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JNCC Science Talks

Marine Recorder: Species Dictionary Update Process

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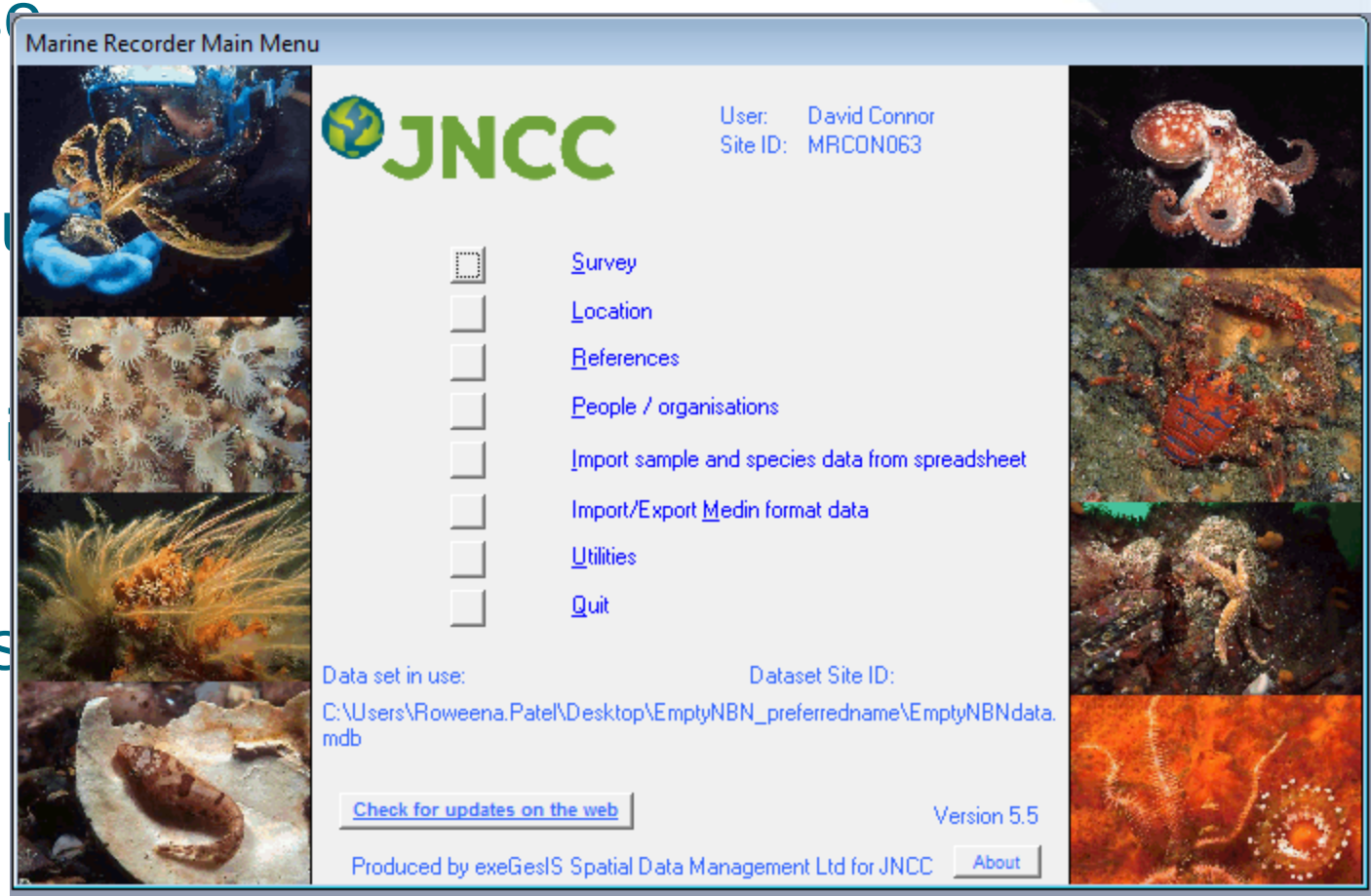
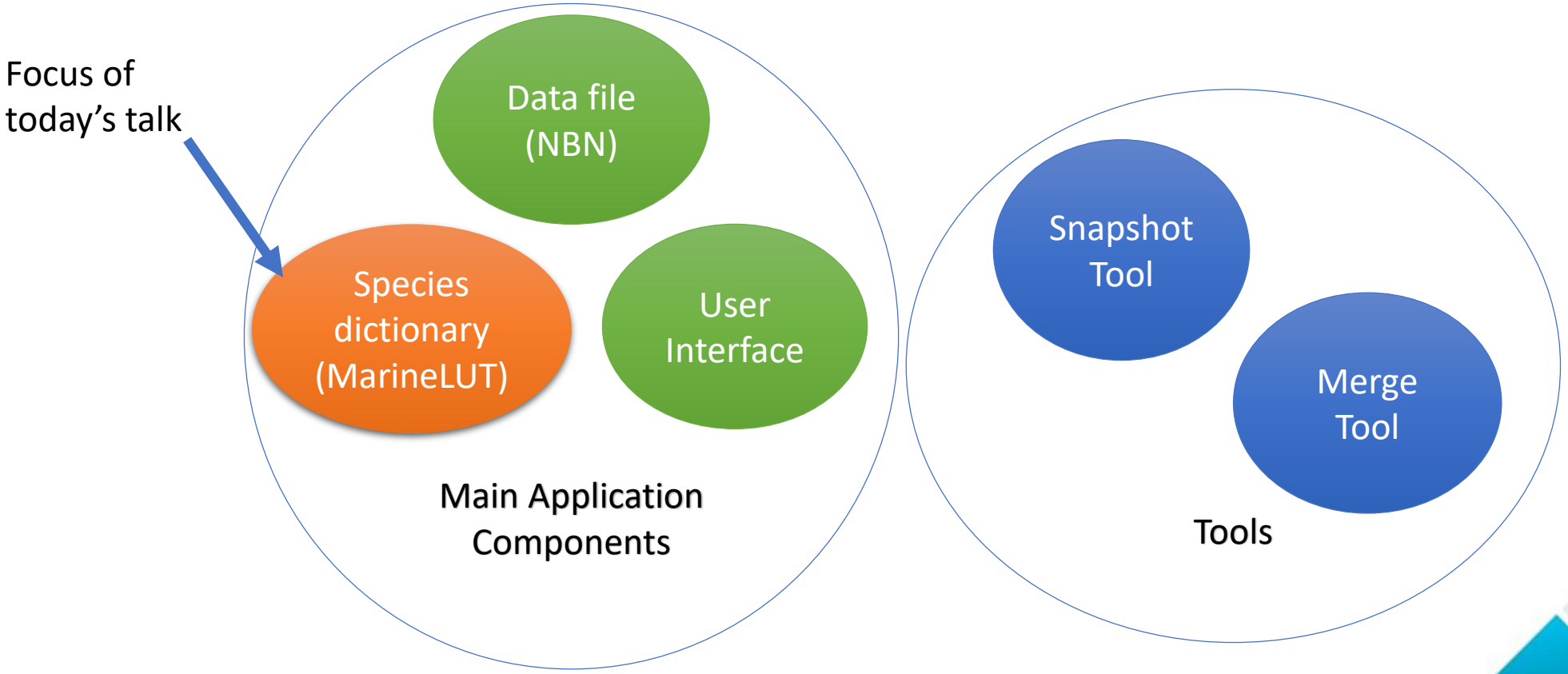
What is Marine Recorder?

- A Microsoft Access database
- Stores UK marine benthic s
- Provide consistency in term
- Consists of a variety of tools



Marine Recorder Components



Current update process

- There is no formal process
- It is very manual and time consuming
- Taxonomic decisions are required (we are not taxonomists)
- Multiple organisations are involved
- Creates conflicting standards

Who is involved in the species dictionary

- World Register of Marine Species (WoRMS)

- Marine Species of the British Isles and Adjacent Seas (MSBIAS)
  - Maintained by the Marine Biological Association (MBA)
  - It is a UK subset of WoRMS

- Natural History Museum (NHM)

What is WoRMS?

- WoRMS aim is to provide an authoritative and **comprehensive list of names of marine organisms**, including information on synonymy

- Each taxon added to WoRMS is given an unique ID called **AphiaID**

- WoRMS will also provide information on the validity of the taxon

MSBIAS taxon details

★ *Salmo salar* Linnaeus, 1758

AphiaID	127186 (urn:lsid:marinespecies.org:taxname:127186)
Classification	Biota > ★ Animalia > ★ Chordata > ★ Vertebrata > ★ Gnathostomata > ☆ Pisces > ★ Actinopterygii > ★ Salmoniformes > ★ Salmonidae > ★ Salmoninae > ★ *Salmo* > ★ *Salmo salar*
Status	accepted
Rank	Species
Typetaxon of	★ *Salmo* Linnaeus, 1758
Parent	★ *Salmo* Linnaeus, 1758
Orig. name	★ *Salmo salar* Linnaeus, 1758
Environment	marine, brackish, fresh, ~~terrestrial~~
Original description	Linnaeus, C. (1758). Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. *Editio decima, reformata. Laurentius Salvius: Holmiae.* ii, 824 pp., *available online at* http://www.biodiversitylibrary.org/item/10277#page/3/mode/1up page(s): 308 [details]
Taxonomic citation	Froese, R. and D. Pauly. Editors. (2018). FishBase. *Salmo salar* Linnaeus, 1758. Accessed through: The UK Marine Environmental Data and Information Network (2018) Marine Species of the British Isles and Adjacent Seas (MSBIAS): a checklist of species derived from the UNICORN and Marine Recorder applications at: http://www.marinespecies.org/msbias/aphia.php?p=taxdetails&id=127186 on 2018-08-19
Regional species database citation	The UK Marine Environmental Data and Information Network (2018). Marine Species of the British Isles and Adjacent Seas (MSBIAS): a checklist of species derived from the UNICORN and Marine Recorder applications. *Salmo salar* Linnaeus, 1758. Accessed at: http://www.marinespecies.org/msbias/aphia.php?p=taxdetails&id=127186 on 2018-08-19

Taxonomic edit history

Date	action	by
2004-12-21 15:54:05Z	created	van der Land, Jacob
2008-01-15 17:27:08Z	changed	Bailly, Nicolas
2017-07-13 06:59:44Z	changed	Bailly, Nicolas
2017-07-20 07:00:16Z	changed	Bailly, Nicolas

[taxonomic tree]

Sources (11) | Documented distribution (0) | Attributes (134) | Vernaculars (10) | Links (16) | Images (13)

original description Linnaeus, C. (1758). Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. *Editio decima, reformata. Laurentius Salvius: Holmiae.* ii, 824 pp., *available online at* http://www.biodiversitylibrary.org/item/10277#page/3/mode/1up
page(s): 308 [details]

basis of record van der Land, J.; Costello, M.J.; Zavodnik, D.; Santos, R.S.; Porteiro, F.M.; Bailly, N.; Eschmeyer, W.N.; Froese, R. (2001). Pisces, ***in***: Costello, M.J. *et al.* (Ed.) (2001). *European register of marine species: a check-list of the marine species in Europe and a bibliography of guides to their identification. Collection Patrimoines Naturels,* 50: pp. 357-374 (look up in IMIS) [details]

additional source Scott, W.B.; Scott, M.G. (1988). Atlantic fishes of Canada. *Canadian Bulletin of Fisheries and Aquatic Sciences.* No. 219. 731 pp. [details]

additional source Muller, Y. (2004). Faune et flore du littoral du Nord, du Pas-de-Calais et de la Belgique: inventaire. [Coastal fauna and flora of the Nord, Pas-de-Calais and Belgium: inventory]. *Commission Régionale de Biologie Région Nord Pas-de-Calais: France.* 307 pp., *available online at* http://www.vliz.be/imisdocs/publications/145561.pdf [details]

additional source King, C.M.; Roberts, C.D.; Bell, B.D.; Fordyce, R.E.; Nicoll, R.S.; Worthy, T.H.; Paulin, C.D.; Hitchmough, R.A.; Keyes, I.W.; Baker, A.N.; Stewart, A.L.; Hiller, N.; McDowall, R.M.; Holdaway, R.N.; McPhee, R.P.; Schwarzhans, W.W.; Tennyson, A.J.D.; Rust, S.; Macadie, I. (2009). Phylum Chordata: lancelets, fishes, amphibians, reptiles, birds, mammals, in: Gordon, D.P. (Ed.) (2009). New Zealand inventory of biodiversity: 1. Kingdom Animalia: Radiata, Lophotrochozoa, Deuterostomia. pp. 431-554. [details]

Tablular output of WoRMS

AphiaID	ScientificName	Authority	AphiaID_accepted	ScientificName_accepted	Authority_accepted	taxonRank	taxonomicStatus	Unacceptreason
534836	Adna	Sowerby, 1823	534836	Adna	Sowerby, 1823	Genus	accepted	
535458	Adna anglica	Sowerby, 1823	535458	Adna anglica	Sowerby, 1823	Species	accepted	
345772	Adontorhina	Berry, 1947	345772	Adontorhina	Berry, 1947	Genus	accepted	
134155	Adreus fascicularis	(Bowerbank, 1866)	134155	Adreus fascicularis	(Bowerbank, 1866)	Species	accepted	
992758	Aduncodinium glandula	(E.C.Herdman) N.S.Kang, H.J.Jeong & Ã˜.Moestrup	992758	Aduncodinium glandula	(E.C.Herdman) N.S.Kan	Species	accepted	
146894	Adyte pellucida	(Ehlers, 1864)	130833	Subadyte pellucida	(Ehlers, 1864)	Species	unaccepted	synonym
101820	Aeginina longicornis	(KrÃ¸yer, 1843)	101820	Aeginina longicornis	(KrÃ¸yer, 1843)	Species	accepted	
22980	Aegiretidae	P. Fischer, 1883	531070	Aegiridae	P. Fischer, 1883	Family	unaccepted	incorrect subsequent spelling
531070	Aegiridae	P. Fischer, 1883	531070	Aegiridae	P. Fischer, 1883	Family	accepted	
137630	Aeolidia	Cuvier, 1798	137630	Aeolidia	Cuvier, 1798	Genus	accepted	
880371	Aeolidia filomenae	Kienberger, Carmona, Pola, Padula, Gosliner & Ce	880371	Aeolidia filomenae	Kienberger, Carmona, I	Species	accepted	
137631	Aeolidiella	Bergh, 1867	137631	Aeolidiella	Bergh, 1867	Genus	accepted	
138711	Aeolidiella glauca	(Alder & Hancock, 1845)	138711	Aeolidiella glauca	(Alder & Hancock, 1845	Species	accepted	
138313	Aequipecten	P. Fischer, 1886	138313	Aequipecten	P. Fischer, 1886	Genus	accepted	
140686	Aequipecten commutatus	(Monterosato, 1875)	140686	Aequipecten commutatus	(Monterosato, 1875)	Species	accepted	
100021	Agaricales	Underw., 1899	100021	Agaricales	Underw., 1899	Order	accepted	
128633	Agetus	KrÃ¸yer, 1849	128633	Agetus	KrÃ¸yer, 1849	Genus	accepted	
128797	Agetus typicus	KrÃ¸yer, 1849	128797	Agetus typicus	KrÃ¸yer, 1849	Species	accepted	
117849	Aglantha digitale	(O. F. MÃ¼ller, 1776)	117849	Aglantha digitale	(O. F. MÃ¼ller, 1776)	Species	accepted	
129366	Aglaophamus	Kinberg, 1865	129366	Aglaophamus	Kinberg, 1865	Genus	accepted	
130343	Aglaophamus agilis	(Langerhans, 1880)	130343	Aglaophamus agilis	(Langerhans, 1880)	Species	accepted	
547398	Aglaophamus pulcher	(Rainer, 1991)	547398	Aglaophamus pulcher	(Rainer, 1991)	Species	accepted	

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What is the Species Dictionary?

- A Lookup Table (LUT) that is part of the main Marine Recorder Application
- It is a controlled vocabulary of species based off MSBIAS (UK subset of WoRMS)

AphiaID

Taxon_Version_Key is generated by the Natural History Museum
(it is required for the Marine Recorder application to see the taxon record)

TAXON_Marine_LUT

Taxon_List_Item_Key	Taxon_List_Item_Key_(	Taxon_Version_Key	Item_Name	Authority	Preferred_Name	Taxor	Parent_Aph	Lst_Itm_Coc	Abbrev	DateLastModified	IsCurrent
1		NHMSYS0021048735	Biota		1		1	A	Bio	14/01/2014	
2		NBNSYS0100001342	Animalia		2	Kingdon	1	B	Ani	14/01/2014	
3		NHMSYS0021059028	Plantae	Haeckel, 1866	3	Kingdon	1	T	Pla	14/01/2014	
4		NBNSYS0000172214	Fungi		4	Kingdon	1	P	Fun	14/01/2014	
5	JNCCMNCR00000929	NHMSYS0021060399	Protozoa	Owen, 1858	5	Kingdon	1	X	Pro	14/01/2014	
6		NBNSYS0100001885	Bacteria		6	Kingdon	1	G	Bac	14/01/2014	
7	NBNSYS0000169869	NHMSYS0020787081	Chromista		7	Kingdon	1	K	Chr	14/01/2014	
11		NHMSYS0021036368	Ciliophora		11	Phylum	536209	KB00001	Cil	14/01/2014	
51	NBNSYS0000164799	NBNSYS0000160443	Mollusca		51	Phylum	2	BCQ00001	Mol	14/01/2014	
55	NBNSYS0000164871	NHMSYS0021056536	Polyplacophora	Gray, 1821	55	Class	51	BCQ03217	Pol	14/01/2014	
57	NBNSYS0000164872	NHMSYS0021056537	Neoloricata	Bergenhayn, 1955	57	Subclass	55	BCQ03279	Neo	14/01/2014	

Excerpt from the “MarineLUT.mdb”

Taxon Version Keys

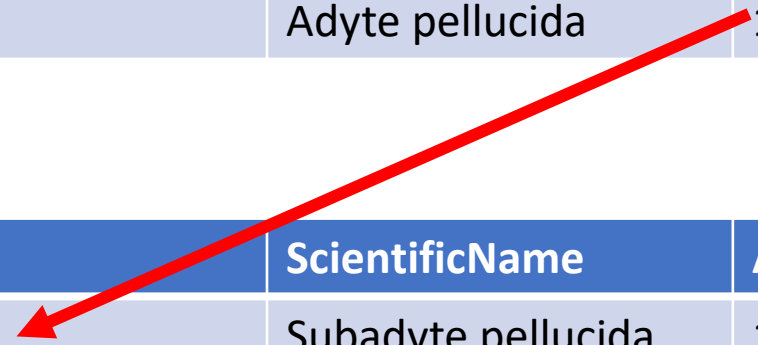
- Generated by the Natural History Museum
- Required for Marine Recorder to recognise the species
- Species will be added into the UK Species Inventory (UKSI)
- This will provide cross domain links (terrestrial and marine)

The update process

- The species dictionary or LUT does not connect directly to MSBIAS
- The MSBIAS list will need to be downloaded and merged with the current LUT
- Taxon will need to be checked to see if they are ‘accepted’
- The LUT will need to be a full hierarchy
  - E.g. Biota →Animalia→ Chordata→ Vertebrata → Gnathostomata → Pisces →Actinopterygii → Salmoniformes → Salmonidae → Salmoninae → Salmo →Salmo salar

Accepted or Valid Aphia IDs Checks

AphiaID	ScientificName	AphiaID_accepted	ScientificName_accepted	taxonomicStatus
146894	Adyte pellucida	1303833	Subadyte pellucida	unaccepted



AphiaID	ScientificName	AphiaID_accepted	ScientificName_accepted	taxonomicStatus
1303833	Subadyte pellucida	1303833	Subadyte pellucida	accepted

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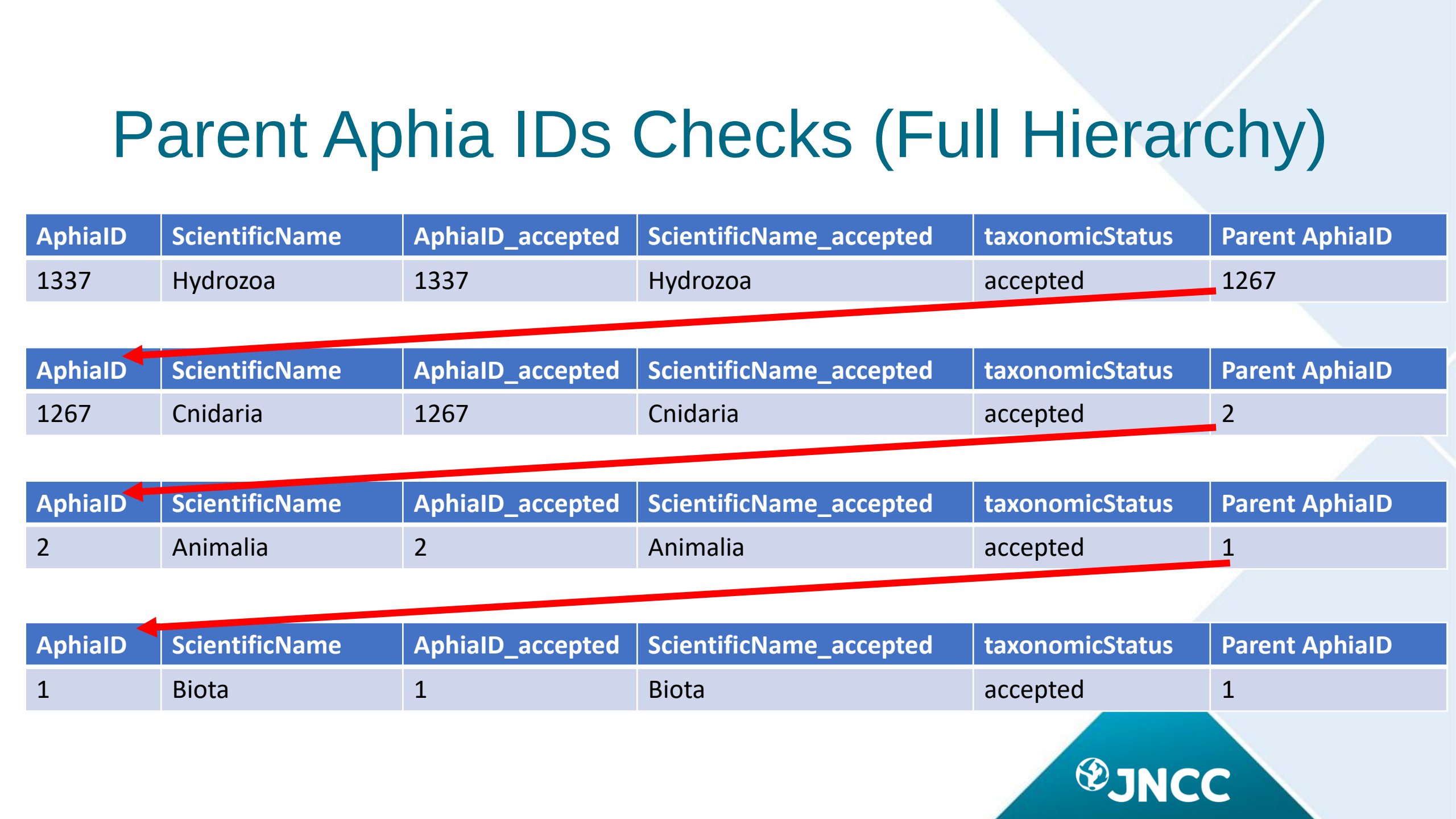
Parent Aphia IDs Checks (Full Hierarchy)

AphiaID	ScientificName	AphiaID_accepted	ScientificName_accepted	taxonomicStatus	Parent AphiaID
1337	Hydrozoa	1337	Hydrozoa	accepted	1267

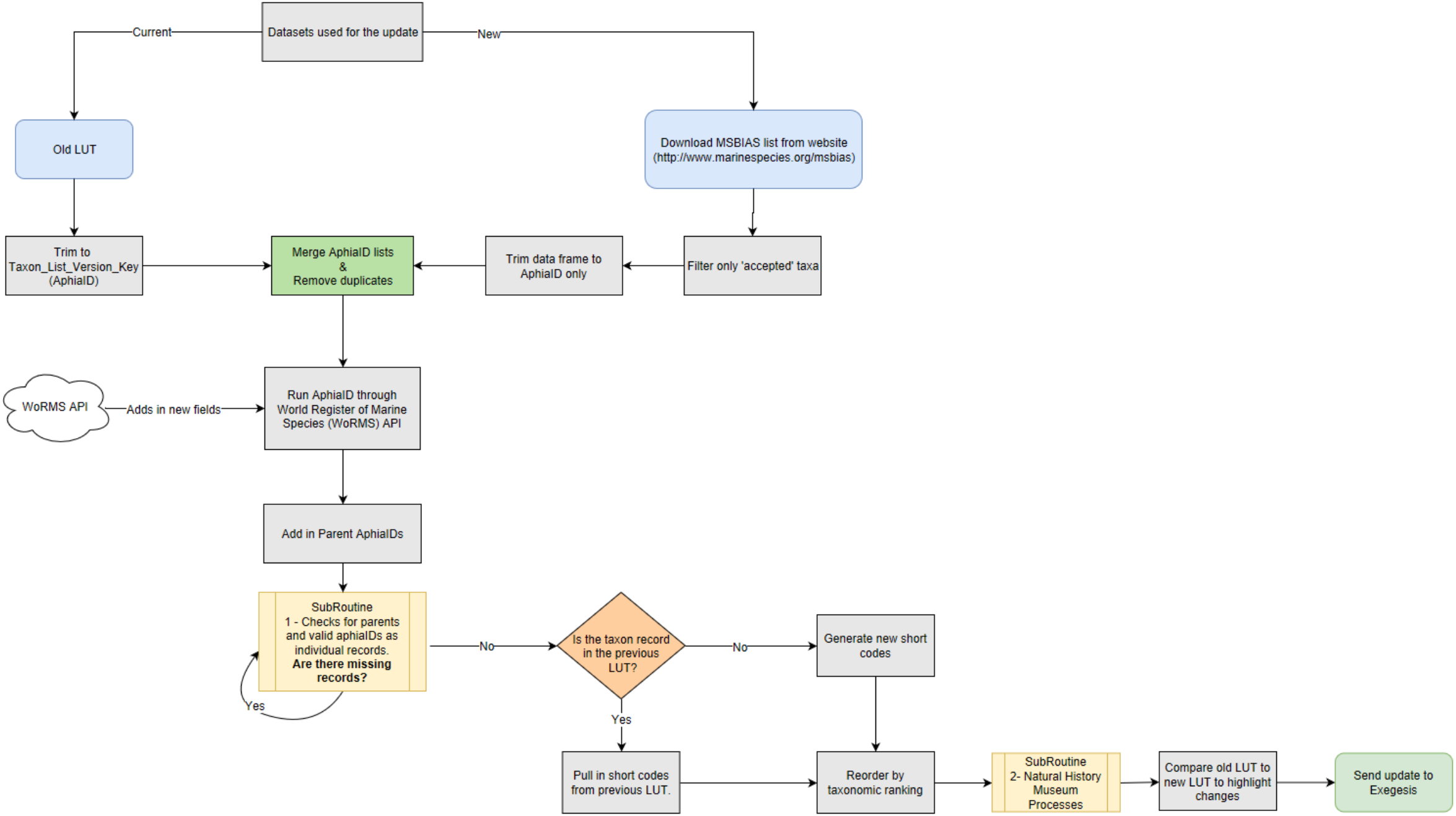
AphiaID	ScientificName	AphiaID_accepted	ScientificName_accepted	taxonomicStatus	Parent AphiaID
1267	Cnidaria	1267	Cnidaria	accepted	2

AphiaID	ScientificName	AphiaID_accepted	ScientificName_accepted	taxonomicStatus	Parent AphiaID
2	Animalia	2	Animalia	accepted	1

AphiaID	ScientificName	AphiaID_accepted	ScientificName_accepted	taxonomicStatus	Parent AphiaID
1	Biota	1	Biota	accepted	1



Full Species Dictionary Process



`marineRecorder` Package

A Marine Recorder R Package was developed to work with the marine recorder snapshot. The functions included in this package create shapefiles, find the newly added surveys and check species to update the species dictionary (a separate database used with the main application).

Installation of `marineRecorder` Package

```
# install.packages("devtools")
library("devtools")
devtools::install_github("jncc/marine-recorder-tools", subdir = "marineRecorder", build_vignettes = TRUE, force = TRUE
```

List of functions currently available:

- **MR_GIS_Sample()** - creates a shapefile of samples from the snapshot
- **MR_GIS_Species()** - creates a shapefile of species from the snapshot
- **newSurveys()** - find new surveys added to the new snapshot
- **addParentAphiaIDs()** - adds parent aphia IDs as records to the data frame
- **addValidAphiaIDs()** - adds valid aphia IDs, if valid aphia IDs are missing from the data frame
- **createShortcodes()** - creates short codes, first three letters of the first and second word from a given string
- **getParentID()** - finds out the aphia ID of parent
- **missingParentAphiaIDs()** - identifies the missing parent aphia IDs from the data frame
- **missingValidAphiaIDs()** - identifies the missing valid aphia IDs from the data frame
- **updateParentAphiaIDs()** - updates parent aphia ID records

Download at:
https://github.com/jncc/marine-recorder-tools/tree/master/marineRecorder

Future processes

- Currently the taxa are with the Natural History Museum to generate Taxon Version Keys
- This process will hopefully be used for the new Marine Recorder
- Further automation of the process

Benefits…

- Taxonomic decisions by the experts
  - Changes made at the source
- Quicker turn around (hopefully) for regular species dictionary updates
- Open decision process

Any questions?

Stay connected

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