

Easier advice for making seahorse CITES non-detriment findings (NDFs)

Project Seahorse¹

June 2023

INTRODUCTION AND RATIONALE

The CITES Appendix II listing for all seahorse species (*Hippocampus* spp.) means all seahorse exports require a permit issued by the exporting Party's CITES Management Authority.

Three conditions must be met before that permit can be issued:

- The proposed export will not harm wild populations.
- The proposed export is of legally acquired specimens.
- When applicable, live seahorses are being shipped humanely.

A non-detriment finding (NDF) determines if the first of these conditions is being met – that the proposed export will not harm wild populations of seahorses.

Seahorses were the focus of the first CITES Review of Significant Trade (RST) for fully marine fishes, with three rounds initiated in 2008, 2011 and 2014.² The RST process for seahorses triggered development of an NDF framework for the genus. With support from the CITES Secretariat and funds from the European Union (EU), Project Seahorse (which hosts the IUCN SSC Seahorse, Pipefish & Seadragon Specialist Group (SPS SG)) worked with the Management Authorities (MAs) and Scientific Authorities (SAs) in Thailand and Viet Nam to create the first NDF framework for marine fishes. It was later refined in consultation with Authorities in the Philippines. This most recent version is available on the [SPS SG website](#).³ The NDF framework guides Authorities to identify the pressures facing the seahorse species under consideration, evaluate the ability of existing management to mitigate identified or unknown risks, and consider options for making NDFs.

¹ Cite as: Foster, S.J. & A.C.J. Vincent (2023). Easier advice for making seahorse non-detriment findings (NDFs). Project Seahorse, The University of British Columbia. June 2023. 18 pp.

² Foster, S.J. & A.C.J. Vincent (2021). Holding governments accountable for their commitments: CITES Review of Significant Trade for a very high-volume taxon. *Global Ecology and Conservation* 27:e01572. <https://doi.org/10.1016/j.gecco.2021.e01572>.

³ Foster, S.J. & Vincent, A.C.J. 2016. Making Non-Detriment Findings for seahorses – a framework, Version 4. Project Seahorse, Institute for the Oceans and Fisheries, The University of British Columbia. 72 pp. <https://www.iucn-seahorse.org/cites-toolkit#ndf>

Despite its methodical and measured approach, this first NDF framework for seahorses has been little used. Indeed, most historically important export Parties for the vast trade in dried seahorses have chosen to end legal exports due to challenges in making NDFs.² However, exports of dried seahorses persist at high levels, primarily in forms of illegal trade.⁴ Both before and after the CITES listing, tens of millions of dried seahorses have been traded internationally each year, involving countries on all populated continents.

To meet Appendix II obligations under CITES, Parties must be both willing and able to make NDFs that regulate exports meaningfully. We need a modified process that acknowledges the complexities of export regulation but reduces the difficulty of making NDFs. It is far better for Parties to apply an easier process that is imperfect than it is for Parties to set aside a complex process that is notionally better.

Project Seahorse proposes that governments might find it easier to make NDFs by mapping the answers to five questions (5Q):

A. where have the species been found?;

Then, for those areas,

B. what pressures do the species face?;

C. what measures are in place to manage the pressures?; and

D. how well are the management measures implemented?

And, ultimately,

E. what is happening to wild populations? (Figure 1).

The results of this pragmatic 5Q NDF evaluation should enable Parties to make progress in assessing the status of wild populations under their regulatory regimes and to move towards adaptive management. Answering the first four questions allows for a rough inference of possible population trends – and the capacity to make interim NDFs – even while monitoring is being developed to answer QE.

Project Seahorse thanks our Asian colleagues, particularly those from the CITES Management and Scientific Authorities, for their positive and constructive engagement in the development of this guidance. A first draft of this guidance was introduced to government representatives and technical experts from eight CITES Parties at the “Implementing CITES for seahorses - Asia region workshop”, held in Cebu, Philippines, in March 2023.⁵ Participants tested the easier NDF guidance using large maps and acetate overlays. They were encouraged to map the answers to the five questions, using available information, for one or more species. This version of the guidance reflects participant feedback.

⁴ Vincent, A.C.J., Foster, S.J., Fowler, S.L., Lieberman, S., and Sadovy de Mitcheson, Y. (2022) [Implementing CITES Appendix II listings for marine fishes: a novel framework and a constructive analysis](#). *Fisheries Centre Research Report*, 30(3), 189 pp.

⁵ Workshop report available as AC32 Doc. 28.2: <https://cites.org/sites/default/files/documents/AC/32/agenda/E-AC32-38-02.pdf>

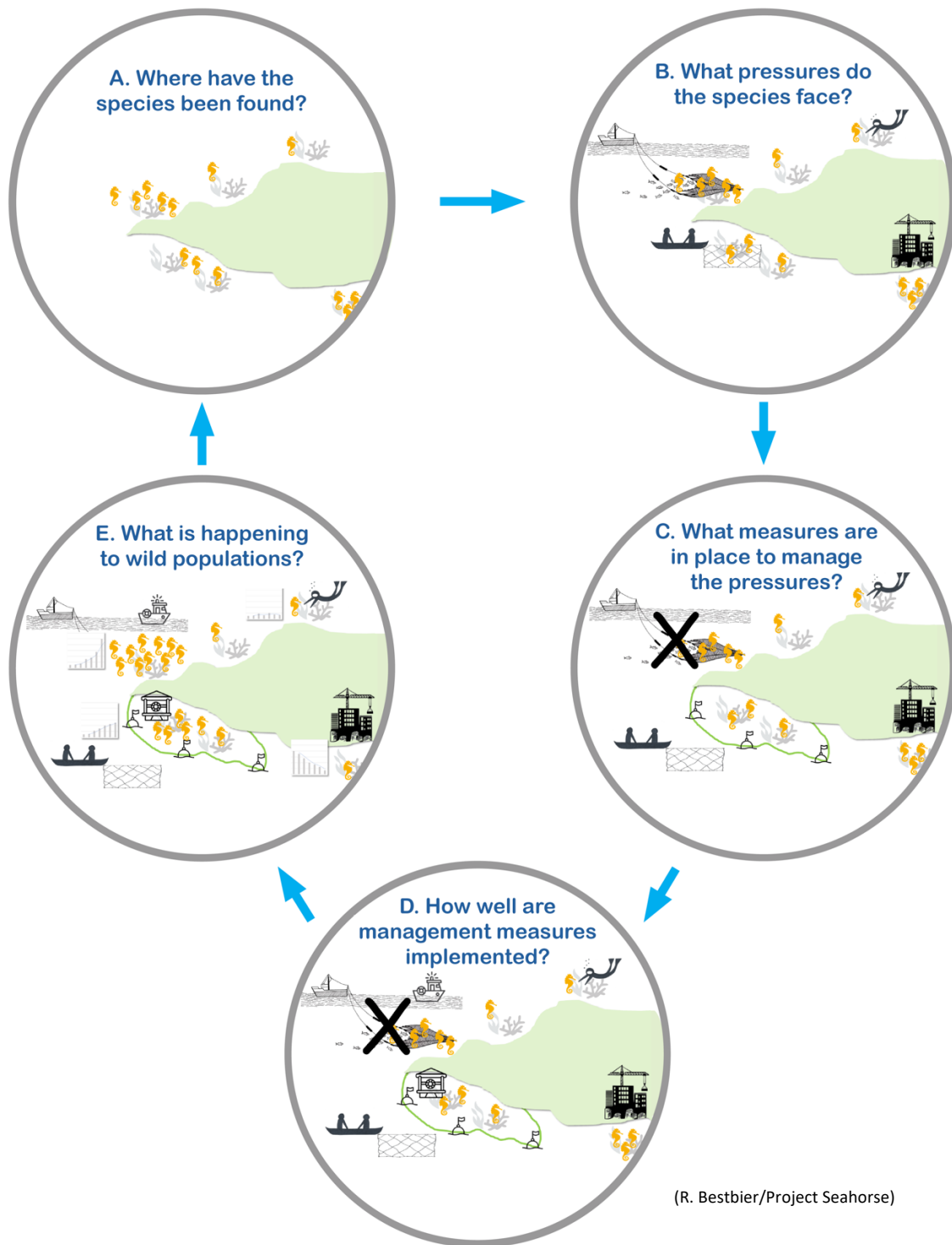


Figure 1. Pictorial depiction of the five question (5Q) approach to making an easier NDF: A. where have the species found? (distribution); then, for those areas, B. what pressures do the species face? (e.g., fisheries, coastal development); C. what measures are in place to manage the pressures? (e.g., fisheries regulations, MPAs); D. how well are the management measures implemented? (e.g. evidence of enforcement/compliance); and, ultimately, E. what is happening to wild populations (changes in numbers or other indices of population health).

HOW TO USE THIS GUIDANCE

This pragmatic 5Q approach to making NDFs allows Parties to embark on meaningful evaluation even with very limited knowledge and very few data. **A lot can be done right away with the information already on hand, and by answering the first four questions.** Then – in the spirit of adaptive management – Authorities can improve their NDFs as they learn more, particularly and necessarily by monitoring populations as per QE. The more seahorse populations are exploited or under pressure from people, the more NDFs will need to be revised and improved over time and space.

This 5Q guidance addresses making NDFs for wild caught seahorses (seahorses taken from the wild, CITES source codes W and R), and **offspring of wild caught seahorses** (seahorses born in captivity to wild caught parents = captive born, CITES source code F).

Most seahorses in trade, dominated by dried specimens, are fished from the wild. Many of the same characteristics that make seahorses such interesting animals also make them vulnerable to heavy fishing and habitat damage. Indeed, we know that **wild seahorse populations usually do badly under heavy fishing pressure.**⁶

- Seahorses are generally found in low numbers, and are patchy in distribution. This means even low rates of removal can significantly reduce population numbers.
- The male seahorse becomes pregnant and this means the young depend on their father until they are born. If males are fished when they are pregnant, none of their young survive.
- Seahorses form long-term pair bonds. Many only mate with a single partner throughout the breeding season. If one partner is removed, the other stops reproducing until it can find a new mate.
- Seahorses of most species have very small home ranges and are slow swimmers. This makes it hard for seahorses to find each other, further compromising reproductive potential.
- Seahorses live in coastal habitats that are being damaged and destroyed, adding to the pressure on seahorses.

All that said, Parties have many ways to reduce potential harm to wild populations, allowing both ongoing seahorse trade and healthy seahorse populations.

⁶ See Vincent et al 2011 (Journal of Fish Biology 78(6): 1681–1724) for a comprehensive review of seahorse conservation and management.

The 5Q approach involves three steps of evaluation:

- I. **Determine which species** are being exported, as NDFs should be made at the species level.
- II. **Answer the following 5Q** – considering each species separately, or all seahorses together if information is not available for individual species:

A. Where have the species been found? Map the locations of seahorses in national waters.

In those locations,

B. What pressures do the species face? Map the pressures facing seahorses where they live.

C. What measures are in place to manage the pressures? Map the management measures relevant to the pressures.

D. How well are the management measures implemented? Map levels of enforcement and compliance for the managed areas.

And, ultimately...

E. What is happening to seahorse populations? Map population trends for seahorses to evaluate whether the management is working to good effect.

NB: The mapping exercise need not be complicated. It can be done using GIS software (such as ArcGIS), but a much simpler approach – such as sketching answers to the four questions on a map – would also be highly useful.

- III. Use the mapping exercise to **evaluate risk** to wild populations from proposed exports.
- IV. Use the mapping exercise to **take action** toward sustainable trade.

I. Determine the species being proposed for export

NDFs should be made at the species level. CITES Management Authorities (MAs) are supposed to ensure the seahorses are correctly identified on the permit application.

The challenges are that (a) seahorse species can all look much the same to traders and border agencies and (b) dried seahorses are commonly exported as mixed species shipments.

CITES Authorities should use the identification guides produced by Project Seahorse to identify/verify the species being proposed for export. The guides can be found online at <https://www.iucn-seahorse.org/cites-toolkit#idguide>.

Authorities can take a sub-sampling approach where they suspect a shipment consists of more than one seahorse species. Sub-sampling involves taking a random sample of any shipment with multiple species and identifying all seahorses in that sample. While this approach might miss some of the less commonly traded species, it is unrealistic to expect Authorities to identify every individual in a shipment of thousands of seahorses. Worksheet 4.1 in the comprehensive seahorse [NDF framework](#)³ can be used to guide this exercise (attached as an Annex to this document).

The information used in mapping answers to the five questions should be as species-specific as possible (particularly for QA and QE), but pragmatism may again dictate that a more generic approach must be used as data on locations and monitoring are improved.

II. Map the answers to the five questions

Sources of information

There are many sources Authorities can turn to for the information needed to map the answers to the five questions:

- **Primary (published, peer-reviewed) and grey literature** – Project Seahorse has collated relevant resources online at www.projectseahorse.org/NDF.
- **Citizen science databases – Project Seahorse hosts a citizen science site for seahorses – iSeahorse (www.iSeahorse.org)**. iSeahorse is a tool for seahorse science and conservation. iSeahorse harnesses the power of ‘citizen scientists’ — anyone, anywhere in the world who sees a seahorse in the wild — to improve our understanding of these animals and protect them from overfishing and other threats. iSeahorse has amassed 8000+ seahorse observations from more than 1400 individual contributors. The data are particularly useful for answering QA (seahorse distributions).
- **Conservation assessments** – can provide information to answer all 5 questions.
 - **The IUCN Red List of Threatened Species (www.iucnredlist.org) is the best-known worldwide conservation status listing and ranking system.** Species are classified by experts into nine categories of risk reflecting criteria such as rate of decline, population size, area of geographic distribution, and degree of population fragmentation. The species assessments found at www.iucnredlist.org include summaries of the information used to make the assessment – such as taxonomic notes, geographic range, population information and trends, habitat and ecology, threats, and conservation action. **The information is all cited and peer reviewed**, which is why IUCN Red List assessments make a good starting place for understanding what is known about a species globally.
 - **National conservation status – The conservation status of a species globally may be different from the status regionally or nationally.** Because of this some countries also have national assessment lists (<http://www.nationalredlist.org/>). Most of these lists use the same approach as the IUCN Red List, but consider the populations within a country.

These are also often called Red Lists or Red Data Books. **Some, but not all, of these also include summaries of the information used to make the assessment**, which is why national assessments can make a good starting place for understanding what is known about a species nationally – although the information may be out of date and may not be peer reviewed. See also: Stanton *et al.* 2021. [Identifying national conservation status, legislation and priorities for syngnathid fishes globally.](#)

- **Local ecological knowledge/stakeholder interviews** – for an immediate assessment, Authorities can ask stakeholders (e.g. fishers, buyers, exporters) for information relevant to all 5Q. This is usually the best place to start when information is limited.
- **Field studies/monitoring programs** –
 - **Underwater surveys** – information on seahorse distributions (QA), pressures (especially from habitat damage/destruction, QB) and population health (QE), can be collected through rapid assessments or longer term monitoring of seahorse populations using SCUBA or snorkel (<https://projectseahorse.org/iseahorse/trends/underwater/>). eDNA is also emerging as a tool for gathering information on seahorse distribution (Q1) and population health (QE).
 - **Fisheries surveys** – information on seahorse distributions (QA), pressures (QB), management implementation (QD) and population health (QE) can come from monitoring seahorse catches or landings. The key to fisheries dependent monitoring is to collect information on fishing effort – the data are only truly useful and dependable if they are accompanied by a measure of effort.
 - **Buyer surveys** – data collection by or from primary buyers may offer a pragmatic approach to gathering information because they generally gather seahorses from many fishers, often across multiple communities. Buyer surveys, if properly designed, would automatically provide information across time and space (in support of QA, QB, QD and QE).
- **Experts – National or regional seahorse experts will be important partners in completing NDFs for seahorse exports.** Authorities can consult the IUCN SSC Seahorse, Pipefish and Seadragon Specialist Group for seahorse experts in their area (www.iucn-seahorse.org). However, important information can also come from people that know nothing about seahorses at all, but know a lot about the habitats they live in, the fisheries that catch them, the management that might affect them. For guidance on marine experts in general, Authorities can consult the Marine Conservation Subcommittee of the IUCN (www.iucn-sscmarine.org), or reach out to relevant agencies and organisations like FAO, SEAFDEC, TRAFFIC, among others.

A. Where have the species been found?



Mapping seahorse distributions requires an understanding of where they live in national waters – ideally by species, habitat type and depth, although the details can be refined as more is learned.

Explanatory blurb

Seahorses live in the sea and also in lagoons, estuaries and brackish waters. Seahorses are sparsely distributed in most populations, but do occur in higher densities at particular times and places, especially in lagoons.

Seahorses occupy a huge diversity of shallow water habitats: seagrasses, mangroves, corals, sponges, seaweeds, and shallow dips in mud and sandy bottoms. Artificial habitats (like pilings, ropes, nets or cages) can also host important populations. Many species live in two, three, or all of these habitats.

Seahorses are most likely to be found shallower than 30 m depth, but some have been found to at least 100 m deep.

Some seahorse species engage in migration, moving long distances, for at least four reasons: newly released young enter the plankton for days to weeks; settled juveniles move to adult habitats; adults move on a seasonal basis; and some seahorses go rafting.

Seahorses can become locally extinct, or extirpated, from areas when pressures prove to be too much. It is important to map information about extirpations as this will be important when evaluating pressures (QB) and population health (QE).

B. What pressures do the species face?



Seahorses are under pressure from many human activities. If managed poorly or inadequately, these pressures may become threats that lead to declines in seahorse numbers and/or in demographics, destruction or damage of seahorse habitats, or changes in seahorse distribution.

NDFs need to consider ALL pressures on a population – not just those imposed by international trade.

Background

The vast majority of seahorses in trade are obtained as bycatch in non-selective fishing gears, particularly by bottom trawls and gillnets.

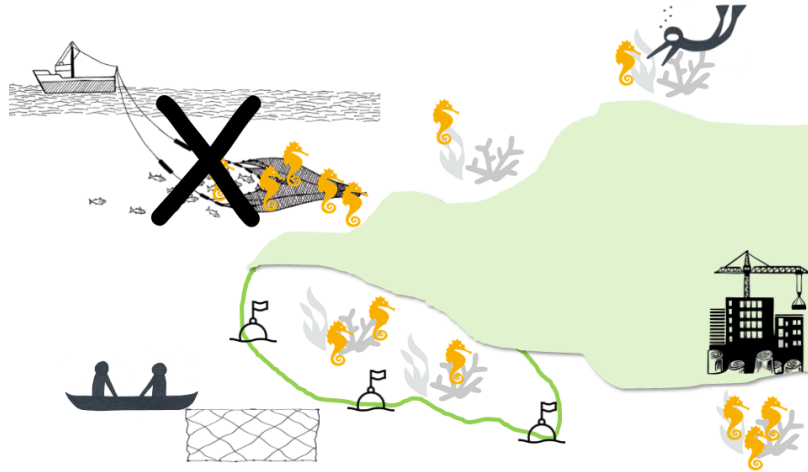
Seahorses can also be targeted for trade, most commonly by free or compressor divers, also by modified bottom trawls.

Very large numbers of seahorses are caught. Each boat or fisher may only catch one or two seahorses per trip, but fishing effort is so large that those small individual catches scale up to very large volumes. Along with removing many seahorses, fisheries also injure and/or displace seahorses, disrupting complex social systems.

Habitat damage and destruction are very problematic for seahorse populations. Such degradation often poses the biggest problem for seahorses in estuaries and lagoons. Seahorse habitats are being degraded globally because of threats such as coastal development, fishing (e.g., trawling), pollution, eutrophication, sedimentation, and climate change.

Habitat pressures can cause habitat fragmentation (i.e., breaking apart of continuous habitat into small patches), habitat degradation (when habitat quality declines) or wholesale habitat loss (i.e., reduced area covered by a critical habitat). Climate change is also affecting seahorse distribution.

C. What measures are in place to manage the pressures?



Seahorses can tolerate and show resilience to pressures that are managed carefully and responsively. Layering management measures over a population that is under pressure can help indicate the level of threat / risk to the population.

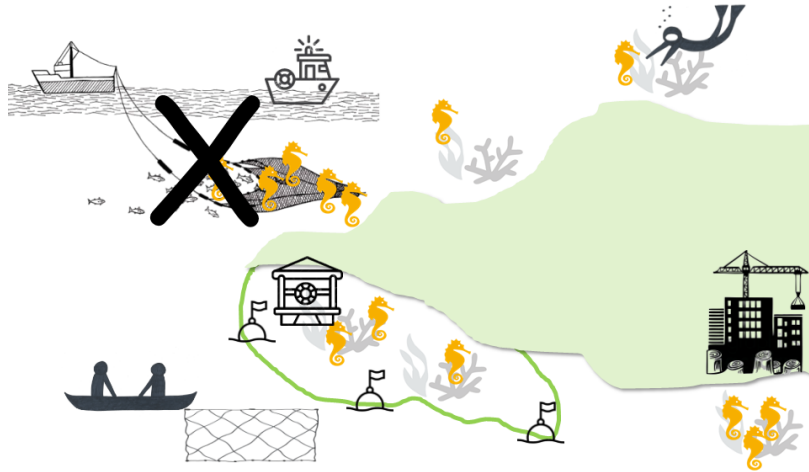
Background

To be included, management measures need to be directed at relieving pressures identified in answer to QB. They may benefit seahorses directly or indirectly.

- **Species-specific** management measures are those directed at the seahorse species concerned (e.g. a minimum size limit, quotas on numbers fished, or seasonal restrictions on seahorse catches).
- **Generic** management measures are those in place for an activity (especially fishing) that affects seahorses or an area where seahorses are found, and which may confer some benefit on seahorses (e.g. restrictions on destructive fishing activities, protected areas or habitat restoration).

Example measures: Limited entry, no-take MPAs, spatial and temporal gear restrictions, catch quotas, size limits, leaving pregnant males, habitat restoration (details in Section 5 and Table 5a of the [NDF framework](#), also attached as an Annex to this document).

D. How well are management measures implemented?



To be effective, management measures need to be adequately implemented.
Implementation depends on compliance and/or enforcement.

Background

Management of a human activity is effectively implemented when it reduces a pressure on a species, offers relief from a threat, or creates an opportunity for population recovery.

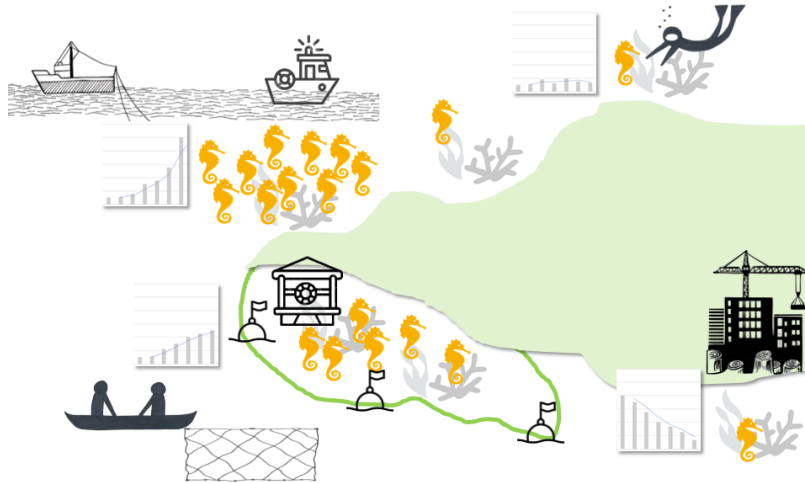
Implementation requires front line action, out where the pressures are taking place: on vessels, at docks, inside protected or managed areas, at traders' facilities and Customs sheds, among others. It can include enforcement of a new protected area, implementation of a quota, seizure of illegal catches or trade, measurable compliance and adherence to a management protocol and/or clear enforcement of a rule or management measure (e.g., quotas, time and area closures, gear restrictions).

When management measures are well implemented, fish populations are directly affected, with consequences that are likely to be reflected in biological impacts (QE).

Depending on the management measure, implementation can be determined by:

- monitoring fishing activity – in space and time
- probing where seahorses are being caught
- monitoring seahorse catches and/or landings (for species, numbers, sizes and/or reproductive status)
- monitoring seahorse trade (for species, numbers, sizes and/or reproductive status)
- monitoring seahorse habitats

E. What is happening to wild populations?



Monitoring is vital to track population trends over time, and is essential to determine the effectiveness (QD) of any management intervention (QC) in addressing pressures (QB) to seahorse populations (QA).

Background

QE entails assessing population change, both quickly from expert opinion (e.g., from fishers) and more slowly (from repeat monitoring using fisheries-dependent or fisheries-independent methods).

Where populations and/or other indicators of population health are estimated to be stable or increasing in size over time, then management can be considered effective.

If, however, population numbers are declining or there are other indicators of adverse impacts, then existing management plans need work. Is it either not the right management for the pressures, it is not enough management, or there is insufficient compliance or enforcement.

We suggest that Parties set up an array of specific “sentinel” or indicator populations and/or fisheries that can be monitored at regular intervals.

Authorities can find clues to the effectiveness of management measures by monitoring their seahorse populations or catches over time for, or asking stakeholders about, changes in any of the following parameters (see “sources of information”, above):

- Geographic distribution (presence/absence across space).
- Relative abundance [population size and/or catch per unit effort (CPUE)].
- Mean size of animals.
- Frequency of male pregnancy (indicates disruption of breeding activities).
- Sex ratio.

III. Evaluate risk

After mapping the answers to the first four questions, Authorities can make a decision about an interim NDF. Over time, however, QE must be answered to make a scientifically defensible NDF.

The less confident Authorities are about the quality of information used in this assessment, the more precautionary they must be when assessing risk.

For shorthand purposes, a finding of non-detriment is referred to as a **positive NDF**, while a finding of conservation detriment is referred to as a **negative NDF**.

A positive NDF can be made when proposed exports are considered to be non-detrimental to wild populations. This means pressures are known and being managed appropriately and effectively.

A negative NDF or an NDF with conditions should be made where risks are not being managed with good results, or are unknown.

An NDF with conditions allows for precautionary levels of exports while risks are reduced, gaps in management are addressed, or quality of information is improved.

IV. Take action

In most cases, working through this 5Q approach will reveal that seahorse exports should be limited, and pressures should be better managed, to ensure non-detriment.

If management of any of the fishing or habitat pressures is non-existent, unknown, inappropriate, unused or ineffectual, then Authorities need to develop an action plan to improve management so exports can be allowed (in the case of a negative NDF) or NDF conditions adjusted (in the case of an NDF with conditions).

Three main actions should emerge from this NDF process:

- If management is non-existent or inappropriate, **then add appropriate management.**
- If existing management is appropriate but not well implemented, **then increase enforcement and/or increase incentives for compliance.**
- If existing management is appropriate and used, but ineffectual, **then increase the amount, level or diversity of management.**

The most important thing is to get going. Authorities should choose and initiate key actions, then add more as seems necessary and feasible. A lot can be achieved by changes in one fishery even if not all exploitation can be addressed immediately. Much can be improved by better management of one habitat or region, even if others also need attention. Some helpful changes are better than none at all.

We suggest using three criteria to set priorities for action:

- **Take actions to address the most critical risks** – Pick one or two dominant pressures and implement actions to relieve them. Use the maps to identify which fisheries are putting the most pressure on seahorse species, and/or which seahorse habitats are at greatest risk. One example that will apply to many Parties is to implement or enforce constraints on bottom trawl and/or gillnet fisheries.
- **Take actions that are easier to implement** – Pick one or two unmanaged or unknown pressures that could be addressed with relatively little effort. This will allow positive gains for seahorses right away. Use the maps to identify pressures that meet this criterion.
- **Take actions that reinforce existing commitments** – Pick one or two actions that will help seahorses while also helping to meet other existing commitments. These might include actions to meet CITES obligations to other listed species, or that address responsibilities under other multilateral environmental agreements (e.g. Global Biodiversity Targets, Sustainable Development Goals).

Whatever action is taken, it is vital to set up a monitoring program to answer QE: “what is happening to wild populations”.

Choosing one or two actions from each of these categories, together with a monitoring plan, would be a good start at a national plan of action for seahorses. In defining the plan, Authorities must describe the actions to be taken, define the actors, and determine the timelines. The IUCN Conservation Planning Specialist Groups has excellent resources on strategic planning for species conservation (<https://www.cpsg.org/>).

Worksheet 4.1. Which seahorse species is being traded?

from: Foster, S.J. & Vincent, A.C.J. 2016. *Making Non-Detriment Findings for seahorses – a framework, Version 4. Project Seahorse, The Institute for the Oceans and Fisheries (formerly the Fisheries Centre), The University of British Columbia. 72 pp.*

Instructions:

Using Table 4a:

- Record the weight or total number of **all individuals in the proposed shipment** in **cell X**. For dried shipments, weight will almost always be easier.
- Take a sample** of the shipment – make it as big as possible but also remember you will need to identify every individual in the sample. So be realistic.
- Record the weight or total number of **all sampled individuals** in **cell Y**.
- Identify each seahorse in the sample**, using the identification materials at www.projectseahorse.org/NDF where needed, and sort the sample according to species.
- Record each species** you found under column heading: ***Hippocampus sp.***
- Record the weight or total number of **individuals of each species** in the sample under column heading: **Weight or number of species in sample**.
- Finally, **extrapolate** from the sample up to the entire shipment, by doing the math under column heading: **Total weight or number of species in shipment**.
- Hint: The sum of all entries under Total weight or number of species in shipment of Table 4a should be equal to the value recorded in cell X.*

Table 4a. Determining the species composition of proposed seahorse shipments.

Total weight or number of all individuals in the shipment		X
Weight or number of all individuals in the sample		Y
<i>Hippocampus sp.</i>	Weight or number of species in sample	Total weight or number of species in shipment
<i>species 1</i>	a	=a*(X/Y)
<i>species 2</i>	b	=b*(X/Y)
<i>species 3</i>	c	=c*(X/Y)
<i>species 4</i>	d	=d*(X/Y)
<i>species 5</i>	e	=e*(X/Y)
<i>species 6</i>	f	=f*(X/Y)
<i>species 7</i>	g	=g*(X/Y)
<i>species 8</i>	h	=h*(X/Y)

Table 5a. Potential management responses and their appropriateness for mitigating pressures on seahorse populations from fisheries and habitat pressures.

from: Foster, S.J. & Vincent, A.C.J. 2016. Making Non-Detriment Findings for seahorses – a framework, Version 4. Project Seahorse, The Institute for the Oceans and Fisheries (formerly the Fisheries Centre), The University of British Columbia. 72 pp.

Text section	Potential management response	Appropriate for targeted capture	Explanation	Appropriate for incidental capture (including both active and static gear types)	Explanation	Appropriate for additional pressure from habitat loss	Explanation	Implementation
5.2.1	Limited entry	YES when combined	Only when used in combination with seahorse catch quotas.	YES when combined	Only when used in combination with seahorse catch quotas and/or spatial restrictions of gears that catch seahorses.	YES when combined	Only when used in combination with MPAs or spatial restrictions of gears that catch seahorses.	Determined by monitoring fishing activity.
5.2.2	Permanent, no-take Marine Protected Areas (i.e. reserves)	YES	Where enforced these buffer against all pressures.	YES	Where enforced these buffer against all pressures.	YES	Where enforced these buffer against all pressures.	Determined by monitoring fishing activity in and around the MPAs by probing where seahorses are being caught.
5.2.3	Gear restrictions - spatial	YES	Where enforced these buffer against fishing pressures.	YES	Where enforced these buffer against fishing pressures.	YES	Where enforced these buffer against gear pressures on habitats.	As for 5.2.2 (MPAs) for select gear.
5.2.4	Gear restrictions - temporal	Cautiously	Only when temporal gear restrictions coincide with peak seahorse reproduction periods.	Cautiously	Only when temporal gear restrictions coincide with peak seahorse reproduction periods.	NO, usually	Not appropriate where habitats are still subject to destructive fishing practices at other times of the year.	Determined by monitoring fishing activity in and around the periods of closure and by probing where and when seahorses are being caught.
5.2.5	Catch quota	YES	Fishers targeting seahorses are able to limit their catch volumes and so fishing mortality.	Cautiously	Appropriate only where a fishery is completely closed once seahorse bycatch quota is met.	Not applicable	Output controls do not protect habitats.	Determined by monitoring catch and/or landings.

Table 5a. Continued...

Text section	Potential management response	Appropriate for targeted capture	Explanation	Appropriate for incidental capture (including both active and static gear types)	Explanation	Appropriate for additional pressure from habitat loss	Explanation	Implementation
5.2.6	Minimum size limit	YES	Fishers targeting seahorses are able to be selective, taking only those larger than the agreed minimum size, and leaving smaller individuals where they are found.	NO	Non-selective fishing gears that catch seahorses cannot be selective for seahorse size – mesh size does not matter.	Not applicable	Output controls do not protect habitats.	Determined by monitoring the size of seahorses in the catch and/or landings and/or trade.
5.2.7	Maximum size limits	YES	Fishers targeting seahorses are able to be selective, taking only those smaller than the agreed maximum size, and leaving larger individuals where they are found.	NO	Non-selective fishing gears that catch seahorses can not be selective for seahorse size – mesh size does not matter.	Not applicable	Output controls do not protect habitats.	As for 5.2.7 (Minimum size limits).
5.2.8	Slot size limits	YES	Fishers targeting seahorses are able to be selective, taking only those that fall between the agreed minimum and maximum size limits, leaving other individuals where they are found.	NO	Non-selective fishing gears that catch seahorses can not be selective for seahorse size – mesh size does not matter.	Not applicable	Output controls do not protect habitats.	As for 5.2.7 (Minimum size limits).
5.2.9	Leaving pregnant males	YES	Fishers targeting seahorses are able to be selective, leaving pregnant males where they are found.	NO	Non-selective fishing gears that catch seahorses can not be selective for seahorse reproductive state.	Not applicable	Output controls do not protect habitats.	Determined by monitoring the reproductive status of male seahorses in the catch and/or landings and/or trade.

Table 5a. Continued...

Text section	Potential management response	Appropriate for targeted capture	Explanation	Appropriate for incidental capture (including both active and static gear types)	Explanation	Appropriate for additional pressure from habitat loss	Explanation	Implementation
5.2.10	Export quota	NO, usually	Only where there is a direct feedback loop that generates a catch reduction of seahorses.	NO, usually	Only where there is a direct feedback loop that generates a catch reduction of seahorses.	Not applicable	Output controls do not protect habitats.	Determined by monitoring catches, landings or even trade volumes.
5.2.11	Reintroduction/supplementation	Not if threat is ongoing	There is no evidence that seahorse releases can increase densities of wild seahorse populations.	Not if threat is ongoing	There is no evidence that seahorse releases can increase densities of wild seahorse populations.	Not applicable	-	Determined by monitoring the fate of the newly release seahorses in areas where there were no remaining wild seahorses. Again, the threats that led to original declines need to have been eliminated.
5.2.12	Habitat restoration	YES when combined	Only when combined with Permanent, no-take Marine Protected Areas. No sense increasing seahorse habitats if they are going to be targeted by fishers.	YES when combined	Only when combined with Permanent, no-take Marine Protected Areas. No sense increasing seahorse habitats if they are going to be fished.	Cautiously	Not if threat that caused habitat decline is ongoing	Determined by monitoring the restored habitats for increases in the number of seahorses.