Descriptor	Commission_Decision_GES_criteria	Commission_Decision_indicator_or_Indicator-class	Component	Proposed_Indicator_Name	Indicator_Metric	Proposed_Target	Target_relevance	Baseline_used	New_or_existing_target	development_stage_of_indicator_and_target	Source	Additional_monitoring_required	Existing_Monitoring_Scheme_or_data_source	Baseline-setting_approach	Target-setting_approach	Evidence-base_for_indicator_DETAILS
1	1.1 Species distribution	1.1.1 Distributional range	Birds	Distributional range of breeding seabirds	Number /location of breeding seabirds colonies	Compared to baseline range, no loss of species from any existing administrative areas (e.g. county in England, Wales & Northern Ireland; and regions in Scotland)	Applicable to all breeding seabird species in all relevant functional groups	set for each species based on expert judgement of when population distribution and population size were considered to be least negatively impacted by human activities.	New Target	defined by 2012 & operational by 2014		Need to ensure regular complete breeding census (every 10-15 years)	Seabird Monitoring Programme & Breeding Bird Atlases of Britain and Ireland	B) Baseline set in the past	Target set as deviation from baseline	Past performance of previous surveys (e.g. Mitchell et al. (2004) *Seabird Populations of Britain & Ireland.* T & ADPoyser, 511pp.)
1	1.1 Species distribution	1.1.1 Distributional range	Birds	Distributional range of non-breeding waterbirds	Number /location of inshore sites occupied by non-breeding waterbird species	Range relative to baseline has not decreased	Applicable to all non-breeding waterbird species in inshore waters (two functional groups inshore benthic feeders, inshore pelagic feeders, plus roosting gulls)	set at the beginning of the time series.	New Target	operational by 2018		Monitoring of inshore aggregations of seaduck, divers & grebes by UK Seabird & Cetacean Monitoring Project (under development). Probably requires increase in frequency of Winter Gull Roost Survey from decadal to annual.	Winter Gull Roost Survey	B) Baseline set in the past	Target set as deviation from baseline	No time series data yet available.
1	1.1 Species distribution	1.1.1 Distributional range	Birds	Distributional range of non-breeding shorebirds	Number /location of coastal 10km squares occupied by non-breeding shorebird species	Compared to baseline range, no loss of species from any existing administrative areas (e.g. county in England, Wales & Northern Ireland; and regions in Scotland)	Applicable to all species of intertidal benthic feeders (i.e. non-breeding shorebirds)	set for each species based on expert judgement of when population distribution and population size were considered to be least negatively impacted by human activities.	New Target	defined by 2012 & operational by 2014		Gap filling for Wetland Bird Survey and Non-Estuarine Wader Survey, and increase frequency of the latter.	Wetland Bird Survey, Non-Estuarine Wader Survey & Breeding Bird Atlases of Britain and Ireland	B) Baseline set in the past	Target set as deviation from baseline	Wetland Bird Surveys Annual reports - see http://www.bto.org/volunteer-surveys/webs/publications/annual-reports. Indicator needs further work to define: surveys are known to have gaps. Need GIS file of MSFD area to select relevant data for non-transitional waters
1	1.1 Species distribution	1.1.1 Distributional range	Birds	Distributional range of coastal-breeding waterbirds	Number /location of coastal 10km squares occupied by breeding waterbird species	Compared to baseline range, no loss of species from any existing administrative areas (e.g. county in England, Wales & Northern Ireland; and regions in Scotland)	Applicable to all species of waterbird breeding close to the shoreline and dependant on intertidal and inshore areas for feeding	set for each species based on expert judgement of when population distribution and population size were considered to be least negatively impacted by human activities.	New Target	defined by 2012 & operational by 2014		Gap filling for Wetland Bird Survey and Non-Estuarine Wader Survey, and increase frequency of the latter.	Wetland Bird Survey, Non-Estuarine Wader Survey & Bird Atlases of Britain and Ireland	B) Baseline set in the past	Target set as deviation from baseline	Further work is needed to define indicator: need GIS file of MSFD area to select relevant data for non-transitional waters.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Birds	Distributional pattern of breeding seabirds	Number /location of breeding seabirds colonies	Distribution range within each county/region has not changed by more than +/- 10%	Applicable to all breeding seabird species in all relevant functional groups	set for each species based on expert judgement of when population distribution and population size were considered to be least impacted by human activities.	New Target	defined by 2012 & operational by 2014		Need to ensure regular complete breeding census (every 10-15 years)	Wetland Bird Survey, Non-Estuarine Wader Survey & Bird Atlases of Britain and Ireland	B) Baseline set in the past	Target set as deviation from baseline	Past performance of previous surveys (e.g. Mitchell et al. (2004) *Seabird Populations of Britain & Ireland.* T & ADPoyser, 511pp.)
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Birds	Distributional pattern of non-breeding waterbirds	% of modelled 1km squares with loss of habitat (displacement)	within each UK regional sea < X% modelled 1km square with loss of habitat (displacement)	Applicable to all non-breeding waterbird species in inshore waters (two functional groups inshore benthic feeders, inshore pelagic feeders, plus roosting gulls)	set for each species based on expert judgement of when population distribution and population size were considered to be least impacted by human activities.	New Target	operational by 2018		Monitoring of inshore aggregations of seaduck, divers & grebes by UK Seabird & Cetacean Monitoring Project (under development). Probably requires increase in frequency of Winter Gull Roost Survey from decadal to annual.	Winter Gull Roost Survey	B) Baseline set in the past	Target set as deviation from baseline	
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Birds	Distributional pattern of seabirds at sea	% of modelled 1km squares with loss of habitat (displacement)	within each UK regional sea < X% modelled 1km square with loss of habitat (displacement)	Applicable to all seabird species in all functional groups	set for each species based on expert judgement of when population distribution and population size were considered to be least impacted by human activities.	New Target	operational by 2018		Monitoring of seabirds at sea by the UK Seabird & Cetacean Monitoring Project (under development)		B) Baseline set in the past	Target set as deviation from baseline	No time series data yet available.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Birds	Distributional pattern of non-breeding shorebirds	Number /location of coastal 10km squares occupied by non-breeding shorebird species	Distribution range within each county/region has not changed by more than +/- 10%	Applicable to all species of intertidal benthic feeders (i.e. non-breeding shorebirds)	set for each species based on expert judgement of when population distribution and population size were considered to be least impacted by human activities.	New Target	defined by 2012 & operational by 2014		Gap filling for Wetland Bird Survey and Non-Estuarine Wader Survey, and increase frequency of the latter.	Wetland Bird Survey, Non-Estuarine Wader Survey & Bird Atlases of Britain and Ireland	B) Baseline set in the past	Target set as deviation from baseline	Wetland Bird Surveys Annual reports - see http://www.bto.org/volunteer-surveys/webs/publications/annual-reports. Indicator needs further work to define: surveys are known to have gaps. Need GIS file of MSFD area to select relevant data for non-transitional waters
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Birds	Distributional pattern of coastal-breeding waterbirds	Number /location of coastal 10km squares occupied by breeding waterbird species	Distribution range within each county/region has not changed by more than +/- 10%	Applicable to all species of waterbird breeding close to the shoreline and dependant on intertidal and inshore areas for feeding	set for each species based on expert judgement of when population distribution and population size were considered to be least impacted by human activities.	New Target	defined by 2012 & operational by 2014		Gap filling for Wetland Bird Survey and Non-Estuarine Wader Survey, and increase frequency of the latter.	Wetland Bird Survey, Non-Estuarine Wader Survey & Bird Atlases of Britain and Ireland	B) Baseline set in the past	Target set as deviation from baseline	Further work is needed to define indicator: need GIS file of MSFD area to select relevant data for non-transitional waters.
1	1.2 Population size	1.2.1 Population abundance	Birds	Species-specific trends in relative breeding abundance	annual abundance of breeding birds expressed as a percentage of baseline	Species-specific annual abundance should be more than 70% of the baseline in marine bird species that lay more than one egg	Applicable to marine bird species from all functional groups, that lay more than one egg and where population size is monitored regularly.	baseline set for each species based on expert judgement of when population levels were considered to be least impacted by human activities;	Existing Target	defined by 2012 & operational by 2014	OSPAR	Existing schemes for breeding aggregations of seabird, which already delivers species specific trends that can be used in the indicator. New indicators could be produced for waterbird species breeding close to the shoreline and dependant on intertidal and inshore areas for feeding , but would require gap filling for Wetland Bird Survey and Non-Estuarine Wader Survey, and increase frequency of the latter.	Seabird Monitoring Programme Wetland Bird Survey, Non-Estuarine Wader Survey & Bird Atlases of Britain and Ireland	B) Baseline set in the past	Target set as deviation from baseline	Cook et al. (2011 - Mar Ecol Prog Ser, In press) looked accuracy and power to detect change of species specific trends in breeding seabird numbers produced by the Seabird Monitoring Programme. They assessed accuracy and power for trends at scales of UK, OSPAR regions and UK Regional Seas.
1	1.2 Population size	1.2.1 Population abundance	Birds	Species-specific trends in relative breeding abundance	annual abundance of breeding birds expressed as a percentage of baseline	Species-specific annual abundance should be more than 80% of the baseline in marine bird species that lay only one egg	Applicable to marine bird species from all functional groups, that lay one egg and where population size is monitored regularly.	baseline set for each species based on expert judgement of when population levels were considered to be least impacted by human activities;	Existing Target	defined by 2012 & operational by 2014	OSPAR	Existing schemes for breeding aggregations of seabird, which already delivers species specific trends that can be used in the indicator.	Seabird Monitoring Programme	B) Baseline set in the past	Target set as deviation from baseline	Cook et al. (2011 - Mar Ecol Prog Ser, In press) looked accuracy and power to detect change of species specific trends in breeding seabird numbers produced by the Seabird Monitoring Programme. They assessed accuracy and power for trends at scales of UK, OSPAR regions and UK Regional Seas.
2	1.2 Population size	1.2.1 Population abundance	Birds	Species-specific trends in relative breeding abundance	annual abundance of breeding birds expressed as a percentage of baseline	Species-specific annual abundance should be less than 130% of the baseline in marine bird species that depredate other birds and benefit from anthropogenic food sources.	Applicable to Great Skua, Great Black-backed Gull, Herring Gull and Lesser Black-backed Gull	baseline set for each species based on expert judgement of when population levels were considered to be least impacted by human activities;	Existing Target	defined by 2012 & operational by 2014	OSPAR	Existing schemes for breeding aggregations of seabird, which already delivers species specific trends that can be used in the indicator.	Seabird Monitoring Programme	B) Baseline set in the past	Target set as deviation from baseline	Cook et al. (2011 - Mar Ecol Prog Ser, In press) looked accuracy and power to detect change of species specific trends in breeding seabird numbers produced by the Seabird Monitoring Programme. They assessed accuracy and power for trends at scales of UK, OSPAR regions and UK Regional Seas.
1	1.2 Population size	1.2.1 Population abundance	Birds	Species-specific trends in relative non-breeding abundance	annual abundance of non-breeding birds expressed as a percentage of baseline	Species specific annual abundance is within +/ x% of the baseline. (Target levels to be set once a monitoring programme is in Place)	Potentially applicable to all non-breeding seabird and waterbird species in all functional groups.	Species-specific abundance at the start of any new monitoring programme.	New Target	operational by 2018		Existing schemes for non-breeding aggregations of shorebirds, which already delivers species specific trends that can be used in the indicator. Additional monitoring of non-breeding aggregations of divers, seaduck and offshore seabirds required. Monitoring of inshore benthic feeders (seaduck) UK Seabird & Cetacean Monitoring Project (under development).	Wetland Bird Survey, NEWS, WinGS	B) Baseline set in the past	Target set as deviation from baseline	a) non-breeding aggregations of shorebirds: Wetland Bird Surveys Annual reports - see http://www.bto.org/volunteer-surveys/webs/publications/annual-reports. Indicator needs further work to define: surveys are known to have gaps. Need GIS file of MSFD area to select relevant data for non-transitional waters b) non-breeding aggregations of seaduck and of divers: existing monitoring provides partial trends at individual sites, but not yet at UK scale. c) Offshore monitoring of seabirds under development.

1	1.3 Population condition	1.3.1 Population demographic characteristics	Birds	Annual breeding success of kittiwakes	annual mean breeding success (no. offspring per pair) of kittiwake at sampled colonies	Annual breeding success is not significantly different, statistically, from the level expected in the prevailing climatic conditions (defined by local SST in winter 2 years previous winter) in five years out of six.	Kittiwakes are considered amongst most sensitive of UK breeding seabirds to changes in food availability. Indicator will be applicable to other species that rely on small shoaling fish (e.g. sandeels).	Regression of annual Kittiwake breeding success against local SST (in winter 2 years previous winter).	New Target	defined by 2012 & operational by 2014		None	Seabird Monitoring Programme	Aiii) Modelling of reference conditions	Target set as deviation from baseline	Furness & Tasker (2000 · Mar Ecol Prog Ser 202: 253–264) applied criteria to identify species that are most sensitive to changes in food supply and found kittiwake to be the most sensitive seabird species breeding in the UK. Cook et al. (2011 - Mar Ecol Prog Ser, In press) looked accuracy and power to detect change of species specific trends in seabird breeding success produced by the Seabird Monitoring Programme. They assessed accuracy and power for trends at scales of UK, OSPAR regions and UK Regional Seas.
1	1.3 Population condition	1.3.1 Population demographic characteristics	Birds	Breeding failure of seabird species sensitive to food availability	Percentage of colonies failing (breeding success < 0.1 chicks per nest) per year	Less than 5-15% of colonies failing per year in more than three out of six years	Applicable to breeding seabird species that are notably sensitive to food availability		New Target	defined by 2012 & operational by 2014		None	Seabird Monitoring Programme	NA	Absolute Value (target not set at baseline)	Species for this indicator should be sensitive to changes in food supply -see Furness & Tasker (2000 - Mar Ecol Prog Ser 202: 253–264) who applied criteria to identify the most sensitive species. Cook et al. (2011 - Mar Ecol Prog Ser, In press) looked accuracy and power to detect change of species specific trends in seabird breeding success produced by the Seabird Monitoring Programme. They assessed accuracy and power for trends at scales of UK, OSPAR regions and UK Regional Seas.
1	1.3 Population condition	1.3.1 Population demographic characteristics	Birds	Seabird adult survival	Annual adult survival rate	Estimated annual survival should not, as a result of anthropogenic mortality, fall below levels that would prevent targets for 1.2 population size from being achieved.	Applicable to breeding seabird species that suffer increased mortality as a result of anthropogenic pressure (e.g. By catch, persecution, pollution etc)	Modelled from sustainable population level to meet targets under 1.2	New Target	operational by 2018		Current JNCC/BTO project to scope the required expansion of survival monitoring within the Seabird Monitoring Programme and UK & Ireland Ringing Scheme.	Seabird Monitoring Programme and UK & Ireland Ringing Scheme	Aiii) Modelling of reference conditions	Absolute Value (target not set at baseline)	Further analyses required to determine for which species, annual survival rates can be estimated with greatest accuracy,
1	1.3 Population condition	Pressure indicator	Birds	Non-native mammal presence on island seabird colonies	Number key island colonies where non-native mammal species are present	No non-native mammals on key island seabird colonies	All key islands identified by Ratcliffe at al. (2009 - Ibis 151, 699–708).		New Target	defined by 2012 & operational by 2014		Monitoring required at 16 rat-free key colonies identified in Ratcliffe at al. (2009 - Ibis 151, 699–708) and subsequently at any other island colony where rats or other non-native mammals are eradicated.	All but two colonies are SPAs for burrow-nesting seabirds but only 4 are currently monitored for rat presence.	NA	Absolute Value (target not set at baseline)	Priority islands listed in Ratcliffe at al. (2009 - Ibis 151, 699–708).
1	1.3 Population condition	Pressure indicator	Birds	Mortality of seabirds from fishing (bycatch) and aquaculture	Number of seabirds killed by commercial fishing and by aquaculture	Estimated mortality as a result of fishing bycatch and aquaculture entanglement does not exceed levels that would prevent targets for 1.2 population size from being achieved.	All marine birds susceptible to being caught and killed by commercial fishing and by being entangled and killed aquaculture.	Modelled from sustainable population level to meet targets under 1.2	New Target	operational by 2018		Expansion of monitoring on commercial vessels (spatial and frequency) and at fish farms	seabirds are recorded by the Cetacean Bycatch Monitoring Scheme, but the survey is not designed to systematically measure seabird bycatch.	Aiii) Modelling of reference conditions	Target set as deviation from baseline	Northern fulmars appear to be particularly susceptible to entanglement in offshore fishing nets and taking the baited hooks of long-line fisheries , (Dunn et al. 2001. The impact of long-line fishing on seabirds in the north-east Atlantic: recommendations for reducing mortality. RSPB/JNCC Report) whilst Auks can become trapped in inshore salmon nets (Murray et al. 1994 Biological Conservation 70: 251-256). Robust quantitative data are currently lacking on the numbers of seabirds caught by commercial fisheries. The UK cetacean Bycatch Monitoring Scheme does make ad hoc records of seabird, but concentrates on fishing methods that have a high risk of catching cetaceans (e.g. bottom-set static gill nets), which do not have a high risk of catching seabirds. Long-lining and nets set near the surface (e.g. drift nets) are more likely to catch seabirds.
4	4.1 Productivity (production per unit biomass) of key species or trophic groups	4.1.1 Performance of key predator species using their production per unit biomass (productivity)	Birds	Annual breeding success of kittiwakes	annual mean breeding success (no. offspring per pair) of kittiwake at sampled colonies	Annual breeding success is not significantly different, statistically, from the level expected in the prevailing climatic conditions (defined by local SST in winter 2 years previous winter) in five years out of six.	Kittiwakes are considered amongst most sensitive of UK breeding seabirds to changes in food availability. Indicator will be applicable to other species that rely on small shoaling fish (e.g. sandeels).	Regression of annual Kittiwake breeding success against local SST (in winter 2 years previous winter).	New Target	defined by 2012 & operational by 2014		None	Seabird Monitoring Programme	Aiii) Modelling of reference conditions	Target set as deviation from baseline	Furness & Tasker (2000 · Mar Ecol Prog Ser 202: 253–264) applied criteria to identify species that are most sensitive to changes in food supply and found kittiwake to be the most sensitive seabird species breeding in the UK. Cook et al. (2011 - Mar Ecol Prog Ser, In press) looked accuracy and power to detect change of species specific trends in seabird breeding success produced by the Seabird Monitoring Programme. They assessed accuracy and power for trends at scales of UK, OSPAR regions and UK Regional Seas.
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Birds	Species-specific trends in relative breeding abundance	annual abundance of breeding birds expressed as a percentage of baseline	Species-specific annual abundance should be more than 70% of the baseline in marine bird species that lay more than one egg	Applicable to marine bird species from all functional groups, that lay more than one egg and where population size is monitored regularly.	baseline set for each species based on expert judgement of when population levels were considered to be least impacted by human activities;	Existing Target	defined by 2012 & operational by 2014	OSPAR	Existing schemes for breeding aggregations of seabird, which already delivers species specific trends that can be used in the indicator. New indicators could be produced for waterbird species breeding close to the shoreline and dependant on intertidal and inshore areas for feeding , but would require gap filling for Wetland Bird Survey and Non-Estuarine Wader Survey, and increase frequency of the latter.	Seabird Monitoring Programme Wetland Bird Survey, Non-Estuarine Wader Survey & Bird Atlases of Britain and Ireland	B) Baseline set in the past	Target set as deviation from baseline	Cook et al. (2011 - Mar Ecol Prog Ser, In press) looked accuracy and power to detect change of species specific trends in breeding seabird numbers produced by the Seabird Monitoring Programme. They assessed accuracy and power for trends at scales of UK, OSPAR regions and UK Regional Seas.
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Birds	Species-specific trends in relative breeding abundance	annual abundance of breeding birds expressed as a percentage of baseline	Species-specific annual abundance should be more than 80% of the baseline in marine bird species that lay only one egg	Applicable to marine bird species from all functional groups, that lay one egg and where population size is monitored regularly.	baseline set for each species based on expert judgement of when population levels were considered to be least impacted by human activities;	Existing Target	defined by 2012 & operational by 2014	OSPAR	Existing schemes for breeding aggregations of seabird, which already delivers species specific trends that can be used in the indicator.	Seabird Monitoring Programme	B) Baseline set in the past	Target set as deviation from baseline	Cook et al. (2011 - Mar Ecol Prog Ser, In press) looked accuracy and power to detect change of species specific trends in breeding seabird numbers produced by the Seabird Monitoring Programme. They assessed accuracy and power for trends at scales of UK, OSPAR regions and UK Regional Seas.
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Birds	Species-specific trends in relative breeding abundance	annual abundance of breeding birds expressed as a percentage of baseline	Species-specific annual abundance should be less than 130% of the baseline in marine bird species that depredate other birds and benefit from anthropogenic food sources.	Applicable to Great Skua, Great Black-backed Gull, Herring Gull and Lesser Black-backed Gull	baseline set for each species based on expert judgement of when population levels were considered to be least impacted by human activities;	Existing Target	defined by 2012 & operational by 2014	OSPAR	Existing schemes for breeding aggregations of seabird, which already delivers species specific trends that can be used in the indicator.	Seabird Monitoring Programme	B) Baseline set in the past	Target set as deviation from baseline	Cook et al. (2011 - Mar Ecol Prog Ser, In press) looked accuracy and power to detect change of species specific trends in breeding seabird numbers produced by the Seabird Monitoring Programme. They assessed accuracy and power for trends at scales of UK, OSPAR regions and UK Regional Seas.
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Birds	Species-specific trends in relative non-breeding abundance	annual abundance of non-breeding birds expressed as a percentage of baseline	Species specific annual abundance is within +/-x% of the baseline. (Target levels to be set once a monitoring programme is in Place)	Potentially applicable to all non-breeding seabird and waterbird species in all functional groups.	Species-specific abundance at the start of any new monitoring programme.	New Target	operational by 2018		Existing schemes for non-breeding aggregations of shorebirds, which already delivers species specific trends that can be used in the indicator. Additional monitoring of non-breeding aggregations of divers, seaduck and offshore seabirds required. Monitoring of inshore benthic feeders (seaduck) UK Seabird & Cetacean Monitoring Project (under development).	Wetland Bird Survey, NEWS, WinGS	B) Baseline set in the past	Target set as deviation from baseline	a) non-breeding aggregations of shorebirds: Wetland Bird Surveys Annual reports - see http://www.bto.org/volunteer-surveys/webs/publications/annual-reports. Indicator needs further work to define: surveys are known to have gaps. Need GIS file of MSFD area to select relevant data for non-transitional waters b) non-breeding aggregations of seaduck and of divers: existing monitoring provides partial trends at individual sites, but not yet at UK scale. c) Offshore monitoring of seabirds under development.

1	1.1 Species distribution	1.1.1 Distributional range	Marine Mammals	Distributional range of Harbour seal	change in presence at extremities of range in UK waters	No decrease in current (baseline) range	harbour seal	The Habitats Directive baseline (data from 1988-1994)	Existing Target	operational now	Habitats Dir	Monitoring of core areas is already undertaken through the seal monitoring programme based at SMRU. May need some augmentation on peripheral areas (south and west England, Wales). Funding comes from a variety of non-permanent sources.	UK Seals monitoring programme	B) Baseline set in the past	Target set as deviation from baseline	The distributional range of harbour seal haulouts has been regularly monitored for core areas since 1988. A time series of data for this metric already exists.
1	1.1 Species distribution	1.1.1 Distributional range	Marine Mammals	Distributional range of Grey seal breeding	change in presence at extremities of breeding range	No decrease in current (baseline) range	grey seal	The Habitats Directive baseline (data from 1984-1987)	Existing Target	operational now	Habitats Dir	Coverage not guaranteed everywhere.	UK Seals monitoring programme. Monitoring of core areas is already undertaken through the seal monitoring programme based at SMRU. Monitoring in other areas by a variety of groups with information collated by SMRU.	B) Baseline set in the past	Target set as deviation from baseline	The core distributional range of breeding grey seals has been regularly monitored since c1960s. Other areas are patchy.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Marine Mammals	Distributional pattern within range of harbour porpoises	Presence/absence in quarter ICES rectangles per year in five year periods	No statistically significant decrease in current (baseline) distributional pattern	harbour porpoises	The Habitats Directive baseline (data from 1984-1987)	Existing Target	operational by 2018	Habitats Dir	Ensure that IBTS and other wide area surveys covered with reasonable frequency	Data collected under Joint Cetacean Protocol	B) Baseline set in the past	Target set as deviation from baseline	JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Marine Mammals	Distributional pattern within range of bottlenose dolphins	Presence/absence in quarter ICES rectangles per year in five year periods	No statistically significant decrease in current (baseline) distributional pattern	bottlenose dolphin	The Habitats Directive baseline (data from 1984-1987)	Existing Target	operational by 2018	Habitats Dir	Ensure that IBTS and other wide area surveys covered with reasonable frequency	Data collected under Joint Cetacean Protocol	B) Baseline set in the past	Target set as deviation from baseline	JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Marine Mammals	Distribution pattern within range of long fin pilot whales	Presence/absence in quarter ICES rectangles per year in five year periods	No statistically significant decrease in current (baseline) distributional pattern	long fined pilot whale	The Habitats Directive baseline (data from 1984-1987)	Existing Target	operational by 2018	Habitats Dir	Ensure that IBTS and other wide area surveys covered with reasonable frequency	Data collected under Joint Cetacean Protocol	B) Baseline set in the past	Target set as deviation from baseline	JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Marine Mammals	Distributional pattern within range of short-beaked common dolphins	Presence/absence in quarter ICES rectangles per year in five year periods	No statistically significant decrease in current (baseline) distributional pattern	short beaked common dolphins	The Habitats Directive baseline (data from 1984-1987)	Existing Target	operational by 2018	Habitats Dir	Ensure that IBTS and other wide area surveys covered with reasonable frequency	Data collected under Joint Cetacean Protocol	B) Baseline set in the past	Target set as deviation from baseline	JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Marine Mammals	Distribution pattern within range of white beaked dolphins	Presence/absence in quarter ICES rectangles per year in five year periods	No statistically significant decrease in current (baseline) distributional pattern	white beaked dolphins	The Habitats Directive baseline (data from 1984-1987)	Existing Target	operational by 2018	Habitats Dir	Ensure that IBTS and other wide area surveys covered with reasonable frequency	Data collected under Joint Cetacean Protocol	B) Baseline set in the past	Target set as deviation from baseline	JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Marine Mammals	Distributional pattern within range of minke whales in summer	Presence/absence in quarter ICES rectangles per year in five year periods	No statistically significant decrease in current (baseline) distributional pattern	minke whale	The Habitats Directive baseline (data from 1984-1987)	Existing Target	operational by 2018	Habitats Dir	Ensure that IBTS and other wide area surveys covered with reasonable frequency	Data collected under Joint Cetacean Protocol	B) Baseline set in the past	Target set as deviation from baseline	JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Marine Mammals	Distributional pattern within range of Harbour seal	Proportion of occupancy of sampling sub-units	No statistically significant decrease in current (baseline) distributional pattern	harbour seal	The Habitats Directive baseline (data from 1988-1994)	Existing Target	operational now	Habitats Dir	Monitoring of core areas is already undertaken through the seal monitoring programme based at SMRU. Some additional funding required for analysis to be undertaken. Funding comes from a variety of non-permanent sources.	UK Seals monitoring programme	B) Baseline set in the past	Target set as deviation from baseline	Harbour seals are very faithful to sites. The core areas are divided into units, the occupancy of which can be assessed at regular intervals. These can then be compared for similarity between years.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Marine Mammals	Distributional pattern within range of Grey seal breeding	An assessment of changes in distribution within core areas including an assessment of similarity between years	No statistically significant decrease in current (baseline) distributional pattern	grey seal	The Habitats Directive baseline (data from 1984-1987)	Existing Target	operational now	Habitats Dir	Monitoring of core areas is already undertaken through the seal monitoring programme based at SMRU. Some additional funding required for analysis to be undertaken, and potentially for some non-core areas	UK Seals monitoring programme for core areas. Monitoring in other areas by a variety of groups with information collated by SMRU.	B) Baseline set in the past	Target set as deviation from baseline	Grey seals are very faithful to colonies often returning within metres of a particular location. The core areas are divided into units, the occupancy of which can be assessed at regular intervals. These can then be compared for similarity between years.
1	1.2 Population size	1.2.1 Population abundance	Marine Mammals	Abundance of three inshore bottlenose dolphin populations	Total number of bottlenose dolphins in Scottish east coast, Cardigan Bay and Scottish west coast populations	No statistically significant decrease in abundance of any of the three populations	inshore bottlenose dolphin	Moray Firth - 1992; west coast Scotland - 2008; Cardigan Bay - 2005	Existing Target	defined by 2012 & operational by 2014	Habitats Dir	West coast of Scotland	Schemes exist on east coast of Scotland and in Cardigan Bay, short-term study data available on west coast of Scotland	B) Baseline set in the past	Target set as deviation from baseline	Robust mark-recapture estimates
1	1.2 Population size	1.2.1 Population abundance	Marine Mammals	Abundance of harbour porpoise	Abundance	No statistically significant decrease in abundance	harbour porpoise	2005	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
1	1.2 Population size	1.2.1 Population abundance	Marine Mammals	Abundance of white-beaked dolphin	Abundance	No statistically significant decrease in abundance	white beaked dolphin	2005	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
1	1.2 Population size	1.2.1 Population abundance	Marine Mammals	Abundance of short-beaked common dolphin	Abundance	No statistically significant decrease in abundance	short-beaked common dolphin	2007	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
1	1.2 Population size	1.2.1 Population abundance	Marine Mammals	Abundance of minke whale	Abundance	No statistically significant decrease in abundance	minke whale	2007	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
1	1.2 Population size	1.2.1 Population abundance	Marine Mammals	Abundance of bottlenose dolphin	Abundance	No statistically significant decrease in abundance	bottlenose dolphin	2007	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
1	1.2 Population size	1.2.1 Population abundance	Marine Mammals	Abundance of long-finned pilot whale	Abundance	No statistically significant decrease in abundance	long-finned pilot whale	2007	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
1	1.2 Population size	1.2.1 Population abundance	Marine Mammals	Harbour seal abundance	Annual abundance expressed as estimates (counts during moult) at approximately 5 year intervals or as a five year rolling mean	No statistically significant deviation from long-term variation in abundance	harbour seal	The Habitats Directive baseline (data from 1988-1994)	Existing Target	operational now	Habitats Dir	Monitoring of core areas is already undertaken through the seal monitoring programme based at SMRU and results presented to SCOS. Funding comes from a variety of non-permanent sources.	UK Seals monitoring programme	Mixture of approaches (details in comments)	Target set as deviation from baseline	Long time series of data beginning 1988-1994 depending on site.
1	1.2 Population size	1.2.1 Population abundance	Marine Mammals	grey seal abundance	Annual abundance expressed as estimates (from counts during pupping) at approximately 5 year intervals or as a five year rolling mean	No statistically significant deviation from long-term variation in abundance	grey seal	The Habitats Directive baseline (data from 1988-1994)	Existing Target	operational now	Habitats Dir	Monitoring of core areas is already undertaken through the seal monitoring programme based at SMRU and results presented to SCOS. Funding comes from a variety of non-permanent sources.	UK Seals monitoring programme	Mixture of approaches (details in comments)	Target set as deviation from baseline	Long time series of data beginning in 1960s but new methods/techniques applied in 1980s.
1	1.3 Population condition	1.3.1 Population demographic characteristics	Marine Mammals	Harbour seal pup production	Numbers of pups and adults through the breeding season in The Wash and in the Moray Firth	No statistically significant deviation from long-term variation in pup production in The Wash and in the Moray Firth.	harbour seal	mean value of entire time-series	Existing Target	defined by 2012 & operational by 2014	Habitats Dir	90% of this species outside Scotland resides here and the Moray Firth is the only other site where this occurs. Further sites (possibly SACs) should be added. Assessments are annual in the Moray Firth and every five years in the Wash.	UK Seals monitoring programme (Lincolnshire and Norfolk funded by Natural England)	A) Existing/Current reference conditions	Target set as deviation from baseline	Moray Firth pup production assessed since 1988 although more accurate aerial techniques were introduced in 2006. The Wash was first surveyed in 2003.

1	1.3 Population condition	1.3.1 Population demographic characteristics	Marine Mammals	Grey seal pup production	Estimated total number of pups born at individual breeding colonies	No statistically significant deviation from long-term variation in pup production	grey seal	mean value of entire time-series	Existing Target	operational now	Habitats Dir	Some extra funding would ensure more reliable supply of data from peripheral breeding areas	UK Seals monitoring programme (Wash funded by Natural England)	A) Existing/Current reference conditions	Target set as deviation from baseline	Pup production has regularly been assessed at a large number of sites since 1960s, although more accurate aerial techniques were introduced in 1984.
1	1.3 Population condition	1.3.1 Population demographic characteristics	Marine Mammals	Annual calf production of Scottish east coast and Cardigan Bay area bottlenose dolphin populations	Number of calves	No statistically significant decrease in annual calf production	bottlenose dolphin	mean value of entire time-series	Existing Target	defined by 2012 & operational by 2014	Habitats Dir		Study off east coast population has been underway since 1989 and in Cardigan Bay since 2005.	A) Existing/Current reference conditions	Target set as deviation from baseline	Photo-id study of calves with known adult female dolphins
1	1.3 Population condition	1.3.2 Population genetic structure	Marine Mammals	Harbour seal genetics	abundance of animals in discrete population sub-units	No statistically significant loss of genetic variability	harbour seal	all existing data	New Target	operational by 2018		Continue collecting samples, undertake analysis of samples, re-examine numbers in light of knowledge of genetic distribution	To identify different subpopulation units, tissue samples will be required for genetic analyses. These are being taken routinely every time a seal is handled at present	A) Existing/Current reference conditions	Target set as deviation from baseline	Initial work was undertaken on genetic structure of harbour seal populations in UK and Europe in the 90s. This has recently been repeated with more samples and greater microsatellite loci coverage. Once these results are available, we will have a better idea of possible targets
4	4.1 Productivity (production per unit biomass) of key species or trophic groups	4.1.1 Performance of key predator species using their production per unit biomass (productivity)	Marine Mammals	Harbour seal pup production	Numbers of pups and adults through the breeding season in The Wash and in the Moray Firth	No statistically significant deviation from long-term variation in pup production	harbour seal	all existing data	Existing Target	defined by 2012 & operational by 2014	Habitats Dir	90% of this species outside Scotland resides here and the Moray Firth is the only other site where this occurs. Further sites (possibly SACs) should be added. Assessments are annual in the Moray Firth and every five years in the Wash.	UK Seals monitoring programme (Lincolnshire and Norfolk funded by Natural England)	A) Existing/Current reference conditions	Target set as deviation from baseline	Moray Firth pup production assessed since 1988 although more accurate aerial techniques were introduced in 2006. The Wash was first surveyed in 2003.
4	4.1 Productivity (production per unit biomass) of key species or trophic groups	4.1.1 Performance of key predator species using their production per unit biomass (productivity)	Marine Mammals	Grey seal pup production	Estimated total number of pups born at individual breeding colonies	No statistically significant deviation from long-term variation in pup production	grey seal	all existing data	Existing Target	operational now	Habitats Dir	Some extra funding would ensure more reliable supply of data from peripheral breeding areas	UK Seals monitoring programme (Wash funded by Natural England)	A) Existing/Current reference conditions	Target set as deviation from baseline	Pup production has regularly been assessed at a large number of sites since 1960s, although more accurate aerial techniques were introduced in 1984.
4	4.1 Productivity (production per unit biomass) of key species or trophic groups	4.1.1 Performance of key predator species using their production per unit biomass (productivity)	Marine Mammals	Annual calf production of Scottish east coast and Cardigan Bay area bottlenose dolphin populations	Number of calves	No statistically significant decrease in annual calf production	bottlenose dolphin	Average since start of monitoring	Existing Target	defined by 2012 & operational by 2014	Habitats Dir		Study off east coast population has been underway since 1989 and in Cardigan Bay since 2005.	A) Existing/Current reference conditions	Target set as deviation from baseline	Photo-id study of calves with known adult female dolphins
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Marine Mammals	Relative use of haulouts by grey and harbour seals	Relative shared occupancy of haulout sites	Requires further data analysis	grey and harbour seal		New Target	operational by 2018	Habitats Dir	Additional analysis underway to determine if there is a relationship between relative haulout numbers and local trends in population abundance between the two species.	UK Seals monitoring programme	C) Current baseline	Target set as deviation from baseline	
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Marine Mammals	Harbour seal abundance	Annual abundance expressed as estimates (counts during moult) at approximately 5 year intervals or as a five year rolling mean	No statistically significant deviation from long-term variation in abundance	harbour seal	The Habitats Directive baseline (data from 1988-1994)	Existing Target	operational now	Habitats Dir	Monitoring of core areas is already undertaken through the seal monitoring programme based at SMRU and results presented to SCOS. Funding comes from a variety of non-permanent sources.	UK Seals monitoring programme	Mixture of approaches (details in comments)	Target set as deviation from baseline	Long time series of data beginning 1988-1994 depending on site.
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Marine Mammals	Abundance of three inshore bottlenose dolphin populations	Total number of bottlenose dolphins in Scottish east coast, Cardigan Bay and Scottish west coast populations	No statistically significant decrease in abundance of any of the three populations	inshore bottlenose dolphin	Moray Firth - 1992; west coast Scotland - 2008; Cardigan Bay - 2005	Existing Target	defined by 2012 & operational by 2014	Habitats Dir	West coast of Scotland	Schemes exist on east coast of Scotland and in Cardigan Bay, short-term study data available on west coast of Scotland	B) Baseline set in the past	Target set as deviation from baseline	Robust mark-recapture estimates
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Marine Mammals	Abundance of harbour porpoise	Abundance	No statistically significant decrease in abundance	harbour porpoises	2005	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Marine Mammals	Abundance of white-beaked dolphin	Abundance	No statistically significant decrease in abundance	white beaked dolphin	2005	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Marine Mammals	Abundance of short-beaked common dolphin	Abundance	No statistically significant decrease in abundance	short beaked common dolphins	2007	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Marine Mammals	Abundance of minke whale	Abundance	No statistically significant decrease in abundance	minke whale	2007	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Marine Mammals	Abundance of bottlenose dolphin	Abundance	No statistically significant decrease in abundance	bottlenose dolphin	2007	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Marine Mammals	Abundance of long-finned pilot whale	Abundance	No statistically significant decrease in abundance	long-finned pilot whale	2007	Existing Target	operational by 2018	Habitats Dir	At present, wide scale surveys are dodecadal; more frequent surveys would be costly (but note if averaged by year is comparatively low) with little gain in precision of trend information. Next survey should be planned for 2016-18	SCANS I and II, and CODA	C) Current baseline	Target set as deviation from baseline	Robust line-transect estimates
1	1.3 Population condition	Pressure indicator	Marine Mammals	harbour porpoise bycatch	estimate of bycatch	Annual bycatch rate is reduced to less than 1.7% of best population estimate	harbour porpoise	SCANS II (2005), CODA (2007), ICES WGMME (2009) and the IWC all advocate the use of Catch Limit Algorithms (CLA) in determining the level of allowable bycatch from population estimates.	Existing Target	operational now	ASCOBANS	Annual bycatch observer surveys are undertaken on commercial fishing vessels in relation to EU Regulation 812/2004 and the Habitats Directive already. No additional costs likely to be incurred.	UK Bycatch Monitoring Scheme	Mixture of approaches (details in comments)	Absolute Value (target not set at baseline)	Robust bycatch estimates. These have been estimated annually since 2005.
1	1.3 Population condition	Pressure indicator	Marine Mammals	common dolphin bycatch	estimate of bycatch	Annual bycatch rate is reduced to less than 1.7% of best population estimate	short beaked common dolphins	SCANS II (2005), CODA (2007), ICES WGMME (2009) and the IWC all advocate the use of Catch Limit Algorithms (CLA) in determining the level of allowable bycatch from population estimates.	Existing Target	defined by 2012 & operational by 2014	ASCOBANS	Annual bycatch observer surveys are undertaken on commercial fishing vessels in relation to EU Regulation 812/2004 and the Habitats Directive already. No additional costs likely to be incurred.	UK Bycatch Monitoring Scheme	Mixture of approaches (details in comments)	Absolute Value (target not set at baseline)	Robust bycatch estimates. These have been estimated annually since 2005.
1	1.3 Population condition	Pressure indicator	Marine Mammals	harbour seal bycatch	estimate of bycatch	Annual bycatch rate is reduced to less than 2% of best population estimate	harbour seals	Use of Catch Limit Algorithms (CLA) is advocated for determining the level of allowable bycatch from population estimates.	Existing Target	defined by 2012 & operational by 2014	Habitats Dir	Annual bycatch observer surveys are undertaken on commercial fishing vessels in relation to EU Regulation 812/2004 and the Habitats Directive already. Needs assessment as to whether additional costs likely to be incurred.	UK Bycatch Monitoring Scheme	Mixture of approaches (details in comments)	Absolute Value (target not set at baseline)	Robust bycatch estimates. These have been estimated annually since 2005.
1	1.3 Population condition	Pressure indicator	Marine Mammals	grey seal bycatch	estimate of bycatch	Annual bycatch rate is reduced to less than 2% of best population estimate	grey seals	Use of Catch Limit Algorithms (CLA) is advocated for determining the level of allowable bycatch from population estimates.	Existing Target	defined by 2012 & operational by 2014	Habitats Dir	Annual bycatch observer surveys are undertaken on commercial fishing vessels in relation to EU Regulation 812/2004 and the Habitats Directive already. Needs assessment as to whether additional costs likely to be incurred.	UK Bycatch Monitoring Scheme	Mixture of approaches (details in comments)	Absolute Value (target not set at baseline)	Robust bycatch estimates. These have been estimated annually since 2005.

1	1.3 Population condition	Pressure indicator	Marine Mammals	PCB and other organohalogenated contamination in porpoises	estimate of PCB and other organohalogenated contaminants in tissues	PCB and other organohalogenated contamination in porpoises are below estimated threshold levels for adverse health effects.	harbour porpoise		New Target	operational by 2018	Habitats Dir	UK stranding scheme (CSIP) collects tissue samples. Analysis of these are undertaken on an ad hoc basis when funding becomes available. Most recent costing indicated approximately £26k to complete data set to 2010, and £7.5k per annum to 2013.	UK stranding scheme (CSIP) collects tissue samples. Analysis of these are undertaken on an ad hoc basis when funding becomes available	NA	Limits / thresholds	Work undertaken through CSIP has demonstrated that porpoises dying as a result of infectious disease had significantly higher levels of PCBs than healthy porpoises that dies as a result of traumatic deaths (e.g. bycatch or bottlenose dolphin kills). PCS I
1	1.3 Population condition	Pressure indicator	Marine Mammals	PCB and other organohalogenated contamination in harbour seals	estimate of PCB and other organohalogenated contaminants in tissues	PCB and other organohalogenated contamination in harbour seals are below estimated threshold levels for adverse health effects.	harbour seals		New Target	operational by 2018	Habitats Dir	Need systematic sampling of carcasses from outside Scotland. Analysis of all archived and new samples is required.	Systematic collection of tissues samples from carcasses occurs in Scotland. Analysis of samples is on an ad hoc basis when funding is available.	NA	Limits / thresholds	Work undertaken through CSIP has demonstrated that porpoises dying as a result of infectious disease had significantly higher levels of PCBs than healthy porpoises that dies as a result of traumatic deaths (e.g. bycatch or bottlenose dolphin kills). PCS I
1	1.3 Population condition	Pressure indicator	Marine Mammals	algal toxins in seals	estimate of exposure to algal toxins	Requires further data analysis	harbour seals & grey seals		New Target	operational by 2018	Habitats Dir	Need systematic sample collection (of seal scats) that is regularly undertaken and is representative of seal distribution in the UK. Additional funds would be required for toxin analysis of the samples.	Faecal samples are currently obtained by SMRU as part of a study on seal diet. This involves ad hoc collection of seal scats at various sites around the UK, but is unlikely to continue beyond the end of the current diet study.	NA	Limits / thresholds	Assessment of toxin levels in seal faeces will provide information on the exposure of seals to the toxins produced by harmful algal blooms which appear to be increasing in many areas throughout the world, including the UK, due to changes in the environment and increases in nutrient input to the marine environment.
1	1.1 Species distribution	1.1.1 Distributional range	Fish	Distributional range of Fish (Continental Shelf Seas)	Proportion of sampled ICES rectangles in which the species occurs. Annual indicator values are converted to standardised deviates (Dy) (by Dy=(Xy-Xbar)/SD), where Xy is the annual indicator value, Xbar is the mean indicator value over the whole time series, and SD is the standard deviation of indicator values around this mean.	Sensitive Species: If below GES (i.e.. OSPAR Fish community EcoQO not attained: LFI≤0.3). The most recent standardised deviate of the distribution range indicator should exceed +0.5. Sensitive Species: If at GES (i.e.. OSPAR Fish community EcoQO attained: LFI>0.3). The most recent standardised deviate of the distribution range indicator should equal or exceed the long-term time series mean (standardised deviate ≥0.0). Opportunist Species: At any time. The most recent standardised deviate of the distribution range indicator should not exceed, and ideally be less than, the long-term time series mean (standardised deviate ≤0.0).	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	New Target	defined by 2012 & operational by 2014		None	International and national bottom trawl groundfish surveys	Empirical variability of metric over specified time period.	Target set as deviation from baseline	ICES WGFE and scientific literature.
1	1.1 Species distribution	1.1.1 Distributional range	Fish	Distributional range of Fish (Shelf-edge Seas)	Proportion of sampled depth bands in which the species occurs. Annual indicator values are converted to standardised deviates (Dy) (by Dy=(Xy-Xbar)/SD), where Xy is the annual indicator value, Xbar is the mean indicator value over the whole time series, and SD is the standard deviation of indicator values around this mean.	Sensitive Species: If below GES (i.e.. OSPAR Fish community EcoQO not attained: LFI≤0.3). The most recent standardised deviate of the distribution range indicator should exceed +0.5. Sensitive Species: If at GES (i.e.. OSPAR Fish community EcoQO attained: LFI>0.3). The most recent standardised deviate of the distribution range indicator should equal or exceed the long-term time series mean (standardised deviate ≥0.0). Opportunist Species: At any time. The most recent standardised deviate of the distribution range indicator should not exceed, and ideally be less than, the long-term time series mean (standardised deviate ≤0.0).	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	New Target	defined by 2012 & operational by 2014		None	International and national bottom trawl groundfish surveys	Empirical variability of metric over specified time period.	Target set as deviation from baseline	ICES WGFE and scientific literature.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Fish	Distributional pattern within range of Fish (Shelf-edge Seas)	Measure of depth distribution within occupied depth range – e.g. Dispersion/Contagion metric such as mean:variance ratio. Annual indicator values are converted to standardised deviates (Dy) (by Dy=(Xy-Xbar)/SD), where Xy is the annual indicator value, Xbar is the mean indicator value over the whole time series, and SD is the standard deviation of indicator values around this mean.deviation).	Target currently under development	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	New Target	defined by 2012 & operational by 2014		None	International and national bottom trawl groundfish surveys	Empirical variability of metric over specified time period.	Target set as deviation from baseline	ICES WGFE and scientific literature.
1	1.1 Species distribution	1.1.2 Distributional pattern within range	Fish	Distributional pattern within range of Fish (Continental Shelf Seas)	Measure of species patchiness within the distribution – e.g. Dispersion/Contagion metric such as mean:variance ratio. Annual indicator values are converted to standardised deviates (Dy) (by Dy=(Xy-Xbar)/SD), where Xy is the annual indicator value, Xbar is the mean indicator value over the whole time series, and SD is the standard deviation of indicator values around this mean.	Target currently under development	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	New Target	defined by 2012 & operational by 2014		None	International and national bottom trawl groundfish surveys	Empirical variability of metric over specified time period.	Target set as deviation from baseline	ICES WGFE and scientific literature.
1	1.2 Population size	1.2.1 Population abundance	Fish	Population abundance of Fish	Log abundance estimates standardised to a defined area appropriate to the survey in question – e.g. 30km^2 for North Sea Q1 IBTS, or minimum swept area. Annual indicator values are first Log-transformed and then converted to standardised deviates (Dy) (by Dy=(Xy-Xbar)/SD), where Xy is the log annual indicator value, Xbar is the mean indicator log value over the whole time series, and SD is the standard deviation of indicator log values around this mean.	Sensitive Species: If below GES (i.e.. OSPAR Fish community EcoQO not attained: LFI≤0.3). The most recent standardised deviate of the log-abundance indicator should exceed +0.5. Sensitive Species: If at GES (i.e.. OSPAR Fish community EcoQO attained: LFI>0.3). The most recent standardised deviate of the log-abundance indicator should equal or exceed the long-term time series mean (standardised deviate ≥0.0). Opportunist Species: At any time. The most recent standardised deviate of the log-abundance indicator should not exceed, and ideally be less than, the long-term time series mean (standardised deviate ≤0.0).	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	New Target	defined by 2012 & operational by 2014		None	International and national bottom trawl groundfish surveys	Empirical variability of metric over specified time period.	Target set as deviation from baseline	ICES assessment and survey working groups, groundfish survey databases, and scientific literature.

1	1.2 Population size	1.2.1 Population biomass	Fish	Fish population biomass	Log biomass, either directly obtained from the measured weight of species in the survey or derived from application of weight at length relationships applied to the abundances at length data, standardised to a defined area appropriate to the survey in question – e.g. 30km^2 for current N.Sea coast study, or minimum swept area. Annual indicator values are first Log-transformed and then converted to standardised deviates (Dy) (by Dy=(Xy-Xbar)/SD), where Xy is the log annual indicator value, Xbar is the mean indicator log value over the whole time series, and SD is the standard deviation of indicator log values around this mean.	Sensitive Species: If below GES (i.e.. OSPAR Fish community EcoQO not attained: LFI≤0.3). The most recent standardised deviate of the log-biomass indicator should exceed +0.5. Sensitive Species: If at GES (i.e.. OSPAR Fish community EcoQO attained: LFI>0.3). The most recent standardised deviate of the log-biomass indicator should equal or exceed the long-term time series mean (standardised deviate ≥0.0). Opportunist Species: At any time. The most recent standardised deviate of the log-biomass indicator should not exceed, and ideally be less than, the long-term time series mean (standardised deviate ≤0.0).	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	New Target	defined by 2012 & operational by 2014		None	International and national bottom trawl groundfish surveys	Empirical variability of metric over specified time period.	Target set as deviation from baseline	ICES assessment and survey working groups, groundfish survey databases, and scientific literature.
1	1.3 Population condition	1.3.1 Population demographic characteristics	Fish	Proportion of mature fish in population	Proportion of individual fish greater than their species-specific length at first sexual maturity. Annual indicator values are converted to standardised deviates (Dy) (by Dy=(Xy-Xbar)/SD), where Xy is the annual indicator value, Xbar is the mean indicator value over the whole time series, and SD is the standard deviation of indicator values around this mean.	Target currently under development	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	New Target	defined by 2012 & operational by 2014		None	International and national bottom trawl groundfish surveys	Empirical variability of metric over specified time period.	Target set as deviation from baseline	ICES assessment and survey working groups, groundfish survey databases, and scientific literature.
1	1.3 Population condition	1.3.2 Population genetic structure	Fish	No indicator proposed	No indicator proposed	No indicator proposed					New sampling programme on board RV groundfish surveys required. Associated lab-based analytical programmes need establishing	International and national bottom trawl groundfish surveys. Analysis to assess genetic structure in many species			ICES assessment and survey working groups, groundfish survey databases, and scientific literature.
1	1.7 Ecosystem structure	1.7.1 Composition and relative proportions of ecosystem components	Fish	Fish relative abundance	Proportion of Large Fish Indicator (LFI): proportion (by weight) of demersal fish exceeding a specified length threshold (current thresholds 40cm in North Sea, 50cm in Celtic Sea).	Current targets are 0.3 in the North Sea and 0.4 in the Celtic Sea	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	Existing Target	operational now	Baseline setting process underpinning the North Sea LFI.	None	International and national bottom trawl groundfish surveys	Reference period set in the past	Target set as when fishing pressure last deemed sustainable.	ICES assessment, survey, and ecosystem working groups, groundfish survey databases, and scientific literature.
1	1.7 Ecosystem structure	1.7.1 Composition and relative proportions of ecosystem components	Fish	Fish relative abundance	Hills N1 indicator of species diversity	Target currently under development	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	New Target	operational by 2018	Baseline setting process underpinning the North Sea LFI.	None	International and national bottom trawl groundfish surveys	Reference period set in the past	Target set as when fishing pressure last deemed sustainable.	ICES assessment, survey, and ecosystem working groups, groundfish survey databases, and scientific literature.
4	4.2 Proportion of selected species at the top of food webs	4.2.1 Large fish by weight	Fish	Large fish indicator (LFI)	Proportion (by weight) of fish exceeding a specified length threshold where the length threshold is pertinent to the community and species composition in question	Targets to be established for each marine region relative to a region specific reference period, and dependent on the species composition included in the indicator calculation. Being a food web metric, pelagic species may be included - thus new targets will need to be established.	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	New Target	defined by 2012 & operational by 2014	OSPAR	None (groundfish survey data available in most regions - certainly throughout UK waters).	International and national bottom trawl groundfish surveys	Reference period using historical data	Target set as the metric value at the point in time when fishing pressure on the community first became non-sustainable.	1) Greenstreet, S.P.R. et al. (2011) ICES Journal of Marine Science, 68: 1-11. 2) Shephard, S.et al. (in press) ICES Journal of Marine Science.
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Fish	Dietary functional group biomass	Biomass of pelagic planktivores, pelagic piscivores, demersal benthivores, demersal piscivores and omnivores	Target currently under development	Applicable to all species sampled adequately in international and national bottom-trawl groundfish surveys	Bottom trawl groundfish surveys time-series.	New Target	operational by 2018		None (groundfish survey data available in most regions - certainly throughout UK waters).	International and national bottom trawl groundfish surveys	Empirical variability of metrics over specified time period.	Target set as deviation from baseline	These fish predator groups were used in the early ERSEM modelling work and have supported previous food web studies (Greenstreet, S.P.R.et al. (1997) ICES Journal of Marine Science, 54: 243-266.)
1	1.4 Habitat distribution	1.4.1 Distributional range	Pelagic habitats	Change of plankton functional types (life form) index	Lifeforms: Ratio between: Diatoms & Dinoflagellates; Large copepods & Small copepods; Copepod grazers & Non-copepod grazers	plankton community not significantly influenced by anthropogenic drivers	As plankton are primarily influenced by climate and natural variability, difficulty lies in separating out the anthropogenic changes. The comparison between the changes in lifeform seasonal variability (see Annex III) occurring in coastal waters to those in the open ocean can help us distinguish between changes due to manageable anthropogenic pressures and those due to climate and natural variability. If a shift in lifeforms occurs in coastal waters concomitantly with a pressure event (nutrient loading, etc) and there is no corresponding shift in other coastal time-series or in the open ocean, the coastal shift could be a response to an anthropogenic pressure, especially if there is a correlation between the trend in lifeforms and anthropogenic	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	New Target	defined by 2012 & operational by 2014	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008), , all recommended targets could be operationalised now. There is, however, a need to operationalise the lifeform approach and this would require the following: • Completion of a map showing the	The plankton community is currently studied at a number of locations in UK waters (Figure 0-2) and it is recommended that these should form the basis of a network of sampling stations. There are a number of gaps, for example there is limited sampling of zooplankton in coastal waters and it is important that sampling stations are located in all of the ecohydrodynamic water types within a region in order to make a representative assessment of GES of UK waters. A possible (and cost-effective) solution could be to undertake coastal zooplankton sampling concomitant to SEPA and the Environment Agency's phytoplankton monitoring programme which periodically collects phytoplankton samples in UK coastal waters, but that does not retain the zooplankton component. It is important that plankton sampling occurs in all of the ecohydrodynamic water types within UK waters (Figure 0 2). A map of ecohydrodynamic regions for the western shelf region of the UK is currently in development (Sonia Leeuwen, Cefas). Additional sampling stations (off shore and coastal for zooplankton) will need to be established around the UK as there are clear	Can be extracted from any dataset that identifies plankton using light microscopy and other methods that resolve to spp level(SAHFOS, Marine Scotland sites, NOC, Cefas sites, AFBI, EA WFD, PML). Few coastal zooplankton time-series exist.	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	Directional / trend based targets (direction of change)	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).

1	1.4 Habitat distribution	1.4.2 Distributional pattern within range	Pelagic habitats	Change of plankton functional types (life form) index	Lifeforms: Ratio between: Diatoms & Dinoflagellates; Large copepods & Small copepods; Copepod grazers & Non-copepod grazers	plankton community not significantly influenced by anthropogenic drivers	As plankton are primarily influenced by climate and natural variability, difficulty lies in separating out the anthropogenic changes. The comparison between the changes in lifeform seasonal variability (see Annex III) occurring in coastal waters to those in the open ocean can help us distinguish between changes due to manageable anthropogenic pressures and those due to climate and natural variability. If a shift in lifeforms occurs in coastal waters concomitantly with a pressure event (nutrient loading, etc) and there is no corresponding shift in other coastal time-series or in the open ocean, the coastal shift could be a response to an anthropogenic pressure, especially if there is a correlation between the trend in lifeforms and anthropogenic	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	New Target	defined by 2012 & operational by 2014	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008), , all recommended targets could be operationalised now. There is, however, a need to operationalise the lifeform approach and this would require the following: • Completion of a map showing the	The plankton community is currently studied at a number of locations in UK waters (Figure 0- 2) and it is recommended that these should form the basis of a network of sampling stations. There are a number of gaps, for example there is limited sampling of zooplankton in coastal waters and it is important that sampling stations are located in all of the ecohydrodynamic water types within a region in order to make a representative assessment of GES of UK waters. A possible (and cost-effective) solution could be to undertake coastal zooplankton sampling concomitant to SEPA and the Environment Agency's phytoplankton monitoring programme which periodically collects phytoplankton samples in UK coastal waters, but that does not retain the zooplankton component. It is important that plankton sampling occurs in all of the ecohydrodynamic water types within UK waters (Figure 0 2). A map of ecohydrodynamic regions for the western shelf region of the UK is currently in development (Sonia Leeuwen, Cefas). Additional sampling stations (off shore and coastal for zooplankton) will need to be established around the UK as there are clear	Can be extracted from any dataset that identifies plankton using light microscopy and other methods that resolve to spp level(SAHFOS, Marine Scotland sites, NOC, Cefas sites, AFBI, EA WFD, PML). Few coastal zooplankton time-series exist.	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	Directional / trend based targets (direction of change)	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Pelagic habitats	Change of plankton functional types (life form) index	Lifeforms: Ratio between: Diatoms & Dinoflagellates; Large copepods & Small copepods; Copepod grazers & Non-copepod grazers	plankton community not significantly influenced by anthropogenic drivers	As plankton are primarily influenced by climate and natural variability, difficulty lies in separating out the anthropogenic changes. The comparison between the changes in lifeform seasonal variability (see Annex III) occurring in coastal waters to those in the open ocean can help us distinguish between changes due to manageable anthropogenic pressures and those due to climate and natural variability. If a shift in lifeforms occurs in coastal waters concomitantly with a pressure event (nutrient loading, etc) and there is no corresponding shift in other coastal time-series or in the open ocean, the coastal shift could be a response to an anthropogenic pressure, especially if there is a correlation between the trend in lifeforms and anthropogenic	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	New Target	defined by 2012 & operational by 2014	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008), , all recommended targets could be operationalised now. There is, however, a need to operationalise the lifeform approach and this would require the following: • Completion of a map showing the	The plankton community is currently studied at a number of locations in UK waters (Figure 0- 2) and it is recommended that these should form the basis of a network of sampling stations. There are a number of gaps, for example there is limited sampling of zooplankton in coastal waters and it is important that sampling stations are located in all of the ecohydrodynamic water types within a region in order to make a representative assessment of GES of UK waters. A possible (and cost-effective) solution could be to undertake coastal zooplankton sampling concomitant to SEPA and the Environment Agency's phytoplankton monitoring programme which periodically collects phytoplankton samples in UK coastal waters, but that does not retain the zooplankton component. It is important that plankton sampling occurs in all of the ecohydrodynamic water types within UK waters (Figure 0 2). A map of ecohydrodynamic regions for the western shelf region of the UK is currently in development (Sonia Leeuwen, Cefas). Additional sampling stations (off shore and coastal for zooplankton) will need to be established around the UK as there are clear	Can be extracted from any dataset that identifies plankton using light microscopy and other methods that resolve to spp level(SAHFOS, Marine Scotland sites, NOC, Cefas sites, AFBI, EA WFD, PML). Few coastal zooplankton time-series exist.	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	Directional / trend based targets (direction of change)	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).
1	1.6 Habitat condition	1.6.2 Relative abundance and biomass	Pelagic habitats	Zooplankton biomass	Zooplankton biomass	plankton community not significantly influenced by anthropogenic drivers	As plankton are primarily influenced by climate and natural variability, difficulty lies in separating out the anthropogenic changes. The comparison between the changes in lifeform seasonal variability (see Annex III) occurring in coastal waters to those in the open ocean can help us distinguish between changes due to manageable anthropogenic pressures and those due to climate and natural variability. If a shift in lifeforms occurs in coastal waters concomitantly with a pressure event (nutrient loading, etc) and there is no corresponding shift in other coastal time-series or in the open ocean, the coastal shift could be a response to an anthropogenic pressure, especially if there is a correlation between the trend in lifeforms and anthropogenic	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	New Target	defined by 2012 & operational by 2014	Zooplankton biomass can be measured in a straightforward manner through sample collection and weight-based determination of biomass.	The plankton community is currently studied at a number of locations in UK waters (Figure 0- 2) and it is recommended that these should form the basis of a network of sampling stations. There are a number of gaps, for example there is limited sampling of zooplankton in coastal waters and it is important that sampling stations are located in all of the ecohydrodynamic water types within a region in order to make a representative assessment of GES of UK waters. A possible (and cost-effective) solution could be to undertake coastal zooplankton sampling concomitant to SEPA and the Environment Agency's phytoplankton monitoring programme which periodically collects phytoplankton samples in UK coastal waters, but that does not retain the zooplankton component. It is important that plankton sampling occurs in all of the ecohydrodynamic water types within UK waters (Figure 0 2). A map of ecohydrodynamic regions for the western shelf region of the UK is currently in development (Sonia Leeuwen, Cefas). Additional sampling stations (off shore and coastal for zooplankton) will need to be established around the UK as there are clear	Few coastal zooplankton time-series exist, the CPR has a zooplankton biomass indicator for open/shelf waters	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	Directional / trend based targets (direction of change)	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).
1	1.6 Habitat condition	1.6.2 Relative abundance and biomass	Pelagic habitats	Phytoplankton biomass	Phytoplankton biomass	plankton community not significantly influenced by anthropogenic drivers	As plankton are primarily influenced by climate and natural variability, difficulty lies in separating out the anthropogenic changes. The comparison between the changes in lifeform seasonal variability (see Annex III) occurring in coastal waters to those in the open ocean can help us distinguish between changes due to manageable anthropogenic pressures and those due to climate and natural variability. If a shift in lifeforms occurs in coastal waters concomitantly with a pressure event (nutrient loading, etc) and there is no corresponding shift in other coastal time-series or in the open ocean, the coastal shift could be a response to an anthropogenic pressure, especially if there is a correlation between the trend in lifeforms and anthropogenic	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	New Target	defined by 2012 & operational by 2014	Phytoplankton biomass can be measured in multiple ways. The Phytoplankton Colour Index, obtained by the Continuous Plankton Recorder, has a long time-series and wide spatial coverage. This is a visual estimate of phytoplankton biomass and can be converted to chlorophyll, one of the most commonly-measured pigments in phytoplankton. Chlorophyll data can be obtained through in situ sampling as well as from ocean colour satellite data. Chlorophyll doesn't provide the entire biomass picture of the phytoplankton community as a wide variety of marker pigments are typically found in addition to chlorophyll a. The presence of zeaxanthin and chlorophyll b is associated with cyanobacteria and picoeukaryotes respectively, and these groups occur in greater abundance offshore. The markers 19-but-fucoxanthin and	The plankton community is currently studied at a number of locations in UK waters (Figure 0- 2) and it is recommended that these should form the basis of a network of sampling stations. There are a number of gaps, for example there is limited sampling of zooplankton in coastal waters and it is important that sampling stations are located in all of the ecohydrodynamic water types within a region in order to make a representative assessment of GES of UK waters. A possible (and cost-effective) solution could be to undertake coastal zooplankton sampling concomitant to SEPA and the Environment Agency's phytoplankton monitoring programme which periodically collects phytoplankton samples in UK coastal waters, but that does not retain the zooplankton component. It is important that plankton sampling occurs in all of the ecohydrodynamic water types within UK waters (Figure 0 2). A map of ecohydrodynamic regions for the western shelf region of the UK is currently in development (Sonia Leeuwen, Cefas). Additional sampling stations (off shore and coastal for zooplankton) will need to be established around the UK as there are clear	The CPR provides an estimate of phytoplanktn biomass. This information can be provided by satellite data (though these are not useful. in coastal waters due to sediment, etc and in open and shelf waters are affected by cloud cover) as well as existing time-series.	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	Directional / trend based targets (direction of change)	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).

1	1.7: Ecosystem structure	1.7.1: Composition and relative proportion of ecosystem components	Pelagic habitats	change in all pelagic indicators for D1, D4, D5.2.4, D6	Change in all pelagic indicators for D1, D4, D5.2.4, D6	plankton community not significantly influenced by anthropogenic drivers	As plankton are primarily influenced by climate and natural variability, difficulty lies in separating out the anthropogenic changes. The comparison between the changes in lifeform seasonal variability (see Annex III) occurring in coastal waters to those in the open ocean can help us distinguish between changes due to manageable anthropogenic pressures and those due to climate and natural variability. If a shift in lifeforms occurs in coastal waters concomitantly with a pressure event (nutrient loading, etc) and there is no corresponding shift in other coastal time-series or in the	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine	New Target	defined by 2012 & operational by 2014	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).	The plankton community is currently studied at a number of locations in UK waters (Figure 0- 2) and it is recommended that these should form the basis of a network of sampling stations. There are a number of gaps, for example there is limited sampling of zooplankton in coastal waters and it is important that sampling stations are located in all of the ecohydrodynamic water types within a region in order to make a representative assessment of GES of UK waters. A possible (and cost-effective) solution could be to undertake coastal zooplankton sampling concomitant to SEPA and the Environment Agency's phytoplankton monitoring programme which periodically collects phytoplankton samples in UK coastal waters, but that does not retain the zooplankton component. It is important that plankton sampling occurs in all of the ecohydrodynamic water types within UK	Can be extracted from any dataset that identifies plankton using light microscopy and other methods that resolve to spp. level(SAHFOS, Marine Scotland sites, NOC, Cefas sites, AFBI, EA WFD, PML). Few coastal zooplankton time-series exist.	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine	Directional / trend based targets (direction of change)	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).
4	4.3 Abundance/distribution of key trophic groups/species	4.3.1 Abundance trends of functionally important selected groups/species	Pelagic habitats	Change of plankton functional types (life form) index	Life forms: Ratio between: Ratio between: Gelatinous zooplankton & Fish larvae, Copepods & Phytoplankton; Holoplankton & Meroplankton	plankton community not significantly influenced by anthropogenic drivers	As plankton are primarily influenced by climate and natural variability, difficulty lies in separating out the anthropogenic changes. The comparison between the changes in lifeform seasonal variability (see Annex III) occurring in coastal waters to those in the open ocean can help us distinguish between changes due to manageable anthropogenic pressures and those due to climate and natural variability. If a shift in lifeforms occurs in coastal waters concomitantly with a pressure event (nutrient loading, etc) and there is no corresponding shift in other coastal time-series or in the open ocean, the coastal shift could be a response to an anthropogenic pressure, especially if there is a correlation between the trend in lifeforms and anthropogenic	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	New Target	defined by 2012 & operational by 2014	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008), , all recommended targets could be operationalised now. There is, however, a need to operationalise the lifeform approach and this would require the following: • Completion of a map showing the	The plankton community is currently studied at a number of locations in UK waters (Figure 0- 2) and it is recommended that these should form the basis of a network of sampling stations. There are a number of gaps, for example there is limited sampling of zooplankton in coastal waters and it is important that sampling stations are located in all of the ecohydrodynamic water types within a region in order to make a representative assessment of GES of UK waters. A possible (and cost-effective) solution could be to undertake coastal zooplankton sampling concomitant to SEPA and the Environment Agency's phytoplankton monitoring programme which periodically collects phytoplankton samples in UK coastal waters, but that does not retain the zooplankton component. It is important that plankton sampling occurs in all of the ecohydrodynamic water types within UK waters (Figure 0 2). A map of ecohydrodynamic regions for the western shelf region of the UK is currently in development (Sonia Leeuwen, Cefas). Additional sampling stations (off shore and coastal for zooplankton) will need to be established around the UK as there are clear	Can be extracted from any dataset that identifies plankton using light microscopy and other methods that resolve to spp. level(SAHFOS, Marine Scotland sites, NOC, Cefas sites, AFBI, EA WFD, PML). Few coastal zooplankton time-series exist.	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	Directional / trend based targets (direction of change)	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).
5	5.2 Direct effects of nutrient enrichment	5.2.4 Species shift in floristic composition	Pelagic habitats	Change of plankton functional types (life form) index	Ratio between: Diatoms & Dinoflagellates; Ciliates & Microflagellates; Pseudo-nitzchia spp. & Other toxin producing dinoflagellates	plankton community not significantly influenced by anthropogenic drivers	As plankton are primarily influenced by climate and natural variability, difficulty lies in separating out the anthropogenic changes. The comparison between the changes in lifeform seasonal variability (see Annex III) occurring in coastal waters to those in the open ocean can help us distinguish between changes due to manageable anthropogenic pressures and those due to climate and natural variability. If a shift in lifeforms occurs in coastal waters concomitantly with a pressure event (nutrient loading, etc) and there is no corresponding shift in other coastal time-series or in the open ocean, the coastal shift could be a response to an anthropogenic pressure, especially if there is a correlation between the trend in lifeforms and anthropogenic	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to	New Target	defined by 2012 & operational by 2014	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008), , all recommended targets could be operationalised now. There is, however, a need to operationalise the lifeform approach and this would require the following: • Completion of a map showing the	The plankton community is currently studied at a number of locations in UK waters (Figure 0- 2) and it is recommended that these should form the basis of a network of sampling stations. There are a number of gaps, for example there is limited sampling of zooplankton in coastal waters and it is important that sampling stations are located in all of the ecohydrodynamic water types within a region in order to make a representative assessment of GES of UK waters. A possible (and cost-effective) solution could be to undertake coastal zooplankton sampling concomitant to SEPA and the Environment Agency's phytoplankton monitoring programme which periodically collects phytoplankton samples in UK coastal waters, but that does not retain the zooplankton component. It is important that plankton sampling occurs in all of the ecohydrodynamic water types within UK waters (Figure 0 2). A map of ecohydrodynamic regions for the western shelf region of the UK is currently in development (Sonia Leeuwen, Cefas). Additional sampling stations (off shore and coastal for zooplankton) will need to be established around the UK as there are clear	Can be extracted from any dataset that identifies plankton using light microscopy and other methods that resolve to spp. level(SAHFOS, Marine Scotland sites, NOC, Cefas sites, AFBI, EA WFD, PML). Few coastal zooplankton time-series exist. Nano and pico plankton data are very scare due to their small size so efforts would have to be made to add sampling of this component to most existing time-series.	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to		The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).
6	6.2 Condition of benthic community	6.2.2: Multi-metric indexes assessing benthic community condition and functionality	Pelagic habitats	Change of plankton functional types (life form) index	Life forms: Holoplanktotn, meroplanktotn	plankton community not significantly influenced by anthropogenic drivers	As plankton are primarily influenced by climate and natural variability, difficulty lies in separating out the anthropogenic changes. The comparison between the changes in lifeform seasonal variability (see Annex III) occurring in coastal waters to those in the open ocean can help us distinguish between changes due to manageable anthropogenic pressures and those due to climate and natural variability. If a shift in lifeforms occurs in coastal waters concomitantly with a pressure event (nutrient loading, etc) and there is no corresponding shift in other coastal time-series or in the open ocean, the coastal shift	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the	New Target	defined by 2012 & operational by 2014	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008), , all recommended targets could be operationalised now. There	The plankton community is currently studied at a number of locations in UK waters (Figure 0- 2) and it is recommended that these should form the basis of a network of sampling stations. There are a number of gaps, for example there is limited sampling of zooplankton in coastal waters and it is important that sampling stations are located in all of the ecohydrodynamic water types within a region in order to make a representative assessment of GES of UK waters. A possible (and cost-effective) solution could be to undertake coastal zooplankton sampling concomitant to SEPA and the Environment Agency's phytoplankton monitoring programme which periodically collects phytoplankton samples in UK coastal waters, but that does not retain the zooplankton component. It is important that plankton sampling occurs in all of the ecohydrodynamic water types within UK waters (Figure 0 2). A map of ecohydrodynamic regions for the western shelf region of the UK is currently in development (Sonia Leeuwen, Cefas). Additional sampling stations (off shore and coastal for zooplankton) will need to be established around the UK as there are clear	Can be extracted from any dataset that identifies plankton using light microscopy and other methods that resolve to spp. level(SAHFOS, Marine Scotland sites, NOC, Cefas sites, AFBI, EA WFD, PML). Few coastal zooplankton time-series exist.	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the	Directional / trend based targets (direction of change)	The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).
1	1.4 Habitat distribution	1.4.1 Distributional range	Rock and biogenic reef habitats	Distributional range of habitat	Location of habitat (NGR / lat/long)	Range is stable or increasing and not smaller than the baseline value (Favourable Reference Range for HD habitats)	Target applies to all listed (special) & predominant habitat types. A favourable reference range will be established for each habitat.	Different baselines may need to be used, depending on data availability - see Column S.	Existing Target	defined by 2012 & operational by 2014	Habitats Directive	Additional monitoring of Annex I Reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.	
1	1.4 Habitat distribution	1.4.2 Distributional pattern	Rock and biogenic reef habitats	Distributional pattern of habitat	Spatial extent of habitat (ha) Location of habitat (NGR / lat/long) Spatial distribution of habitat (NGR / Lat/long) Boundary of habitat (NGR /lat/long)	Spatial distribution is stable	Target applies to all listed (special) & predominant habitat types.	Different baselines may need to be used, depending on data availability - see Column S.	New Target	defined by 2012 & operational by 2014	New	Yes	All monitoring of Annex I Reef is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.	
1	1.5 Habitat extent	1.5.1 Habitat Area	Rock and biogenic reef habitats	Area of subtidal biogenic structures	Area measured in ha OR number of units of occurrence (1km2?).	Area is stable or increasing and not smaller than the baseline value (Favourable Reference Area for HD habitats)	Target applies to all listed (special) & predominant habitat types. A favourable reference area will be established for each habitat.	Different baselines may need to be used, depending on data availability - see Column S.	Existing Target	defined by 2012 & operational by 2014	Habitats Directive	Additional monitoring of Annex I Reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.	

1	1.5 Habitat extent	1.5.1 Habitat Area	Rock and biogenic reef habitats	Area of intertidal rock	Area measured in km2 or linear extent	Area is stable or increasing and not smaller than the baseline value (Favourable Reference Area for HD habitats)	Target applies to all listed (special) & predominant habitat types. Energy / exposure sub-types should be considered in application of the target. A favourable reference area will be established for each habitat.	Different baselines may need to be used, depending on data availability - see Column S.	Existing Target	defined by 2012 & operational by 2014	Habitats Directive	Additional monitoring of Annex I Reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.
1	1.5 Habitat extent	1.5.1 Habitat Area	Rock and biogenic reef habitats	Area of subtidal rock	area measured as km2 / m2	Area is stable or increasing and not smaller than the baseline value (Favourable Reference Area for HD habitats)	Target applies to all listed (special) & predominant habitat types. Energy / exposure sub-types should be considered in application of the target.	Different baselines may need to be used, depending on data availability - see Column S.	Existing Target	defined by 2012 & operational by 2014	Habitats Directive	Additional monitoring of Annex I Reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.
1	1.5 Habitat extent	1.5.1 Habitat Area	Rock and biogenic reef habitats	Area of littoral chalk habitat	area measured as km2 or linear extent	Area is stable or increasing and not smaller than the baseline value (Favourable Reference Area for HD habitats)	Target applies to all listed (special) & predominant habitat types. A favourable reference area will be established for each habitat.	Different baselines may need to be used, depending on data availability - see Column S.	Existing Target	defined by 2012 & operational by 2014	Habitats Directive	Additional monitoring of Annex I Reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.
1	1.5 Habitat extent	1.5.1 Habitat Area	Rock and biogenic reef habitats	Area of intertidal sea caves	Number of intertidal sea caves	Area is stable or increasing and not smaller than the baseline value (Favourable Reference Area for HD habitats)	Target applies to all listed (special) & predominant habitat types. A favourable reference area will be established for each habitat.	Different baselines may need to be used, depending on data availability - see Column S.	Existing Target	defined by 2012 & operational by 2014	Habitats Directive	Additional monitoring of Annex I sea caves may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Abundance of typical species on biogenic reef	Species composition/ richness	Maintain current species richness / diversity of biogenic structures	Target applies to all biogenic reefs. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Different baselines may need to be used - Extant data from some locations exists	New Target	defined by 2012 & operational by 2014	New	Additional monitoring (specifically wider geographic coverage) of Annex I reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive. Application/monitoring of condition indicators have been focused largely with SACs.	Mixture of approaches (details in comments)	Target set as deviation from baseline	Rees et al . 2008; Sanderson et al. 2008.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Density of biogenic reef forming species	Numbers per unit area	Maintain current density of biogenic species at known locations with biogenic structures	Target applies to all biogenic reefs. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Different baselines may need to be used - Probably needs to be site specific until state model is understood E.g. Rees et al. 2008	New Target	defined by 2012 & operational by 2014	New	Additional monitoring (specifically wider geographic coverage) of Annex I reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive. Application/monitoring of condition indicators have been focused largely with SACs.	C) Current baseline	Target set as deviation from baseline	Rees et al . 2008; Sanderson et al. 2008.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Subtidal species composition & abundance (sponge anthozoan community)	Abundance of taxa and/or % cover of taxon groups or diversity indices	Subtidal species composition is maintained	Target applies to subtidal reef. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Different baselines may need to be used.	New Target	operational by 2018	New	Additional monitoring (specifically wider geographic coverage) of Annex I reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive. Application/monitoring of condition indicators have been focused largely with SACs.	E) Purely expert judgement	Target set as deviation from baseline	
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Sponge diversity	Morphological richness and diversity measures	Sponge morphological diversity / richness is maintained within regional seas	Target applies to subtidal reef. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Different baselines may need to be used - Baselines from Wales but model response needs testing for Atlantic Europe	New Target	operational by 2018	New	Additional monitoring (specifically wider geographic coverage) of Annex I reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive. Application/monitoring of condition indicators have been focused largely with SACs.	Ai) Existing/Current reference conditions	Target set as deviation from baseline	Literature by Bell.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Intertidal species composition & abundance	Abundance and presence of species from full land reduced lists	Macroalgal species composition is maintained within regional seas	Target applies to intertidal reef. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	As for WFD tool (Reference conditions)	Existing Target	operational now	WFD	Additional monitoring (specifically wider geographic coverage) of Annex I reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive. Application/monitoring of condition indicators have been focused largely with SACs. This tool has to date been used in a WFD context.	Aiii) Modelling of reference conditions	Target set as deviation from baseline	Wilkinson et al.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Epifaunal indicator species	Abundance per unit of area for e.g. erect indicator taxa	Proportion of erect fauna are maintained in circalittoral habitats	This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Different baselines may need to be used - Impact gradient models may be needed in stratified habitat types to establish appropriate target levels	New Target	defined by 2012 & operational by 2014	New	Additional monitoring (specifically wider geographic coverage) of Annex I reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive. Application/monitoring of condition indicators have been focused largely with SACs.	Mixture of approaches (details in comments)	Absolute Value (target set as baseline)	Evidence for sensitive species in circalittoral and deep sea habitats needs to be compiled.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Boulder turning index	Percentage cover of key species	Proportion of boulders with reference proportions of indicator biota	This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Different baselines may need to be used - Some data from Wales and N. France	New Target	defined by 2012 & operational by 2014	New	Additional monitoring (specifically wider geographic coverage) of Annex I reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive. Application/monitoring of condition indicators have been focused largely with SACs.	C) Current baseline	Directional / trend based targets (direction of change)	Need for research to clinch environmental model. Recent French work may suffice.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Intertidal community indicator (MarClim)	SACFORN scale abundance. Semi-logarithmic abundance scale: Superabundant/Abundant/Common/Frequent/Occasional/Rare/Not seen. Rocky intertidal invertebrates Rocky intertidal macroalgae	Maintain native intertidal biodiversity	Target applies to intertidal reef. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Different baselines may need to be used - based on MBA MarClim data	New Target	defined by 2012 & operational by 2014	New	Additional monitoring (specifically wider geographic coverage) of Annex I reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive. This indicator is in use for annual surveys since 2002 in UK for MarClim but incomplete geographic coverage.	Mixture of approaches (details in comments)	Directional / trend based targets (rate of change)	MarClim www.mba.ac.uk/marclim

1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Kelp depth and kelp park depth	Max depth bcd at which kelp occurs and at which a specific density of kelp occurs.	Maintain the depth of kelp communities within a regional context	Target applies to subtidal reef. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Different baselines may need to be used. Data available for parts of Wales to help set baselines. Historic data may also be retrievable from elsewhere.	New Target	operational by 2018	New	Additional monitoring (specifically wider geographic coverage) of Annex I reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive. Application/monitoring of condition indicators have been focused largely with SACs.	C) Current baseline	Target set as deviation from baseline	Trials suggest good repeatable indicator. Care needed in site selection with appropriate geology. Links to turbidity need confirmation
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Impact/Vulnerability of habitat to 'Penetration and/or disturbance of the substrate below the surface of the seabed' (Physical pressure)	Level of exposure of habitat to pressure 'Penetration and/or disturbance of the substrate below the surface of the seabed'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures).	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014		Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Impact/Vulnerability of habitat to 'Shallow abrasion/penetration: damage to seabed surface and penetration' (Physical pressure)	Level of exposure of habitat to pressure 'Shallow abrasion/penetration: damage to seabed surface and penetration'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014		Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Impact/Vulnerability of habitat to 'Surface abrasion: damage to seabed surface features' (Physical pressure)	Level of exposure of habitat to pressure 'Surface abrasion: damage to seabed surface features'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014		Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Impact/Vulnerability of habitat to 'Removal of target species' (Biological pressure)	Level of exposure of habitat to pressure 'Removal of target species'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014		Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Rock and biogenic reef habitats	Impact/Vulnerability of habitat to 'Removal of non-target species' (Biological pressure)	Level of exposure of habitat to pressure 'Removal of non-target species'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014		Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
6	6.1 Physical damage having regard to substrate characteristics	6.1.2 Extent of the seabed significantly affected by human activities for the different substrate types	Rock and biogenic reef habitats	Impact/Vulnerability of habitat to 'Penetration and/or disturbance of the substrate below the surface of the seabed' (Physical pressure)	Level of exposure of habitat to pressure 'Penetration and/or disturbance of the substrate below the surface of the seabed'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures).	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014		Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
6	6.1 Physical damage having regard to substrate characteristics	6.1.2 Extent of the seabed significantly affected by human activities for the different substrate types	Rock and biogenic reef habitats	Impact/Vulnerability of habitat to 'Shallow abrasion/penetration: damage to seabed surface and penetration' (Physical pressure)	Level of exposure of habitat to pressure 'Shallow abrasion/penetration: damage to seabed surface and penetration'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014		Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
6	6.1 Physical damage having regard to substrate characteristics	6.1.2 Extent of the seabed significantly affected by human activities for the different substrate types	Rock and biogenic reef habitats	Impact/Vulnerability of habitat to 'Surface abrasion: damage to seabed surface features' (Physical pressure)	Level of exposure of habitat to pressure 'Surface abrasion: damage to seabed surface features'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014		Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
6	6.1 Physical damage having regard to substrate characteristics	6.1.1 Type, abundance, biomass and areal extent of relevant biogenic substrate	Rock and biogenic reef habitats	Area of subtidal biogenic structures	Area measured in ha OR number of units of occurrence (Skm2?).	Area is stable or increasing and not smaller than the baseline value (Favourable Reference Area for HD habitats)	Target applies to all listed (special) & predominant habitat types. A favourable reference area will be established for each habitat.	Different baselines may need to be used, depending on data availability - see Column S.	New Target	defined by 2012 & operational by 2014	Habitats Directive	Additional monitoring of Annex I Reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.
6	6.1 Physical damage having regard to substrate characteristics	6.1.1 Type, abundance, biomass and areal extent of relevant biogenic substrate	Rock and biogenic reef habitats	Density of biogenic reef forming species	Numbers per unit area	Maintain current density of biogenic species at known locations with biogenic structures	Target applies to all biogenic reefs. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Different baselines may need to be used - Probably needs to be site specific until state model is understood E.g. Rees et al. 2008	New Target	defined by 2012 & operational by 2014	New	Additional monitoring (specifically wider geographic coverage) of Annex I reef may be required under the Habitats Directive	All monitoring of Annex I Reef is conducted under the Habitats Directive. Application/monitoring of condition indicators have been focused largely with SACs.	C) Current baseline	Target set as deviation from baseline	Rees et al . 2008; Sanderson et al. 2008.
1	1.4 Habitat distribution	1.4.1 Distributional range	Sediment habitats	Distributional range of habitat	Location of habitat (NGR / lat/long)	Range is stable or increasing and not smaller than the baseline value (Favourable Reference Range for HD habitats)	Target applies to all listed (special) & predominant habitat types.	Different baselines may need to be used, depending on data availability - see Column S.	New Target	defined by 2012 & operational by 2014	Habitats Directive	Yes	Some monitoring of Annex I Sediment Habitats (e.g. Shallow Sandbanks) is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.
1	1.4 Habitat distribution	1.4.2 Distributional pattern	Sediment habitats	Distributional pattern of habitat	Spatial extent of habitat (ha) Location of habitat (NGR / lat/long) Spatial distribution of habitat (NGR / Lat/long) Boundary of habitat (NGR /lat/long)	Spatial distribution is stable	Target applies to all listed (special) & predominant habitat types.	Different baselines may need to be used, depending on data availability - see Column S.	New Target	defined by 2012 & operational by 2014	New	Yes	Some monitoring of Annex I Sediment Habitats (e.g. Shallow Sandbanks) is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.

1	1.5 Habitat extent	1.5.1 Habitat Area	Sediment habitats	Area of sediment habitat	Spatial extent of habitat (ha)	**Option 1**: area of habitat lost + area of habitat below GES ≤ 10% **Option 2:** area of habitat lost + area of habitat below GES ≤ 15%	Predominant habitat types	Different baselines may need to be used, depending on data availability - see Column S.	New Target	defined by 2012 & operational by 2014	New	Yes	Some monitoring of Annex I Sediment Habitats (e.g. Shallow Sandbanks) is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.
1	1.5 Habitat extent	1.5.1 Habitat Area	Sediment habitats	Area of sediment habitat	Spatial extent of habitat (ha)	Area is stable or increasing and not smaller that the baseline value (Favourable Reference Area for HD habitats) WFD extent targets for saltmarsh and seagrass should be used within WFD boundaries as appropriate. These ensure Good Ecological Status of benthic invertebrates, macroalgae and angiosperms. No deterioration between classes for High/Good/Moderate/Poor/Bad classifications of water bodies permitted under WFD. For seagrass good/moderate boundary is >30% loss **at the waterbody level**.	All listed (special) habitat types	Different baselines may need to be used, depending on data availability - see Column S.	New Target	defined by 2012 & operational by 2014	Habitats Directive and WFD	Yes	Some monitoring of Annex I Sediment Habitats (e.g. Shallow Sandbanks) is conducted under the Habitats Directive.	Mixture of approaches **(but see explanation in Column S)**	Absolute Value (target set as baseline) OR Target set as deviation from baseline **(See explanation in Column R)**	Indicator specified in Commission Decision is already used across multiple policy obligations e.g. Habitats Directive.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Sediment habitats	WFD seagrass tool	Ecological Quality Ratio based on the species composition, density and extent of cover of seagrass communities	Targets should be aligned with those set under WFD. These ensure Good ecological status of angiosperms. No deterioration between classes for High/Good/Moderate/Poor/Bad classifications of water bodies permitted under WFD.	applies to special habitat 'Zostera'. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Reference conditions are derived using a combination of historic data and expert judgement	Existing Target	operational now	WFD	Monitoring for WFD can be adapted and extended where necessary	WFD	Mixture of approaches (details in comments)	Target set as deviation from baseline	Evidence base considered in detail for WFD tool development
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Sediment habitats	Infaunal Quality Index	Ecological Quality Ratio based on the sensitivity, richness and diversity (evenness) of benthic communities	Targets should be aligned with those set under WFD. These ensure Good ecological status of benthic invertebrates. No deterioration between classes for High/Good/Moderate/Poor/Bad classifications of water bodies permitted under WFD.	Proposed for all predominant habitats as well as the special habitat, intertidal mudflats. However - It is currently not applicable to coarse habitats and for assessing response to physical pressures. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Reference conditions are derived using a combination of best available low pressure data and expert judgement with reference conditions being adapted according to habitat.	Existing Target	operational now	WFD	Monitoring for WFD can be adapted and extended where necessary	WFD	Mixture of approaches (details in comments)	Target set as deviation from baseline	Evidence base considered in detail for WFD tool development
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Sediment habitats	Opportunistic macroalgae	Identification and collection for measurement of macroalgal bloom algae (opportunistic nuisance weed) at a shore site, for the purpose of estimating the Ecological Quality Ratio	Targets should be aligned with those set under WFD. These ensure Good ecological status of macroalgae. No deterioration between classes for High/Good/Moderate/Poor/Bad classifications of water bodies permitted under WFD.	applicable to intertidal mudflats (and possibly sandflats) in coastal and transitional waters. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Reference conditions are derived using a combination of historic data and expert judgement	Existing Target	operational now	WFD	Monitoring for WFD can be adapted and extended where necessary	WFD	Mixture of approaches (details in comments)	Target set as deviation from baseline	Evidence base considered in detail for WFD tool development
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Sediment habitats	Saltmarsh WFD classification tool	Ecological Quality ratio based on the diversity, extent and zonation of intertidal saltmarsh habitats	Targets should be aligned with those set under WFD. These ensure Good ecological status of angiosperms. No deterioration between classes for High/Good/Moderate/Poor/Bad classifications of water bodies permitted under WFD.	applies to special habitat 'Atlantic salt meadows (Glauco-Puccinellietalia maritimae)' and other special habitats as appropriate (this indicator is still under development). This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	Reference conditions are derived using a combination of historic data and expert judgement	Existing Target	defined by 2012 & operational by 2014	WFD	Monitoring for WFD can be adapted and extended where necessary	WFD	Mixture of approaches (details in comments)	Target set as deviation from baseline	Evidence base considered in detail for WFD tool development
1	1.6 Habitat condition	1.6.3 Physical, hydrological & chemical conditions	Sediment habitats	Sediment profile imaging	Benthic Habitat Quality (BHQ) derived from Sediment profile imaging	BHQ in appropriate range according to Rosenburg et al 2009.	Applicable to soft sediments but methodology not fully developed and could be issues with mobile coarse sediment and the deep sea - applicable to all habitats as this indicator repeated across habitats. This indicator and target can also be used to assess criterion 6.2 (condition of benthic community).	E) Purely expert judgement	New Target	defined by 2012 & operational by 2014	New	Yes. For both Sediment profile imaging and also for accompanying ground-truth surveys	None	E) Purely expert judgement	Target set as deviation from baseline	Rosenberg et al 2009 for BHQ and various for Sediment profile imaging (see report).
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Sediment habitats	Impact/Vulnerability of habitat to 'Penetration and/or disturbance of the substrate below the surface of the seabed' (Physical damage)	Level of exposure of habitat to pressure 'Penetration and/or disturbance of the substrate below the surface of the seabed'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Sediment habitats	Impact/Vulnerability of habitat to 'Shallow abrasion/penetration: damage to seabed surface and penetration' (Physical damage)	Level of exposure of habitat to pressure 'Shallow abrasion/penetration: damage to seabed surface and penetration'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Sediment habitats	Impact/Vulnerability of habitat to 'Surface abrasion: damage to seabed surface features' (Physical damage)	Level of exposure of habitat to pressure 'Surface abrasion: damage to seabed surface features'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.

1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Sediment habitats	Impact/Vulnerability of habitat to 'Removal of target species' (Biological pressure)	Level of exposure of habitat to pressure 'Removal of target species'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
1	1.6 Habitat condition	1.6.1 Condition of the typical species and communities	Sediment habitats	Impact/Vulnerability of habitat to 'Removal of non-target species' (Biological pressure)	Level of exposure of habitat to pressure 'Removal of non-target species'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
6	6.1 Physical damage having regard to substrate characteristics	6.1.2 Extent of the seabed significantly affected by human activities for the different substrate types	Sediment habitats	Impact/Vulnerability of habitat to 'Penetration and/or disturbance of the substrate below the surface of the seabed' (Physical damage)	Level of exposure of habitat to pressure 'Penetration and/or disturbance of the substrate below the surface of the seabed'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
6	6.1 Physical damage having regard to substrate characteristics	6.1.2 Extent of the seabed significantly affected by human activities for the different substrate types	Sediment habitats	Impact/Vulnerability of habitat to 'Shallow abrasion/penetration: damage to seabed surface and penetration' (Physical damage)	Level of exposure of habitat to pressure 'Shallow abrasion/penetration: damage to seabed surface and penetration'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.
6	6.1 Physical damage having regard to substrate characteristics	6.1.2 Extent of the seabed significantly affected by human activities for the different substrate types	Sediment habitats	Impact/Vulnerability of habitat to 'Surface abrasion: damage to seabed surface features' (Physical damage)	Level of exposure of habitat to pressure 'Surface abrasion: damage to seabed surface features'	Level of exposure to pressure should not result in more than 'Moderate Impact/Vulnerability' of the habitat (dependent on the sensitivity of the habitat to this pressures)	Target applies to all listed (special) & predominant habitat types.	Current baseline	New Target	defined by 2012 & operational by 2014	Benthic Habitat sensitivity assessments undertaken via NE/JNCC Marine Conservation Zone project	Additional monitoring of pressures may be required and will be covered by the UK Biodiversity Monitoring Programme.	Physical damage and removal of species already being mapped/monitored by Cefas. JNCC Marine Ecosystem Team also developing maps of benthic habitat impact/vulnerability over next year.	Mixture of approaches **(but see explanation in Column S)**	Target (threshold in this case) set as deviation from baseline	High priority pressure indicator in terms of relative impact on benthic habitats.

Evidence-base_for_target_DETAILS	Evidence-base_for_baseline_DETAILS	Comments on indicator	Comments on targets	North East Atlantic Scale?	OSPAR Region?	UK Regional Sea (CP2)?	CSEG Regional Sea?	Local Scale (e.g. MPA / WFD waterbody)	Patch scale (e.g. seagrass bed)
UK & Ireland seabird censuses (e.g. Mitchell et al. (2004) Seabird Populations of Britain & Ireland. T & ADPoyser, 511pp.)	UK & Ireland seabird censuses (e.g. Mitchell et al. (2004) Seabird Populations of Britain & Ireland. T & ADPoyser, 511pp.) Need clear criteria for selecting baseline years.		For breeding seabird colony distribution targets a pragmatic approach to reporting on changes to the distribution of colonies has been proposed. UK regional sea boundaries would be too large even to pick up substantial changes in distribution and pattern . Seabird censuses have used admin areas (e.g. English counties and Scottish vice-counties) as the reporting unit for seabird distributional range and pattern, given that other units e.g. 10km grid squares do not work well with discrete colonies that are often dissected by OS grids. Admin area recording does also enable feedback to processes and policies at a local level at which measures may be implemented.	Yes	Yes	Yes	Yes	No	No
Target set in accordance with the precision of estimated trends from the new time series i.e. ability to detect significant change.	Baseline set at start of new time series.	Such an indicator would be unsuitable for inshore and offshore aggregations of seabird species (except inshore gull roosts) that tend to be more wide-ranging than inshore waterbird species because the extremities of the range of wide-ranging species are unlikely provide an indicator of GES. More pertinent to GES of wide-ranging seabirds at sea will be an indicator of distributional pattern (1.1.2) that will detect changes in the distribution of high and low density areas that may be linked to the distribution and intensity of pressures.		Yes	Yes	Yes	Yes	No	No
	Need clear criteria for selecting baseline years.	These surveys known to have gaps. Need GIS file of MSFD area to select relevant data for non-transitional waters		Yes	Yes	Yes	Yes	No	No
	Need clear criteria for selecting baseline years.	These surveys known to have gaps. Need GIS file of MSFD area to select relevant data for non-transitional waters		Yes	Yes	Yes	Yes	No	No
	Need clear criteria for selecting baseline years.		For breeding seabird colony distribution targets a pragmatic approach to reporting on changes to the distribution of colonies has been proposed. UK regional sea boundaries would be too large even to pick up substantial changes in distribution and pattern . Seabird censuses have used admin areas (e.g. English counties and Scottish vice-counties) as the reporting unit for seabird distributional range and pattern, given that other units e.g. 10km grid squares do not work well with discrete colonies that are often dissected by OS grids. Admin area recording does also enable feedback to processes and policies at a local level at which measures may be implemented.	Yes	Yes	Yes	Yes	No	No
Target set in accordance with the precision of estimated trends from the new time series i.e. ability to detect significant change.	Baseline set at start of new time series.			Yes	Yes	Yes	Yes	No	No
Target set in accordance with the precision of estimated trends from the new time series i.e. ability to detect significant change.	Baseline set at start of new time series.	An indicator of distributional pattern (1.1.2) is more pertinent to GES of wide-ranging seabirds that an indicator of distributional range (1.1.1). An indicator of distributional pattern should detect changes in the distribution of high and low density areas that may be linked to the distribution and intensity of pressures. Whereas, an indicator of range would be unsuitable for inshore and offshore aggregations of seabird species that tend to be more wide-ranging than inshore waterbird species because the extremities of the range of wide-ranging species are unlikely provide an indicator of GES.		Yes	Yes	Yes	Yes	No	No
	Need clear criteria for selecting baseline years.			Yes	Yes	Yes	Yes	No	No
	Need clear criteria for selecting baseline years.			Yes	Yes	Yes	Yes	No	No
ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator. ICES CM 2008/LRC:06. 60 pp. ICES. 2010. Report of the Working Group on Seabird Ecology (WGSE), ICES CM 2010/SSGEF:10. 77 pp.	ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator. ICES CM 2008/LRC:06. 60 pp. ICES. 2010. Report of the Working Group on Seabird Ecology (WGSE), ICES CM 2010/SSGEF:10. 77 pp.	RE. Breeding seabirds - same indicators as recommended for OSPAR draft EcoQO on seabird population trends as an index of seabird community health. UK Seabird Monitoring Programme currently reports on UK species specific trends in abundance of breeding seabirds at http://jncc.defra.gov.uk/page-3201. Re. breeding waterbirds - monitoring is known to have gaps. Need GIS file of MSFD area to select relevant data for non-transitional waters.	Target based on an OSPAR draft EcoQO on seabird population trends as an index of seabird community health. EcoQO is currently under development.	Yes	Yes	Yes	No	No	No
ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator. ICES CM 2008/LRC:06. 60 pp. ICES. 2010. Report of the Working Group on Seabird Ecology (WGSE), ICES CM 2010/SSGEF:10. 77 pp.	ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator. ICES CM 2008/LRC:06. 60 pp. ICES. 2010. Report of the Working Group on Seabird Ecology (WGSE), ICES CM 2010/SSGEF:10. 77 pp.	Same as indicators recommended for OSPAR draft EcoQO on seabird population trends as an index of seabird community health. UK Seabird Monitoring Programme currently reports on UK species specific trends in abundance of breeding seabirds at http://jncc.defra.gov.uk/page-3201	Target based on an OSPAR draft EcoQO on seabird population trends as an index of seabird community health. EcoQO is currently under development.	Yes	Yes	Yes	No	No	No
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Targets to be set in accordance with the precision of estimated trends from the new time series i.e. ability to detect significant change.	a) non-breeding shorebirds - Need clear criteria for selecting baseline years. b) inshore non-breeding waterbirds and seabirds at sea require baseline to be set at start of new time series.			Yes	Yes	Yes	No	No	No

Targets equal 95% confidence limits around a statistically significant relationship between breeding success of kittiwakes and local sea-surface temperature SST (in winter 2 years previous) at individual colonies (i.e. where 95% of breeding success values would lie if the relationship with SST is true). The relationship with SST is thought to be related to interannual variation in sandeel recruitment and availability. Known additional measurable impact of presence of sandeel fisheries at some colonies. See Frederiksen et al. (2004 J Animal Ecol, 41: 1129–1139 ; 2007 Mar Ecol Prog Ser 352: 205–211.) Breeding success should be within the target band in at least five years in each six year reporting cycle, in order to allow for natural stochastic events that may depress breeding success (e.g. heavy rainfall).	Statistically significant relationship between breeding success of kittiwakes and local sea-surface temperature (in winter 2 years previous) at individual colonies; thought to be related to interannual variation in sandeel recruitment and availability. Known additional measurable impact of presence of sandeel fisheries at some colonies. See Frederiksen et al. (2004 J Animal Ecol, 41: 1129–1139 ; 2007 Mar Ecol Prog Ser 352: 205–211.)	UK Seabird Monitoring Programme currently reports on UK species specific trends in abundance of breeding seabirds at http://jncc.defra.gov.uk/page-3201. Need to investigate applicability to other species (e.g. Guillemot, Fulmar & Shag)	OSPAR tried to develop an EcoQO on kittiwake breeding success but this used an absolute value target of 0.6 chicks per pair, which did not take into account the effect of climatic variation on kittiwake breeding success. Further work needed to determine assessment areas and determine appropriate target levels.	Yes	Yes	Yes	No	No	No
there is no strong evidence base for the target values proposed. The aim of the target (<5-15% of colonies) is to ensure that only a small proportion of colonies fail per year, probably due to local problems, rather than any large scale anthropogenic impact. the aim of the target of 3 years out of six is to ensure that the cumulative effect of successive failures does not have a significant impact on recruitment into on the UK or regional population.		UK Seabird Monitoring Programme currently reports on UK species specific trends in breeding success of seabirds at http://jncc.defra.gov.uk/page-3201.		Yes	Yes	Yes	No	No	No
Requires population modelling to estimate levels of adult survival (along with concurrent rates of breeding success and other parameters) that would be required to meet target s for Population Size (criterion 1.2).				Yes	Yes	Yes	No	No	No
Ratcliffe at al. (2009 - Ibis 151, 699–708) fully justify why key colonies were selected and why all should be maintain rat free or eradicated of rats.		Monitoring of a pressure and also of a measure where eradication has been conducted and quarantine is in place	Ratcliffe at al. (2009 - Ibis 151, 699–708) list 16 colonies that are important for burrow-nesting petrels and shearwaters an should be maintained free of non-native mammal predators such as rat and mink. They also list 19 other islands where rats would be eradicated from in order to create suitable and safe nesting habitat for petrels and shearwaters and other ground-nesting seabirds.	Yes	Yes	Yes	Yes	Yes	Yes
Requires population modelling to estimate the levels of adult mortality that could be sustained (along with concurrent rates of breeding success and other parameters) and still achieve targets for Population Size (criterion 1.2).				Yes	Yes	Yes	Yes	Yes	Yes
Targets equal 95% confidence limits around a statistically significant relationship between breeding success of kittiwakes and local sea-surface temperature SST (in winter 2 years previous) at individual colonies (i.e. where 95% of breeding success values would lie if the relationship with SST is true). The relationship with SST is thought to be related to interannual variation in sandeel recruitment and availability. Known additional measurable impact of presence of sandeel fisheries at some colonies. See Frederiksen et al. (2004 J Animal Ecol, 41: 1129–1139 ; 2007 Mar Ecol Prog Ser 352: 205–211.) Breeding success should be within the target band in at least five years in each six year reporting cycle, in order to allow for natural stochastic events that may depress breeding success (e.g. heavy rainfall).	Statistically significant relationship between breeding success of kittiwakes and local sea-surface temperature (in winter 2 years previous) at individual colonies; thought to be related to interannual variation in sandeel recruitment and availability. Known additional measurable impact of presence of sandeel fisheries at some colonies. See Frederiksen et al. (2004 J Animal Ecol, 41: 1129–1139 ; 2007 Mar Ecol Prog Ser 352: 205–211.)	UK Seabird Monitoring Programme currently reports on UK species specific trends in abundance of breeding seabirds at http://jncc.defra.gov.uk/page-3201. Need to investigate applicability to other species (e.g. Guillemot, Fulmar & Shag)	OSPAR tried to develop an EcoQO on kittiwake breeding success but this used an absolute value target of 0.6 chicks per pair, which did not take into account the effect of climatic variation on kittiwake breeding success. Further work needed to determine assessment areas and determine appropriate target levels.	Yes	Yes	Yes	No	No	No
ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator. ICES CM 2008/LRC:06. 60 pp. ICES. 2010. Report of the Working Group on Seabird Ecology (WGSE), ICES CM 2010/SSGEF:10. 77 pp.	ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator. ICES CM 2008/LRC:06. 60 pp. ICES. 2010. Report of the Working Group on Seabird Ecology (WGSE), ICES CM 2010/SSGEF:10. 77 pp.	RE. Breeding seabirds - same indicators as recommended for OSPAR draft EcoQO on seabird population trends as an index of seabird community health. UK Seabird Monitoring Programme currently reports on UK species specific trends in abundance of breeding seabirds at http://jncc.defra.gov.uk/page-3201. Re. breeding waterbirds - monitoring is known to have gaps. Need GIS file of MSFD area to select relevant data for non-transitional waters.	Target based on an OSPAR draft EcoQO on seabird population trends as an index of seabird community health. EcoQO is currently under development.	Yes	Yes	Yes	No	No	No
ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator. ICES CM 2008/LRC:06. 60 pp. ICES. 2010. Report of the Working Group on Seabird Ecology (WGSE), ICES CM 2010/SSGEF:10. 77 pp.	ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator. ICES CM 2008/LRC:06. 60 pp. ICES. 2010. Report of the Working Group on Seabird Ecology (WGSE), ICES CM 2010/SSGEF:10. 77 pp.	Same as indicators recommended for OSPAR draft EcoQO on seabird population trends as an index of seabird community health. UK Seabird Monitoring Programme currently reports on UK species specific trends in abundance of breeding seabirds at http://jncc.defra.gov.uk/page-3201	Target based on an OSPAR draft EcoQO on seabird population trends as an index of seabird community health. EcoQO is currently under development.	Yes	Yes	Yes	No	No	No
ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator. ICES CM 2008/LRC:06. 60 pp. ICES. 2010. Report of the Working Group on Seabird Ecology (WGSE), ICES CM 2010/SSGEF:10. 77 pp.	ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator. ICES CM 2008/LRC:06. 60 pp. ICES. 2010. Report of the Working Group on Seabird Ecology (WGSE), ICES CM 2010/SSGEF:10. 77 pp.	Same as indicators recommended for OSPAR draft EcoQO on seabird population trends as an index of seabird community health. UK Seabird Monitoring Programme currently reports on UK species specific trends in abundance of breeding seabirds at http://jncc.defra.gov.uk/page-3201	Target based on an OSPAR draft EcoQO on seabird population trends as an index of seabird community health. EcoQO is currently under development. NB. The current recommendations from ICES for a draft EcoQO on Seabird Population Trends include an upper bound of 130% for all species-specific indicators of abundance, but it would seem inappropriate in the context of GES, unless an increase in abundance of a particular species would have a detrimental effect on another species achieving GES.	Yes	Yes	Yes	No	No	No
Targets to be set in accordance with the precision of estimated trends from the new time series i.e. ability to detect significant change.	a) non-breeding shorebirds - Need clear criteria for selecting baseline years. b) inshore non-breeding waterbirds and seabirds at sea require baseline to be set at start of new time series.			Yes	Yes	Yes	No	No	No

The distributional range of harbour seal haulouts has been regularly monitored for core areas since 1988.	The distributional range of harbour seal haulouts has been regularly monitored for core areas since 1988.	This is a very basic indicator assessing change in the boundaries of range. It would also be useful to liaise with local groups in the south-west of England and Wales to assess whether an increase in range has occurred (e.g. Isles of Scilly, Anglesey, Poole and Chichester Harbours).	Target based on the range element of FCS reporting requirements under the Habitats Directive	Yes	Yes	Yes	No	No	No
The core distributional range of breeding grey seals has been regularly monitored since c1960s. Other areas are patchy.	The core distributional range of breeding grey seals has been regularly monitored since c1960s. Other areas are patchy.	This is a very basic indicator assessing change in the boundaries of range.	Target based on the range element of FCS reporting requirements under the Habitats Directive	Yes	Yes	Yes	No	No	No
The JCP analysis is underway to provide trends in cetacean distribution and abundance over time, including power to detect trends. Preliminary results based on the Irish Sea indicate a high level of power to detect small changes (equivalent to 1% decline per annum) for harbour porpoise, short-beaked common dolphin and bottlenose dolphin. Project completion expected March 2012.	JCP data	A time series could be constructed from the mid 1980s; statistical tools for describing and assessing significance of range change need to be agreed	Target based on the range element of FCS reporting requirements under the Habitats Directive. There is an obligation for this through ASCOBANS. JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.	Yes	Yes	Yes	No	No	No
The JCP analysis is underway to provide trends in cetacean distribution and abundance over time, including power to detect trends. Preliminary results based on the Irish Sea indicate a high level of power to detect small changes (equivalent to 1% decline per annum) for harbour porpoise, short-beaked common dolphin and bottlenose dolphin. Project completion expected March 2012.	JCP data	A time series could be constructed from the mid 1980s; statistical tools for describing and assessing significance of range change need to be agreed	Target based on the range element of FCS reporting requirements under the Habitats Directive. There is an obligation for this through ASCOBANS. JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.	Yes	Yes	Yes	No	No	No
The JCP analysis is underway to provide trends in cetacean distribution and abundance over time, including power to detect trends. Project completion expected March 2012.	JCP data	A time series could be constructed from the mid 1980s; statistical tools for describing and assessing significance of range change need to be agreed	Target based on the range element of FCS reporting requirements under the Habitats Directive. There is an obligation for this through ASCOBANS. JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.	Yes	Yes	Yes	No	No	No
The JCP analysis is underway to provide trends in cetacean distribution and abundance over time, including power to detect trends. Preliminary results based on the Irish Sea indicate a high level of power to detect small changes (equivalent to 1% decline per annum) for harbour porpoise, short-beaked common dolphin and bottlenose dolphin. Project completion expected March 2012.	JCP data	A time series could be constructed from the mid 1980s; statistical tools for describing and assessing significance of range change need to be agreed	Target based on the range element of FCS reporting requirements under the Habitats Directive. There is an obligation for this through ASCOBANS. JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.	Yes	Yes	Yes	No	No	No
The JCP analysis is underway to provide trends in cetacean distribution and abundance over time, including power to detect trends. Project completion expected March 2012.	JCP data	A time series could be constructed from the mid 1980s; statistical tools for describing and assessing significance of range change need to be agreed	Target based on the range element of FCS reporting requirements under the Habitats Directive. There is an obligation for this through ASCOBANS. JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.	Yes	Yes	Yes	No	No	No
The JCP analysis is underway to provide trends in cetacean distribution and abundance over time, including power to detect trends. Project completion expected March 2012.	JCP data	A time series could be constructed from the mid 1980s; statistical tools for describing and assessing significance of range change need to be agreed	Target based on the range element of FCS reporting requirements under the Habitats Directive. There is an obligation for this through ASCOBANS. JCP data are dispersed among many groups. This carries some risks of variability in data availability. Ideally only effort-related data should be used. Geographical biases may also exist.	Yes	Yes	Yes	No	No	No
The distribution within core areas has been regularly monitored since 1988. No analysis has been undertaken to provide an estimation of natural variability.	The distribution within core areas has been regularly monitored since 1988. No analysis has been undertaken to provide an estimation of natural variability.	There is a long time series of data for this, but no analysis has been undertaken; statistical tools for describing and assessing significance of range change need to be agreed.	Target based on the range element of FCS reporting requirements under the Habitats Directive. The suggested target is a pragmatic approach that may need revision in the future. Seal monitoring information should be examined to understand natural variability.	Yes	Yes	Yes	No	No	No
The breeding distribution within core areas has been regularly monitored since the 60s. No analysis has been undertaken to provide an estimation of natural variability.	The breeding distribution within core areas has been regularly monitored since the 60s. No analysis has been undertaken to provide an estimation of natural variability.	There is a long time series of data for this, but no analysis has been undertaken; statistical tools for describing and assessing significance of range change need to be agreed.	Target based on the range element of FCS reporting requirements under the Habitats Directive. The suggested target is a pragmatic approach that may need revision in the future. Seal monitoring information should be examined to understand natural variability.	Yes	Yes	Yes	No	No	No
Robust mark-recapture estimates	Robust mark-recapture estimates, based SCANS II Survey, which covered all of European continental shelf waters.	Some of necessary monitoring undertaken as part of SAC monitoring. Statistically significant means a 1/20 chance that the change caused by random fluctuation.	Target based on the population element of FCS reporting requirements under the Habitats Directive. There is also commitment for this work through ASCOBANS.	Yes	Yes	Yes	No	No	No
Robust line-transect estimates	Robust mark-recapture estimates, based SCANS II Survey, which covered all of European continental shelf waters.	Needs to be a NW European survey. Considerable complexity in organisation. Statistically significant means a 1/20 chance that the change caused by random fluctuation.	Target based on the population element of FCS reporting requirements under the Habitats Directive. There are also commitments for this work through ASCOBANS and OSPAR.	Yes	Yes	Yes	No	No	No
Robust line-transect estimates	Robust mark-recapture estimates, based SCANS II Survey, which covered all of European continental shelf waters.	Needs to be a NW European survey. Considerable complexity in organisation. Statistically significant means a 1/20 chance that the change caused by random fluctuation.	Target based on the population element of FCS reporting requirements under the Habitats Directive. There is also a commitment for this work through ASCOBANS.	Yes	Yes	Yes	No	No	No
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Since 1988, abundance at core sites has been assessed regularly.	Since 1988, abundance at core sites has been assessed regularly.		Baseline set as mean (and deviation) over, for example, 20 years. This could be improved after detailed examination of the data. Target based on the population element of FCS reporting requirements under the Habitats Directive and the OSPAR EcoQO.	Yes	Yes	Yes	No	No	No
Since 1960s, abundance at core sites has been assessed regularly.	Since 1960s, abundance at core sites has been assessed regularly.		Baseline set as mean (and deviation) over, for example, 20 years. This could be improved after detailed examination of the data. Target based on the population element of FCS reporting requirements under the Habitats Directive and the OSPAR EcoQO.	Yes	Yes	Yes	No	No	No
Pup production has been assessed at two sites: in the Wash (every 5 years) and Moray Firth (annually). Further sites (possibly SACs) will need to be added to this.	Pup production has been assessed at two sites: in the Wash (every 5 years) and Moray Firth (annually). Further sites (possibly SACs) will need to be added to this.	Existing data will need to be analysed to provide an indication of variability in pup production. Such an analysis will need to encompass other sites in Europe. Once completed, targets can be set. Evidence strong in existing sites only.	Target based on the population element of FCS reporting requirements under the Habitats Directive.	Yes	Yes	Yes	No	No	No

Pup production has regularly been assessed at a large number of sites since 1960s, although more accurate aerial techniques were introduced in 1984.	Pup production has regularly been assessed at a large number of sites since 1960s, although more accurate aerial techniques were introduced in 1984.	Grey seal abundance is modelled from pup production information with additional data input. Model refitted every year.	Target based on the population element of FCS reporting requirements under the Habitats Directive. There is also an OSPAR EcoQO.	Yes	Yes	Yes	No	No	No
Photo-id study of calves with known adult female dolphins	Photo-id study of calves with known adult female dolphins	Data quality may need further assurance	Target based on the population element of FCS reporting requirements under the Habitats Directive. There is also an obligation for this work through ASCOBANS.	Yes	Yes	Yes	No	No	No
Initial work was undertaken on genetic structure of harbour seal populations in UK and Europe in the 90s. This has recently been repeated with more samples and greater microsatellite loci coverage. Once these results are available, we will have a better idea of possible targets	Initial work was undertaken on genetic structure of harbour seal populations in UK and Europe in the 90s. This has recently been repeated with more samples and greater microsatellite loci coverage. Once these results are available, we will have a better idea of possible targets	This is an indicator that focuses on abundance of genetic subpopulations and not changes in genetic diversity over time. Further development required	Target based on the population element of FCS reporting requirements under the Habitats Directive.	Yes	Yes	Yes	No	No	No
Pup production has been assessed at two sites: in the Wash (every 5 years) and Moray Firth (annually). Further sites (possibly SACs) will need to be added to this.	Pup production has been assessed at two sites: in the Wash (every 5 years) and Moray Firth (annually). Further sites (possibly SACs) will need to be added to this.	Existing data will need to be analysed to provide an indication of variability in pup production. Such an analysis will need to encompass other sites in Europe. Once completed, targets can be set. Evidence strong in existing sites only.	Target based on the population element of FCS reporting requirements under the Habitats Directive.	Yes	Yes	Yes	No	No	No
Pup production has regularly been assessed at a large number of sites since 1960s, although more accurate aerial techniques were introduced in 1984.	Pup production has regularly been assessed at a large number of sites since 1960s, although more accurate aerial techniques were introduced in 1984.	Grey seal abundance is modelled from pup production information with additional data input. Model refitted every year.	Target based on the population element of FCS reporting requirements under the Habitats Directive. There is also an OSPAR EcoQO.	Yes	Yes	Yes	No	No	No
Photo-id study of calves with known adult female dolphins	Photo-id study of calves with known adult female dolphins		Target based on the population element of FCS reporting requirements under the Habitats Directive. There is also an obligation for this work through ASCOBANS.	Yes	Yes	Yes	No	No	No
Existing data will need to be analysed to provide an indication of feasibility of such an assessment. Once completed targets can be set.	Existing data will need to be analysed to provide an indication of feasibility of such an assessment. Once completed targets can be set.	Existing data will need to be analysed to provide an indication of feasibility of such an assessment. Once completed targets can be set.		Yes	Yes	Yes	No	No	No
Abundance at core sites is regularly assessed since 1988.	Abundance at core sites is regularly assessed since 1988.		Baseline set as mean (and deviation) over, for example, 20 years. This could be improved after detailed examination of the data. Target based on the population element of FCS reporting requirements under the Habitats Directive and the OSPAR EcoQO.	Yes	Yes	Yes	No	No	No
Robust mark-recapture estimates	Robust mark-recapture estimates, based SCANS II Survey, which covered all of European continental shelf waters.	Some monitoring undertaken as part of SAC monitoring	Target based on the population element of FCS reporting requirements under the Habitats Directive. There is also an obligation for this work through ASCOBANS.	Yes	Yes	Yes	No	No	No
Robust line-transect estimates	Robust mark-recapture estimates, based SCANS II Survey, which covered all of European continental shelf waters.	Needs to be a NW European survey. Considerable complexity in organisation.	Target based on the population element of FCS reporting requirements under the Habitats Directive. There are also commitments for this work through ASCOBANS and OSPAR.	Yes	Yes	Yes	No	No	No
Robust line-transect estimates	Robust mark-recapture estimates, based SCANS II Survey, which covered all of European continental shelf waters.	Needs to be a NW European survey. Considerable complexity in organisation.	Target based on the population element of FCS reporting requirements under the Habitats Directive. There are also commitments for this work through ASCOBANS.	Yes	Yes	Yes	No	No	No
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Robust bycatch observer estimates	Robust bycatch observer estimates	The UK Bycatch monitoring scheme was formally initiated in 2005, although bycatch data has been collected since the late 90s.	Although an aspiration and commitment of ASCOBANS, this indicator is also relevant to the incidental killing and capture element of the Habitats Directive and there is an OSPAR EcoQO for the North Sea. Threshold also used by ICES is defining excessive level of bycatch.	Yes	Yes	Yes	No	No	No
Robust bycatch estimates. Analysis needed to determine if 1.7% threshold suitable as a sustainability descriptor for common dolphins.	Robust bycatch observer estimates	The UK Bycatch monitoring scheme was formally initiated in 2005, although bycatch data has been collected since the late 90s.	Although an aspiration and commitment of ASCOBANS, this indicator is also relevant to the incidental killing and capture element of the Habitats Directive.	Yes	Yes	Yes	No	No	No
Robust bycatch observer estimates	Robust bycatch observer estimates	The UK Bycatch monitoring scheme was formally initiated in 2005, although bycatch data has been collected since the late 90s.	2% is used rather than 1.7% because seals have a higher reproductive output than cetaceans. CLA is proposed as the mechanism for determining bycatch levels in line with the cetacean work.	Yes	Yes	Yes	No	No	No
Robust bycatch observer estimates	Robust bycatch observer estimates	The UK Bycatch monitoring scheme was formally initiated in 2005, although bycatch data has been collected since the late 90s.	2% is used rather than 1.7% because seals have a higher reproductive output than cetaceans. CLA is proposed as the mechanism for determining bycatch levels in line with the cetacean work.	Yes	Yes	Yes	No	No	No

Jepson et al (2005 - Environmental Toxicology & Chemistry, 24: 238-248) indicates that total PCB levels greater than 17 mg/kg lipid begin to impact on the immune system of porpoises.				Yes	Yes	Yes	No	No	No
Ross et al. (1996 - Toxicology 112: 157-169) indicates that PCB levels exceeding 20mg/kg lipid begin to impact on the immune system of harbour seals.				Yes	Yes	Yes	No	No	No
Research is ongoing, which will hopefully give an indication of the level of exposure to algal toxins that has an adverse health effect in seals.				Yes	Yes	Yes	No	No	No
North Sea case study (MS-S). Data available for other areas to do similar analyses (see QSR2010, CPII). Recent scientific literature detailing development of similar indicators across different marine regions.		Further work need to describe trends in metrics in different marine regions and analysis to determine co-variance relationships with other indicators.	Baselines will have to be species/community dependent. Value of the decline will need further discussion and debate.	Yes	Yes	Yes	No	No	No
North Sea case study (MS-S). Data available for other areas to do similar analyses (see QSR2010, CPII). Recent scientific literature detailing development of similar indicators across different marine regions.		Further work need to describe trends in metrics in different marine regions and analysis to determine co-variance relationships with other indicators.	Baselines will have to be species/community dependent. Value of the decline will need further discussion and debate.	Yes	Yes	Yes	No	No	No
North Sea case study (MS-S). Data available for other areas to do similar analyses (see QSR2010, CPII). Recent scientific literature detailing development of similar indicators across different marine regions.		Further work need to describe trends in metrics in different marine regions and analysis to determine co-variance relationships with other indicators.		Yes	Yes	Yes	No	No	No
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		Considerable new research programme necessary to establish genetic structure in many new non-target species.					No		
North Sea case study (MS-S). Data available for other areas to do similar analyses (see QSR2010, CPII). Recent scientific literature detailing development of similar indicators across different marine regions.		Further work need to describe trends in metrics in different marine regions and analysis to determine co-variance relationships with other indicators.		Yes	Yes	Yes	No	No	No
North Sea case study (MS-S). Data available for other areas to do similar analyses (see QSR2010, CPII). Recent scientific literature detailing development of similar indicators across different marine regions.		Further work need to describe trends in metrics in different marine regions and analysis to determine co-variance relationships with other indicators.		Yes	Yes	Yes	No	No	No
1) Greenstreet, S.P.R. et al. (2011) ICES Journal of Marine Science, 68: 1-11. 2) Shephard, S. et al. (in press) ICES Journal of Marine Science.		The LFI is specified for each region to which it is applied so that the metric is adapted to most suit the resident community (proportion of biomass >40cm in the North Sea and proportion of biomass >50cm in the Celtic Sea). The LFI as an indicator of 4.2, should be expanded to tale account of pelagic fish as well as for demersal fish, for which it was developed. This may need some redefining of the indicator, a change in the "large fish" threshold length for example, perhaps to a length that separates piscivorous fish from non-piscivores. So the indicator needs some development work and work needs to be done to assess appropriate targets.	Target based on OSPAR EcoQO for "Fish Communities" in North Sea pilot project and subsequently rolled out for other marine regions.	Yes	Yes	Yes	No	No	No
North Sea case study (MS-S). Data available for other areas to do similar analyses (see QSR2010, CPII). Recent scientific literature detailing development of similar indicators across different marine regions.		More recent demersal fish diet and consumption work has been undertaken (HM Fraser Aberdeen Univ PhD) and will shortly be peer-review published. This will certainly provide an even stronger evidentiary basis for these indicators.	Early ERSEM model for the North Sea provides a basis for setting targets.	Yes	Yes	Yes	No	No	No
The use of plankton lifeforms (or functional groups) as indicators is well published in the scientific literature. The approach outlined here will compliment Water Framework Directive coastal phytoplankton monitoring currently underway in UK waters. Due to the strong evidence base underpinning both the lifeform approach to indicators (Tett et al 2008, Margalef 1978, Le Quéré et al., 2005) and the comparative approach to separating climate- and anthropogenically-driven change in marine ecosystems ((see McQuatters-Gollop et al. 2007 and references therein, McQuatters-Gollop et al. 2008).	The baseline for a particular region or site can be set with existing historical data where available; however the continuing influence of climate variability must be considered and continually reviewed in the context of baseline setting. This will mean the baseline may change over time, and our targets allow for this (see below). The status of the plankton will then need to be assessed to determine the extent to which it is influenced by anthropogenic pressures.. This approach is somewhat aligned with the method 'baseline set in the past' – however we are not seeking to set baselines that reflect pristine conditions; the purpose of the baseline is a point from which to determine if a change has occurred. Where new monitoring is instated, several years of data will be needed to determine the status of the plankton in that area.	Often indicator species are used to assess changes in plankton at the local level. While this is appropriate at the scale of individual sites, at regional scale it may be necessary to work at a higher (more generic) level which is in line with the assessment of GES at the regional seas scale. This approach allows the flexibility of application to all time-series and datasets.	Our target is a conceptual target that there should be no change beyond that driven by climate/natural variability. We are trying to capture characteristics of plankton comm, and determine if it is changing in response to pressure, climate or natural variability. If changing, is the difference between donuts (Phyto Comm Index) statistically significant and can be clearly linked to a pressure? Unclear at this stage is what degree of shift should trigger management action. If trajectory is correlated with pressure, that is a reasonable indication that the pressure is influencing the plankton comm. Science can't answer this question so it has to be policy decision, but we recognize we don't understand the tipping point. Assumption will be next initial assessment in 6 yrs time will need to refer back to CP2. This may require reinterpretation of data which will take resources.				Our boundaries are based on ecohydrodynamic regions, so may cut across CP2/regional sea boundaries which may be a problem when aggregating up to form broader assessments			

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Target in line with that set under Habitats Directive	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	It should be fairly easy to establish ranges of habitats at a range of scales although this information is likely to be most important at larger scales. Mapping of extent and distribution of habitat using acoustic and remote techniques but heavy reliance on modelling and expert judgement.		yes	yes	yes	yes			
	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	This could be made more useful as an indicator if future R&D could be used to look at measures of connectivity between habitats. Mapping of extent and distribution of habitat using acoustic and remote techniques but heavy reliance on modelling and expert judgement.		yes	yes	yes	yes	yes		
Target in line with that set under Habitats Directive	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	Applicable to Sabellaria spinulosa, Mytilus edulis beds, Sabellaria alveolata reefs, Serpula vermicularis, Lophelia reefs. Cost effective, easily measured, widely used indicator of community change. May need to scale up metric to assessment units.	Need to: expand extant monitoring to get better coverage, collate extant monitoring. For some biogenic structures historic baselines may be applicable and restoration targets appropriate. Various extent measures from different survey methods. Indices from diver and video transects and hydroacoustic estimates. Mytilus estimates in fished areas.	yes		Yes	Yes		Yes	

Target in line with that set under Habitats Directive	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	Cost effective, easily measured, widely used indicator of habitat and community change. Monitored via a desk study against a current baseline Burrows (submitted) model outputs for UK shore types as possible baseline. Similar desk- based approaches have been undertaken within Habs Directive.	Ground truthed model by Burrows (submitted) can derive intertidal rock extents by exposure types as baseline. Some areas have GT Phase 1 intertidal data therefore area measure is achievable. Scotland has high coastal complexity and no areal extent measure. Linear extent index is achievable throughout.	yes		Yes	Yes		Yes
Target in line with that set under Habitats Directive	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	Pressure based indicator based on overlay on baseline. (Leonie/Neil to advise and develop case).	Pressure based indicator based on overlay on baseline. (Leonie/Neil to advise and develop case). Combination of model and MBES data available at UK level.	yes		Yes	Yes		Yes
Target in line with that set under Habitats Directive	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	Baseline data exists within Natural England. And EA. Other sources of aerial survey required e.g. Channel coast observatory.. Needs cross reference baseline with casework tracker and additional sources. Collation required. Extant mapping of chalk resource in SE England by NE, Wildlife Trusts (?). Shore Search, Marclim. E Sussex CC.	Baseline data for Indicator target will need to be collated. Most areas of intertidal chalk in the Part of SE of England have been mapped providing suitable baseline. Chalk habitats are a nationally rare resource and have been historically lost during intertidal developments.	restricted to certain UK Regional Seas			Yes		Yes
Target in line with that set under Habitats Directive	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	Target levels will need carefully consideration within a GES context.	Probably an indicator applicable to Wales and England			Yes	Yes		Yes
Community data available from several locations. Physical impact models from Cook et al. (in prep), Moore et al (2009), Service & Magorrian (1997) for Modiolus Serpula and Limaria.		Applicable to Mytilus edulis beds, Sabellaria alveolata reefs, Maerl beds, Serpula vermicularis reefs. Cost effective, easily measured, widely used indicator of community change. Application to Sabellaria spinulosa needs carefully consideration. The community composition will vary across structures of the same species so this indicator / target will need to be derived on a site by site basis.	Possible application of standard univariate indices or WFD multimetrics. Targets need exploration on a habitat by habitat and also site by site basis.		Yes		Yes		Yes
Data available several UK sites that have been studied. Increase in geographic coverage required.		Applicable to Sabellaria spinulosa, Mytilus edulis beds, Sabellaria alveolata reefs, Maerl beds, Serpula vermicularis reefs. Cost effective, easily measured, widely used indicator of community change. Additional physical samples need to be taken along with video work to help with accurate identification. May not be possible for large offshore sites e.g. Lophelia reefs on NW Rockall Bank. Parallels biodiversity measures (e.g. Rees et al. 2008) and indicates structural complexity of habitat / site	Target may need specific definition for each biogenic species. Still need to ascertain if this is workable for Lophelia.		Yes		Yes		Yes
	Community change baselines from vertical rock in Pembrokeshire Marine SAC	Various methods and deployment strategies used for different subhabitats. National standard would require stratification. Fragile sponge and anthozoan communities on subtidal rocky habitats. Cost effective, easily measured. Ecological response models needed to underpin community indicators This is a gap in sufficient monitoring, especially for deeper habitats. Unification required for national standard. Focus on common habitat types. Possibly most on circalittoral rock with erect sponges and anthozoans. Relevant of fisheries impacts, nutrient enrichment etc	Various methods and deployment strategies used for different sub habitats. National standard would require stratification. Fragile sponge and anthozoan communities on subtidal rocky habitats. Cost effective, easily measured. Ecological response models needed to underpin community indicators This is a gap in sufficient monitoring, especially for deeper habitats.			Yes	Yes		
Literature by Bell and Barnes on morphology surrogates for species richness in sponges. Cuban and Mediterranean case studies for functional response of sponge communities		Good potential in this indicator. Simple in situ methods but effort required in set up. Probable WQ indicator but research needed e.g. calibration. Could be used in deeper water reef with drop down video methods (Work done by Roger Coggan and Kerry Howell). Relevant to water quality and physical impact factors	Would need research to test community model response to perturbations. Extended geographic scope? And deeper water monitoring techniques / methodology. Work needs to be pulled together from Roger Coggan & Kerry Howell.			Yes	Yes		
Evidence base considered in detail for WFD tool development		Cost effective, widely used indicator of community change. Used throughout GB in WFD context. Relevant to nutrient, physical impacts. NEED INPUT HERE FROM EA / SEPA.	Wells et al.			Yes	Yes		
Extant case studies and some unpublished work shows functional response of some indicator species groups. Widespread systematic data not available yet as basis of monitoring programme.		Cost effective, easily measured, widely used indicator species groups that respond to impacts of fishing pressure on non-target, slow-growing, sessile and vulnerable reef organisms. Relevant of fisheries impacts, nutrient enrichment etc.	May need new sampling techniques. Coverage required (subtidal). Widespread drop camera work needed. Possible new towed technology application. Various fisheries case studies re epifaunal species.			Yes	Yes		
CCW and studies from N. France available to model impact gradient. Unimpacted state probably definable but some more research required.		Cost effective, easily measured, widely used indicator of community change against a specific pressure.% cover live barnacles % cover trapped algae under boulder % cover dead barnacles % cover encrusting / colonising species Pressure indicator for intertidal - needs further development (Gabe to liaise with Nova to check species lis and make case) to be a useful biodiversity indicator. Possible development of subtidal indicator. James to make case. Relevant to bait collection and physical shore impacts	May need to be a multimetric indicator of ratios of corresponding negative and positive indicators. Expansion to Scottish region may be logistically demanding unless sentinal sites used. Local: Menai Strait and Conwy Bay.		Yes	Yes	Yes		Yes
Indicator can be climate adjusted based on extant studies.		Target species list might need some additions. For new GES aspirations. Rapid techniques. Single annual shore visits so cost effective. Sensitive, climate adjusted indicator of community change and non native pressures.	Reference condition could be based on historic data. This aspects needs consideration. Long list of indicator species could be added to in order to support GES. Marine Biodiversity and Climate Change Project: MarClim www.mba.ac.uk/marclim			Yes	Yes		

Kelp depth methodology very consistent. Trials in several places in Wales (unpublished). Burrows (submitted) shows link between biodiversity and L. hyperborea in UK. Kain 1979; Dayton 1985 link kelp depth to light attenuation.		If there was a contemporary case study of the biodiversity associated with kelp - a kelp depth indicator would extrapolated to national biodiversity assessment. This could also contribute to indicators under 1.6, 1.3 and 4.3 Case study would need periodic updating. Biological integration of water turbidity regime and indicator of the amount of infralittoral biodiversity.	Needs appropriate geology and aspect. Some regions such as SE England may not be appropriate. May need to develop L. hyp abundance measure too (?). In use in parts of Wales. Geographic coverage limited in UK. Remote sensing data on turbidity may offer additional information for this indicator.			Yes	Yes		
Evidence base for sensitivity scores underpinned by habitat sensitivity research conducted as part of the MCZ Project.	Sensitivity assessments based on current physical and biological composition of habitats using a combination of expert judgement and primary research. For further information on sensitivity assessment, see Report	CP2 ranked pressures based on the relative impact on seabed habitats: 'Removal of species (target & non-target)' and 'Physical habitat damage' were ranked highest. Strong link to fisheries impacts. Also applicable to criteria 6.1 and 6.2	It is not yet possible to quantify what level of pressure will prevent unacceptable impact - further research is required on the link between pressure and state, on a habitat by habitat basis. However, where a habitat shows sensitivity to a particular pressure, its exposure to that pressure will most likely need to be limited to a level that prevents unacceptable impact (i.e. for the habitat to achieve GES) . This 'unacceptable impact' (i.e. where an impact ceases to be in line with sustainable use) threshold could be considered anything higher than 'moderate impact' or 'moderate Impact/Vulnerability'. The conceptual relationship between sensitivity, pressure exposure and Impact/Vulnerability/impact is outlined in the HBDSEG report.	yes	yes	Yes	Yes		
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Evidence base for sensitivity scores underpinned by habitat sensitivity research conducted as part of the MCZ Project.	Sensitivity assessments based on current physical and biological composition of habitats using a combination of expert judgement and primary research. For further information on sensitivity assessment, see Report	CP2 ranked pressures based on the relative impact on seabed habitats: 'Removal of species (target & non-target)' and 'Physical habitat damage' were ranked highest. Strong link to fisheries impacts. Also applicable to criteria 6.1 and 6.2	It is not yet possible to quantify what level of pressure will prevent unacceptable impact - further research is required on the link between pressure and state, on a habitat by habitat basis. However, where a habitat shows sensitivity to a particular pressure, its exposure to that pressure will most likely need to be limited to a level that prevents unacceptable impact (i.e. for the habitat to achieve GES) . This 'unacceptable impact' (i.e. where an impact ceases to be in line with sustainable use) threshold could be considered anything higher than 'moderate impact' or 'moderate Impact/Vulnerability'. The conceptual relationship between sensitivity, pressure exposure and	yes	yes	Yes	Yes		
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Evidence base for sensitivity scores underpinned by habitat sensitivity research conducted as part of the MCZ Project.	Sensitivity assessments based on current physical and biological composition of habitats using a combination of expert judgement and primary research. For further information on sensitivity assessment, see Report	CP2 ranked pressures based on the relative impact on seabed habitats: 'Removal of species (target & non-target)' and 'Physical habitat damage' were ranked highest. Strong link to fisheries impacts. Also applicable to criteria 6.1 and 6.2	It is not yet possible to quantify what level of pressure will prevent unacceptable impact - further research is required on the link between pressure and state, on a habitat by habitat basis. However, where a habitat shows sensitivity to a particular pressure, its exposure to that pressure will most likely need to be limited to a level that prevents unacceptable impact (i.e. for the habitat to achieve GES) . This 'unacceptable impact' (i.e. where an impact ceases to be in line with sustainable use) threshold could be considered anything higher than 'moderate impact' or 'moderate Impact/Vulnerability'. The conceptual relationship between sensitivity, pressure exposure and Impact/Vulnerability/impact is outlined in the HBDSEG report.	yes	yes	Yes	Yes		
Target in line with that set under Habitats Directive	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	Applicable to Sabellaria spinulosa, Mytilus edulis beds, Sabellaria alveolata reefs, Serpula vermicularis, Lophelia reefs. Cost effective, easily measured, widely used indicator of community change. May need to scale up metric to assessment units.	Need to: expand extant monitoring to get better coverage, collate extant monitoring. For some biogenic structures historic baselines may be applicable and restoration targets appropriate. Various extent measures from different survey methods. Indices from diver and video transects and hydroacoustic estimates. Mytilus estimates in fished areas.	yes		Yes	Yes		Yes
Data available several UK sites that have been studied. Increase in geographic coverage required.		Applicable to Sabellaria spinulosa, Mytilus edulis beds, Sabellaria alveolata reefs, Maerl beds, Serpula vermicularis reefs. Cost effective, easily measured, widely used indicator of community change. Additional physical samples need to be taken along with video work to help with accurate identification. May not be possible for large offshore sites e.g. Lophelia reefs on NW Rockall Bank. Parallels biodiversity measures (e.g. Rees et al. 2008) and indicates structural complexity of habitat / site	Target may need specific definition for each biogenic species. Still need to ascertain if this is workable for Lophelia.		Yes		Yes		Yes
Target in line with that set under Habitats Directive	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	It should be fairly easy to establish ranges of habitats at a range of scales although this information is likely to be most important at larger scales. Mapping of extent and distribution of habitat using acoustic and remote techniques but heavy reliance on modelling and expert judgement		yes	yes	yes	yes	no	
	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	This could be made more useful as an indicator if future R&D could be used to look at measures of connectivity between habitats (e.g. Zostera beds). Mapping of extent and distribution of habitat using acoustic and remote techniques but heavy reliance on modelling and expert judgement		yes	yes	yes	yes	yes	

It is not possible, with current levels of evidence, to set scientifically robust % targets for marine habitats which ensure the maintenance of ecosystem functioning and the continued provision of ecological goods and services. In light of this, the group has proposed target options for habitats which are based on best expert judgement (derived in part from the CP2 assessment process) and the precautionary approach	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	The key for making this a successful indicator is making sure that changes in distribution/extent are attributed to anthropogenic pressures and not seen as a result of better mapping / improved habitat modelling. It may be appropriate to apply different methodologies when measuring spatial extent of intertidal vs. subtidal sediment habitats. Mapping of extent and distribution of habitat using acoustic and remote techniques.		yes	Yes	Yes	Yes	yes	Yes
Target in line with that set under Habitats Directive and WFD. WFD evidence base considered in detail for individual biological elements (benthic invertebrates, angiosperms, macroalgae). Deviation from a reference condition as derived from existing data and expert judgement under the requirements of the normative definitions of the WFD, and formalised through the Intercalibration process.	Current baselines may need to be used in line with available evidence; however, future research may allow the setting of a baseline based on historical data or reference conditions (as recommended in HBDSEG report). Further evidence base for baselines is presented within HBDSEG report.	The key for making this a successful indicator is making sure that changes in distribution/extent are attributed to anthropogenic pressures and not seen as a result of better mapping / improved habitat modelling. It may be appropriate to apply different methodologies when measuring spatial extent of intertidal vs. subtidal sediment habitats. Information on pressures and direct observation of loss of habitat. Challenge is to establish link between pressure and significance of impact (particularly offshore).	WFD normative definitions compatible with MSFD descriptors for coastal waters defined as: the level of diversity and abundance of invertebrate taxa is slightly outside the range associated with the type-specific conditions. Most of the sensitive taxa of the type-specific communities are present. Most disturbance-sensitive macroalgal and angiosperm taxa associated with undisturbed conditions are present. The level of macroalgal cover and angiosperm abundance show slight signs of disturbance.	yes	Yes	Yes	Yes	yes	Yes
WFD evidence base considered in detail for individual biological elements (benthic invertebrates, angiosperms, macroalgae). Deviation from a reference condition as derived from existing data and expert judgement under the requirements of the normative definitions of the WFD, and formalised through the Intercalibration process	Evidence base considered in detail for WFD tool development. Reference conditions are derived using a combination of historic data and expert judgement.	The indicator and target would have to be scaled up to be applied for MSFD.	WFD normative definitions compatible with MSFD descriptors for coastal waters defined as: the level of diversity and abundance of invertebrate taxa is slightly outside the range associated with the type-specific conditions. Most of the sensitive taxa of the type-specific communities are present. Most disturbance-sensitive macroalgal and angiosperm taxa associated with undisturbed conditions are present. The level of macroalgal cover and angiosperm abundance show slight signs of disturbance.					yes	
WFD evidence base considered in detail for individual biological elements (benthic invertebrates, angiosperms, macroalgae). Deviation from a reference condition as derived from existing data and expert judgement under the requirements of the normative definitions of the WFD, and formalised through the Intercalibration process	Evidence base considered in detail for WFD tool development. Reference conditions are derived using a combination of best available low pressure data and expert judgement with reference conditions being adapted according to habitat. Reference conditions for the IQI are under continued development as data becomes available.	The indicator and target would have to be scaled up to be applied for MSFD.	WFD normative definitions compatible with MSFD descriptors for coastal waters defined as: the level of diversity and abundance of invertebrate taxa is slightly outside the range associated with the type-specific conditions. Most of the sensitive taxa of the type-specific communities are present. Most disturbance-sensitive macroalgal and angiosperm taxa associated with undisturbed conditions are present. The level of macroalgal cover and angiosperm abundance show slight signs of disturbance.					yes	
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		Redox/bioturbation reflect chemical/physical condition of habitat and closely linked to benthic function.	Sediment Profile Imagery. Birchenough et al 2011. Combining bioturbation and redox metrics: potential tools for assessing seabed function. Ecological indicators. Targets can then be set according to the classic Pearson and Rosenburg gradient.	yes	Yes	Yes	Yes	yes	
Evidence base for sensitivity scores underpinned by habitat sensitivity research conducted as part of the MCZ Project.	Sensitivity assessments based on current physical and biological composition of habitats using a combination of expert judgement and primary research. For further information on sensitivity assessment, see Report	CP2 ranked pressures based on the relative impact on seabed habitats: 'Removal of species (target & non-target)' and 'Physical habitat damage' were ranked highest. Strong link to fisheries impacts. Also applicable to criteria 6.1 and 6.2	It is not yet possible to quantify what level of pressure will prevent unacceptable impact - further research is required on the link between pressure and state, on a habitat by habitat basis. However, where a habitat shows sensitivity to a particular pressure, its exposure to that pressure will most likely need to be limited to a level that prevents unacceptable impact (i.e. for the habitat to achieve GES) . This 'unacceptable impact' (i.e. where an impact ceases to be in line with sustainable use) threshold could be considered anything higher than 'moderate impact' or 'moderate Impact/Vulnerability'. The conceptual relationship between sensitivity, pressure exposure and Impact/Vulnerability/impact is outlined in the HBDSEG report.	yes	yes	Yes	Yes		
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Evidence base for sensitivity scores underpinned by habitat sensitivity research conducted as part of the MCZ Project.	Sensitivity assessments based on current physical and biological composition of habitats using a combination of expert judgement and primary research. For further information on sensitivity assessment, see Report	CP2 ranked pressures based on the relative impact on seabed habitats: 'Removal of species (target & non-target)' and 'Physical habitat damage' were ranked highest. Strong link to fisheries impacts. Also applicable to criteria 6.1 and 6.2	It is not yet possible to quantify what level of pressure will prevent unacceptable impact - further research is required on the link between pressure and state, on a habitat by habitat basis. However, where a habitat shows sensitivity to a particular pressure, its exposure to that pressure will most likely need to be limited to a level that prevents unacceptable impact (i.e. for the habitat to achieve GES) . This 'unacceptable impact' (i.e. where an impact ceases to be in line with sustainable use) threshold could be considered anything higher than 'moderate impact' or 'moderate Impact/Vulnerability'. The conceptual relationship between sensitivity, pressure exposure and Impact/Vulnerability/impact is outlined in the HBDSEG report.	yes	yes	Yes	Yes		

Descriptor	Component	Proposed_Indicator_Name	Target-setting_approach	Evidence-base_for_indicator_DETAILS
1	Birds	Distributional range of breeding seabirds	Target set as deviation from baseline	Past performance of previous surveys (e.g. Mitchell et al. 2004)
1	Birds	Distributional range of non-breeding seabirds & waterbirds	Target set as deviation from baseline	WinGS past performance (Burton et al.). Inshore benthos indicators under development
1	Birds	Distributional range of non-breeding shorebirds	Target set as deviation from baseline	WeBS & NEWS past performance - see Musgrove et al.
1	Birds	Distributional pattern of breeding seabirds	Target set as deviation from baseline	Past performance of previous surveys (e.g. Mitchell et al. 2004)
1	Birds	Distributional pattern of non-breeding seabirds & waterbirds	Target set as deviation from baseline	Evidence from Petersen & Rexstad
1	Birds	Distributional pattern of non-breeding shorebirds	Target set as deviation from baseline	WeBS & NEWS past performance - see Musgrove et al.
1	Birds	Breeding success of species sensitive to food availability	Absolute Value (target not set at baseline)	Tasker & Furness listing sensitive species.
1	Birds	Seabird adult survival	Absolute Value (target not set at baseline)	Previous results of SMP and ringing scheme
4	Birds	Breeding success of species sensitive to food availability	Absolute Value (target not set at baseline)	Tasker & Furness listing sensitive species.
1	Birds	Invasive species monitoring	Absolute Value (target not set at baseline)	Priority islands listed in Ratcliffe et al
1	Birds	By-catch monitoring	Target set as deviation from baseline	Good information in Carss on Cormorants. Some information in past in Zydelis (2010) and from ringing scheme. Current levels of mortality e.g. From long-line fisheries largely unknown
1	Fish_Cephalopod	Distributional range of Fish (Continental Shelf Seas)	Target set as deviation from baseline	ICES WGFE and scientific literature.
1	Fish_Cephalopods	Distributional range of Fish (Shelf-edge Seas)	Target set as deviation from baseline	ICES WGFE and scientific literature.
1	Fish_Cephalopods	Distributional pattern within range of Fish (Shelf-edge Seas)	Target set as deviation from baseline	ICES WGFE and scientific literature.
1	Fish_Cephalopods	Distributional pattern within range of Fish (Continental Shelf Seas)	Target set as deviation from baseline	ICES WGFE and scientific literature.

4	Fish_Cephalopods	Dietary functional group biomass	Target set as deviation from baseline	These fish predator groups were used in the early ERSEM modelling work and have supported previous food web studies (Greenstreet, S.P.R., Bryant, A.D., Broekhuizen, N., Hall, S.J. & Heath, M.R. (1997) Seasonal variation in the consumption of food by fish in the North Sea and implications for foodweb dynamics. ICES Journal of Marine Science, 54: 243-266.)
1	Rock_Biogenic_Reef_Special_Habitat_Species	Eco(380) Extent of subtidal biogenic structures	Absolute Value (target set as baseline)	Lindenbaum et al. 2008; Moore et al. 2009
1	Rock_Biogenic_Reef_Special_Habitat_Species	Eco(365) Abundance of associated species on biogenic reef	Target set as deviation from baseline	Rees et al . 2008; Sanderson et al. 2008.
1	Rock_Biogenic_Reef_Special_Habitat_Species	Eco(370) Density of biogenic reef forming species	Target set as deviation from baseline	Rees et al . 2008; Sanderson et al. 2008.
1	Rock_Predominant_Habitats	Sponge diversity	Target set as deviation from baseline	Literature by Bell.
1	Rock_Predominant_Habitats	Eco(244) Intertidal species composition & abundance	Limits / thresholds	Wilkinson et al.
1	sediment_Predominant_Habitats	distribution of pressures	Limits / thresholds	Maps etc…….
1	sediment_Predominant_Habitats	RPD & Bpc	Target set as deviation from baseline	Paul Dando to add. (Sediment Profile Imagery. Birchenough et al 2011 also suggest combining bioturbation and redox metrics: potential tools for assessing seabed function. Ecological indicators).
1	sediment_Predominant_Habitats	Area covered by non-breeding inshore benthos feeders		Past performance of previous surveys (e.g. Kaiser/Sanderson)