GALLIFREY FOUNDATION

KYMA sea conservation & research

SHARKPROJECT

Version 06/10/2025

Factsheet Sharks and Rays

1. Sharks and rays play a key role for healthy ecosystems in the world's ocean

A total of 1,213 shark and ray species are currently described.[i] There are over 546 different species of shark and 667 species of ray. Sharks and rays have roamed the ocean for over 450 million years. Some shark species are apex predators, many are mesopredators like the rays, but there are also some that feed by filter-feeding.

Due to their diversity and high degree of adaptability, they play a key role in the marine ecosystem, as they control the number of other species and keep their populations healthy by eating old and sick animals in particular. With their feeding behaviour, they maintain the balance in the ecosystem and with their excretions they contribute to the distribution of nutrients in the sea. Sharks, like many species of rays, are long-lived animals, they grow slowly and only reproduce after several years. This makes them very susceptible to overfishing. The decline in shark and ray populations has a negative effect on the vitality of marine ecosystems and communities.

2. Status of sharks and rays

- 37.5% (= 391 species) of shark and ray species are threatened with extinction.[ii]
- Around 59 % of reef shark and reef ray species are considered threatened with extinction.[iii]
- The global population of oceanic sharks and rays has declined by 71 % since 1970 due to an 18-fold increase in relative fishing pressure.[iv]
- Some shark populations have declined by 95 % in certain regions.[v]
- Over 100 million sharks are killed every year - through bycatch or deliberate capture.[vi]

Overfishing, IUU (illegal, unregulated and unreported fishing), unselective, and harmful fishing methods such as trawling pose the most important threats besides habitat loss and degradation, climate change and pollution.

3. Trade in shark and ray meat and products

The majority of shark and ray products traded worldwide are meat and fins, cartilage, squalene as a food supplement, as well as oils and jewellery. Shark meat is often mislabelled (e.g. Cação)[vii] and shark components are contained in cosmetics or food supplements without correct labelling. In some cases, shark meat is also used in animal feed production, especially in feed for livestock or in aquaculture. It can serve as a cheap source of protein, with the quality of the meat often not meeting the high standards for human consumption. Manta and devil rays are among the most endangered ray species and are increasingly threatened by trade despite international protection measures.[viii] They are mainly fished because their gill plates are considered as dried seafood and are used in Chinese medicine.[ix] Stingrays are also hunted for their gill plates, and their populations are also declining.

The global trade in ray and shark meat and products is a billion-dollar business, with Europe being an important hub in this trade (see below and Annex I).[x] The total value worldwide of shark and ray products exceeded USD 4.1 billion in the period 2012-2019. The value of shark and ray meat (USD 2.6 billion) exceeds the value of shark fins (USD 1.5 billion). Prices vary greatly. Around USD 0.1/kg for meat and over USD 100/kg for shark fins. Italy pays the highest average price for meat, USD 4/kg, and Hong Kong pays the highest average price for shark fins, USD 30/kg.[xi] For information on the international trade in shark and ray products, see Annex I.

Import of shark and ray products into Switzerland

In Switzerland, mainly shark meat and shark and ray fillets are imported (see Fig. 1).[xii] According to Swiss trade statistics, 65.1 tonnes of shark meat have been imported in the last 25 years, 5.4 tonnes of shark fins and 17.4 tonnes of shark and ray fillets (reported only since 2017 in the statistics), and 87.4 tonnes of ray meat (reported only since 2012 in the statistics).

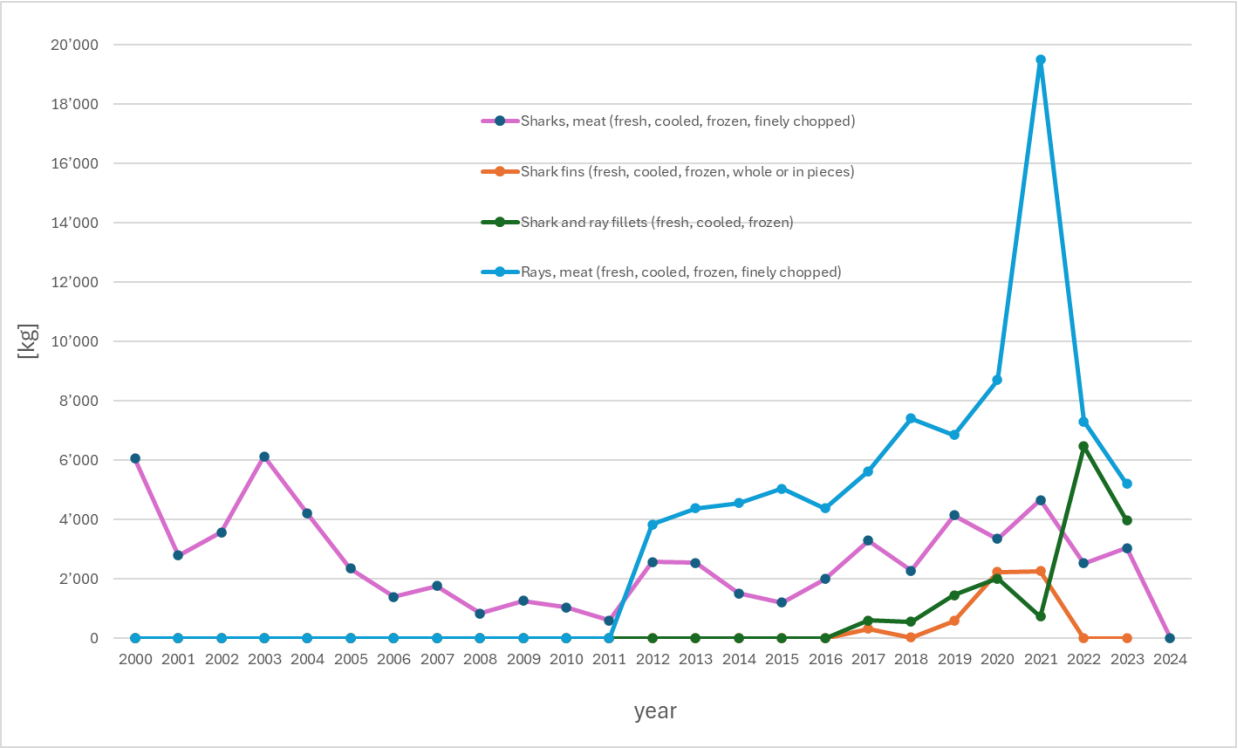

Figure 1: Imports of shark and ray products into Switzerland 2000-2024.[xiii]

It should be noted that it is doubtful whether the statistics reflect the actual amount of shark fins and shark meat effectively imported. In 2024 for example, the import volume appears to be 0, which cannot be correct in view of what is available in stores in Switzerland. It is also important to note that the statistics cannot be used to determine how much shark and ray products are imported in the form of ingredients, e.g. in food supplements, as well as mislabelled shark products. However, in a global comparison, imports of shark and ray products into Switzerland are low and originate mainly from the EU (see Fig. 2).

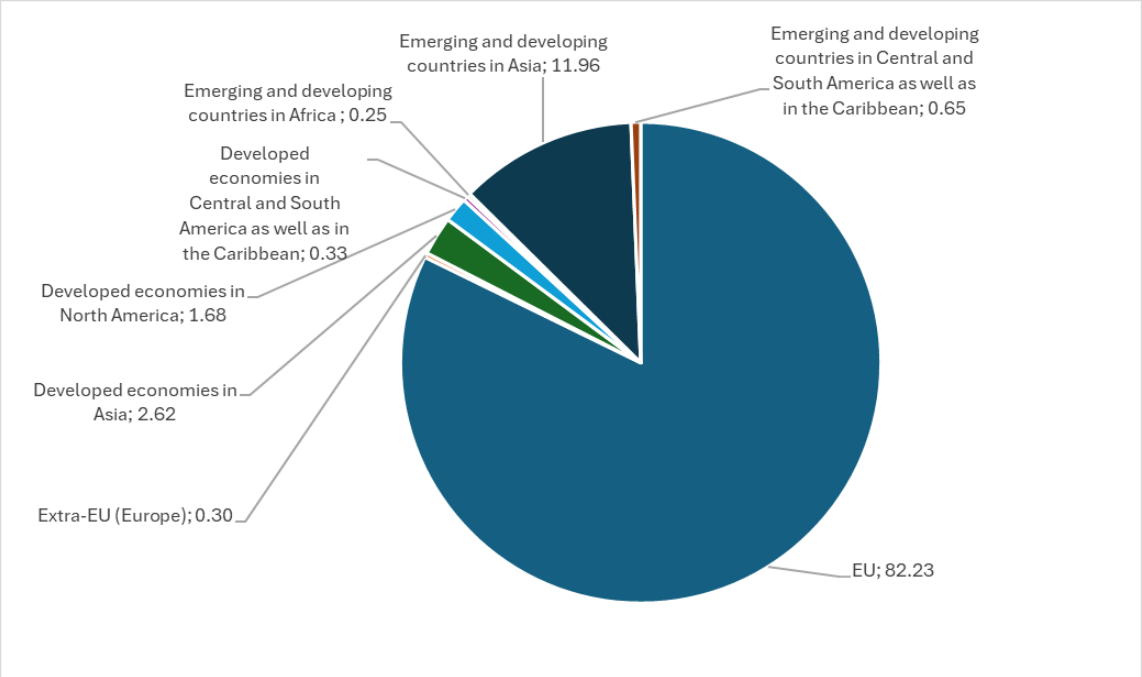

Figure 2: Origin of imports of shark and ray products into Switzerland by economic area in % of volume (Source: Swiss-Impex).

4. Existing regulations, restrictions and bans on the trade in shark and ray products

Countries with import bans on shark and ray products

- Austria (2024): Ban on the import and export of shark meat, shark fins and other products containing shark components (e.g. squalene).[xiv]
- Panama (2024): Ban on the import and export of shark meat, ray meat, shark and ray fins and other products containing shark or ray components.

In addition to these countries with import and export bans there are several countries with full or partial bans on shark finning or shark fishing as listed in Annex II.

International agreements

CITES[xv]: The Convention on International Trade in Endangered Species of Wild Fauna and Flora aims to conserve and sustainably manage animal and plant species. Endangered species are listed in CITES Appendices I-III according to their level of protection. Appendix I corresponds to the highest level of protection, as trade in the listed species is either severely restricted or not permitted at all. Over 130 shark and ray species are currently listed in CITES Appendix II, which means that their trade must be better controlled to reduce overfishing.[xvi] The family of sawfishes (i.e. a family of rays) is listed on CITES Appendix I.[xvii] Switzerland as a party to CITES is subject to the rules of this trade agreement. For instance, if a species of CITES Appendix II is to be imported to Switzerland, a CITES export permit from the country of origin is required, as well as an import permit and inspection upon entry into Switzerland.

«Fins naturally attached» (FNA): This "best practice", which has been adopted by several countries and organisations worldwide (e.g. EU, USA**,** General Fisheries Commission for the Mediterranean GFCM) to prevent finning, is considered one of the few measures that has had a positive effect in reducing this cruel practice.[xviii] While the positive effect of the FNA in terms of curbing finning has been confirmed, the requirement that

sharks must be landed whole has probably fuelled the demand for shark meat.[xix] In any case, the trade figures indicate that the markets for shark meat have grown since the tightening of regulations on the removal of shark fins.[xx]

EU Regulations

The EU plays an important role in the current trade in shark and ray products as shown in Figure 2 as well as in Annex I. Imports from EU countries account for approx. 22 % of total global trade. The EU also plays an important role in established market regulation systems, such as EU Regulation 1224/2009[xxi] on control systems in fisheries and the EU Regulation 1005/2008[xxii] to prevent IUU fishing. These regulations are intended to help provide more transparent traceability of shark and ray catches. Despite these regulations, there are no comprehensive management systems at EU level, let alone at national level, which fully record the data from fisheries.

5. Human health and the consumption of shark and ray products

Many shark and ray species are top predators or mesopredators and are long-lived, which makes them very susceptible to the accumulation of pollutants in their bodies. If humans in turn use sharks and rays as food, the pollutants can be transferred to them and be harmful to human health.

High concentrations of toxic pollutants such as polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane (DDT) and heavy metals (e.g. mercury, methylmercury) are found in sharks and rays, which seriously threaten the animals. However, the methylmercury and PCB concentrations in sharks may also exceed the limits for human consumption. A systematic review on the human health risks of the consumption of shark and ray meat found that eating shark meat once a week leads to an intake of methylmercury three times higher than the maximum recommended by the US Environmental Protection Agency (EPA).[xxiii] A study in Switzerland in 2004 showed that 20% of the fish tested exceeded the legal limit value of 1,000 micrograms per kilogram.[xxiv] A 2025 European study [xxv]showed that nearly two-thirds of shark meat analysed had alarming (0,72 mg/kg to 0,92 mg/kg) or above safe level rates (1 mg/kg to 4,40 mg/kg), one-third for the latter case. The intake of mercury is associated with damage to the nervous system, kidney damage and impaired fertility. Mercury can also affect foetuses via the placenta. The widespread global practice of falsely labelling shark and ray products[xxvi] or not to be labelled transparently[xxvii], exposes people to an additional risk of ingesting harmful substances through the consumption of shark and ray products.

6. An import ban on shark and ray products in Switzerland: sensible and necessary

Sharks and rays are indispensable for the ecological balance of the ocean and therefore also for the basis of life on land and for us humans. However, many shark and ray species are threatened with extinction due to overfishing. The consumption of shark and ray products can also be harmful to human health, as a high level of contamination with harmful substances has been proven.

CITES cannot completely prevent endangered shark and ray species from entering Switzerland. Processed products from illegal fishing, incorrect labelling of products and the processing of shark and ray products in food supplements and animal feed make it almost impossible to determine whether endangered shark and ray species are being imported. This is because the respective shark or ray species can only be identified in processed form with costly DNA analyses. These analyses have shown, for example, that fins from juvenile individuals of large shark species and highly endangered small shark species are sold on markets in Hong

Kong.[xxviii] In addition, a recent CITES study found that many countries are alarmingly underreporting trade in shark and ray species listed on the CITES Appendices.[xxix]

A ban on the import of all shark and ray products into Switzerland is necessary so that Swiss consumers can be sure that they are not consuming products contaminated with mercury that originate from sharks and rays. Even though the import of shark and ray products into Switzerland is low by global standards, the health risks that the consumption of shark and ray products can cause cannot be ignored. Besides, a relatively low import volume also means that there are no economic arguments against an import ban. Ultimately, an import ban also makes sense, as it is an important signal from Switzerland in favour of protecting endangered shark and ray populations. Switzerland introduced a similar ban on seal products in 2017. [xxx] A look at our neighbouring country Austria shows that an import ban on shark products is possible and compatible with international agreements (e.g. WTO). In Switzerland, however, following the example of Panama, an import ban should be introduced for the entire group of elasmobranchs, i.e. sharks and rays, as rays are just as endangered by fishing and trade as sharks. This step would add value to the commitment of Switzerland to improve biodiversity and reduce marine overexploitation as mentioned in the Swiss Maritime Strategy.[xxxi]

ANNEX I

International trade in shark and ray products

Exports	Volume (t)
Spain	183,884
Portugal	104,758
Uruguay	72,839
Japan	59,117
USA	49,422
Namibia	37,492

Exports	Value (USD)
Spain	536,339,368
Portugal	232,967,950
USA	192,719,619
Uruguay	177,983,226
China	165,072,476
Singapore	128,347,782

Imports	Volume (t)
Brazil	149,484
Spain	136,144
Italy	88,876
Portugal	60,316
Uruguay	56,963
China	34,809

Table 1: The six largest export and import countries of shark products by volume and value 2012-2019 (Source: Niedermüller et al., 2021)

Exports	Volume (t)
Argentina	81,601
Sierra Leone	55,818
USA	41,524
Indonesia	18,049
Spain	16,188

Exports	Value (USD)
Argentina	221,230,213
USA	144,779,396
Spain	53,640,864
Japan	43,234,144
China	41,428,758

Imports	Volume (t)
South Korea	141,655
Ghana	55,788
France	26,131
Malaysia	18,231
China	15,600

Table 2: The five largest export and import countries of ray products by volume and value 2012-2019. (Source: Niedermüller et al., 2021)

ANNEX II

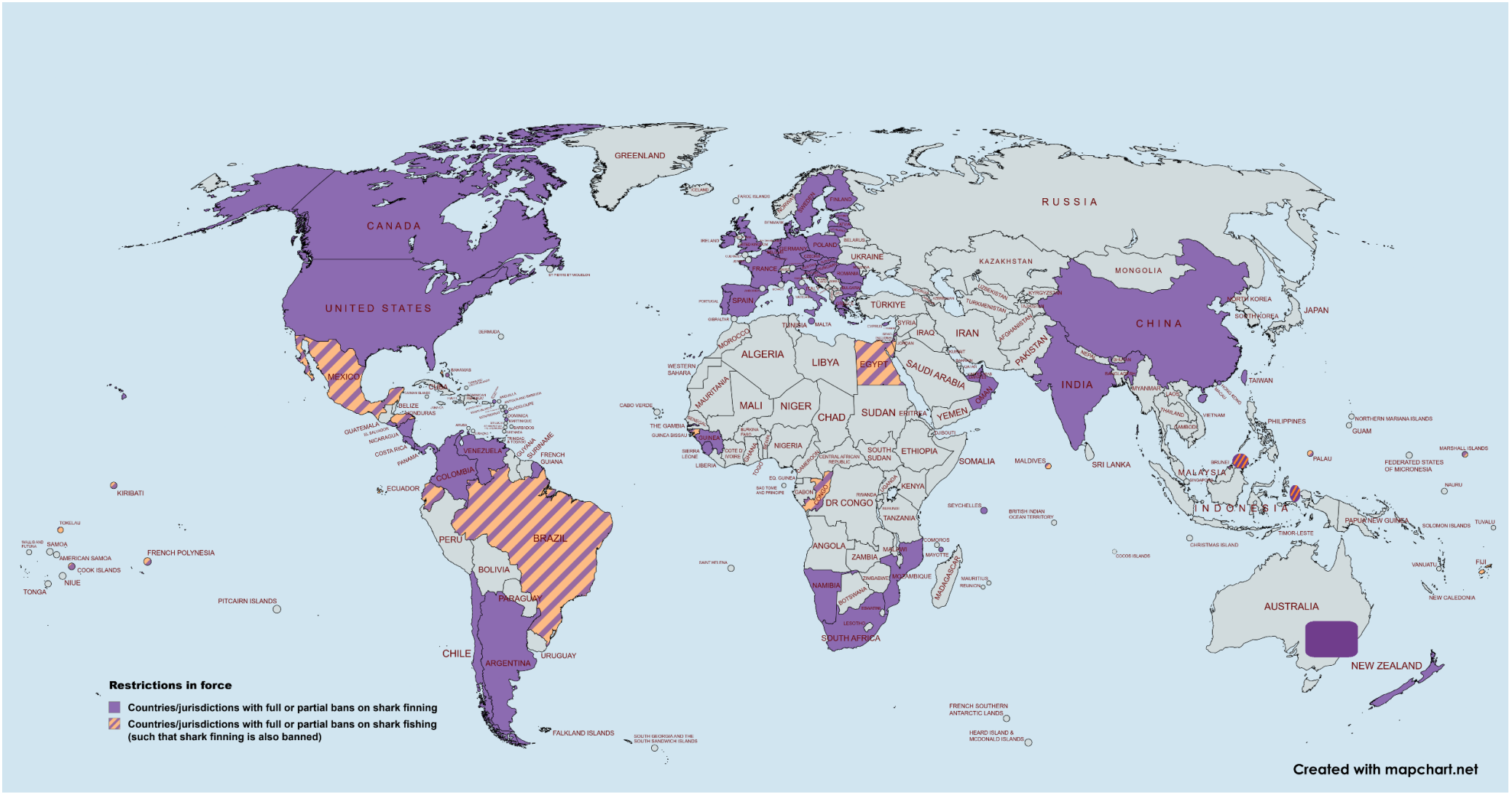

Figure 3: Countries/jurisdictions with full or partial bans on shark finning or/and fishing. There are currently 34 countries worldwide where a ban on shark finning is in place and in 22 countries shark fishing is fully or partially banned. [xxxii] ***See KYMA's letter of protest to the government of Maldives regarding the partial resumption of shark fishing.***

ANNEX III

[i] Jabado, R.W., Morata, A.Z.A., Bennett, R.H., Finucci, B., Ellis, J.R., Fowler, S.L., Grant, M.I., Barbosa Martins, A.P., & Sinclair, S.L. (eds.) (2024). The global status of sharks, rays, and chimaeras. Gland, Switzerland - IUCN

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[iii] Sherman, C.S., Simpfendorfer, C.A., Pacoureau, N. *et al.* Half a century of rising extinction risk of coral reef sharks and rays. *Nat Commun* 14, 15 (2023). https://doi.org/10.1038/s41467-022-35091-x

[iv] Pacoureau, N., Rigby, C.L., Kyne, P.M. *et al.* Half a century of global decline in oceanic sharks and rays. *Nature* 589, 567–571 (2021). https://doi.org/10.1038/s41586-020-03173-9

[v] Examples: Whitetip shark in the Western and Central Pacific Ocean or angelshark in Ireland.

[vi] Boris Worm u. a., „Global shark fishing mortality still rising despite widespread regulatory change", *Science* 383, Nr. 6679 (2024): 225–30, https://doi.org/10.1126/science.adf8984.

[vii] Cristina Bernardo, Aisni Mayumi Corrêa de Lima Adachi, Vanessa Paes da Cruz, Fausto Foresti, Robin H. Loose, Hugo Bornatowski, The label "Cação" is a shark or a ray and can be a threatened species! Elasmobranch trade in Southern Brazil unveiled by DNA barcoding, Marine Policy, Volume 116, 2020, 103920, ISSN 0308-597X, https://doi.org/10.1016/j.marpol.2020.103920.

[viii] Palacios, M.D., Weiand, L., Laglbauer, B.J. *et al.* Global assessment of manta and devil ray gill plate and meat trade: conservation implications and opportunities. *Environ Biol Fish* (2024). https://doi.org/10.1007/s10641-024-01636-w

[ix] O'Malley, M., Townsend, K. A., Hilton, P., Heinrichs, S., and Stewart, J. D. (2017) Characterization of the trade in manta and devil ray gill plates in China and South-east Asia through trader surveys. *Aquatic Conserv: Mar. Freshw. Ecosyst.*, 27: 394–413. doi: 10.1002/aqc.2670.

[x] „US$ 2.6 billion global trade in shark and ray meat revealed. Better rules and transparency needed to fight overexploitation", WWF, 2021.

[xi] Simona, Niedermüller & Ainsworth, Gillian & Juan, Silvia & Garcia, Raul & Ospina-Alvarez, Andrés & Pita, Pablo & Villasante, Sebastian. (2021). The shark and ray meat network: a deep dive into a global affair. 10.13140/RG.2.2.13195.67365.

[xii] Datenbank Swiss-Impex, Bundesamt für Zoll und Grenzsicherheit BAZG, https://www.gate.ezv.admin.ch/swissimpex/

[xiii] Swiss-Impex https://www.gate.ezv.admin.ch/swissimpex/

[xiv] https://www.ris.bka.gv.at/eli/bgbl/II/2024/107

[xv] https://cites.org/eng

[xvi] https://cites.org/eng/disc/how.php and https://www.blv.admin.ch/blv/en/home/das-blv/kooperationen/internationale-institutionen/cites.html

[xvii] https://cites.org/eng/prog/shark/history.php

[xviii] Ziegler, Iris. (2024). Fins Naturally Attached, the globally acknowledged best practice to prevent finning REV 1 IOTC WPEB 2023.

[xix] Boris Worm u. a., „Global shark fishing mortality still rising despite widespread regulatory change", *Science* 383, Nr. 6679 (2024): 225–30, https://doi.org/10.1126/science.adf8984.

[xx] Simona, Niedermüller & Ainsworth, Gillian & Juan, Silvia & Garcia, Raul & Ospina-Alvarez, Andrés & Pita, Pablo & Villasante, Sebastian. (2021). The shark and ray meat network: a deep dive into a global affair. 10.13140/RG.2.2.13195.67365.

[xxi] https://eur-lex.europa.eu/legal-content/DE/ALL/?uri=celex%3A32009R1224

[xxii] https://eur-lex.europa.eu/legal-content/DE/TXT/?uri=CELEX:32008R1005

[xxiii] Guuske P. Tiktak, Demi Butcher, Peter J. Lawrence, John Norrey, Lee Bradley, Kirsty Shaw, Richard Preziosi, David Megson, Are concentrations of pollutants in sharks, rays and skates (Elasmobranchii) a cause for concern? A systematic review, Marine Pollution Bulletin, Volume 160, 2020, 111701, ISSN 0025-326X.

[xxiv] https://www.srf.ch/sendungen/kassensturz-espresso/umwelt-und-verkehr-viel-quecksilber-in-meeres-speisefischen

[xxv] Report available at https://gallifrey.foundation/sharks-apex-preditors-and-ocean-guardians/.

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[xxvii] Hobbs, C. A. D., Potts, R. W. A., Bjerregaard Walsh, M., Usher, J. and Griffiths, A. M. (2019) 'Using DNA Barcoding to Investigate Patterns of Species Utilisation in UK Shark Products Reveals Threatened Species on Sale.' Sci. Rep., 9(1) pp. 1–10. und Almerón-Souza, F., Sperb, C., Castilho, C. L., Figueiredo, P. I. C. C., Gonçalves, L. T., Machado, R., Oliveira, L. R., Valiati, V. H. and Fagundes, N. J. R. (2018) 'Molecular identification of shark meat from local markets in Southern Brazil based on DNA barcoding: Evidence for mislabeling and trade of endangered species.' Front. Genet., 9(APR) pp. 1–12

[xxviii] Diego Cardeñosa *et al.,* Small sharks, big problems: DNA analysis of small fins reveals trade regulation gaps and burgeoning trade in juvenile sharks. *Sci. Adv.*10, eadq 6214 (2024).

[xxix] CITES Secretariat (2024), Deep diving into shark catch and trade mismatches.

[xxx] https://www.admin.ch/gov/de/start/dokumentation/medienmitteilungen.msg-id-65877.html

[xxxi] https://www.eda.admin.ch/eda/en/fdfa/fdfa/publikationen.html/content/publikationen/en/eda/schweizer-aussenpolitik/maritime-strategie-2023-2027

[xxxii] List from https://awionline.org/content/international-shark-protection-measures