ECOLOGICAL TARGETS AND TARGETS ON CULTURAL AND HISTORICAL ASPECTS

A basic element in the elaboration of the Guiding Principle is the presence of the full scala of habitat types which belong to a natural and dynamic Wadden Sea. Each of these habitats needs a certain quality (natural dynamics, absence of anthropogenic disturbance, absence of pollution), which can be reached by proper management of the area.

The physical, biological, chemical and geomorpholocial quality of the habitats has been specified by means of Ecological Targets, in short Ecotargets, elaborated by the trilateral Eco-Target Group (ETG) in its Final Report. The Ecotargets are valid for the whole area of the trilateral cooperation, be it with a differentiation in scale, place and time. The Ecotargets regarding the chemical quality have not been geographically differentiated.
In addition to the above Ecotargets, a number of targets on cultural aspects have been developed.

TARGETS ON HABITAT AND SPECIES

SALT MARSHES

The habitat type salt marsh includes all mainland and island salt marshes, including the pioneer zone. Also the brackish marshes in the estuaries are considered part of this habitat type.

The following targets apply to salt marshes:
- an increased area of natural salt marsh;
- an increased natural morphology and dynamics, including natural drainage patterns, of artificial salt marshes, under the condition that the present surface area is not reduced;
- an improved natural vegetation structure, including the pioneer zone, of artificial salt marshes.

TIDAL AREAS

The tidal area covers all tidal flats and subtidal areas. The border to the North Sea side is determined by an artificial line between the tips of the islands. The borders to the estuaries are determined by the average 10 ‰ isohaline at high water in the winter situation.

The following targets are valid:
- a natural dynamic situation in the tidal area;
- an increased area of geomorphologically and biologically undisturbed tidal flats and subtidal areas;
- an increased area of, and a more natural distribution and development of natural mussel beds, *Sabellaria* reefs and *Zostera* fields;
- viable stocks and a natural reproduction capacity, including juvenile survival, of common seal and grey seal;
- favorable conditions for migrating and breeding birds:
  = a favorable food availability;
  = a natural breeding success;
  = sufficiently large undisturbed roosting and moulting areas;
  = natural flight distances.

ESTUARIES

Estuaries include the estuaries of the rivers with a natural water exchange with the Wadden Sea. On the landward side, estuaries are delimited by the mean-brackish-water line. On the seaward side, the border is the average 10‰ isohaline at high water in the winter situation.
Estuaries will be protected and restored according to the conditions as agreed on in § 15.

BEACHES AND DUNES

Beaches and dunes include beaches, primary dunes, beach plains, primary dune valleys, secondary dunes and heathland behind the dunes.

The following targets apply:
- increased natural dynamics of beaches, primary dunes, beach planes and primary dune valleys in connection with the offshore zone;
- an increased presence of a complete natural vegetation succession;
- favorable conditions for migrating and breeding birds.

OFF-SHORE ZONE

The offshore zone ranges from the 3-sea-mile line to an artificial line connecting the outer tips of the islands. The border between the offshore zone and the beaches on the islands is determined by the average low-tide water mark.

The following targets apply to the offshore zone:
- an increased natural morphology, including the outer deltas between the islands;
- a favorable food availability for birds;
- viable stocks and a natural reproduction capacity of the common seal, grey seal and harbor porpoise.

RURAL AREA

The rural area includes meadows and arable land on the islands and on the mainland where there is a strong ecological relationship with the Wadden Sea.

The following target applies:
- favorable conditions for flora and fauna, especially migrating and breeding birds.

TARGETS ON THE QUALITY OF WATER AND SEDIMENT

NUTRIENTS
- a Wadden Sea which can be regarded as a eutrophication non-problem area.

NATURAL MICROPOLLUTANTS
- background concentrations in water, sediment and indicator species.

MAN-MADE SUBSTANCES
- concentrations as resulting from zero discharges.

TARGETS ON LANDSCAPE AND CULTURAL ASPECTS

Firstly, the Wadden Sea landscape with its special natural and characteristic impressions has to be conserved or developed as far as possible. Secondly, the typical features that remind us of its cultural and historic past should be maintained:

IDENTITY
- to preserve, restore and develop the elements that contribute to the character, or identity, of the landscape.

VARIETY
- to maintain the full variety of cultural landscapes, typical for the Wadden Sea landscape.

HISTORY
- to conserve the cultural-historical heritage.

SCENERY

- to pay special attention to the environmental perception of the landscape and the cultural-historical contributions in the context of management and planning.

Parameter list of the TMAP - Priority setting

The table gives on overview an all parameter groups of the TMAP which were ranked by the TMAG to set priorities for the implementation of the program.

The scoring criteria are listed in column 1 - 5:

1. technical effort for implementation: effort for harmonization or for developments of methods (big =1, medium = 2, small = 3)
2. significance for Issue of Concern (IoC): basic parameter as a minimum to work on the hypotheses (low = 1, medium = 2, high = 3)
3. importance for ecotargets (not relevant = 0, low = 1, medium = 2, high = 3)
4. coverage by ongoing programs (no = 0, one, two or three countries= 1, 2, 3)
5. power of a parameter in a long term program (cost-benefit analysis) (low = 1, medium = 2, high = 3)

The columns 6, 7 and 8 cover:

6. overall technical effort (sum 1 + 4)
7. overall importance (sum 2 + 3 + 5)
8. Priority: A, B, C

Priority A-parameters (marked as A + B*): The A-parameters were selected as important parameters relative to priority B- and C-parameters with respect to their relevance for the assessment (TMAP-hypotheses and ecotargets) and their feasibility (technical appicability). Detailed guidelines can be elaborated bases on the available knowledge.

Priority B-parameters (marked as B): The priority-B-parameters are essential parameters of the TMAP which should be implemented as soon as possible. Due to the technical effort needed, they can be implemented only after appropriate methods/guidelines have been elaborated. They should be implemented after the parameters with priority A have been elaborated.

Priority C-parameters (marked as C): The parameters with the priority C are of medium importance (compared to A and B parameters) and need a relatively high technical implementation effort (e.g. development of new methods, additional research projects needed). The implementation may start after the parameters with priority B have been implemented.

				1	2	3	4	5	6	7	8	9
Parameter	I.o.C., Hypoth	Status	Follow up work	techn. implem effort	signif. for IoC	eco-target	ongoing prg.	power	sum: 1+4	sum: 2+3 +5	total	priority
				big = 1 med = 2 small=3	low = 1 med =2 high = 3	no = 0 low = 1 mid = 2 high = 3	no = 0 1 2 3	low = 1 mid = 2 high = 3				
1) Contaminants	poll 1-4											
In water (dissolved):												
- TBT		surveys	see JAMP	2	3	2	1	2	3	7	10	**B***
- Lindane		NL	guidelines	3	2	1	1	2	4	5	9	B
- Triazines		NL (since 96)	projects	3	2	1	1	2	4	5	9	B
In suspended matter:												
- metals		NL, D	guidelines (JAMP), selection of sampling stations	2	2	2	2	2	4	6	10	B
- PAH		NL		2	3	2	1	2	3	7	10	B
- PCB		NL		2	3	2	1	2	3	7	10	B
(-TBT)			more information needed									
In sediment:												
- metals		NL, D, DK	guidelines (JAMP), sampling stations, frequencies, statistical analysis	2	3	2	3	2	5	7	12	**A**
- PAH		NL, (DK)		2	3	2	1	2	3	7	10	B
- PCB		NL, (DK)		2	3	2	1	2	3	7	10	B
(-TBT)		single surveys	follow JAMP development									
2) Nutrients	poll 1-4											
Nutrients in water:												
- inorganic nutrients		NL, D, DK	harmonization of guidelines (see also JAMP), selection of monitoring areas	2	3	3	3	3	5	9	14	**A**
- organic nutrients			elaboration of guidelines									
Nutrients in sediment: (inorganic and organic)			selection of areas, frequencies, methods; calculation of fluxes									
Inputs of nutrients: exchange with North Sea			calculation of exchange with North Sea (other inputs: INPUT working group)									
3) Decomposition	poll 2			1	3	1	0	2	1	5	6	C
Bacterial cell number, community respiration, nutrients		research projects	use existing HELCOM guidelines, combine with other parameters									
Other microbiol. parameters			trilateral research project									
4) Salt Marshes												
Location and area / vegetation type	poll 4 agr clim	NL, D, DK	harmonization, common guidelines	2	3	3	3	3	5	9	14	**A**
Agricultural utilization (grazing, no. of animals)	agr	NL, D, DK	inventory of utilization intensity	3	3	3	3	3	6	9	15	**A**
Vegetation (selected areas)	agr clim	NL, D, DK	harmonzation of methods, common guidelines (expert consultations)	2	2	1	3	3	5	6	11	B
Invertebrate fauna	poll 4 agr	(NL), Nds, (SH: single projects) (DK)	new parameters, common guidelines, expert consultations (only low effort acceptable)	3	1	1	0	1	3	3	6	C
5) Benthos												
Phytobenthos												
Macroalgae (area covered)	poll 1,2,4	D, DK	common guidelines for remote sensing	3	2	2	2	2	5	6	11	**B***
Eelgrass (location and coverage)	poll 4 fish 1,2	NL, D, DK	common guidelines for remote sensing	3	2	3	3	3	6	8	14	**A**
Benthic microalgae	poll, 2,4	Nds., (NL)	common guidelines	1	2	1	1	2	2	5	7	C
Zoobenthos (intertidal)												
Selected areas (macrozoobenthos communities)	poll 1,2,4	NL, D, DK	common guidelines, expert meeting	3	2	1	3	3	6	6	12	**A**
Location and area of biotopes (whole area)	poll 4	single RS projects	remote sensing, common methods	1	2	1	0	2	1	5	6	C
Tidal basins (macrozoobenthos communities)	poll 1,2,4	-	new approach, ground truth for RS in 1 - 2 basins / area	1	2	1	0	1	1	4	5	C

				1	2	3	4	5	6	7	8	9
Parameter	I.o.C., Hypoth	Status	Follow up work	techn. implem effort	signif. for IoC	eco-target	ongoing prg.	power	sum: 1+4	sum: 2+3 +5	total	priority
Contaminants in Nereis, Arenicola	poll 2,3	research projects		2	2	1	0	2	2	5	7	C
Zoobenthos (subtidal)												
Sabellaria reefs (location)	fish	single projects	methods to be elaborated	2	3	3	0	3	2	9	11	**B***
Shrimping gullies (benthos communities)	fish, 2	-	project for selection of areas, closed areas needed	1	3	3	0	3	1	9	10	B
Blue Mussels												
Location /area of beds (whole area)	poll 4 fish 1,2	single projects NL, D, DK	common guidelines for remote sensing	3	3	3	3	3	6	9	15	**A**
Mytilus stocks (species parameters)	poll 2-4, fish 1,2	NL, D, DK	common guidelines, expert meeting	2	3	2	3	2	5	7	12	**A**
Selected beds (benthos community)	poll 4 fish 1,2	(NL, D, DK)	common guidelines, expert meeting	2	2	1	1	3	3	6	9	B
Contaminants in Blue Mussels	poll, 2,3,4		guidelines (JAMP), selection of stations frequencies, statistics									
- metals		NL, D, DK		3	3	2	3	3	6	8	14	**A**
- orgonochlorines		NL, D, DK		2	3	2	3	3	5	8	13	**A**
- PAH		NL, DK		2	3	2	2	3	4	8	13	**A**
(- TBT)			more information needed									
Crangon (stocks)												
Species parameters	poll 2,3 fish 1	NL, D, (DK)	long term research project	1	3	1	2	2	3	6	9	B
Contaminants (metals and organochlorines	poll 2,3	-										C
6) Plankton												
Phytoplankton	poll 1-4	NL, D, DK	common guidelines, harmonization of methods	2	3	3	3	2	5	8	13	**A**
Zooplankton	poll 2,3,4	(NL, D), DK	common guidelines	3	3	2	1	2	4	7	11	**B***
7) Fish			project to select monitoring areas									
Key species: Eelpout, Flounder, Plaice	poll 2,3 (fish)	DYFS: NL, D, DK: plaice	DYFS to be specified and extended project to select monitoring areas	3	3	1	2	2	5	6	11	**B***
Demersal fish communities	poll 4 fish, 4	NL, D, (DK)	DYFS to be specified and extended, project to select monitoring areas	1	3	1	2	2	3	6	9	B
Pelagic fish communities	poll fish	SH, single surveys	common guidelines needed, project to select monitoring areas	1	2	1	1	2	2	5	7	C
Eelpout :		D, (DK)		3	3	2	1	3	4	8	12	**A**
- metals, orgono-chlorines, PAH (+ metabolites)		NL, D, (DK)	new guidelines									
Flounder:				2	3	2	1	3	4	8	12	**A**
- metals, orgonochlorines PAH (+ metabolites)			guidelines acc. JAMP, selection of sampling stations									
General fishery parameters	fish 1,2											
Fishing amount per km^2		NL		3	3	3	1	3	4	9	13	**A**
Hours of fishing		(NL, D)		2	3	3	1	3	3	9	12	**A**
Fishery statistics (licences, vessels, gear type)		NL, D, DK: official statistics	to be compiled	3	3	1	3	3	6	7	13	**A**
Fishing areas + periods		-		1	3	3	0	3	1	9	10	B
Shrimping by catch composition and discard		projects (e.g. RESCUE)	guidelines	2	2	2	1	2	3	6	9	B
8) Dunes												
Location and area		single surveys	harmonization, common guidelines	2	3	3	3	3	5	9	14	**A**
9) Birds												
Breeding Birds												
Numbers and distribution of selected breeding birds	clim poll 3,4 recr	**trilateral program**	evaluation of guidelines (every five years)									
Breeding success:	poll 3											

				1	2	3	4	5	6	7	8	9
Parameter	I.o.C., Hypoth	Status	Follow up work	techn. implem effort	signif. for IoC	eco-target	ongoing prg.	power	sum: 1+4	sum: 2+3 +5	total	priority
	recr											
- juvenile mortality , egg mortality, growth rate		trilateral guidelines, (D)	trilateral pilot phase 1996 - 97	3	2	3	1	2	4	7	11	**B***
- recruitment, mortality (outside the breeding season)			common guidelines	2	2	3	0	2	2	7	9	B
Contaminants in bird eggs (Hg, organochlorines)	poll 2,3	D: long term project	trilateral pilot phase 1996 - 97	3	3	3	0	3	3	9	12	**A**
Migratory Birds												
Numbers of waterbirds in counting units	poll 3,4 recr	**trilateral program**										
Percentage of young birds of staging waterbirds	poll 3,4 recr	(geese: D, DK)	implementation	3	1	0	(2)	2	3	3	6	C
Beached Bird Survey												
- no. of dead birds - no. of contam. birds - kind of contamination	poll 3	NL, D, DK (not oil analysis)	implementation of JAMP guidelines, installation of regular monitoring									**A**
10) Seals	poll 3, recr											
Numbers and distribution of seals (population size, breeding success, recruitment)		NL, D, DK, trilateral coordinated program	further harmonization of trilateral program									**A**
Population parameters (recruitment, condition, age structure)		NL, DK	develop common guidelines	1	3	3	2	3	3	9	12	**A**
No. of dead seals (mortality)		(NL, D, DK) SH: yearly	common guidelines	3	1	1	3	1	6	3	9	B
No. of heulers & released seals		(NL, D, DK)	implementation	3	1	1	3	1	4	5	9	B
11) Recreational Activities												
Human activities:	recr											
Boats at sea (leisure boats, selected areas)		DK, SH, (Nds.)	elaboration of methods (aerial surveys)	2	2	2	2	2	4	6	10	**B***
Human activ. on tidal flats, beaches, salt marshes (selected areas)		DK		2	3	3	3	1	3	9	12	**A**
No. of flatwalkers (whole areas) (guided tours)		DK, (Nds)		3	2	2	2	2	5	7	12	**A**
Air traffics (airports)			NL, D, DK	3	2	2	2	2	6	6	12	**A**
Ships in marinas		(NL, D, DK)	official statistics	2	1	1	3	2	5	4	9	B
Sluice passages		NL (not relevant in D+DK)										
Tourism general:	recr											
Socioeconomic data (inhabitants, tourists)		(NL, D, DK)	official statistics (inventory), elaborate standardized questionnaire	2	1	1	0	1	3	3	6	C
Overnight stays and bed capacity (< and 9 beds)		(NL, D, DK)	inventory official statistics, project for conversion factors	2	1	1	0	2	2	4	6	C
Official harbor capacity		(NL, D, DK)	inventory official statistics	3	1	1	0	2	3	4	7	C
No. of visitors												
12) General parameters												
Coastal protection measures	clim	(NL, D, DK)	inventory of available information	3	3	3	3	3	6	9	15	**A**
Coastline	clim, agr	single surveys	common guidelines	1	1	1	3	1	4	3	7	C
Geomorphology (height, drainage)	clim	single surveys	select areas, elaborate common methods	1	3	3	2	2	3	8	11	**B***

				1	2	3	4	5	6	7	8	9
Parameter	I.o.C., Hypoth	Status	Follow up work	techn. implem effort	signif. for IoC	eco-target	ongoing prg.	power	sum: 1+4	sum: 2+3 +5	total	priority
Flooding (frequency, inundation, flooding level elevation	clim, poll 1-4	(NL, D, DK)	inventory of available information from gauges	3	3	1	3	3	6	7	13	**A**
Groundwater level (islands)	recr	NL, Nds.	inventory of available information	3	1	3	3	2	6	6	12	**A**
Land use	recr	single surveys	common methods (remote sensing)	3	2	3	0	1	3	6	12	**B***
Weather conditions			inventory	3	3	0	3	3	6	6	12	**A**
Hydrology			inventory	3	3	0	3	3	6	6	12	**A**

List of TMAP Parameter groups and Priorities for their Implementation

- Priority A: key parameters, to be implemented based on the proposed trilateral draft guidelines as soon as possible,
- Priority B and C: important parameters to be implemented after appropriate methods / guidelines have been elaborated

Pri-ority	Parameter group	Parameter	Methods	I.o.C.* Hypoth	Status	Follow-up work	Status of guidelines
	1) CONTAMINANTS						
	In water (dissolved):						
A	- TBT	see JAMP	see JAMP	poll 1-4	NL ongoing, DK planned in 98, D: single surveys	testing guidelines (see also JAMP)	refinement needed
B	- Lindane		2 sites each country, whole year, monthly, 1h after high tide	poll 1-4	NL	elaboration of guidelines	
B	- triazines			poll 1-4	NL (since 96)	research projects	
	In suspended matter:						
B	- metals	see JAMP	3 sites per country, whole year, 4 times per year, 1h after high tide	poll 1-4	NL, D	elaboration of guidelines (see also JAMP), selection of sampling stations	
B	- PAH	see JAMP		NL			
B	- PCB	see JAMP		NL			
B	- (TBT)	see JAMP			more information needed		
	In sediment :						
A	- metals	see JAMP	3 sites per country, 4 times per year (quarterly), every 2 - 5 years	poll 1-4	NL, D, DK	testing guidelines (see also JAMP), selection of stations, frequencies, statistics	refinement needed
B	- PAH	see JAMP	3 sites per country, 4 times per year (quarterly), every 2 - 5 years	poll 1-4	NL, (DK)	testing guidelines (see also JAMP), selection of stations, frequencies, statistics	
B	- PCB	see JAMP		poll 1-4	NL, (DK)		
B	- TBT			poll 1-4	surveys	follow JAMP developments	
	Contaminants in biota	Mytilus, Fish, Bird eggs, Seals				(see under the respective item)	
	2) NUTRIENTS						
	Nutrients in water:						
A	- inorganic nutrients	particulate and dissolved N,P, SiO4, total N+P, covariables: organic carbon (part. + diss), O2, pH, seston, turbidity, temp., salinity, residence time, flushing time (see also JAMP)	a. input areas: whole year (daily weekly) b. 5 transects (10 - 33.6 PSU): winter c. selected tidal basins: monthly	poll 1-4	a: NL, D, DK b: NL, SH c: NL, D, DK	testing of guidelines, selection of monitoring areas, (see also JAMP),	refinement needed
B	- organic nutrients	part. + diss. organic N + P	see above			elaboration of guidelines	
B	Nutrients in sediment: (inorganic and organic)	see above; additional covariables: redox potential, oxidized layer, netsedimentation, grain size distribution, gas production (methane) free sulfide concentrations)	selected areas, to be elaborated	poll 1-4	only single projects	selection of areas, frequencies & methods; calculation of fluxes	
B	Inputs of nutrients: exchange with North Sea	see above	transects, to be elaborated (including modelling)	poll 1-4	only single projects	calculation of exchange with North Sea (other inputs: see INPUT working group)	

Pri-ority	Parameter group	Parameter	Methods	I.o.C.* Hypoth	Status	Follow-up work	Status of guidelines
C	Microbial parameters	cell number, microbial biomass, bacterial production, biological oxygen demand, community respiration, enzyme activity	combine with nutrient sampling, selected areas, water: whole year, bi-weekly, bloom sediment: once per month	poll 2	research projects, single surveys	testing existing guidelines (HELCOM), trilateral research project	
C	Interpretation parameters	H_2S, FeS, sulfate reduction, gas production (methane), denitrification rate, nutrients and organic carbon		poll 2		elaboration of common guidelines	
	4) SALT MARSHES						
A	Spatial extension (whole area)	location and area , vegetation types (to be specified)	every five years, remote sensing, maps 1:10.000	poll 4 agr, (clim)	NL, D; DK: no remote sensing	testing of trilateral guidelines for remote sensing (project)	refinement needed
A	Agricultural utilization: - grazing (no. of animals)	no. of domestic animals (to be specified) per area and time	every year, inventory	agr	NL, D, DK	inventory of utilization intensity	ready for implemen-tation
B	Vegetation (selected areas	species richness, dominance structure, vegetation height, biomass, zonation, additional: flooding, soil parameters, nutrient input	every year: selected transects, every five years: all transects	agr clim	NL, D, DK	harmonization of methods, common guidelines (expert consultations)	
C	Invertebrate fauna	species richness, dominance structure, biomass, zonation	frequency and area same as vegetation	poll 4, agr	(NL), Nds, (SH: single projects) (DK)	new parameters, common guidelines, expert consultations	only low effort acceptable
	5) BENTHOS						
	Phytobenthos						
A	Macroalgae	location and coverage	remote sensing and ground truth	poll 2,3,4	D, DK; NL: single surveys	testing guidelines for remote sensing	ready for implemen-tation
A	Eelgrass	location and area, coverage of eelgrass, biomass of eelgrass, (see also community parameters of zoobenthos)	remote sensing and ground truth yearly, during summer	poll 3,4 fish 1,2	NL, D, DK	testing guidelines for remote sensing	ready for implemen-tation
C	Benthic microalgae	chlorophyll a primary production	combine with zoobenthos sampling, Chl a: Lorenzen production: oxygen exchange	poll, 2,4	Nds., (NL)	elaboration of common guidelines	
	Zoobenthos (intertidal)						
A	Selected areas (macrozoobenthos communities)	biomass, abundance, species composition, dominance structure, species distribution pattern (key species: Arenicola, Nereis)	fixed stations or transects, twice per year	poll 3,4 (coc-kles: fish 1, 2)	NL, D, DK	testing of trilateral guidelines (cockle areas to be included)	ready for implemen-tation
C	Location and area of biotopes (whole area)	location and area of biotopes	remote sensing	poll, 4	single RS projects	elaboration of common remote sensing methods (project)	
C	Tidal basins (macrozoo-benthos communities)	(see above, selected areas)	to be elaborated	poll 3,4	-	new approach, elaboration of common methods	
C	Contaminants in Nereis, Arenicola	heavy metals, organic micropollutants	(according to JAMP)	poll 2,3	research projects		
	Zoobenthos (subtidal)						
A	Sabellaria (reefs)	location and development of reefs	to be elaborated (underwater video or sonar)	fish 2	single projects	testing of trilateral guidelines	further elabora-tion of methods needed
B	Shrimping gullies (benthos communities)	biomass, abundance, species composition, dominance structure, species distribution pattern	to be elaborated	fish 2	subtidal stations: NL, SH, DK	project for selection of areas, closed areas needed	
	Blue Mussels						

Pri-ority	Parameter group	Parameter	Methods	I.o.C.* Hypoth	Status	Follow-up work	Status of guidelines
A	Location / area of beds (whole area) (remote sensing)	a. intertidal beds: location and area b. subtidal: only location	a. remote sensing, every 5 years b. fishery statistics	poll 4 fish 1,2	single projects in NL, D, DK	testing of trilateral guidelines	refinement needed
A	Mytilus stocks (species parameters)	intertidal beds: abundance[2], biomass[2], primary settlement[1], length distribution[1,2], condition index, stress indices, histological changes (1=subtidal, 2=cultured beds)	once / twice per year, selected areas, monthly: prim. settlement, length distribution	poll 2-4 fish 1,2	SH: running prg. NL, Nds, DK: partly, single surveys	testing of trilateral guidelines	refinement needed
B	Selected beds (benthos community)	biomass, abundance, species composition, dominance structure, mussel bed structure	twice per year	poll 4 fish 1,2	(NL, D, DK)	elaboration of common methods	
	Contaminants in Blue Mussels						
A	- metals	Cd, Hg, Pb, Cu, (Zn), As, Se, Sn, Organo-Hg	at least once per year, covariables (lipid types, weight (AFDW, DW, FW), condition index, salinity	poll 2,3	NL, D, DK	testing guidelines (see also JAMP) to be specified: selection of stations frequencies, statistics	refinement needed
A	- organochlorines	PCB (see JAMP), DDT's, HCH's, HCB, toxaphene			NL, D, DK		
A	- PAH	see JAMP			NL, DK		
B	- TBT	see JAMP	to be elaborated	poll 2,3		elaboration of guidelines	
	Crangon (stocks)						
B	Species parameters	stock size (relative abundance and biomass), no. of larvae, recruitment, size structure, black spot disease		poll 2,3 fish,1	NL, D, (DK)	long term research project see also ICES Working Group on Crangon Fisheries and Life History (WGCRAN)	
C	Contaminants in Crangon	heavy metals and organochlorines (see above)		poll 2,3	-		
	6) PLANKTON						
A	Phytoplankton	cell number of all different species: species composition, species richness, dominance structure; phytoplankton C, chlorophyll a, C14-uptake, global radiation, Secchi disk (or PAR 400 - 700), UV-B	selected areas, bucket sampling, whole year (except winter), weekly, increase during bloom	poll 1-4	NL, D, DK	testing of guidelines (see also JAMP) selection of monitoring areas	refinement needed
A	Zooplankton	number of all species (to be calculated: biomass, no. of copepodites, particle size distribution, age structure, species composition, species richness, dominance structure)	combine with phytoplankton, every two weeks (or weekly)	poll 2,3,4	(SH), DK	elaboration of common guidelines	refinement needed
	7) FISH						
A	Key species (Eelpout, Flounder, Plaice)	relative abundance, biomass, pathology, growth, age structure, fecundity, maturity, no. of larvae, recruitment	selected areas, once per year (late summer)	poll 2,3 (fish 1)	DYFS: NL, D, DK: plaice	testing of trilateral guidelines	refinement needed
B	Demersal fish communities	species composition, biomass + abundance, species richness, dominance structure	once per year (late summer), DYFS to be modified	poll, 4 fish 2	NL, D, (DK)	DYFS to be specified and extended, project to select monitoring areas	
C	Pelagic fish communities	species composition, biomass + abundance, species richness, dominance structure	to be elaborated	poll 4 fish 2	SH, single surveys	common guidelines needed, project to select monitoring areas	
	Contaminants in Eelpout and Flounder:						

Pri-ority	Parameter group	Parameter	Methods	I.o.C.* Hypoth	Status	Follow-up work	Status of guidelines
A	- metals, organochlorines	see above	once per year before spawning	poll 2,3	Eelpout: D Flounder: NL, D, (DK)	testing guidelines (for flounder see also JAMP), selection of sampling stations	refinement needed
B	- PAH (+ metabolites)	see JAMP		poll 2,3	(DK)	testing guidelines selection of sampling stations	
	General fishery parameters			fish 1,2			
A	Fishing effort per area	CPUE	fishery statistics		NL, D, DK	inventory	refinement needed
A	Hours of fishing		fishery statistics		(NL, D)	inventory	
A	Fishery statistics	(licenses, vessels, gear type)			NL, D, DK: official stat.	inventory	
B	Fishing areas + periods		fishery statistics		-		
B	Shrimping by-catch composition and discard				projects (e.g. RESCUE)	elaboration of trilateral guidelines	
	8) DUNES						
A	spatial extension (beaches and dunes)	location and area	every five years, remote sensing	-	single surveys	testing of trilateral guidelines for remote sensing (project)	refinement needed
	9) BIRDS						
	Breeding Birds					**Joint Monitoring Breeding Bird Group**	
A	Numbers and distribution of breeding birds	species according to the trilateral program	see trilateral program: a. annual counts in selected census areas b. complete annual survey of selected species c. total count of the entire area every five years	clim poll 2,3,4 fish 1,2 recr agr 1,2	**trilateral program since 1990**	evaluation of guidelines (every five years)	**running**
A	Breeding success	juvenile mortality, egg mortality, growth rate	see trilateral guidelines: selected birds in selected areas, yearly	poll 2,3 fish 1 recr agr	testing trilateral guidelines, trilateral pilotphase 96/97	implementation, regular evaluation of guidelines	ready for implemen-tation
B	Breeding success: recruitment, mortality (outside the breeding season)	to be elaborated	to be elaborated	poll 2,3 fish 1 recr agr		elaboration of common guidelines	
A	Contaminants in bird eggs	Hg, organochlorines in bird eggs: Common Tern, Oystercatcher	see JAMP guidelines, selected areas, one-lab approach	poll 2,3	testing guidelines, trilateral pilotphase 96/97	implementation, regular evaluation of guidelines	ready for implemen-tation
	Migratory Birds					**Joint Monitoring Migratory Bird Group:**	
A	Numbers of waterbirds in counting units	species according to the trilateral program	see trilateral program	poll 3,4 fish 2 recr	**trilateral program since 1992**	regular evaluation of guidelines	**running**
C	Percentage of young birds of staging waterbirds	species according to the trilateral program		poll 3,4 fish 2 recr	(geese: D, DK)	to be further elaborated by JMMB Group; the activities in the countries should be harmonized	
	Beached Bird Survey (BBS)					**Trilateral Beached Bird Survey Group:**	
A	Beached birds and oil analysis	- no. of dead birds - no. of contam. birds - kind of contamination	see JAMP guidelines,	poll 3	NL, D, DK (not harmonized. Oil analysis are not carried out)	implementation of JAMP guidelines, installation of regular monitoring	ready for implemen-tation
	10) SEALS					**Trilateral Seal Expert Group:**	

Pri-ority	Parameter group	Parameter	Methods	I.o.C.* Hypoth	Status	Follow-up work	Status of guidelines
A	Population parameters by aerial survey	numbers and distribution of seals, calculation of population size, breeding success, recruitment / survival	see trilateral coordinated program: regular aerial surveys, whole area	poll 2,3	**trilaterally coordinated program** since 1989	further harmonization of the trilateral program (e.g. photo documentation)	**running**
A	Population parameters: Immunological status	Serology: PDV; Hormones (reproductive, thyroid, stress); CR Proteins (early inflammation markers);Vitamin A Immune function: Lymphocyte activity (T-cell, NK-cell)	in blood, samples from dead and partly from live-captured seals, standardized methods more or less available	poll 2,3	irregular sampling	development of common guidelines and statistical evaluation	further elabora-tion of guidelines needed
A	Pollutants in tissue: Toxicological status	heavy metals (Cd, Hg), organic micropollutants (PCBs, Dioxin, pesticides)	metals: in kidney and liver; organic micro-pollutants: in blood and blubber; samples from dead and partly from live-captured seals, standardized methods more or less available	poll 2,3	irregular sampling	development of common guidelines and statistical evaluation	further elabora-tion of guidelines needed
B	Dead Seals (mortality)	no. of dead seals		poll 3	DK, SH, Nds, NL	development of common documentation	
B	Taken & released seals	no. of taken & released seals		(recr)	DK, SH, Nds, NL	development of common documentation	
	11) RECREATIONAL ACTIVITIES						
	Human activities:				(NL, D, DK)		
A	Boats at sea (selected areas)	no. of boats (all types)	aerial surveys, 8 time per year (high water)	recr	DK, SH, Nds	testing of guidelines	refinement needed
A	Human activ. on tidal flats, beaches, salt marshes (selected areas)		aerial surveys, 8 time per year (low water)	recr	(DK)	testing of guidelines	
A	Flatwalkers (whole areas)	no. of guided tours and flatwalkers	official statistics	recr	DK, (Nds)	testing of guidelines	
A	Air traffics (airports)	landings and take offs on all islands, coastal areas	official statistics	recr	NL, D, DK	testing of guidelines	
B	Ships in marinas	different types, overnight stays, in- and outgoing		recr	(NL, D, DK)	inventory of official statistics	
B	Sluice passages		official statistics	recr	NL	(not relevant in D + DK)	
	Tourism general:						
C	Socioeconomic data (inhabitants, tourists)	selected communities and provinces, general socio-economic data	every 10 years. official statistics and questionnaires	recr	(NL, D, DK)	official statistics (inventory), elaboration of a standardized questionnaire	
C	Overnight stays and bed capacity (< and 9 beds)	a. 9 beds b. < 9 beds c. bed capacity (< and 9 beds)	a. every year (by month) b. every five years c. every 5 years	recr	(NL, D, DK)	inventory official statistics, project for conversion factors	
C	Harbor capacity		official statistics	recr	(NL, D, DK)	inventory official statistics	
B	Visitors	no. of visitors length of stay		recr			
	12) GENERAL PARAMETERS						
A	Coastal protection measures	coastal protection measures, supra- and eulitoral, whole area	inventory	clim	(NL, D, DK)	inventory of available information	refinement needed
A	Geomorphology	height, coastline, drainage	remote sensing, every 5 - 10 years	clim	single surveys	testing remote sensing guidelines	
A	Flooding	frequency, inundation, flooding level elevation	inventory, from gauges	clim, poll 1-4	(NL, D, DK)	inventory of available information	
A	Groundwater level (islands)			recr	NL, Nds.	inventory of available information	
A	Land use	main types of agricultural utilization	remote sensing	agr	single surveys	testing common methods (remote	

Pri-ority	Parameter group	Parameter	Methods	I.o.C.* Hypoth	Status	Follow-up work	Status of guidelines
						sensing)	
A	Weather conditions			clim	NL, D, DK	inventory	
A	Hydrology			clim	NL, D, DK	inventory	
C	Coastline			clim	single surveys	elaboration of common guidelines	

* I.o.C / Hypoth. : Issue of Concern and respective Hypotheses of the TMAP

- clim: climate change
- poll: effects of pollution (nutrients, heavy metals, organic micropollutants) on: 1. chemical processes, 2. natural processes, 3. species, 4. communities
- fish: response of species and communities to fisheries
- recr: response of species to recreational activities
- agr: response of salt marsh communities to agricultural utilization