

# UNESCO environmental DNA (eDNA) Expeditions in marine World Heritage sites

Biodiversity survey for Shark Bay, Western Australia

Interim Results  
Not for public distribution



Credit: UNESCO / Geo Media Interactive.

## About eDNA Expeditions

UNESCO's eDNA Expeditions is a global, citizen science initiative that is conducted with the intention to measure marine biodiversity and predict the impact climate change on marine community composition across UNESCO World Heritage marine sites.

eDNA is a cost effective and minimally invasive method to measure biodiversity in any given area. Marine species continuously shed DNA into the water around them in the form of waste, mucus, or cells. By extracting this DNA from water samples, and subsequently multiplying and sequencing specific regions within these DNA strands, a wide variety of species can be detected without removing any organisms from their environment. The regions in the DNA targeted for sequencing are selected depending on the scope of the study: while some markers are suitable to obtain a broad overview of biodiversity across many groups of species, other markers are particularly suited to get high resolution insight for a more specific taxonomic group such as fish. The UNESCO eDNA Expeditions initiative combines a number of markers tailored for marine vertebrates (fish, mammals, and turtles). A general marker was added to also allow detection of species from other groups such as invertebrates, which can give a broader insight in the marine species diversity in a given area.

Between September 2022 and May 2023, UNESCO organized eDNA sampling campaigns in 21 marine World Heritage sites across 17 countries around the world. At every World Heritage site, about 20 samples were collected from different habitats. Over 250 young people participated in the local sampling expeditions. They were guided by local experts and park management staff, using protocols and eDNA sampling equipment provided by UNESCO.

Biodiversity inventories generated from the samples are being combined with existing species distribution data from public biodiversity databases such as the Ocean Biodiversity Information System (OBIS) in view of obtaining a comprehensive overview of marine life across marine World Heritage sites. Through the use of climate scenarios and species distribution models, an estimate will be made of the impact of climate change, in particular rising temperatures, on local biodiversity and its potential future distribution patterns.

More information about the initiative and a press kit are available on the UNESCO website: <https://www.unesco.org/en/edna-expeditions>.

## Results

### Sampling and sample processing

eDNA sampling was conducted in Shark Bay, Western Australia in October 2022. A total of 20 samples were collected at 5 locations in the park covering different habitats: debault\_creek, fowlers\_camp, monkey\_mia, petit\_point, and sandy\_bay (Figure 1). Up to 1,500 mL of seawater was filtered through filter cartridges containing a filter with a 0.8  $\mu\text{m}$  pore size. After sampling, the filter cartridges were flushed with preservation liquid and shipped to UNESCO. DNA from the samples was extracted and amplified, and subsequently sent to the sequencing facility at KU Leuven in Belgium, a specialized university eDNA lab contracted by UNESCO for this work. PCR amplification was done using five primer pairs selected to capture as much biodiversity as possible in the target groups of the study: fish, mammals, and turtles.

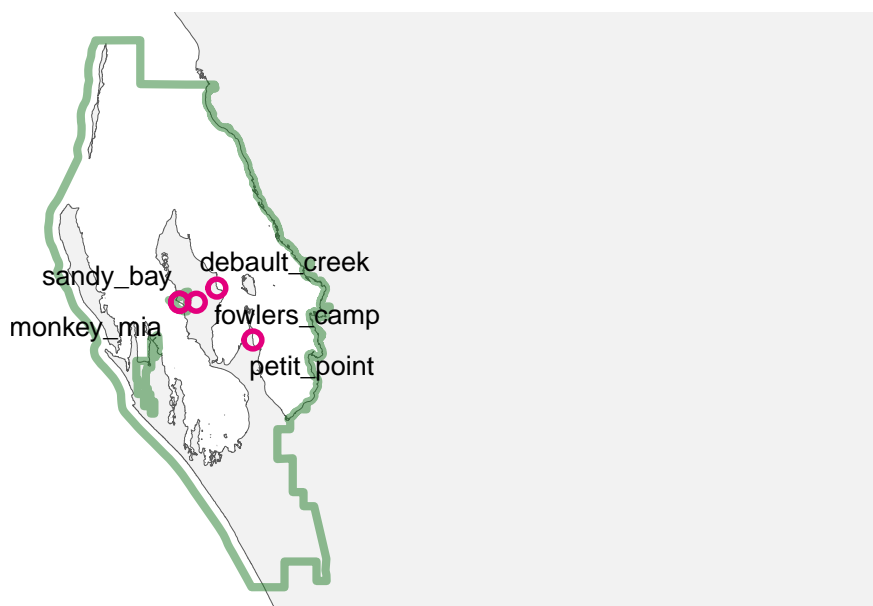


Figure 1: Map of the sampling locations.

### DNA sequencing

Sequencing of the DNA from 20 samples resulted in over 40 million sequence reads, from which we collected 24,926 unique sequences or ASVs (Tables 1 and 2).

reads	asvs
40147378	24926

Table 1: Reads, ASVs, and species across all samples.

### Species identification

The marker sequences obtained from sequencing were matched with sequence reference databases built using public data available from the National Center for Biotechnology Information (NCBI). This resulted in the identification of 289 species, including 165 fish species, 3 mammalian species, and 3 turtle species (Table 3). Species from other groups, such as algae, molluscs, sponges, crustaceans, and cnidarians, were also detected (Figures 2 and 3). This number of species detected represents about 17% of the 2,653 species known from Shark Bay, Western Australia in the OBIS database. Of the 289 species detected, 134 are not among the species

locality	materialSampleID	sampleSize	reads	asvs	species
Debault Creek	EE0062	1500	2912126	5777	81
Fowlers Camp Shark Bay	EE0044	1500	1489927	5868	93
Fowlers Camp Shark Bay	EE0047	1500	2309443	7717	105
Fowlers Camp Shark Bay	EE0094	1500	1658425	6137	94
Fowlers Camp Shark Bay WA Aus	EE0043	1500	1903077	8771	107
Fowlers camp	EE0063	1500	1973504	6841	94
Monkey Mia seagrass banks Western Australia	EE0120	1500	1276534	5272	92
Monkey Mia, Western Australia, Australia	EE0045	1500	1032824	4488	88
Monkey Mia, Western Australia, Australia	EE0097	1500	1641976	5152	103
Petit Point	EE0046	1500	2208896	3359	53
Sandy Point Shark Bay Western Australia	EE0107	1500	1865480	6235	122
Sandy Point Shark Bay Western Australia	EE0123	1500	1451385	2532	86
Sandy Point, Dirk Hartog Island	EE0061	1500	1577720	6872	102
Sandy Point, Shark Bay Western Australia, Australia	EE0078	1500	1613823	6222	105
Shark Bay; Debault Creek	EE0072	1500	2287436	5488	77
Shark Bay; Debault Creek	EE0082	1500	4020507	5012	82
Shark Bay; Debault Creek	EE0122	1500	3154544	4982	80
Shark Bay; Petit Point	EE0086	1500	2703226	3587	52
Shark Bay; Petit Point	EE0119	1500	1144134	2936	42
Shark Bay; Petit Point	EE0124	1500	1922391	3174	48

Table 2: Reads, ASVs, and species by sample.

previously reported from Shark Bay, Western Australia to the UNESCO OBIS database. 23 of the detected species are listed as threatened on the IUCN Red List (Table 4). A full list of species is added at the end of this report.

group	eDNA species	total species	fraction
fish	165	987	0.17
mammals	3	24	0.12
turtles	1	2	0.50

Table 3: Number of species in the three target groups, from the OBIS database and from eDNA sampling.

category	eDNA species	total species	fraction
CR	4	4	1.00
EN	9	20	0.45
VU	10	48	0.21

Table 4: Number of species by IUCN Red List category, from the OBIS database and from eDNA sampling.

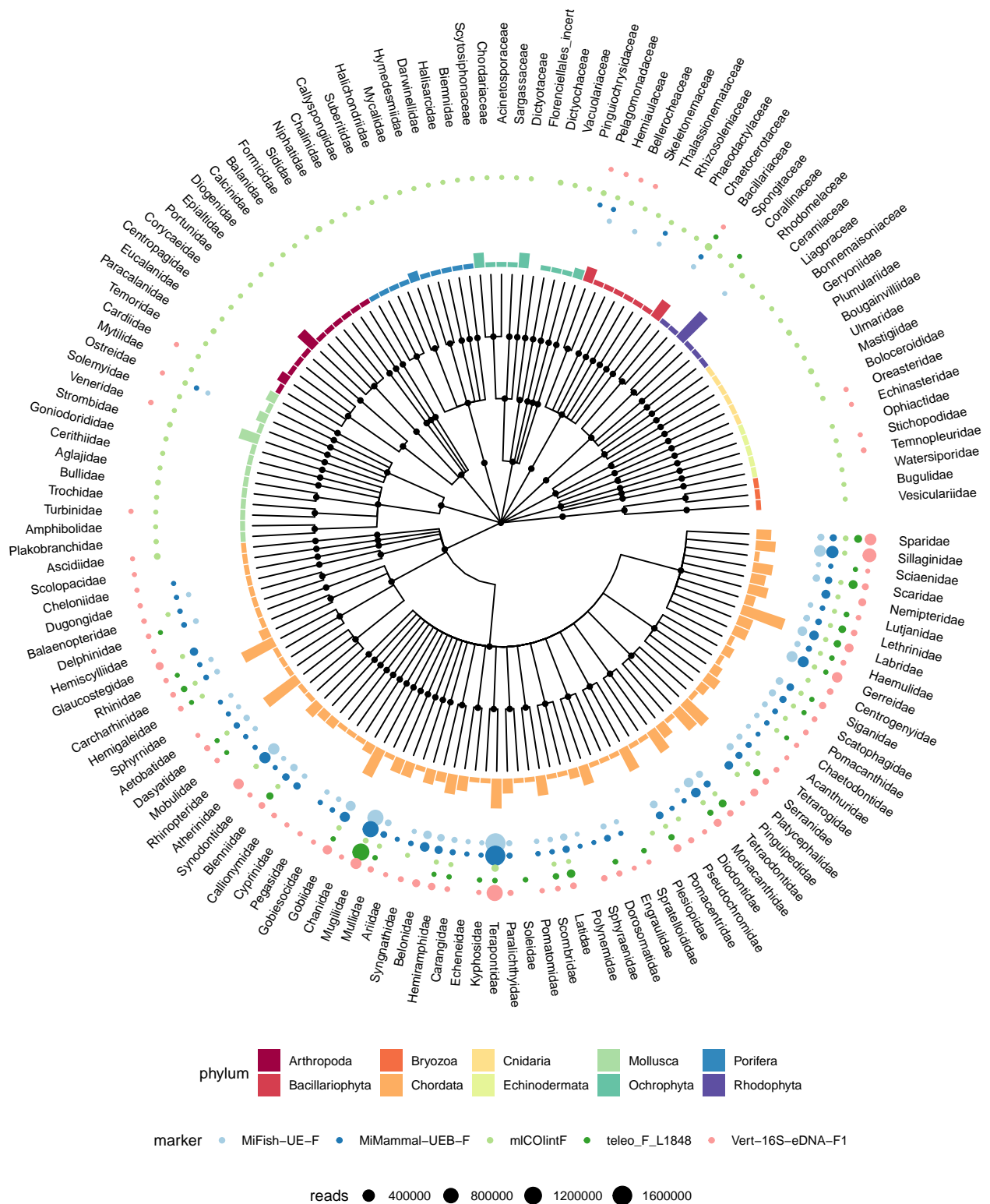


Figure 2: Number of DNA reads (bubbles) and species detected (bars) by family.

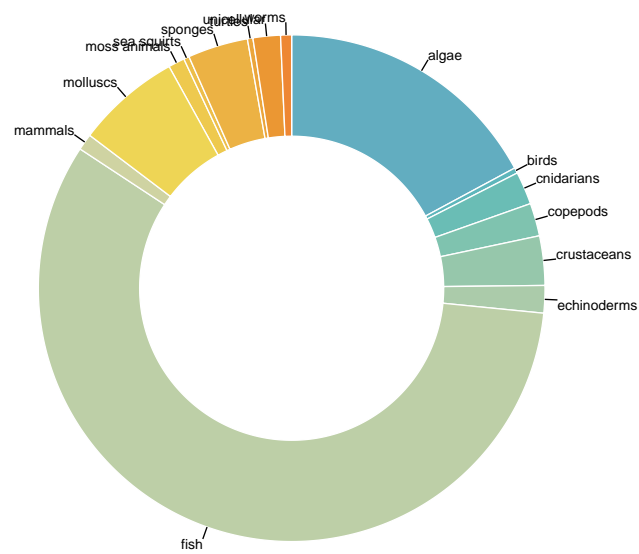


Figure 3: Distribution of detected species across groups.

phylum	class	species	group	category	new	vernacular
Amoebozoa	Discosea	Neoparamoeba aestuarina	unicellular		yes	
Amoebozoa	Discosea	Parvamoeba rugata	unicellular		yes	
Annelida	Polychaeta	Syllis lutea	worms			
Annelida	Polychaeta	Thelepus australiensis	worms		yes	
Arthropoda	Branchiopoda	Penilia avirostris	crustaceans		yes	
Arthropoda	Copepoda	Bestiolina similis	copepods		yes	
Arthropoda	Copepoda	Centropages orsinii	copepods		yes	
Arthropoda	Copepoda	Ditrichocorycaeus andrewsi	copepods		yes	
Arthropoda	Copepoda	Paracalanus indicus	copepods		yes	
Arthropoda	Copepoda	Subeucalanus subtenius	copepods		yes	
Arthropoda	Copepoda	Temora turbinata	copepods		yes	
Arthropoda	Hexapoda	Pheidole megacephala			yes	
Arthropoda	Malacostraca	Calcinus dapsiles	crustaceans		yes	
Arthropoda	Malacostraca	Dardanus crassimanus	crustaceans			
Arthropoda	Malacostraca	Menaethius monoceros	crustaceans		yes	
Arthropoda	Malacostraca	Portunus pelagicus	crustaceans			blue swimming crab
Arthropoda	Malacostraca	Thalamita admete	crustaceans			
Arthropoda	Malacostraca	Thalamita danae	crustaceans		yes	
Arthropoda	Malacostraca	Thalamita savignyi	crustaceans		yes	
Arthropoda	Thecostraca	Pectinoacasta pectinipes	crustaceans			
Bacillariophyta	Bacillariophyceae	Bellerochea polymorpha	algae		yes	
Bacillariophyta	Bacillariophyceae	Chaetoceros socialis	algae		yes	
Bacillariophyta	Bacillariophyceae	Eucampia striata	algae			
Bacillariophyta	Bacillariophyceae	Eucampia zodiacus	algae			
Bacillariophyta	Bacillariophyceae	Hemiaulus sinensis	algae		yes	
Bacillariophyta	Bacillariophyceae	Phaeodactylum tricornutum	algae		yes	
Bacillariophyta	Bacillariophyceae	Pseudo-nitzschia abrensis	algae		yes	
Bacillariophyta	Bacillariophyceae	Pseudo-nitzschia caciantha	algae		yes	
Bacillariophyta	Bacillariophyceae	Pseudo-nitzschia cuspidata	algae		yes	
Bacillariophyta	Bacillariophyceae	Pseudo-nitzschia sabit	algae		yes	
Bacillariophyta	Bacillariophyceae	Skeletonema grevillei	algae		yes	
Bacillariophyta	Bacillariophyceae	Sundstroemia setigera	algae		yes	
Bacillariophyta	Bacillariophyceae	Thalassionema nitzschioides	algae		yes	
Bryozoa	Gymnolaemata	Amathia gracilis	moss animals		yes	
Bryozoa	Gymnolaemata	Bugula neritina	moss animals		yes	Common bugula, Brown bryozoan, bugule brune
Bryozoa	Gymnolaemata	Watersipora subtorquata	moss animals		yes	bryozoaire orange vif à points noirs
Cercozoa	Chlorarachnea	Bigelowiella natans	unicellular		yes	
Cercozoa	Chlorarachnea	Chlorarachnion reptans	unicellular		yes	
Chlorophyta	Mamiellophyceae	Bathycoccus prasinos	algae		yes	
Chlorophyta	Mamiellophyceae	Micromonas pusilla	algae		yes	
Chlorophyta	Pyramimonadophyceae	Cymbomonas tetramitiformis	algae		yes	
Chlorophyta		Chloropicon laurae	algae		yes	
Chlorophyta		Chloropicon primus	algae		yes	
Chlorophyta		Chloropicon roscoffensis	algae		yes	
Chlorophyta		Chloropicon sieburthii	algae		yes	
Chordata	Ascidacea	Ascidia ahodori	sea squirts		yes	
Chordata	Aves	Actitis hypoleucos	birds	LC		common sandpiper, chevalier guignette
Chordata	Elasmobranchii	Aetobatus narinari	fish	EN	yes	spotted eagle ray
Chordata	Elasmobranchii	Carcharhinus caudatus	fish	LC		
Chordata	Elasmobranchii	Carcharhinus leucas	fish	VU		bull shark, requin-bouledogue

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phylum	class	species	group	category	new	vernacular
Chordata	Elasmobranchii	Carcharhinus melanopterus	fish	VU		blacktip reef shark
Chordata	Elasmobranchii	Carcharhinus plumbeus	fish	EN		sandbar shark, requin gris
Chordata	Elasmobranchii	Carcharhinus sorrah	fish	NT	yes	spottail shark
Chordata	Elasmobranchii	Chiloscyllium punctatum	fish	NT		brownbanded bamboo shark, requin-chabot bambou
Chordata	Elasmobranchii	Glaucostegus typus	fish	CR		
Chordata	Elasmobranchii	Hemipristis elongata	fish	VU	yes	
Chordata	Elasmobranchii	Himantura uarnak	fish	EN		honeycomb stingray
Chordata	Elasmobranchii	Maculabatis astra	fish	LC		
Chordata	Elasmobranchii	Mobula birostris	fish	EN	yes	
Chordata	Elasmobranchii	Negaprion acutidens	fish	EN		sicklefin lemon shark
Chordata	Elasmobranchii	Neotrygon kuhlii	fish	DD		Blue spotted stingray
Chordata	Elasmobranchii	Neotrygon ningalooensis	fish	DD		
Chordata	Elasmobranchii	Pastinachus ater	fish	VU		
Chordata	Elasmobranchii	Pastinachus sephen	fish	NT		
Chordata	Elasmobranchii	Pateobatis fai	fish	VU		
Chordata	Elasmobranchii	Rhinoptera javanica	fish	EN	yes	flapnose ray
Chordata	Elasmobranchii	Rhizoprionodon acutus	fish	VU		milk shark
Chordata	Elasmobranchii	Rhynchobatus australiae	fish	CR	yes	
Chordata	Elasmobranchii	Rhynchobatus djiddensis	fish	CR	yes	whitespotted wedgfish
Chordata	Elasmobranchii	Sphyrna lewini	fish	CR	yes	scalloped hammerhead
Chordata	Elasmobranchii	Taeniurops meyeri	fish	VU		
Chordata	Mammalia	Dugong dugon	mammals	VU		dugong
Chordata	Mammalia	Megaptera novaeangliae	mammals	LC		humpback whale, rorqual keporkak
Chordata	Mammalia	Stenella longirostris	mammals	LC	yes	long-snouted spinner dolphin, dauphin longirostre
Chordata	Teleostei	Abudefduf bengalensis	fish	LC		
Chordata	Teleostei	Acanthopagrus australis	fish	LC		
Chordata	Teleostei	Acanthurus blochii	fish	LC	yes	ringtail surgeonfish
Chordata	Teleostei	Acanthurus lineatus	fish	LC	yes	lined surgeonfish
Chordata	Teleostei	Acentrogobius nebulosus	fish			
Chordata	Teleostei	Alepes vari	fish	LC	yes	herring scad
Chordata	Teleostei	Amblygobius phalaena	fish	LC		
Chordata	Teleostei	Amniataba caudavittata	fish			
Chordata	Teleostei	Anacanthus barbatus	fish	LC		
Chordata	Teleostei	Argyrosomus japonicus	fish	EN		Japanese meagre
Chordata	Teleostei	Atherinomorus vaigiensis	fish			
Chordata	Teleostei	Bathygobius fuscus	fish	LC	yes	dusky frill-goby
Chordata	Teleostei	Callionymus enneactis	fish			
Chordata	Teleostei	Centrogenys vaigiensis	fish			
Chordata	Teleostei	Centropyge vrolikii	fish	LC	yes	
Chordata	Teleostei	Chaetodermis penicilligerus	fish	LC		
Chordata	Teleostei	Chaetodon octofasciatus	fish	LC	yes	eightband butterflyfish
Chordata	Teleostei	Chaetodontoplus duboulayi	fish	LC		
Chordata	Teleostei	Chanos chanos	fish	LC		milkfish, chano
Chordata	Teleostei	Chelmon marginalis	fish	LC		
Chordata	Teleostei	Chelmon rostratus	fish	LC		copperband butterflyfish
Chordata	Teleostei	Chlorurus sordidus	fish	LC		
Chordata	Teleostei	Choerodon cauteroma	fish	LC		
Chordata	Teleostei	Choerodon cephalotes	fish	LC		
Chordata	Teleostei	Choerodon cyanodus	fish	LC		
Chordata	Teleostei	Choerodon rubescens	fish	LC		

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phylum	class	species	group	category	new	vernacular
Chordata	Teleostei	Choerodon schoenleinii	fish	NT		
Chordata	Teleostei	Congrogadus subducens	fish	LC		
Chordata	Teleostei	Coris picta	fish	LC	yes	
Chordata	Teleostei	Craterocephalus mugiloides	fish			
Chordata	Teleostei	Crenimugil seheli	fish	LC	yes	
Chordata	Teleostei	Cymbacephalus nematophthalmus	fish			
Chordata	Teleostei	Cymbacephalus staigeri	fish			
Chordata	Teleostei	Diagramma pictum	fish			grunt
Chordata	Teleostei	Diodon liturosus	fish		yes	black-blotched porcupinefish
Chordata	Teleostei	Discotrema crinophilum	fish	LC	yes	
Chordata	Teleostei	Echeneis naucrates	fish	LC		sharksucker
Chordata	Teleostei	Encrasicholina heteroloba	fish	LC	yes	shorthead anchovy
Chordata	Teleostei	Epinephelus coioides	fish	LC		orange-spotted grouper
Chordata	Teleostei	Epinephelus fuscoguttatus	fish	VU	yes	brown-marbled grouper
Chordata	Teleostei	Epinephelus malabaricus	fish	LC	yes	Malabar grouper
Chordata	Teleostei	Epinephelus multinotatus	fish	LC		white-blotched grouper
Chordata	Teleostei	Epinephelus rivulatus	fish	LC		halfmoon grouper
Chordata	Teleostei	Eucinostomus gula	fish	LC	yes	Jenny mojarra
Chordata	Teleostei	Festucalex scalaris	fish	LC		
Chordata	Teleostei	Gerres decacanthus	fish		yes	
Chordata	Teleostei	Gerres subfasciatus	fish	LC		
Chordata	Teleostei	Gnathanodon speciosus	fish	LC		golden trevally
Chordata	Teleostei	Halichoeres brownfieldi	fish	LC		
Chordata	Teleostei	Helotes sexlineatus	fish			
Chordata	Teleostei	Hemigymnus melapterus	fish	LC		thicklip wrasse
Chordata	Teleostei	Hemiramphus far	fish		yes	spotted halfbeak
Chordata	Teleostei	Hemiramphus robustus	fish			
Chordata	Teleostei	Herklotsichthys quadrimaculatus	fish	LC		fourspot sardine
Chordata	Teleostei	Hippocampus subelongatus	fish	DD		
Chordata	Teleostei	Hypoatherina temminckii	fish		yes	Samoan silverside
Chordata	Teleostei	Hypophthalmichthys molitrix	fish	NT	yes	silver carp
Chordata	Teleostei	Hyporhamphus affinis	fish			tropical halfbeak
Chordata	Teleostei	Hyporhamphus quoyi	fish	LC		
Chordata	Teleostei	Inegocia japonica	fish	LC		
Chordata	Teleostei	Istigobius nigroocellatus	fish	LC		
Chordata	Teleostei	Lagocephalus scleratus	fish	LC		silverstripe blaasop
Chordata	Teleostei	Leiopotherapon aheneus	fish	EN	yes	
Chordata	Teleostei	Leiopotherapon unicolor	fish	LC		
Chordata	Teleostei	Lepadichthys frenatus	fish	LC	yes	
Chordata	Teleostei	Lethrinus laticaudis	fish	LC		
Chordata	Teleostei	Lethrinus nebulosus	fish	LC		spangled emperor
Chordata	Teleostei	Liachirus melanospilos	fish	LC		
Chordata	Teleostei	Lutjanus argentimaculatus	fish	LC	yes	river snapper
Chordata	Teleostei	Lutjanus carponotatus	fish	LC		
Chordata	Teleostei	Lutjanus fulviflamma	fish	LC		dory snapper
Chordata	Teleostei	Lutjanus russellii	fish	LC		
Chordata	Teleostei	Microcanthus strigatus	fish	LC		
Chordata	Teleostei	Monacanthus chinensis	fish	LC		
Chordata	Teleostei	Mugil cephalus	fish	LC		grey mullet, muge
Chordata	Teleostei	Mugilogobius mertoni	fish	LC	yes	

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phylum	class	species	group	category	new	vernacular
Chordata	Teleostei	Mulloidichthys vanicolensis	fish	LC	yes	yellowfin goatfish
Chordata	Teleostei	Nematalosa erebi	fish	LC	yes	
Chordata	Teleostei	Neopomacentrus aktites	fish		yes	
Chordata	Teleostei	Netuma thalassina	fish			
Chordata	Teleostei	Notograptus guttatus	fish		yes	
Chordata	Teleostei	Omobranchus rotundiceps	fish	LC		
Chordata	Teleostei	Pagrus major	fish	LC		
Chordata	Teleostei	Paracentropogon longispinis	fish	LC		
Chordata	Teleostei	Paramonacanthus choirocephalus	fish	LC		
Chordata	Teleostei	Parapercis haackei	fish			
Chordata	Teleostei	Pegasus volitans	fish	DD		longtail seamount
Chordata	Teleostei	Pelates octolineatus	fish			
Chordata	Teleostei	Pelates quadrilineatus	fish			fourlined terapon
Chordata	Teleostei	Pentapodus paradiseus	fish	LC		
Chordata	Teleostei	Pentapodus setosus	fish	LC	yes	
Chordata	Teleostei	Petroscirtes breviceps	fish	LC		
Chordata	Teleostei	Planiliza macrolepis	fish	LC	yes	
Chordata	Teleostei	Platycephalus indicus	fish	DD	yes	Indian flathead
Chordata	Teleostei	Platycephalus westraliae	fish			
Chordata	Teleostei	Plectorhinchus chrysotaenia	fish		yes	
Chordata	Teleostei	Plectorhinchus schotaf	fish	LC		minstrel sweetlips
Chordata	Teleostei	Plectroglyphidodon apicalis	fish		yes	
Chordata	Teleostei	Plectropomus maculatus	fish	LC		roving grouper
Chordata	Teleostei	Polydactylus plebeius	fish			striped threadfin, barbure rayé
Chordata	Teleostei	Pomacentrus vaiuli	fish	LC		
Chordata	Teleostei	Pomacentrus wardi	fish	LC	yes	
Chordata	Teleostei	Pomatomus saltatrix	fish	VU		blue fish, tassergal
Chordata	Teleostei	Psammoperca waigiensis	fish			
Chordata	Teleostei	Pseudorhombus arsius	fish	LC		largetooth flounder
Chordata	Teleostei	Pseudorhombus duplicioccellatus	fish	LC		
Chordata	Teleostei	Pseudorhombus jenynsii	fish	LC		
Chordata	Teleostei	Pteragogus flagellifer	fish	LC		cocktail wrasse
Chordata	Teleostei	Rastrelliger kanagurta	fish	DD		Indian mackerel
Chordata	Teleostei	Rhabdosargus sarba	fish	LC		yellowfin bream
Chordata	Teleostei	Sardinella albella	fish	LC	yes	white sardinella
Chordata	Teleostei	Sardinella gibbosa	fish	LC		goldstripe sardinella
Chordata	Teleostei	Saurida argentea	fish	LC		
Chordata	Teleostei	Saurida wanieso	fish	DD	yes	
Chordata	Teleostei	Scaevius milii	fish	LC		
Chordata	Teleostei	Scarus ghobban	fish	LC		bluechin parrotfish
Chordata	Teleostei	Scarus rivulatus	fish	LC		
Chordata	Teleostei	Scarus rubroviolaceus	fish	LC		ember parrotfish
Chordata	Teleostei	Scobinichthys granulatus	fish	LC		
Chordata	Teleostei	Scomberomorus commerson	fish	NT		narrow-barred Spanish mackerel
Chordata	Teleostei	Scomberomorus queenslandicus	fish	LC		
Chordata	Teleostei	Scomberomorus semifasciatus	fish	LC	yes	
Chordata	Teleostei	Selaroides leptolepis	fish	LC		yellowstripe scad
Chordata	Teleostei	Selenotoca multifasciata	fish	LC		
Chordata	Teleostei	Siganus canaliculatus	fish	LC		white-spotted spinefoot
Chordata	Teleostei	Siganus fuscescens	fish	LC		

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phylum	class	species	group	category	new	vernacular
Chordata	Teleostei	Sillago burrus	fish			
Chordata	Teleostei	Sillago ingenuua	fish		yes	
Chordata	Teleostei	Sillago maculata	fish			
Chordata	Teleostei	Sillago schomburgkii	fish			
Chordata	Teleostei	Sphyaena flavicauda	fish		yes	yellowtail barracuda
Chordata	Teleostei	Sphyaena obtusata	fish			obtuse barracuda
Chordata	Teleostei	Spratelloides robustus	fish	LC		
Chordata	Teleostei	Strongylura strongylura	fish			
Chordata	Teleostei	Torquigener pleurogramma	fish	LC		
Chordata	Teleostei	Torquigener whiteleyi	fish	LC		
Chordata	Teleostei	Tylosurus crocodilus	fish	LC		houndfish
Chordata	Teleostei	Upeneus australiae	fish	LC	yes	
Chordata	Teleostei	Upeneus tragula	fish	LC		freckled goatfish
Chordata	Teleostei	Urocampus carinirostris	fish	LC	yes	
Chordata	Teleostei	Yongeichthys criniger	fish		yes	
Chordata		Chelonia mydas	turtles	EN		green turtle, tortue verte
Cnidaria	Anthozoa	Bolocerooides mcmurrici	cnidarians			
Cnidaria	Hydrozoa	Bougainvillia muscus	cnidarians		yes	
Cnidaria	Hydrozoa	Liriope tetraphylla	cnidarians		yes	
Cnidaria	Hydrozoa	Plumularia filicaulis	cnidarians		yes	
Cnidaria	Scyphozoa	Aurelia insularia	cnidarians		yes	
Cnidaria	Scyphozoa	Phyllorhiza punctata	cnidarians		yes	Australian spotted jellyfish
Cryptophyta	Cryptophyceae	Hemiarma marina			yes	
Echinodermata	Asteroidea	Echinaster luzonicus	echinoderms		yes	Luzon seastar
Echinodermata	Asteroidea	Protoreaster nodulosus	echinoderms			
Echinodermata	Echinoidea	Temnopleurus michaelsoni	echinoderms			
Echinodermata	Holothuroidea	Stichopus monotuberculatus	echinoderms	DD	yes	
Echinodermata	Ophiuroidea	Ophiactis savignyi	echinoderms		yes	
Haptophyta	Coccolithophyceae	Emiliania huxleyi	algae		yes	
Haptophyta	Coccolithophyceae	Phaeocystis globosa	algae		yes	
Mollusca	Bivalvia	Antigona chemnitzii	molluscs			
Mollusca	Bivalvia	Antigona lamellaris	molluscs			lamellate venus clam
Mollusca	Bivalvia	Brachidontes erosus	molluscs			
Mollusca	Bivalvia	Callista impar	molluscs			
Mollusca	Bivalvia	Circe rivularis	molluscs			
Mollusca	Bivalvia	Dendostrea sandvichensis	molluscs			
Mollusca	Bivalvia	Fragum erugatum	molluscs			
Mollusca	Bivalvia	Fragum unedo	molluscs			strawberry cockle
Mollusca	Bivalvia	Nanostrea pinnicola	molluscs			
Mollusca	Bivalvia	Solemya velesiana	molluscs		yes	
Mollusca	Gastropoda	Biuvu fulvipunctata	molluscs		yes	
Mollusca	Gastropoda	Bulla quoyii	molluscs			
Mollusca	Gastropoda	Clypeomorus batillariaeformis	molluscs			
Mollusca	Gastropoda	Doxander vittatus	molluscs			
Mollusca	Gastropoda	Elysia thompsoni	molluscs		yes	
Mollusca	Gastropoda	Monilea lentiginosa	molluscs		yes	
Mollusca	Gastropoda	Murphydoris maracabanchia	molluscs		yes	
Mollusca	Gastropoda	Salinator rosaceus	molluscs		yes	
Mollusca	Gastropoda	Turbo haynesi	molluscs			
Myxozoa	Dinophyceae	Heterocapsa circularisquama	unicellular		yes	

Continued on next page

phylum	class	species	group	category	new	vernacular
Ochrophyta	Dictyochophyceae	Octactis octonaria	algae		yes	
Ochrophyta	Dictyochophyceae	Pseudochattonella verruculosa	algae		yes	
Ochrophyta	Pelagophyceae	Aureococcus anophagefferens	algae		yes	
Ochrophyta	Pelagophyceae	Pelagomonas calceolata	algae		yes	
Ochrophyta	Phaeophyceae	Acinetospora filamentosa	algae		yes	
Ochrophyta	Phaeophyceae	Cladosiphon okamuranus	algae		yes	
Ochrophyta	Phaeophyceae	Colpomenia claytoniae	algae		yes	
Ochrophyta	Phaeophyceae	Dictyota acutiloba	algae		yes	
Ochrophyta	Phaeophyceae	Dictyota ciliolata	algae			
Ochrophyta	Phaeophyceae	Hydroclathrus clathratus	algae			
Ochrophyta	Phaeophyceae	Hydroclathrus tenuis	algae		yes	
Ochrophyta	Phaeophyceae	Lobophora sonderi	algae		yes	
Ochrophyta	Phaeophyceae	Sirophysalis trinodis	algae			
Ochrophyta	Pinguiphyceae	Pinguicoccus pyrenoidosus	algae		yes	
Ochrophyta	Raphidophyceae	Chattonella marina	algae		yes	
Porifera	Demospongiae	Biemna fistulosa	sponges		yes	stinging tube sponge
Porifera	Demospongiae	Callispongia (Cladochalina) diffusa	sponges		yes	
Porifera	Demospongiae	Chelonaplysilla erecta	sponges		yes	
Porifera	Demospongiae	Gelliodes wilsoni	sponges		yes	
Porifera	Demospongiae	Halichondria (Halichondria) coerulea	sponges		yes	
Porifera	Demospongiae	Haliclona (Gellius) amboinensis	sponges		yes	
Porifera	Demospongiae	Halisarca dujardini	sponges		yes	soft horny sponge, éponge de Dujardin
Porifera	Demospongiae	Hymeniacidon flavia	sponges		yes	
Porifera	Demospongiae	Mycale (Carmia) fibrexilis	sponges		yes	yellow flabby-sponge
Porifera	Demospongiae	Phorbas clathratus	sponges		yes	
Porifera	Demospongiae	Terpios hoshinota	sponges		yes	
Rhodophyta	Florideophyceae	Acanthophora spicifera	algae			
Rhodophyta	Florideophyceae	Acanthosiphonia echinata	algae		yes	
Rhodophyta	Florideophyceae	Asparagopsis taxiformis	algae			
Rhodophyta	Florideophyceae	Centroceras clavulatum	algae			
Rhodophyta	Florideophyceae	Herposiphonia pectinata	algae		yes	
Rhodophyta	Florideophyceae	Jania adhaerens	algae			
Rhodophyta	Florideophyceae	Laurencia dendroidea	algae			
Rhodophyta	Florideophyceae	Liagora ceranoides	algae			
Rhodophyta	Florideophyceae	Neogoniolithon brassica-florida	algae			
Rhodophyta	Florideophyceae	Palisada parvipapillata	algae		yes	
Rhodophyta	Florideophyceae	Palisada tenerima	algae		yes	
Rhodophyta	Florideophyceae	Polysiphonia scopulorum	algae			
		Amastigomonas debruynei			yes	