

# Article

← [FME Desktop](#)  
(/S/Topic/0TO4Q000000QL9uWAG/Fme-...

## Download Files from a REST API Using FME

🕒 Jun 16, 2022 • Knowledge

### Product Type

FME Desktop

### FME Version

2020.1

**Tutorial:** [Tutorial: Getting Started with APIs \(/s/article/getting-started-with-apis-1\)](#) | **Previous:** [Authenticating and Extracting Information from API calls with the HTTPCaller \(https://community.safe.com/s/article/Authenticating-and-Extracting-Information-from-API-calls-with-the-HTTPCaller\)](#) | **Next:** [Advanced API Calls \(https://community.safe.com/s/article/advanced-api-calls-in-fme\)](#)

## Introduction

This article will provide instructions on how to access [Movebank's REST API \(https://github.com/movebank/movebank-api-doc/blob/master/movebank-api.md\)](https://github.com/movebank/movebank-api-doc/blob/master/movebank-api.md) using the [HTTPCaller \(http://docs.safe.com/fme/2019.0/html/FME\\_Desktop\\_Documentation/FME\\_Transformers/Transformers/httpcaller.htm\)](http://docs.safe.com/fme/2019.0/html/FME_Desktop_Documentation/FME_Transformers/Transformers/httpcaller.htm). [Movebank \(https://www.movebank.org/\)](https://www.movebank.org/) is a public database containing animal movement data from scientific studies all over the world.

In this demonstration, the HTTPCaller returns data on the movement of a bald eagle from a study based in British Columbia. The workspace will allow users to choose one of the ten tagged birds from the study at run time. The HTTPCaller will receive a response from the Movebank API containing spatial and temporal data about the selected eagle. Using the timestamp of each GPS reading, we will categorize the point locations by season to create a GeoJSON that displays migratory patterns of the eagle throughout the year.

Movebank's API requires Basic authentication which can be done using three different methods in FME:

- The Authentication option in HTTPCaller - Check the box to Use Authentication and specify Basic as your Authentication Method. Fill in your Movebank username and password directly into the HTTPCaller. This method will be used in the following demonstration.
- The Headers parameter in HTTPCaller - use the Authorization header and encode your Movebank username and password in Base64 using this format username:password
- [Web Connection](#)  
([http://docs.safe.com/fme/2017.1/html/FME\\_Desktop\\_Documentation/FME\\_Workbench/NamedConnections/Using\\_Web\\_Service\\_Connections.htm](http://docs.safe.com/fme/2017.1/html/FME_Desktop_Documentation/FME_Workbench/NamedConnections/Using_Web_Service_Connections.htm)) - Create an HTTP Authentication Service from Tools → FME Options → Web Connections. Once it is authenticated, you should be able to select it from the HTTPCaller. This method allows you to [securely share credentials using FME Server](#).  
([http://docs.safe.com/fme/html/FME\\_Server\\_Documentation/WebUI/Web-Connections.htm#Managing](http://docs.safe.com/fme/html/FME_Server_Documentation/WebUI/Web-Connections.htm#Managing)).



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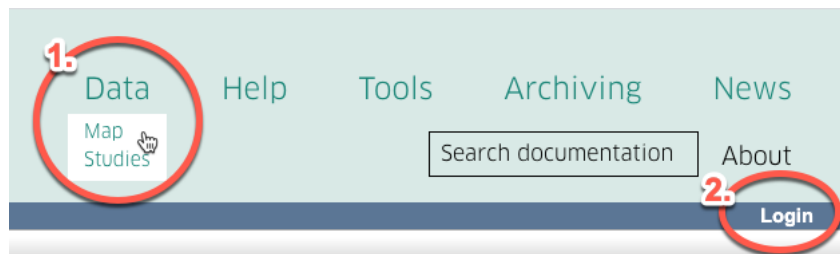
Although the Movebank API offers request URLs that return JSON data, the request URL that we are interested in only returns CSV. Since we are modifying the request URL with each run, the Query String Parameters in the HTTPCaller will be used to improve readability and incorporate User Parameters. Because we are making dynamic calls to an API that requires Basic authentication and returns CSV data, Movebank is the ideal API to handle in the HTTPCaller.

## Step-by-step Instructions

### 1. Create a Movebank account to gain permissions for animal tracking data

Since Movebank data is managed by the owners of the respective study, permissions on data access can vary depending on the dataset needed. While some studies require users to read and accept their terms of use, the data we are interested in only requires a username and password.

To get started, [create a Movebank account \(https://www.movebank.org/cms/movebank-main\)](https://www.movebank.org/cms/movebank-main). Select Data > Map on the header, and then select Login on the Map's banner menu.



On the Login popup window, select Register. Once you sign up, check the email that is immediately sent containing an activation link. After activating your account, return to the Movebank Map.

### 2. View the metadata for the bald eagle study

Using the Search bar, type in "Bald Eagles" and zoom into western Canada. You should see one green point near Vancouver, BC. Click on the point to view additional information and select "Open in Studies Page".

**Search** **Studies**

**Search** **Advanced Search**

**Bald Eagles**

All Sensor Types

☐ Only studies where I can see data

**Search result**

Sort by Animal Identifier

(EBD) Northern Bald Ibis (Geronticus eremita), Andalu	
ABOVE: USGS/WVU Raptors	
Aquila chrysaetos interior west N. America, Craigs, Ful	
baea	
<input checked="" type="checkbox"/> Bald Eagle (Haliaeetus leucocephalus) in British Colum	
Bald Eagle (Haliaeetus leucocephalus) NAS Oceana e	
Bald Eagle - Haliaeetus leucocephalus - Biodiversity R	
<input checked="" type="checkbox"/> Bald eagle / Haliaeetus leucocephalus / Bullis	
Bald Eagle Haliaeetus leucocephalus Georgia	
Bald Eagle Haliaeetus leucocephalus Mojica/Watts	
Bald Eagle Haliaeetus leucocephalus Navy Potomac E	

**Search**

Select Zoom Options Link Google Maps Open Layers

**Bald Eagle (Haliaeetus leucocephalus) in British Columbia**

[Contact owner](#)

[Show Movement Data on Map](#)

[Open in Studies Page](#)

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The Study Details outline all the relevant information provided by both Movebank and the owner of the data. Note the Movebank ID number which is a unique key for accessing the data in this study. We will use it later as a parameter in our request URL.

Studies	
View ▾ Download ▾ Env-DATA ▾	
<b>Study Details</b>	
<b>Study Name</b>	Bald Eagle ( <i>Haliaeetus leucocephalus</i> ) in British Columbia
Contact Person	myleslamont (Myles Lamont)
Principal Investigator	myleslamont (Myles Lamont)
Citation	<i>not set</i>
Acknowledgements	<i>not set</i>
Grants used	<i>not set</i>
License Type	Custom
License Terms	<i>not set</i>
Study Summary	Bald Eagle Tracking Alliance project monitoring the migration of Bald Eagles in the Pacific Northwest.
Study Reference Location	
Longitude	-123.022
Latitude	49.083
Movebank ID	430263960
<b>Study Statistics</b>	
Number of Animals	12
Number of Tags	12
Number of Deployments	11
Time of First Deployed Location	2018-01-19 18:00:00.000
Time of Last Deployed Location	2020-08-11 16:00:00.000
Taxa	<i>Haliaeetus leucocephalus</i>
Number of Deployed Locations	26678
Number of Records	Deployed (outliers) / Total (outliers)
GPS	26678 (0) / 27402 (0)
<a href="#">About study details</a>	
<b>Processing Status</b>	Up-to-date

### 3. View Movebank's API Documentation

Movebank's [API Documentation](https://github.com/movebank/movebank-api-doc/blob/master/movebank-api.md) (<https://github.com/movebank/movebank-api-doc/blob/master/movebank-api.md>) is shared on GitHub where additional security, data access and authentication information is also detailed. Since we are creating a workflow that allows users to select a specific eagle at run time, select "Get information about animals in a study" from the Contents.

- [Get descriptions of entities in a study](#)
  - [Get a description about a study](#)
  - [Get information about tags in a study](#)
  - [Get information about animals in a study](#)
  - [Get information about deployments in a study](#)

Note the request URL that we will be using to obtain a list of unique eagle IDs will take the form:

```
https://www.movebank.org/movebank/service/direct-read?entity_type=individual&study_id=2911040
.(https://www.movebank.org/movebank/service/direct-read?entity_type=individual&study_id=2911040).
```

Referring back to the Contents, now select "Get event data for an individual animal".

- [Get event data from a study](#)
  - [Get event data with all event-level attributes](#)
  - [Get event data with select additional event-level attributes](#)
  - [Get event data for a single sensor type](#)
  - [Get event data for an individual animal](#)
  - [Get event data for a specified time period](#)



Note the request URL that we will be using to obtain tracking data for our selected eagle will take the form:

```
https://www.movebank.org/movebank/service/direct-read?entity_type=event&study_id=2911040&individual_id=2911059 (https://www.movebank.org/movebank/service/direct-read?entity_type=event&study_id=2911040&individual_id=2911059).
```

#### 4. Start FME Workbench

Select New workspace from the start-up page to open a blank canvas.

#### 5. Add a Creator as a trigger for your workspace

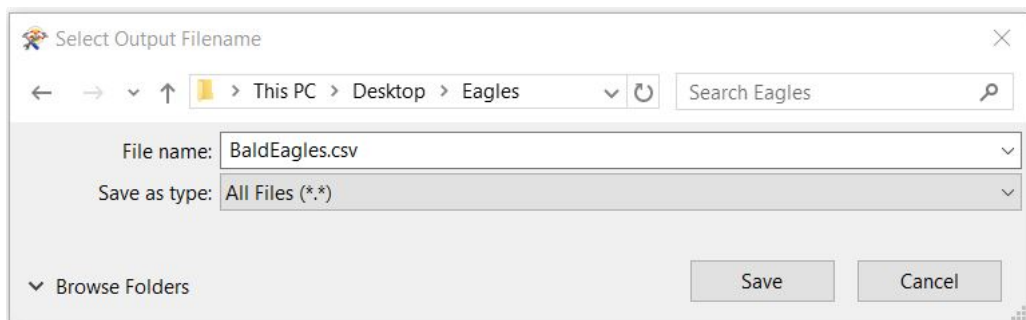
The parameters can be left as default as this transformer is only used to initiate the workspace without having to input data.

#### 6. Add an HTTPCaller to set up the first call to Movebank

Connect your Creator to the input port of an HTTPCaller and open the parameters. Our first call to the Movebank API will use the request URL to get information about animals in a study. Use the following request URL with the HTTP Method set to GET:

```
https://www.movebank.org/movebank/service/direct-read?entity_type=individual&study_id=430263960 (https://www.movebank.org/movebank/service/direct-read?entity_type=individual&study_id=430263960).
```

Change where the response body is saved to by selecting File from the Save Response Body To drop-down menu. For the Output Filename, select the ellipses to choose a directory, making sure that you add ".csv" as a file extension onto the name of your output.



Check the box to Use Authentication. Select Basic as your Authentication Method and enter your Movebank account's username and password.

HTTPCaller Parameters

Transformer

Transformer Name: HTTPCaller

Request

Request URL: https://www.movebank.org/movebank/service/direct-read?entity\_type=individual&study\_id=430263960

HTTP Method: GET

> Query String Parameters

> Headers

> Body

Response

Save Response Body To: File

Response Body Attribute:

Response Body Encoding:

Save Response Body To File

Create a New File Per Feature: No

Output Filename: "C:\Users\Nancy Pham\Desktop\Eagles\BaldEagles.csv"

Output Folder:

File Extension:

File Path Attribute: \_response\_file\_path

> Response Headers and Status

> HTTP Client Options

☒ Use Authentication

Authentication Method: Basic

Web Connection:

HTTP Authentication Username: npham

HTTP Authentication Password: .....

Help Presets OK Cancel

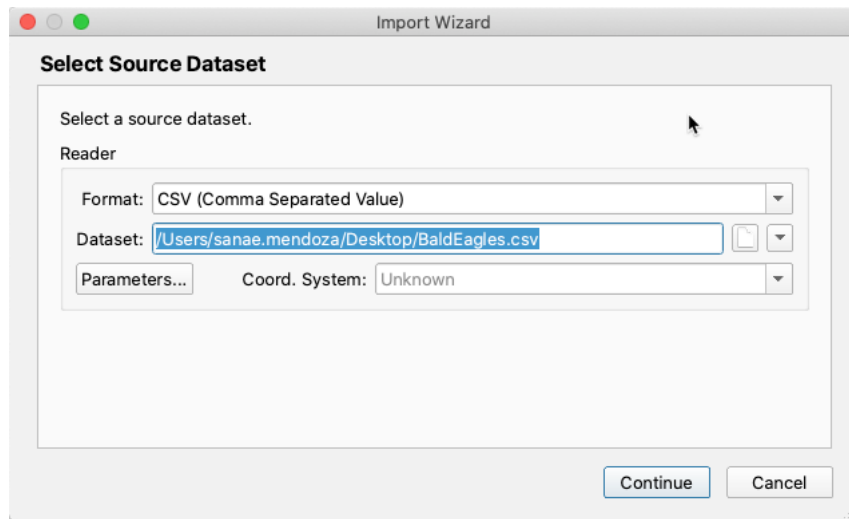
## 7. Run the workspace to ensure that the CSV file is saved in the correct directory

Click the green Run button. When the translation is completed successfully, check your directory to make sure the file was saved. Open the file in a text editor or Microsoft Excel to view the data. The fifth column will show the individual bird IDs that we will be entering as a user parameter.

E		
irth	id	lat
	430731866	
	430731867	
	430731868	
	768159829	
	768161195	
	768162242	
	430731869	
	430731870	
	430731871	
	430270991	
	430731873	
	653162237	

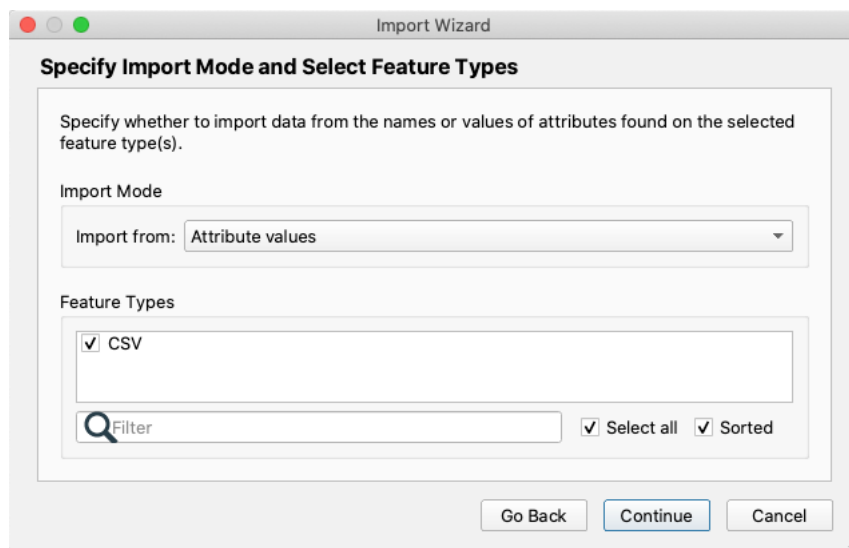
## 8. Create a User Parameter to select an individual eagle at run time

Right-click User Parameters in the Navigation pane and select Create User Parameter. Set the Type as Choice. This parameter will provide the user with a drop-down list of Bird IDs at run time. Name your User Parameter `individual_id` and set Prompt as Individual Bird ID:. Uncheck the Optional box to ensure that an ID is selected with every run. Select the ellipses next to Configuration, and click the Import button. The Import Wizard will open prompting you for a Format and Dataset. Set the Format as CSV and choose your CSV file from the previous step as the Dataset.



The screenshot shows the 'Import Wizard' dialog box with the title 'Import Wizard'. The main heading is 'Select Source Dataset'. Below this, it says 'Select a source dataset.' and 'Reader'. There are three input fields: 'Format' set to 'CSV (Comma Separated Value)', 'Dataset' set to '/Users/sanae.mendoza/Desktop/BaldEagles.csv', and 'Parameters...' with a button icon. Below these is 'Coord. System' set to 'Unknown'. At the bottom right are 'Continue' and 'Cancel' buttons.

Click Continue and Import from: Attribute values.



The screenshot shows the 'Import Wizard' dialog box with the title 'Import Wizard'. The main heading is 'Specify Import Mode and Select Feature Types'. Below this, it says 'Specify whether to import data from the names or values of attributes found on the selected feature type(s)'. There are two sections: 'Import Mode' with 'Import from:' set to 'Attribute values', and 'Feature Types' with a list containing 'CSV' which is checked. Below the list is a 'Filter' input field and two checkboxes: 'Select all' and 'Sorted', both of which are checked. At the bottom are 'Go Back', 'Continue', and 'Cancel' buttons.

Click Continue and select id as your Choice List.

The 'Import Wizard' dialog box is shown with the 'Select Attributes' step. It contains a text box with the instruction: 'For each column you wish to import data into, select an attribute to import the values from.' Below this is a dropdown menu labeled 'Choice List' with 'id' selected. There is an unchecked checkbox labeled 'Show format attributes'. At the bottom are three buttons: 'Go Back', 'Import', and 'Cancel'.

Click on Import and a list of 12 individual eagle IDs will appear. Click OK and the Configuration box will automatically populate with your data. Make sure you uncheck Optional (this is a mandatory choice) and the Default Value remains blank, and then click OK.

The 'Add/Edit User Parameter' dialog box is shown. It has several fields: 'Type' is set to 'Choice'; 'Name' is 'individual\_id' with a checked 'Published' checkbox and an unchecked 'Optional' checkbox; 'Prompt' is 'Individual Bird ID'; 'Configuration' is a long alphanumeric string followed by an ellipsis button; 'Attribute Assignment' is 'Default'; and 'Default Value' is empty. At the bottom are 'Help', 'Cancel', and 'OK' buttons.

#### 9. Go back into the HTTPCaller to make another call to the Movebank API

We will reuse the HTTPCaller from before since we are done with this request. The next request URL will receive tracking data for an individual from our eagle study:

```
https://www.movebank.org/movebank/service/direct-read?entity_type=event&study_id=430263960&individual_id=
<INDIVIDUAL_(https://www.movebank.org/movebank/service/direct-read?
entity_type=event&study_id=430263960&individual_id=<INDIVIDUAL_)_EAGLE_ID>
```

We will use the Query String Parameters to break up the components of the URL. Enter the following URL into the request URL field and set the method to GET:

```
https://www.movebank.org/movebank/service/direct-read?_(https://www.movebank.org/movebank/service/direct-
read?).
```

Enter entity\_type, study\_id, and individual\_id under the Name column of the Query String Parameters as three different rows. In the Value column, set the entity type as event, and the study ID to 430263960. For the individual ID, click on the arrow that appears in the Value column when you click inside the cell. Move your cursor down to User Parameter and then select individual\_id.

Change the Output Filename to a directory of your choice renaming the file to TrackingData.csv.



**Transformer**

Transformer Name: HTTPCaller

**Request**

Request URL: https://www.movebank.org/movebank/service/direct-read?

HTTP Method: GET

**Query String Parameters**

Name	Value
entity_type	event
study_id	430263960
individual_id	\$(individual_id)

**Response**

Save Response Body To: File

Response Body Attribute:

Response Body Encoding:

**Save Response Body To File**

Create a New File Per Feature: No

Output Filename: .\TrackingData.csv

Output Folder:

File Extension:

File Path Attribute: \_response\_file\_path

**Response Headers and Status**

**HTTP Client Options**

☒ Use Authentication

Authentication Method: Basic

Web Connection:

HTTP Authentication Username: npham

HTTP Authentication Password: .....

Help Presets OK Cancel

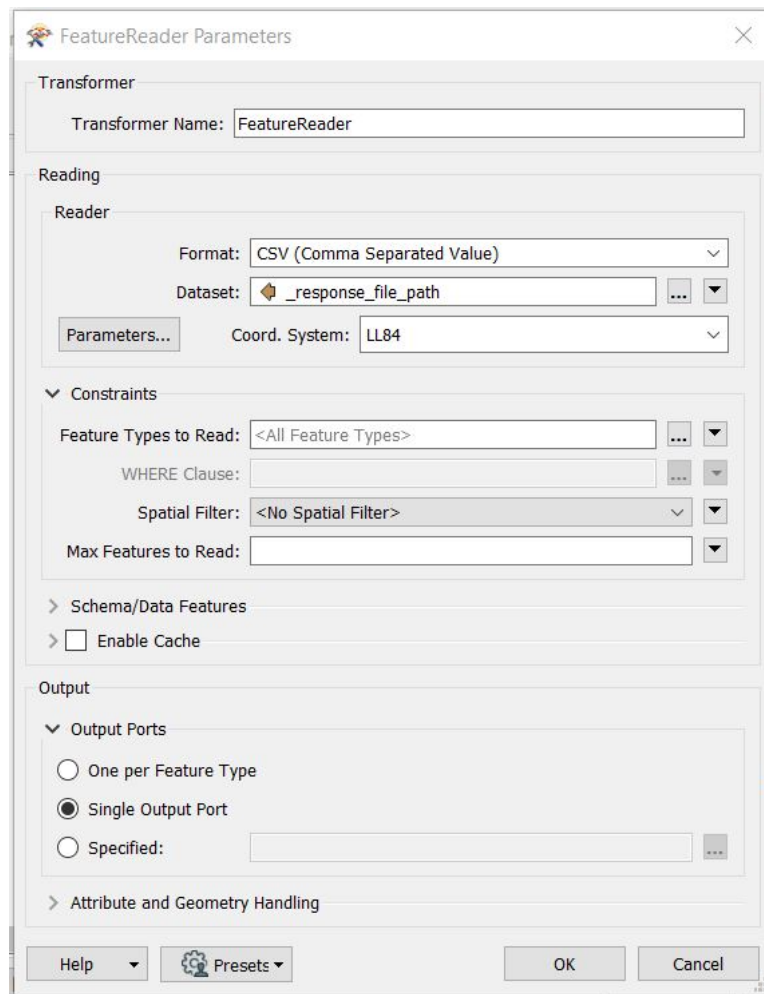
#### 10. Run the workspace to make sure the HTTPCaller is working

Make sure your User Parameter will be prompted every time you run the workspace by clicking on Run along the top toolbar and then Prompt for User Parameters. A checkmark should appear next to this text. Run the workspace and you will be prompted to select an Individual Bird ID. Select the first value from the list 430270991 and click Run. Check your directory to make sure the response body was saved, and that it contains data.

#### 11. Add a FeatureReader ([http://docs.safe.com/fme/2019.0/html/FME\\_Desktop\\_Documentation/FME\\_Transformers/Transformers/featurereader.htm](http://docs.safe.com/fme/2019.0/html/FME_Desktop_Documentation/FME_Transformers/Transformers/featurereader.htm)) to read in your CSV file

Connect your HTTPCaller output to a FeatureReader. In the parameters, set the Format as CSV and use the arrow to the right of Dataset to specify the \_response\_file\_path attribute as your input. Set the coordinate system to LL84 and then expand Output Ports to select Single Output Port.



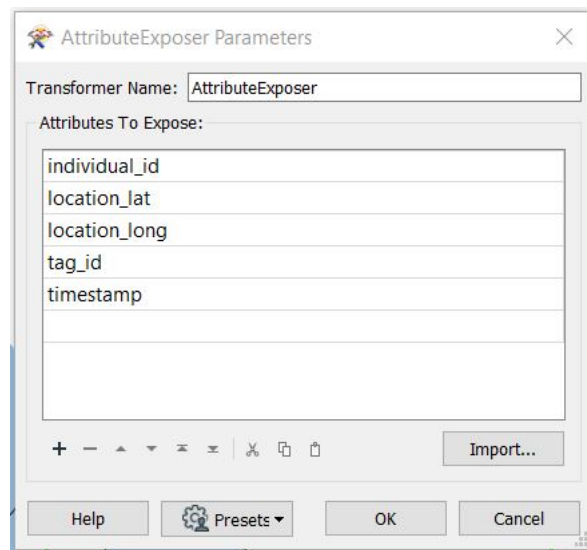


Run the workspace with Feature Caching enabled to view the output in Visual Preview. You can choose any ID when prompted. The Generic port will have hundreds to thousands of output features but if you click on the magnifying glass next to <Generic>, you will only see empty rows in Visual Preview. This is because the attributes are unexposed. You can still see them by opening the Feature Information window (Ctrl + Alt + F) and selecting a row from the table. Scroll through this window and you will see our five attributes.

individual_id (encoded: windows-1252)	430731866
location_lat (encoded: windows-1252)	49.095599
location_long (encoded: windows-1252)	-122.999533
tag_id (encoded: windows-1252)	430266212
timestamp (encoded: windows-1252)	2018-02-09 22:00:00.000

## 12. Add an **AttributeExposer** ([http://docs.safe.com/fme/2019.0/html/FME\\_Desktop\\_Documentation/FME\\_Transformers/Transformers/attributeexposer.htm](http://docs.safe.com/fme/2019.0/html/FME_Desktop_Documentation/FME_Transformers/Transformers/attributeexposer.htm)) to reveal hidden attributes

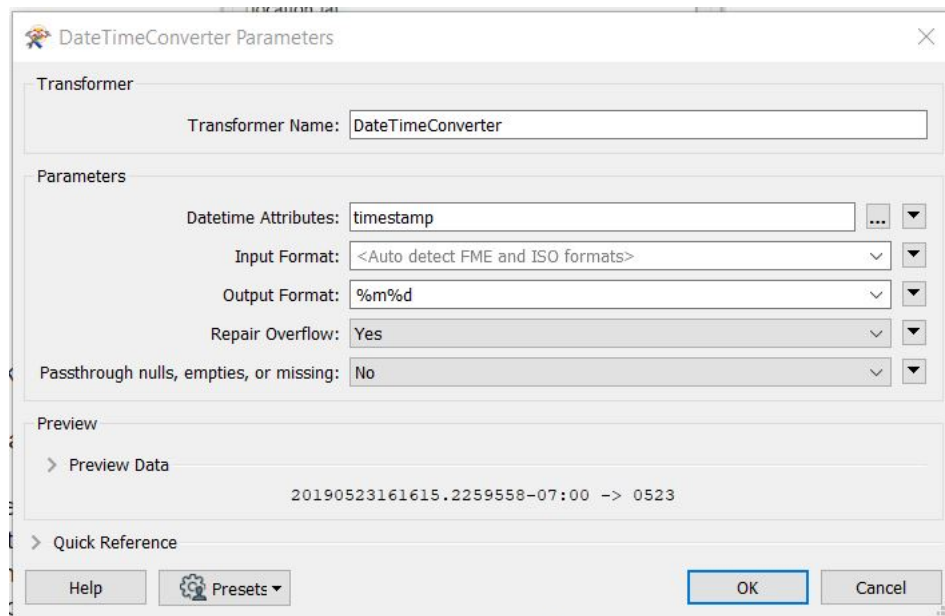
Dynamic source data causes attributes to be hidden from a workspace so we have to expose them in order to use the attributes downstream. Connect the Generic output port of the FeatureReader to an AttributeExposer. Fill in the Attributes to Expose using the five attribute names from the Feature Information window in the previous step (you could also use Import on TrackingData.csv and choose Attribute Names instead of Values, if you prefer).



Run the workspace again and you will see that the attributes are now visible in Visual Preview.

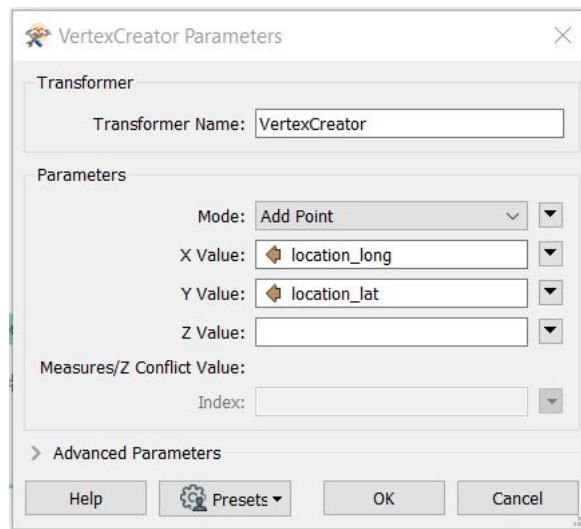
**13. Add a [DateTimeConverter](https://docs.safe.com/fme/html/FME_Desktop_Documentation/FME_Transformers/Transformers/datetimeconverter.htm) to reformat the timestamp attribute**

To categorize our data by season, we have to first format the timestamp attribute to only display month and day. Connect the AttributeExposer to the DateTimeConverter and open the parameters. Select the timestamp attribute from the drop-down menu next to the Datetime Attributes field. For Output Format, enter %m%d. Click OK.



**14. Add a [VertexCreator](http://docs.safe.com/fme/2019.0/html/FME_Desktop_Documentation/FME_Transformers/Transformers/vertexcreator.htm) to create point geometry**

In the parameters, set the X Value as your location\_long attribute and the Y Value as location\_lat.



VertexCreator Parameters

Transformer

Transformer Name: VertexCreator

Parameters

Mode: Add Point

X Value: location\_long

Y Value: location\_lat

Z Value:

Measures/Z Conflict Value:

Index:

> Advanced Parameters

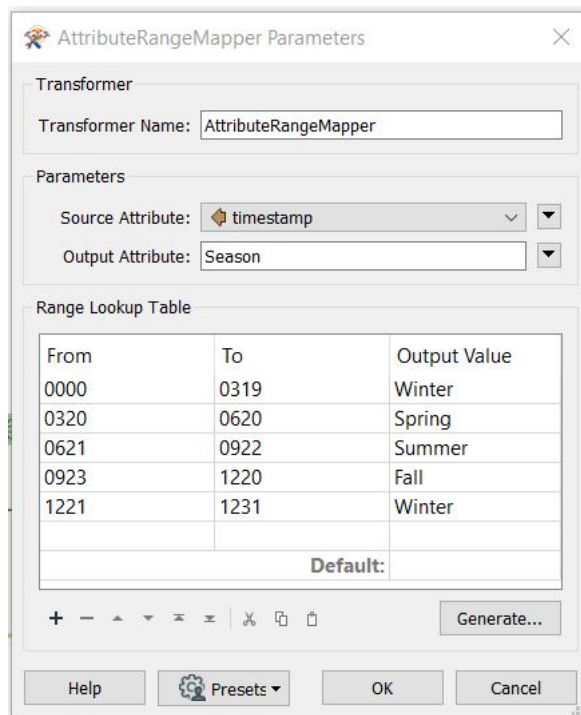
Help Presets OK Cancel

#### 15. Add an AttributeRangeMapper

([http://docs.safe.com/fme/2019.0/html/FME\\_Desktop\\_Documentation/FME\\_Transformers/Transformers/attributerangemapper.htm](http://docs.safe.com/fme/2019.0/html/FME_Desktop_Documentation/FME_Transformers/Transformers/attributerangemapper.htm)) to categorize dates into seasons

The AttributeRangeMapper will create a new attribute based on numeric ranges. Select timestamp as the Source Attribute and set the Output Attribute as Season. Since equinoxes and solstices vary by year, we will go by the 2019 calendar year to indicate start and end dates of each season. In the first row of the Range Lookup Table, enter 0000 in the From column and 0319 in the To column. Set the Output Value as Winter. This indicates that from the beginning of the year (which would be 0101) to March 19th, the season is Winter. Repeat this process for the following ranges:

- From 0320 To 0620 → Spring
- From 0621 To 0922 → Summer
- From 0923 To 1220 → Fall
- From 1221 To 1231 → Winter



AttributeRangeMapper Parameters

Transformer

Transformer Name: AttributeRangeMapper

Parameters

Source Attribute: timestamp

Output Attribute: Season

Range Lookup Table

From	To	Output Value
0000	0319	Winter
0320	0620	Spring
0621	0922	Summer
0923	1220	Fall
1221	1231	Winter
Default:		

+ - < > % Copy Paste Generate...

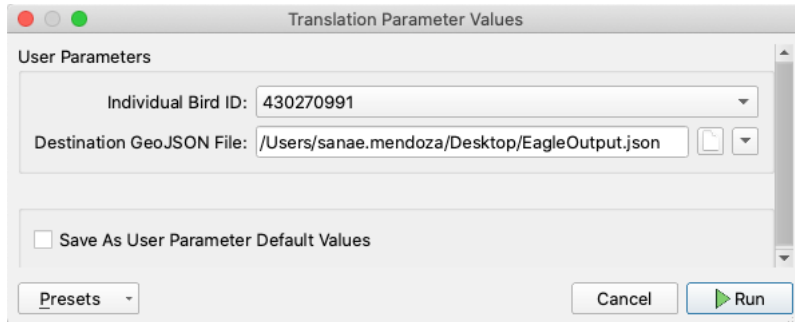
Help Presets OK Cancel

#### 16. Add a GeoJSON writer for your output

Add a Writer and specify the Format as GeoJSON (Geographic JavaScript Object Notation). Write a file named EagleOutput.json to your desired output folder. Ensure Feature Type Definition is set to Automatic. Click OK and you will be prompted to change the Feature Type Name - enter BaldEagle. Connect your AttributeRangeMapper to the Writer. If you look at the Published Parameters in your Navigation pane, you will notice a new one has appeared which asks users to specify a destination for their output. Because every run may contain different data, it is important that users be able to specify a different file name to avoid overwriting their data with every run.

#### 17. Run the workspace and ensure that the GeoJSON file is saved in the correct directory

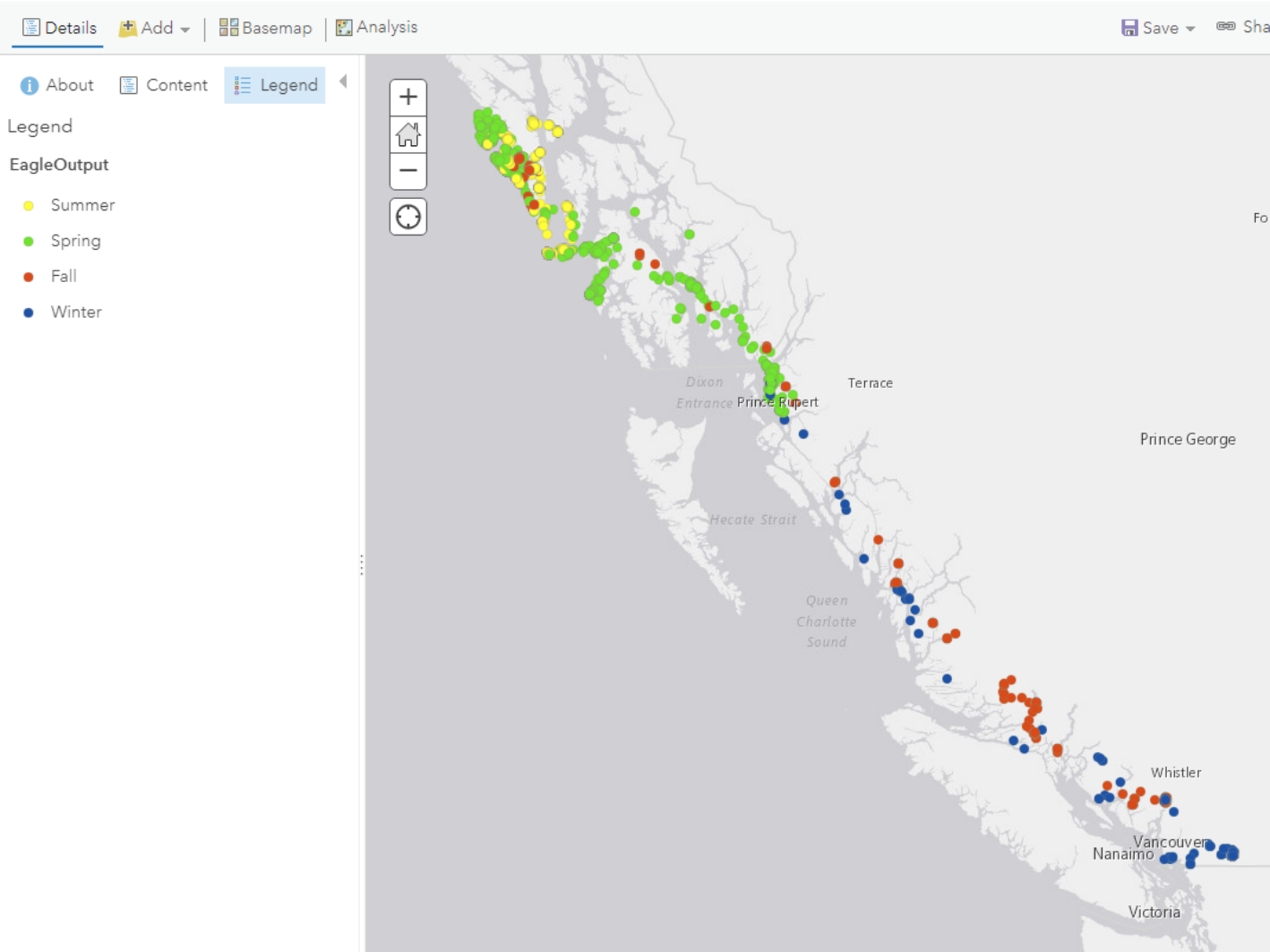
You will be prompted to select a bird and a directory for your GeoJSON when you click the green Run button. Fill in the parameters and click Run. Once the translation is successful, go to the directory to make sure the file was written.



The screenshot shows a dialog box titled "Translation Parameter Values". Under the "User Parameters" section, there is a dropdown menu for "Individual Bird ID" with the value "430270991" selected. Below it is a text field for "Destination GeoJSON File" containing the path "/Users/sanae.mendoza/Desktop/EagleOutput.json". There is a checkbox labeled "Save As User Parameter Default Values" which is currently unchecked. At the bottom of the dialog, there are three buttons: "Presets", "Cancel", and "Run".

#### 18. View the migratory patterns of your select bald eagle

To view migratory patterns, you will have to symbolize your data by the Season attribute. There are many applications that will directly read a GeoJSON file (i.e. QGIS, ArcMap). In this example, we will be using ArcGIS Online (you can also do a quick visualization by reading in the GeoJSON with FME Workbench and then sending it to an Inspector transformer with a Group-By set on Season). Upload your GeoJSON file to ArcGIS Online as a hosted layer and open it in the Map Viewer. When prompted to choose an attribute to show, select Season. The output map will vary depending on which individual ID you selected, but migratory patterns should remain similar. In the Spring and Summer, bald eagles along the coast of BC tend to migrate North towards the Gulf Islands, whereas they fly South in the Fall and Winter when temperatures drop.




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6/16/2022, 3:52 PM

- Integration  
(/s/topic/OTO4Q000000...)
- FME Desktop  
(/s/topic/OTO4Q000000...)


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 siennaatsafe (/s/profile/0050c00000CzqRuAAJ) (Employee) published a new version of this Knowledge.  
[June 16, 2022 at 3:52 PM \(/s/feed/0D54Q000009b1G1kSAM\)](#).

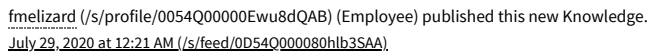
1 view

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