Strategic Plans and Adaptive Management

Lance Gunderson
Emory University
GCD Adaptive Management Work Group
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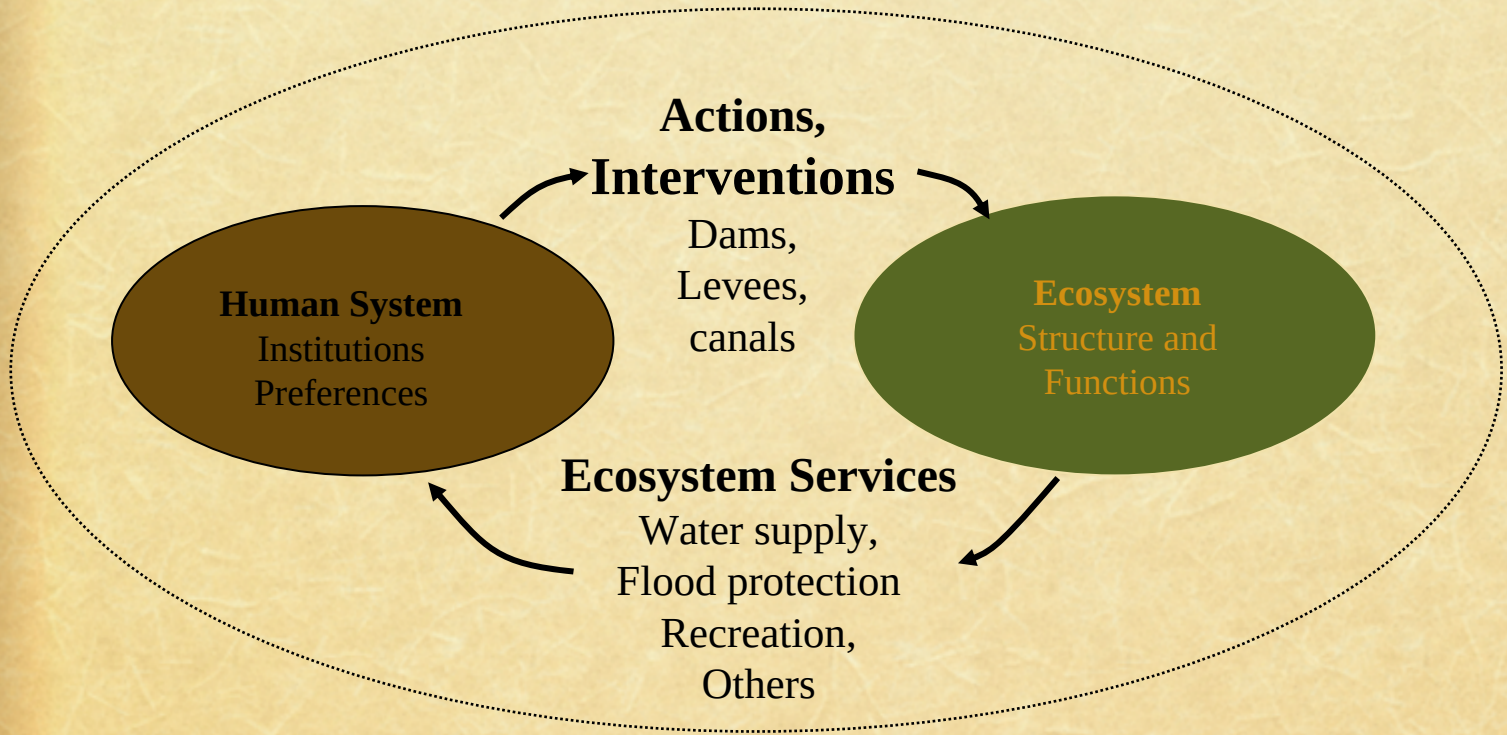
Topics

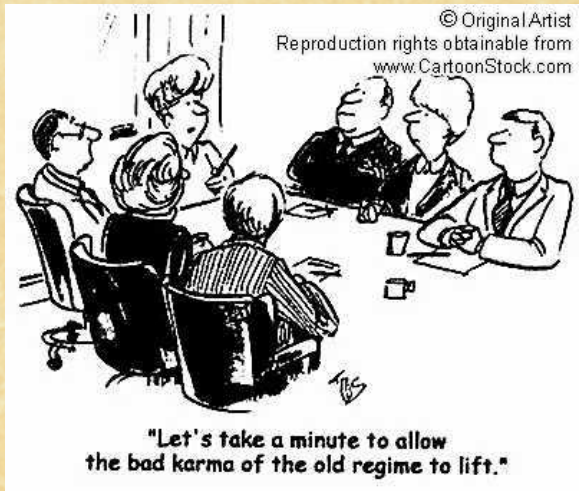
- **Dynamic Systems and Regime Management**
  - Ecological Resilience and AEAM
- **Uncertainties of Resource Management**
  - Different Types of Problems
  - Adaptive Management & Adaptive Governance
- **Adaptive Planning and Management**
  - Kruger National Park Example
  - Management Objectives Hierarchy



Social-Ecological System

Managing Regimes

System	Regimes A	B
Rangeland:	grass	shrubs
Reefs:	coral	algae
Lakes:	clear	turbid
Populations:	endangered	safe



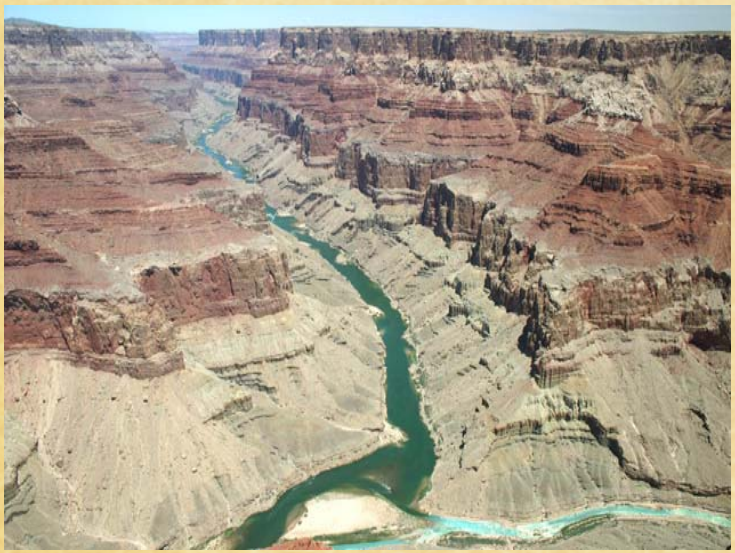
Managing Regimes

- Maintain Current/Desired Regime
  - Detect and Avoid thresholds

Nutrient Thresholds in Everglades

Managing Regimes

- **Move System to Desired Regime**
  - Restoration of
    - Temperature variability
    - Sediments
    - Pre- dam fauna



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  - **Resilience and AEAM**
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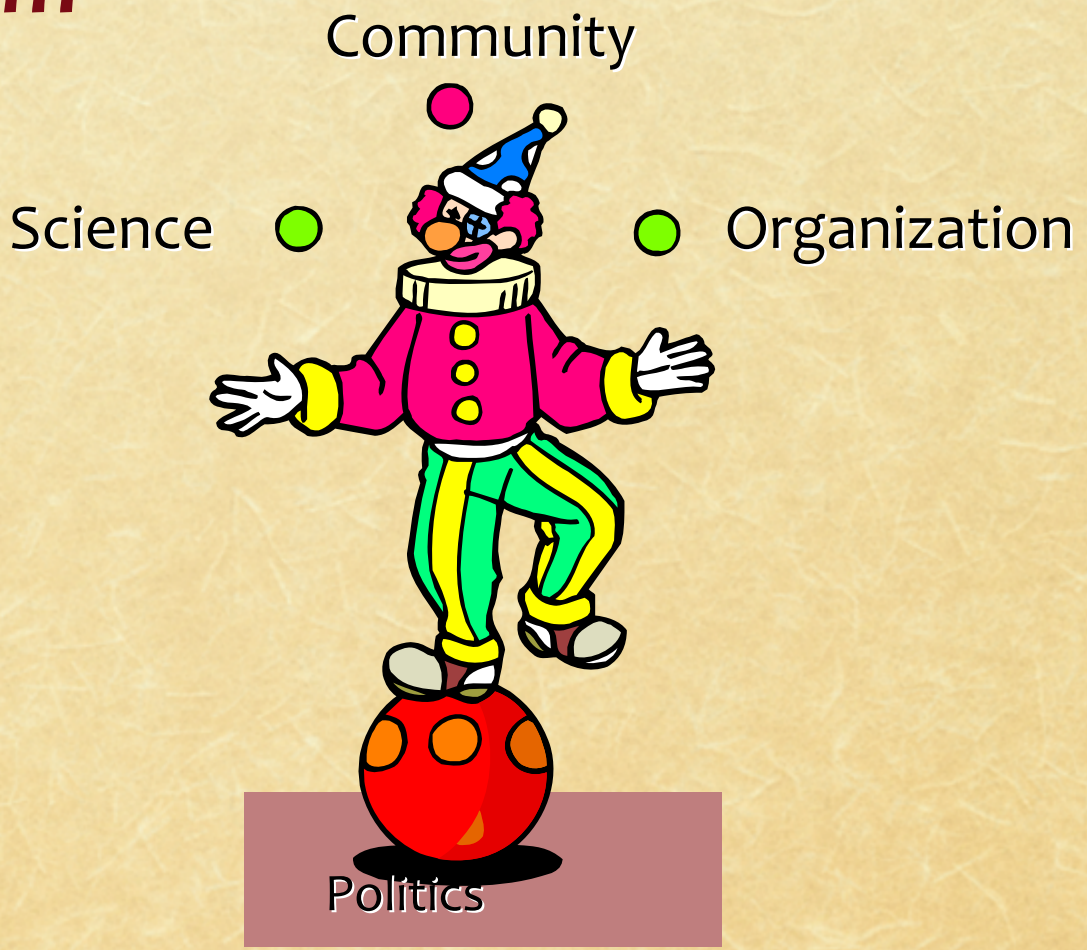
Managers must deal with different problem domains



Managing Uncertainty

-Problem Domain

-science

-organizational

-community

-political

- adequate theory
- multiple hypotheses
- tractability (complexity)
- models
  - scales and data
- types of science
  - integrative
  - piecemeal
- types of learning

Managing Uncertainty

-Problem Domain

-science

-organizational

-community

-political

- culture of institution
- scales of institutions
- integration (in/out game)
- shifting objectives
- sources of novelty
  (loyal heretics , skunkworks)
- location of learning

Managing Uncertainty

-Problem Domain

-science
-organizational

-community

-political

- role of crises
  - windows of opportunity
- groups
  - -functional (epistemic, advocates)
  - -formal (AMP) / informal (shadow)
- arenas for discourse
- use of uncertainty
- trust & social capital

Managing Uncertainty

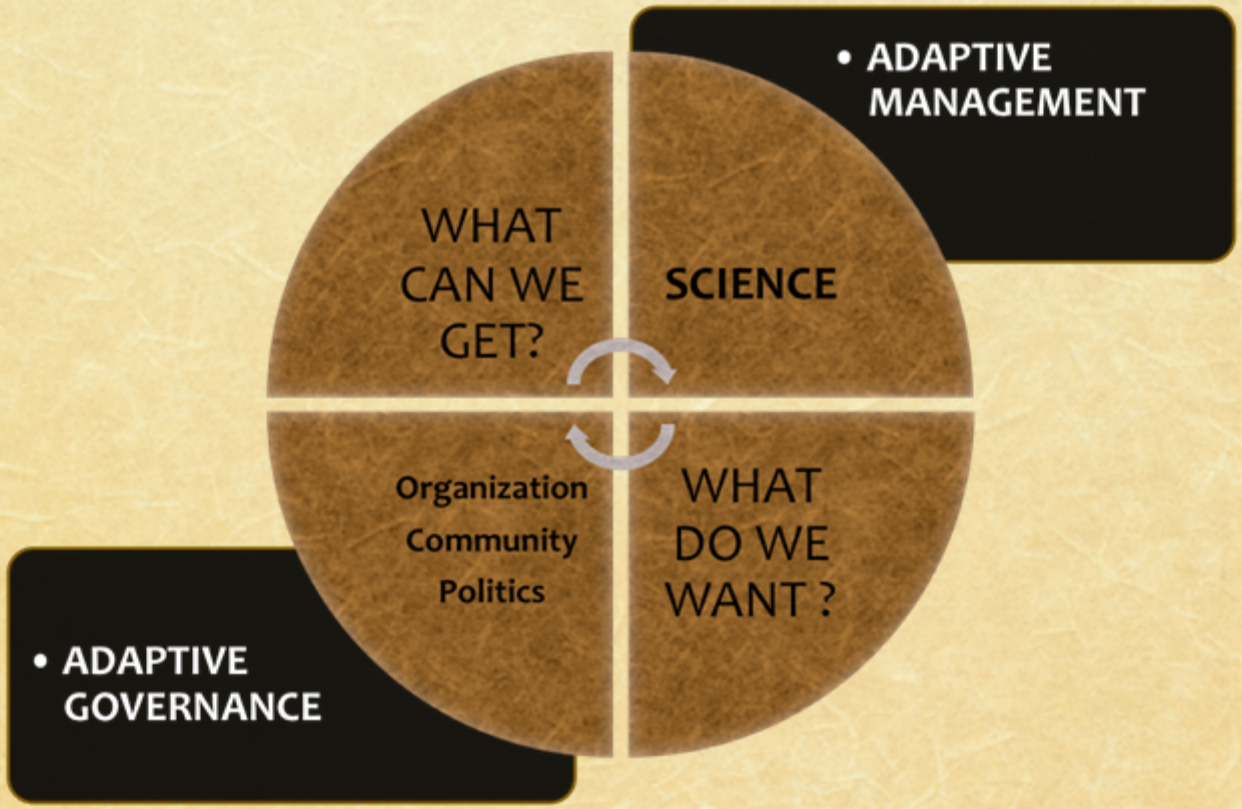
-Problem Domain

-science
-organizational
-community

-political

-leadership
  -arena for experimentation
  -scale spanners
-expressions of power
  -alternative agendas
-use of scientific uncertainty
  -status quo
-multiple discourses- scales

Managing Uncertainty



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Planning and Adaptive Management

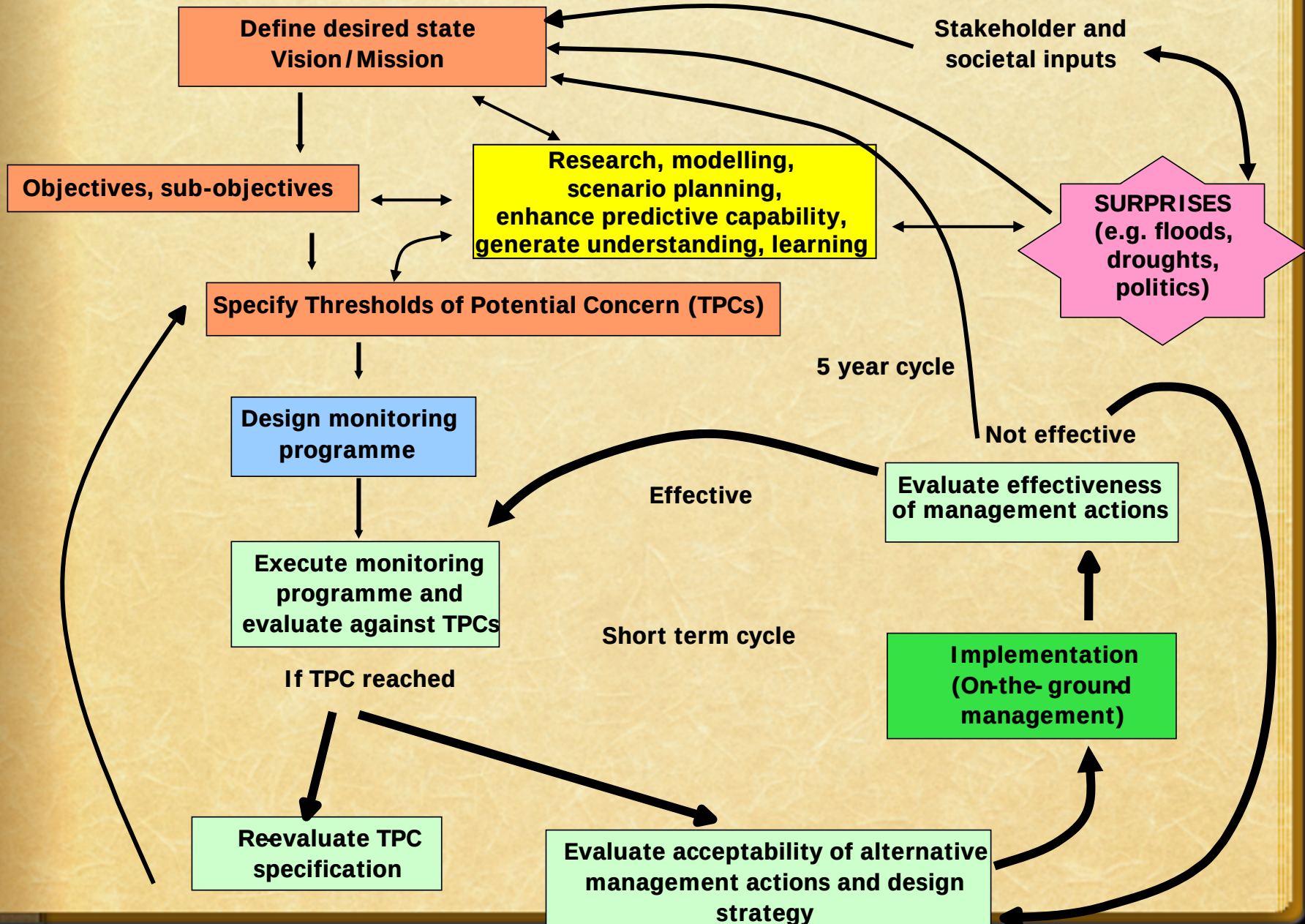
Kruger National Park:

Integrating Plans

Defining objectives

(Thanks to Harry Biggs and Kevin Rogers)

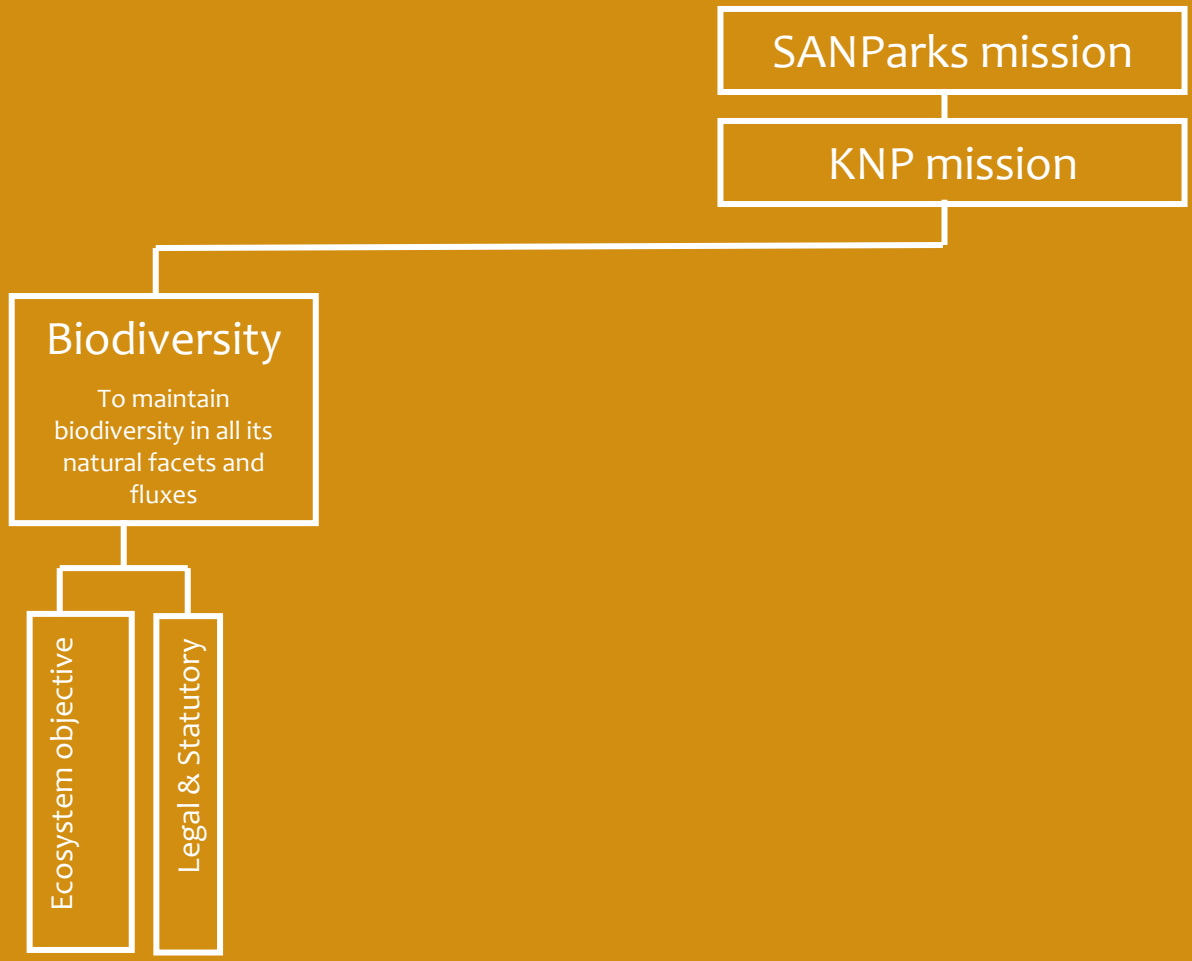
KNP Management Process

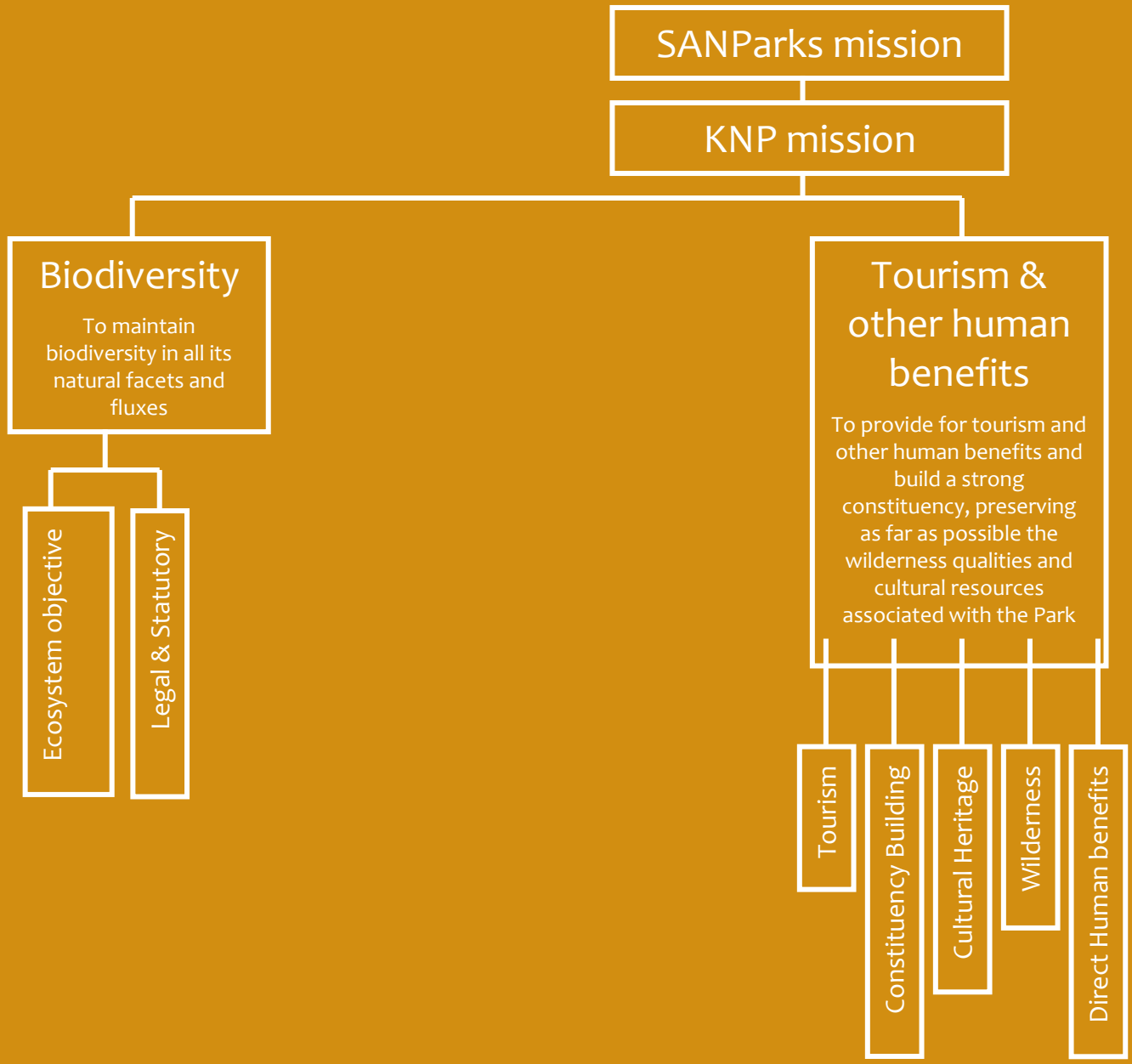


Kruger National Park Mission Statement

- In keeping with the SANParks mission;

1. to maintain biodiversity in all its natural facets and fluxes
2. provide for tourism and other human benefits, and build a strong constituency
3 . nd preserve as far as possible the wilderness qualities and cultural resources associated with the Park


SANParks mission
KNP mission
Biodiversity
To maintain biodiversity in all its natural facets and fluxes
Ecosystem objective
Legal & Statutory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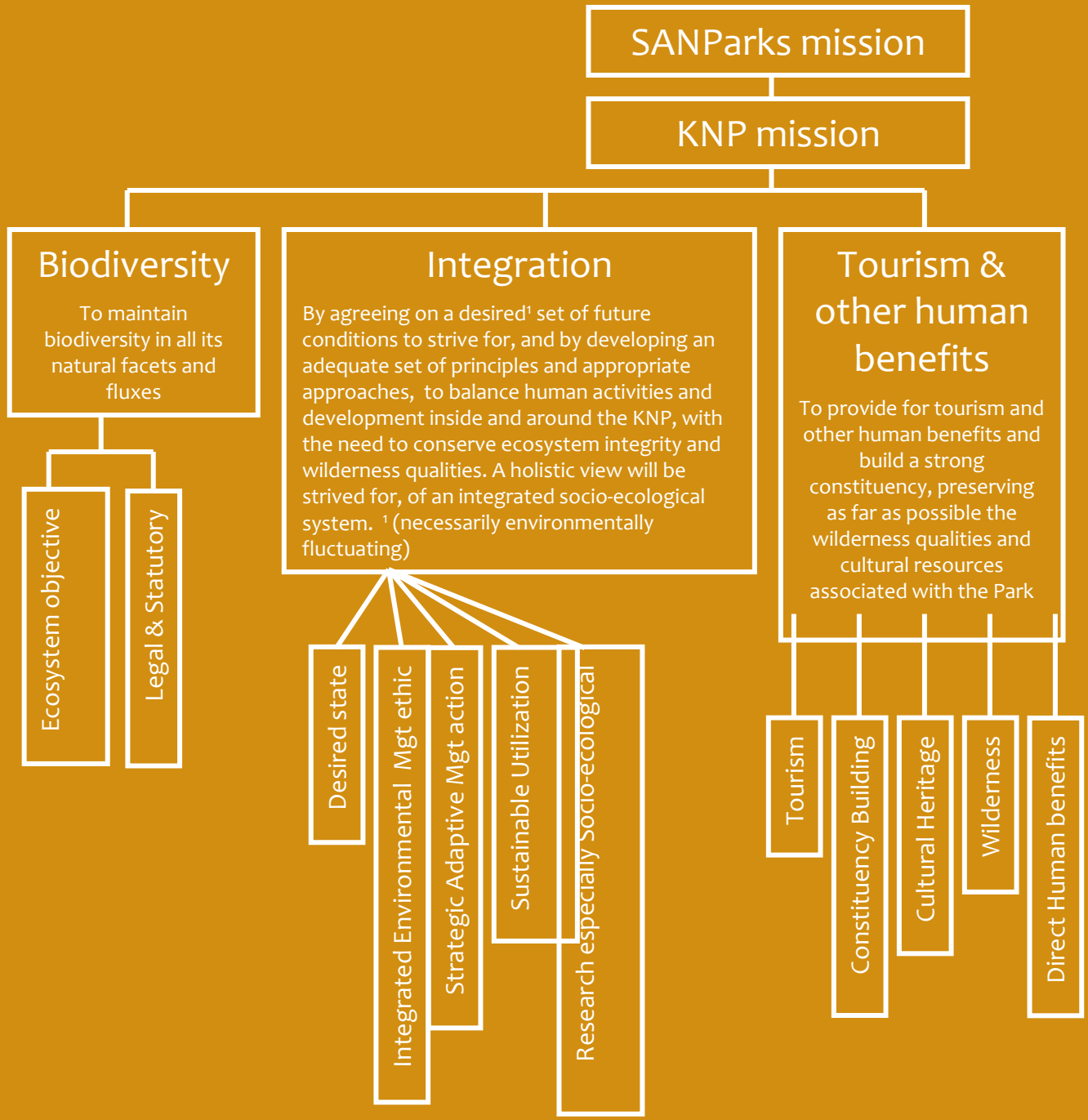
Tourism & other human benefits
To provide for tourism and other human benefits and build a strong constituency, preserving as far as possible the wilderness qualities and cultural resources associated with the Park
Tourism
Constituency Building
Cultural Heritage
Wilderness
Direct Human benefits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KNP mission
Biodiversity
To maintain biodiversity in all its natural facets and fluxes
Ecosystem objective
Legal & Statutory
Integration
By agreeing on a desired[1] set of future conditions to strive for, and by developing an adequate set of principles and appropriate approaches, to balance human activities and development inside and around the KNP, with the need to conserve ecosystem integrity and wilderness qualities. A holistic view will be strived for, of an integrated socio-ecological system. [1] (necessarily environmentally fluctuating)
Desired state
Integrated Environmental Mgt ethic
Strategic Adaptive Mgt action
Sustainable Utilization
Research especially Socio-ecological
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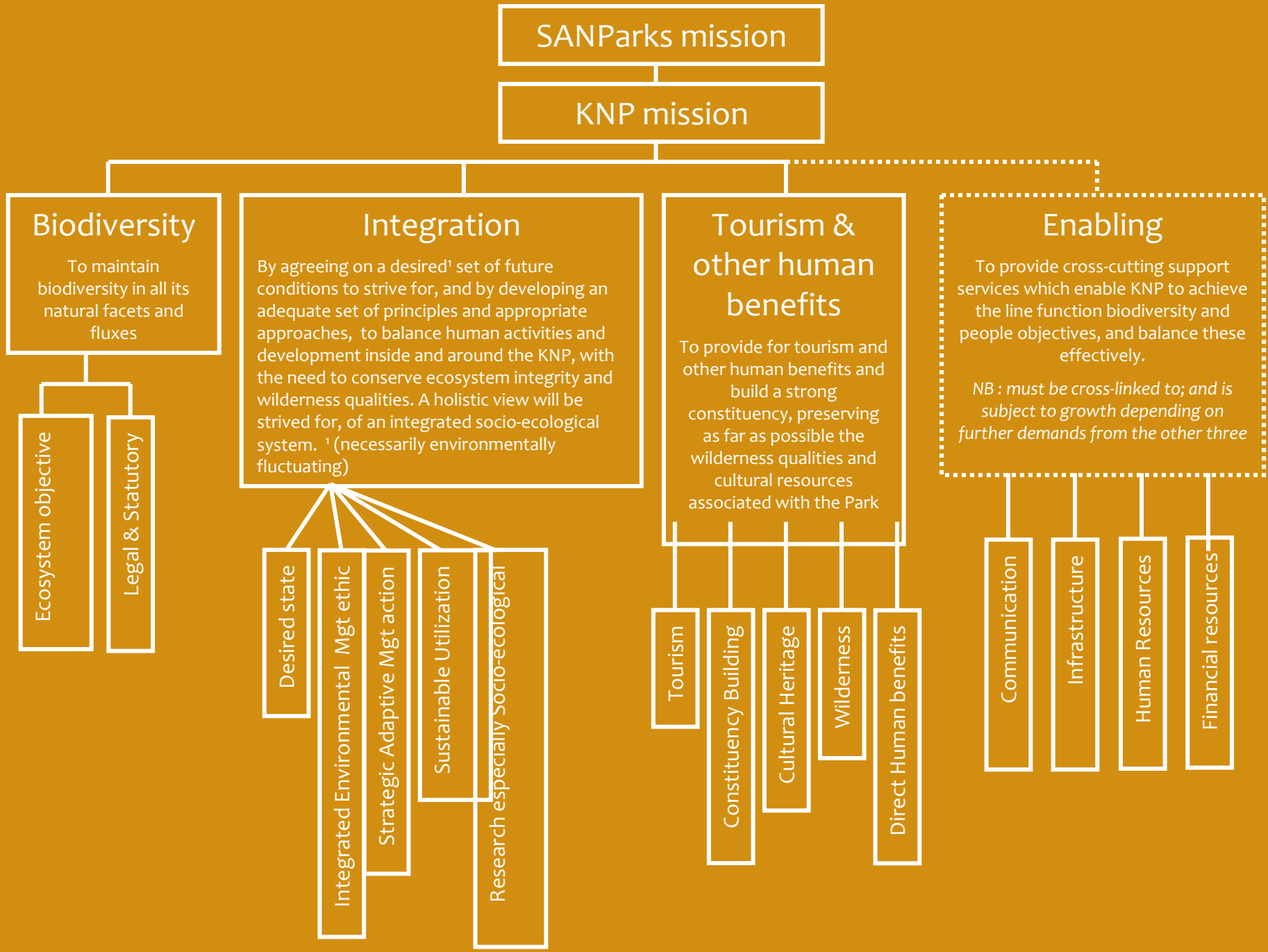
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Enabling
To provide cross-cutting support services which enable KNP to achieve the line function biodiversity and people objectives, and balance these effectively.
NB : must be cross-linked to; and is subject to growth depending on further demands from the other three
Communication
Infrastructure
Human Resources
Financial resources

Ecosystem objective

To understand and manage the KNP as part of the Lowveld savanna and its river catchment areas in such a manner as to conserve and restore its varied natural structure, function and composition over time and space, and its wilderness qualities, through an approach integrating the different scales of types of objectives in the KNP objectives tree.

Atmospheric

To understand the major effects of climate (esp. rainfall) in influencing biodiversity, and therefore if, when and how to take management decisions (including the no-action decision) with this clearer context.

Aquatic

To maintain the intrinsic biodiversity (hydrological, geomorphic and biotic) of the aquatic ecosystems as an integral component of the landscape, and where necessary restore or simulate natural structure, function and composition.

Terrestrial

To develop an integrated understanding of ecosystem diversity and dynamics, and where necessary intervene with appropriate strategies, in order to conserve and restore terrestrial biodiversity and natural processes

Alien Species

To anticipate, prevent entry and where possible control invasive alien species, in an effort to minimize the impact on, and maintain the integrity of indigenous biodiversity

Rare Biota

To prevent extinction within the Kruger Park of any species on the IUCN's global critically endangered or endangered lists[1], and to work with other conservation initiatives to secure and strengthen the future of such species over their historic distribution ranges. To put in place appropriate conservation efforts of other threatened[2] species or lower taxonomic division, including considering recommendations of experts of invertebrate taxa for which no formal red listing has been done, according to a realistic framework. Except in crucial instances for the survival of globally critically endangered species management for system integrity and biodiversity must take precedence over species management.

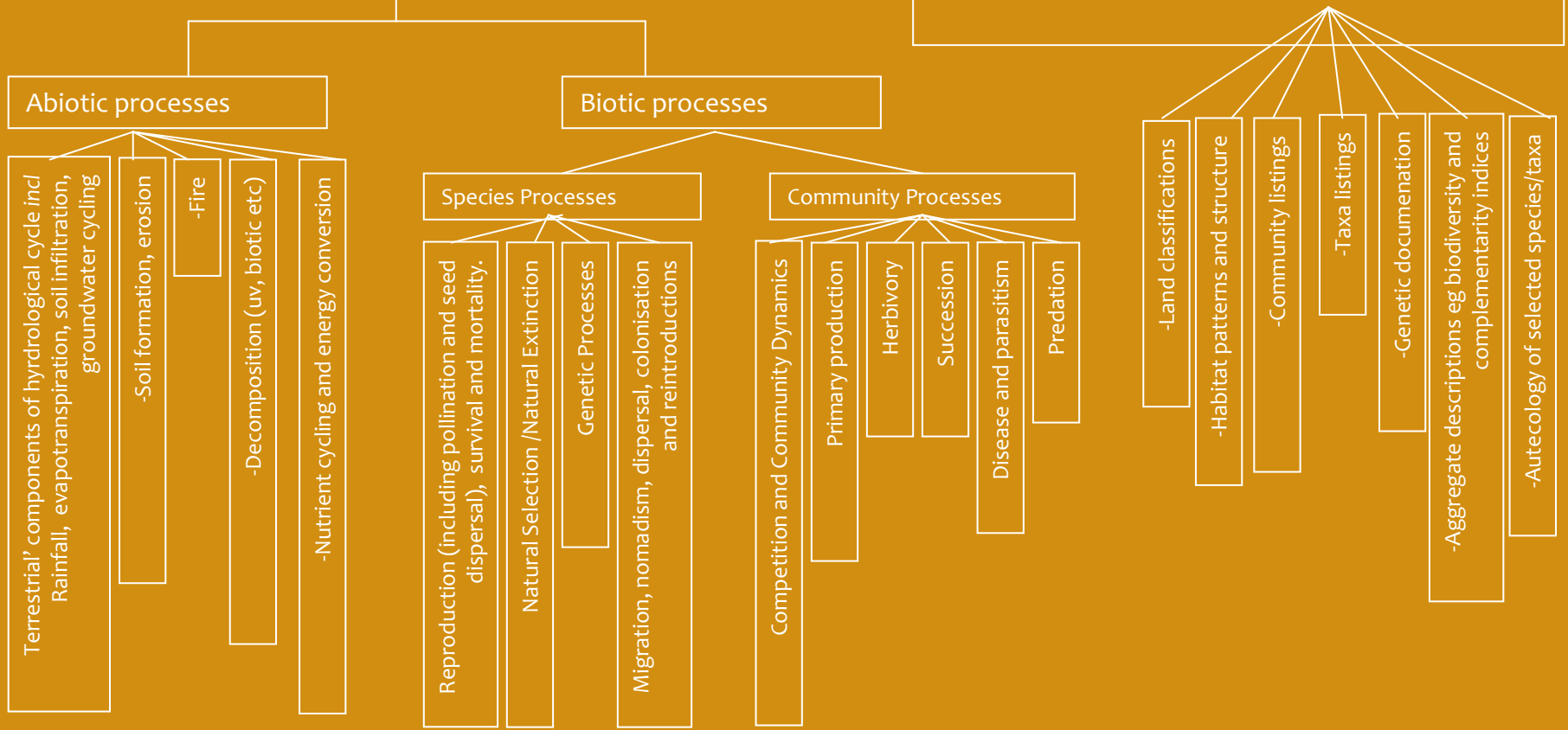
Terrestrial ecosystem objective: To develop an integrated understanding of ecosystem diversity and dynamics, and where necessary intervene with appropriate strategies, in order to conserve an restore terrestrial biodiversity and natural processes

Ecological Processes Objective:

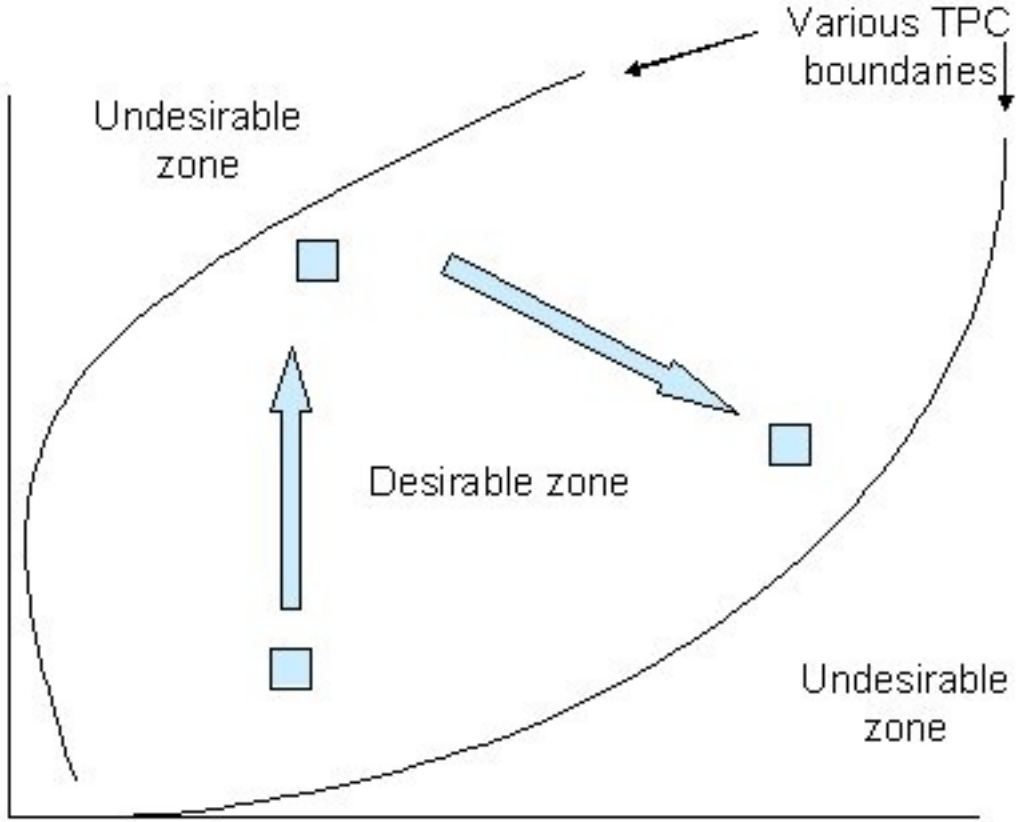
To understand the major processes which are, or should be, taking place in the ecosystems in and around KNP, articulating implications for management and responding appropriately in the interests of biodiversity management.

Composition, Structure & Pattern Objective:

to adequately inventorise our biodiversity heritage, understand the ecology of important elements, and of unnatural threats leading to compositional or structural changes deemed beyond acceptable flux limits, and respond appropriately.



There are about 10 major TPC groupings used in the Park - Jointly, they represent a multidimensional envelope in which we want the system to remain, "bouncing around" as much as possible, without going to the undesirable zone:



Fluvial geomorphology and riparian vegetation: TPCs for flow and sediment as agents of change

Rationale: Increased sediment storage causes alluviation, loss of habitat diversity from bedrock influence and reduction in diversity of woody species regeneration niches.

Indicators	Measurement	TPC
		
Population structure of woody species which regenerate on the bedrock template	**Size class frequency distribution every 3 yrs and events >1:25 yrs in selected representative reaches/channel types**	**E.G. *Breonadia salicina:* loss of negative J population structure in pool rapid reaches/channel types**

SUGGESTIONS

- **Complex Resource Systems**
  - Social and Ecological Components--DYNAMIC!
  - Regime Management
    - Resilience moderates transitions
- **Managers must deal with different problem domains**
  - Science, community, organization, politics
  - Where is the problem?
- **Social Objectives - Desired Conditions**
  - Hierarchy of Goals/Objectives

SUGGESTIONS

- **Strategic Plans and Adaptive Management**
  - Re-evaluate plans and change as needed
  - Develop shared views of possible futures
  - Differences are good, polarization is bad
  - Discourses and collaborations, not fixed structures.
  - Focus on new ideas, solutions
  - Getting to Maybe
  - **Leadership across scales is needed**
  - One person can do it for a time, but several are better locally, regionally and politically.