Occurrence information available via the NBN Atlas Web API

What is the NBN Atlas Web API?

The NBN Atlas Web API allows users to pull information from the Atlas and directly into external programs (e.g., R, Python), through various NBN Atlas web services.

This guide covers the useful NBN Atlas web services for pulling occurrence information from the NBN Atlas.

Occurrence web services:

- **Occurrence search** – Can be used to return records based on a specified search criteria, this service is used when completing a search on the Atlas, e.g., records.nbnatlas.org. Can also be used to retrieve facet counts (record counts for a field value, e.g., number of records per species).

- **Occurrence details** – Can be used to return details for a record on the Atlas, this service is used when viewing a record overview page

- **Occurrence download** – Can be used to download records in CSV or TSV format. This service is used when completing an occurrence download on the NBN Atlas. *This guide doesn't cover this web service currently, as we need to review how this web service is used by API users. Please contact support@nbnatlas.org with any questions about this.*

See the full list of occurrence web services and their parameters here (all other web services are also listed here).

*All Web Services covered in this guide support **HTTR GET** requests and return **JSON** data, unless specified otherwise.*

Occurrence search

The Occurrence search web service allows you to search for occurrence records, as you would search for records on the NBN Atlas, e.g., https://records.nbnatlas.org

The web service: https://records-ws.nbnatlas.org/occurrences/search?

Download a list of fields you can use for the q, fq, and facets parameters from here

Useful parameters: ** indicates that the parameter must be included in the request*

q*	Query parameter – format query as *FIELD*:*VALUE*. If you are not using this parameter to filter your search, supply a catch all query, meaning return all fields and all values. Supply * for the *FIELD* and *VALUE* to return all fields and values (i.e., **q=***:*). When filtering by a string, e.g., by scientific name, wrap the string in quotation marks for an exact match, e.g., **q=**taxon_name:"Fratercula arctica"
fq	Filter query parameter – format as *FIELD*:*VALUE.* As explained above, if filtering by a string, wrap the string in quotation marks for an exact match.
pageSize	Set the limit for number of occurrence records to be returned. **DO NOT supply an integer higher than 1000, this can bring the Atlas down!** If this parameter is not supplied, the page size is set to 10 by default.
facets	Supply a field name to return facet counts for (record count per field value, e.g., data provider). You can supply multiple facets parameters in a single request, and a data frame will be returned for each set of facet counts.
dir	Supply 'asc' to order the facet results by counts in ascending order or 'desc' to order the facet results in descending order
flimit	Set the limit for number of facet values to be returned for facets. To return all facet values returned for facets, set flimit to -1, i.e., **flimit**=-1.
lat	Can use this parameter to search for a supplied latitude. If using this parameter, you must also supply a value for the lon parameter.
lon	Can use this parameter to search for a supplied longitude. If using this parameter, you must also supply a value for the lat parameter.
radius	This parameter MUST be supplied if using the **lat** and **lon** parameters (otherwise request will fail). Can use 0.1, 0.5, 1, 2, 5, or 10 to define a search circle in kilometres.

Occurrence search

For the **q** and **fq** parameters you can specify field names used on the NBN Atlas to filter your search query. You can also specify a field name for a **facet** parameter/s in your search to return record counts for the field values.

You can download a list of all the fields available to use in your search queries here. **Note that the searchable fields for the Occurrence web services (i.e., those covered in this guide) differ for the other Species web services.**

Example use cases for this web service:

1. Search for species occurrence records of Puffin on Skomer Island (latitude = 51.7362, longitude = -5.2884) with a 2km search radius, excluding any absent records:

https://records-ws.nbnatlas.org/occurrences/search?**q=**taxon_name:"Fratercula arctica"&**fq=**-occurrence_status:"absent"&**lat=**51.7362&**lon=**-5.2884&**radius=**2&**pageSize=**1000

Note the minus symbol before the field name for this **fq** parameter. This is how you exclude records from your search, i.e., **-***FIELD*:*VALUE*

2. Retrieve a list of species recorded in Nottinghamshire from 2015 to the current year and their record counts:

https://records-ws.nbnatlas.org/occurrences/search?**q=**cl254:"Nottinghamshire"&**fq=**-occurrence_status:"absent"&**fq=**year:[2015 TO *]&**facets=**species&**pageSize=**0&**flimit=**-1

Supplying -1 for the **flimit** parameter to return all facet counts. Set the **pageSize** to 0 as we're only interested in the facet counts and not the occurrence records

Spatial layers on the NBN Atlas are also searchable fields, with the field name being their layer ID, and you can then search for polygons/attributes within that layer. For more guidance on retrieving spatial layer information on the NBN Atlas see the Geospatial web services guidance.

For fields which use an integer value, e.g., year, you can use this format to search for records within a range. An * before the TO will search from the lowest value available and an * after the TO will search to the highest value available

Occurrence search – data structure returned

When completing an occurrence search, the API for the search are stored using the following structure:

totalRecords

= total number of occurrence records returned

status

= status of request, if successful = "OK", else will supply an error code

occurrences

facetResults

fieldResult

= only returned if facet parameter included in occurrence search

Useful fields stored for occurrence records (note more fields are returned):

Field name	Description
uuid	A unique ID assigned to the records on the NBN Atlas – the NBN Atlas record ID
occurrenceID	An ID supplied by the data partner
taxonConceptID	The Taxon Version Key (TVK) for taxon name, as supplied by the UKSI
scientificName	The scientific name
vernacularName	The common name
taxonRank	Taxonomic rank, e.g., species
decimalLatitude	Processed latitude
decimalLongitude	Processed longitude
coordinateUncertaintyInMeters	Uncertainty in meters for latitude and longitude
month	The month the event occurred in, e.g., for 01/02/2023, 2 will be supplied
year	The year the event occurred in, e.g., for 01/01/2023, 2023 will be supplied
dataProviderName	Name of the data provider who supplied the record to the NBN Atlas
dataResourceName	Name of dataset the record was supplied in by the data provider
gridReference	OS grid reference (supplied or processed)
identificationVerificationStatus	Verification status, e.g., Accepted – considered correct
license	Licence the record has been shared with, e.g., CC-BY-NC. See further guidance here

Facets fields stored in fieldResult:

label	Values returned for field supplied for facets parameter
count	Number of records
fq	Filter query used to retrieve count

Occurrence search – Examples using web service in R

Getting occurrence records for Puffin on Skomer Island (latitude = 51.7362, longitude = -5.2884) with a 2km search radius, excluding absent records:

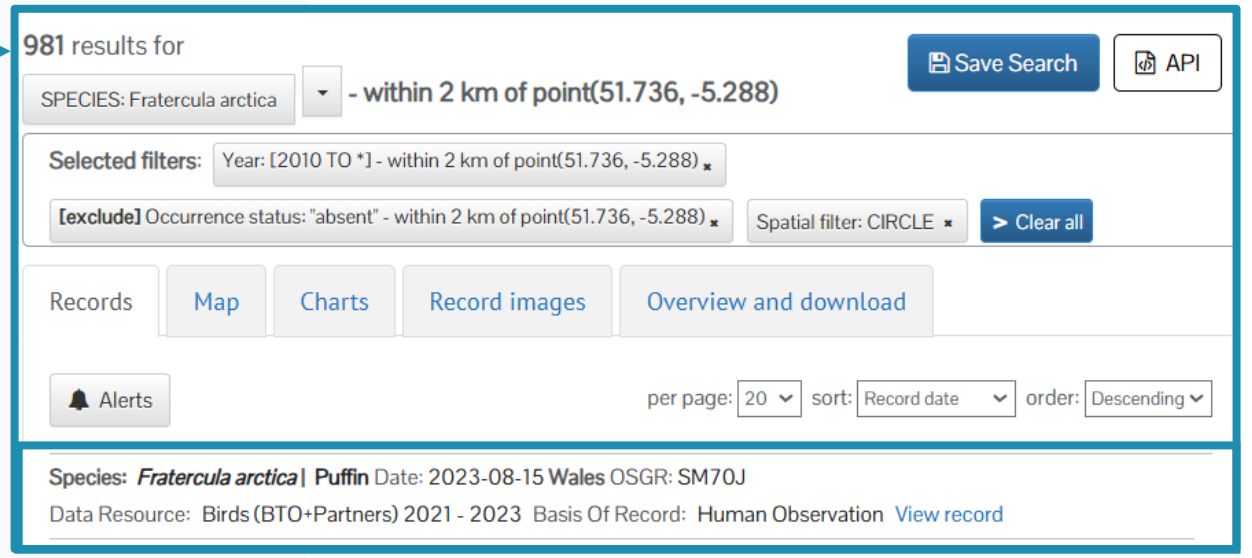
Install and load the **httr2** & **tidyverse** packages to run this and all other code examples included in this guide. Throughout this guide the 'native pipe operator' is used, see further information here

```
# Build and send request, then flatten the results
result <- request('https://records-ws.nbnatlas.org/occurrences/search') |>
  req_url_query(q = 'lsid:NBNSYS0000000013',
                fq = '-occurrence_status:"absent"',
                fq = 'year:[2010 TO *]',
                lat = 51.7362,
                lon = -5.2884,
                radius = 2,
                pageSize = 1000) |>
  req_perform() |>
  resp_body_json(simplifyVector = T)

# Extract occurrence record count
result |> pluck('totalRecords')

# Extract the occurrence records
occurs <- result |> pluck('occurrences')
```

Use the species search on the NBN Atlas (or web service) to source the Atlas recommended Taxon Version Key (if not the recommended TVK, no records will be returned!)

R studio console:

```
[1] 981
```



scientificName	vernacularName	taxonRank	year	month	stateProvince
Fratercula arctica	Puffin	species	2023	04	Wales

gridReference	dataResourceName	basisOfRecord
SM70J	Birds (BTO+partners) 2021 - 2023	HumanObservation

Occurrence search – Examples using web service in R

Getting a species list for SSSI 'The Wash', using only verified records, and a list of Data Partners who supplied records (data provider)

```
# Build and send request, then flatten the results
result <- request('https://records-ws.nbnatlas.org/occurrences/search') |>
  req_url_query(q = 'cl280:"The Wash"',
                fq = '(identification_verification_status:"Accepted" OR
identification_verification_status:"Accepted - correct" OR
identification_verification_status:"Accepted - considered correct")',
                facets = 'species',
                facets = 'data_provider',
                flimit = -1, pageSize = 0) |>
  req_perform() |>
  resp_body_json(simplifyVector = T)

# Extract the species facet results (i.e., the species list)
sp_list <- result |> pluck('facetResults', 'fieldResult', 1)

# Extract the data provider facet results (i.e., list of data partners)
dps <- result |> pluck('facetResults', 'fieldResult', 2)
```

Narrow your results panel from occurrence search on the NBN Altas

The facet parameter can be used to retrieve counts for specified fields

Use () and 'OR' operator to filter by multiple field values

label	count
Tringa totanus	8441
Anas platyrhynchos	8203
Chroicocephalus ridibundus	8126

label	count
British Trust for Ornithology	370168
Norfolk Biodiversity Information Service	49086
Butterfly Conservation	23319

Occurrence details

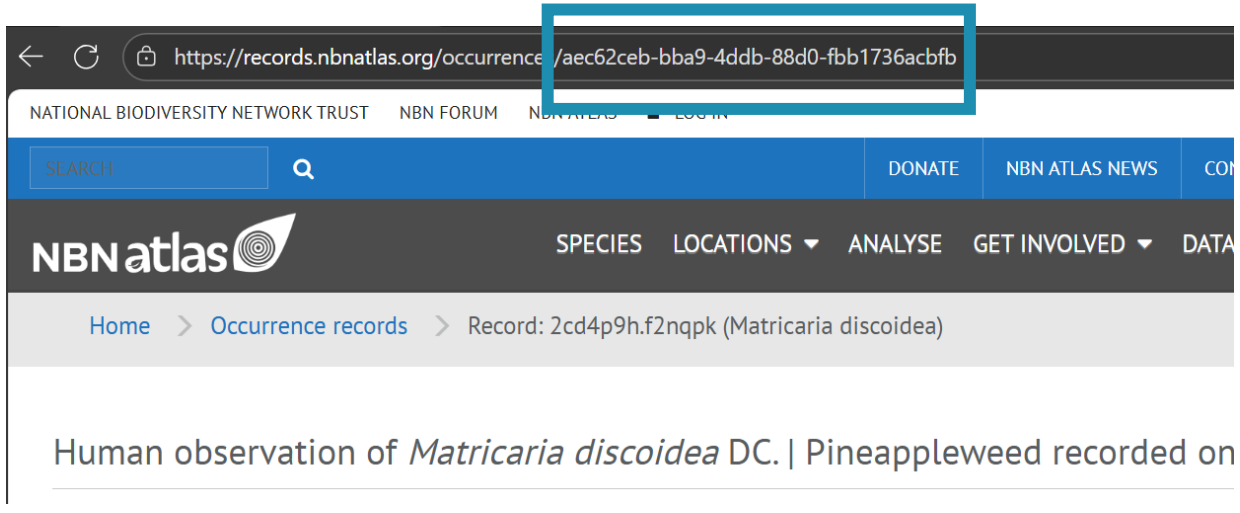
The Occurrence details web service allows you to retrieve the full details for an occurrence records using the NBN Atlas record ID. This is a useful web service to be used alongside the Occurrence web service which returns the NBN Atlas record ID (uuid). You can also retrieve this ID from the URL of an occurrence detail page on the NBN Atlas.

The web service: https://records-ws.nbnatlas.org/occurrence/*{NBN Atlas record ID, also referred to as 'uuid'}*

Sourcing the NBN Atlas ID from Record's details page:

1. Complete an occurrence search on the NBN Atlas, e.g., https://records.nbnatlas.org/occurrences/search?q=lsid%3ANBNSYS0000000013
2. Click on the **View record** link for a record listed under the **Records** tab

1. Copy the NBN Atlas record ID from the URL



Occurrence details – data structure returned

Below highlights the fields returned by this web service and the structure API returned:

raw | processed

Can retrieve the processed or raw values for the fields below. Except for fields that aren't processed as these won't be included in the processed list and if a value wasn't supplied the field won't be included in the raw list.

- occurrence
- classification (e.g., scientific name, kingdom etc., habitat group, e.g., terrestrial)
- location
- event

Field name	Description
occurrenceID	An ID supplied by the data partner
basisOfRecord	The specific nature of the data record, e.g., Human observation
occurrenceStatus	'Present' or 'Absent'
recordedBy	e.g., dead, alive
vitality	If supplied, who made the record

decimalLatitude	Processed latitude
decimalLongitude	Processed longitude
coordinateUncertaintyInMeters	Uncertainty in meters for latitude and longitude
gridReference	OS grid reference (supplied or processed)
locality	Text about the locality as supplied by the data provider
stateProvince	Country, e.g., England

day	The day the event occurred in, e.g., for 01/02/2023, 1 will be supplied
month	The month the event occurred in, e.g., for 01/02/2023, 2 will be supplied
eventDate	The full date the record was made (start date, if supplied with a date range)
eventDateEnd	The end date, if record was supplied with a date range
datePrecision	Precision of the date supplied, e.g., recorded to a day, month, or year etc.

Continued next page…

Occurrence details – data structure returned

attribution

identification

cl

userAssertions

assertions

Assertions are returned as a list of strings and represent data quality tests carried out by the NBN Atlas. They may include:

- decimalLatLongCalculatedFromGridReference
- gridReferenceCalculatedFromLatLong
- invalidCollectionDate
- missingCollectionDate

Field name	Description
dataProviderName	Name of the data provider who supplied the record to the NBN Atlas
dataProviderUid	Unique ID used for the Data provider on the NBN Atlas
dataResourceName	Name of dataset the record was supplied in by the data provider
license	Licence the record has been shared with. See further guidance here

identificationVerificationStatus	Verification status, e.g., Accepted – considered correct

cl18	10km grid reference
cl256	Watsonian vice county (includes a 12-mile marine buffer)
cl131	Districts, Boroughs and Unitary Authorities (Great Britain)

name	Issue type, e.g., Taxonomic issue
qaStatus	**50005** = not yet reviewed by the data provider, **50001** = unresolved issue, recognised by data provider, **50002** -= verified by data provider as being correct, **50003** = record has been corrected by data provider, **50006** = record is incorrect and to be deleted
comment	Comment added by the user to describe the issue
userDisplayName	User who flagged the issue
created	When the issue was flagged

Occurrence details – Example using web service in R

Get processed event details, e.g., full event date for an occurrence record (using results from Occurrence web service example for pulling 'occurrences' – the first example)

```
# Build and send request, then flatten the results
occur <- request('https://records-ws.nbnatlas.org/occurrence') |>
  req_url_path_append(occurs$uuid[1]) |>
  req_perform() |>
  resp_body_json(simplifyVector = T) |>
  pluck('processed')

# Extract the full event details for the record
occur |>  pluck('event') |>
  glimpse()
```

The first NBN Atlas record ID (uuid) returned in the Occurrence web service example (see page 5)

Can extract processed and raw field values – raw values stored in 'raw' list

R studio console:

```
List of 5
 $ day           : chr "02"
 $ eventDate     : chr "2012-06-02"
 $ year          : chr "2012"
 $ month         : chr "06"
 $ datePrecision: chr "Day"
```

Event details on record details page on the NBN Atlas:

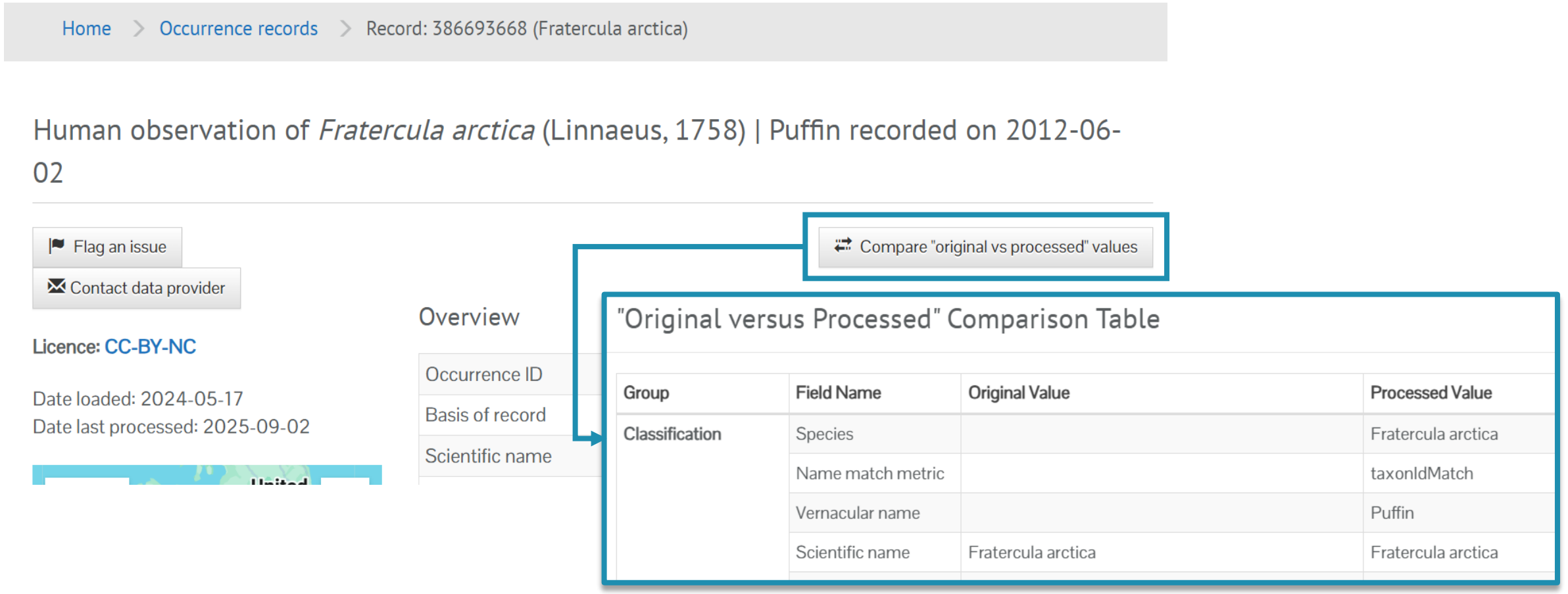
Event

Occurrence date	2012-06-02
Date precision	Day
Event date	2012-06-02

Compare original vs processed

This is a dedicated web service for retrieving the raw (supplied) and processed values for an occurrence record. This web service is used to generate the values shown in the **Compare original vs processed values table** accessed via an occurrence record's detail page. If the raw field is blank for a record, this means no value was supplied and if the processed value is blank this means the value isn't processed (i.e., the raw value is used).

The web service: https://records-ws.nbnatlas.org/occurrence/compare/*{NBN Atlas record ID, also referred to as 'uuid'}*



Compare original vs processed – data structure returned

Below highlights how the raw and processed values for fields are returned as lists and the structure of the lists.

Lists returned

- Occurrence
- Classification
- Location
- Event
- Attribution
- Identification

Fields returned by each list

- name → ***Field name**, e.g., eventDate*
- raw → ***The raw value**, if one was supplied for the field, e.g., 01/12/2025*
- processed → ***The processed value**, if processed, e.g., 2025-12-01*

Note: if a raw value wasn't supplied or a field is not processed (i.e., the Atlas uses the raw value), then the retrospective field will be blank.

Compare original vs processed – Example using web service in R

Get raw and processed location details (using results from Occurrence web service example for pulling 'occurrences' – the first example)

```
# Build and send request, then flatten the results
raw_v_pro <- request('https://records-ws.nbnatlas.org/occurrence/compare/') |>
  req_url_path_append(occurs$uuid[1]) |>
  req_perform() |>
  resp_body_json(simplifyVector = T)

# Extract the raw vs processed event details
loc_compare <- raw_v_pro |>
  pluck('Location')
```

The first NBN Atlas record ID (uuid) returned in the Occurrence web service example (see page 5)

name	raw	processed
decimalLatitude		51.737911
decimalLongitude		-5.296406
easting		172000
geodeticDatum		EPSG:4326
gridReference	SM7209	SM7209

Shows that the record was supplied with a grid reference, all other location details have been processed by the NBN Atlas

Note: this screenshot shows only a subset of the rows returned