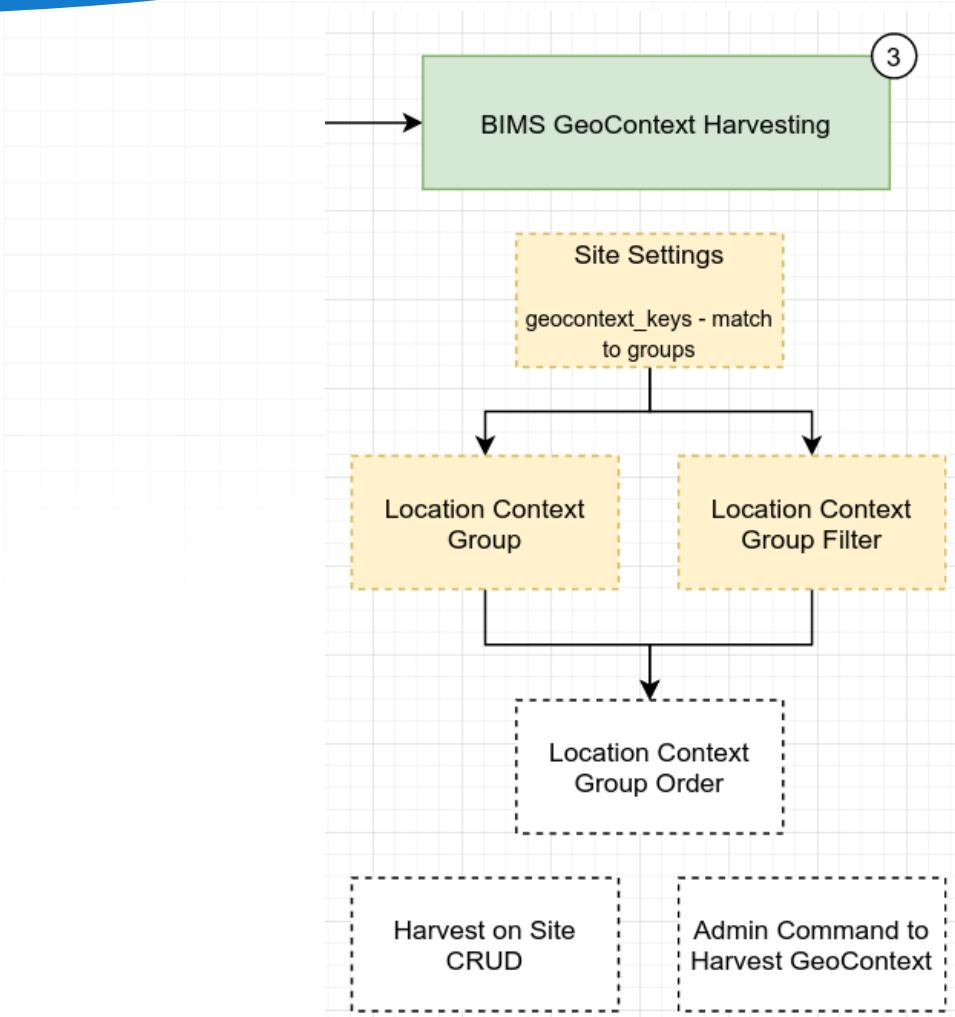
If you've done it correctly, then you will have two new layers in Location Context Group admin page :

Location context groups						
2 total	<input type="checkbox"/>	Name	Key	Geocontext group key	Layer name	Verified
	<input type="checkbox"/>	Rwanda Catchments Level 2	rwanda_catchments_level_2	rwanda_catchments		
	<input type="checkbox"/>	Rwanda Catchments Level 1	rwanda_catchments_level_1	rwanda_catchments		

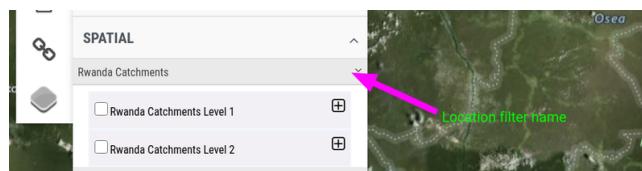
Creating a Location Context Group Filter in BIMS

In this section we explain how to create a Location Context Filter in BIMS.





Location context filter is just the filter name for the spatial filter on the Map page.



To add groups (Rwanda Catchments Level 1 & Rwanda Catchment Level 2) to the Location context filter please follow this guide.

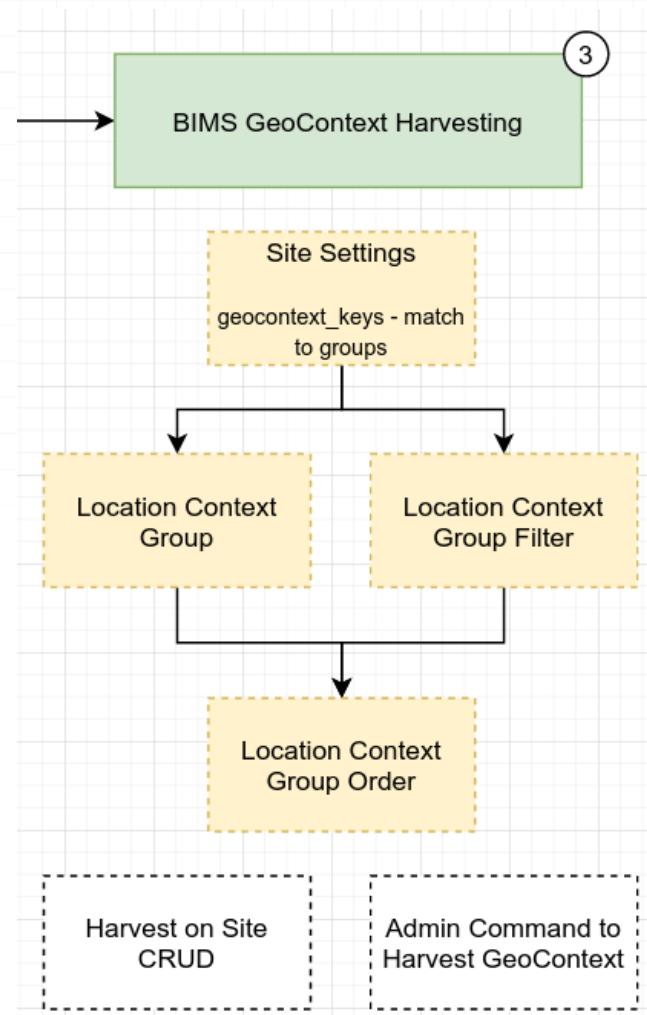
To add new Location context filter please follow these steps :

- Open the Location context filter admin page
- Click Add location context filter button at the top right
- Fill up these required fields :
- **Name** - Name of the location context filter
- **Display order** - Order of this location context filter
- Click **Save** when you've done

Configuring the order of Location Context Groups

In this section we describe the process of sorting Location Context Groups to control the order in which they appear in BIMS.

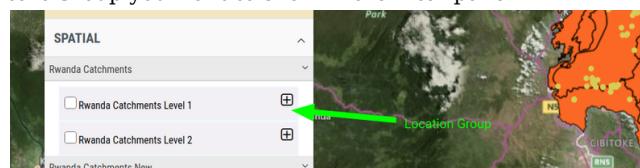




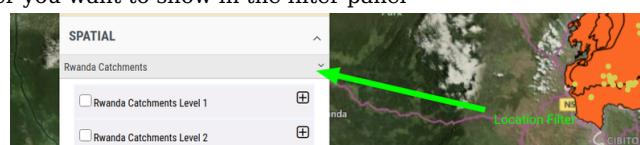
To do this guide, you need to add Location Context Group and Location Context Group Filter beforehand.

Open the admin page for Location Context Filter Group Order Click Add location context group order button at the top right Fill up these fields :

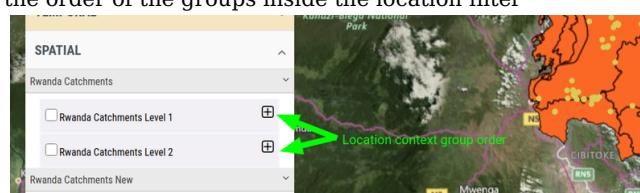
Group - Choose Location Context Group you want to show in the filter panel



Filter - Choose Location Filter you want to show in the filter panel



Group display order - This is the order of the groups inside the location filter



Show in dashboard (optional) - Whether to show this data in the dashboard or not





Overview	
Refined Geomorphological zone	Rwanda Catchments
Rwanda Catchments Level 1	20
Rwanda Catchments Level 2	-
Species and Occurrences	

Show in side panel (optional) - Whether to show this data in the side panel or not

Details

 Unknown

Edit

Site Details

Site Code Unknown

Site Description Unknown

Site Coordinates 30.093, -1.93

Rwanda Catchments Level 1 20

Rwanda Catchments Level 2 -

River Unknown

Biodiversity Data



Occurrences 4

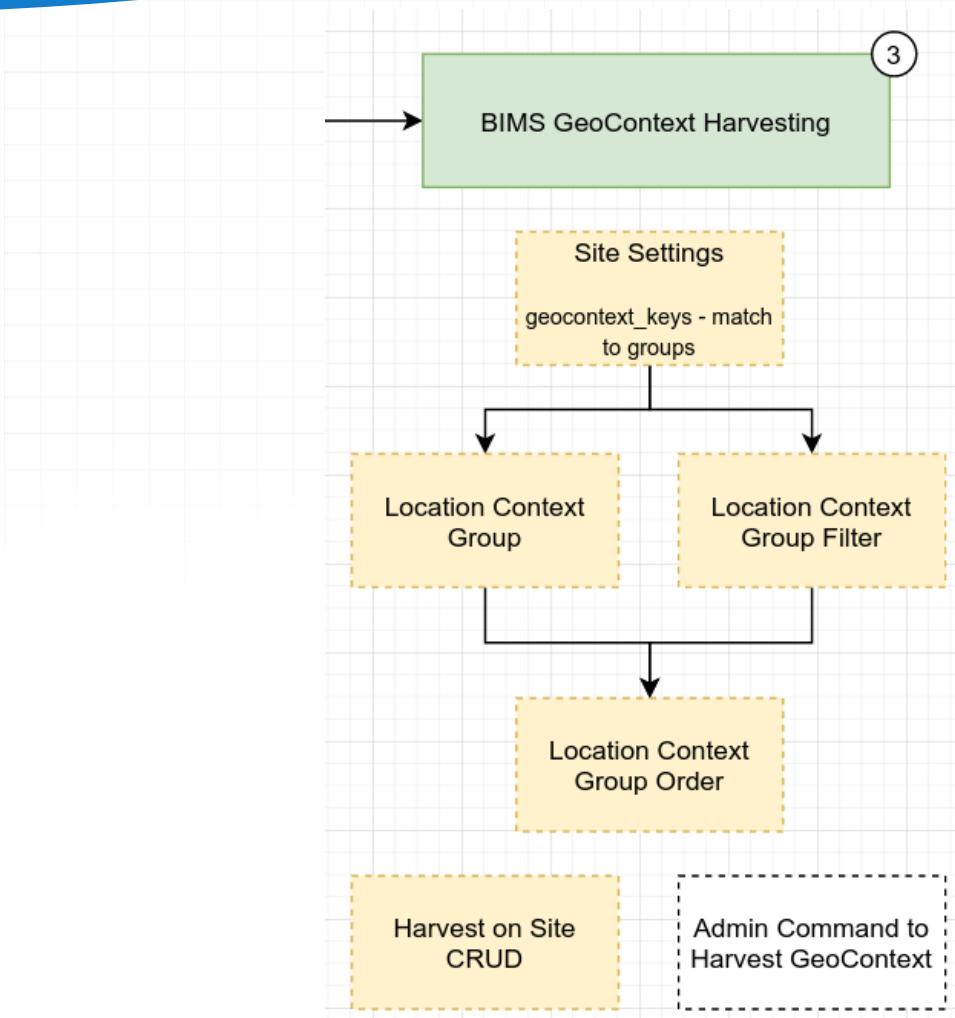
Origin ■ Native

Click **Save** when you've done.

Harvesting GeoContext data when sites change

In this section we describe the process of updating GeoContext associated with sites when the location or content of those sites change.



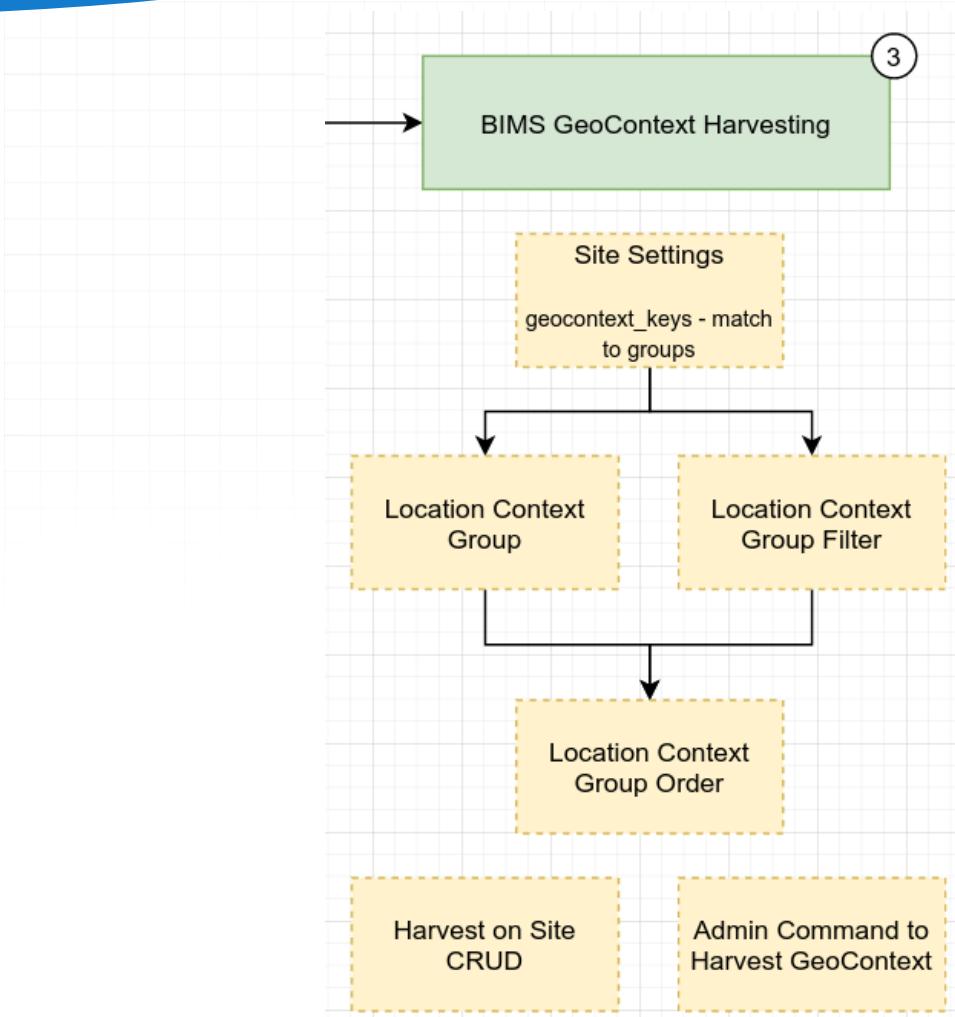


Will be added later

1.2.5 Updating GeoContext data for sites using the admin panel

In this article we describe the process of updating the GeoContext data in one or more sites using the admin panel.







1 Resources

1.1 Contributing

1.1.1 Pull Request Steps

This project is open source, so you can create a pull request(PR) after you fix issues. Get a local copy of the plugins checked out for development using the following process.

Pull Request

Before uploading your PR, run test one last time to check if there are any errors. If it has no errors, commit and then push it!

For more information on PR's steps, please see links in the Contributing section.





Commit messages

Please make this project more fun and easy to scan by using emoji prefixes for your commit messages (see [GitMoji](#)).





Commit type	Emoji
Initial commit	:tada:
Version tag	:bookmark:
New feature	:sparkles:
Bugfix	:bug:
Metadata	:card_index:
Documentation	:books:
Documenting source code	:bulb:
Performance	:racehorse:
Cosmetic	:lipstick:
Tests	:rotating_light:
Adding a test	:white_check_mark:
Make a test pass	:heavy_check_mark:
General update	:zap:
Improve format/structure	:art:
Refactor code	:hammer:
Removing code/files	:fire:
Continuous Integration	:green_heart:
Security	:lock:
Upgrading dependencies	:arrow_up:
Downgrading dependencies	:arrow_down:
Lint	:shirt:
Translation	:alien:
Text	:pencil:
Critical hotfix	:ambulance:
Deploying stuff	:rocket:
Fixing on MacOS	:apple:
Fixing on Linux	:penguin:
Fixing on Windows	:checkered_flag:
Work in progress	:construction:
Adding CI build system	:construction_worker:
Analytics or tracking code	:chart_with_upwards_trend:
Removing a dependency	:heavy_minus_sign:
Adding a dependency	:heavy_plus_sign:
Docker	:whale:
Configuration files	:wrench:
Package.json in JS	:package:
Merging branches	:twisted_rightwards_arrows:
Bad code / need improv.	:hankey:
Reverting changes	:rewind:
Breaking changes	:boom:
Code review changes	:ok_hand:
Accessibility	:wheelchair:
Move/rename repository	:truck:
Other	Be creative





1.1.2 Contributing

- [Code of Conduct](#)
- [Contributing Guideline](#)
- [Commit Convention](#)
- [Issue Guidelines](#)





1.2 Media





1.3 Links





<https://github.com/kartoza/bims-website>