Species Sighting Data Standard

BioNet Web Services

Version 5

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1. Introduction

The BioNet Species Sightings Web Service provides an open Application Programing Interface (API) to enable IT application developers to integrate species sightings data held in the Bionet Atlas of NSW Wildlife with software applications. As an open data initiative the scope of applications spans the full breadth of potential uses; from mobile apps through to organisational decision management business systems.

The web service does not replace the existing BioNet Atlas of NSW Wildlife web application, as it is intended for use by software applications not as a user interface.

This document provides detailed information on the data available via the BioNet Species Sightings Web Service. To ensure that this version of the data standard applies to the web service, please check https://data.bionet.nsw.gov.au/biosvcapp/odata/$metadata and confirm that the version of this document aligns with the value in "*bioNet:dataStandardVersion*" for "*EntitySet Name=SpeciesSightings_CoreData*" see Figure 1 below

```
− <EntitySet Name="SpeciesSightings_CoreData"
  EntityType="BioSvcApp.Models.vwCUBE_SpeciesSightings"
  bioNet:bioNetOpenAPIVersion="1.1" bioNet:dataStandardVersion="5.0"
  bioNet:dateLastBulkUpdate="30/05/2016">
    <NavigationPropertyBinding Path="SpeciesSightings_AdditionalMeasurementsOrFacts"
    Target="SpeciesSightings_AdditionalMeasurementsOrFacts"/>
  </EntitySet>
```

Figure 1: Metadata output

2. Overview of the web service and standard

The web service is an OASIS Open Data (OData) v4.0 based web service. OData provides a standardised RESTful protocol for querying and retrieving data and is already in use for the BioNet Species Sightings Web Service. The following links are provided to give you more background on the protocol:

- https://www.youtube.com/watch?v=wH5TUwzlaWI – a short high level explanatory video
- https://www.youtube.com/watch?v=dPlFNsLTPJU – a short more technical explanation of the protocol
- https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=odata. – the OASIS standard specification details
- http://www.odata.org/ - the OData community website

OData makes data available via entity sets. These can be thought of as tables of data, very much like a tab within a spread sheet. For the Species Sightings Web Service there are three entity sets that are available, which are linked by catalogNumber (see Figure 2 below):

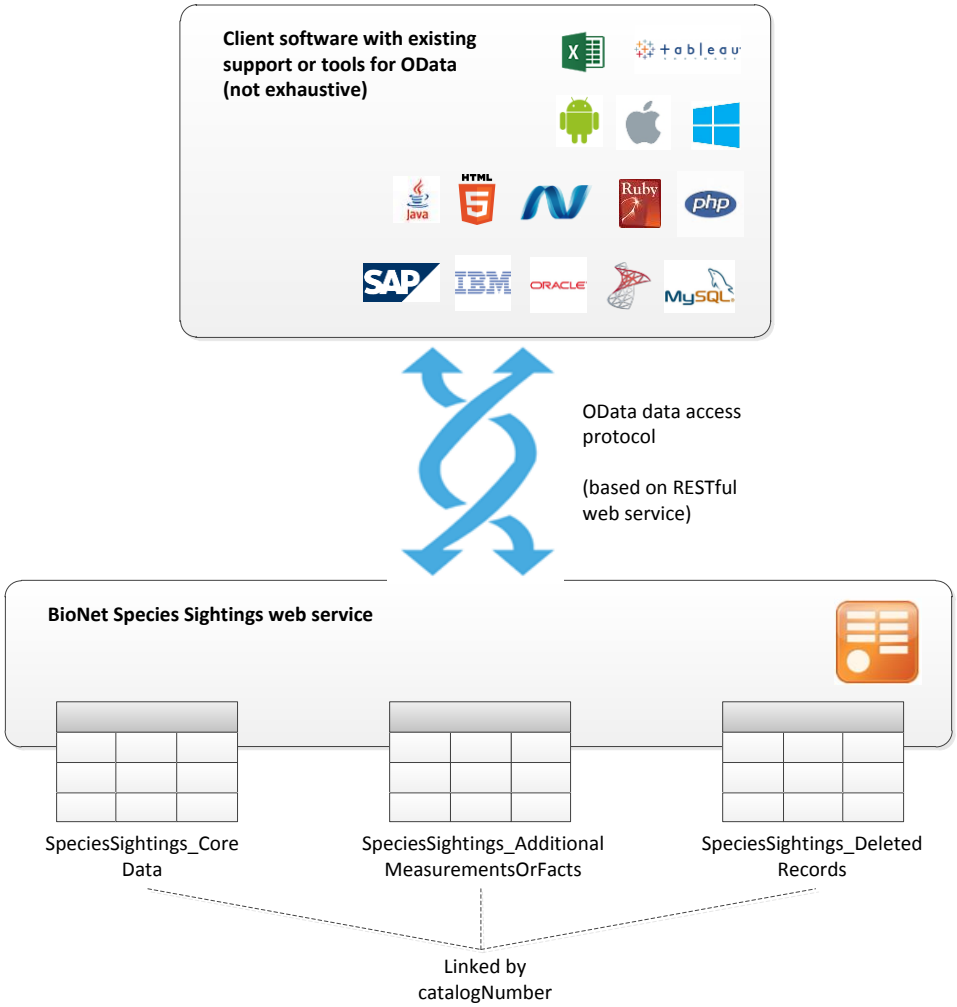


Figure 2: Conceptual overview of data exposure via OData based web service

The data standard for the CoreData and AdditionalMeasuremntsOrFacts entity sets is based on the Darwin Core standard (http://rs.tdwg.org/dwc/2014-11-08/terms/index.htm). Where data provided by OEH does not fit into an existing Darwin Core term, either terms already in use by the Atlas of Living Australia (ALA) or new proprietary terms were created. These are indicated in the standard. The following diagrams give a high level overview of the type of data communicated in each of the entity sets.

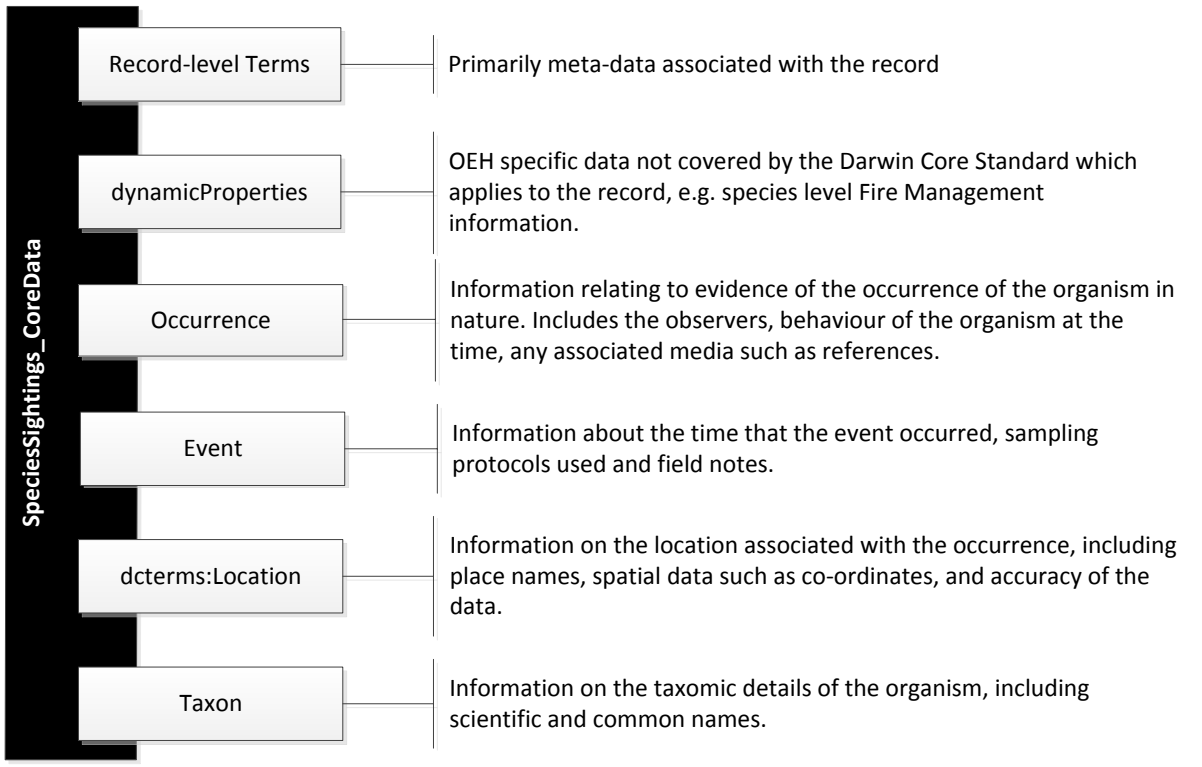


Figure 3: Overview of the categories of data shared via the SpeciesSightings_CoreData entity set

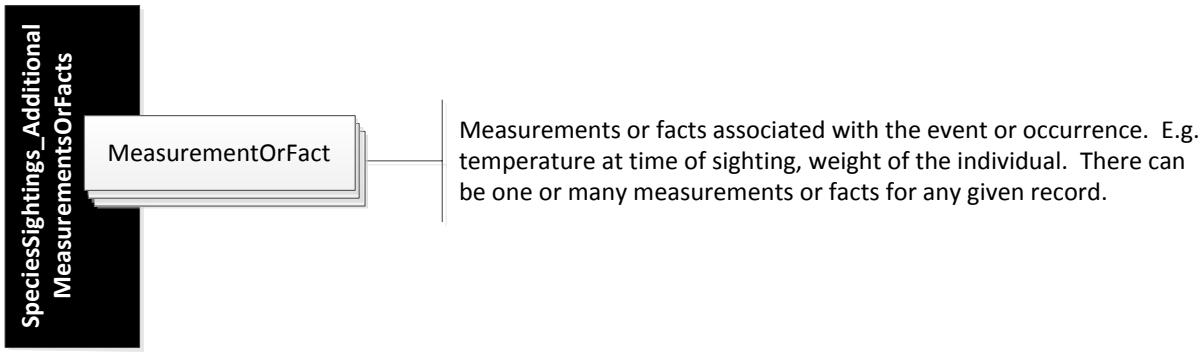


Figure 4: Overview of the categories of data shared via the SpeciesSightings_AdditionalMeasurementsOrFacts entity set

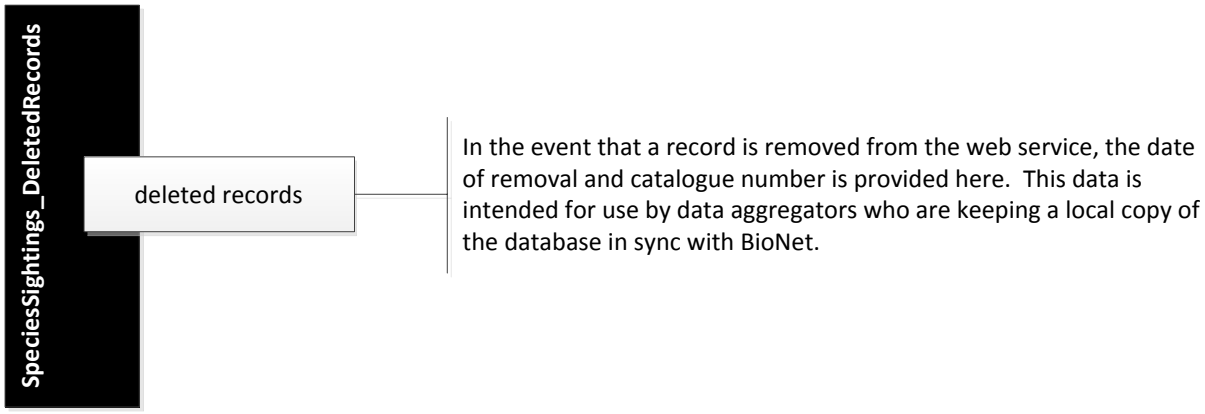


Figure 5: Overview of the categories of data shared via the SpeciesSightings_DeletedRecords entity set

3. SpeciesSightings_CoreData

The following tables provide the exact specifications of the data fields available via the Species Sightings Web Service. Each table presents the group of terms which fall within the relevant category. Each field is also marked with a Standards reference to clearly indicate if the field is a DarwinCore term (marked DwC), an existing Atlas of Living Australia term which we have re-used (marked ALA), or an Office of Environment and Heritage proprietary term (marked OEH).

Where reference is made to Category 2 or 3 species in the 'Access restrictions column' this indicates that data is being withheld or obfuscated in accordance with the OEH Sensitive species data policy. More details on the sensitive species policy can be found in the Sensitive Species Data Policy.

3.1 Record-level terms

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
basisOfRecord	Yes	The specific nature of the data record. Based on the Darwin Core Type controlled vocabulary (Darwin Core Terms: A quick reference guide).	'PreservedSpecimen', 'FossilSpecimen', 'LivingSpecimen', 'HumanObservation', 'MachineObservation'.	VARCHAR (30)	None	DwC
collectionCode	Yes	The name, acronym, coden or initialism identifying the collection or data set from which the record was derived. This will always be 'BioNet Atlas of NSW Wildlife'.	'BioNet Atlas of NSW Wildlife'	VARCHAR (50)	None	DwC
dataGeneralizations	No	Actions taken to make the shared data less specific or complete than in its original form. In this case, when the record is for a species that is listed in the Sensitive Species data policy information will be given on the actual denaturing applied to the location data. It will be either: • coordinates rounded to 0.01°' for Category 3 species • coordinates rounded to 0.1°' for Category 2 species	'coordinates rounded to 0.01DEG' or 'coordinates rounded to 0.1DEG' And 'The observer name has been changed to a unique User ID'	VARCHAR (300)	None	DwC

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
		• The policy in full including the sensitive species listings can be located at: Sensitive species data policy. For Public and Licensed users the Observer Names will be provided as UserID, and there will be text ='The observer name has been changed to a unique User ID'				
datasetID	Yes	An identifier for the set of data. May be a global unique identifier or an identifier specific to a collection or institution.	12	INT	None	DwC
datasetName	Yes	The name identifying the data set from which the record was derived.	'Atlas of Australian Birds 1', 'OEH Default Sightings', 'Grafton SF EIS Survey'	VARCHAR (100)	None	DwC
dcterms_bibliographic Citation	Yes	A bibliographic reference for the resource as a statement indicating how this record should be cited (attributed) when used. This reference will be formatted as follows: 'Atlas of NSW Wildlife <current date> <HH:MM> <AM/PM> + <HH:MM offset from UTC>' Note: the date and time are AEST adjusted for daylight saving and reflect the data and time that the web service data was last refreshed from the source data (BioNet Atlas of NSW Wildlife database).	'Atlas of NSW Wildlife 22/08/2014 12:47 AM + 10:00'	VARCHAR (50)	None	DwC
dcterms_language	Yes	The language of the resource based on RFC 4646 [RFC4646].	'en' for English	VARCHAR (3)	None	DwC
dcterms_modified	Yes	The most recent date-time on which the resource was changed based on ISO 8601:2004(E). Note: OData only supports datetimeoffset, which mandates that the offset from Coordinated Universal Time (UTC) is given. For many historical records in the BioNet Atlas of NSW Wildlife we cannot be certain that the server capturing the data at the time	'2001-02-15T16:29:56+11:00'	VARCHAR (50)	None	DwC

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
		was adjusted for daylight savings. To this end, the offset should not be relied upon.				
dcterms_rights	Yes	Information about rights held in and over the resource. Typically, rights information includes a statement about various property rights associated with the resource, including intellectual property rights.	'Creative Commons By Attribution'	VARCHAR (300)	None	DwC
dcterms_rightsHolder	Yes	A person or organization owning or managing rights over the resource.	'Office of Environment and Heritage', 'Birds Australia', 'Australian Museum'	VARCHAR (150)	None	DwC
dcterms_type	Yes	The nature or genre of the resource. For Darwin Core, recommended best practice is to use the name of the class that defines the root of the record.	'StillImage', 'MovingImage', 'Sound', 'PhysicalObject', 'Event'.	VARCHAR (20)	None	DwC
informationWithheld	No	Additional information that exists, but that has not been shared in the given record.	'The following fields have been withheld and are only available to licensed or OEH staff: locality, locationRemarks, occurenceRemarks	VARCHAR (300)	None	DwC
institutionCode	Yes	The name (or acronym) in use by the institution having custody of the object(s) or information referred to in the record.	'NSW Office of Environment and Heritage'	VARCHAR (200)	None	DwC
ownerInstitutionCode	Yes	The name (or acronym) in use by the institution having ownership of the object(s) or information referred to in the record.	'Office of Environment and Heritage', 'Birds Australia', 'Australian Museum'	VARCHAR (150)	None	DwC

3.2 dynamicProperties

Field Name	Always present ?	Definition	Example	Data Type	**Access restrictions**	**Standards reference**
BFMCS	No	The number of bush fire management council areas that the species is found in.	'8'	VARCHAR(5)	None	OEH
botanicalDivision	Yes	The name of the Botanical Division within which the flora record occurs based on Harden (1990)[1]. Will be one of the following: • North Coast • Central Coast • South Coast • Northern Tablelands • Central Tablelands • Southern Tablelands • North Western Slopes • South Western Slopes • North Western Plains • South Western Plains • North Far Western Plains • South Far Western Plains	'North Coast'	VARCHAR(100)	None	OEH
CMA	Yes	The name of the Catchment Management Authority within which the record occurs.	'Northern Rivers'	VARCHAR(100)	None	OEH
CMAsubregion	Yes	The name of the Catchment Management Authority subregion within which the record occurs.	'Clarence Valley'	VARCHAR(100)	None	OEH
floraReserve	Yes	If the record occurs within a flora reserve (as defined in the *Forestry Act 2012*) this field gives the name of that flora reserve. If the field is marked 'N/A' this	'Fenwicks Scrub Flora Reserve'	VARCHAR(100)	None	OEH

[1] Harden, G.J. (ed) (1990) *Flora of New South Wales* – Volume 1, New South Wales University Press.

Field Name	Always present ?	Definition	Example	Data Type	**Access restrictions**	**Standards reference**
		indicates that the record does not occur within a flora reserve. Note: This field does not give the name of reserves administered under the *National Parks Wildlife Act 1974*. See the 'reserve' field for information on reserves administered under that act.				
geogExtent	No	The geographic extent of the species based on the following controlled vocabulary: • W = Widespread; where the species is known from 5 or more BFMCs • R = Restricted; where the species is known from 2 to 4 BFMCs • HR = Highly Restricted; where the species in only known from 1 BFMC Otherwise this field gives the value 'N/A'	'HR'	VARCHAR(5)	None	OEH
IBRA	Yes	The name of the IRBA (Interim Biogeographic Regionalisation for Australia) Region within which the record occurs. This is based on IRBA version 6.1. Otherwise this field gives the value 'N/A' For more information on IBRA refer to: Australia's bioregions (IBRA)	'New England Tablelands'	VARCHAR(100)	None	OEH
mechanicalHRDescription	Yes	Information on any restrictions on the use of Mechanical Hazard Reduction Techniques within 100 metres of the Occurrence record. Otherwise this field gives the value 'N/A'	'No slashing, trittering or tree removal', 'Slashing in winter, but no trittering or tree removal'	VARCHAR(200)	None	OEH
potentialImpact	Yes	A categorisation of the information recorded in speciesFireDescription into one of three broad categories related to the use of fire as a Hazard Reduction techniques using the following controlled vocabulary: • Exclude Bush Fire • Restrict Bush Fire	'Restrict Bush Fire'	VARCHAR(20)	None	OEH

Field Name	Always present ?	Definition	Example	Data Type	**Access restrictions**	**Standards reference**
		• No Conditions Otherwise this field gives the value 'N/A'				
TSProfileID	Yes	The unique identifier for the related threatened species profile as stored in the Threatened Species Profile Database maintained by the Office of Environment and Heritage. Otherwise this field gives the value 'N/A'	'10484'	VARCHAR(10)	None	OEH
reserve	Yes	If the record occurs within a reserve (as defined in the *National Parks and Wildlife Act 1974*) this field gives the name of that reserve. If the field is marked 'N/A', this indicates that the record does not occur within a reserve. The following types of reserve are covered under this legalisation: • national park • historic site • state conservation area • regional park • karst conservation reserve • nature reserve • Aboriginal area. Note: This field does not give the name of reserves administered under the *Forestry Act 2012*. See the 'floraReserve' field for information on flora reserves.	'Cocoparra National Park', 'Bedooba State Conservation Area'	VARCHAR(100)	None	OEH
speciesFireDescription	Yes	Information on any restrictions on the use of Controlled Burning as a Hazard Reduction Technique within 100 metres of the Occurrence record. Otherwise this field gives the value 'N/A'	'No burning within 100 metres of streams', 'No burning from 1 August to 31 March, and no more than once every 2 years. Retain logs on ground.', 'No fire'	VARCHAR(200)	None	OEH

Field Name	Always present ?	Definition	Example	Data Type	**Access restrictions**	**Standards reference**
stateForest	Yes	If the record occurs within a state forest (as defined in the *Forestry Act 2012*) this field gives the name of that state forest. If the field is marked 'N/A' this indicates that the record does not occur within a state forest.	'Bom Bom State Forest'	VARCHAR(100)	None	OEH
vulnerability	Yes	Vulnerability of the species to Hazard Reduction activities, based on a combination of Status on the Threatened Species Conservation Act and the species Geographic Extent as recorded in GeogExtent. Uses the following controlled vocabulary: • L = Low • M = Moderate • H = High • VH = Very High Otherwise this field gives the value 'N/A'	'VH'	VARCHAR(5)	None	OEH

3.3 Occurrence

Field Name	Always Present?	Definition	Example	Data Type	Access restrictions	Standards reference
associatedReferences	No	A list (concatenated and separated) of identifiers (publication, bibliographic reference, global unique identifier, URI) of literature associated with the Occurrence.	'Christopher J. Conroy, Jennifer L. Neuwald. 2008. Phylogeographic study of the California vole, Microtus californicus Journal of Mammalogy, 89(3):755-767.'.	VARCHAR (500)	None	DwC
austConservation	No	The Legal Status of the species under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act), and Migratory Bird agreements (JAMBA, CAMBA and ROKAMBA). It uses the following controlled vocabulary: Description: Definition under the EPBC Act 1999, and Migratory Birds agreement. CAMBA: China-Australia Migratory Bird Agreement: Refers to species listed in the Bilateral Agreement between the Government of Australia and the Government of the People's Republic of China for the protection of Migratory Birds and their Environment (Part 5, Commonwealth EPBC Act 1999). Conservation Dependent: A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:	'CAMBA'	VARCHAR (150)	None	ALA

Field Name	Always Present?	Definition		Example	Data Type	Access restrictions	Standards reference
			a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or b) the following subparagraphs are satisfied: i. the species is a species of fish ii. the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised iii. the plan of management is in force under a law of the Commonwealth or of a State or Territory iv. cessation of the plan of management would adversely affect the conservation status of the species (Subdivision A of Division 1 of Part 13, Commonwealth EPBC Act 1999).				
		Critically Endangered	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the				

Field Name	Always Present?	Definition		Example	Data Type	Access restrictions	Standards reference
			prescribed criteria (Subdivision A of Division 1 of Part 13, Commonwealth EPBC Act 1999).				
		Endangered	A native species is eligible to be included in the endangered category at a particular time if, at that time: a) it is not critically endangered; and b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria (Subdivision A of Division 1 of Part 13, Commonwealth EPBC Act 1999).				
		JAMBA	Japan-Australia Migratory Bird Agreement: Refers to species listed in the Bilateral Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (Part 5, Commonwealth EPBC Act 1999).				
		ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement: Refers to species listed in the Bilateral Agreement between the Government of Australia and the Government of the Republic of Korea for the protection of Migratory Birds and their Environment (Part 5, Commonwealth EPBC Act 1999).				

Field Name	Always Present?	Definition		Example	Data Type	Access restrictions	Standards reference
		Key Threatening Process	Refers to a key process that threatens or may threaten the survival, abundance or evolutionary development of a native species or ecological community (Subdivision A of Division 1 of Part 13, Commonwealth EPBC Act 1999).				
		Vulnerable	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: a) it is not critically endangered or endangered; and b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria (Subdivision A of Division 1 of Part 13, Commonwealth EPBC Act 1999).				
		Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died (Subdivision A of Division 1 of Part 13, Commonwealth EPBC Act 1999).				
		Extinct in the Wild	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or b) it has not been recorded in its known and/or expected habitat, at appropriate seasons,				

Field Name	Always Present?	Definition	Example	Data Type	Access restrictions	Standards reference
		anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form (Subdivision A of Division 1 of Part 13, Commonwealth EPBC Act 1999).				
catalogNumber	Yes	An identifier (preferably unique) for the record within the data set or collection.	'WD9884'	VARCHAR (20)	None	DwC
consequence	No	Final assessment as to the impact of Hazard Reduction activities on a species, based on the following controlled vocabulary: • Mi: Minor • Mo: Moderate • Ma: Major • C: Critical	'Ma'	VARCHAR (5)	None	OEH
establishmentMeans	Yes	The process by which the biological individual(s) represented in the Occurrence became established at the location. Based on the following controlled vocabulary: • Alive in NSW, Native • Extinct in NSW, Native • Introduced • Not Known from NSW • Hybrid	'Introduced'	VARCHAR (150)	None	DwC
estimateTypeCode	No	Refers to the accuracy of the NumberIndividuals field using the following controlled vocabulary: • At least • Less than • Greater than • Estimate • Exactly	'At least'	VARCHAR (20)	None	OEH

Field Name	Always Present?	Definition	Example	Data Type	Access restrictions	Standards reference
individualCount	No	The number of individuals represented present at the time of the Occurrence.	'25'	NUMERIC (18)	None	DwC
individualID	No	An identifier for an individual or named group of individual organisms represented in the Occurrence. Meant to accommodate resampling of the same individual or group for monitoring purposes. May be a global unique identifier or an identifier specific to a data set.	'DJS019'	VARCHAR (100)	None	DwC
observationType	Yes	Refers to the mode of observation. Uses a controlled vocabulary as follows: • Acoustic recording • Bone, teeth or shell • Burnt • Burrow • Camera • Cat kill • Crushed Cones • Dead • Dog kill • Flora Record • Floristics Record from Systematic Flora Survey • Fox kill • Hair, feathers or skin • Heard call • In raptor/owl pellet • In scat • Miscellaneous • Nest/roost • Not located • Observed • Observed and Heard call	'Nest/Roost'	VARCHAR (50)	None	OEH

Field Name	Always Present?	Definition	Example	Data Type	Access restrictions	Standards reference
		• Road kill • Scat • Shot • Stranding/beached • Subfossil/Fossil Remains • Tracks, scratchings • Trapped or netted • Ultrasonic recording				
occurrenceID	Yes	An identifier for the Occurrence (as opposed to a particular digital record of the occurrence). In the absence of a persistent global unique identifier, construct one from a combination of identifiers in the record that will most closely make the occurrenceID globally unique. For this service it will be constructed according to the recommended Darwin Core formula as follows: 'urn:catalog:[institutionCode]:[collectionCode]:[catalogNumber]	'urn:catalog: NSW Office of Environment and Heritage: BioNet Atlas of NSW Wildlife: WD9884'.	VARCHAR (300)	None	DwC
occurrenceRemarks	No	Comments or notes about the Occurrence.	'found dead on road'.	VARCHAR (1000)	For Public and Registered users this field is withheld for Category 2 & 3 species. For licensed users this field is withheld for Category 2 species.	DwC

Field Name	Always Present?	Definition	Example	Data Type	Access restrictions	Standards reference
occurrenceStatus	Yes	A statement about the presence or absence of a Taxon at a Location, based on the following controlled vocabulary: • Present • Absent	'Present'	VARCHAR (20)	None	DwC
otherCatalogNumbers	No	A list (concatenated and separated) of previous or alternate fully qualified catalog numbers or other human-used identifiers for the same Occurrence, whether in the current or any other data set or collection.	'The Australian Museum, Sydney R10694', 'Royal Botanic Gardens & National Herbarium of NSW, Sydney NSW227432'.	VARCHAR (2000)	None	DwC
PNFFilter	Yes	Indicator as to whether the record is relevant to the Private Native Forestry Code of Practice based on the following controlled vocabulary: • Y (Yes) • N (No) See Private Native Forestry Code of Practice for more details and to download the code of practice.	'Y', 'N'	VARCHAR (1)	None	OEH
populationName	No	Where the observation relates to the occurrence of a species within an endangered population as listed under the *Threatened Species conservation Act 1995*, the name of the threatened population will be given here.	'Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area'	VARCHAR (255)		
recordedBy	No	A list (concatenated and separated) of names of people, groups, or organisations responsible for recording the original Occurrence.	'Oliver P. Pearson; Anita K. Pearson'	VARCHAR (500)	For Public, Registered and Licensed users the recorder name has been replaced with a	DwC

Field Name	Always Present?	Definition	Example	Data Type	Access restrictions	Standards reference
					unique UserID	
recordNumber	No	An identifier given to the Occurrence at the time it was recorded. Often serves as a link between field notes and an Occurrence record, such as a specimen collector's number.	'OPP7101'	VARCHAR (30)	None	DwC
reproductiveCondition	No	The reproductive condition of the biological individual(s) represented in the Occurrence. For Fauna, the following controlled vocabulary is applied: • Not breeding • A Adult • D Distraction display • E Eggs • G Gravid • I Immature (subadult) • J Juveniles • L Lactating • M Nestling • N Nesting • P Pregnant • T Tadpoles • Y Yes, but no details For Flora, the following controlled vocabulary is applied: • BU Flower Buds • FL Flowering • FR Fresh Fruit • N No Breeding Evident • OF Old Fruit • SD Seeds • SE Seedlings Present • Y Breeding Present, but not specified	'- Not breeding,A Adult,D Distraction display,E Eggs,I Immature (subadult),M Nestling,N Nesting'	VARCHAR (900)	None	DwC

<table>
<tr><th>Field Name</th><th>Always Present?</th><th>Definition</th><th>Example</th><th>Data Type</th><th>Access restrictions</th><th>Standards reference</th></tr>
<tr><td>sex</td><td>No</td><td>The sex of the biological individual(s) represented in the Occurrence based on the following controlled vocabulary:
Not Recorded
Female
Male
Unknown
Mixed sexes</td><td>‘Female’, ‘Unknown’</td><td>VARCHAR (20)</td><td>None</td><td>DwC</td></tr>
<tr><td>stateConservation</td><td>No</td><td>The Legal Status of the species within NSW under the Threatened Species Conservation Act (TSC Act 1995), the National Parks and Wildlife Act 1974 (NPW Act 1974), the Fisheries Management Act 1994 No. 38 (FM Act 1994) and the Sensitive Species Data Policy (SSDP).

Any given record can contain one or more of the following status’:<table><tr><th>Description</th><th>Definition under the NPW Act 1974, the TSC Act 1995, the FM Act 1994 No. 38, or the SSDP.</th></tr><tr><td>Protected</td><td>Refers to fauna not listed in Schedule 11 of the NPW Act 1974 or to flora listed in Schedule 13 of the NPW Act 1974.</td></tr><tr><td>Vulnerable</td><td>Refers to fauna and flora species that are likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate (Schedule 2, TSC Act 1995).</td></tr><tr><td>Endangered</td><td>Refers to fauna and flora species that are likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary developments cease to operate; or, its numbers have been reduced to such a critical level, or its habitats have been so</td></tr></table></td><td>‘Protected’, ‘Endangered, Category 2 Sensitive Species’</td><td>VARCHAR (150)</td><td>None</td><td>ALA</td></tr>
</table>

Field Name	Always Present?	Definition		Example	Data Type	Access restrictions	Standards reference
			drastically reduced, that it is in immediate danger of extinction; or, it might already be extinct, but it is not presumed extinct (Schedule 1, part 1, TSC Act 1995).				
		Endangered Population	Refers to a population where, in the opinion of the Scientific Committee, its numbers have been reduced to such a critical level, or its habitat has been so drastically reduced, that it is in immediate danger of extinction and it is not a population of a species already listed in Schedule 1, and: (a) it is disjunct and at or near the limit of its geographic range, or (b) it is or is likely to be genetically distinct, or (c) it is otherwise of significant conservation value. (Schedule 1, part 2, TSC Act 1995).				
		Presumed Extinct	Refers to fauna and flora species that have not been located in nature during the preceding 50 years despite searching of known and likely habitats of that period (Schedule 1, part 4, TSC Act 1995).				
		Critically Endangered	Refers to a species that is eligible to be listed as a critically endangered species if, in the opinion of the Scientific Committee, it is facing an extremely high risk of extinction in New South Wales in the immediate future, as determined in accordance with criteria prescribed by the regulations. (Schedule 1a, part 1, TSC Act 1995).				
		Category 2 sensitive species	Refers to species for which Atlas sightings' coordinates will be supplied denatured to public web applications, and denatured to licensed clients. Such species are classed as highly sensitive,				

Field Name	Always Present?	Definition		Example	Data Type	Access restrictions	Standards reference
			and provision of precise locations would subject the species to high risk from threats such as disturbance and collection.				
		Category 3 sensitive species	Refers to species for which sightings' coordinates will be supplied denatured to public web applications, but supplied 'as-held' to licensed clients. Current denaturing specifications are set out in Appendix 2. Such species are classed as of medium sensitivity, and provision of precise locations would subject the species to medium risk from threats such as collection/deliberate damage. Data are supplied under the conditions of a written data agreement, usually a Data Licence Agreement.				
status	Yes	The status of the record with respect to its validity as per the following controlled vocabulary: • Accepted as valid from quarantine • Invalid, in quarantine • Rejected as certainly incorrect • Suspect • Vagrant or Escaped Animal or Planted Specimen • Valid and accepted without modification • Valid record from population that is no longer extant		'Suspect', 'Rejected as certainly incorrect'	VARCHAR (200)	Public and Registered users can only access records where status is valid or accepted as valid or 'Vagrant or Escaped Animal or Planted Specimen'	OEH

3.3 Event

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
eventDate	Yes	The date-time or interval during which an Event occurred. For occurrences, this is the date-time when the event was recorded. As per recommended best practice encoded using ISO 8601:2004(E).	'1978-06-01/1978-06-28'	VARCHAR (25)	None	DwC
eventID	No	The unique key assigned to a Census. A Census is a time distinct assessment conducted within a survey at a designated site.	'CPXEI0000001'	VARCHAR (20)	For Category 2 & 3 Sensitive species, this data is withheld from Public, Registered and Licensed users.	DwC
eventRemarks	No	Comments or notes about the Event.	'after the recent rains the river is nearly at flood stage'.	VARCHAR (1000)	None	DwC
eventTime	No	The time or interval during which an Event occurred. As per recommended best practice encoded using ISO 8601:2004(E).	'10:00:00/10:05:00'	VARCHAR (20)	None	DwC
habitat	No	A category or description of the habitat in which the Event occurred as per the following controlled vocabulary: • Closed chenopod shrubland • Isolated chenopod shrub • Isloated clump of chenopod shrubs • Chenopod shrubland • Open chenopod shrubland • Sparse chenopod shrubland • Closed sod grassland • Isolated sod grasses • Isolated clump of sod grasses	'Sod grassland', 'Open tussock grassland'	VARCHAR (150)	For Category 2 & 3 Sensitive species, this data is withheld from Public, Registered and Licensed users.	DwC

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
		• Sod grassland • Open sod grassland • Sparse sod grassland • Closed fernland • Isolated ferns • Isolated clumps of ferns • Fernland • Open fernland • Sparse fernland • Closed forbland • Isolated forbs • Isolated clumps of forbs • Forbland • Open forbland • Sparse forbland • Closed tussock grassland • Isolated tussock grasses • Isolated clump of tussock grasses • Tussock grassland • Open tussock grassland • Sparse tussock grassland • Closed hummock grassland • Isolated hummock grass • Isolated clump of hummock grasses • Hummock grassland • Open hummock grassland • Sparse grassland • Closed vineland • Isolated vines				

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
		• Isolated clump of vines • Vineland • Open vineland • Sparse vineland • Closed mallee forest • Isolated mallee trees • Isolated clump of mallee trees • Open mallee forest • Mallee woodland • Open mallee woodland • Closed lichenland • Isolated lichens • Isolated clup of lichens • Lichenland • Open lichenland • Sparse lichenland • Beach • Billabong or Swamp • Coastal Waters • Estuary • Freshwater Lake • Grazing Land • Saltwater Lake • Mudflat • Open Ocean • Crop Land • Rock Outcrop • Stream or River • Urban				

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
		• Cave • Closed rushland • Isolated rushes • Isolated clump of rushes • Rushland • Open rushland • Sparse rushland • Closed shrubland • Isolated shrubs • Isolated clump of shrubs • Shrubland • Open shrubland • Sparse shrubland • Closed forest • Isolated trees • Isolated clump of trees • Open forest • Woodland • Open woodland • Closed sedgeland • Isolated sedges • Isolated clump of sedges • Sedgeland • Open sedgeland • Sparse sedgeland • Closed liverwortland • Isolated liverworts • Isolated clump of liverworts • Liverwortland				

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
		• Open liverwortland • Sparse liverwortland • Closed mossland • Isolated mosses • Isolated clump of mosses • Mossland • Open mossland • Sparse mossland • Closed mallee shrubland • Isolated mallee shrubs • Isolated clump of mallee shrubs • Mallee shrubland • Open mallee shrubland • Sparse mallee shrubland • Closed heathland • Isolated heath shrub • Isolated clump of heath shrubs • Heathland • Open heath • Sparse heath				
samplingEffort	No	The amount of effort expended during an Event.	'60.00 Trap Nights'	VARCHAR (200)	For Category 2 & 3 Sensitive species this data is withheld from Public, Registered and Licensed users.	DwC
samplingProtocol	No	The name of, reference to, or description of the method or protocol used during an Event.	'20 by 20 Vegetation Plot (old type)', 'Bat Ultrasound', 'Cage Trapping'	VARCHAR (255)	For Category 2 & 3 Sensitive species this data is withheld from	DwC

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
					Public, Registered and Licensed users.	

3.4 Dcterms:Location

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
coordinatePrecision	Yes	A decimal representation of the precision of the coordinates given in the decimalLatitude and decimalLongitude. For example, 2 for coordinates accurate to two decimal places. Note: be careful with coordinates converted from D:M:S they can have a lot of decimal places that are not warranted by the original coordinates.	'1', '2', '9'	VARCHAR (5)	None	DwC
coordinateUncertaintyInMeters	Yes	The horizontal distance (in metres) from the given decimalLatitude and decimalLongitude describing the smallest circle within which the Location is likely to occur. For example a value of 100 would mean that the location is accurate to the nearest 100 metres.	'30.0000' '50'	NUMERIC (10,4)	None	DwC
country	Yes	The name of the country or major administrative unit in which the Location occurs. Recommended best practice is to use a controlled vocabulary such as the Getty Thesaurus of Geographic Names.	'Australia'	VARCHAR (9)	None	DwC
countryCode	Yes	The standard code for the country in which the Location occurs. Recommended best practice is to use ISO 3166-1-alpha-2 country codes.	'AU' for Australia	VARCHAR (2)	None	DwC
county	Yes	The full, unabbreviated name of the next smaller administrative region than stateProvince (county, shire, department, etc.) in which the Location occurs. In the context of NSW, the Local Government Area. Where the record does not occur in a NSW LGA this field give the value 'N/A'	'Clarence Valley', 'Dubbo', 'Tumut'	VARCHAR (120)	None	DwC
decimalLatitude	Yes	The geographic latitude (in decimal degrees, using the spatial reference system given in	'-36.864246125'	NUMERIC (12,9)	For Public and Registered users,	DwC

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
		geodeticDatum) of the geographic center of a Location. Positive values are north of the Equator, negative values are south of the Equator. Legal values lie between -90 and 90, inclusive.			this data is denatured to 0.01 for Category 3 Sensitive species, and 0.1 for Category 2 Sensitive species For Licensed users, this data is denatured to 0.01 for Category 2 Sensitive species.	
decimalLongitude	Yes	The geographic longitude (in decimal degrees, using the spatial reference system given in geodeticDatum) of the geographic center of a Location. Positive values are east of the Greenwich Meridian, negative values are west of it. Legal values lie between -180 and 180, inclusive.	'149.927962884'	NUMERIC (12,9)	For Public and Registered users, this data is denatured to 0.01 for Category 3 Sensitive species, and 0.1 for Category 2 Sensitive species For Licensed users, this data is denatured to 0.01 for Category 2 Sensitive species.	DwC
easting	Yes	The reference in metres, measured east of an arbitrary origin (also referred to as the x-coordinate). The Easting provided in Atlas reports has been calculated from the Latitude and Longitude values. Data provided in Map Grid of Australia (MGA).	'691573'	NUMERIC (6)	For Public and Registered users, this data is denatured to 0.01 (decimal degrees or add degrees symbol as per northing) for Category 3 Sensitive species, and 0.1 (decimal degrees) for	ALA

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
					Category 2 Sensitive species For Licensed users, this data is denatured to 0.01 (decimal degrees)for Category 2 Sensitive species.	
geodeticDatum	Yes	The ellipsoid, geodetic datum, or spatial reference system (SRS) upon which the geographic coordinates given in decimalLatitude and decimalLongitude are based. Recommended best practice is to use the European Petroleum Survey Group (EPSG) code as a controlled vocabulary to provide an SRS, if known. Otherwise use a controlled vocabulary for the name or code of the geodetic datum, if known. Otherwise use a controlled vocabulary for the name or code of the ellipsoid, if known. If none of these is known, use the value 'unknown'.	'GDA94'	VARCHAR (5)	None	DwC
georeferenceProtocol	No	A description or reference to the methods used to determine the spatial footprint, coordinates, and uncertainties. In the context of this data set, it will indicate if GPS was used to determine the location.	'GPS'	VARCHAR (5)	None	DwC
locality	No	The specific description of the place. Less specific geographic information can be provided in other geographic terms (higherGeography, continent, country, stateProvince, county, municipality, waterBody, island, islandGroup). This term may contain information modified from the original to correct perceived errors or standardize the description.	'Hawkshead Road, 1km W of Hereford Park. Specified Map No: 8824'	VARCHAR (500)	For Category 2 & 3 Sensitive species, this data is withheld from Public and Registered users. For Category 2 Sensitive species, this data is withheld	DwC

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
					from Licensed users.	
locationID	No	An identifier for the set of location information (data associated with dcterms:Location). May be a global unique identifier or an identifier specific to the data set.	'7457-HO', '5224-035'		For Category 2 & 3 Sensitive species this data is withheld from Public and Registered users. For Category 2 Sensitive species, this data is withheld from Licensed users.	DwC
locationRemarks	No	Comments or notes about the Location.	'Partially cleared and regenerated.'	VARCHAR (1000)	This data is withheld from Public and Registered users.	DwC
mapSheetNumber	Yes	The Australian Topographic Map Sheet number for the map which covers the location of the record. Where the record does not overlap a valid NSW mapsheet this field gives the value 'N/A'	'8824 – BEGA'	VARCHAR (200)	None	OEH
maximumElevationInMeters	No	The upper limit of the range of elevation (altitude, usually above sea level), in metres.	'200'.	NUMERIC (4)	For Category 2 & 3 Sensitive species, this data is withheld from Public and Registered users. For Category 2 Sensitive species, this data is withheld from Licensed users.	DwC
minimumElevationInMeters	No	The lower limit of the range of elevation (altitude, usually above sea level), in metres.	'100'.	NUMERIC (4)	For Category 2 & 3 Sensitive species this data is withheld	DwC

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
					from Public and Registered users. For Category 2 Sensitive species, this data is withheld from Licensed users.	
northing	Yes	The reference in metres, measured north of an arbitrary origin (also referred to as the y-coordinate). The Northing provided in Atlas reports has been calculated from the Latitude and Longitude values. Data provided in Map Grid of Australia (MGA).	'6121614'	NUMERIC (7)	For Public and Registered users, this data is denatured to 0.01º for Category 3 species, and 0.1º for Category 2 species. For Licensed users, this data is denatured to 0.01º for Category 2 species.	ALA
stateProvince	Yes	The name of the next smaller administrative region than country (state, province, canton, department, region, etc.) in which the Location occurs. Where the record does not overlap a valid Australian state, this field gives the value 'N/A'	'NSW'	VARCHAR (15)	None	DwC
zone	Yes	A 6° band of longitude, divided according to the Universal Transverse Mercator (UTM) coordinate system. NSW Is divided into 4 Zones; Zone 56 is 150° –156° longitude, which encompasses much of eastern NSW. Zone 55 is 144°–150° longitude. Zone 54 is 138°–144° longitude, encompassing most of Western NSW. Zone 57 covers Lord Howe Island. The Zone in Atlas reports has been calculated from the Latitude and Longitude values. Data provided in MGA.	'55'	NUMERIC (2)	None	ALA

3.5 Taxon

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
class	Yes	The full scientific name of the class in which the taxon is classified.	'Aves', 'Equisetopsida'	VARCHAR (150)	None	DwC
family	Yes	The full scientific name of the family in which the taxon is classified.	'Cacatuidae', 'Fabaceae'	VARCHAR (50)	None	DwC
genus	Yes	The full scientific name of the genus in which the taxon is classified.	'Callocephalon', 'Acacia'	VARCHAR (50)	None	DwC
infraspecificEpithet	No	The name of the lowest or terminal infraspecific epithet of the scientificName, excluding any rank designation.	'latifolia', 'calcicola'	VARCHAR (50)	None	DwC
kingdom	Yes	One of the following three values: • Animalia • Plantae • Fungi	'Plantae',	VARCHAR (150)	None	DwC
nomenclaturalCode	Yes	The nomenclatural code (or codes in the case of an ambiregnal name) under which the scientificName is constructed. Recommended best practice is to use a controlled vocabulary.	'ICBN', 'ICZN'	VARCHAR (5)	None	DwC
order	Yes	The full scientific name of the order in which the taxon is classified.	'Psittaciformes'	VARCHAR (150)	None	DwC
scientificName	Yes	The full scientific name, with authorship and date information if known. When forming part of an identification, this should be the name in lowest level taxonomic rank that can be determined.	'Callocephalon fimbriatum', 'Acacia pycnantha'	VARCHAR (80)	None	DwC
scientificNameAuthorship	No	The authorship information for the scientificName formatted according to the conventions of the applicable nomenclaturalCode.	'(Grant, 1803)'	VARCHAR (100)	None	DwC
scientificNameID	Yes	An identifier for the nomenclatural (not taxonomic) details of a scientific name.	'0268'	VARCHAR (10)	None	DwC

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
sortOrder	Yes	An integer used to sort species in a sensible taxonomic order	'97'	INT	None	OEH
specificEpithet	No	The name of the first or species epithet of the scientificName.	'fimbriatum', 'pycnantha'	VARCHAR (50)	None	DwC
taxonRank	Yes	The taxonomic rank of the most specific name in the scientificName.	'Subspecies', 'Species', 'Genus'.	VARCHAR (150)	None	DwC
vernacularName	No	A common or vernacular name.	'Gang-gang Cockatoo', 'Golden Wattle'	VARCHAR (80)	None	DwC

4. SpeciesSightings_AdditionalMeasurementsOrFacts

4.1 MeasurementOrFact

As discussed in the overview, additional measurements associated with a given sighting record will be supplied via a linked table using Darwin Core AdditionalMeasurementsOrFacts. Each measurement will be linked back to the sighting record using the catalogNumber with the table below documenting the Darwin Core fields that will be made available via the Species Sightings web service.

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
catalogNumber	Yes	An identifier (preferably unique) for the record within the data set or collection.	'WD9884'	VARCHAR (20)	None	DwC
measurementType	Yes	The nature of the measurement, fact, characteristic, or assertion. Recommended best practice is to use a controlled vocabulary. See the meaurementType table below for the full list of measurements supplied via the Species Sightings Web Service.	'Aspect'	VARCHAR (20)	none	DwC
measurementValue	Yes	The value of the measurement, fact, characteristic, or assertion.	'30'	VARCHAR (20)	none	DwC
measurementUnit	Yes	The units associated with the measurementValue. Recommended best practice is to use the International System of Units (SI).	'degrees clockwise from true North'	VARCHAR (150)	none	DwC
occurrenceID	Yes	An identifier for the Occurrence (as opposed to a particular digital record of the occurrence). In the absence of a persistent global unique identifier, construct one from a combination of identifiers in the record that will most closely make the occurrenceID globally unique. For this service it will be constructed according to the recommended Darwin Core formula as follows: 'urn:catalog:[institutionCode]:[collectionCode]:[catalogNumber]	'urn:catalog: NSW Office of Environment and Heritage: BioNet Atlas of NSW Wildlife: WD9884'.	VARCHAR (300)	None	DwC

measurementType

The following table provides the full list of measurementTypes that (where available) will be given for each sighting record.

measurementType	Always present?	Definition	Example
Aspect	No	The aspect of the location where the observations was made measured in degrees clockwise from true North.	'30'
Microhabitat	No	The small-scale habitat (e.g. on ground, or in tree) as per the following controlled vocabulary: • Flying above canopy • In/on bridge • In building • Crevice in rock • Crevice in log • Farm/fire dam • In dead tree (stag) • Edge of water • In/on post or stump • Flying within canopy • On ground • High shrub • In burrow • In cave • In grass • In tree hollow • In litter • In reeds • In soil • In Tree • In water • Lower canopy • Low shrub	'In burrow'

measurementType	Always present?	Definition	Example
		• Mid canopy • On (beach) sand • On fence • On log • -On rock • Over water • Power line • On road • On trunk • Under bark • Upper canopy • Undergrowth • Under log • Under rock • Under iron • Waterhole	
Slope	No	The slope of the location where the observation was made measured in degrees from horizontal.	‘15’
SurfaceGeology	No	The surface geology of the location where the observation was made as per the following controlled vocabulary: • Adamellite • Agglomerate • Altered Substrate Materials • Amphibolite • Andesite • Aplite • Arkose • Ash • Basalt	‘Basalt’

measurementType	Always present?	Definition	Example
		• Breccia • Clay • Chert • Coal • Conglomerate • Coffee Rock • Diorite • Dolomite • Dolerite • Eolianite • Ferricrete • Gabbro • Granodiorite • Greenstone • Granite • Gneiss • Gravel • Graywacke • Hornfels • Unidentified igneous rock • Jasper • Calcrete • Calcareous sand • Laterite • Limestone • Marble • Unidentified metamorphic rock • Marl • Monzonite	

measurementType	Always present?	Definition	Example
		• Mudstone • No Observation Possible • Not Recorded • Obsidian • Other • Phyllite • Quartz porphyry • Quartzite • Rhyolite • Sand • Sandstone • Silcrete • Sand/Clay/Alluvium • Unidentified sedimentary rock • Shale • Shale/Sandstone • Siltstone • Scoria • Slate • Serpentine • Schist • Syenite • Trachyte • Tuff • Unidentified Unconsolidated Substrate Material • Unknown • Silt	

5. SpeciesSightings_DeletedRecords

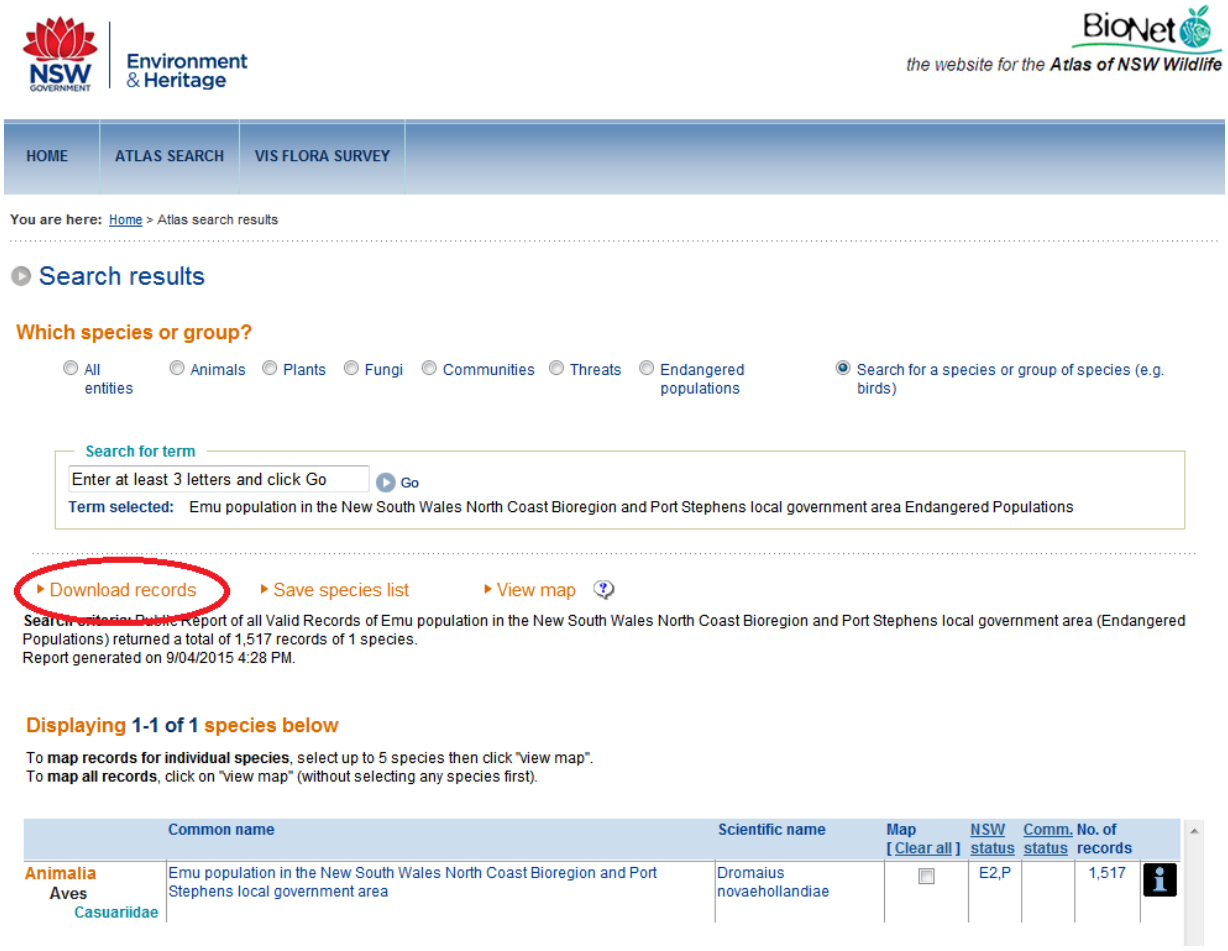
4.1 DeletedRecords

The deleted records entity set will list records that have been deleted during the daily delta sync of data from the source BioNet Atlas of NSW Wildlife to the data warehouse for the Web Service. This enables data aggregators to keep local copies of the entire BioNet Species Sightings collection in sync using a daily delta query rather than downloading the entire collection. Periodically it is necessary for a full re-sync to be undertaken between the source system and the data warehouse, for instance during new releases. When this occurs, the deleted records entity set will be reset and cleared.

Field Name	Always present?	Definition	Example	Data Type	Access restrictions	Standards reference
catalogNumber	Yes	An identifier (preferably unique) for the record within the data set or collection.	'WD9884'	VARCHAR (20)	None	DwC
date	Yes	The date when the record was removed from the SpeciesSightings_CoreData and (if present) the SpeciesSightings_AdditionalMeasurementsOrFacts entity sets based on ISO 8601:2004(E).	'2016-06-18T04:04:56.873+10:00'	VARCHAR (50)	None	OEH

6. Mapping to existing BioNet Atlas of NSW Wildlife field names

The illustration below shows how to manually search for and download records using the BioNet Atlas of NSW Wildlife website.



The following table provides a mapping between the field names in the BioNet Atlas of NSW Wildlife record download and the new standardised field names in the Species Sightings web service.

Field name mapping

BioNet website download field name	Web Service Field Name
Accuracy	coordinateUncertaintyInMeters
CensusKey	eventID
ClassName	class
CommonName	vernacularName
CommStatus	austConservation
DatasetName	datasetName
DateFirst	eventDate
DateLast	eventDate
Description	locality
Easting	easting
Effort	samplingEffort
EstimateTypeCode	estimateTypeCode
Exotic	establishmentMeans
FamilyName	family
KingdomName	kingdom
Latitude_GDA94	decimalLatitude
LocationNotes	locationRemarks
Longitude_GDA94	decimalLongitude
MicrohabitatType	MicrohabitatType
Northing	northing
NSWStatus	stateConservation
NumberIndividuals	individualCount
ObservationType	observationType
Observers	recordedBy
ProfileID	TSProfileID
ScientificName	scientificName
SensitivityClass	stateConservation
SightingKey	catalogNumber
SightingNotes	occurrenceRemarks
SortOrder	sortOrder
SourceCode	basisOfRecord
SpeciesCode	scientificNameID
Status	status
TechniqueType	samplingProtocol
Zone	zone