



BLUE NATURE  
ALLIANCE

# Accelerating Impact in the High Seas

Preliminary Draft Discussion Document

August 2022

# This document provides potential approaches to address several issues that the treaty on biodiversity beyond national jurisdiction (BBNJ) is trying to resolve



## Issues

**Mechanism** to identify and establish high seas MPAs

**Framework** for adopting meaningful conservation objectives and enforceable management plans

**Financial structure(s)** to ensure adequate financing for activities

## This document addresses

- 1 Potential areas of the high seas that are critical to protect
- 2 Roadmap and design choices to designate and establish high seas MPAs, the costs associated with it and value that can be unlocked
- 3 Potential financial structures suited to fund high seas MPAs and high-level evaluation based on key criteria

## This document does not address

Environmental assessment components (EIA, Strategic EAs), costs for administration, the BBNJ secretariat and for capacity building and marine technology transfer

# 1 Existing studies have identified key marine areas to protect and identified specific high seas regions to start with<sup>1</sup>

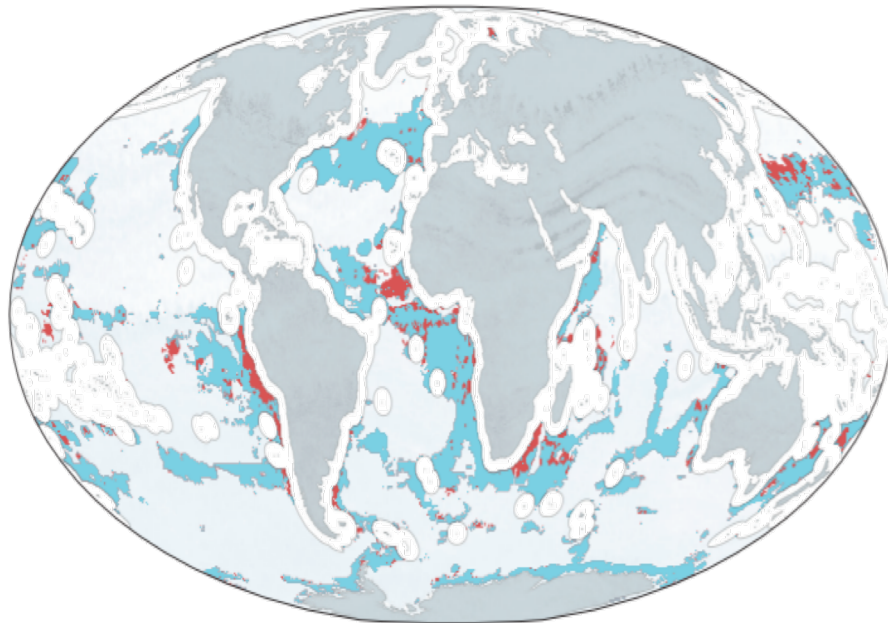
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## High seas areas that meet 30% conservation objective

Some of the most biodiverse places also tend to be commercially important

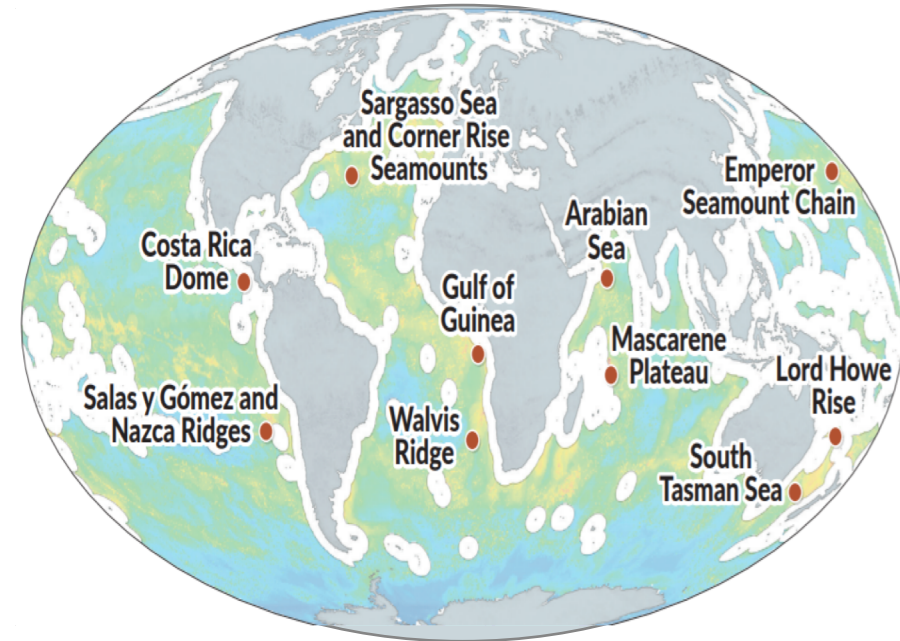
## 10 high seas that could be “starting points” for establishing MPAs

These areas have exceptionally high concentrations of conservation features



Light blue: Prioritized solution to protect 30 per cent of conservation features

Dark red: Areas that would have been included in the solution but were excluded because they are highly fished



These highlighted high seas regions cover 13mn sq km and account for 6% of the high seas


**The High Seas Alliance has collectively also recognized the value of these specific areas through similar prioritization exercises**


1. The source of this study is “A Path to Creating the First Generation of High Seas Protected Areas by The PEW Charitable Trusts”, however there are other feasible areas that fulfill the criteria as well and could be used as an alternative

# 2 The roadmap to implement High Seas MPAs involves several activities, only some of which are covered by the treaty





Establishing a network of high seas MPAs will mean moving from theory to practice over many years

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 Capacity building activities

 Currently covered by the Treaty text

 Deep dive on design choices to follow

	<i>In theory</i>	<i>On paper</i>	<i>In practice</i>	
	<b>1 Identify potential MPA sites</b>	<b>2 Propose and designate MPAs</b>	<b>3 Implement MPAs</b>	
<b>Description</b>	<b>Define potential target zones for MPAs as a starting point for future legal designation</b>	<b>Legally define high seas MPA footprint, allowable uses and activities, and implementing parties/jurisdictions</b>	<b>Establish<sup>1</sup> Move from “on paper” MPA to operational MPA with active monitoring and enforcement by signatories</b>	<b>Actively manage<sup>1</sup> Conduct ongoing MPA management activities in perpetuity</b>
<b>Activities (not exhaustive)</b>	<ul style="list-style-type: none"> <li>Establish a regional core team</li> <li> Conduct capacity building workshops for states on developing proposals</li> <li> Co-create studies to identify areas of exceptional ecological value</li> <li>Determine key prioritization criteria to identify potential areas that meet conservation objectives</li> <li> Co-create and conduct regional ecosystem diagnostic and stakeholder mapping exercises</li> <li>Socialize findings and conduct negotiations with international and sectoral organizations to agree upon identified sites and develop concepts for identified sites</li> </ul>	<ul style="list-style-type: none"> <li>Formally announce intent to create MPA</li> <li>Conduct stakeholder consultations (e.g., International Maritime Organization, fishing organizations, etc.) for coordination of planning                             <ul style="list-style-type: none"> <li>– This might require marine spatial planning exercises to build common interests in ecosystem health</li> </ul> </li> <li>Facilitate coordination and cooperation amongst relevant sectoral and international bodies to encourage adoption of effective measures for MPAs</li> <li>Develop MPA management &amp; research plans which defines boundaries, allowed uses within MPAs (e.g., % no-take zone, allowed activities) &amp; measures to control impact and monitor effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>Establish a management team</li> <li>Activate financial and human resource management systems</li> <li>Develop and activate monitoring (e.g., satellite surveillance, processes to document and report activities, alert home ports of illegal activity by flagged vessels, etc.)</li> <li>Activate MPA management plan</li> <li>Activate MPA research plan</li> <li>Engage relevant stakeholders to ensure they are aware of regulations</li> <li>Develop and launch measures to evaluate MPA performance (e.g., ongoing scientific monitoring, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Continue implementation and adaptation of MPA management plan including monitoring, reporting, periodic reviews, financing, etc.</li> <li>Conduct regular outreach and consultation with stakeholders as necessary and allowable, adjust activities and allowable uses to achieve biodiversity conservation and other ecological &amp; social goals</li> <li>Conduct regular impact assessment studies to measure performance and effectiveness</li> <li> Ensuring coordinated compliance and conducting enforcement activities in line with MPA rules</li> </ul>

**There are costs associated with each of these steps; those costs will depend primarily on design choices and implementation**



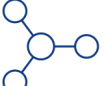

1. These are a list of activities (not exhaustive) that could be implemented depending on the design choices that are being made; it is not necessary to implement all but would be standard in a typical within-EEZ MPA

## 2 Design choices for implementing High Seas MPAs

Costs will vary based on how signatories choose to implement MPAs

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NOT EXHAUSTIVE

	Base case	Enhanced case	Comprehensive case
<b>Activity</b>	<b>A Monitoring and light-touch compliance</b>	<b>B Monitoring, light-touch compliance, and research</b>	<b>C Enhanced monitoring and compliance and research</b>
<b>Monitoring</b> 	Use satellites radar and imagery to monitor MPAs in combination with VMS and AIS tracking	Same as A, plus: <ul style="list-style-type: none"> <li>Use of electronic physical infrastructure (buoys) to track ship movement and noise pollution</li> </ul>	Same as B, plus reimbursement for: <ul style="list-style-type: none"> <li>Targeted monitoring through aircrafts or surface patrol boats (additional patrols could target areas of poor coverage or specific activity as identified by satellites)</li> </ul>
<b>Compliance</b> 	Reporting of suspicious and/or illegal activity to home ports under the aegis of the Treaty  Recording of activity in international database	Same as A, plus: <ul style="list-style-type: none"> <li>Capacity building / training of treaty members to promote adherence to treaty and promote compliance at ports</li> </ul>	Same as B, plus: <ul style="list-style-type: none"> <li>Funding<sup>1</sup> for port states to enforce compliance of illegal vessels (confiscate vessels, repatriate crew, seek criminal charges)</li> </ul>
<b>Science (research)</b> 	Conducting assessment surveys <sup>2</sup> on MPA effectiveness	Same as A, plus: Conducting research (e.g., marine genetic studies, ecosystem protection)	Same as B, plus: <ul style="list-style-type: none"> <li>Dedicated funding for ongoing monitoring of ecosystem health and climate change impacts</li> <li>Dedicated funding for ongoing research activities</li> </ul>
<b>Administration</b> 	Analysis of data / imagery from satellites feed, AIS and VMS  Basic annual reporting on MPAs (e.g., use of funds, illegal activity, etc.)	Same as A, plus: <ul style="list-style-type: none"> <li>Summary of scientific research and MPA impacts</li> </ul>	Same as B, plus: <ul style="list-style-type: none"> <li>More frequent reporting on illegal activities and in-port actions</li> </ul>

High Seas MPAs are different from MPAs within national jurisdictions, as there is much more limited scope for active monitoring and compliance measures

Depending on the text of the Treaty, there could be widely varying levels of implementation activity and thus varying costs at each stage of MPA development and operation

While each High Seas MPA will likely require a slightly different approach, this analysis that follows will provide a preliminary average cost estimate

Source: Discussions with the High Seas Alliance

1. Funding may not be covered under the treaty text

3. Scientific studies to monitor water column health, water temperatures, stock assessment, topographical assessment amongst other things

## 2 Costs associated with establishing an MPA in 1mn sq km of high seas

Establishing an MPA in the high seas have significant economies of scale especially if MPAs are established in contiguous regions; Costs have been ranged with +/- 50% to account for variations in the different MPAs

			A	B	C
	Activity	Treaty coverage <sup>3</sup>	Base case	Enhanced case	Comprehensive case
<b>One-time costs</b>	Identifying MPA	Included	\$1-\$2M	\$1-\$2M	\$1-\$2M
		Financial gap	\$6-\$17M	\$6-\$17M	\$6-\$17M
	Proposing MPA	Included	\$1-\$2M	\$1-\$2M	\$1-\$2M
		Financial gap	\$8-\$24M	\$8-\$24M	\$8-\$24M
	Establishing MPA	Included	\$1-\$20M <sup>1</sup>	\$1-\$20M <sup>1</sup>	\$1-\$20M <sup>1</sup>
		Financial gap	-	-	\$15-\$45M
<b>Total one-time costs</b>	Included		<b>\$3-\$24M</b>	<b>\$3-\$24M</b>	<b>\$3-\$24M</b>
	Financial gap		<b>\$14-\$41M</b>	<b>\$14-\$41M</b>	<b>\$29-\$86M</b>
<b>Annual costs</b>	Actively manage MPA <sup>4</sup>	Included	\$0.2-\$0.5M	\$0.2-\$0.5M	\$0.2-\$0.5M
		Financial gap	\$0.6-\$1.8M	\$1.6-\$4.7M	\$5.1-\$15.2M

Treaty covered and not-covered costs across the three scenarios for MPAs in 30% of the high seas (62.5 million sq km) are

### One-time establishment costs

Covered :\$195-\$1,560M

Not covered: \$910-\$5,590M

### Annual operating costs

Covered: \$10-\$29M

Not covered: \$39-\$975M

1. This includes monitoring infrastructure costs which could be in various forms including satellite radar, satellite photos of different resolutions, VMS and AIS tracking, buoy tracking. The range for each technique varies significantly and these costs are based on best assumptions from expert interviews
2. All costs have been ranged with +/- 50% to account for variations in the different MPAs
3. The current treaty texts explicitly mention certain activities (e.g., negotiations) that can be funded with funds raised under the treaty through the financial structure
4. Management costs can be lowered if MPA monitoring & enforcement is coordinated via relevant RFMO

## 2 Potential value can be unlocked through MPAs in high seas...

DRAFT FOR DISCUSSION – ESTIMATES ARE HYPOTHETICAL

Value MPAs could generate	Assumptions for 30% of high seas	Potential value (annual)
<b>Fisheries in EEZs (spillover impact)</b>	Assuming completely closing the HS to fishing would unlock a 30% increase in yield in fisheries at the same profit levels in EEZs. Global EEZ fisheries revenue is currently \$70-80B.	\$20-\$30 B <sup>1</sup>
<b>Marine based industry (spillover impact)</b>	10% increase in revenue from marine-based industries due to spillover of fish from high seas MPAs; Revenues total \$300B and it is assumed that 25% of it (i.e., \$50B) comes from the high seas	\$5-\$8 B <sup>2</sup>
<b>Carbon storage</b>	Studies have indicated 1.65 billion tonnes of carbon dioxide is captured and stored annually through natural biological processes (though phytoplankton) on the high seas. Assuming a notional price of \$90 per tonne of carbon under current carbon monetization frameworks and prices.	\$50 B <sup>3</sup>
<b>Ecosystem services</b>	Contributes \$490 \$/year for per hectare of open ocean and \$350,000 per hectare of coral reefs. This includes the total bundle of ecosystem services (provisioning, regulating, habitat and cultural services) . It is assumed 99% of the high sea's is average open ocean and 1% is coral reefs	\$25-\$30 T <sup>4</sup> = US economy

### Monetization of the above could open the door to other complementary sources of funding

1. Close the High Seas to Fishing? by Crow White and Christopher Costello indicate that closing the high seas would lead to more than >100% profit in fisheries and >30% increase in fish yields ; The transboundary nature of the world's exploited marine species by Juliano Palacios-Abrantes indicates global fisheries revenue from EEZ is \$70-80B;
2. Hurst, D.; Børresen, T.; Almesjö, L.; De Raedemaeker, F.; Bergseth, S. (2016). Marine biotechnology strategic research and innovation roadmap (Revenue includes ~\$5bn marine biotechnology, nutraceutical products \$250bn, Omega 3 products \$19bn, cosmeceutical products \$30.5bn)
3. Global Ocean Commission Report 2014 ; adjusted to 30% based on 30% of high seas protected ; total value is \$148B
4. Global estimates of the value of ecosystems and their services in monetary units Rudolf de Groot et al

## ...while doing nothing could have damaging repercussions

Category 

Impact 

Deep sea mining<sup>5</sup>

If a moratorium is not put in place, or precautionary regulations adopted, there could be a potential race by private players and countries to “grab” control over minerals in the seabed. To understand the order of magnitude, the Clarion-Clipperton Zone, covering in an area of 1.7 million square kilometers, is estimated to have mineral deposits worth \$16 trillion.

Carbon storage<sup>6</sup>

According to recent research, marine sediments store approximately twice as much organic carbon as terrestrial soils. The lack of protection for marine carbon makes it vulnerable to human disturbances that can lead to their remineralization to CO<sub>2</sub>, further aggravating climate change impacts.

Human rights

If unchecked, illegal activities including forced labor will continue to prevail. It is estimated that 1.8 million people are forcefully employed on high seas vessels.

Cultural value

Indigenous people and local communities value ocean ecosystems for various reasons and depend on it for their livelihoods. They could be negatively impacted with deteriorating ocean health and transgressions in the ocean.

5. CCZ mineral estimates taken from <https://www.nature.com/articles/d41586-019-02242-y> and valued at average mineral prices in 2021-22; it is the estimated the value of the minerals is \$125T across 30% of the high seas assuming the rest of the areas has 20% of the CCZ reserves
6. UNEP Finance Initiative, HARMFUL MARINE EXTRACTIVES: DEEP-SEA MINING <https://www.unepfi.org/publications/harmful-marine-extractives-deep-sea-mining/>

### 3 Identifying the right financial structure is critical for success

■ Deep dives to follow



#### A financial structure is essential to fund

- Inter-governmental and organization dialogue and negotiations
- COP administrative and management costs
- Identification, designation, establishment and management of MPAs



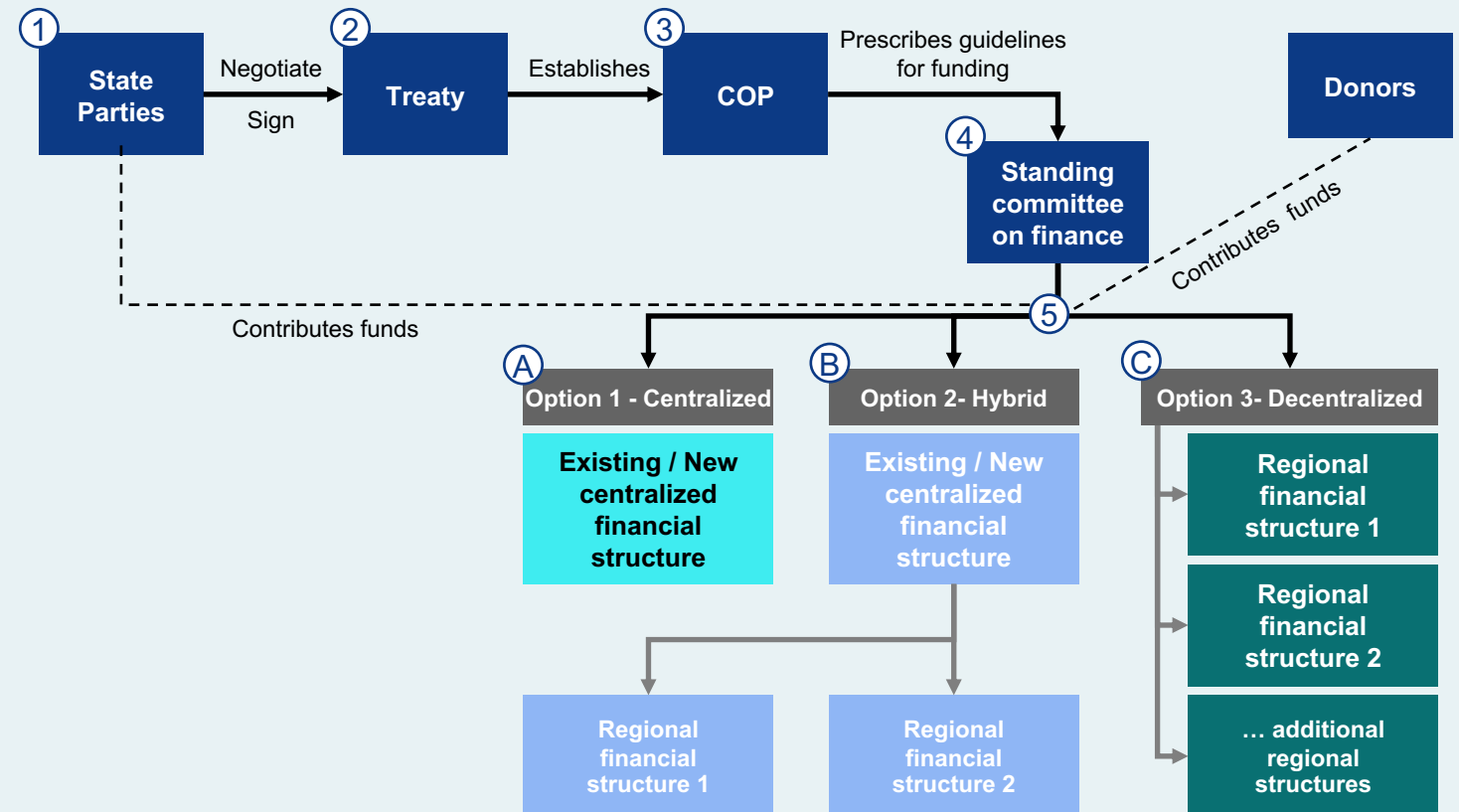
#### For MPAs specially, the structure should be able to

- Effectively and efficiently receive state contributions and moneys raised
- Defray costs for different activities across all regions ensuring equitability
- Accommodate potential future revenue streams that can help raise additional funding and repay some of the infrastructure cost over time



#### There can be multiple financial structures adopted simultaneously to execute the treaty

There are 3 types of potential financial structures that can be adopted to execute on the BBNJ treaty








### 3 Roles of different bodies under the treaty






































<b>State Parties</b>	<ul style="list-style-type: none"> <li>All nation states that are parties to the BBNJ treaty</li> <li>Subject to the treaty text, these States Parties will be responsible for mandatory contributions (within their capabilities) to the financial structure</li> </ul>
<b>Treaty</b>	<ul style="list-style-type: none"> <li>The Treaty will govern all aspects of BBNJ including creating sub-committees, oversight bodies and establishing guidelines for execution of marine protection of the high seas</li> </ul>
<b>COP</b>	<ul style="list-style-type: none"> <li>The Conference of Party (COP), established by the Treaty, will serve as a body reviewing implementation</li> <li>The COP may adopt standards and guidelines for activities as allowed by the Treaty text and shall provide guidance on strategies, priorities, and criteria for access and use of financial resources</li> </ul>
<b>Standing committee on finance</b>	<ul style="list-style-type: none"> <li>The standing committee on finance, will be established by the COP to oversee all the financial aspects of the Treaty including fund distribution across all regions, and across different high seas MPAs, to ensure equitable fund distribution and ensure capability transfers across regions</li> <li>The committee will provide advice and recommendations to ensure the COP guidelines and Treaty terms are being met</li> </ul>
<b>Donors</b>	<ul style="list-style-type: none"> <li>Donors could include States Parties, private individuals, philanthropic organizations, corporates and other states (non-state parties could also contribute)</li> <li>They can contribute voluntary funding to the establishment of high seas MPAs through the financial structure established under the Treaty (or outside the Treaty)</li> </ul>
<b>Financial structure (not yet envisaged in the text)</b>	<ul style="list-style-type: none"> <li>The financial structure is the institutional infrastructure required to assist States Parties in implementing the agreement</li> <li>The financial mechanism will likely need a secretariat to oversee distribution of funds and other financial aspects of the Treaty including fund mobilization and distribution across different high seas MPAs</li> <li>Its responsibilities should include raising funding, and funding of the establishment and operations of high MPAs, inter-governmental and organization dialogue and negotiations, and COP administrative / management costs</li> <li>It could be of three archetypes – centralized, decentralized or hybrid</li> </ul>

<b>Executing authority<sup>1</sup></b>	<ul style="list-style-type: none"> <li>The executing authority is the authority responsible for specific high seas MPAs</li> <li>The executing authority could be a State Party, a group of States Parties, a regional bodies, a not-for-profit, or any combination as authorized by the treaty text</li> <li>The executing authority will be responsible for facilitating the creation and submission of MPA proposals, and managing the operations and funding of MPA activities</li> </ul>
<b>Implementing authority<sup>1</sup></b>	<ul style="list-style-type: none"> <li>The implementing authority is the arm of the financial structure that oversees the delivery of the funds</li> <li>It could be global or regional organizations such as the World Bank, Asian Development Bank</li> <li>It is responsible to verify funding proposals in accordance with the COP guidelines and financial standing committee directives, before submitting it to the financial structure for final approval</li> <li>If approved, the implementing authority receives the funding via the special fund. The authority will then release funds to the executing authority over the course of the project while monitoring progress</li> </ul>
<b>Monitoring authority (if centralized)</b>	<ul style="list-style-type: none"> <li>If the COP decides that monitoring of all high seas MPAs should be centralized, a centralized monitoring authority will have to be established</li> <li>The financial structure will then fund all monitoring activities as per the guidelines of the COP and financial standing committee</li> <li>All infringements identified by the authority will be reported to the COP and inputted in the international database</li> </ul>

1. Although not in the treaty text, these are standard bodies established by GEF, GCF and other financial structures to execute treaties, and are expected to be established for the BBNJ treaty

### 3 Assessing the 3 options on key criteria to consider

DRAFT FOR DISCUSSION  Strong alignment to criteria  Some alignment to criteria  Weak alignment to criteria  Potential to align to criteria

Decision making criteria	Description	A. Centralized	B. Hybrid	C. Decentralized
 <b>Raising of capital and ongoing finance</b>	Large scale funding			
	Sustainability and capacity to make productive investments			
 <b>Ease of set up &amp; implementation (incl. accessibility of funds)</b>	Ease to operationalize			
	Accessibility and ease of approvals			
	Flexibility in use of funds			
	Low transaction costs <sup>1</sup>			
 <b>Equity considerations</b>	Equitable access and distribution of capital			
	Adequacy and timeliness of capabilities and technology transfer			
 <b>Governance and reporting</b>	Transparency of decision making			
	Transparency, robustness, and timeliness of reporting			
	Ease of reporting			

1. Cost of funds includes transaction costs and fund administrative costs

Centralized structures are most suited if the following are key criteria

- Raising and sustaining large scale capital
- Standardized operating infrastructure
- Uniform and transparent standards for approvals and risk control

A challenge to implementation is that developing nations face a higher barrier to access these funds and processes are slower

Hybrid structures allow for a combination of both but is much more complex to establish and govern since it is a two-tiered approval system

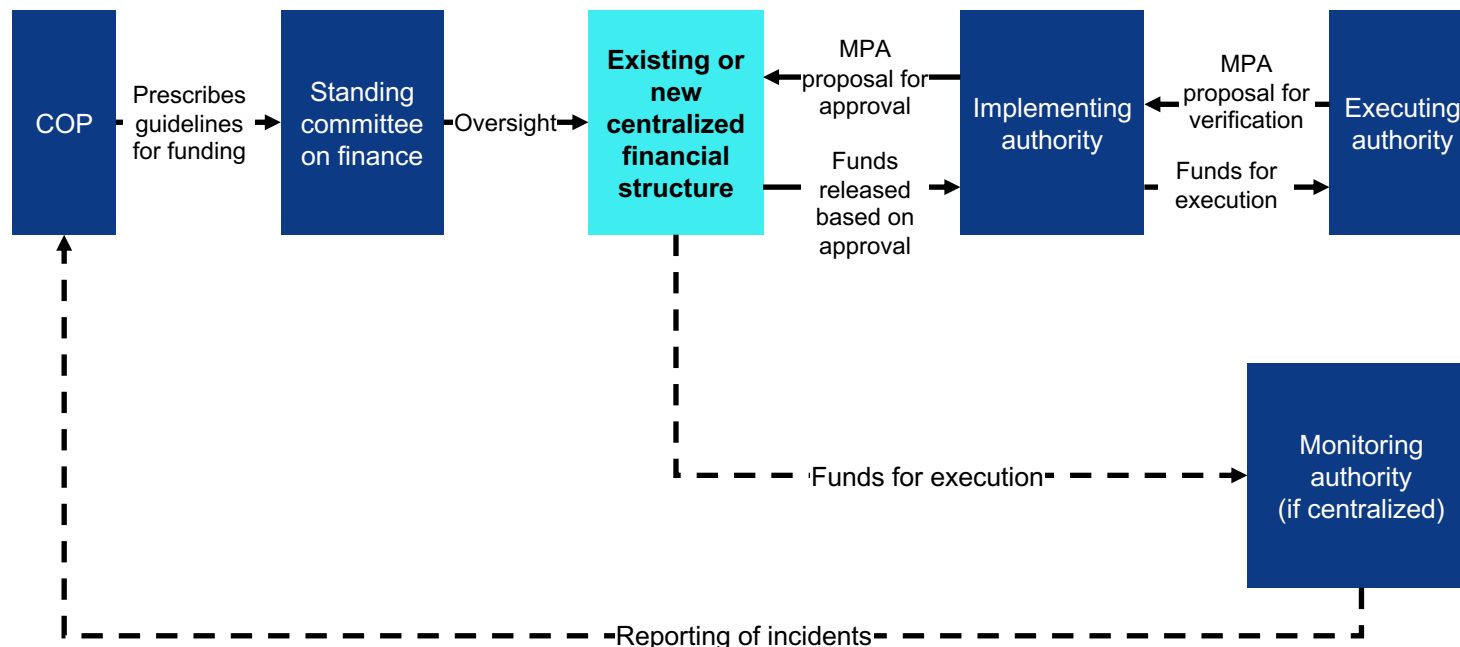
Regional structures will also need to be set up for those regions that do not have one

Decentralized structures are most suited if the following are key criteria

- Flexibility in approvals to accommodate contextual factors
- Greater accessibility to funding and lower transaction costs

A challenge in implementing this model is that not all regions have a regional structure and new structures would need to be set up

### 3 A: Centralized financial structure



Centralized structures could either leverage existing institutions (e.g., GEF) or establish a new institution (e.g., Ocean sustainability fund)

#### Benefits of the structure

- Ability to raise large scale funding and enforce mandatory contributions
- Capability to make productive investments
- A fixed and standard approval process to ensure projects are well-scoped, allowing for benchmarking, learning, and risk control
- Centralized coordination to ensure equitable regional allocation
- Potential to promote greater learning and coordination between MPAs to prevent duplication, improve synergies, and increase capabilities transfer

#### Challenges to consider

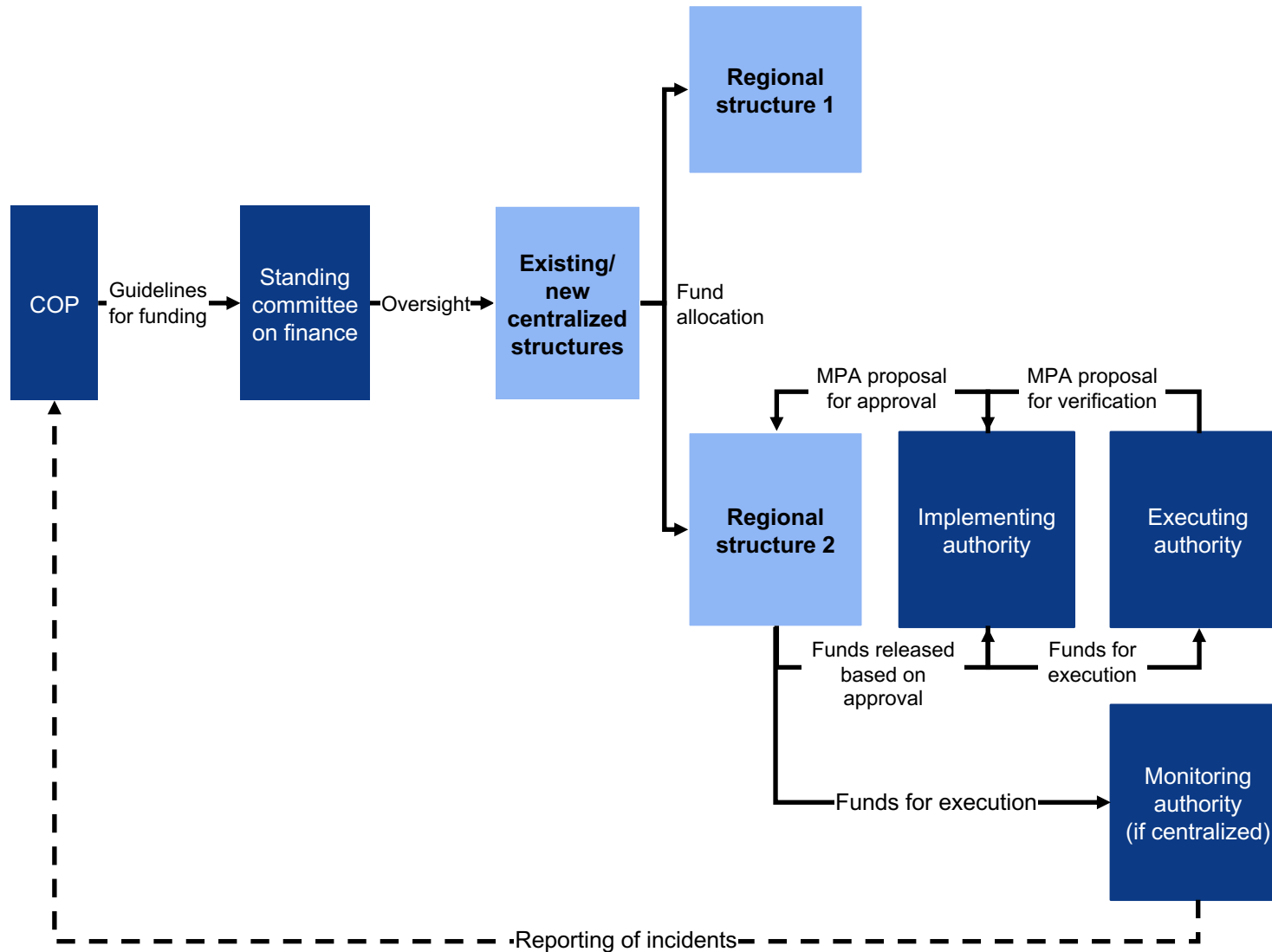
- Slower speed of deployment
- Standard approval process could also lead to restrictive project funding due to significant project preconditions defined by donor members
- Higher cost of funds<sup>1</sup>
- Standardized but complex reporting across all projects

#### Other considerations

- Unclear whether new structure can address limitation of using existing structures or that using existing structures is faster to deploy

1. Cost of funds includes transaction costs and fund administrative costs

### 3 B: Hybrid structure



Hybrid structures are a combination of centralized and decentralized structures with a centralized body raising funds and allocating them to regional structures for further disbursement

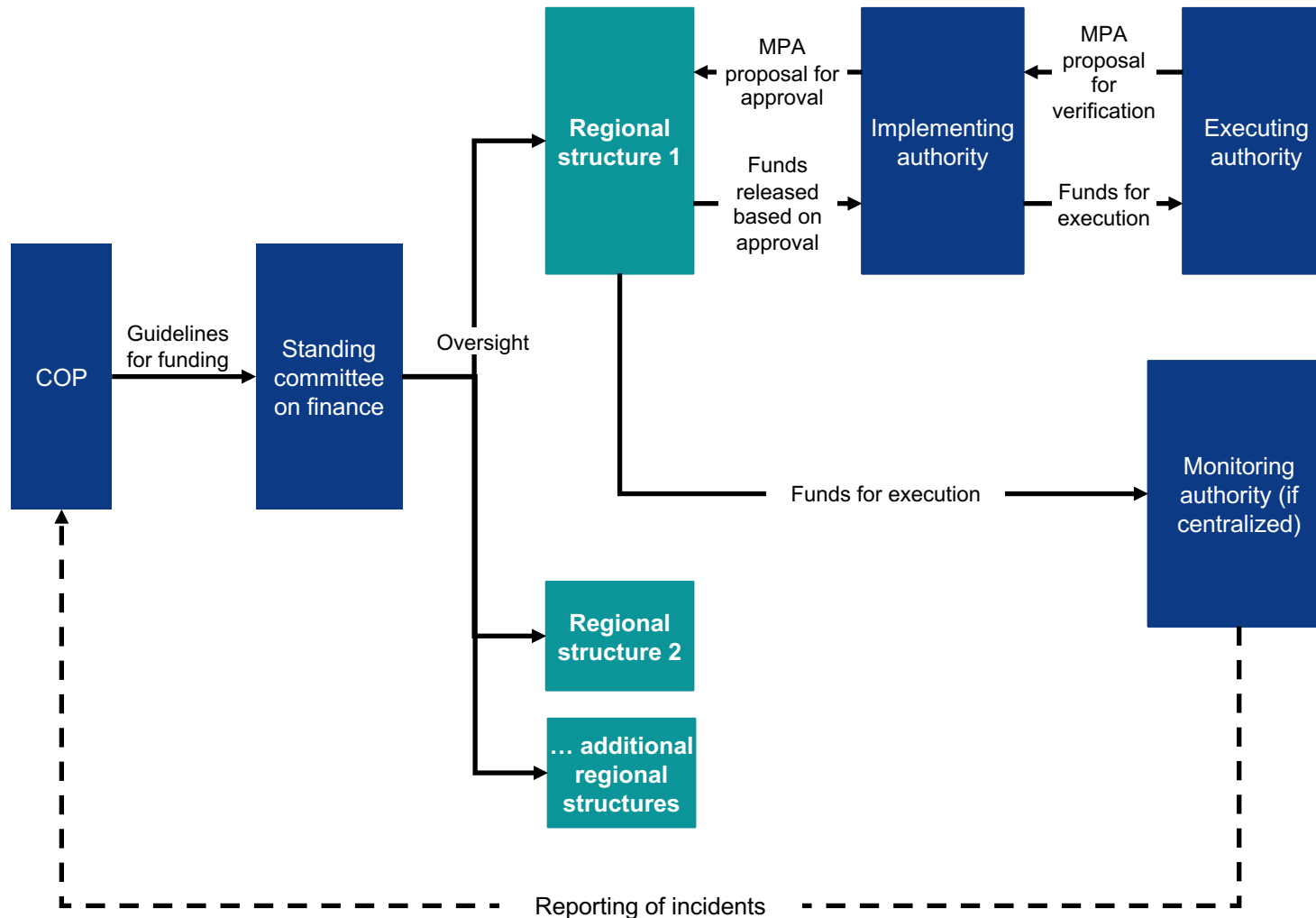
#### Benefits of the structure

- Potential ability to raise relatively large-scale funding and enforce mandatory contributions
- A regional structure allows for contextual factors to be considered while approving proposals within a standard approval process defined by the centralized structure, potentially improving accessibility to funds while being scoped to a minimum standard
- Centralized coordination to ensure equitable regional allocation and greater equitable allocation within the region
- Potential to promote greater learning and coordination between MPAs to prevent duplication, improve synergies, and increase capabilities transfer

#### Challenges to consider

- Structure of dual authorities make it complex to navigate and there is a risk of significant red tape
- Regional execution implies a less standard approval process and different regions could prioritize different needs
- Standardized but complex reporting across all projects
- Not all regions will be covered via existing structures and new regional structures will have to be established

### 3 C: Decentralized structure



**Decentralized structures could leverage existing institutions (e.g., HELCOM), but are likely to require establishing new institutions as well**

#### Benefits of the structure

- Ability to unlock regional donor funding
- Regional decision making allows for contextual factors to be considered while approving proposals, potentially improving accessibility to funds
- Allows for more equitable allocation within the region
- Faster speed of deployment
- Lower cost of funds<sup>1</sup>
- Potential to promote greater learning and coordination between regional MPAs to prevent duplication, improve synergies, and increase local capabilities transfer

#### Challenges to consider

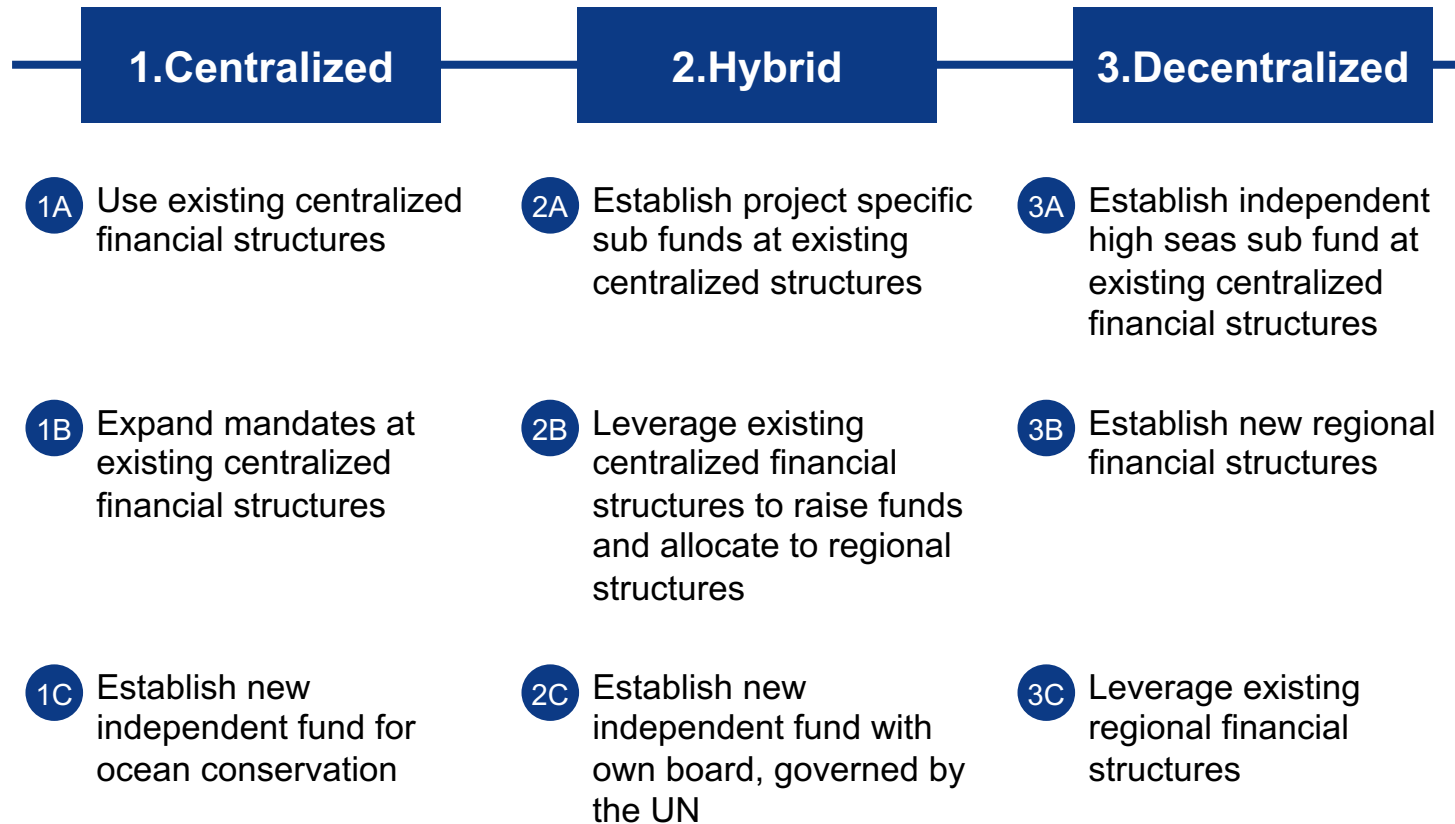
- As funds are raised regionally, it is hard to maintain global equitability, and this will require a centralized finance committee to navigate this aspect
- Not all regions will be covered via existing structures and new regional structures will have to be established
- Ability to fundraise is limited as countries may be hesitant to fund activities for another region where they gain no benefit
- While reporting is less complex, and suited to match capabilities, it is less transparent and standardized

1. Cost of funds includes transaction costs and fund administrative costs

# We considered nine archetypal financial structures across three potential governance structures

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## Potential governance structures and financial archetypes



The IGC is considering three potential governance structures

- Centralized – all high seas governed centrally
- Decentralized – high seas governed regionally
- Hybrid – oversight is central, while execution is regional

Although nuanced, there are multiple archetypal financing structures that could be a fit for each governance structure.

While this brief outlines 3 archetypes for each negotiating position, there are many more potential structures that could mix elements of each.

Each structure has different considerations to keep in mind, which this brief explores next.

# Appendix

# There are different types of monitoring options on the high seas<sup>1</sup>

Effective and cost-efficient monitoring requires a combination of the options listed below

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NOT EXHAUSTIVE



## Satellite Imagery



## Satellite Radar



## AIS + VMS



## Buoys



## Surface patrol

### Description

- |  |  |   |   |   |
|--|--|---|---|---|
| <ul style="list-style-type: none"> <li>• These are actual images, such as those on Google Earth, that include visible colors</li> <li>• Satellites use a camera to take pictures and show images as they actually appear, usually the same as the human eye; camera sensors determine the colors through temperature detection</li> <li>• On cloud free days, optical satellite imagery allows us to see vessels at sea and can offer the best visual “proof” of vessel activity and type</li> </ul> | <ul style="list-style-type: none"> <li>• These are electronic signals that are transmitted by satellites that receive information when the signals bounce off objects and return for analysis</li> <li>• These can transmit and receive signals to see through clouds and darkness, obtaining detailed images of the Earth</li> <li>• Radar can create representations to show things the camera may not reveal</li> </ul> | <ul style="list-style-type: none"> <li>• The Automatic Identification System, (AIS), transmits a ship’s position so that other ships are aware of its position</li> <li>• The International Maritime Organization and other management bodies require large ships, including many commercial fishing vessels, to broadcast their position with AIS in order to avoid collisions</li> <li>• VMS tracks vessels in a similar way to AIS but has historically been restricted to government regulators or other fisheries authorities</li> </ul> | <ul style="list-style-type: none"> <li>• Buoys are floating objects anchored at a definite location or drifting in the ocean, that can have many purposes from navigation to mooring to observation</li> <li>• The new age buoys can provide data on winds, waves, air pressure, air &amp; water temperature, dew point, swell, and salinity</li> </ul> | <ul style="list-style-type: none"> <li>• Patrol vessels generally designed for coastal defense, border protection, law-enforcement, search and rescue duties</li> </ul> |
|--|--|---|---|---|

### Mechanics

- |  |   |  |   |  |
|--|---|--|---|--|
| <ul style="list-style-type: none"> <li>• Satellite cameras takes daily snapshots of the specific locations</li> <li>• Analysts study the imagery to identify any suspicions activity and report it onward</li> <li>• Satellite imagery could be of different resolutions- higher resolutions are clearer images but cover a smaller area while, lower resolutions cover large areas and are usually sufficient to identify vessels that are fishing illegally</li> </ul> | <ul style="list-style-type: none"> <li>• Radar are more frequent and regular observations but focus on targeted areas</li> <li>• Radar can cover a large area, and can quickly identify narrow down to areas with activity which can allow focused further scrutiny through imagery</li> <li>• Radar can be acquired regardless of weather conditions and time of day and can spot the dark fleets</li> </ul> | <ul style="list-style-type: none"> <li>• AIS devices broadcast vessel location, identity, course and speed information</li> <li>• This is used by ground stations and satellites, to track vessels even in the most remote areas of the ocean</li> <li>• VMS systems broadcast positions at set intervals, allowing easy tracking of the vessel</li> </ul> | <ul style="list-style-type: none"> <li>• Data buoys measure and transmit automatically in a predictable and controlled way, communicating in real time via satellite telecommunication systems</li> <li>• A buoy can provide supplemental data by capturing the noise of vessels that pass by, while some buoys can even capture continuous side on imagery for a small distance</li> </ul> | <ul style="list-style-type: none"> <li>• Patrol boats continuously monitor the seas to catch illegal vessels / activities</li> <li>• While patrolling, they usually attempt to cover a large area and attempt to act as a prohibitive measure rather than corrective</li> <li>• Patrol boats are most useful when directed towards identified suspicious activity and can catch bad actors while in the act</li> </ul> |
|--|---|--|---|--|

1. These options are based on current existing and widely technology, but technology in this field is changing quickly



# Satellite imagery is a costly measure of monitoring and targeted monitoring using a combination of options is ideal

Costs will vary based on size, usage and number of illegal activities taking place in the covered region

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## Satellite imagery is not enough

- Obtaining satellite imagery is very expensive, with one still daily image costing \$10-\$30 per sq km
- Images are not always clear, and if a suspicious activity is found, a second high-resolution picture (which covers a much smaller area) might be required to identify the vessel flag
- Vessels are usually moving and an image every 24 hours is not fast enough to catch / get further evidence of the vessel's suspicious activities
- A team of analysts might be required to monitor these images constantly to analyze the vessels, identify suspicious activities and to be able to take any further action



## A combination of all monitoring options is more appropriate

- Conducting analysis of past VMS and AIS data to identify areas which are most susceptible, the type of vessels in the area (e.g., mining, fishing) and the months / time periods in which most activity takes places
- Target higher resolution satellite imagery in these areas in the specific time period
- Track AIS and VMS data, and use legitimate vessels as information sources
- Identify a suspicious vessel through satellite images, track movement using AIS and VMS data to determine vessel type, patterns of movement and suspicious activity
- Use machine learning algorithms to determine suspected path of movement and activity of unmatched “dark” vessels
- Use buoys to monitor movement of vessel
- Deploy patrol boats, if possible, to catch vessel in action

# Monitoring is only the first step in identifying bad actors; the compliance and enforcement process

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## Compliance process

Steps	Identify suspicious activity	Confirm activity and collect evidence	Ensure compliance and conduct enforcement		
			Report to flag state	Inspection at port	On surface inspection
<b>Description</b>	Identify any suspicious activity that is underway, using different monitoring sources or through intelligence received	Collect tangible evidence (e.g., flag state of vessel, vessel id, proof of wrongdoing) that can trigger action in the international community and can hold good in a court of arbitration under international laws	Convey to the flagged state, the details of suspicious activities being conducted by their vessel, for them to take action or permit the complainant to act	Track the vessel to dock and conduct on-board inspection once docked in port under national laws  Track vessel movement to identify docking port in another country and coordinate with the nation to conduct inspections	Deploy patrol vessels to intercept the identified vessel and conduct on surface inspection, as allowed by international treaty laws
<b>Use case example for illegal fishing</b>	Track AIS data showing activity in no-take zone  Obtain satellite photographs of vessels having fishing line in the water	Capture high resolution images of fishing lines, catch and storage of illegal catch through satellites imagery, or is possible buoy imagery  Catch vessel in action by patrol boat  Obtain photographs captured by other passing legitimate vessels	Track AIS data, by closest home port, and report to the flag state as under international laws	Conduct inspection on docking, if possible  Validate log-books (via fishing catch inspector), tally catch data and chart data, search for illegal species fishing (e.g., sharks, fins)	Deploy patrol boat to vessel and conduct on board inspection



BLUE NATURE  
ALLIANCE