ISRA
IMPORTANT SHARK AND RAY AREAS

TOWARDS AN 'IMPORTANT SHARK AND RAY AREA' (ISRA) PROCESS

IMPLEMENTATION STRATEGY

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Notarbartolo di Sciara G. 2021. Towards an 'Important Shark and Ray Area' (ISRA) process: implementation strategy. Report to IUCN Species Survival Commission Shark Specialist Group, 42 p.

ACRONYMS

AoI	Areas of Interest
cISRA	Candidate ISRA
CITES	Convention on the International Trade in Endangered Species of Flora and Fauna
CMS	Convention on the Conservation of Migratory Species of Wild Animals
EBSA	Ecologically or Biologically Significant Area
EIA	Environmental Impact Assessment
FAO	United Nations Food and Agriculture Organization
IBA	Important Bird and Biodiversity Area
IMMA	Important Marine Mammal Area
IoK	Inventory of Knowledge
IRP	Independent Review Panel
ISRA	Important Shark and Ray Area
IUCN	International Union for the Conservation of Nature
KBA	Key Biodiversity Area
LME	Large Marine Ecosystem
MEA	Multilateral Environmental Agreement
MPA	Marine Protected Area
NGO	Non-Governmental Organization
pAoI	Preliminary Areas of Interest
PoC	Points of Contact
Sharks MoU	Sharks Memorandum of Understanding
UNEP	United Nations Environment Programme
SSC	Species Survival Commission
SSG	IUCN SSC Shark Specialist Group
WCPA	World Commission on Protected Areas
WCMC	World Conservation Monitoring Centre

EXECUTIVE SUMMARY

A strategy is outlined for the implementation of a global network of Important Shark and Ray Areas – ISRAs – driven by the need to prevent further losses or extinctions to an increasing amount of shark, ray, and chimaera species, currently facing increasing pressure from overfishing, habitat loss, and climate change. Implementing the ISRA process is considered a matter of urgency given the rapid degradation in the conservation status of a high proportion of chondrichthyan species (sharks, rays, and chimaeras – hereafter referred to as 'sharks'), and the limited and effective place-based protection these species have been benefiting from until now.

ISRAS ARE DEFINED AS DISCRETE, TRI-DIMENSIONAL PORTIONS OF HABITAT, IMPORTANT FOR ONE OR MORE SHARK SPECIES, THAT HAVE THE POTENTIAL TO BE DELINEATED AND MANAGED FOR CONSERVATION.

The identification of ISRAs is an evidence-driven, purely biocentric process based on the application of ad hoc scientific criteria supported by the best available science. This makes the ISRA identification process completely independent from political pressure. Any relevant management implication can only be subsequent to, and detached from, the ISRA identification process.

Most importantly, ISRAs are not MPAs. Protected areas are delimited spaces where specific regulations are enforced to ensure human behaviour can be controlled so that the negative effects of such behaviour on the conservation of the target species can be avoided or mitigated. Conversely, ISRAs are only identified based on scientific criteria that describe their importance for the survival and well-being of one or more shark species found there.

The definition of the ISRA criteria is of fundamental importance for the effectiveness of the tool. Criteria have been designed to capture important aspects of shark biology (e.g., age, growth, and reproduction), ecology and population structure and to encompass multiple aspects of species vulnerability, distribution and movement patterns, abundance, specific habitat requirements and key life cycle activities (e.g., species associations with coral reefs or mangrove forests throughout their life or as newborns, juveniles, or adults), as well as areas of high diversity and endemicity.

The recommended approach for the global identification of ISRAs is to proceed on a region-by-region basis. The process can be envisaged as requiring four stages for each region, which is expected to require 12 months:

1. Preliminary Area of Interest (pAoI) nominations, workshop preparation;
2. Development of candidate ISRAs (cISRA) (expert workshop);
3. cISRA review process and ISRA classification; and
4. ISRA delivery, reporting, and publication.

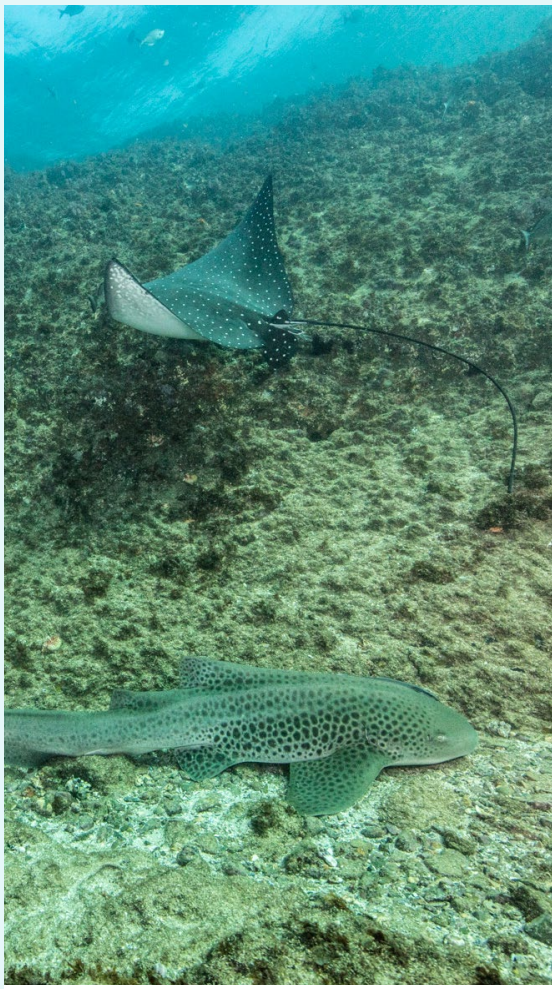
By examining region after region (possibly two per year depending on the availability of funding and personnel) for ISRAs identification, eventually the process will come full circle, bringing up the eventuality of examining regions for the second time. Ideally, such replication may take a decadal periodicity. In ten years, both environmental changes (e.g., warming, species ranges and status) and knowledge progress are likely to be significant, which makes the revision of a regional ISRA configuration desirable if not necessary.

The workshop planned in Stage II, as a moment of collective thinking, has two main functions:

1. A creative function, whereby expert knowledge is shared to distil data scattered across published and grey literature and the personal experience of the participants into a product that is readily actionable by non-scientists (i.e., decision-makers and managers) for the purpose of conservation and management; and

2. The function of providing legitimacy to the process conferred through the collective endorsement of the outcome after the workshop (further bolstered by the successive independent review process). The subsequent submission to the Independent Review Panel of the cISRA proposals resulting from the workshop, or an unbiased assessment of whether the criteria were correctly applied, and of the robustness of the involved scientific information, provides further assurance of the soundness of the process.

The ISRA process is complex and can only be managed by a dedicated group of experts: the 'ISRA Team'. The hiring of a Program Officer can certainly help, however, the amount and quality of work needed cannot be implemented by a single person. A list of tasks is described in this report that will be necessary for the management of the ISRA program, including group governance; familiarity with relevant policy dynamics; skills in fundraising; networking with the science and conservation community at large; scientific competence; database and knowledge/archive management; GIS; IT and website management; financial management; communication expertise, and social media management.



Finally, it is important to ensure that the ISRA uptake in the conservation arena and the real world will allow us to reach the stated goal of providing decision-makers and other relevant stakeholders with the actionable knowledge necessary for the implementation of adequate systematic place-based shark conservation. Several avenues can be envisaged for this purpose, including implementing communication strategies to reach the scientific community, policy-makers, industry regulators, and ocean business stakeholders.

INTRODUCTION

WHY ISRAS – IMPORTANT SHARK AND RAY AREAS?

Chondrichthyans (sharks, rays, and chimaeras – hereafter referred to as 'sharks') are facing a global extinction crisis. According to the IUCN Red List of Threatened Species, it is now estimated that over one-third of sharks are threatened with extinction.

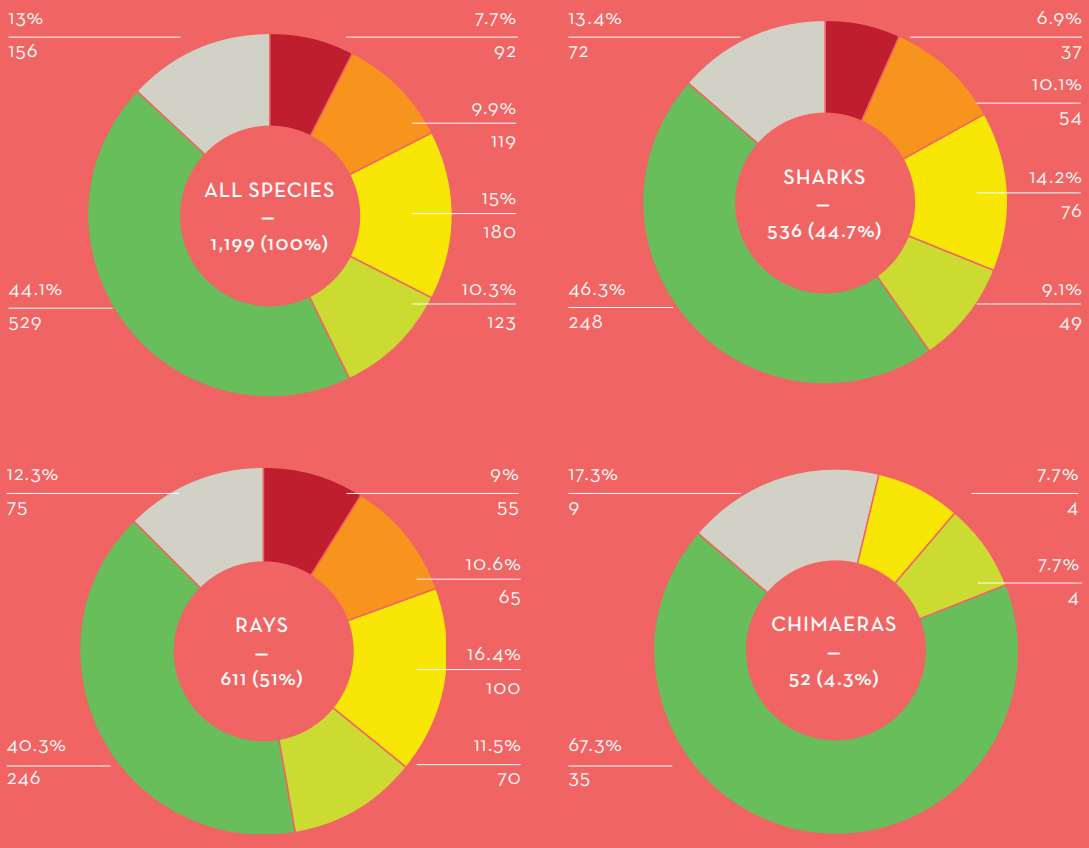
Over the last century, fisheries have had a significant cumulative impact on sharks and this threat has been confounded by habitat loss and climate change. These numbers are higher in coastal habitats where 75% of species are considered under threat. This makes sharks one of the most threatened taxa in the marine environment, second only to amphibians at the global scale.

Despite substantial efforts to conserve species at international, regional, and national levels through improved fisheries governance and trade regulations, most populations continue to decrease at alarming rates. Overall, less than 5% of shark species are currently listed on international treaties (e.g., Convention on the International Trade in Endangered Species of Flora and Fauna (CITES) or Convention on the Conservation of Migratory Species of Wild Animals (CMS)) or receive any type of protection. Considering that many shark species are long-lived, often with naturally low abundances, and are particularly susceptible to fishing pressure, species are increasingly being affected as fisheries expand in effort and space. Fisheries and trade management measures alone are not enough to reverse population declines. However, protected areas can play a critical role in halting these declines by sheltering populations from fishing pressure as well as habitat changes.

Marine Protected Areas (MPAs) have proliferated in recent years as an effective approach to conserving marine biodiversity and ecosystems. While some have proven to be beneficial in conserving reef-associated shark species when animals show strong site fidelity and have small activity spaces, most have been less effective at protecting more mobile species. However, the design and establishment of MPAs should no longer overlook this important species group.

EXTINCTION RISK OF SHARKS, RAYS, AND CHIMAERAS

Number and proportion of species (%)



- Critically Endangered (CR)
- Endangered (EN)
- Vulnerable (VU)
- Near Threatened (NT)
- Least Concern (LC)
- Data Deficient (DD)

Recent innovations and developments in animal tracking, data collection, and reporting have enabled the recognition of discrete areas of the ocean that are significant for various groups of endemic or highly mobile animals, e.g., Important Marine Mammal Areas (IMMAs), Important Bird Areas (IBAs), and Key Biodiversity Areas (KBAs). Given the rapid degradation of the conservation status of a very high proportion of shark species, along with the limited place-based protection these species have received until now, implementing an ISRA approach at the global level is considered a matter of urgency.

The IUCN SSC Shark Specialist Group, with support from the IUCN Ocean Team and the IUCN Task Force on Marine Mammal Protected Areas, aims to develop an expert-driven innovative approach to ensure that discrete portions of habitats, critical to shark species – Important Shark and Ray Areas (ISRAs) – are delineated and used in various place-based conservation and management initiatives across the world's ocean.

In addition to pointing to locations where MPAs or MPA networks can be envisaged to specifically protect shark species, ISRAs can support environmental impact assessments (EIAs) of activities specifically affecting shark conservation, marine spatial planning (MSP) exercises, and in international, regional, national and local conservation contexts.

VISION AND MISSION

ISRAs are discrete, tri-dimensional portions of habitat, important for one or more shark species, that have the potential to be delineated and managed for conservation.

VISION

ENHANCED CONSERVATION OF ALL SHARK, RAY, AND CHIMAERA SPECIES THROUGH THE IMPLEMENTATION OF A SYSTEMATIC PLACE-BASED APPROACH, SUPPORTED BY THE IDENTIFICATION OF ISRAS THROUGHOUT THESE SPECIES' RANGES.

MISSION

TO MOBILIZE SCIENTISTS AND CONSERVATIONISTS TO ENSURE THE RANGES OF ALL KNOWN SHARK, RAY, AND CHIMAERA SPECIES ARE GLOBALLY INVESTIGATED, SO THAT ISRAS ARE IDENTIFIED WITHIN SUCH RANGES AND MAPPED, AND PROVIDE DECISION-MAKERS AND OTHER RELEVANT STAKEHOLDERS WITH ACTIONABLE KNOWLEDGE NECESSARY FOR THE IMPLEMENTATION OF ADEQUATE SYSTEMATIC PLACE-BASED CONSERVATION.

BASIC CONCEPTS

The ISRA program concerns all Chondrichthyans, which include all extant species of sharks, rays, and chimaeras (or 'ghost sharks'). For sake of language simplification, it has been customary in relevant international policy and science fora (e.g., United Nations Food and Agriculture Organization (FAO)) to collectively refer to these species as 'sharks'. Similarly, in this document, the word **'sharks' refers to all Chondrichthyan species, including rays and chimaeras, unless otherwise specified**.

'**Important**' refers to any ecological property or value of the location, susceptible to affect the wellbeing of the sharks within the ISRA, necessary to maintain or improve their conservation status.

ISRAs are **'identified'**, not 'designated' - the latter term having a connotation of legal significance, inappropriate in a strictly scientific context.

The identification of ISRAs is an **evidence-driven, purely biocentric process based on the application of ad hoc scientific criteria supported by the best available science**. This makes the ISRA identification process completely independent from political pressure. Any relevant management implication can only be subsequent to, and detached from, the ISRA identification process.

Most importantly, ISRAs are not MPAs. Protected areas are delimited spaces where specific regulations are enforced to ensure that human behaviour is controlled so that the negative effects of such behaviour on the conservation of the target species can be avoided or mitigated. Conversely, ISRAs are only identified based on scientific criteria that describe their importance for the survival and well-being of one or more shark species found there.

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[1] Adapted from the definition of Important Marine Mammal Areas – IMMAs (Hoyt and Notarbartolo di Sciara 2021), with the added mention of the vertical dimension, needed for marine animals that, unlike mammals, are not tied to the surface by the physiological need of breathing air.

The ISRAs' main purpose is to attract the attention of policy- and decision-makers on the need of maintaining the favourable conservation status of sharks in that specific area, and to provide them with actionable knowledge useful for the implementation of the most appropriate management measures; this of course can include, but should not be limited to, an MPA designation.

DEFINING CRITERIA

The identification of ISRAs will be achieved through the application of scientifically-based criteria. The definition of these ISRA criteria is of fundamental importance for the effectiveness of the tool in terms of its application, standardization and consistency across identified sites, as well as comparability between ISRAs at national, regional, and international scales. ISRA Criteria have been designed to capture important aspects of shark biology (e.g., age, growth, and reproduction), ecology and population structure and to encompass multiple aspects of species vulnerability, distribution and movement patterns, abundance, specific habitat requirements, and key life cycle activities (e.g., species associations with coral reefs or mangrove forests throughout their life or as newborns, juveniles, or adults), as well as areas of high diversity and endemicity.

A useful consideration in the definition of ISRA criteria is to facilitate alignment of the criteria to those of other conservation tools, such as the Convention on Biological Diversity's criteria for Ecologically or Biologically Significant Areas (EBSAs), the Key Biodiversity Areas (KBA) criteria based on the IUCN standard (see 'Policy Implications' in the next section), Important Marine Mammal Areas (IMMAs), and Important Bird and Biodiversity Areas (IBAs).

Table 1 describes the alignment among the IMMA, EBSA, and KBA criteria (Source: IUCN Marine Mammal Protected Areas Task Force, 2021).

Table 1. Alignment of IMMA with EBSA and KBA criteria (Note: the alignment in this table only considers EBSA and KBA criteria because they are multi-taxon systems, in view of a potential contribution of IMMAs to the EBSA and/or KBA efforts. This would be inapplicable to IBAs, which are therefore not considered here).

IMMA Criteria	EBSA Criteria	KBA Criteria
A: Species or Population Vulnerability Areas containing habitats important for the survival and recovery of threatened and declining species or populations.	**Importance for threatened, endangered or declining species and/or habitats** Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.	**Sub-criterion A1: Threatened Taxa** Site regularly holds ≥95% of the global population of a globally Critically Endangered (CR) or an Endangered (EN) taxon; OR ≥0.5% of the global population AND ≥5 functional reproductive units of a globally CR or EN taxon; OR ≥1% of the global population AND ≥10 functional reproductive units of a globally Vulnerable (VU) taxon; OR ≥0.1% of the global population AND ≥5 functional reproductive units of a globally CR or EN taxon qualifying only under Criterion A of the IUCN Red List Categories and Criteria, in any of sub-criteria A1, A2, or A4; OR ≥0.2% of the global population AND ≥10 functional reproductive units of a globally VU taxon qualifying only under Criterion A of the IUCN Red List Categories and Criteria, in any of sub-criteria A1, A2, or A4.

IMMA Criteria	EBSA Criteria	KBA Criteria
B: Distribution and Abundance **Sub-criterion B1:** **Small and Resident Populations** Areas supporting at least one resident population, containing an important proportion of that species or population, which are occupied consistently.	**Vulnerability, fragility, sensitivity, or slow recovery** Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to slow recovery degradation or depletion by human activity or by natural events) or with slow recovery. **Uniqueness or Rarity** Area contains either unique, or endemic species, populations or communities, and/or unique, rare or distinct, habitats or ecosystems; … … and/or unique or unusual geomorphological or oceanographic features.	**Sub-criterion B1:** **Individual geographically restricted species** Site regularly holds ≥10% of the global population and ≥10 functional reproductive units of a species.
Sub-criterion B2: Aggregations Areas with underlying qualities that support important concentrations of a species or population.	**Biological Productivity** Area containing species, populations or communities with comparatively higher natural biological productivity. **Special importance for life-history stages of species** Areas that are required for a population to survive and thrive.	**Sub-criterion D1:** **Demographic Aggregations** Site predictably holds an aggregation representing ·1% of the global population of a species during one or more, but not all, key stages of its life cycle
C: Key Life Cycle Activities **Sub-criterion C1:** **Reproductive Areas** Reproductive areas and conditions that are important for a species or population to mate, give birth, and/or care for young until weaning.	**Special importance for life-history stages of species** Areas that are required for a population to survive and thrive.	**Sub-criterion D1:** **Demographic Aggregations** Site predictably holds an aggregation representing ·1% of the global population of a species during one or more, but not all, key stages of its life cycle.
Sub-criterion C2: **Feeding Areas** Areas and conditions that provide an important nutritional base on which a species or population depends.	**Special importance for life-history stages of species** Areas that are required for a population to survive and thrive.	**Sub-criterion D1:** **Demographic Aggregations** Site predictably holds an aggregation representing ·1% of the global population of a species during one or more, but not all, key stages of its life cycle.

IMMA Criteria	EBSA Criteria	KBA Criteria
Sub-criterion C3: Migration Routes Areas used for important migration or other movements, often connecting distinct life cycle areas or connecting different parts of the year-round range of a non-migratory population	**Special importance for life-history stages of species** Areas that are required for a population to survive and thrive.	**Sub-criterion D1: Demographic Aggregations** Site predictably holds an aggregation representing ·1% of the global population of a species during one or more, but not all, key stages of its life cycle.
D: Special Attributes **Sub-criterion D1: Distinctiveness** Areas that sustain populations with important genetic, behavioural or ecologically distinctive characteristics	**Uniqueness or Rarity** Area contains either unique, or endemic species, populations or communities, and/or unique, rare or distinct, habitats or ecosystems; and/or unique or unusual geomorphological or oceanographic features.	**Sub-criterion B1: Individual geographically restricted species** Site regularly holds ≥10% of the global population and ≥10 functional reproductive units of a species.
Sub-criterion D2: Diversity Areas containing habitat that supports an important diversity of species.	**Biological Diversity** Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.	**Sub-criterion B3: Geographically restricted assemblages** The site regularly holds globally the most important 5% of occupied habitat for each of ≥5 species within a taxonomic group; OR ≥0.5% of the global population of each of several species in a taxonomic group restricted to an ecoregion, determined as either ≥5 species or 10% of the species restricted to the ecoregion, whichever is larger; OR ≥5 biome-restricted species… …or 30% of the biome-restricted species known from the country, whichever is larger. **C. Ecological Integrity** The site is one of ≤2 per ecoregion characterized by wholly intact species assemblages, comprising the composition and abundance of native species and their interactions.

KEY CONSIDERATIONS ON ISRA IDENTIFICATION METHODS

ISRAs are identified based on knowledge of the presence in the area of shark species that satisfy one or more criteria. These species are defined as 'qualifying species'. Other species which have habitat within the ISRA but do not satisfy any of the ISRA criteria can be also listed in the ISRA description as 'supporting species'. However, species that have occupied the area historically but no longer occur (e.g., sawfishes, *Pristis* spp., that have not been recorded from South African waters since 1999 and are considered locally extinct), vagrants (i.e., taxa that are currently found only occasionally within the boundaries of a region), and single occurrences of species that normally occur in habitats not contained within the ISRA boundary should not be listed even as supporting species.

Like EBSAs and IMMAs, and unlike KBAs and IBAs, it is recommended that ISRAs be defined based on qualitative criteria (refer to Table 1 for examples concerning the IMMA criteria). As with most marine mammals, the current limited and fragmented availability of relevant ecological data and the low-density, yet wide geographical range of many shark species makes the identification of ISRAs based on demanding quantitative criteria an insurmountable challenge for most shark species. This ultimately defies the purpose of meaningfully supporting the process of affording systematic place-based protection to these species. By contrast, qualitative criteria will allow the identification of ISRAs to move forward across the taxon based on expert knowledge, published or the grey literature information, and highlight the importance of areas that could not be identified through quantitative criteria because of lack of information. In turn, this will support the conversion into KBAs those ISRAs that were identified based on data that may be used in the application of quantitative criteria. In fact, like IMMAs, the development of the ISRA program can be viewed as likely to provide significant support for the process of identifying KBAs relevant to shark species.

Boundary delimitation can be challenging. National or other legal designations are not considered when selecting ISRA boundaries: ISRAs can be identified in any part of the ocean regardless of political boundaries and can encompass territorial as well as high seas waters depending on the ecology of the concerned species. Experts of the relevant species and regions need to be

called upon to help identify boundaries based on known species distributions, genetics, and other relevant studies. In some cases, geomorphological (e.g., isobaths), oceanographic features and other hydrographic data (including currents, depth, and water temperature) can be used to help define a boundary. Also, there should be no rule about optimal ISRA size, as long as it provides habitat for one or more shark species that can be listed as satisfying one or more criteria.

Finally, habitat identification and depth ranges need to be carefully considered for sharks. Given the ecological properties of many shark species that confine them to specific depth ranges (e.g., most deep-water species only occur at depths greater than 200 m), the description used when identifying an ISRA shall be not only be a two-dimensional polygon on a map. It should include a delimitation of its known depth range. Sharks fundamentally differ from marine mammals because they are not linked to the surface by the physiological need of breathing atmospheric oxygen. Although there exist marine mammal species that spend most of their time submerged, regularly foraging at bathyal depths, the need was never felt for identifying IMMAs by encompassing only a portion of the water column. This requirement to consider portions of shark habitats that include the sea bottom and the water column, entirely or in part, is referred to as 'tri-dimensional portions of habitat' within the context of the ISRA definition.

A sensible first objective to attain the goal of the ISRA program is to support the experimental implementation of an ISRA identification effort in a pilot region. Whilst the model has already been amply tested in the field of marine mammal place-based conservation through the implementation of an IMMA identification program (see also www.imma-network.org), proof of concept is recommended considering the specificities of the shark taxa, as well as to test the adequacy of the criteria and overall process.

POLICY IMPLICATIONS

Place-based denominations have attracted the attention of major Multilateral Environmental Agreements (MEAs) in recent years. Historically, the path to the adoption of such taxon-based denominations was opened by BirdLife International with the development of Important Bird and Biodiversity Areas or IBAs, which had continental-level policy implications. For instance, in Europe most IBAs were morphed into Special Protection Areas under the European Birds Directive, or Special Areas of Conservation under the Habitats Directive. Over time, IBAs have increasingly contributed to global conservation efforts. An example is an initiative by the Convention on Biological Diversity of identifying Ecologically or Biologically Significant Marine Areas (EBSAs), where IBAs have been explicitly mentioned whenever appropriate. Another example is the contribution of IBA-related knowledge to the identification of Key Biodiversity Areas (KBAs). These contributions highlight the importance of identifying such areas at the taxon level and integrate them into broader spatial planning approaches.

Other taxa, such as marine mammals and sharks, have been unsystematically and opportunistically included in such global initiatives. Important Marine Mammal Areas - IMMAs, were devised to address this challenge. Despite their infancy, there was an uptake of IMMAs when the CMS engaged in place-based conservation policy and adopted in 2014 Resolution 11.25 on 'Advancing ecological networks to address the needs of migratory species'. IMMAs were later the subject of a dedicated CMS Resolution (12.13), adopted in 2017, and of several Decisions adopted at Conference of Parties 13 (2020 in India) directed to Parties, Scientific Council, and Secretariat (www.cms.int/en/page/decisions-1354-1357-important-marine-mammal-areas-immas). Over the years, the IMMA program has grown and >300 requests for IMMA shapefiles and metadata were received between 2018–2021 by universities or academia = 39%; industry or business = 22%; Non-Governmental Organizations (NGOs)= 21%; government = 16%; and inter-governmental organisations = 2%. The

stated purpose of received requests included research (35.9% of requests), conservation (33.9%), commercial activities (20.6%), and education (9.6%).

At this point, the need for the development of ISRAs has become evident. Like for mammals, because of the nature of many shark species occurring at low densities over vast oceanic expanses, and the challenges and costs involved in the collection of sufficiently robust data to inform meaningful conservation planning and action, a systematic process for collating data and making them actionable is needed if sharks are to be fully included in the global marine conservation process. More recently, the possibility of engaging through CMS as well as the daughter agreement 'Sharks Memorandum of Understanding (Sharks MoU)' towards the development of ISRAs was discussed with the CMS Secretariat, and the idea emerged of placing ISRAs on the agendas of upcoming meetings of both CMS Scientific Council and Sharks MoU.

[2] See www.cms.int/sharks/en

WHY AN ISRA REGIONAL APPROACH?

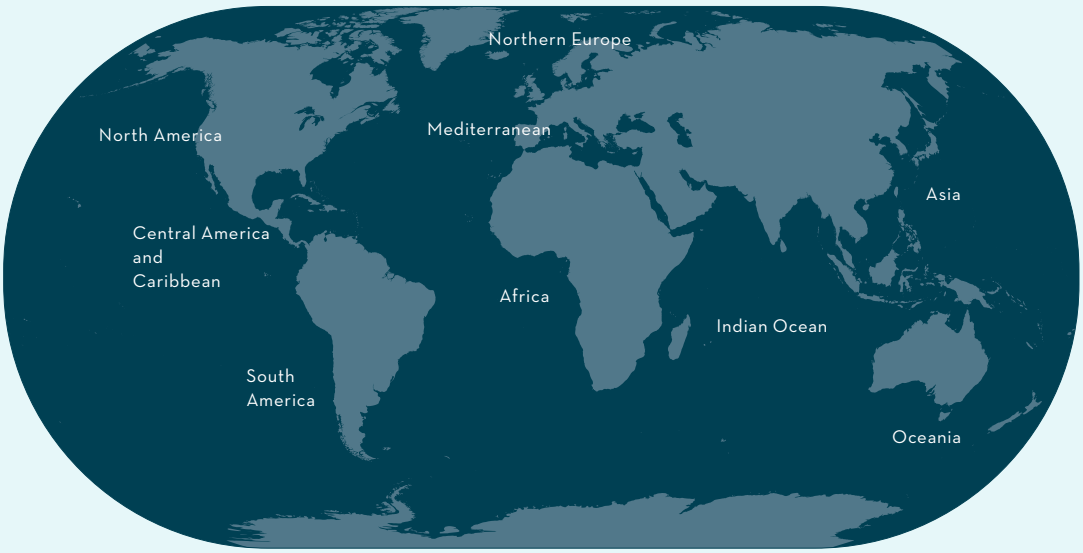
Based on the IMMA process, which is likely to be the case for the ISRAs, the most effective way of proceeding will be by looking at the subdivision of the ocean into regions, examined separately with the goal of identifying ISRAs through an expert workshop.

Whereas in the case of the IMMAs, the initial blueprint for the subdivision of the ocean and seas into workable regions took inspiration from the scheme adopted by IUCN's World Commission on Protected Areas (WCPA), with 18 WCPA-Marine Regions covering the entire ocean surface, a blueprint of the geographic subdivision for ISRA identification purposes can be adopted on the basis of the existing Regional Vice-Chair framework of the IUCN SSC Shark Specialist Group (SSG) with nine regions identified around the world.

The SSG regional subdivision can be taken as an example to be modified. For instance, Africa — which is indicated as a single region in the map (p.23) — will have to be subdivided further. In selecting regions to implement ISRA identification exercises — i.e., expert workshops — the principal consideration should be given not so much to the biogeographic homogeneity of the region, but to the homogeneity of the community of regional experts gathering at the workshop, who will be tasked to work together for five days to decide and develop the candidate ISRAs, and draft the template submissions.

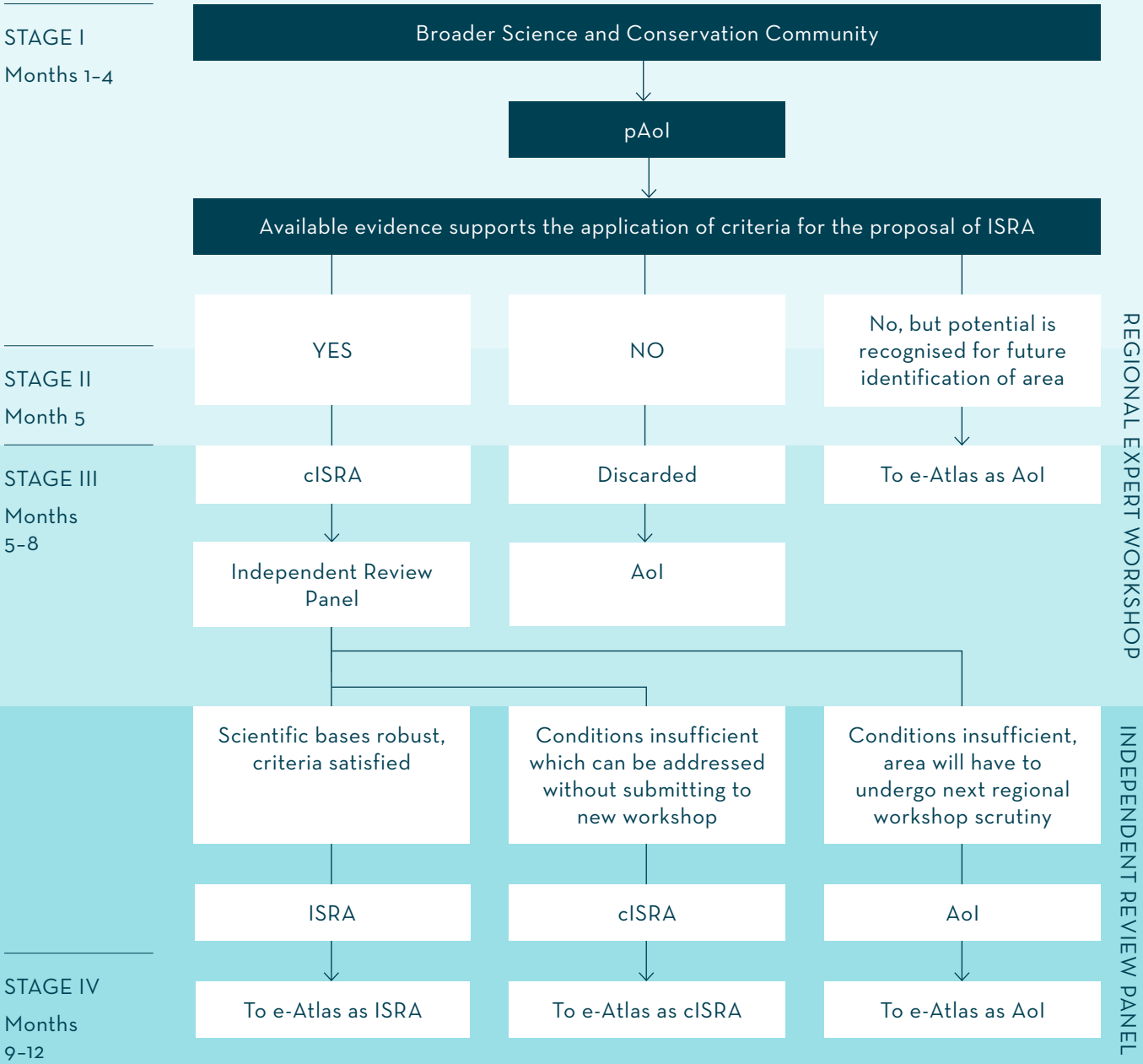
Furthermore, ISRAs will also have to be identified in inland waters that host shark or ray habitats (e.g., Amazon Basin and South American rivers for neotropical stingrays, family Potamotrygonidae). Within the IMMA context, it is anticipated that consideration will be given to organising one single workshop dedicated to the whole of the inland waters marine mammal habitats, wherever they occur on the planet.

This might also prove to be the best approach for sharks, unless they are treated through the regional approaches since, apart from the South American freshwater stingrays (38 currently recognized species), there are relatively few obligate freshwater species — seven species scattered throughout major drainages of the Indo-Pacific and West Africa.



IUCN SSC Shark Specialist Group regional subdivision (above) and scheme adopted by IUCN's World Commission on Protected Areas (below) (WCPA, 18 WCPA-Marine Regions covering the entire ocean surface, Source: UNEP-WCMC 2008).

THE PROCESS FLOWCHART FROM PRELIMINARY AREA OF INTEREST TO IMPORTANT SHARK AND RAY AREA



pAoI: preliminary Area of Interest; AoI: Area of Interest; cISRA: candidate Important Shark and Ray Area; ISRA: Important Shark and Ray Area.

THE ISRA REGIONAL IDENTIFICATION PROCESS

Suggestions for the ISRA process design are based on the experience accumulated throughout the quinquennial (five-year) development of the IMMA process (2016–2021), which is still continuously improved, workshop after workshop. Having to break new ground to get the IMMA process started created the impetus for a constant adaptation as the process increased in complexity and posed new challenges.

The process can be envisaged as requiring four stages, which in the case of the IMMAs requires a total duration of 12 months (Table 2).

TABLE 2. ISRA REGIONAL IDENTIFICATION PROCESS

Stage/ Timeline	Description	Outcomes
Stage I Months 1 – 4	**Preliminary Areas of Interest (pAoI) nominations, workshop preparation:** – region (including sub-regions) delimitation; – identification of experts; – date and venue selection; – circulation and follow-up of pAoI submission form; – preparation and circulation of pAoI Report; – preparation, circulation, and follow-up of Inventory of Knowledge (IoK) survey form; – sending and follow-up of 'Save the Date' and invitations and background materials; – flights, visas and accommodation arrangements; – other administrative aspects.	– workshop announced and ready in all its aspects (venue, budget, final list of participants, flights booked, documentation circulated, received and elaborated); – critical mass of invitees accepted and confirmed.

Stage/ Timeline	Description	Outcomes
Stage II Month 5 (Workshop duration: 5 days)	**Development of 'candidate ISRAs' (cISRAs) based on the pAoI (Workshop delivery):** – participants number: typically 25-30 but this can be adapted to circumstances, regional needs, and funding availability (expenses for participants: travel + per diem x 7 days). This includes an organising committee of 5–7 people to run the workshop and coordinate participants. – basic logistics: large room for plenary with audio-visuals, digital projection, and internet, the possibility of 8–10 large tables (not theatre seating) to allow for breakout groups with shared working space.	– workshop delivered and concluded with formal identification of cISRAs and AoI. – cISRA review templates filled in as appropriate; – Regional Coordinator(s) selected and appointed.
Stage III Months 5 – 8	**cISRA review process and ISRA classification:** – review panel sought and coordinated by the panel chair. Additional editorial assistance is required for the formatting of review templates and feedback forms for cISRA Points of Contact (PoC); – may require Regional Coordinator(s) assistance for the completion of final cISRA descriptions.	– review templates revised before submission to Panel; – revised templates submitted to Panel; – feedback and necessary amendments required by cISRA Points of Contact (PoC); – review completed.
Stage IV Months 9 – 12	**ISRA delivery, reporting and communication:** – e-Atlas, online database population; – workshop reporting and publication.	– e-Atlas populated with ISRAs, cISRAs, AoI; – individual ISRA portfolio pages created on the website with a summary of ISRA Key Info and download options for the GIS layer; – detailed fact sheets (to satisfaction of ISRA PoC) completed and posted online. – workshop report written and disseminated in preliminary version (i.e., before review results); – workshop report disseminated in the final version (after review results); – news releases, social media posts and other announcements prepared and released.

STAGE I
NOMINATION OF 'PRELIMINARY AREAS OF INTEREST' (pAOI) – 4 MONTHS

The process kicks off with a general call for pAoI submission within a defined region, made through a variety of channels including specialised discussion lists, some social media, word of mouth, and the list of participant experts to be invited. Maps connected to submissions can be made by sending them in a variety of ways, but the option of using Seasketch (www.seasketch.org/home.html) can also be given, upon an agreement with the tool providers.

Although a good portion of the regional experts to be invited to the workshop is already known to the organisers, it is usually useful to select a few lead experts in the region to advise about more in-depth expert selection and be able to include more junior (= less published) participants but with good direct expertise from the field. Depending on the availability of funds, it is advisable to invite experts slightly in excess to have more hands at the moment of drafting cISRA templates during the workshop and to compensate for last-minute canceling.

Venue selection is based on several criteria: nearness to a major airport to minimise travel time and facilitate access; availability and affordability of hotel venue with the necessary facilities; if the above criteria are satisfied, venue amenity also contributes to the success of the workshop.

Useful documents to prepare for the workshop, collected online (e.g., Google Drive) include:

— a report with a description of all the pAoI submitted;
— all the relevant pAoI information collected into a folder;
— workshop GIS information, including maps of the region and its subdivision in sub-regions;
— an Inventory of Knowledge document, with details on the species present in the region, their Red List status and range description; the region's OBIS and bathymetry data; geomorphic features; etc.
— a guide to ISRA identification.

A 'Save the Date' notice with an explanation of the process and its goals, and of what is expected from participants, is sent very early during Stage I to allow for a minimum of four months before the beginning of the workshop.

STAGE II
DEVELOPMENT OF 'CANDIDATE ISRAS' (cISRAS) BASED ON THE pAOI – 5 DAYS

cISRAs are developed during a five-day workshop organised around the beginning of the 5th month after the kick-off of a regional identification process. cISRAs are formulated based on a discussion of the merits of the various pAoI proposed and drafted by filling the cISRA template.

The workshop as a moment of collective thinking has two main functions:

— a creative function whereby expert knowledge is shared to distil data scattered across published and grey literature and the personal experience of the participants into a product that is readily actionable by non-scientists (i.e., decision-makers and managers) for the propose of conservation and management;

— the function of providing legitimacy to the process conferred through the collective endorsement of the outcome after the workshop (further bolstered by the successive independent review process).

A typical workshop starts on a Monday morning and ends on the following Friday afternoon. Participants are invited to reach the venue on Sunday (when an evening ice-breaking event is organised) and leave on Saturday. Partial attendance is strongly discouraged: the program invests significantly in inviting participants, and partial attendance can be viewed as a waste of economic resources.

Invited experts have been, in the case of IMMAs, about 30 on average. With the expected addition of facilitators from the IUCN SSC Shark Specialist Group, plus participants invited as observers (e.g., representatives of the local government, relevant intergovernmental organisations, KBA experts, local NGOs), the total number of people involved can reach 50. Meeting facilities should thus include a room large enough to accommodate as many persons in a classroom arrangement, with the flexibility to transform the arrangement to many separate tables for breakout sessions.

The first workshop day is dedicated to welcome addresses, participant presentations, and presentations to provide participants with the information needed to progress with the work.

Presentations can continue in the early afternoon, but the rest of the day can helpfully be dedicated to a reading session.

Tuesday morning starts with an overview of the pAoI on the table and an assignment of tasks among participants for the development of cISRA templates based on the pAoI. A subdivision of the region into subregions is usually a good idea, and subgroups can be assigned to subregions.
If a region is very large and complex, more than one subgroup can be created to address it.

Subgroups start addressing the drafting of cISRA soon after assignments, and the drafting proceeds for the following three days, under the supervision and support from the ISRA Team. Ideally, drafting stops by the end of Friday's morning session. That day's afternoon will see the workshop concluding sessions, with a review of the cISRAs proposed, and the formal adoption of the proposals that at that point become invested by collective endorsement.

It should be expected that not all the pAoI that were tabled at the beginning of the workshop reach the end of the week as cISRAs. Some of them can be deemed lacking sufficient information to qualify as cISRAs, but still deserve further scrutiny should such information become one day available. These proposals will remain part of the workshop's output, listed separately as AoI in the report, and placed on the e-Atlas and database marked as such.

Other matters treated before the end of the workshop include the provision of instructions to participants on what to expect next concerning the review process, and the creation of a standing regional group facilitated by one or more Regional Coordinators, selected during the workshop and acclaimed at its end. Normally a closing dinner is offered by the organisers.

STAGE III
cISRA REVIEW PROCESS AND ISRA CLASSIFICATION – 4 MONTHS

During the weeks following the workshop the cISRA templates are revised by the ISRA Team, which often involves redrafting most of them entirely, given that the circumstances in which they were drafted (in noisy rooms and under the pressure of completing the job in a timespan often too short for the task) are far from optimal. This polishing phase of the cISRAs will likely be a quite laborious task involving getting in touch again with the Points of Contact (PoC: the workshop participants who drafted the cISRA templates), and obtaining from all of them the necessary attention so that final presentable proposals are obtained.

At that point, cISRA templates are submitted to the Independent Review Panel (IRP), selected among recognised shark conservation experts who have not been involved in the ISRA identification process, but who have an in-depth understanding of the program goal and functioning. It is advisable to proceed by selecting one person to function as chair of the IRP in the long-term to ensure consistency, and then to proceed to select the other panel members (3–5 in total, chair included, in the case of IMMAs), in consultation with the chair.

The task of the IRP is to decide whether a cISRA deserves to be awarded ISRA status based on the correct application of the criteria and/or the robustness of the involved scientific information, or whether it will need revision and/or integration to fulfil the requirements. Not unlike the submission of papers for publication to a scientific journal, reviewers will advise whether a cISRA proposal will require minor or major changes, or should be rejected. Reviewers can also address proposals for cISRA boundaries, by expressing an opinion on whether boundaries should be changed to allow either merging of two nearby cISRAs or the splitting of an ISRA into smaller ones. The process of getting to ISRAs from cISRAs is normally time-consuming and laborious. Reviewers will be able to complete their task in about one month, but the successive chasing down of PoC and negotiating amendments to the original cISRA proposals can take up to two months after reviews are received.

The result of Stage III will be:

— the conversion of cISRAs into ISRAs;

— cISRAs that are deemed by reviewers to be needing more information to satisfy the ISRA criteria will remain cISRA, and will be included in the online searchable database and displayed on the e-Atlas with different colouration. For these cISRAs to become ISRAs, it will be sufficient for the PoC to interact with the ISRA Team to ensure that certain requirements have been satisfied, and the Team can then determine if any cISRA can become a full ISRA without requiring submission to, and validation by, a new workshop;

— the filing of all the other proposals that were deemed to be insufficiently robust for being awarded ISRA status as AoI, included in the online searchable database and displayed on the e-Atlas with yet a different colouration. The rationale for AoI to remain in the record and visible is that they are deemed to have the potential to reach ISRA status. It can be anticipated that in the future, when more information becomes available, any AoI may become an ISRA, subject to undergoing consideration at a new workshop and review process.

STAGE IV
ISRA DELIVERY, REPORTING, AND COMMUNICATION – 4 MONTHS

The final stage of the process consists of the elaboration of the results of the process so that the ISRA product is made available.

All ISRA and cISRA documentation is reviewed so that texts are homogenous, in a correct English style, and with the correct names of species and locations. Each of the designations is described by a title name; a unique alphanumerical code; a summary, a portfolio description (including a map, surface area, the qualifying species involved and the criteria applied, a justification of the criteria application, and the list of sources); and a downloadable fact sheet (from www.sharkrayareas.org) enriched by additional relevant information (e.g., maps, tables, pictures).

GIS information related to each ISRA, cISRA and AoI is converted to a format that can be incorporated into the e-Atlas, which can be consulted on the website. The website also hosts a searchable and downloadable database of all the ISRAs, cISRAs and AoI.

AoI have a reduced amount of information displayed, given their uncertain status. They have a title name but do not have a portfolio description or a fact sheet. The concerned species are listed as 'supporting species'. However, they are included in the database and e-Atlas because of their potential importance for the conservation of species, with a level of uncertainty that is only conditioned by the lack of sufficient data.

The building of an archive since the beginning is an essential effort. The archive, preferably cloud-based, is a repository of all the documentation of the workshops, including the paperwork leading to pAoI, cISRA, ISRA and AoI construction; the master ISRA database; and a collection of presentations, correspondence, directories, etc. which rapidly builds up and needs a careful and expert design to ensure its continued usefulness.

By examining region after region (possibly two per year depending on the availability of funding and personnel) for ISRA identification, eventually the process will come full circle, bringing up the eventuality of examining regions for the second time. Ideally, such replication may take a decadal periodicity. In ten years, both environmental changes (e.g., warming, potential shifts in species ranges, and changes in their IUCN Red List of Threatened Species status) and knowledge progress are likely to be significant, which makes the revision of a regional ISRA configuration desirable, if not necessary. Current ISRAs may require boundary adjustment and revision of the criteria applicability; AoI may have reached the knowledge level required to become ISRAs; remaining cISRA may get the impetus for becoming ISRA as well.

THE ISRA TEAM

The ISRA process is complex and can only be managed by a dedicated group of experts: the 'ISRA Team'. The hiring of a Program Officer can support with the coordination of the process, however, the amount and quality of work required cannot be implemented by a single person.

Below, a list of tasks is described that have become necessary in the management of the IMMA program, in the expectation that the requirements of the ISRA process will be similar if not more complex (because of the much greater number of species involved with approximately 1,250 known shark species compared to approximately 130 marine mammal species).

Considering that, once started, the ISRA process will run continuously, personnel involved will have to be able to dedicate sufficient time to the task. In addition, some redundancy of roles (e.g., those that are essential to the functioning of the process) is highly recommended in the case of the temporary unavailability of some of the team's components. The main types of expertise required for the good functioning of the ISRA process include group governance and leadership; familiarity with relevant policy dynamics at international, regional, and national scales; fundraising skills to ensure the financial sustainability of the process; networking with the science and conservation community at large; scientific competence to maintain standards across workshops and regions; database and archive management; Geographic Information System (GIS) mapping skills to produce maps and delineate areas; Information Technology (IT) and website management skills; and communication expertise and social media management.

The functioning of the Independent Review Panel also needs to be considered, although this body will be by definition external to the ISRA Team. As the project leader, the IUCN SSC Shark Specialist Group can facilitate a pool of experts from its members and beyond to be involved for the purpose.

The tasks to be undertaken by the ISRA Team are likely to include:

1. Team management and coordination including finance, human resources and administration.

   This includes periodic meetings by managers to assess and consider/take decisions, which are then communicated to the relevant Team members; fundraising and interacting with donors concerning income administration; defining Terms of References, drafting contracts and disbursing stipends for all team members, including to the Independent Review Panel.

2. ISRA network expansion and management.

   2.1. Data acquisition and ISRA identification. Workshop venue selection, logistics and admin. Workshop participant selection, invitations. Pre-workshop documents and GIS. Call for pAoI submission. Analysis of data appraisal forms. Production of pAoI shapefiles. Inventory of Knowledge. Workshop process facilitation. Workshop GIS support provision. Post-workshop activities (coordination, finalisation and sharing of cISRA templates, master spreadsheet and related GIS refinement, preparation of workshop outcome to be transmitted to IRP, coordination of cISRA review process, interaction with Review Panel and PoC to facilitate the finalisation of ISRAs, revision of cISRA templates, drafting of summaries, portfolios and fact sheets); preliminary report issued after the workshop before the finalisation of the review posted on the website; development of the appropriate communication as a news item on the website, announced to partners and SSG members, and on social media posted on the website; after review, a final report issued with the workshop's final results, replacing the preliminary report; communication and posting follows the same process.

   2.2. ISRA data management, analysis and storage. Archive designed, created and maintained. ISRA GIS and metadata updated, analysed and archived. ISRA master spreadsheet database regularly updated.

2.3. Public provision of the ISRA tool: strategic communications, including website design and management. Website content. ISRA GIS data adapted for e-Atlas display posted and maintained. ISRA fact sheets prepared, reviewed, updated and posted. Shapefile requests, commercial and non-commercial, addressed. Scientific publication support. Presentations to conferences and webinars. Social media, public relations, communicating to the public and policy makers.

3. ISRA uptake in the conservation arena (see next section).

4. Team and ISRA policy developed and communicated to the outside.

ISRA presentations and reporting to Intergovernmental organisations, governments, etc.; liaising with the relevant IUCN bodies and officers, including the SSG, and including the preparation of the end-of-year reports; contacts with regional coordinators and stimulation of regional group activities.

ISRA UPTAKE IN THE CONSERVATION ARENA AND THE REAL WORLD

Ultimately, ISRAs are identified to fulfil the following goal: Ensure the ranges of all known shark, ray, and chimaera species are globally investigated, so that ISRAs are identified within such ranges and mapped, to provide decision-makers and other relevant stakeholders with actionable knowledge necessary to the development of adequate systematic place-based conservation. There is no point going through the considerable trouble of placing ISRA on the world map if they are not put to use as a tool for place-based shark conservation, e.g., in MPAs, Marine Spatial Planning, and through fisheries regulations in relation to spatial and temporal measures.

It is anticipated that the ISRA Team and the wider IUCN SSC Shark Specialist Group will engage regularly in communicating the existence of ISRAs, nature and applicability in the main scientific fora (e.g., conferences, scientific publications, webinars, including IMPAC), as well as at the relevant international policy events (CMS and Shark MoU meetings, CBD initiatives, COFI, Regional Seas Organisations, and Regional Fisheries Management Organizations). At a minimum, the information provided by the ISRA process can be accessed through the online consultation of the ISRA e-Atlas and the searchable and downloadable database. For more in-depth use, the ISRA spatial layers should be made available upon request to be used by industry regulators and ocean business stakeholders to determine where their activities may overlap with important shark, ray, and chimaera habitat. It is recommended to avoid including cISRAs and AoI in the package made available. Industry initiatives such as the Proteus Partnership and the Integrated Biodiversity Assessment Tool (IBAT) enable users to make informed decisions in policy and practice using such specialised georeferenced information.

In many cases, the organisation of implementation planning exercises in specific locations hosting one or more ISRAs, engaging with a range of stakeholders including government and management bodies, can have significant demonstrative value and help to test the tool in real-world situations.

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IUCN SSC
Shark Specialist Group

Federal Ministry
for the Environment, Nature Conservation,
Nuclear Safety and Consumer Protection

IUCN

save our seas
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re:wild

[3] Names and contacts at https://www.marinemammalhabitat.org/contacts/

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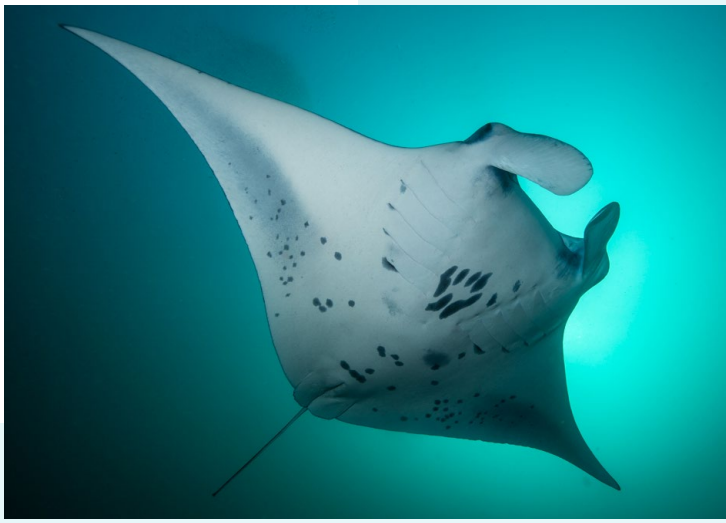

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