Background on ideas, concepts, and the ecosystem approach

Peter Bridgewater
Chair UK Joint Nature Conservation Committee &
Director, Global Garden Consulting

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Reloading the matrix…

… Matrix (habitat between fragments) is usually treated as uniform and ecologically irrelevant. However, recent work on shows that matrix habitat can profoundly influence within-fragment dynamics.

Jules and Shahani, Journal of vegetation science, 14, 459-464. 2003.

The Ramsar Convention *inter alia* has two articles relevant to landscape approaches:
The "**Wise Use**" of wetlands (Article 3.1)
The "**Ecological character**" of Listed Wetlands of International Importance (Article 3.2)

"Wise use of wetlands is the maintenance of their ecological character within the context of sustainable development, achieved through the implementation of the ecosystem approach".

The Millennium Ecosystem Assessment described maintaining ecosystem services for human well-being and poverty reduction.

ecosystem structure included:

- *Components* (features, attributes, properties):
  - biological, physical, chemical
- Processes (interactions etc.)
- Services (functions, products, goods, benefits, values)
  - Provisioning; Regulating; Supporting; Cultural

Goal for Wetlands of International Importance:

To develop and maintain an international network of wetlands that are important for the conservation of global biological diversity, including waterbird flyways and fish populations and for sustaining human life.

While the benefits of protecting such habitats are indisputable, the potential for other, human-dominated land uses also to enhance biodiversity has been largely overlooked in landscape planning.

At the same time, the possibility that a future landscape matrix could surround protected areas with improved ecological function has received little attention in conservation biology.

A systems approach suggests creatively examining other land uses, near and far from reserves, as well as other plausible landscape matrix futures.

Nassauer, 2006

The Matrix

Matrix heterogeneity is controlled by flows of species, genes, energy, nutrients and, especially, *water.*
The dominant component (most extensive and connected landscape type) of a landscape is the matrix.
The characteristics of the matrix, such as density of patches, boundary shape, networks and heterogeneity play a dominant role in landscape functioning (e.g. animal migration).

The ideal **landscape texture** is a coarse-grained matrix with fine-grained areas providing for:

✓large-patch ecological benefits;
✓multi-habitat species including humans: and
✓maximum effective delivery of ecosystem services.

Landscape change is land or water being transformed by several spatial processes overlapping in order, including perforation, fragmentation and attrition, which increase habitat loss and isolation, causing different effects on spatial pattern and ecological processes.

Landscape design is best achieved through aggregation of land uses, and maintaining small patches and corridors of “nature” throughout developed areas, as well as some human activity spatially scattered in the broader matrix.

Landscape ideas imply that for protected spaces that no matter what quality of management goes into them, it is for nought unless the surrounds and connections are also well managed.

And here connections mean species movements, flows of energy, nutrients and, especially, water.

For effective management of protected spaces we need, like transport engineers, good infrastructure: in this case ecological infrastructure.
The landscape matrix is the infrastructure whose qualities determine the scope for maintenance, evolution and adaptation of biodiversity

Managing for the matrix is also about building resilience in protected areas and their component biodiversity.

Properly managed, the matrix can imbue protected areas with resilience:

- against global change,
- to provide for cultural needs, and
- to ensure future human survival.

Ecosystem Approach:

adopted by the Conference of the Parties of the CBD in May 2000.

Principle 1, *The objectives of management of land, water and living resources are a matter of societal choice*

- Management should be decentralized to the lowest appropriate level.
- Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
- Recognizing potential gains from management, there is a need to understand the ecosystem in an economic context.
- Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.
- Ecosystems must be managed within the limits of their functioning.

- The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
- Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
- Management must recognize that change is inevitable.
- The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
- The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.

Ecosystem Approach:

adopted by the Conference of the Parties of the CBD in May 2000.

Principle 12 closes the circle, bringing us back to people. *The ecosystem approach should involve all relevant sectors of society and scientific disciplines*,

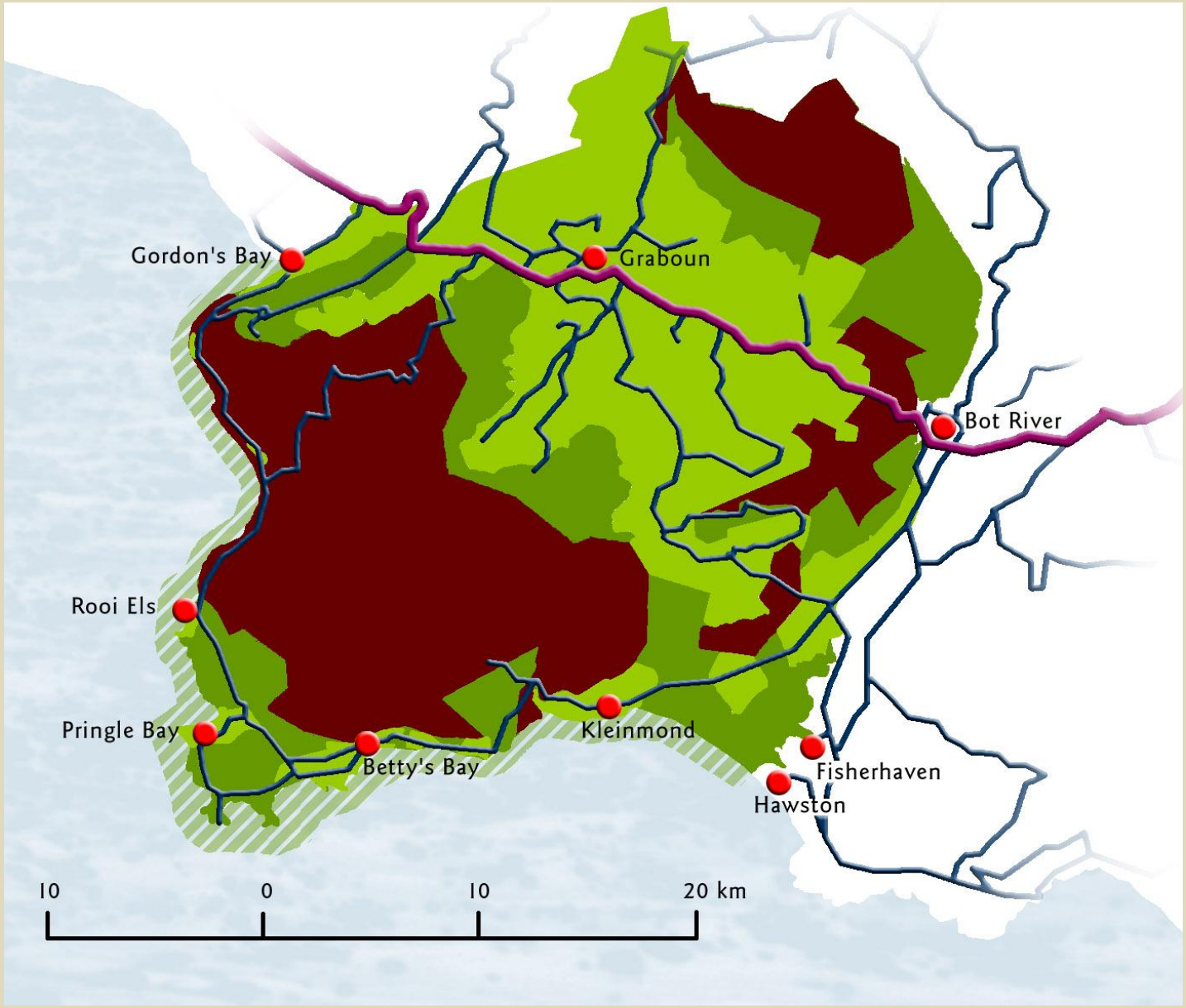
The EA :
helps define the appropriate management level (local, regional, global)
places people as part of ecosystems, and
allows integration of traditional and indigenous knowledge systems with scientific thinking in providing conservation solutions.
One of the significant problems in any discussion of ecosystem management and conservation is to maintain an awareness of scale and of the existence of more than one scale

Biosphere Reserves

Each Biosphere Reserve performs three functions):
- ✓a biodiversity conservation function);
- ✓a development function; and
- ✓a logistical function.

Each Biosphere Reserve also has nested zones:
- ➢Core;
- ➢Buffer and
- ➢Transition

They may comprise any mix of terrestrial and/or marine elements.


Gordon's Bay
Graboun
Bot River
Rooi Els
Pringle Bay
Betty's Bay
Kleinmond
Fisherhaven
Hawston
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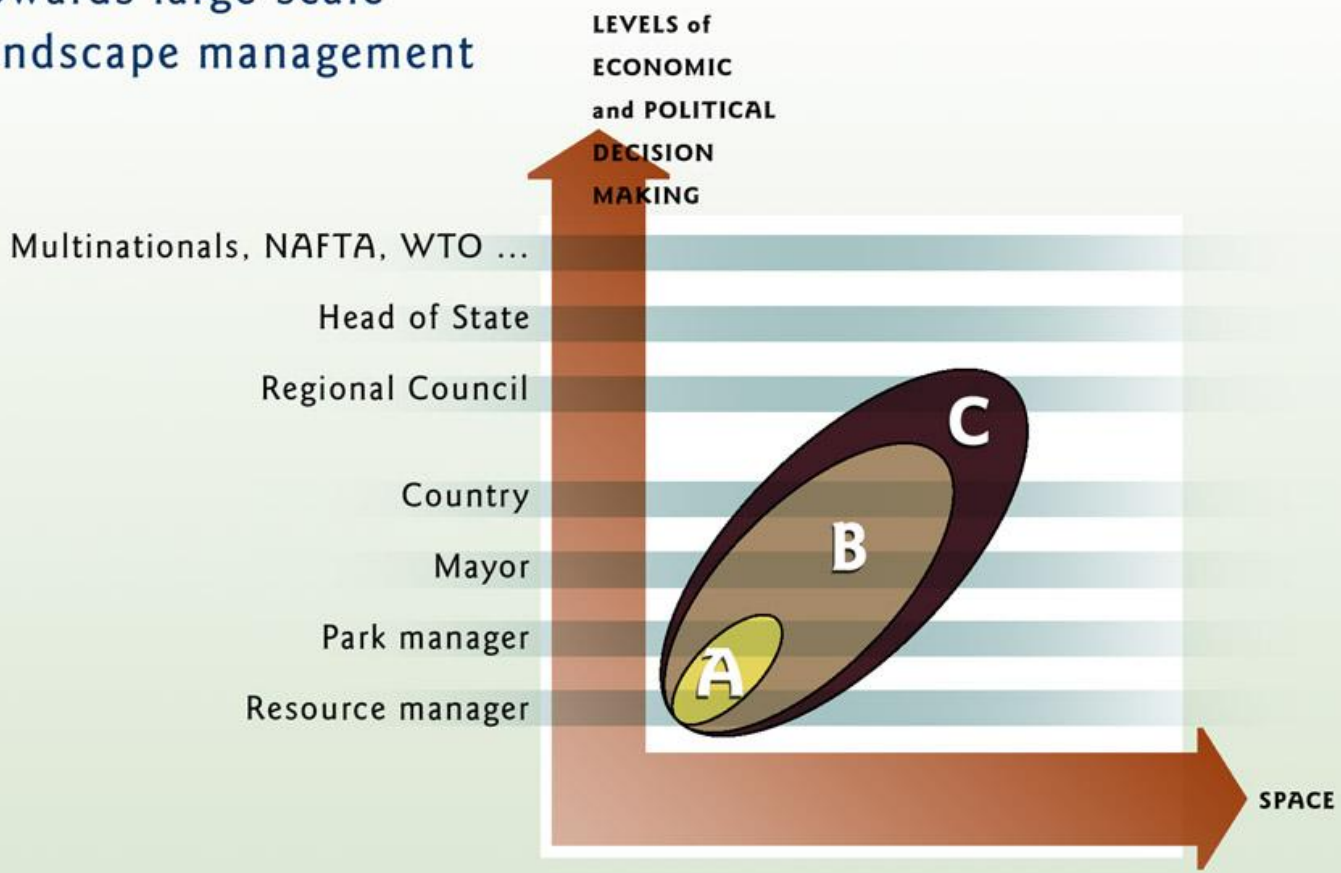
Biosphere reserves:
towards large-scale landscape management



MAN AND BIOSPHERE PROGRAMME

Marine Connectivity

Linkages in the landscape must be recognized as natural and cultural. They are inextricably linked.

linkages between urban and rural areas.

Institutions need to be broadly understood and attention paid to empowering community organizations, and building partnerships among institutions and fostering participatory processes toward a shared vision of the landscape.

Politics and socio-economic linkages are also important to landscape management. The protected landscape/seascape approach can provide a framework for sustainable development.
importance of agro-biodiversity and farming systems.

Freshwater protected areas, can and do stand at the nexus of multiple interests and stakeholders, including biodiversity and ecosystem conservation poverty reduction, water and food security, human health, flood control and management, preservation of indigenous cultures.

Freshwater systems are grossly under-represented in the global protected area network.

Freshwater protected areas are most effective in conserving biodiversity and contributing to human health and well-being if placed in the context of integrated lake and river basin management

With the science of landscape ecology, together with the policy framework of the international agreements, Conservation, and better management, of protected areas can advance rapidly!