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Freedom for Animals  
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# **A Study of the Conservation Status of Species Held in British Aquariums**

Report by Madeline Taylor, on behalf of Freedom for Animals

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## Our Mission

1. We take action to end the captivity of animals, especially those used for entertaining the public in zoos, circuses and the media industry.
2. We carry out investigations and research to provide a solid evidence base for our campaigns and political lobbying.
3. Our educational work and awareness raising promotes a more compassionate attitude and relationship between humans and other animals.
4. We undertake high level work to educate policy makers whilst continuing to support grassroots activism, the very foundations of Freedom for Animals.
5. We work in partnership with organisations that share our values and amplify our campaigns.

**Freedom for Animals is a UK-based charity leading the campaign to end the captivity of animals, especially those used for entertaining the public in zoos, circuses and the media industry.**



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## 1

# Introduction



*Figure 1: Standard tank in an aquarium in Great Britain, 2021*

Zoos and aquariums hold hundreds of thousands of animals captive worldwide (Marcy, 2021). Zoos and aquariums have a successful business model: one where paying visitors can view a range of species as part of an 'entertaining' day out. In recent years, zoos and aquariums have become increasingly controversial, following media coverage raising concerns around welfare and mortality rates (Sturdy and Scotter, 2018; BBC, 2017).

Perhaps in a bid to improve public opinion towards zoos and aquariums, promises to participate in conservation efforts are often included in public promotion which, since 2003, has been a legal obligation in order to gain a zoo licence. Conservation measures which include activities relating to administration, education and animals must be implemented by an aquarium according to Section 1A of the Zoo Licensing Act (Zoo Licensing Act 1981 (England and Wales) Regulations. Parliament. House of Commons, 2002). The commitment to such activities, however small they may be, is used by aquariums and professional bodies to portray aquariums in a positive light. However, animal protection groups including Freedom for Animals have highlighted the disparity between such statements and the conservation activity that is actually carried out by zoos and aquariums (Redmond, 2017; Born Free Foundation, 2021).

Freedom for Animals campaigns against the captivity of animals in aquariums because of the detrimental impact on an animal's physical and mental wellbeing, as well as the unnecessary deaths of animals in the industry (Freedom for Animals, 2021). The charity carries out research and investigations into both broad and specific issues surrounding captive animals. This has included in-depth research into the aquarium industry, including SEA LIFE centres particularly, and the conservation status of animals held in zoos and aquariums (Casamitjana, 2004; Palmer, 2014; Redmond, 2017).

Threats to the survival of species in the wild include poaching, habitat loss and climate change, the latter of which is of growing concern (Ritchie and Roser, 2021). The ongoing threat to species is an argument often used to justify a lifetime of captivity of animals, and their offspring. However, previous research has highlighted that the number of species that are classified as under threat in the wild and held captive in zoos and aquariums, does not reflect the statements of protecting such species.

Freedom for Animals last commissioned research that assessed the conservation status of species in public aquariums in the United Kingdom in 2004 (Casamitjana, 2004). In order to update this research, this study seeks to establish the number of aquatic species and individuals held in aquariums in Great Britain that are of conservation concern. This will be carried out via Freedom of Information requests gaining zoo stocklists for data analysis.

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*Figure 2: Typical aquarium tank containing red lionfish (Pterois volitans), least concern*





## 2

# Definition of an aquarium



Figure 3: Two-spotted goby (*Gobiusculus flavescens*), least concern and sand smelt (*Atherina presbyter*), least concern

Aquariums that formed part of this research had to meet the definition of a zoo, as defined under the Zoo Licensing Act 1981. The Act states a zoo is 'an establishment where wild animals... are kept for exhibition to the public otherwise than for purposes of a circus (as so defined) and otherwise than in a pet shop' (Zoo Licensing Act, United Kingdom. Parliament. House of Commons, 1981). In addition, establishments must be open to the public for seven days or more within a 12 month period (DEFRA, 2012).

In the case of aquariums, 'wild animals' refers to marine and freshwater species.

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Figure 4: Longhorn cowfish (*Lactoria cornuta*), not evaluated



### 3

## Aquariums in Great Britain: the law

The Zoo Licensing Act (United Kingdom. Parliament. House of Commons, 1981) governs zoos and aquariums in Great Britain; Scotland, England and Wales each have a set of regulations in relation to the Act. Extensive guidance is provided via the Secretary of State Standards of Modern Zoo Practice (only applicable to England) and by DEFRA guidance to the Act's provisions (DEFRA, 2012a; DEFRA, 2012b). The latter is specific guidance for local authorities to advise on their duties as enforcers of the zoo licensing regulation. The Act is enforced by the local authority in the respective area to the zoo (The Zoo Licensing Act 1981 (England and Wales) Regulations, United Kingdom. Parliament. House of Commons, 2002).

The law requires aquariums to meet certain provisions under the Zoo Licensing Act including 'Conservation measures for zoos' under Section 1a (Zoo Licensing Act, United Kingdom. Parliament. House of Commons, 1981). Under these measures, zoos must keep up to date records of the animals held there including data on species name, numbers of different individual animals, including records of acquired animals, births, deaths, disposals and escapes of animals, causes of deaths; and the health of the animals (Zoo Licensing Act, United Kingdom. Parliament. House of Commons, 1981). In addition, the zoos are required to submit an annual stocklist, which includes part of this information. This is further explored in Section 6 (DEFRA, 2012b).

## 4

## Methodology

To further define aquariums, the following definition was used to identify suitable establishments to be included in this study:

- An establishment that solely or predominantly exhibits fish to the public and is licensed under the Zoo Licensing Act 1981

The definition therefore excludes zoos that may have an aquatic section but mainly exhibit non-marine animals, or centres that exhibit mammals such as seals, but no other marine species.

As discussed, aquariums pertinent to this research are defined under the Zoo Licensing Act 1981. As such, a list of licensed zoos and aquariums is held by the government department, Animal and Plant Health Agency (APHA). Through an online search, a 2018 APHA list of zoos and aquariums was identified (APHA, 2018).

From this list, a database was created detailing aquarium details and the relevant local authority, totalling 45 aquariums.

Further online research did not identify any aquariums that were not included in the APHA list, however it was established that two of the aquariums were permanently closed, therefore these were removed from the data analysis.

Under the Freedom of Information Act 2000 each relevant local authority was contacted requesting a copy of the 2019 stocklist relating to the respective aquarium.

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*Figure 5: Small spotted catshark (Scyliorhinus canicula), least concern*







Figure 6: Brill (*Scophthalmus rhombus*), least concern

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Through this process, it was established that SEA LIFE had introduced a new process for local authorities to access the stocklist via their website, and the data was apparently not exportable. One local authority (LA) responded to our request stating:

*'The Sea Life centre, by allowing the LA access to the portal have satisfied their licensing agreement that the LA can view stock.'*

As such, SEA LIFE centres were excluded from this study due to the information not being available, removing a further 14 aquariums from the data analysis, which included 2 SEA LIFE aquariums situated within theme parks.

Once responses from local authorities were received, a further 7 aquariums were excluded from the study for a variety of reasons discussed in Section 6. This left a remaining 22 aquariums included in the study with stocklists which could be analysed for the purposes outlined in this study.

This study focuses predominantly on fish, but also amphibian and reptile species. Hybrid species were not included in the data analysis.

The data was analysed from stocklists establishing numbers of and class of species, conservation status, and individual numbers of animals for England, Scotland, Wales, and Great Britain.

The conservation status was established by using the International Union for the Conservation of Nature's Red List (IUCN, 2021).

## 5

## Number of aquariums

The total number of open public aquariums in Great Britain is 43.

As mentioned, there were 21 aquariums that were excluded from the study. Reasons for exclusion are listed below:

1. 14 SEA LIFE centres provide stocklists via a remote portal which is not kept on file by the council
2. 3 aquariums held a dispensation therefore no stocklist was available
3. 2 local authorities did not provide a 2019 stocklist as requested
4. 2 aquariums were catch and release. These were excluded due to the animals in these aquariums being changeable meaning that figures from stocklists would not be reliable.

This left the remaining 22 aquariums included in the study, 51% of aquariums in Great Britain.

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*Figure 7: Orange clownfish (Amphiprion percula), least concern*



## 6

# Stocklists

The Secretary of State Standards of Modern Zoo Practice (SSSZMP) sets out the requirement for zoos to submit an annual stocklist to their local authority (DEFRA, 2012b). Section 9.5 requires “an annual stock record of all animals” to be kept and “a copy must be forwarded to the local authority no later than 1 April of the year following that to which it relates.” (DEFRA, 2012b).

The keeping of detailed records is a legal requirement under the Zoo Licensing Act 1981, however, the information required on an annual stocklist is limited to the species held, acquisitions, births, deaths (including culls), departures (including sales and transfers), the remaining number and the sex (DEFRA, 2012b). Zoos and aquariums are encouraged to submit a stocklist in the SSSZMP format in Table 1. This study found that 86% of the aquariums used the SSSZMP format for their stocklists.

*Table 1: Example format of stocklist detailing male, female and unknown sex of the species (SSSZMP, 2012b).*

Common Name	Scientific Name	Group at 1.1.2011	Arrived	Born	Died	Departed	Group at 31/12/11
Whitenaped Crane	Grusvipio	2.1.1	0.2.1	0.0.2	1.0.0	0.1.0	1.2.3

The stock figure used for analysis in this study was the remaining number of animals in each species group at the end of 2019 from each aquarium stocklist.



*Figure 8: Thicklip grey mullet (Chelon labrosus), least concern*



## 7

# Professional aquarium membership

Zoos and aquariums can voluntarily purchase membership to BIAZA (The British and Irish Association of Zoos and Aquariums) or EAZA (the European Association of Zoos and Aquaria). BIAZA are members of EAZA and WAZA (World Association of Zoos and Aquariums), and according to BIAZA, members gain access to a worldwide network of zoos (BIAZA, 2021).

Furthermore, it is expected by BIAZA that member zoo and aquariums meet a set of standards. These include, but are not limited to, a high level of animal welfare, participating in managed breeding programs and demonstrating local and international involvement in conservation activities (BIAZA, 2019). They are also required to submit certain information to the organisation such as recent inspection reports and incidents of escaped animals (BIAZA, 2019).

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Figure 9: Longhorn cowfish (*Lactoria cornuta*), not evaluated



Among some of the membership benefits that BIAZA offer are:

**Status:** As an Association member you will belong to an organisation whose standards are of high repute.

**International affiliation:** BIAZA is an active and influential component of an international network of more than 1,000 zoological establishments. The work and importance of this network is recognised and endorsed by the major conservation bodies, most notably the IUCN. (BIAZA, 2021).

Certainly, it seems that committing to the BIAZA membership could demonstrate a level of credibility to the public and willingness to come under further standards and additional scrutiny. Despite this, our research found that only 36% of aquariums were members of BIAZA. Whilst cost or administrative duties required by BIAZA could be a barrier for some aquariums, a lack of membership to the industry body raises further concerns about the standards of such aquariums.

It should, however, be noted that despite good welfare being part of BIAZA's requirements from its members, Freedom for Animals has identified significant welfare concerns through a number of investigations into BIAZA member aquariums.

## 8

# Conservation status of species

As noted, the IUCN Red List of Threatened Species is a comprehensive evaluation of the conservation status of plant and animal species (IUCN, 2021). Not only does it exist to inform the public and organisations of the conservation status of species, but also to guide where conservation efforts should focus, such as the protection of habitat. This is of particular importance in the case of aquariums since previous research by Freedom for Animals has demonstrated that the majority of animals in aquariums are taken from the wild (Casamitjana, 2004). Listed species are categorised as follows:

- **Not Evaluated:** A taxon is Not Evaluated when it has not yet been evaluated against the criteria.
- **Data Deficient:** When there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status.

- **Least Concern:** When the taxon has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
- **Near Threatened:** When it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
- **Vulnerable:** Considered to be facing a high risk of extinction in the wild.
- **Endangered:** Considered to be facing a very high risk of extinction in the wild.
- **Critically Endangered:** Considered to be facing an extremely high risk of extinction in the wild.



Figure 10: European perch (*Perca fluviatilis*) and Barbel (*Barbus barbus*) signs, least concern

- **Extinct in the Wild:** When it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range.
- **Extinct:** When there is no reasonable doubt that the last individual has died.

Whilst the assessment process is rigorous, it is worth noting that the IUCN itself has raised concerns over climate change and the need for better accuracy when measuring species' vulnerability (IUCN, 2018). According to an IUCN report, 'climate change vulnerability assessments have tended to overlook species that have small distributions, such as many sub-Saharan amphibians, and to underestimate risk for those declining in number or distribution' (IUCN, 2018). This could mean that the number of species with conservation status threatened in the wild, is even higher than listed in this study.





*Figure 11: Thornback ray (Raja clavata) with wound to snout, near threatened*

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According to the IUCN (2009) marine species in particular are increasingly threatened due to overfishing, climate change, pollution and habitat loss; 17% of shark and ray species, 12.4% of grouper and 86% of marine turtles are at risk of extinction.

#### **a. Fish in aquariums in England**

A total of 934 fish species are held in aquariums in England. Of these, 61.5% are classified as least concern, 2.2% are endangered and just 1.7% are critically endangered.

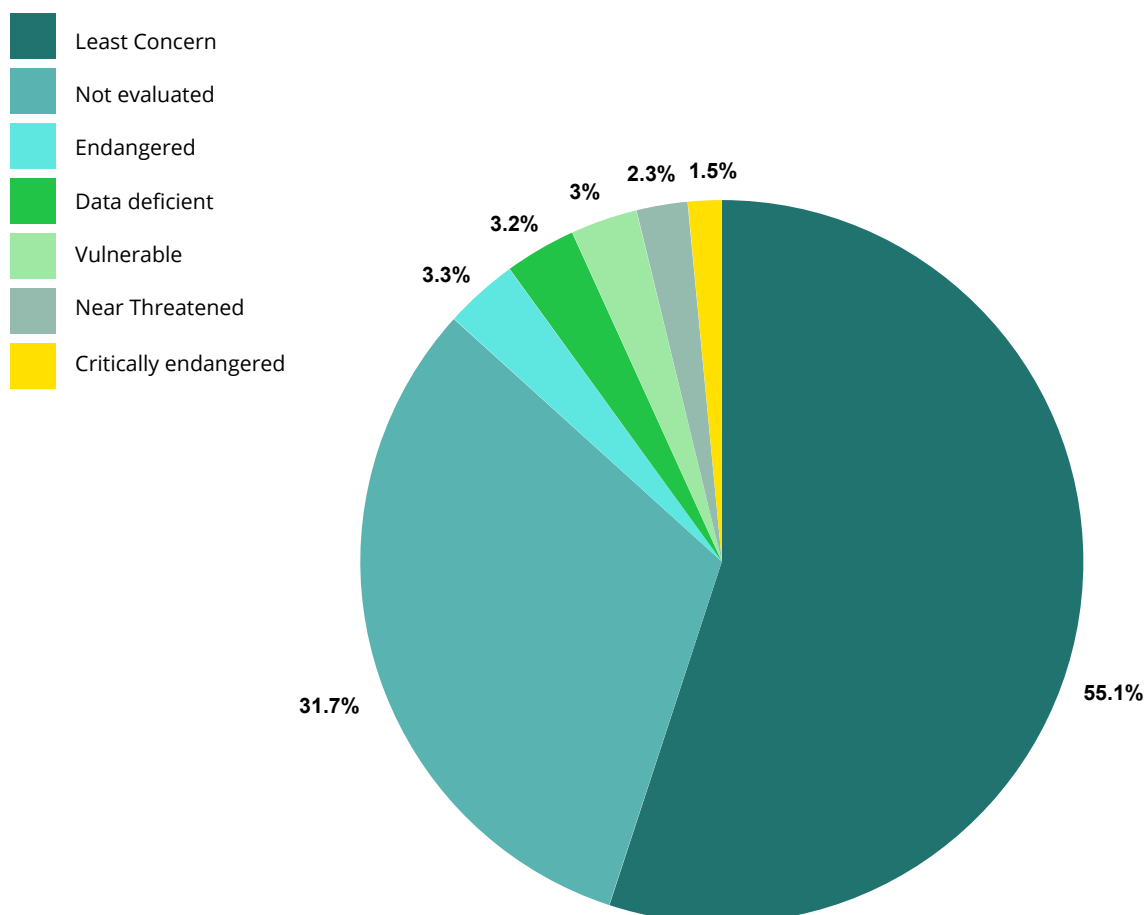
A total of 26231 individual fish are held in 17 aquariums in England; over half of which are classified as least concern. 7.8% of individuals are threatened in the wild, represented by 385 critically endangered (1.5%), 854 endangered (3.3%) and 780 vulnerable (3%) individuals.

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Table 2: The conservation status of fish in aquariums in England

IUCN status	Number of Individual fish	% of individual fish	Number of species	% of species
<b>Total</b>	26231	100%	934	100%
<b>Critically endangered</b>	385	1.5%	16	1.7%
<b>Endangered</b>	854	3.3%	21	2.2%
<b>Vulnerable</b>	780	3%	40	4.3%
<b>Near Threatened</b>	603	2.3%	30	3.2%
<b>Least Concern</b>	14448	55.1%	574	61.5%
<b>Data deficient</b>	836	3.2%	39	4.2%
<b>Not evaluated</b>	8325	31.7%	214	22.9%

Figure 12: The conservation status of individual fish held in aquariums in England



## b. Fish in aquariums in Wales

In Wales, there are 2 aquariums; as seen in Table 3, there are a total of 1224 individual fish across 99 different species. A huge 82.4% of individuals and 64.6% of species are classified by the IUCN as least concern. Just 1 species, of which 3 individuals are held, are critically endangered. Overall, the fish species that are threatened in the wild make up just 11.1% or 5.4% of individuals; the threatened fish are made up of 3 critically endangered (0.2%), 4 endangered (0.3%), and 60 vulnerable (4.9%) individuals.

Table 3: The conservation status of fish in aquariums in Wales

IUCN status	Number of Individuals Animals	% of individual animals	Number of species	% of species
<b>Total</b>	1224	100%	99	100%
<b>Critically endangered</b>	3	0.2%	1	1%
<b>Endangered</b>	4	0.3%	2	2%
<b>Vulnerable</b>	60	4.9%	8	8.1%
<b>Near Threatened</b>	96	7.8%	6	6.1%
<b>Least Concern</b>	1009	82.4%	64	64.6%
<b>Data deficient</b>	13	1.1%	3	3%
<b>Not evaluated</b>	39	3.2%	15	15.2%

The country holding the highest number of fish species that have no conservation concern was Wales.

## c. Fish in aquariums in Scotland

Scotland holds 7823 fish in 3 aquariums, representing 22% of total fish held in Great Britain. 265 different species are held, of which 67 have not been evaluated yet by the IUCN and 13 cannot be classified due to insufficient data. 157 species (59%) are least concern therefore are not considered to be under threat in the wild.

19 species (7.2%), made up by 339 individuals, are threatened in the wild. The fish that are at most risk in the wild (classified as critically endangered) are made up of 58 individuals representing just 0.7% of total individuals held in aquariums in Scotland.



Table 4: The conservation status of fish in aquariums in Scotland

IUCN status	Number of Individuals Animals	% of individual animals	Number of species	% of species
<b>Total</b>	7823	100%	265	100%
<b>Critically endangered</b>	58	0.7%	4	1.5%
<b>Endangered</b>	78	1%	4	1.5%
<b>Vulnerable</b>	203	2.6%	11	4.2%
<b>Near Threatened</b>	208	2.7%	9	3.4%
<b>Least Concern</b>	4933	63.1%	157	59.2%
<b>Data deficient</b>	116	1.5%	13	4.9%
<b>Not evaluated</b>	2227	28.5%	67	25.3%

#### d. Fish in aquariums in Great Britain

The combined figures of fish held by 22 aquariums in England, Scotland and Wales is 35,278 individuals and 966 species. Of these, a huge 10,591 individuals (30%) have not been evaluated by the IUCN. The highest figure is the fish that are categorised least concern, represented by 20,390 individuals (57.8%) and 597 species (61.8%).

Table 5: The conservation status of fish in aquariums in Great Britain

IUCN status	Number of Individuals Animals	% of individual animals	Number of species	% of species
<b>Total</b>	35,278	100%	966	100%
<b>Critically endangered</b>	446	1.3%	17	1.8%
<b>Endangered</b>	936	2.7%	21	2.2%
<b>Vulnerable</b>	1,043	3%	42	4.3%
<b>Near Threatened</b>	907	2.6%	30	3.1%
<b>Least Concern</b>	20,390	57.8%	597	61.8%
<b>Data deficient</b>	965	2.7%	41	4.2%
<b>Not evaluated</b>	10,591	30%	218	22.6%

Figure 13: The conservation status of fish species held in aquariums in Great Britain

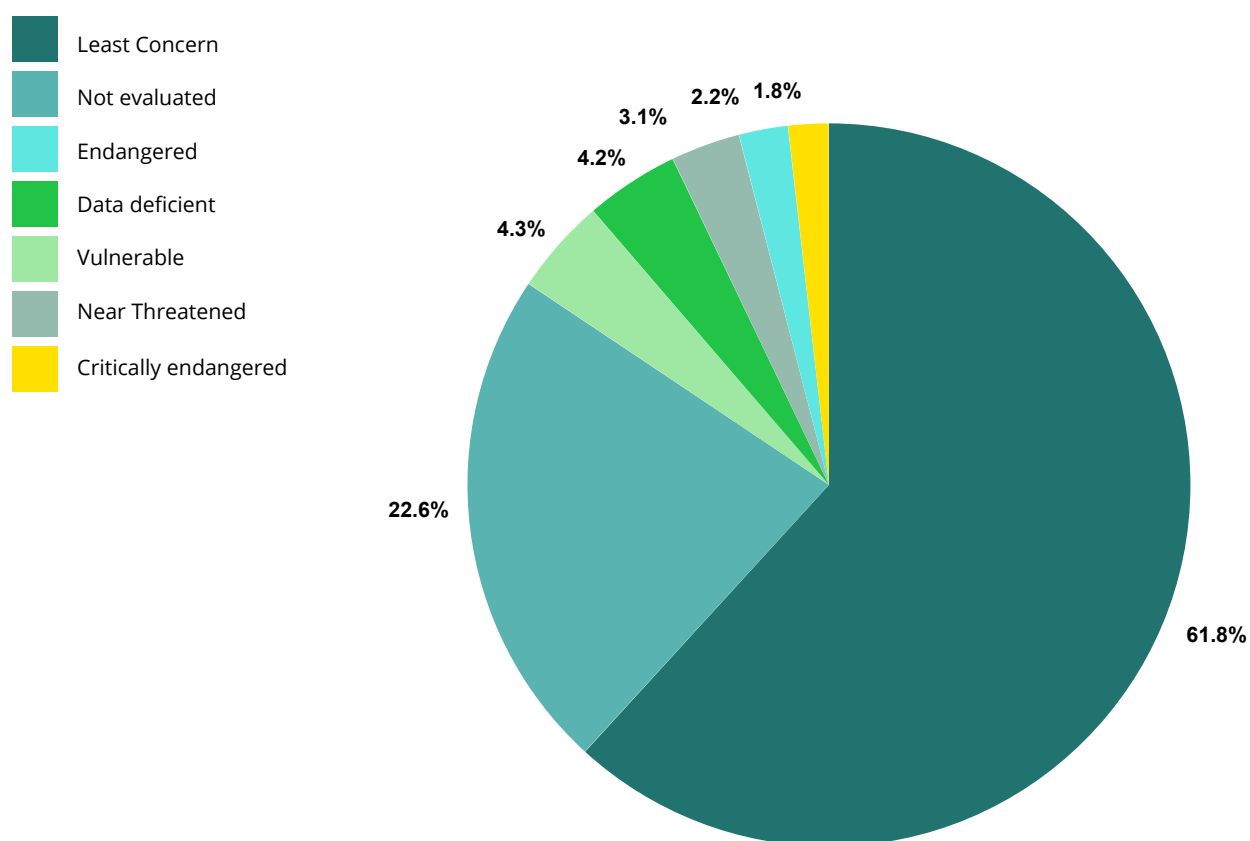
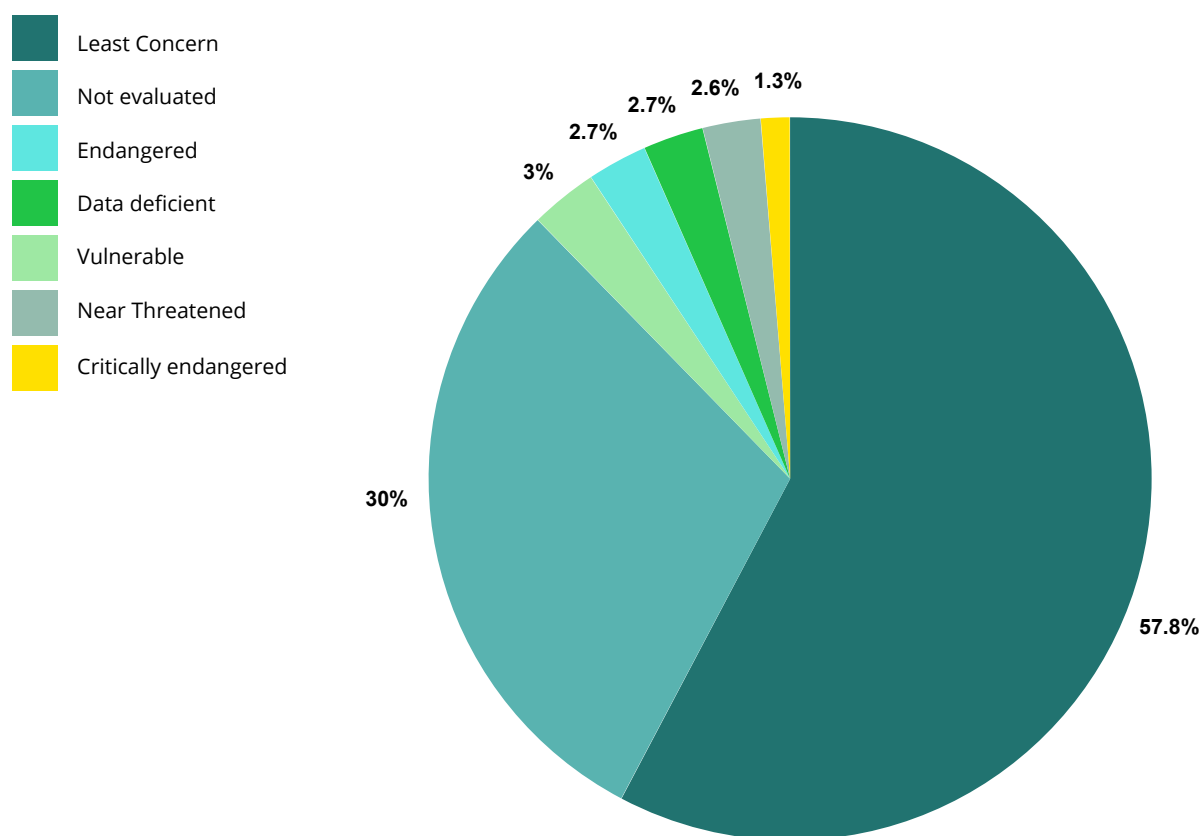


Figure 14: The conservation status of individual fish in aquariums in Great Britain



## e. Fish threatened in the wild

As shown above, species that have been assessed by the IUCN, that are currently threatened in the wild, are categorised as vulnerable, endangered and critically endangered. As such, these categories have been analysed in Table 6 below.

Figure 15: Fish species that are held in aquariums in Great Britain that are classified as 'threatened in the wild'

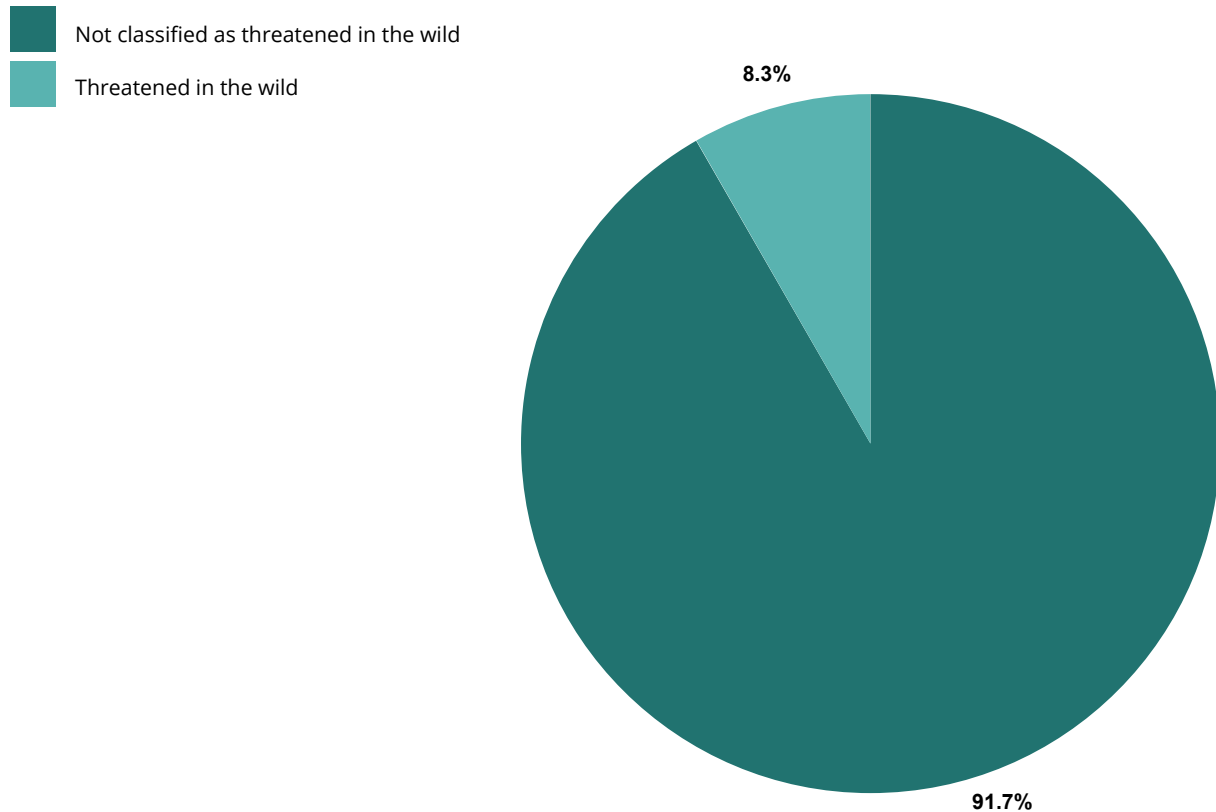


Table 6: Fish that are held in aquariums in Great Britain that are classified as threatened in the wild by the IUCN

IUCN status	Individual animals	% of individual animals	Species	% of species
<b>Vulnerable</b>	1043	2.8%	42	4.4%
<b>Endangered</b>	936	2.5%	21	2.1%
<b>Critically Endangered</b>	446	1.2%	17	1.8%
<b>Threatened in the wild</b>	2425	6.5%	80	8.3%



Of the individuals held in aquariums in Great Britain, those that are threatened in the wild make up just 6.5% of total individuals. As shown, 8.3% of species held captive in aquariums in Great Britain are threatened in the wild. Previous studies carried out by Freedom for Animals have established that 3.2% of threatened species in UK aquariums, and 8.5 % of species in SEA LIFE centres are threatened in the wild (Casamitjana, 2004; Palmer, 2014).

According to the IUCN (2021), 14.8% of global fish species are threatened in the wild, amounting to 3305 species. As seen in Table 6, 80 of the fish species classified as threatened in the wild are kept in aquariums in Great Britain, just 2.4% of globally threatened fish species.



Figure 16: Bamboo shark (*Chiloscyllium sp.*) sign, near threatened

## f. Reptiles and Amphibians in Aquariums in Great Britain

Reptiles and amphibians held in aquariums were further analysed as part of this study. In Great Britain, 466 individual amphibians and 560 individual reptiles were held, a total of 106 species. One species of each, reptiles and amphibians, was critically endangered, 20 and 122 individuals respectively. Amphibians that are held in aquariums that are classified as least concern amount to 24 species, 68.6% of total amphibians held. 54.9% of reptile species are least concern, represented by 449 individuals.

Figure 17: Sign of American green tree frog (*Hyla cinerea*), least concern



Figure 18: The conservation status of amphibians in aquariums in Great Britain

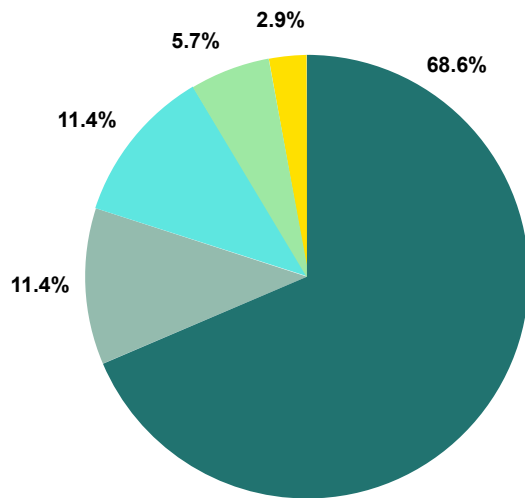


Figure 19: The conservation status of reptiles in aquariums in Great Britain

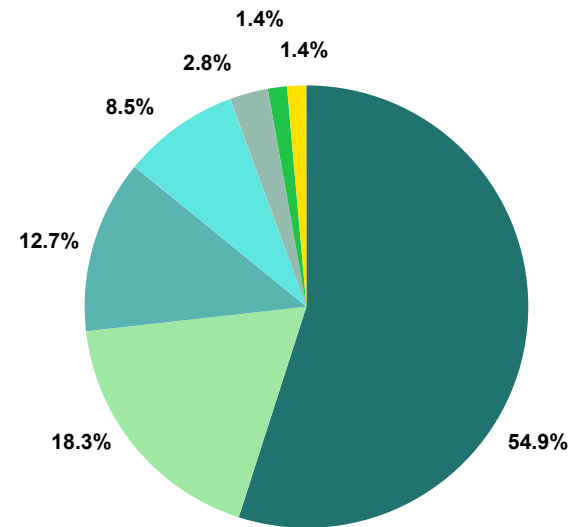


Figure 20: Thornback ray (*Raja clavata*), near threatened



Table 7: The conservation status of amphibians and reptiles in aquariums in Great Britain

IUCN status	Class	Number of individual animals	Number of Species	% of species
<b>Total</b>	Amphibian	466	35	100%
	Reptile	560	71	100%
<b>Critically endangered</b>	Amphibian	122	1	2.9%
	Reptile	20	1	1.4%
<b>Not evaluated</b>	Amphibian	0	0	0%
	Reptile	12	9	12.7%
<b>Data deficient</b>	Amphibian	0	0	0%
	Reptile	1	1	1.4%
<b>Least concern</b>	Amphibian	216	24	68.6%
	Reptile	449	39	54.9%
<b>Near threatened</b>	Amphibian	67	4	11.4%
	Reptile	4	3	2.8%
<b>Vulnerable</b>	Amphibian	11	2	5.7%
	Reptile	55	13	18.3%
<b>Endangered</b>	Amphibian	50	4	11.4%
	Reptile	19	6	8.5%



g. Amphibians threatened in the wild

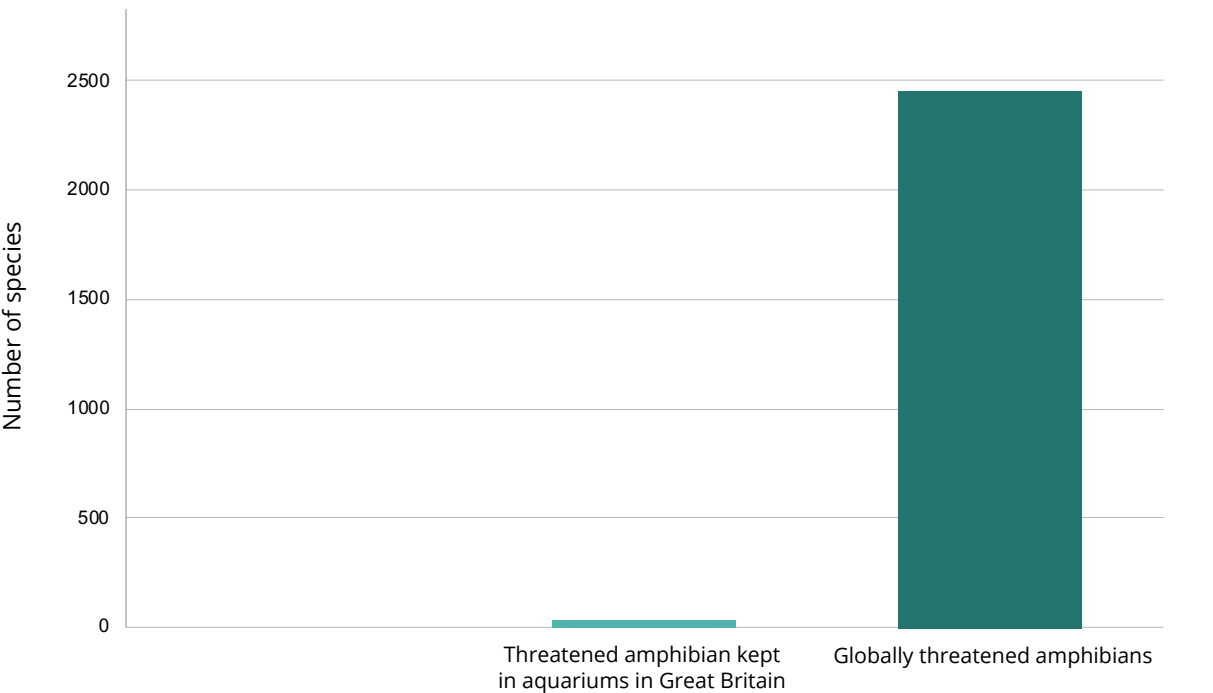
As seen in Figure 18, 33.9% (2445 species) of total amphibian species worldwide are currently threatened in the wild, making them the species at most risk of extinction. However, as shown in Table 8, aquariums in Great Britain hold just 7 such amphibian species, which represents 0.3% of amphibians currently at risk in the wild worldwide.

Amphibian species kept in aquariums in Great Britain that are threatened in the wild are further analysed in Table 8 below.

Table 8: Amphibians that are held in aquariums in Great Britain that are classified as threatened in the wild

IUCN status	Number of Individual animals	Number of Species	% of species
Vulnerable	11	2	5.7%
Endangered	50	4	11.4%
Critically Endangered	122	1	2.9%
Threatened in the wild	183	7	20%

Figure 21: Threatened amphibian species in aquariums in Great Britain and threatened amphibian species worldwide



This study analyses the data of stocklists from aquariums in Great Britain. There are a total of 966 fish species across 22 aquariums. The results have highlighted that 91.7% of fish species in aquariums in Great Britain are not classified as being threatened in the wild.

In 2004, a study commissioned by Freedom for Animals established that just 3.2% of taxa in UK public aquariums were threatened in the wild. However at that stage, a huge 92% of the animals in UK aquariums were of species that had not been evaluated by the IUCN. As seen, far more species in this study have been evaluated by the IUCN however, the results of this study show that species kept in aquariums in Great Britain that are under threat in the wild remain under 10%.

In the same study in 2004, 16,283 individual animals formed part of the analysis, from data from 31 randomly selected zoos. As seen in this study, 35,278 individual fish were identified from stocklists from 22 aquariums in Great Britain. However, the method of data collection in this study differs to the earlier study which was carried out via visits to aquariums. In contrast, this study analyses the aquariums' own data.

A decade later, in 2014, Freedom for Animals commissioned another study solely concentrating on the UK's biggest aquarium brand: SEA LIFE. The investigator found from signage that just 8.5% of species were threatened in the wild, and 59% had not been evaluated by the IUCN. This study found similar results despite SEA LIFE centres not being part of the study: 8.3% of fish species in aquariums in Great Britain are threatened in the wild. Of these, 11.1% of fish species in Wales aquariums are under threat, 1% of which are critically endangered; 7.2% of fish species in Scotland aquariums are threatened; England aquariums hold 8.2% of threatened species. Whilst aquariums so often talk of conservation efforts, these figures counter that oft-used justification for the captivity of marine species in aquariums. In fact, most species held in aquariums in Great Britain are not under threat, or the IUCN has not classified them yet.

With regards to other species in this study, the conservation status of amphibians and reptiles in aquariums is analysed. In this study just 0.3% of globally at-risk amphibians are kept in aquariums in Great Britain. 68.6% of amphibians are least concern and 80% of those kept are not classified as threatened in the wild. According to the IUCN, 41% of amphibians are threatened with extinction making them the animal group that are most at risk in the wild. If zoos and aquariums' commitment to conservation is genuine, one would expect to see a high proportion of these species in aquariums or involvement in in-situ conservation of such species. However, a previous study found that just 29 (0.4%) threatened amphibian species were kept in The Consortium of Charitable Zoos (Born Free, 2021). Another identified that zoos worldwide hold 6.2% of globally threatened amphibians (Dawson et al. 2016).



Figure 22: Red lionfish (*Pterois volitans*), least concern

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Furthermore, a recent study predicts that 1,100 amphibian species that are currently identified as data deficient by the IUCN are actually at risk of extinction and should be categorised as vulnerable, endangered or critically endangered (Gonzales-del-Pliego et al., 2019). This indicates that figures of amphibians under threat in the wild could be even higher in the future once more species have been assessed by the IUCN.

As mentioned, access was not gained to copies of SEA LIFE stocklists due to the new system that the company has implemented allowing the local authority access to the stocklist via a remote portal. It appears that this system was implemented following a BBC exposé that revealed that a third of animals died at SEA LIFE centres within a year, a total of 4500 individuals across 8 different centres (Sturdy and Scotter, 2018). This brings into question whether SEA LIFE are deliberately trying to hide their stock figures, particularly mortality rates, from the public and concerned organisations.

There are 14 SEA LIFE aquariums within Great Britain, some of which are located within theme parks owned by its parent company, Merlin Entertainments. A SEA LIFE stocklist from 2015 shows 1295 individuals, therefore 14 centres could amount to tens of thousands of animals. It could be argued that the local authority should keep the stocklist on file in case of legal disputes and for transparency to the general public. Certainly with public donations, increased transparency would be expected rather than further secrecy.



Many of the world's aquatic species are under threat, hence it is of utmost importance that conservation efforts are taken seriously. The conservation subject is often used as a promotional tool for zoos and aquariums, and participation in conservation efforts is part of the licensing requirements. This study did not assess the in-situ conservation efforts of aquariums, however the number of threatened species held in aquariums has been demonstrated to be low across a range of taxa. The vast majority of species held by aquariums are not considered to be under threat, 80% of amphibians held are not classified as threatened, and 91.7% of fish species.

Furthermore, the number of fish species held in Great British aquariums that have been identified as under threat by the IUCN is just 8.3%. Amphibians are the species most at risk of extinction, but this is not reflected in aquarium stocklists; only 0.3% of globally at-risk amphibians are kept in aquariums in Great Britain. This study was limited to assessing the conservation status of animals using stocklists of licensed zoos that predominantly hold fish. Analysis was further limited to focusing on fish, amphibians and reptiles; further studies could assess all species within aquariums. To assess further the true contribution that aquariums are making to conservation, further research is needed to establish, for example, in-situ conservation projects.

*Due to rounding, some totals may not correspond with the sum of the separate figures.*

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*Figure 23: Yellow dogface puffer (Arothron nigropunctatus), least concern*



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