

An underwater photograph of a kelp forest. The scene is dominated by large, dark green kelp fronds that sway in the water. In the foreground and midground, there are several large, white, fuzzy sponges and clusters of yellowish-orange sea urchins. The water is a deep blue, and the overall atmosphere is serene and natural.

Monitoring and management effectiveness in Scotland's Marine Protected Areas

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MPA Manager - NatureScot
March 2023

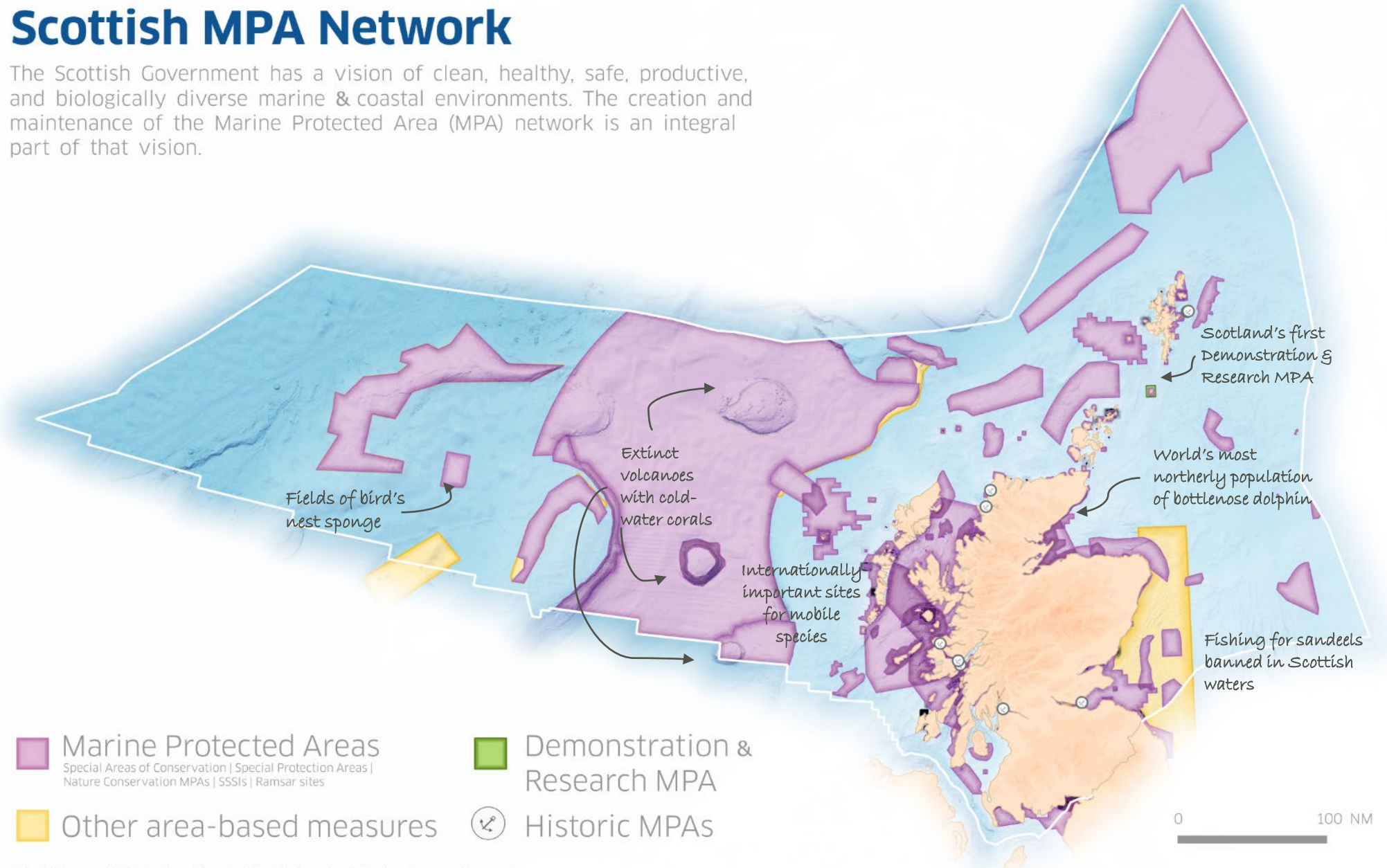


About us...

- Scotland's nature agency
- Responsible to and funded by Scottish Government
- Protect.Restore.Value
- Executive role and Advisory Role

Scottish MPA Network

The Scottish Government has a vision of clean, healthy, safe, productive, and biologically diverse marine & coastal environments. The creation and maintenance of the Marine Protected Area (MPA) network is an integral part of that vision.



What does the MPA network look like?



Monitoring the Scottish MPA network

Why?

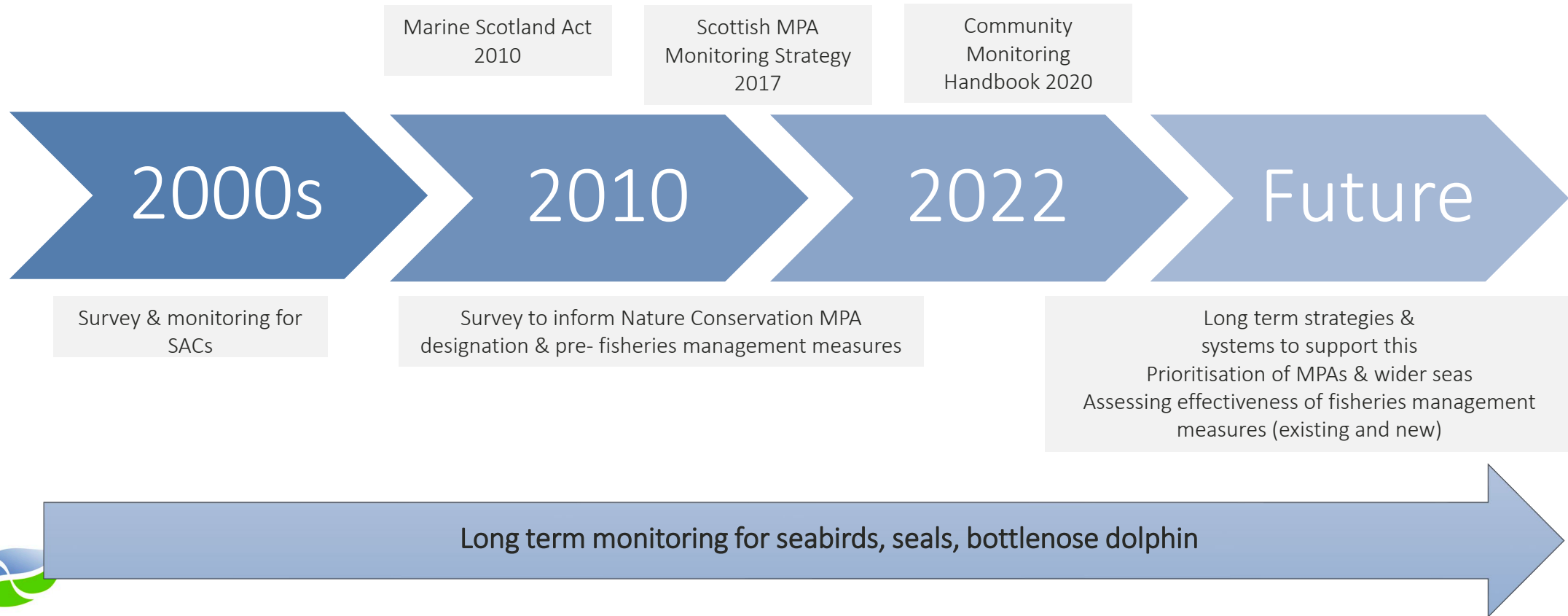
- Setting of conservation objectives , condition assessment & trends over time
- Health and change in the wider marine ecosystem
- Assess the effectiveness of management measures
- Reporting for national & obligations

Who ?

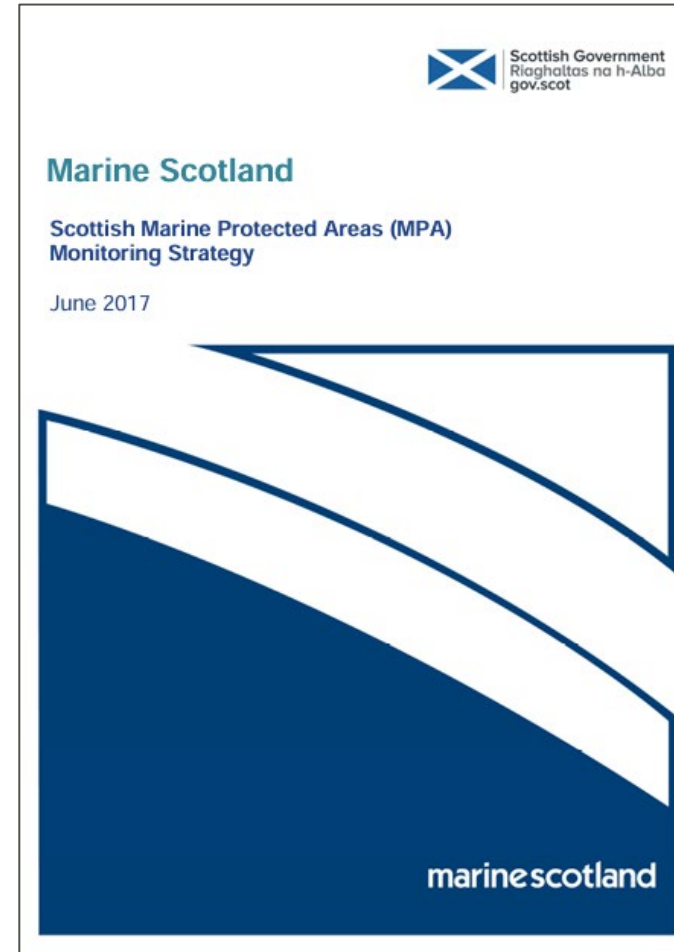
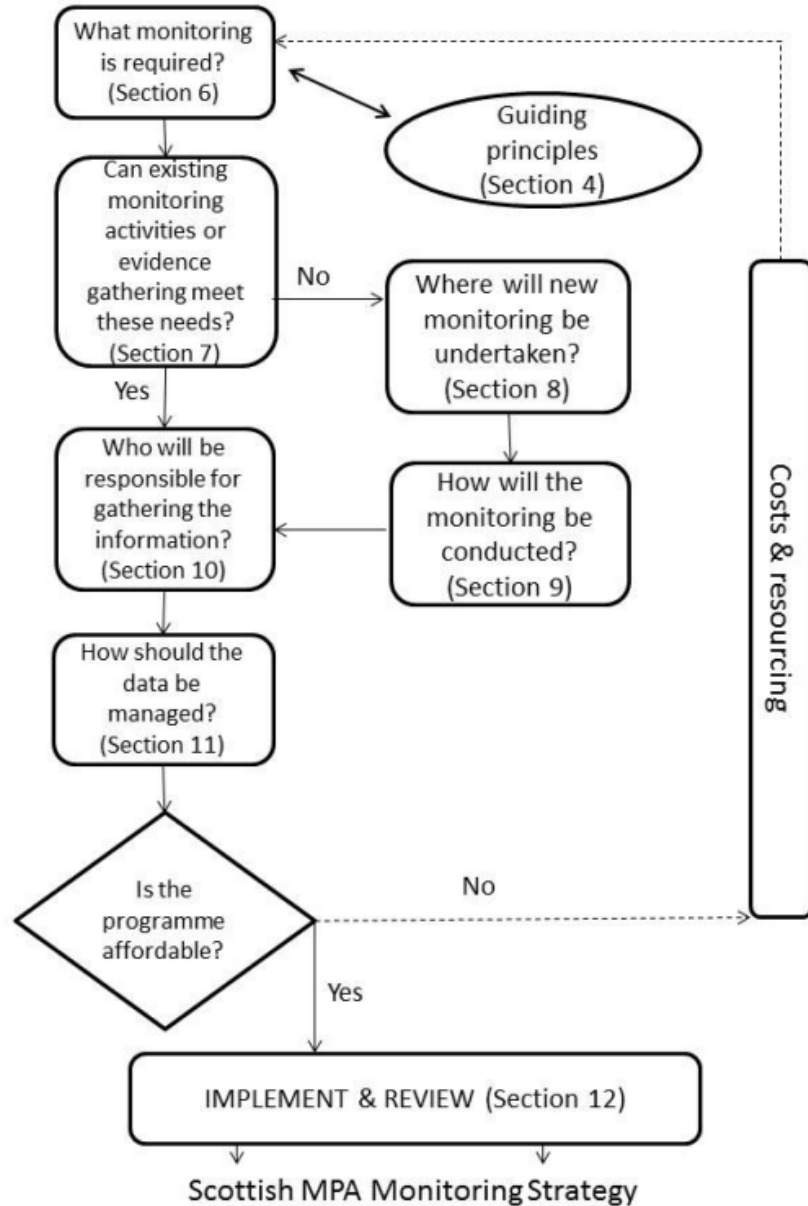
- NatureScot & contractors
- Scottish Government – Marine Science team
- Scottish Environment Protection Agency – water quality
- Universities
- Environmental Organisations
- Communities/public



History of monitoring MPAs in Scotland



Scottish MPA Monitoring Strategy 2017



Scottish MPA Monitoring Strategy

Guiding principles

- Consider all opportunities for gathering & accessing evidence.
- Monitoring of features outside MPAs will be relevant.
- Balance spend on MPA monitoring vs. activities that can help improve conservation status, knowledge of feature distribution & status outside the network
- Sampling of other habitats within MPAs may be cost-effective for helping to meet wider assessment needs.
- A risk-based approach for prioritising monitoring activities.
- Routine monitoring will not be planned in every MPA.
- Long-term monitoring will encompass specific features / sites only.
- Appropriate standards and management systems

Feature prioritisation

- Species / habitat at high risk of negative impact
- A feature for which Scotland has a special responsibility
- Ecosystem services - functional importance

Site prioritisation

- Species / habitats at high risk of negative impact
- Site management characteristics
- Capturing geographic range & ecological variation
- Linkages
- Qualities of existing data
- Local community / stakeholder interest
- Logistics - ease of access / cost

Scottish MPA Monitoring Strategy – types of survey

Type 0

Monitoring to determine continued presence of a feature in a site

Type 1

Monitoring designed to assess the condition of a protected feature at a site

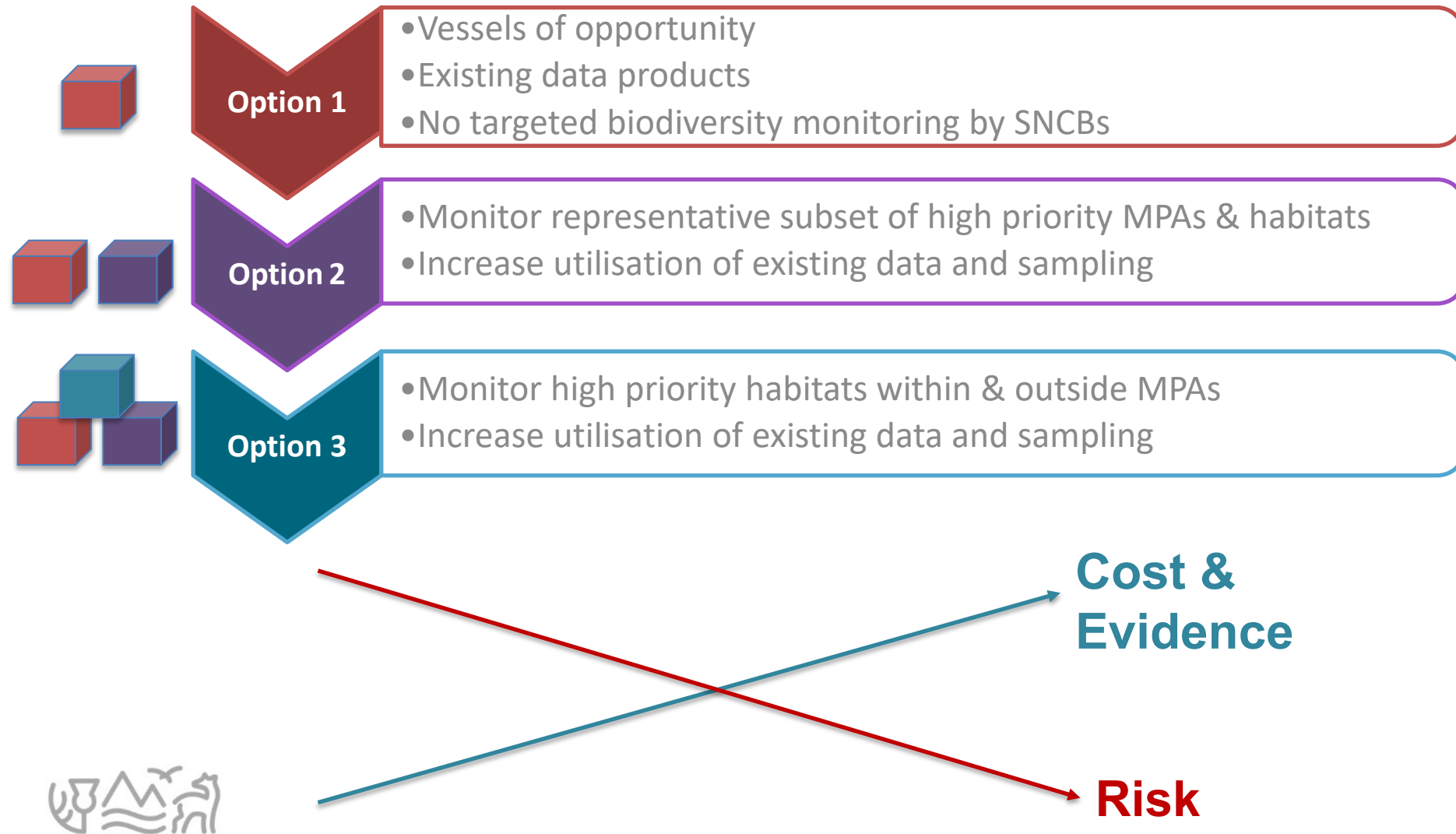
Type 2

Monitoring or analyses undertaken to explore pressure-state relationships

Type 3

Monitoring or analyses undertaken to explore the effectiveness of MPA management measures

Example 'options'



Examples of what and how we monitor (*longer term)



Habitats

How: Vessel & shore surveys; Diver & Snorkel; Drop down video, ROV, Drones

Who: Nature agencies, Government, Academia, contractors

Priorities: MPAs and Priority Marine Features outside sites with fisheries management measures



Marine birds*

How: colony monitoring, population census; seabirds @sea - surveyors, Drones, vessels

Who: Nature agencies, Government, eNGOS, Industry

Priorities: >10 years since survey, HPAI and Offshore)



Cetaceans*

How: Photo ID, visual and acoustic sea surveys - site specific or national/international

Who: Gov and Nature agency funding with eNGOs, industry, academia

Priorities: West coast expert monitoring group; bottlenose dolphin plan



Seals*

How: Aerial (& some vessel) counts during breeding & moult (individuals vs. pups for harbour & greys)

Who: Sea Mammal Research Unit, Special Committee on Seals, industry

Priorities: seal declines



Fish & cephalopods

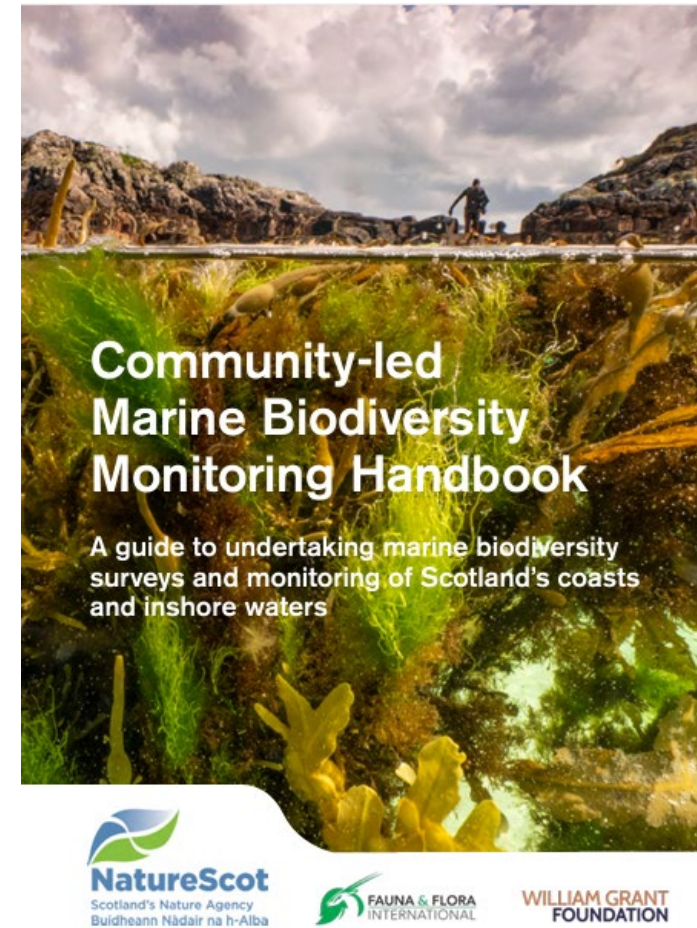
How: surveys for fish species (stock), BRUV, tagging (recapture, acoustic, satellite), photo id

Who: Nature agencies, Government, academia

Priorities: management measure effectiveness, ecology

Citizen science & Industry data

- Established citizen science e.g. SeaSearch, Orca, Shorewatch, NGOs
- Community-led marine biodiversity monitoring
 - Part-time member of staff, Guidance (handbook), training & small equipment fund
 - Plan and prepare for a marine survey & methods to follow
- Industry data
 - Baseline surveys,
 - Monitoring of impacts
 - Fishing data
- Biodiversity data in a consistent format that is scientifically useful
- Improved data flows to our databases



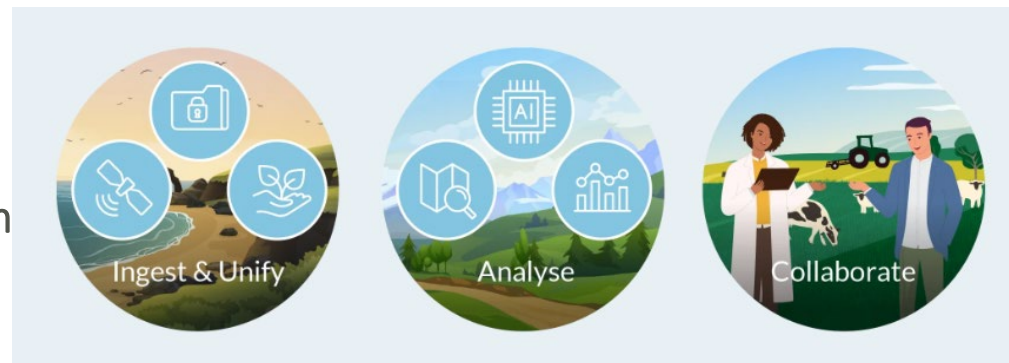
Future monitoring – ecosystem health, other areas and new systems

Monitoring to inform Ecosystem Health

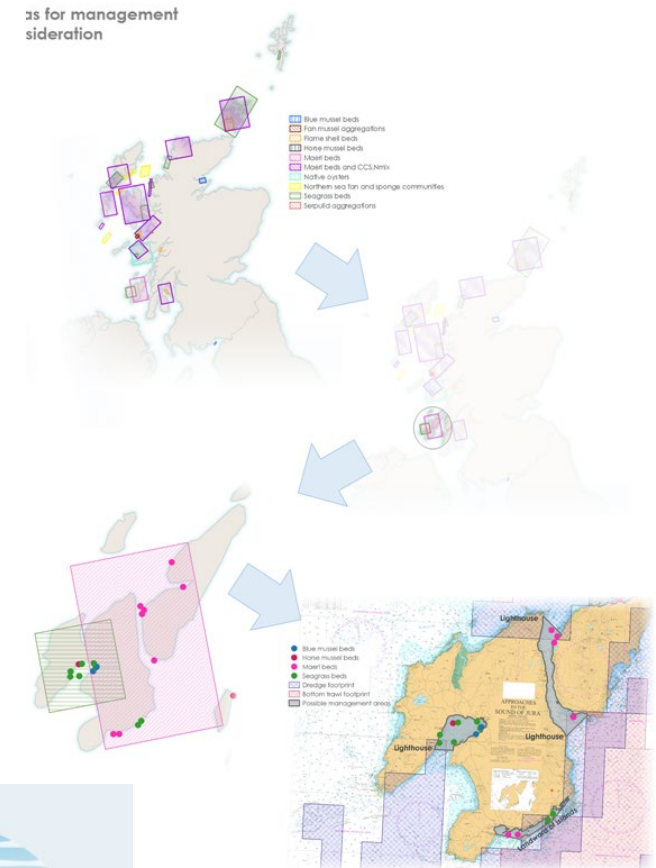
- Attributes that can inform management
- Attributes that are common to multiple features
- Threats and pressures that occur across the environment
- Best use of existing data and attributes – refinement
- Innovative technology

Pilots planned terrestrial & marine

InformedINSIGHT
Site Condition
Monitoring system



Fisheries management measures for important coastal biodiversity areas (PMFs)



Activity monitoring

Fishing

Currently Vessel Monitoring >12m and Logbooks

New - Remote Vessel Monitoring all pelagic and scallop

Commitment to considering REM across rest of fleet e.g. other demersal gear >12 m

Water Quality??



Roles in MPA management

Marine Directorate (of Scottish Government)

Responsible for managing Scotland's seas. Receive formal advice from NatureScot and JNCC that is used to help inform management decisions. They are also the lead authority for monitoring compliance with fisheries management measures and issuing marine licences for activities that require one.

NatureScot

Statutory responsibility to provide advice to relevant authorities on activities or operations that could cause potential impacts to protected features and conservation objectives and management of MPAs (up to 12 nautical miles).

JNCC

Provides guidance and advice on MPAs out with the territorial waters (beyond 12 nautical miles).

Relevant and competent authorities

They ensure that the activities they regulate, permit or license do not risk the achievement of the Conservation Objectives set for an MPA

Management of MPAs




MPAs are multi-use sites and activities are still allowed to take place as long they are compatible with the MPA achieving its conservation objectives.







Management is delivered through a combination of tools including:

- Fisheries management measures
- Licensing/consenting some marine activities
- Codes of good practice

Assessment/Reporting on management effectiveness

Scottish MPA Report to Parliament

Symbol	Meaning	Application in terms of implementation of measures and achievement of objectives
	Yes	<ul style="list-style-type: none"> Specific fisheries measures are implemented. Other licensable activities controlled through regulatory processes. Protected features are improving in condition or have achieved conservation objectives.
	Partial	<ul style="list-style-type: none"> Specific fisheries measures are in the process of being implemented. Other licensable activities controlled through regulatory processes. Some protected features are improving in condition or have achieved conservation objectives. Others are not improving in condition or status is unknown.
	Unknown	<ul style="list-style-type: none"> It is uncertain if there is sufficient management in place to address identified threats or pressures. There is not sufficient data to determine if there is progress towards achieving the conservation objectives.

MPA name	Objectives (COs)	Are measures in place	Have COs have been achieved?	Comments including any further steps required
Norwegian Boundary Sediment Plain	Conserve - all features			The implementation of fisheries management measures is expected to improve the conservation status of the protected features. At present, it is unknown if the conservation objectives for Ocean quahog aggregations are being achieved.
Noss Head	Conserve - horse mussel beds			Required measures were implemented in 2016 and the features are considered to be achieving their objectives.
Papa Westray	Conserve - all features			Black guillemot declining since site designation. The implementation of fisheries management measures should improve feature status. Geodiversity features achieving their objectives.

OSPAR Management Effectiveness

Is the MPA management documented?

Are the measures to achieve the conservation objectives being implemented?

Is monitoring in place to assess if measures are working?

Is the MPA moving towards or has it reached its conservation objectives?

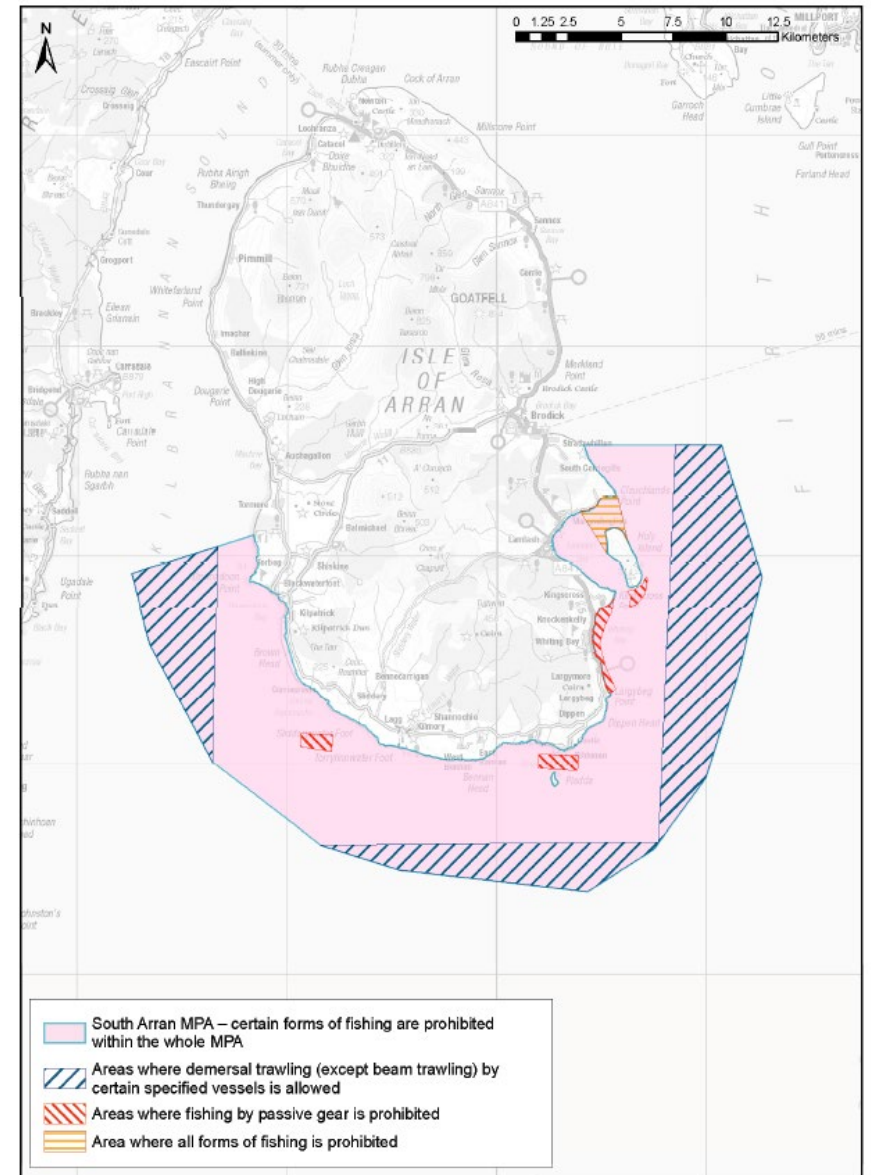
NatureScot Research Report 1292

Towards understanding the effectiveness of management of fishing activity of relevance to Scotland's MPAs.

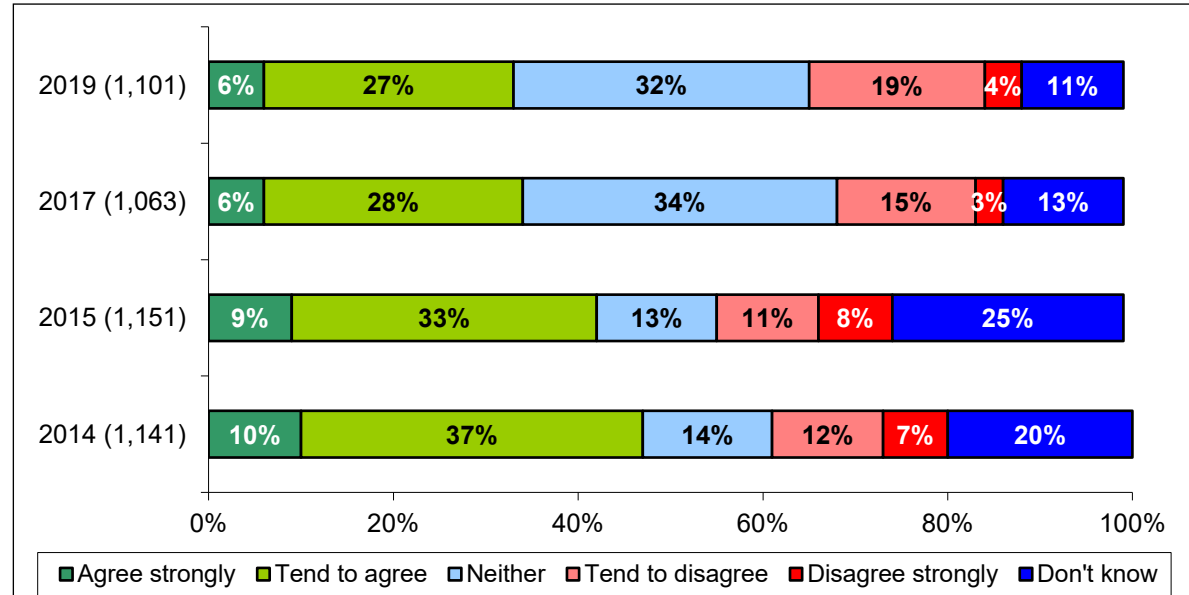
Are fisheries management measures making a difference?

South Arran MPA and Lamlash Bay No Take Zone

- 2008 NTZ established - prohibition on the removal of all fish and shellfish.
- 2012 MPA designated for marine habitats e.g. maerl beds, seagrass beds, burrowed mud
- 2015 - Fisheries management measures in place
- Fisheries management measures 2015 – various restrictions
- Enforcement supported by local community group (COAST)
- NTZ research on commercial species e.g.
 - Older and larger scallops inside the NTZ and increases in the density
 - Mean size of lobsters and higher catch rates in NTZ
 - Results for other species like velvet and brown crab inconclusive
 - Benthic species richness NTZ - nearly double that of the unprotected sites (open to dredging) & % cover higher
- More MPA studies to come ...



Looking ahead ... Are Scotland's seas well managed?



Reduction in those that agree and increase in those that are unsure & disagreeing - suggesting a lack of awareness, disengagement?

Need for an open, transparent mechanism for communicating MPA effectiveness

Scottish Biodiversity Strategy (new) - action to development an adaptive management framework for MPAs by 2028

Thoughts on an adaptive management framework

Working well	Needs further work
Review of network every 6 years through report to Parliament. OSPAR reporting, particularly on management effectiveness.	Lack of adaptive management cycle/process (including effectiveness evaluation, reporting and recommendations) for Scotland.
Development of damage reporting process in NatureScot.	Process and feedback between NatureScot and MS Policy and Compliance teams.
Raising awareness of management in place for MPAs via MarPAMM project	Wider engagement and awareness in communities and stakeholders of management and reporting.

The adaptive management cycle



Source: DPI/PWE 2014 after Jones 2005, 2009

Working well	Needs further work
Developing Conservation and Management Advice documents. Providing management advice for activities.	Complete documents across MPAs. Sensitivity information for MPA features with respect to climate change. Access to activity data to inform our advice.
Improving understanding of benefits of MPAs and community & sector aspirations/issues (MarPAMM)	Developing agreed objectives/outcomes with community and sectors elsewhere
Indicators developed for Scotland's Marine Assessment	Improved synergy and agreement across performance indicators required for different legislative requirements.

Working well	Needs further work
Publication of Scottish MPA monitoring strategy and establishment of monitoring areas in relation to fisheries management.	Forward planning of monitoring cycles for specific MPA monitoring in other areas with resources, including consideration of wider ecosystem indicators for inclusion.
Cross organisation working to deliver monitoring and increasing community capacity.	Marine Recorder Online (further development) Access to survey data from industry Data flows to take in and QA.
Implementation of fisheries management for some MPAs.	Implementation of fisheries management for remaining MPAs.