



SAON Terrestrial Ecosystem Subgroup Report

Magnus Tannerfeldt & Margareta Johansson
on behalf of the group

Revisited and updated list of indicators developed by AON
Make sure not to reinvent the wheel!!

[illegible]

One example of governmental wish list of environmental variables www.miljomal.nu

Population of arctic fox

Acid /Polluted forests

Population of wolverines

Population of reindeers

Migrating birds



Natural indicators identified by Local Users (Bayfield *et al.*, 2004)

	Sweden		Iceland		Scotland		Faroes		Finland	
<i>Natural capital Indicator</i>	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Temperature	61	35	87	26	70	21	71	30	58	30
Precipitation	60	34	77	26	74	20	54	27	52	28
Glaciers			70	27						
Habitats			67	22	72	31	53	23	62	18
Rangeland areas	55	27	67	25	69	30			81	15
Ocean temperature			64	22			71	30		
Currents			61	24			68	35		
Multi use forest			60	26	63	22				
Key species status			60	26	71	32			71	22
Snow	58	33	59	27	56	28			51	31
Greenhouse gases	63	31	59	24					52	37
Conservation areas			57	18	60	35			64	21
Erosion rates			56	29						
Windiness			55	25	63	23	56	25		
Abandoned areas			52	23						
Habitat condition	55	31	50	27	67	26	52	28	64	21
Hunting and fishing areas	56	34			70	28			83	13
Plant communities					69	29	59	31	50	23
Animal populations	53	29			63	30	63	32	65	23
Aquatic biology					58	27	50	28		
Landscape fabric					55	31				
Hydrographic data					55	19			53	27
Precipitation pH	54	31							55	36
Runoff/groundwater chemistry					53	25				
Stock levels					52	22				
Surface water chemistry							56	31		
Artifacts in landscapes							53	27	57	15

Economic indicators identified by Local Users (Bayfield *et al.*, 2004)

<i>Economic indicators</i>	Sweden		Iceland		Scotland		Faroes		Finland	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Primary sector	50	28	78	19	65	25	61	28	72	16
Secondary sector			67	22			55	32		
Employment statistics,	63	32	60	21	50	19			64	24
Tertiary sector	68	23	60	27	56	25			76	16
Numbers on income support	57	35							50	25
Visitor numbers	52	30	56	15	59	17			67	15
Cost of living			55	21						
Tourist bed provision	56	27							53	19
Tourist bed occupancy rates	74	15	52	18	52	19			77	14
New business starts	57	19	51	26					52	21
Agri-environment impacts					65	25			66	15
Recreational activity participation					63	21			65	28
Mammal & bird stocks	70	14			64	16			69	22
Traffic flows	53	25			54	15			58	25
Hunting catches	65	27							57	15
Grant/assistance uptake by sector					51	23			52	20
Regional budget by area	53	20			51	30			59	19
Development investment	52	16							56	13
Use of paths					51	20			54	22
Fish stocks	70	14			51	15	66	30	78	19
Planning applications	50	23			50	29			52	26
Uptake of agri-environment schemes							52	36	53	15
Fish catches	64	28					62	31	67	18
Public transport infrastructure investment	51	30								
Public transport routes network	51	25								
Informal activities participation									57	24
Fuel costs									74	19
Public transport use	58	23								

Social/political indicators identified by Local Users (Bayfield *et al.*, 2004)

<i>Social/political indicators</i>	Sweden		Iceland		Scotland		Faroes		Finland	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Exceedance data	60	36	64	23			53	19	58	28
Approved applications	68	36	62	28	69	22	74	29	55	25
Surveys of stakeholders views	70	18	62	20	65	32			54	23
Population spatial distribution	58	27	59	24	52	14				
Participation in cultural activities			59	15					62	22
Population age structure	56	24	57	25	57	15			74	9
Regulation Compliance	62	31	55	30	78	17	67	24	61	39
Stakeholder membership lists					50	23				
Stakeholder voting statistics	55	32								
Size of holding									68	23
Health provision									56	20
Heritage funding									61	17
Register of ownership									58	29
Education provision									58	27
Household structure									57	20
Land prices									56	22
Costs of housing									56	25
Cultural funding									54	25
New housing applications									53	19
Formal groups membership									50	19
Council services expenditure									52	20
Rental provision									60	18
Damage to heritage sites									50	24
Types of planning application	72	20					66	24	52	23



Principles of user needs – examples

We want everything –
How do we prioritise?

We want it by yesterday – and quality controlled –
What is required to get timely data and ensure
quality control and accessibility?

We want long-term security of data supply and
infrastructure –
How can we secure existing observations and networks?

We want to change our minds as our needs change – no
list is definitive – How can we make a flexible monitoring
system?



Types of metadata, data and data products required on drivers of ecosystem change as well as on biota

- 1. Essential baseline info*
- 2. Core monitoring activities*
- 3. Goal oriented monitoring and current environmental problems and past topical issues*



Scale issues - Space

Pan Arctic

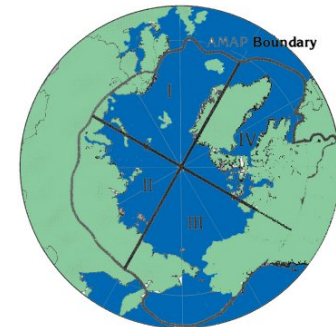
Regional

Local

Plot level

Multi spatial

ACIA Proposed Sub-Regions





Scale issues - Time

High frequency

Daily

Seasonally

Decadal

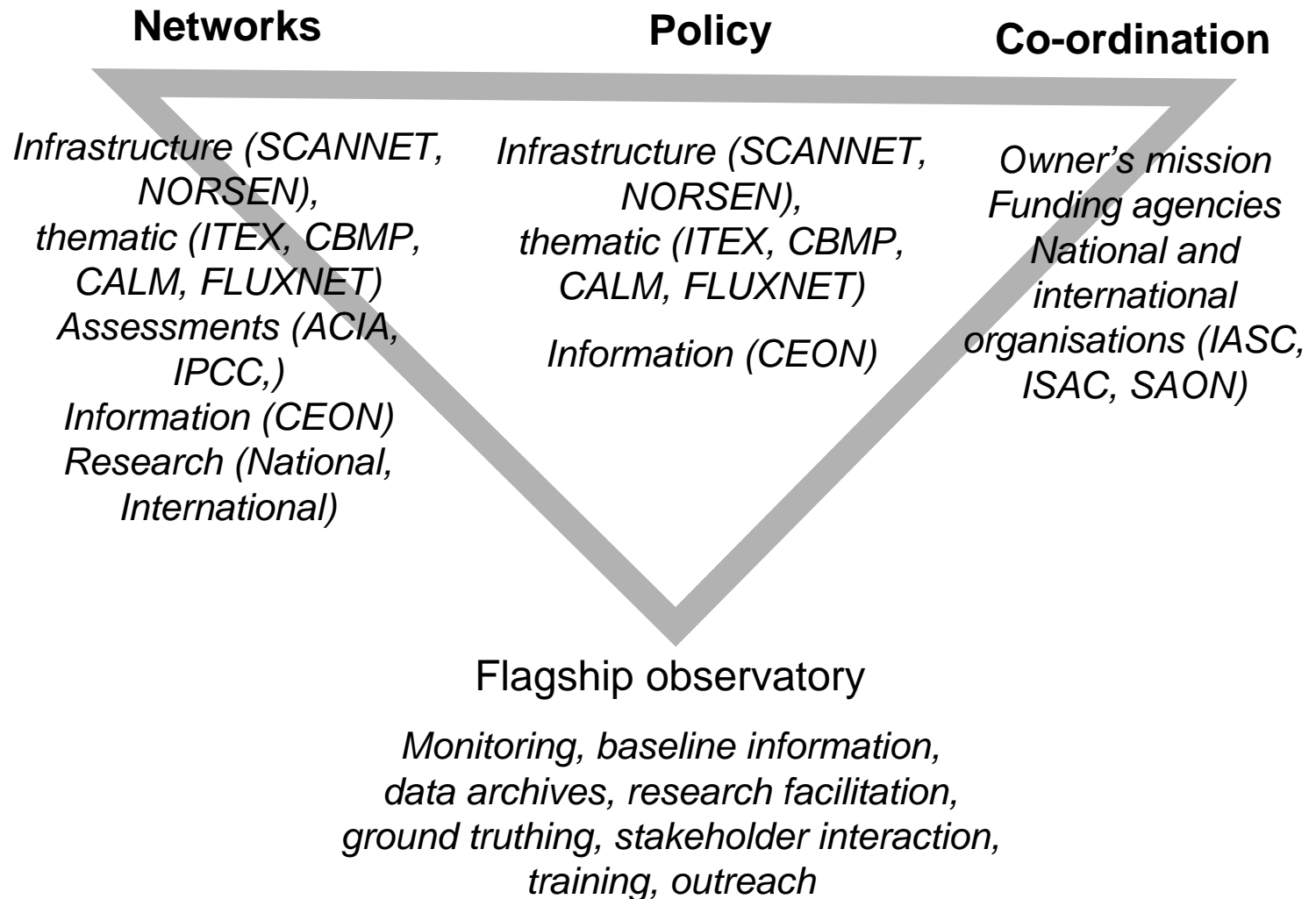
Thresholds

Cyclicity

Extreme events



Flagship observatories – an *unstable* (?) pillar of monitoring and research





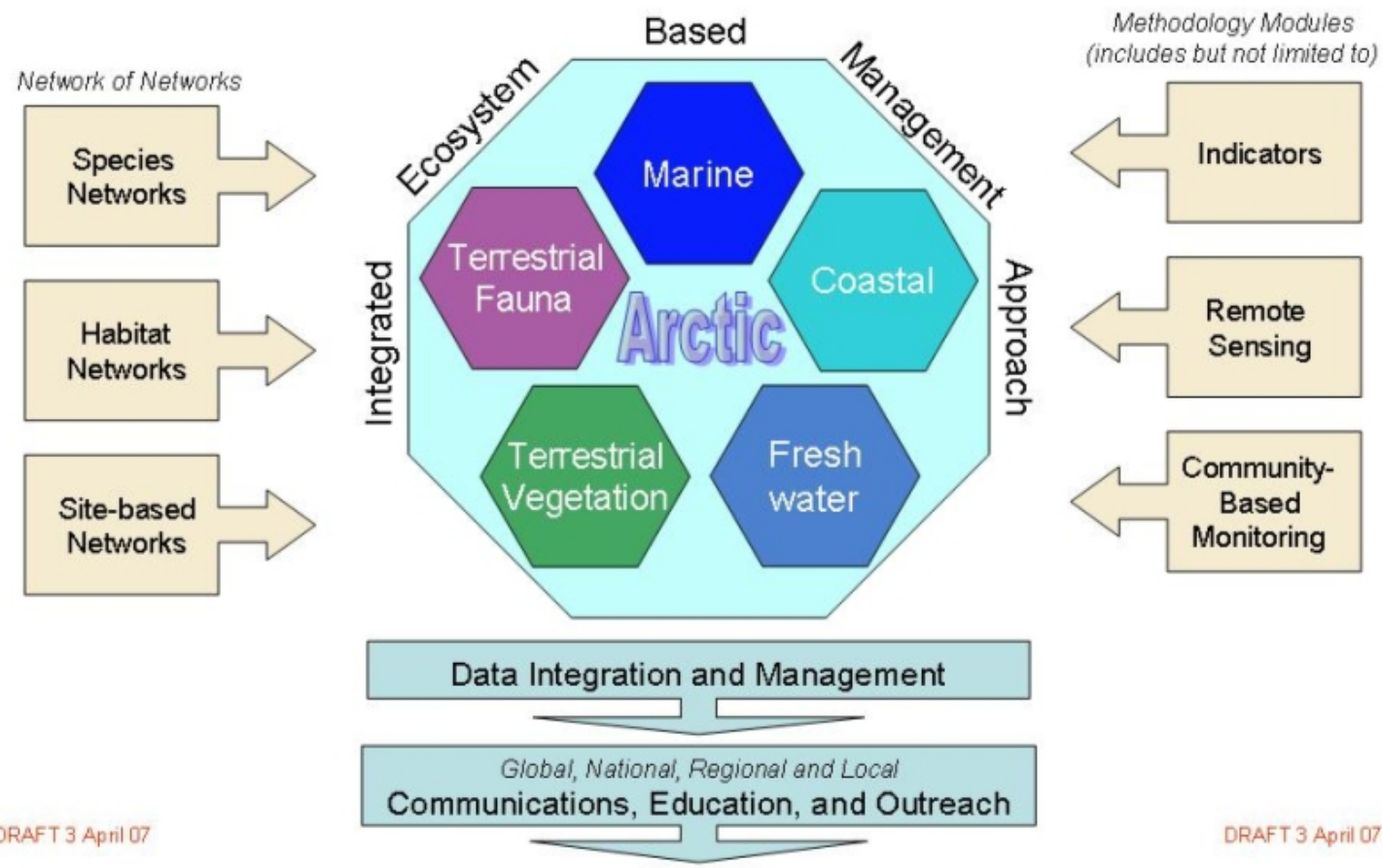
Flagship observatories – an unstable (?) pillar of monitoring and research

A key recommendation is that current flagship observatories and key sites are sustained and that funding is ensured and their networks and collaboration with other monitoring networks and arctic residents are also sustained.

More firm agreements to assure long term funds for the coordination of flagship observatories and key sites is needed, maybe through the Arctic Council?

There is currently no unifying concept or identity to the many observations, networks and inventories that are operating independently of infrastructures, but these types of monitoring also needs to be sustained.

CBMP's view of the world!!





Data access

Data policy

On line GIS approach, e.g. www.armap.org
www.ceoninfo.org

Build on existing meta- databases and data centres

Digital object identifier

Funds for processing and posting data



Food

Downscaled climate, apply ecosystem models, provide local residents with tools to understand what is happening in their area, to be able to develop adaptation and mitigation strategies.

The carrying grazing capacities not know in North America.

Human usage of resources

Focus on ecological bottlenecks, key factors for the species

Migrations and transfer marine/terrestrial fresh water fish



Carbon

Fate of permafrost and wetland areas – wetting or drying

Inventories of carbon stocks in soils/vegetation/permafrost

Carbon monitoring at different sites in the Arctic

Winter processes

Extreme events (e.g. forest fire)

Carbon feedback / albedo feedback



Output from this subgroup

Main report

Report on how to coordinate and integrate existing efforts and data availability

Appendices

Updated "AON" list of indicators

List of existing networks

List of relevant IPY projects