Developing an evidence-led species prioritisation framework

Developed by:

With the support of:

ZOORF
Zoobranschens Riksförbund

PIAA
Pet Industry Association

EPO

aedpac
Asociación Española
de la Industria y el Comercio
del Sector del Animal de Compañía.

Brancheorganisatie
Dibevo

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Pets
Canada
Animaux
de compagnie
Canada

Pet
ADVOCACY
NETWORK

Why are we proposing a framework?

- Historically have been aware that official data sources have had weaknesses for understanding the trade in marine aquarium fish in detail.
- Since the announcement of this workstream within CITES, have also been aware of the flaws associated with other databases at the species level.
- These flaws could result in inappropriate management decisions, with negative impacts both the people that depend on the trade but also the conservation of marine fishes.
- Want to avoid the risk of attention being focussed on species not threatened by trade or omitting consideration of those deserving of extra attention

Our database

- Data from academia, historic since 2016.
- Data from industry
- Extensive cleaning to become species list, e.g. colour variants, sizes
- Identification of species just in literature vs those in trade
- Proportions of species popularity
- Scaled up to world, estimates of global take
- Additional information, captive bred availability

Our database

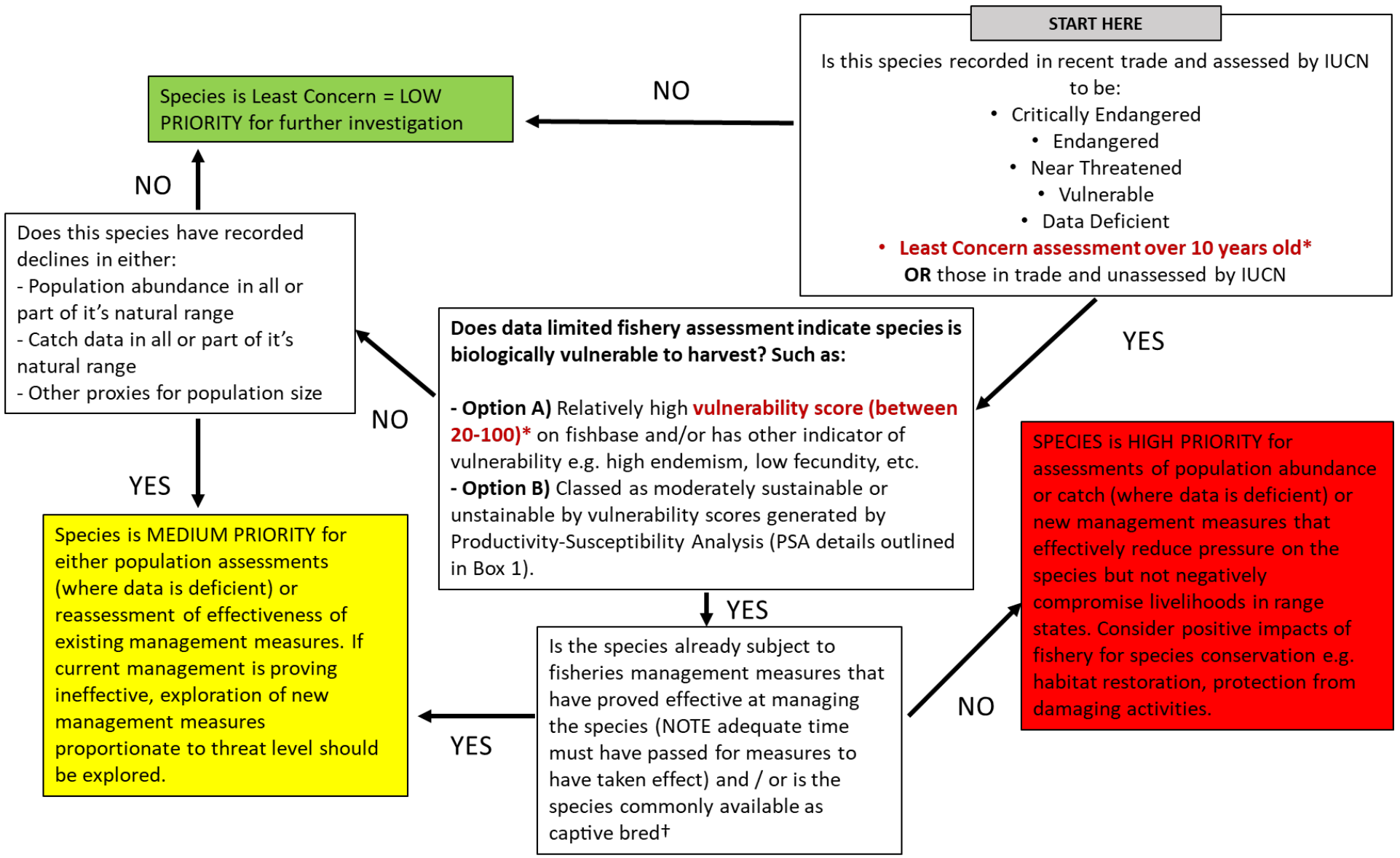
- Additional information added
- Updated IUCN Red List assessments
- Updated fishing vulnerability
- Fishing threat data
- Distributions from two sources – different overlap
- Reproductive method
- Fecundity

Our database

Family	Genus c	Genus	Species	In trade?	Low estim	High estin	Percentage of trade	Cumulative pe	Cultured availability	Year	Assess ye	Category	5.4.1	5.4.2	Territorie	Vulnerabi	Countries	Breeding method	Mean fecund
Pomacentridae		Chromis	Chromis viridis	Y	2500000	3000000	0.100766696	0.100766696	No culture record	2022	2021	Least Con	Y		60	10	47	nesters	
Pomacentridae		Amphiprion	Amphiprion ocellaris	Y	1500000	2000000	0.073333602	0.174100297	Common	2022	2021	Least Con	Y		11	10	19	nesters	
Apogonidae		Pterapogon	Pterapogon kauderni	Y	750000	1000000	0.034289987	0.208390284	Common	2007	2007	Endanger	Y		1	19.08	1	external brooders	
Serranidae		Pseudanthias	Pseudanthias squamipinnis	Y	500000	749999	0.023263144	0.231653428	No culture record	2016	2015	Least Con			51	22.97	43	open water/substratum egg scatt	
Labridae		Labroides	Labroides dimidiatus	Y	450000	499999	0.018584748	0.250238176	No culture record	2010	2008	Least Con			65	10	67	open water/substratum egg scatt	
Pomacentridae		Chrysiptera	Chrysiptera parasema	Y	450000	499999	0.017802523	0.268040699	Scarce	2022	2021	Least Con	Y		3	10	9	nesters	
Microdesmidae		Nemateleotris	Nemateleotris magnifica	Y	450000	499999	0.017351133	0.285391831	No culture record	2010	2009	Least Con			30	10	42	nesters	
Grammatidae		Gramma	Gramma loreto	Y	400000	449999	0.016864313	0.302256144	Moderate	2015	2011	Least Con			37	10	33	nesters	
Acanthuridae		Paracanthurus	Paracanthurus hepatus	Y	400000	449999	0.015947269	0.318203413	No culture record	2012	2010	Least Con	Y		52	21	45	open water/substratum egg scatt	
Gobiidae		Valenciennea	Valenciennea sexguttata	Y	400000	449999	0.015417886	0.3336213	No culture record	2019	2017	Least Con			66	10	46	nesters	
Pomacentridae		Chrysiptera	Chrysiptera hemicyanea	Y	350000	399999	0.014931757	0.348553056	Moderate	2022	2021	Vulnerabl		Y	3	10	9	nesters	
Gobiidae		Valenciennea	Valenciennea puellaris	Y	350000	399999	0.014603222	0.363156278	No culture record	2016	2015	Least Con			50	14.4	38	nesters	
Acanthuridae		Zebrasoma	Zebrasoma flavescens	Y	350000	399999	0.01403933	0.377195608	Common	2012	2010	Least Con	Y	Y	10	57.42	23	open water/substra	10556
Gobiidae		Valenciennea	Valenciennea strigata	Y	350000	399999	0.013608646	0.390804254	No culture record	2019	2017	Least Con			50	10	46	nesters	11256
Callionymidae		Synchiropus	Synchiropus splendidus	Y	300000	349999	0.01223331	0.403037564	Common	2019	2018	Least Con		Y	14	10	12	open water/substratum egg scatt	
Blenniidae		Salarias	Salarias fasciatus	Y	300000	349999	0.012185686	0.41522325	No culture record	2014	2009	Least Con			51	10	34	nesters	
Apogonidae		Sphaeramia	Sphaeramia nematoptera	Y	300000	349999	0.01195355	0.4271768	Common	2022	2021	Least Con			16	10	14	external brooders	
Chaetodontidae		Chelmon	Chelmon rostratus	Y	300000	349999	0.011585214	0.438762014	No culture record	2010	2009	Least Con		Y	15	10	19	open water/substratum egg scatt	
Labridae		Macropharyngodon	Macropharyngodon bipartitus	Y	250000	299999	0.011267722	0.450029736	No culture record	2010	2009	Least Con			21	10	14		
Monacanthidae		Acreichthys	Acreichthys tomentosus	Y	250000	299999	0.010993023	0.461022759	Common	2016	2015	Least Con			18	15.57	19	open water/substratum egg scatt	
Labridae		Pseudocheilinus	Pseudocheilinus hexataenia	Y	250000	299999	0.009620908	0.470643668	No culture record	2010	2009	Least Con			57	10	59		
Pomacentridae		Pomacentrus	Pomacentrus alleni	Y	150000	249999	0.009551889	0.480195556	Scarce	2022	2021	Least Con		Y	4	10	4	nesters	
Gobiidae		Gobiodon	Gobiodon okinawae	Y	150000	249999	0.008800492	0.488996049	Common	2019	2018	Least Con			17	10	15		
Pomacanthidae		Centropyge	Centropyge bispinosa	Y	150000	249999	0.008747807	0.497743856	Moderate	2010	2009	Least Con	Y		45	10	41		
Acanthuridae		Acanthurus	Acanthurus leucosternon	Y	150000	249999	0.00771389	0.505457745	No culture record	2012	2010	Least Con	Y	Y	25	41.6	25	open water/substratum egg scatt	
Pomacentridae		Chrysiptera	Chrysiptera springeri	Y	150000	249999	0.007121239	0.512578985	Scarce	2022	2021	Least Con		Y	4	10	2	nesters	
Pomacentridae		Chrysiptera	Chrysiptera cyanea	Y	150000	249999	0.007014028	0.519593013	Scarce	2022	2021	Least Con	Y		10	10	24	nesters	
Pomacentridae		Amphiprion	Amphiprion percula	Y	150000	249999	0.00677499	0.526368002	Common	2017	2010	Least Con	Y		5	10	12	nesters	
Labridae		Halichoeres	Halichoeres chrysus	Y	150000	249999	0.006751983	0.533119985	No culture record	2010	2009	Least Con			19	10	18		
Apogonidae		Zoramia leptacanthus	Zoramia leptacanthus	Y	100000	149999	0.006688945	0.716693028	Common	2022	2020	Least Concern			43	10	26	external brooders	13

1040 species in trade

How does the framework work?



** Criteria marked with an asterisk and in dark red are ones that can be altered and/or removed to prioritise species for further examination. For example, the flowchart as is might lead to an unfeasible number of species requiring population assessments, so you might decide to increase the vulnerability score or remove all Least Concern species from consideration. Examples of outputs can be found in the results section.*

How does it work in practice?

Example 1:

Bangaii Cardinalfish - *Pterapogon kauderni*

- IUCN listed as endangered, population data available but date 2007.
- Species 360: Research priority A (high trade volumes)
- UNEP-WCMC: Higher Likelihood of being threatened by international trade
- Wider context: represents 3.4% of trade, Estimated numbers traded globally = 750,000 – 1 million.
- Small natural range (single island Indonesia), low fecundity species, Mouth Brooder, now commonly available as captive bred.

START HERE

Is this species recorded in recent trade and assessed by IUCN to be:

- Critically Endangered
- Endangered
- Near Threatened
- Vulnerable
- Data Deficient
- **Least Concern assessment over 10 years old***

OR those in trade and unassessed by IUCN

YES

Does data limited fishery assessment indicate species is biologically vulnerable to harvest? Such as:

- **Option A)** Relatively high **vulnerability score (between 20-100)*** on fishbase and/or has other indicator of vulnerability e.g. high endemism, low fecundity, etc.
- **Option B)** Classed as moderately sustainable or unstainable by vulnerability scores generated by Productivity-Susceptibility Analysis (PSA details outlined in Box 1).

NO

Does this species have recorded declines in either:
- Population abundance in all or part of it's natural range
- Catch data in all or part of it's natural range
- Other proxies for population size

NO

Species is Least Concern = LOW PRIORITY for further investigati

YES

Species is MEDIUM PRIORITY for either population assessments (where data is deficient) or reassessment of effectiveness of existing management measures. If current management is proving ineffective, exploration of new management measures proportionate to threat level should be explored.

YES

Is the species already subject to fisheries management measures that have proved effective at managing the species (NOTE adequate time must have passed for measures to have taken effect) and / or is the species commonly available as captive bred†

NO

SPECIES is HIGH PRIORITY for assessments of population abundance or catch (where data is deficient) or new management measures that effectively reduce pressure on the species but not negatively compromise livelihoods in range states. Consider positive impacts of fishery for species conservation e.g. habitat restoration, protection from damaging activities.

** Criteria marked with an asterisk and in dark red are ones that can be altered and/or removed to prioritise species for further examination. For example, the flowchart as is might lead to an unfeasible number of species requiring population assessments, so you might decide to increase the vulnerability score or remove all Least Concern species from consideration. Examples of outputs can be found in the results section.*

How does it work in practice?

Example 2:

Brown-Banded Bamboo Shark - *Chiloscyllium punctatum*

- IUCN listed as Near Threatened but only suspected declines reported.
- Species 360: Not considered
- UNEP-WCMC: Higher Likelihood of being threatened by international trade
- Wider context: represents 0.02% of trade, Estimated numbers traded globally = 7000-7999.
- Large natural range, found across coral triangle, low fecundity species, often traded as eggs for people to hatch at home.

START HERE

Is this species recorded in recent trade and assessed by IUCN to be:

- Critically Endangered
- Endangered
- Near Threatened
- Vulnerable
- Data Deficient
- **Least Concern assessment over 10 years old***

OR those in trade and unassessed by IUCN

NO

YES

Does data limited fishery assessment indicate species is biologically vulnerable to harvest? Such as:

- **Option A)** Relatively high **vulnerability score (between 20-100)*** on fishbase and/or has other indicator of vulnerability e.g. high endemism, low fecundity, etc.
- **Option B)** Classed as moderately sustainable or unstainable by vulnerability scores generated by Productivity-Susceptibility Analysis (PSA details outlined in Box 1).

NO

YES

Is the species already subject to fisheries management measures that have proved effective at managing the species (NOTE adequate time must have passed for measures to have taken effect) and / or is the species commonly available as captive bred†

NO

SPECIES is HIGH PRIORITY for assessments of population abundance or catch (where data is deficient) or new management measures that effectively reduce pressure on the species but not negatively compromise livelihoods in range states. Consider positive impacts of fishery for species conservation e.g. habitat restoration, protection from damaging activities.

YES

Species is MEDIUM PRIORITY for either population assessments (where data is deficient) or reassessment of effectiveness of existing management measures. If current management is proving ineffective, exploration of new management measures proportionate to threat level should be explored.

YES

Does this species have rec declines in either:
- Population abundance ir part of it's natural range
- Catch data in all or part of it's natural range
- Other proxies for population size

NO

Species is PRIORITY

Criteria marked with an asterisk and in dark red are ones that can be altered and/or removed to prioritise species for further examination. For example, the flowchart as is might lead to an unfeasible number of species requiring population assessments, so you might decide to increase the vulnerability score or remove all Least Concern species from consideration. Examples of outputs can be found in the results section.

Shortlisting results

Option	IUCN Least Concern species	Vulnerability score	Number of species	Percent of trade
A	No least concern species included	>20	62	6.35%
B	Only those over 10 years included*	>40	119	9.54%
C	Only those over 10 years included*	>20	214	16.70%

- Number of species listed here indicates those that either need assessments or might fall into medium or high priority – due to the volume of species sorting all has not yet been possible.

- These numbers are reflective of using fishbase vulnerability data and other life history metrics – Other approaches may well be preferable e.g. Productivity Susceptibility Analysis (PSA).

- The frameworks presented here are designed to be flexible dependent on factors of importance – If you include methods such as PSA it's an extension of the same flexibility as you can build in different aspects that are important.
- Methods such as the PSA can include metrics that align with criteria related to threat level and biological criteria akin to Conf. Res. 9.24 (CITES listing criteria).

Management results

Producing country or territory	Fisheries: Barriers to entry				Fisheries: Regulating commercial collection methods.								International trade		
	Fisheries management plan Available online	License or permit required	Limited licenses	Marine Protected Areas	Quotas for individual species	Total allowable catch	Size limits	Fishing season or seasonal closure by government	Catch Logging, records	Gear restrictions	Anti-cyanide laws	Stock assessments for ornamentals	MPAs	Bans or laws prohibiting catch of endangered species	Trade Restrictions (export inspection, quarantine laws)	OIE members
Australia	✓	✓	✓	✓	✓	✓	No	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bahamas	No	✓	No	✓	Conch only	No	No	No	NA	✓	✓	No	✓	✓	No	✓
Brazil				✓												
Cook islands	Draft	✓	ū	✓	No	NA	NA	NA	✓	✓	✓	No	✓	✓	✓	✓
Costa Rica				✓												
Eritea	No	✓	No	✓	No	No	No	NA	NA	NA	NA	NA	✓	✓	✓	✓
Djibouti	NA	NA	NA	No	NA	NA	NA	✓	NA	NA	✓	NA	✓	✓		
Fiji	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓
Federation State Micronesia	NA	✓	NA		NA	NA	NA	NA	NA	NA	✓	✓	NA	✓	✓	
French Polynesia	✓	✓	NA	No	✓	NA	✓	NA	NA	NA	NA	NA	✓	✓	NA	NA
Haiti	NA	NA	NA	✓	NA	NA	NA	NA	NA	NA	NA	NA	No	NA	NA	✓
India				✓												
Indonesia	No	✓	No	✓	ū	ū	No	No	NA	✓	✓	✓	✓	No	No	✓
Israel																
Kenya	Draft	✓	NA	✓	NO	No	NA	No	NA	No	✓	✓	✓	✓	✓	
Kiribati	Draft	✓	No	✓	Flame Angelfish only	✓	1 species	No	NA	No	No	✓	✓	No	ū	No
Maldives	NA	✓	No	✓	✓	✓	No	No	NA	✓	✓	No	✓	✓	✓	✓

Thank you

ANY QUESTIONS OR COMMENTS?