Adaptive Management for Nature Conservation

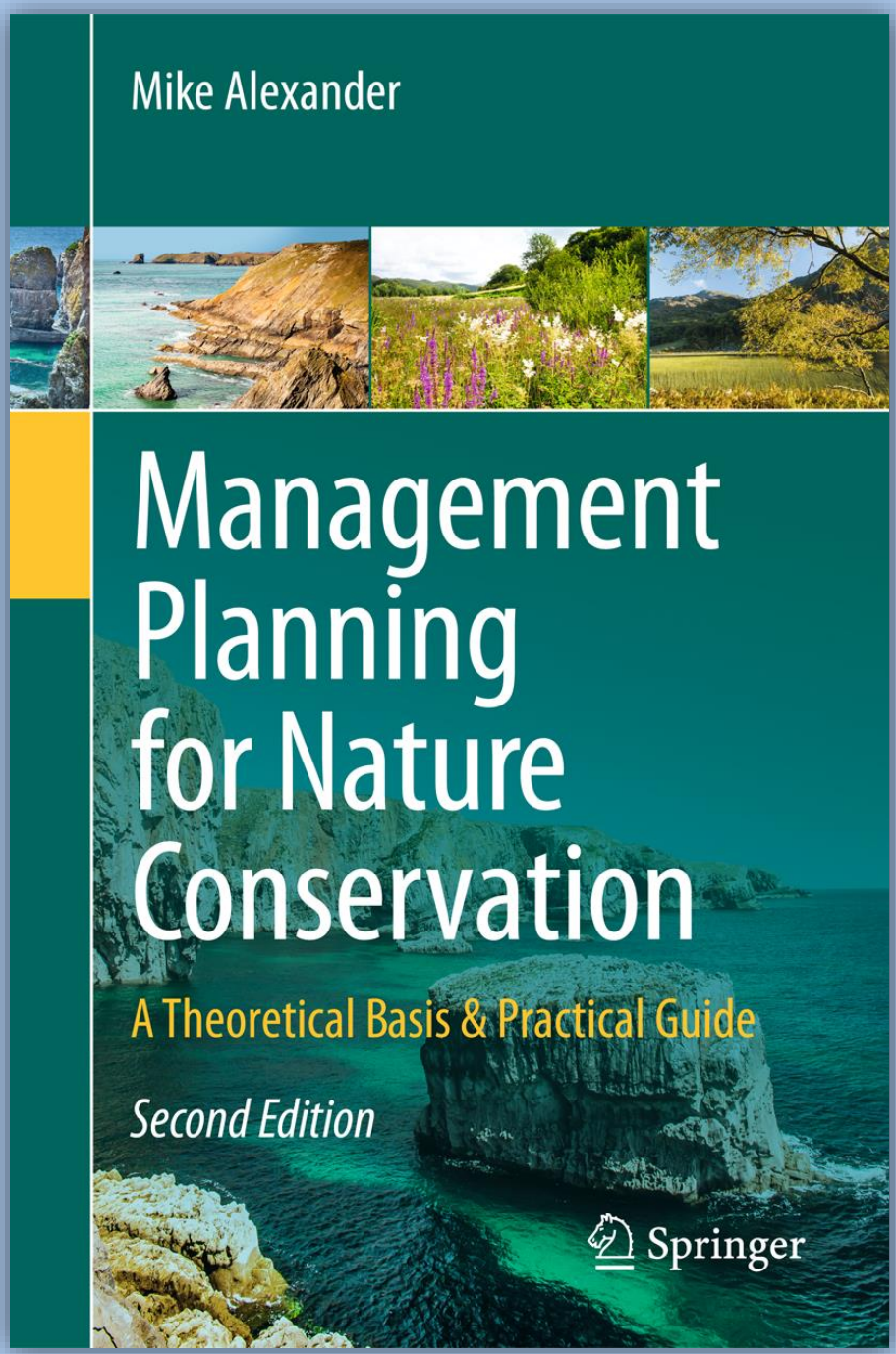
Mike Alexander

www.esdm.co.uk/cms

A GUIDE TO MANAGEMENT PLANNING

Second Edition

Mike Alexander


Mike Alexander
Management Planning for Nature Conservation
A Theoretical Basis & Practical Guide
Second Edition
Springer

THE KEY AREAS OF A MANAGEMENT PLAN

1. Why are we here? (Policy)
2. What have we got? (Description)
3. What are the important features? (Assessment)
4. What are the significant factors? (Influences)
5. What do we want? (Objectives)
6. What must we do? (Action plan)

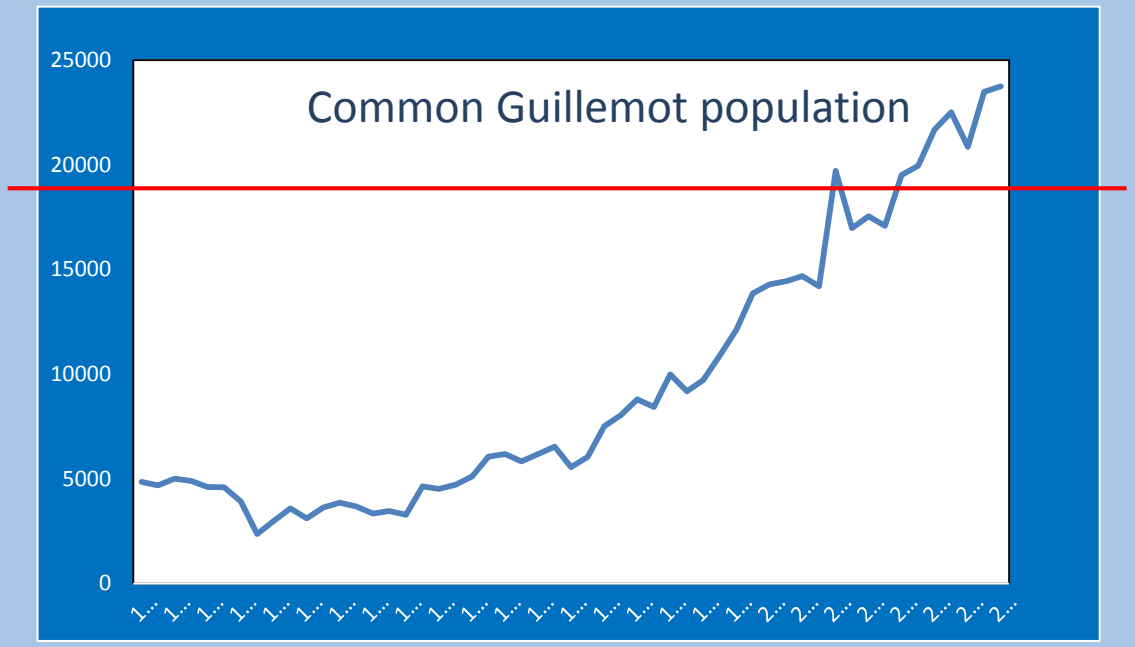
IMPORTANT:

We must monitor so that we know that we are achieving our objectives and that management is appropriate.

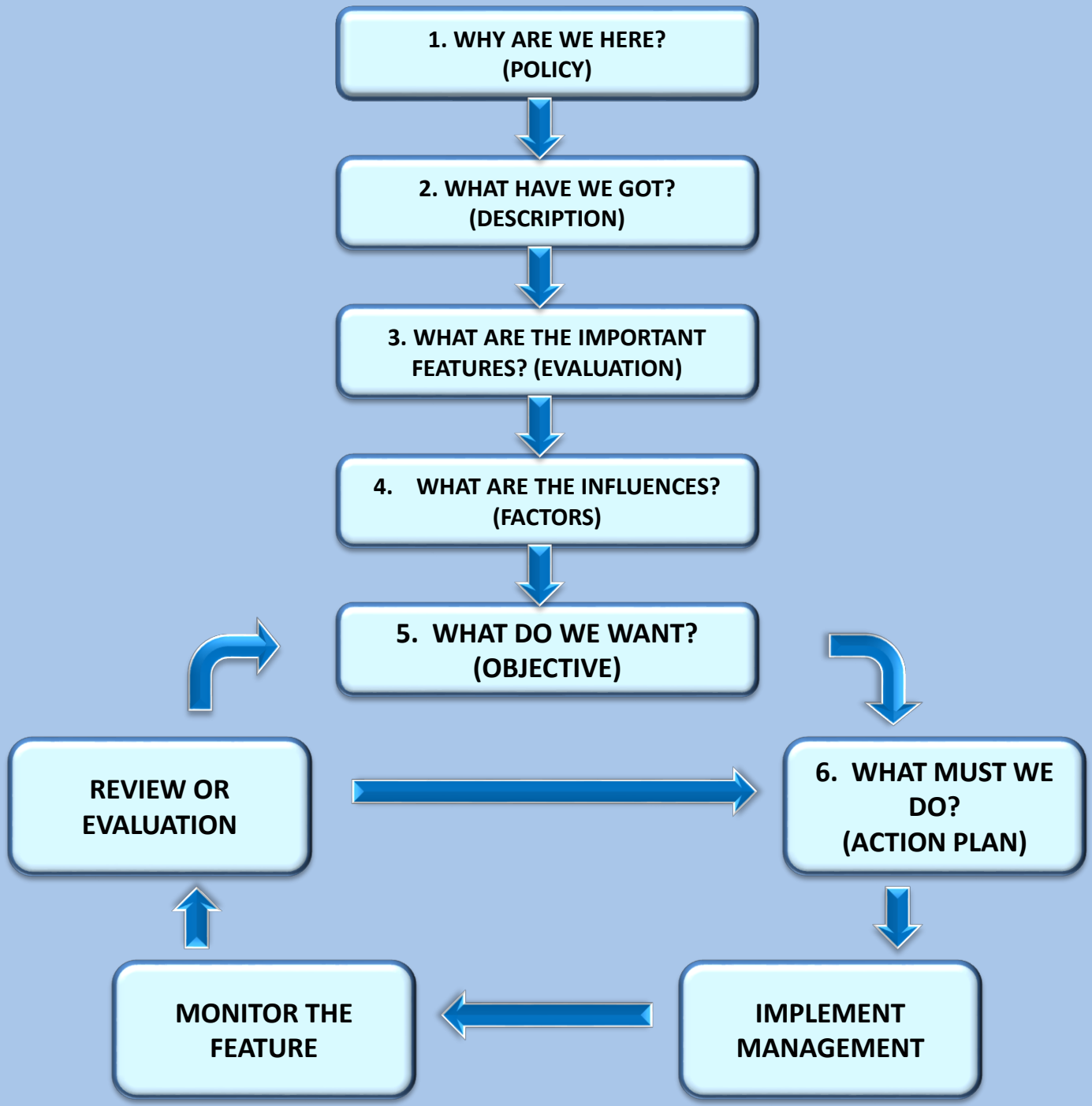
MONITORING ?

Survey?

Surveillance?



MONITORING: Surveillance undertaken to ensure that formulated standards (objectives) are being maintained


1. WHY ARE WE HERE? (POLICY)
2. WHAT HAVE WE GOT? (DESCRIPTION)
3. WHAT ARE THE IMPORTANT FEATURES? (EVALUATION)
4. WHAT ARE THE INFLUENCES? (FACTORS)
5. WHAT DO WE WANT? (OBJECTIVE)
6. WHAT MUST WE DO? (ACTION PLAN)
IMPLEMENT MANAGEMENT
MONITOR THE FEATURE
REVIEW OR EVALUATION

MANAGEMENT PLAN

V

MANAGEMENT PLANNING

Planning should be a continuous, iterative and developmental process.

Planning

- is the intellectual or ‘thinking’ component of the conservation management process.

- is about recognising the things that are important and making decisions about what we want to achieve and what we must do.

Planning:

- Planning is about sharing this process with others so that we can reach agreement; it is about communication; it is about learning.

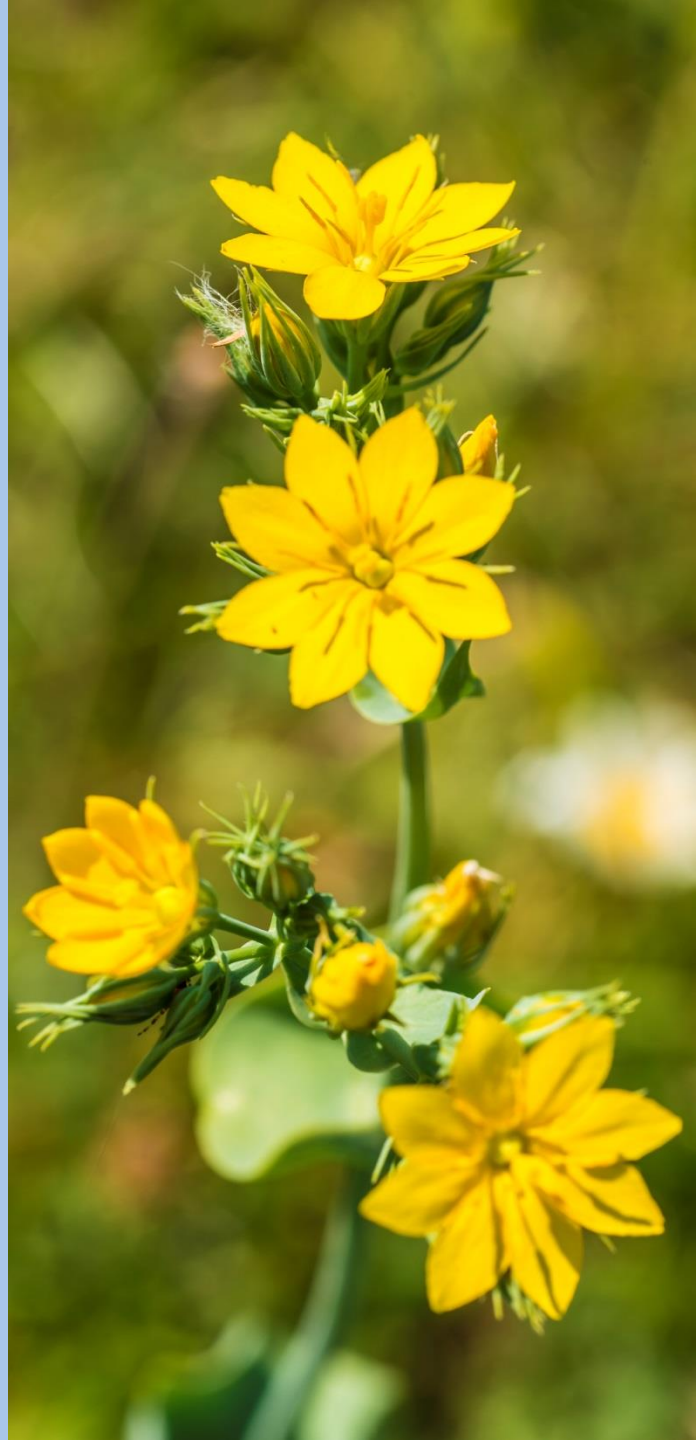
- Planning should always come before management.

- Conservation management is about taking control in order to obtain and maintain desirable conditions.

- ‘Control’ does not necessarily mean doing something: it could mean choosing to do nothing.

All this could be summarised in three simple words: *thought before action.*

Planning is the most important of all conservation management activities.



ADAPTIVE PLANNING & MANAGEMENT

CHANGE

- Environment
- Human values & perceptions
- Evolution?

Adaptive management is grounded in the admission that humans do not know enough to manage ecosystems. (Lee 1999)

In simple terms it is an approach to management that enables changes to be linked to cause and to management operations.

=

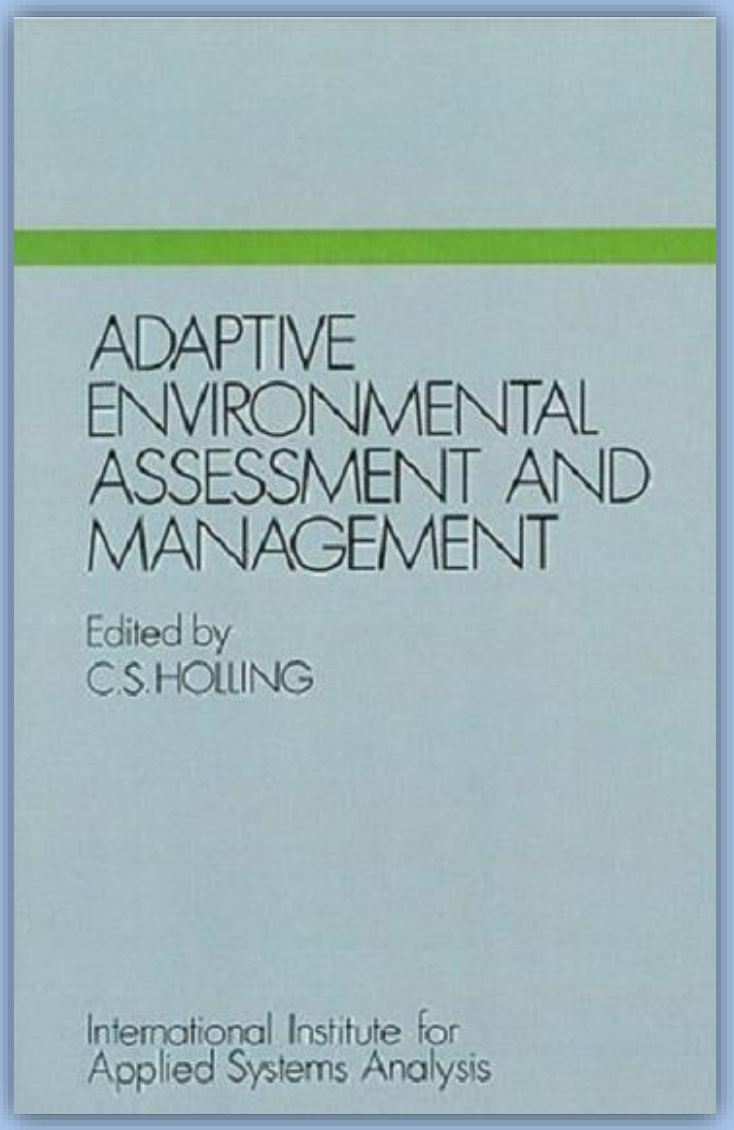
IMPORTANT

Adaptive planning can be applied:

- Regardless of scale; anywhere from small nature reserve, to extremely large protected areas, and including the wider countryside, regardless of how the latter is defined.

- To any feature of interest, including; nature conservation habitats and species, cultural features of all kinds, and ecosystem services. There are no boundaries.

Background to adaptive management



1978

Case study: Is the management plan achieving its objectives?
Glenys Jones, Parks and Wildlife Service, Tasmania

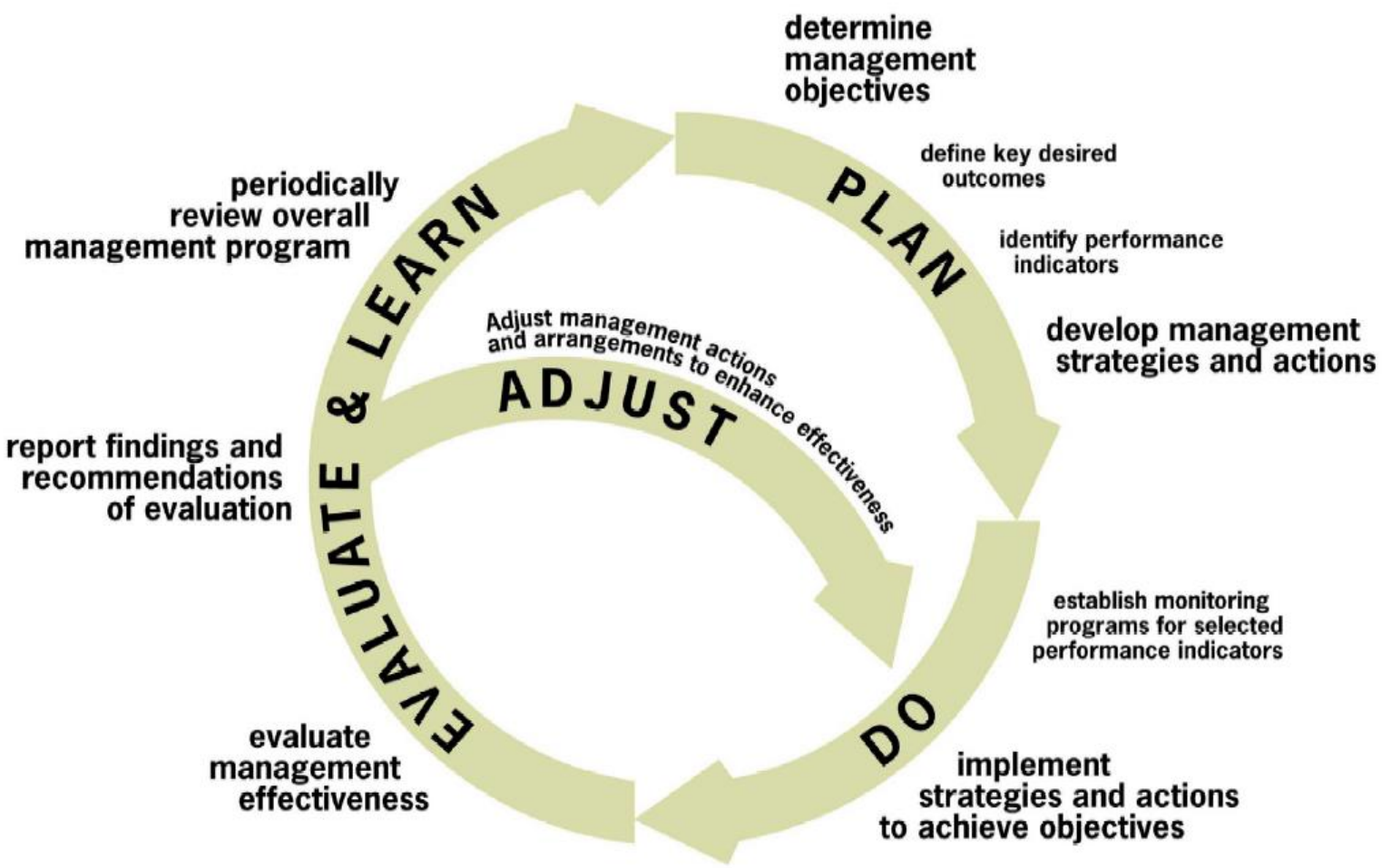


Figure 1 Management cycle for the Tasmanian Wilderness World Heritage Area


1. Conceptualize
Define initial team
Define scope, vision, targets
Identify critical threats
Complete situation analysis
2. Plan Actions and Monitoring
Develop goals, strategies, assumptions, and objectives
Develop monitoring plan
Develop operational plan
3. Implement Actions and Monitoring
Develop work plan and timeline
Develop and refine budget
Implement plans
4. Analyze, Use, Adapt
Prepare data for analysis
Analyze results
Adapt strategic plan
5. Capture and Share Learning
Document learning
Share learning
Create learning environment
Conservation Measures Partnership
Open Standards

1. Evolutionary (Minimal) Adaptive Management

2. Passive Adaptive Management

3. Active Adaptive Management

Characteristics of adaptive management: Desirable but rarely possible:

- Management is treated as experimentation.

- Experimentation has three components:
  - a clear hypothesis,
  - a way of controlling factors that are (thought to be) extraneous to the hypothesis,
  - opportunities to replicate the experiment to check its reliability.

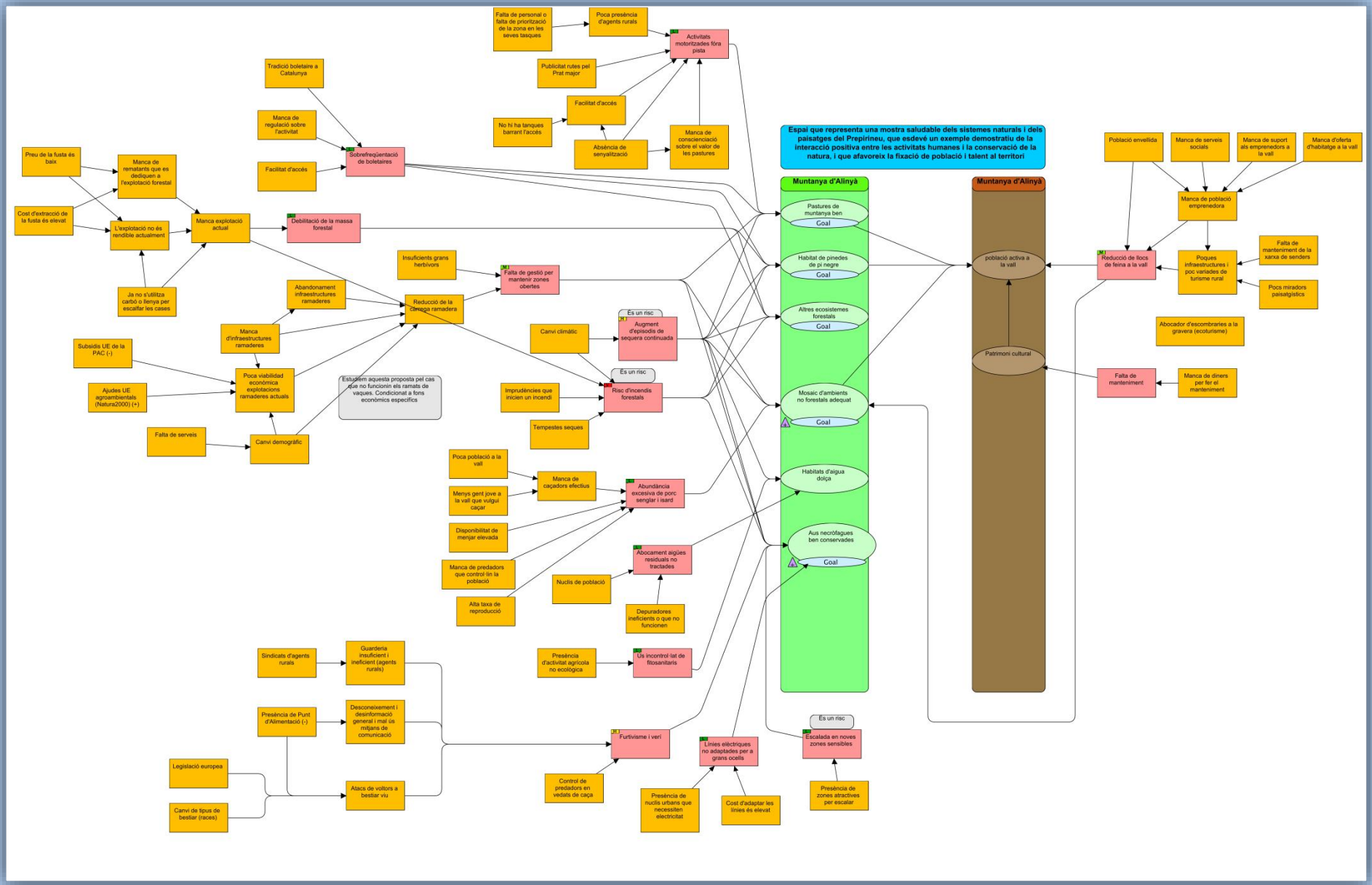
Characteristics of adaptive management: Essential:

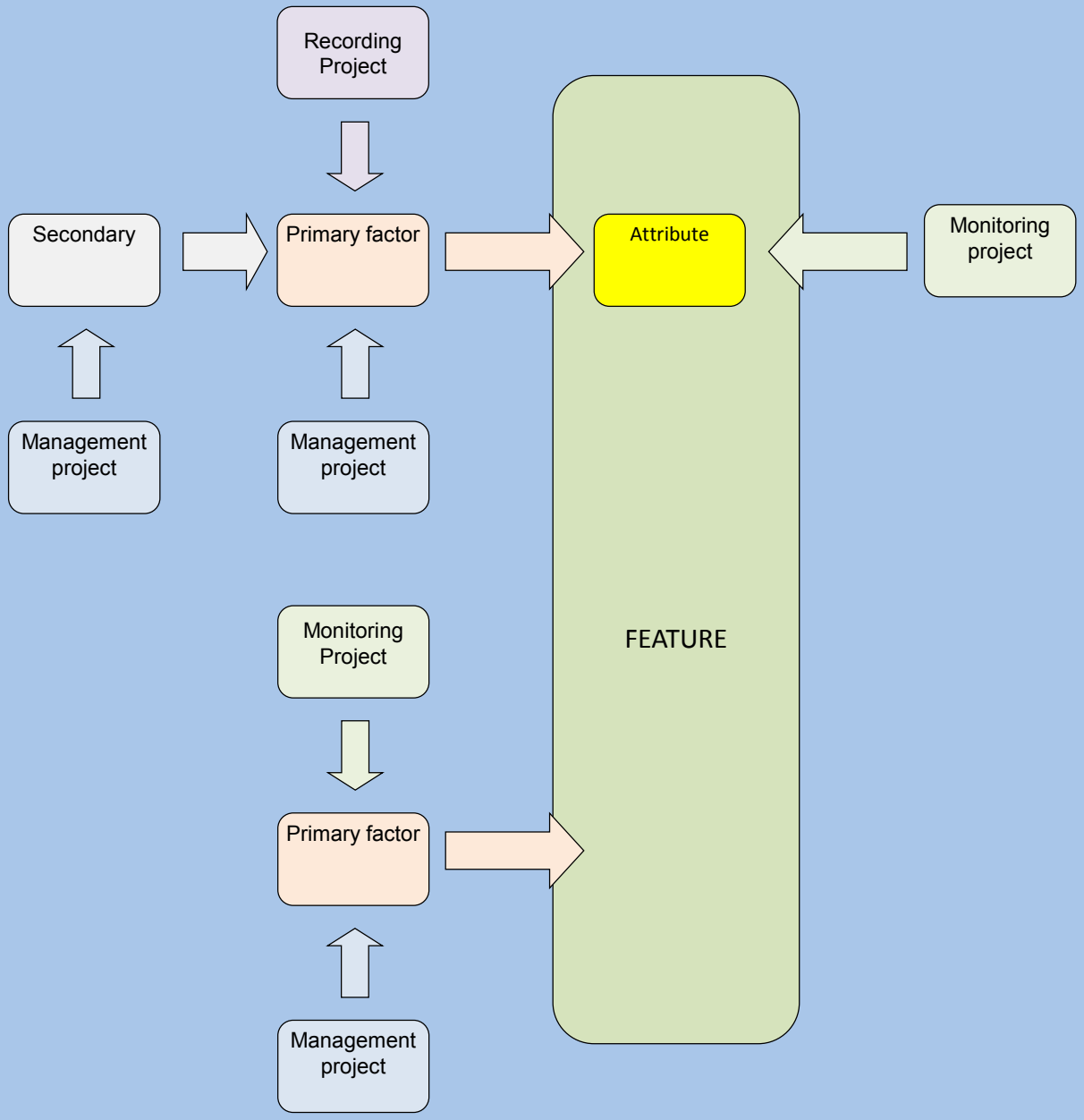
- Clear, specific quantified objectives.
- Monitoring with a feedback link to management.
- Learning is an explicit objective.
- Management is not delayed by uncertainty.
- Adaptation.
- Recording.

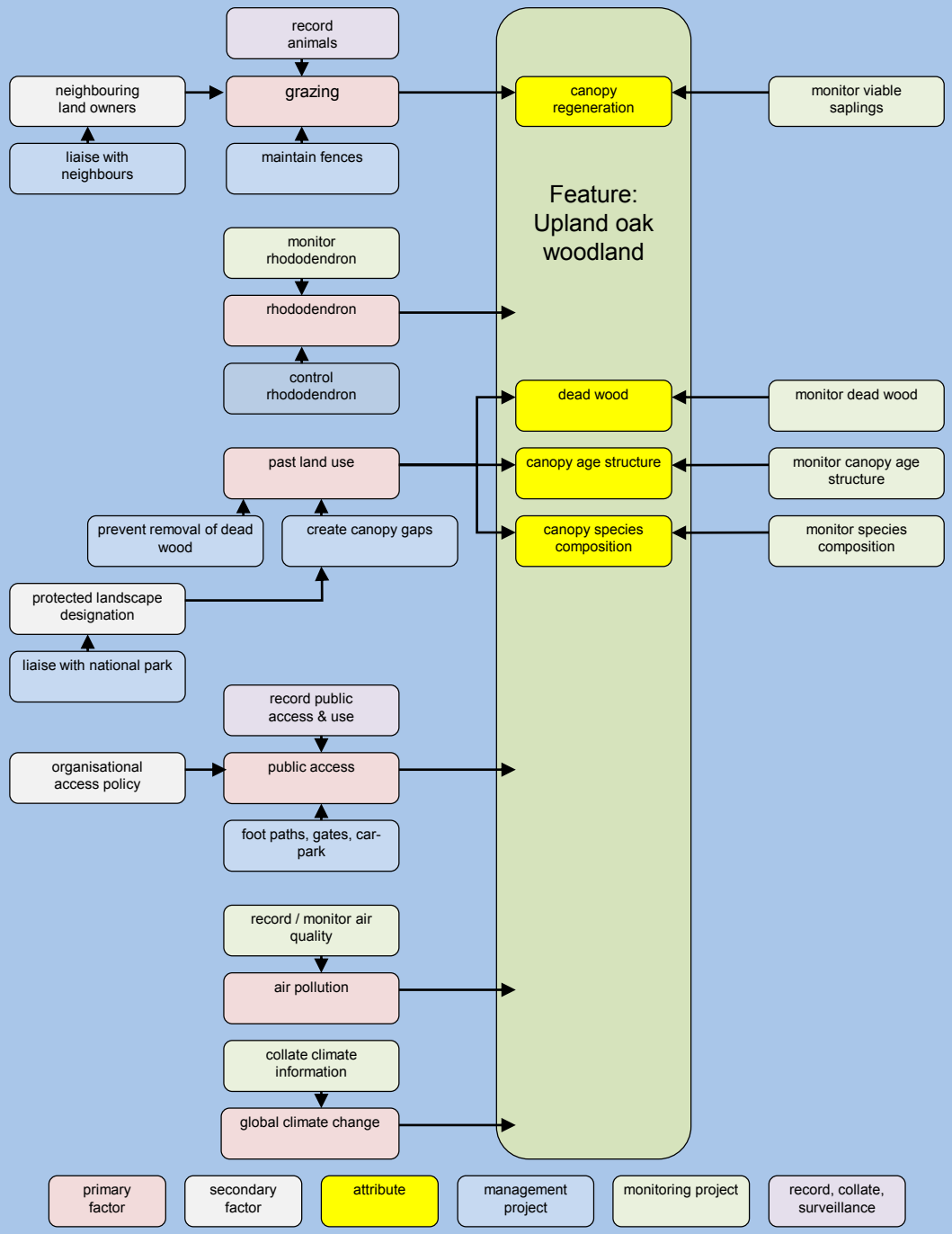
Some definitions also suggest that adaptive management should:

- retain a focus on statistical power and controls
- use computer or conceptual models
- use embodied ecological consensus to evaluate strategic alternatives

A conceptual model.




Recording Project
Secondary
Primary factor
Attribute
Monitoring project
Management project
Management project
Monitoring Project
FEATURE
Primary factor
Management project


record animals
neighbouring land owners
grazing
liaise with neighbours
maintain fences
monitor rhododendron
rhododendron
control rhododendron
past land use
prevent removal of dead wood
create canopy gaps
protected landscape designation
liaise with national park
record public access & use
organisational access policy
public access
foot paths, gates, car-park
record / monitor air quality
air pollution
collate climate information
global climate change
Feature: Upland oak woodland
canopy regeneration
monitor viable saplings
dead wood
monitor dead wood
canopy age structure
monitor canopy age structure
canopy species composition
monitor species composition
primary factor
secondary factor
attribute
management project
monitoring project
record, collate, surveillance

Site Tree

Options

- **Snowdonia**
  - Bron Coed
    - Feature: Upland acid oakwood
      - Monitoring - Factors
        - Factor: Rhododendron
          - Project: RA0/1-MONITOR OTTERS
          - Project: RF14/2-Monitor flowering Rhododendron seedlings
        - Factor: Beech
        - Factor: Fire
        - Factor: Grazing by sheep
        - Factor: Public Recreational Pressure
      - Monitoring - Attributes
      - Management
    - Feature: Silver Studded Blue Butterfly
      - Monitoring - Factors
      - Monitoring - Attributes
        - Attribute: Distribution on apparently suitable habitat within site
        - Attribute: Abundance as indicated by transect counts
          - Project: RA43/1-Monitor Silver Studded Blue adult population size
            - 1996 - Baseline monitoring transects set up and recorded - Finished
            - 1997 - Index of Abundance 276 - Finished
            - 1998 - Index of Abundance 231 - Finished
            - 1999 - Index of Abundance 257 - Finished
            - 2000 - Index of Abundance 299 - Finished
            - 2001 - Index of Abundance 336 - Finished
            - 2002 - Index of Abundance 245 - Finished
            - 2003 - Index of Abundance 265 - Finished
            - 2004 - Index of Abundance 265 - Finished
            - 2005 - Index of Abundance 169 - Finished
            - 2006 - Index of Abundance 179 - Finished
            - 2007 - Index of Abundance 223 - Finished
            - 2008 - Index of Abundance 214 - Finished
            - 2009 - Index of Abundance 261 - Finished

There is **always** a social or stakeholder dimension.

Lee 1999, makes a critical observation which is so important if we are to understand why 'adaptive' from his, and from the USA, perspective is about people:

'Cultivating an ecosystem in order to foster its wild state is paradoxical... This paradox has been resolved by turning around the objective: to think of ecosystem management as managing the people who interact with the ecosystem.'

Stakeholder involvement has become synonymous with adaptive management.

However;

It is possible to apply adaptive management without stakeholder involvement.

It is also possible to involve stakeholders when management is not adaptive.

Most important:

‘Adaptive management is difficult to sustain.’

‘Adaptive management has been more influential, so far, as an idea than as a practical means of gaining insight into the behaviour of ecosystems utilised and inhabited by humans.’ Lee (1999)

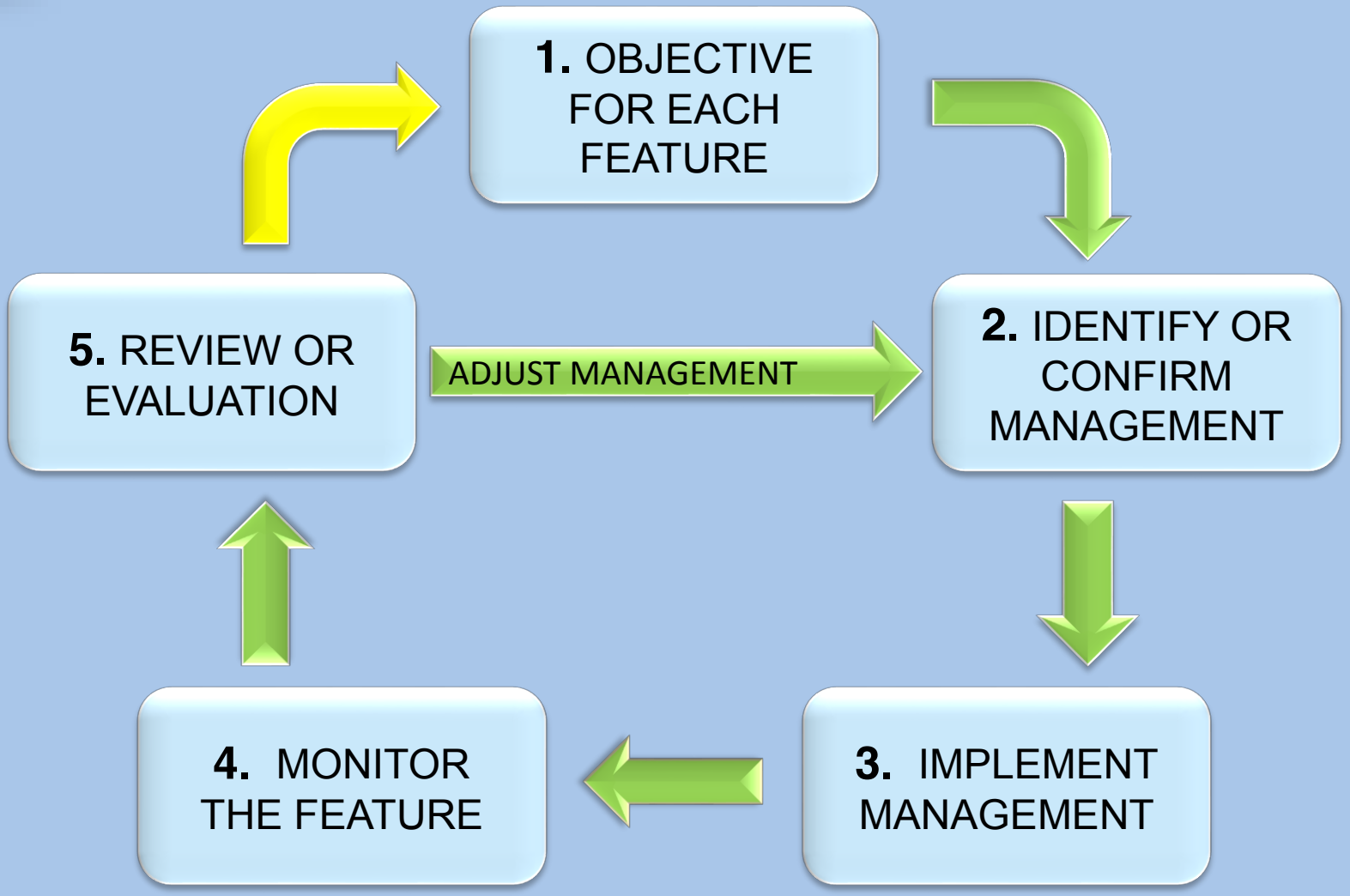
There are few USA examples of passive or active adaptive management which have stood the test of time.

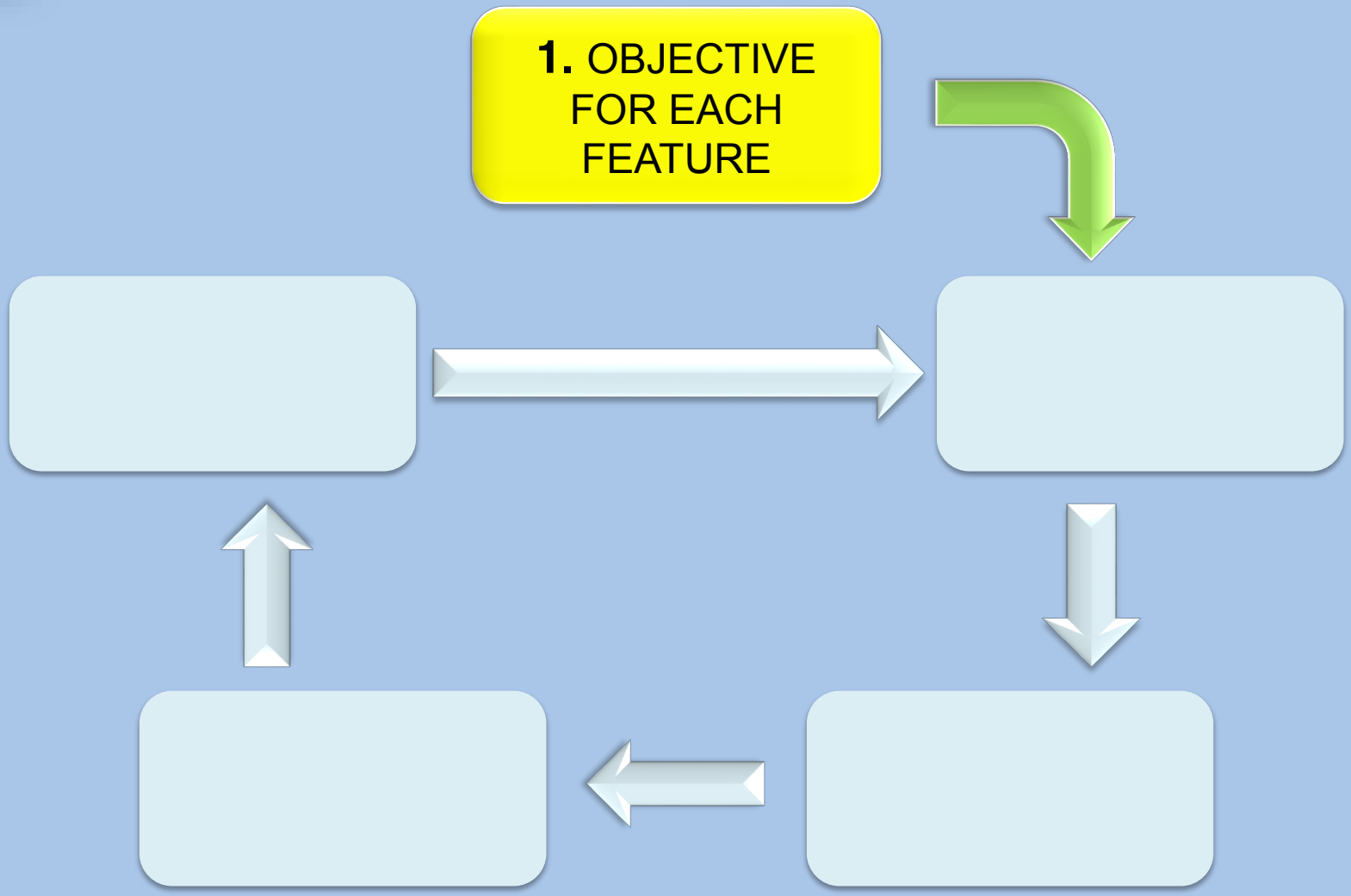
Adaptive management - a minimal approach

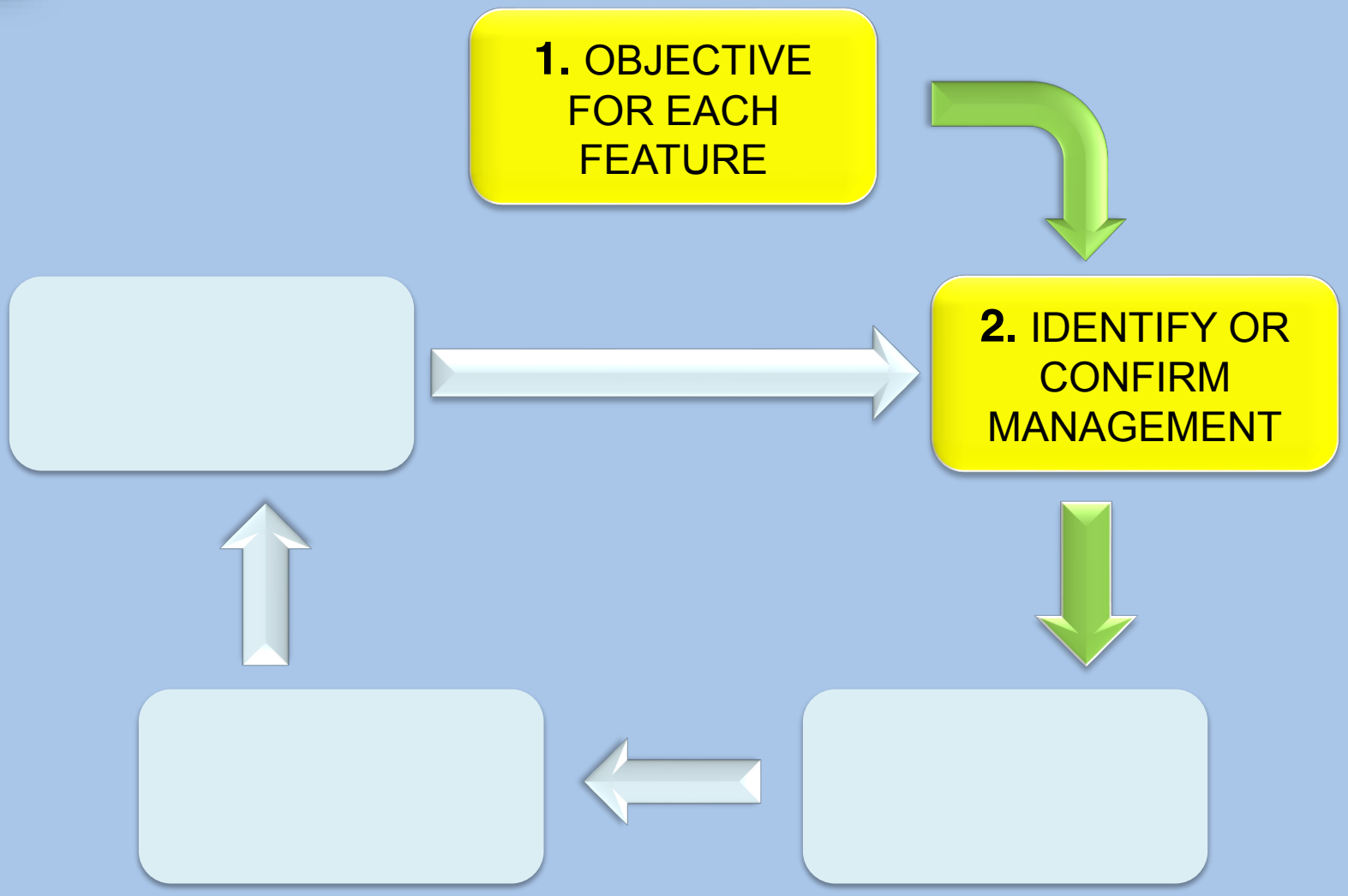
A minimal adaptive approach can be used to:

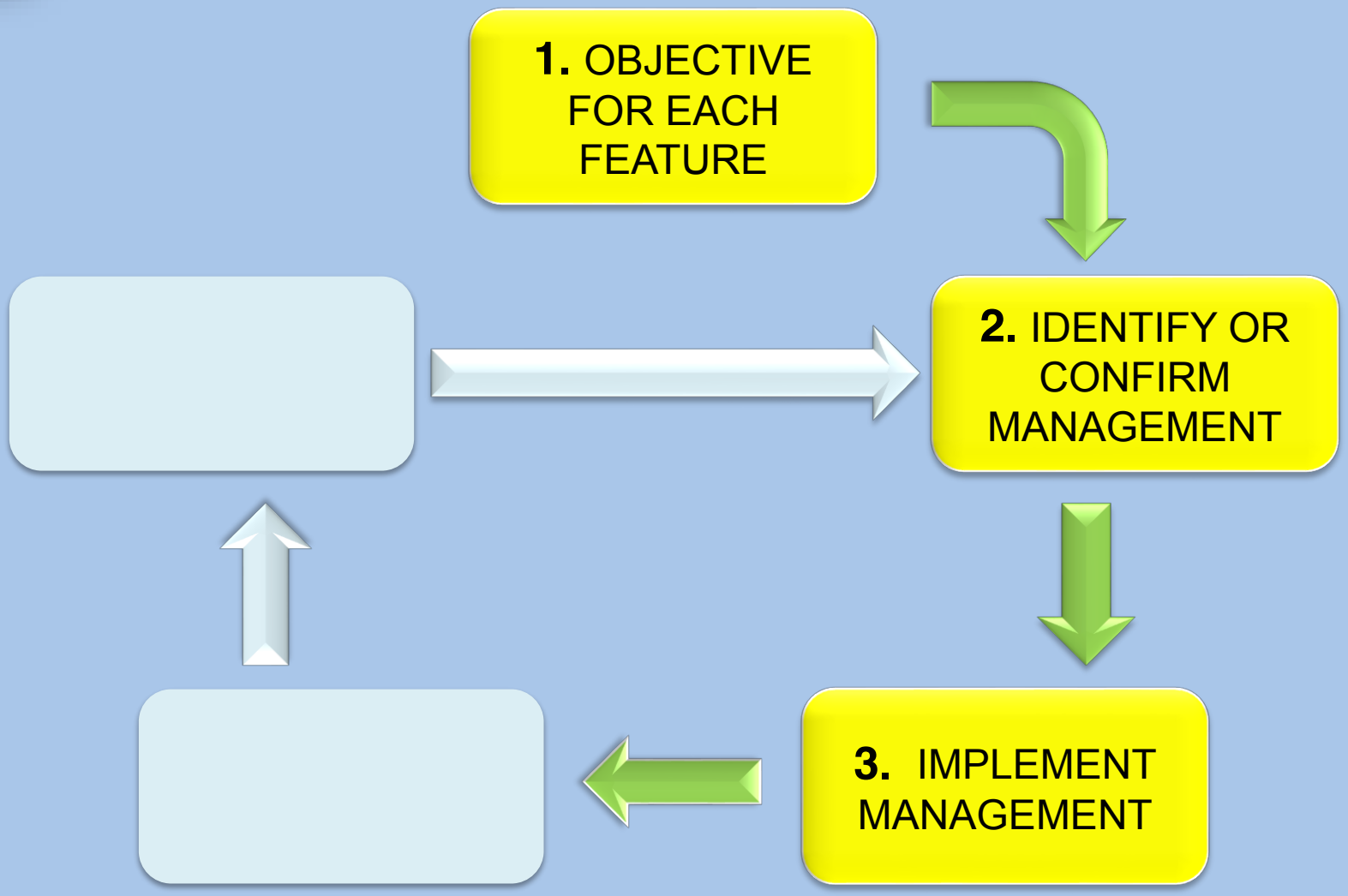
- Ensure the essential link between features, management and monitoring
- Demonstrate that management is appropriate and effective, and that resources are well spent
- Ensure that we learn from experience
- Ensure continuity of effective management
- Encourage and enable communication between managers and stakeholders, both within and between sites and organisations

An ADAPTIVE Management System




1. OBJECTIVE FOR EACH FEATURE


1. OBJECTIVE FOR EACH FEATURE
2. IDENTIFY OR CONFIRM MANAGEMENT


1. OBJECTIVE FOR EACH FEATURE
2. IDENTIFY OR CONFIRM MANAGEMENT
3. IMPLEMENT MANAGEMENT

RECORDING

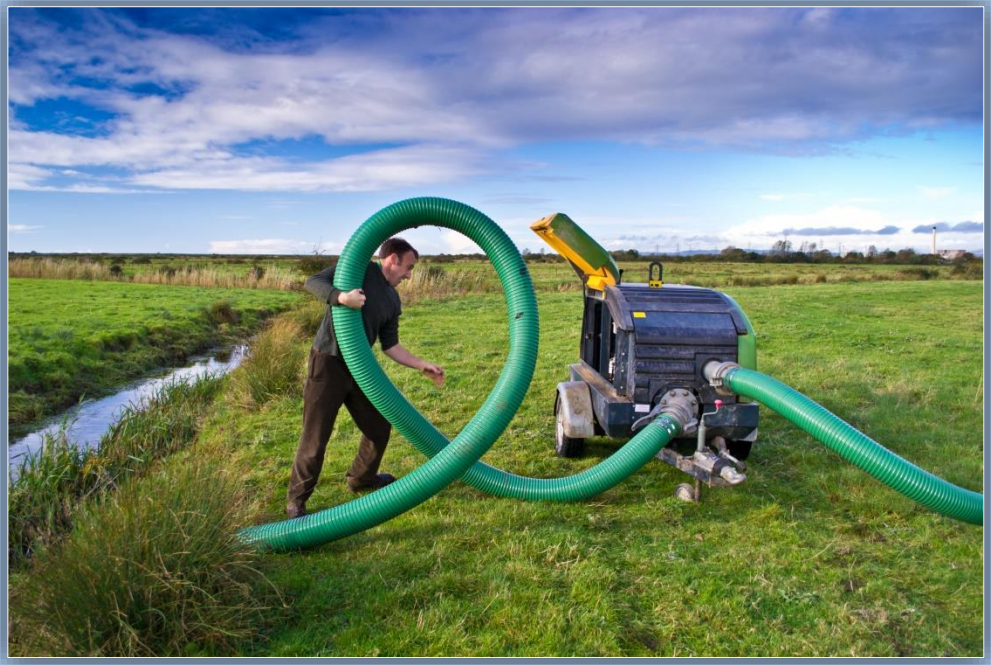
The maintenance of records, in particular recording management activities must be given the highest priority

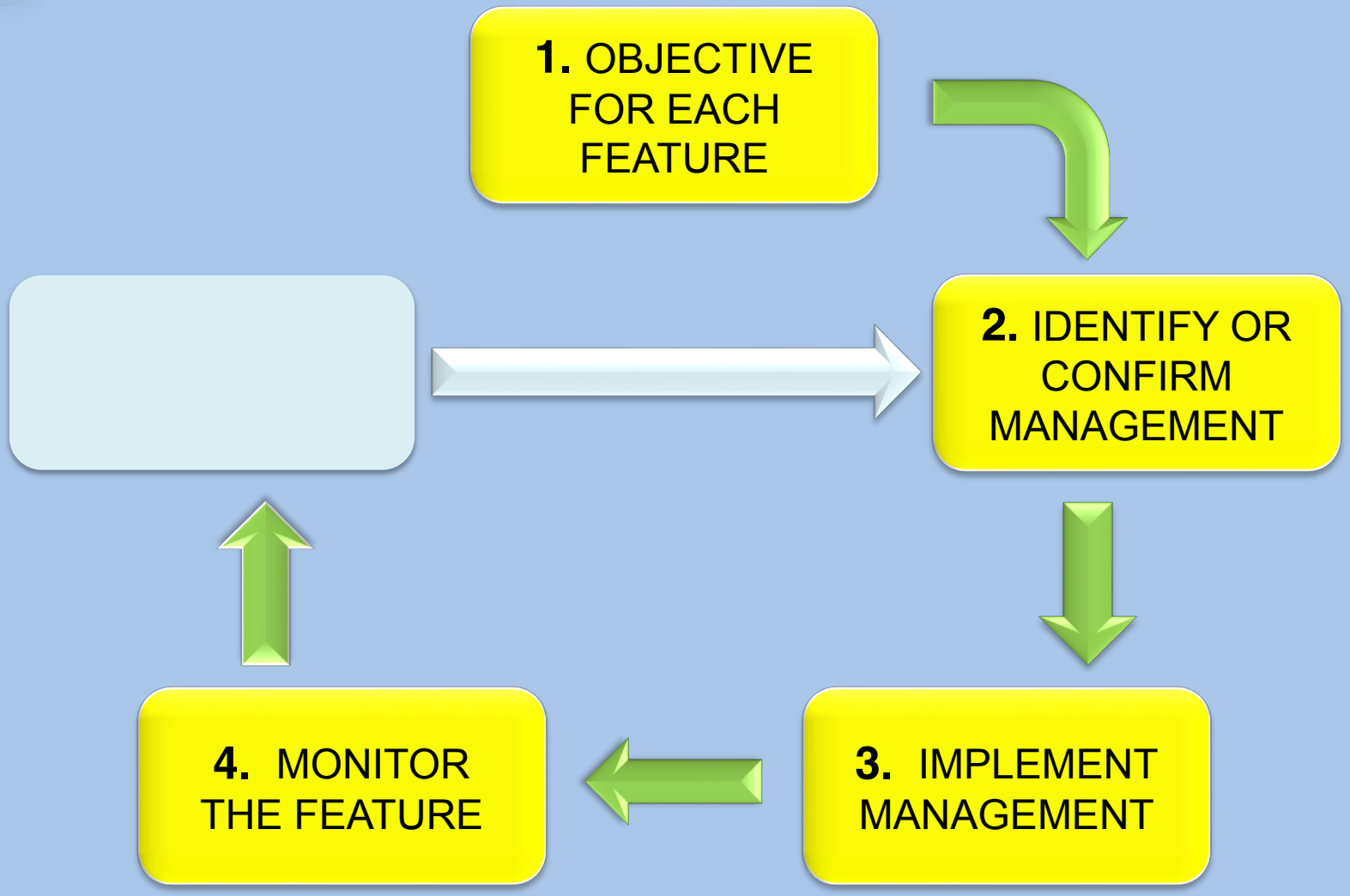
If something is worth doing it must be worth recording

Recording is an expensive activity and it must be planned with exactly the same rigour as all other aspects of reserve management.

It is essential that managers avoid irrelevant or unnecessary recording.

Information and records are only as good as they are accessible.

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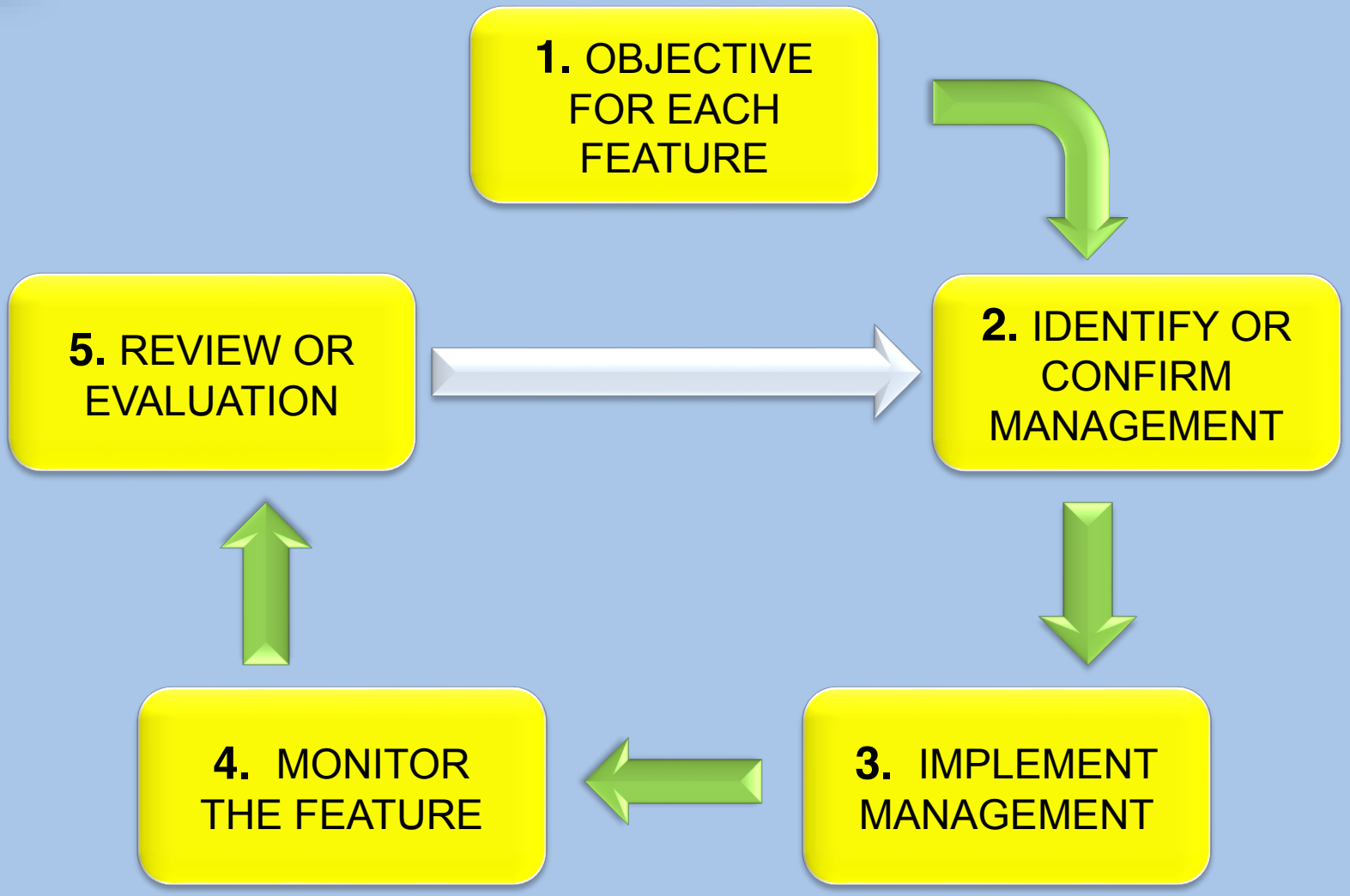
2. IDENTIFY OR CONFIRM MANAGEMENT
3. IMPLEMENT MANAGEMENT
4. MONITOR THE FEATURE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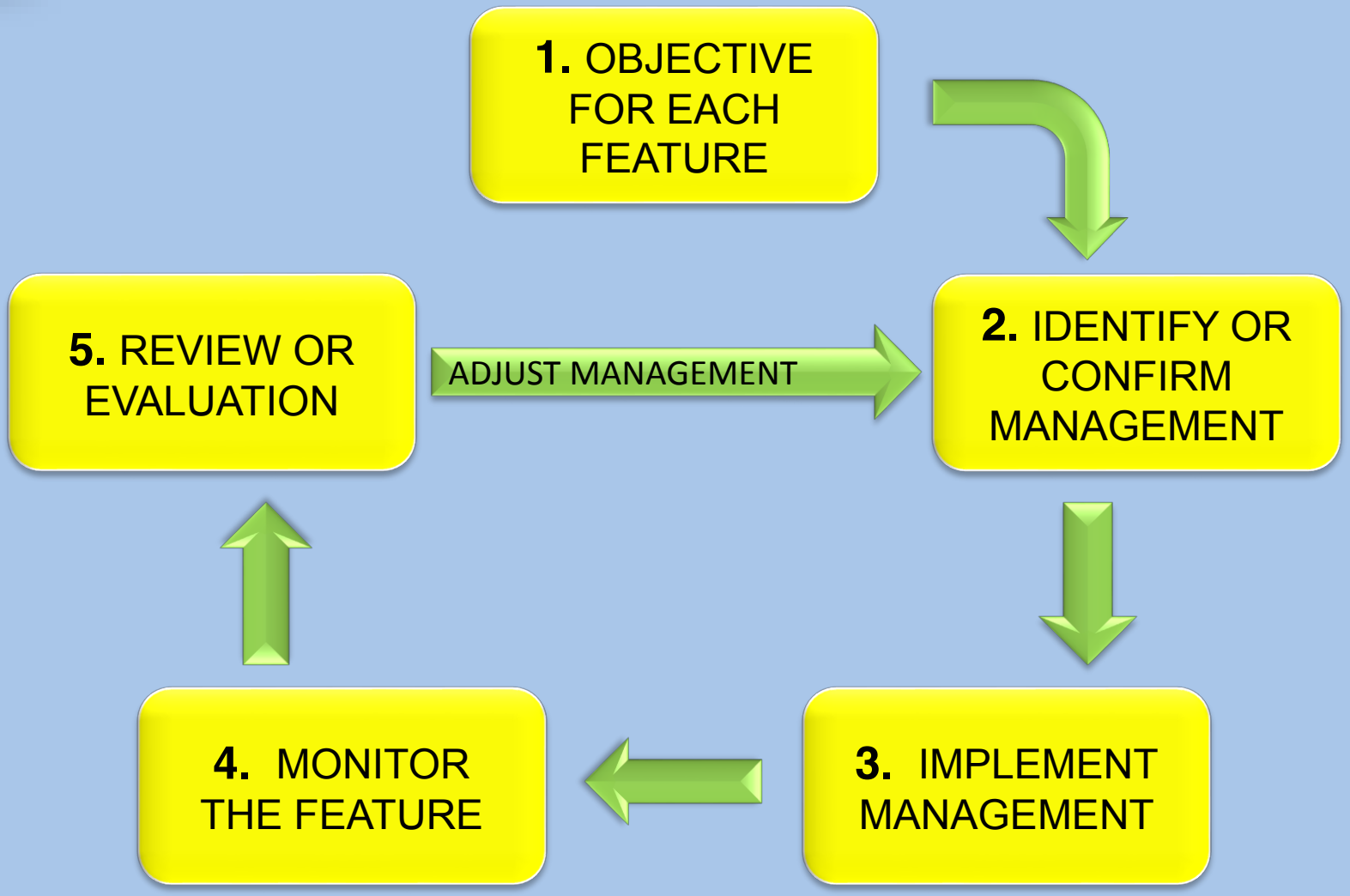
5. REVIEW OR EVALUATION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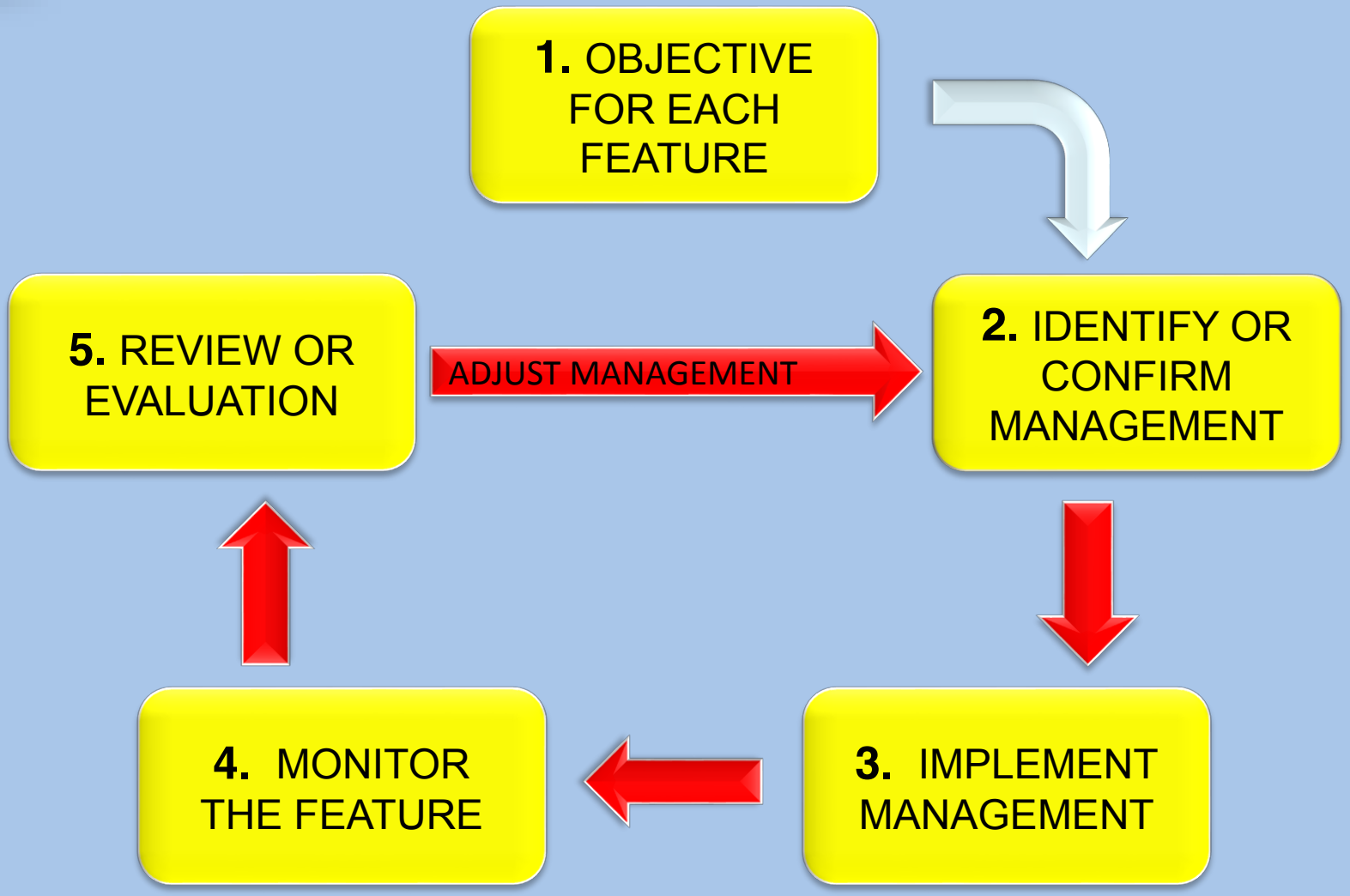
5. REVIEW OR EVALUATION
ADJUST MANAGEMENT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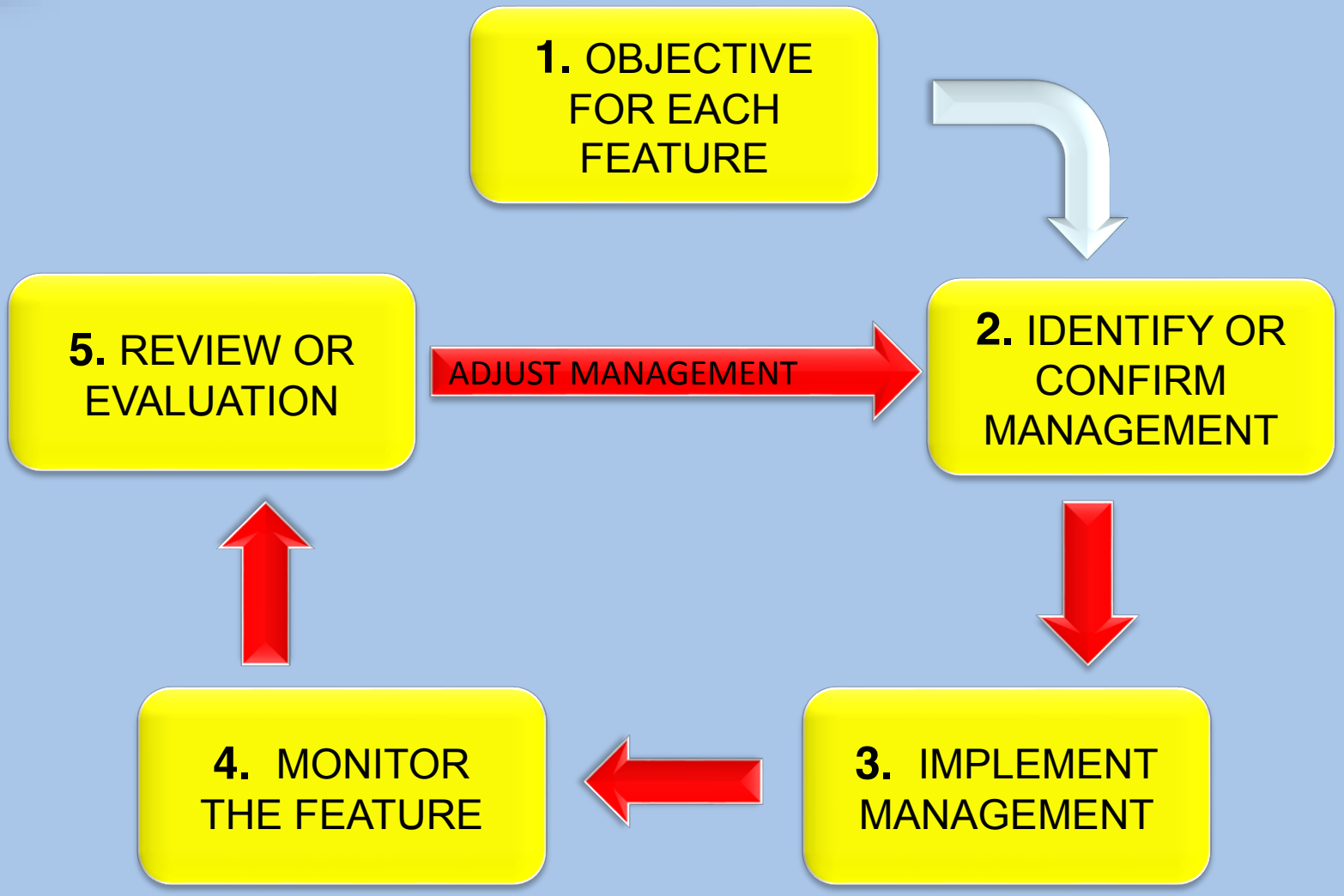
ADJUST MANAGEMENT

CHANGE


CLIMATE CHANGE


SEABIRD WRECK 2014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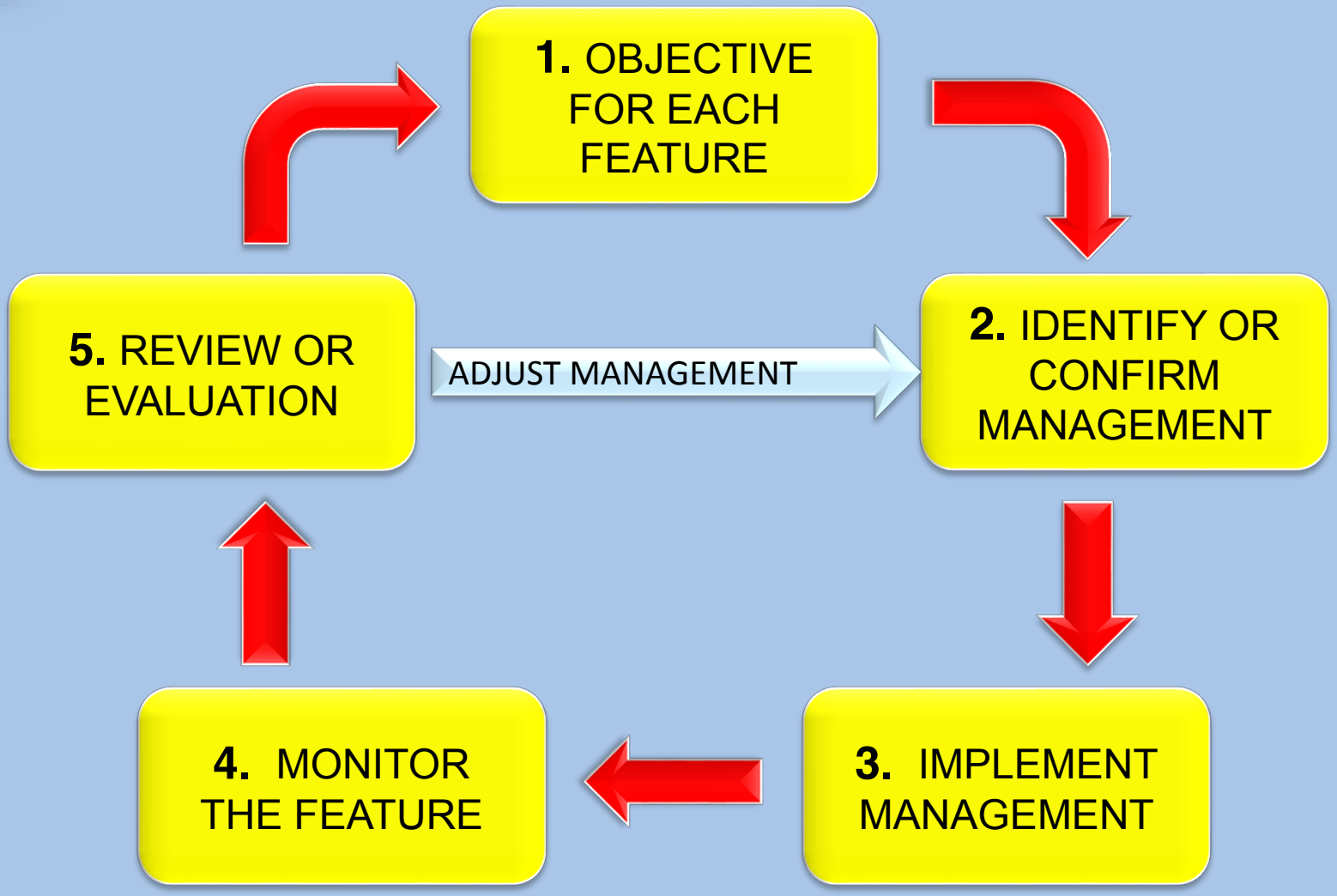
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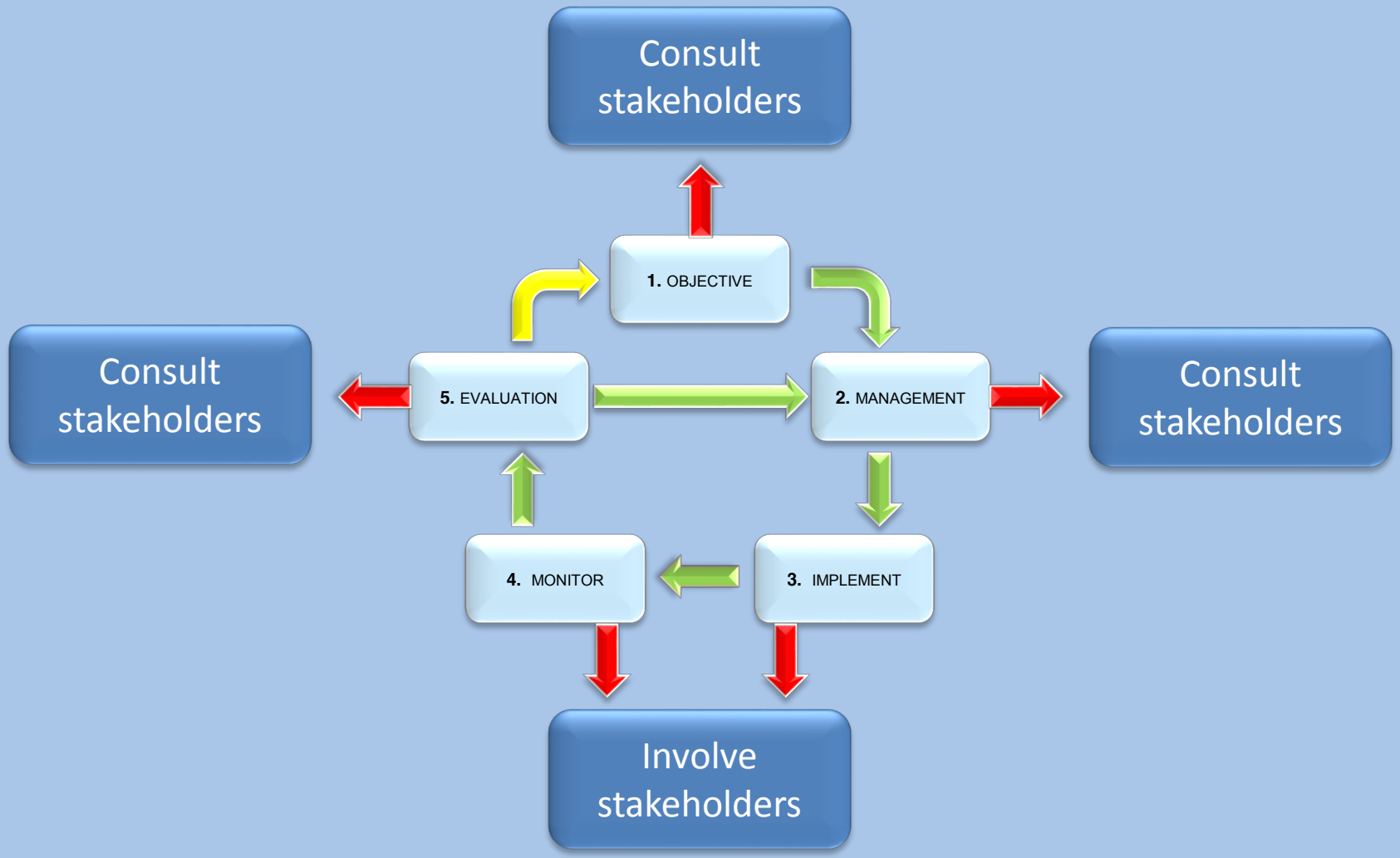
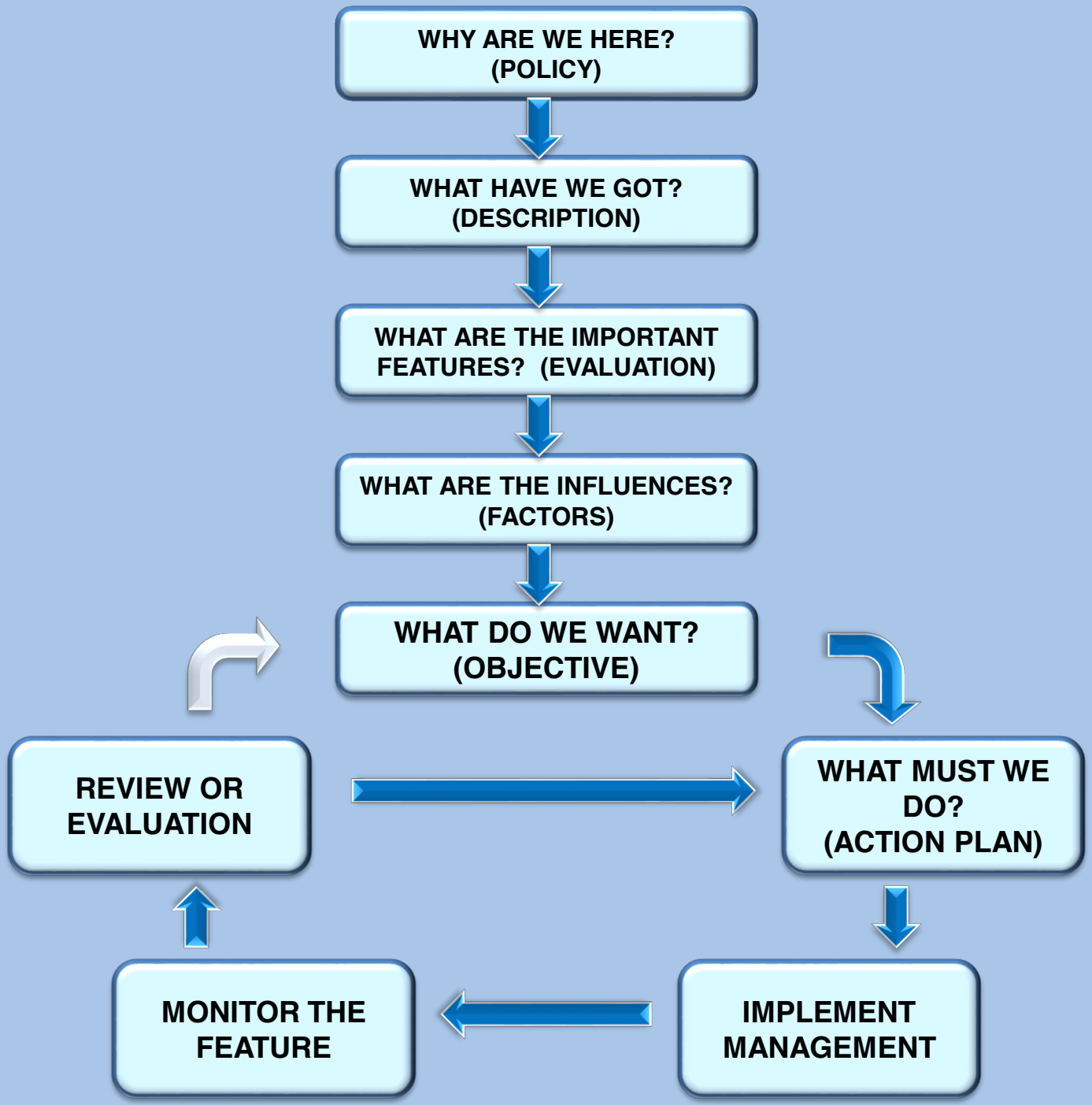
STAKEHOLDER INVOLVEMENT

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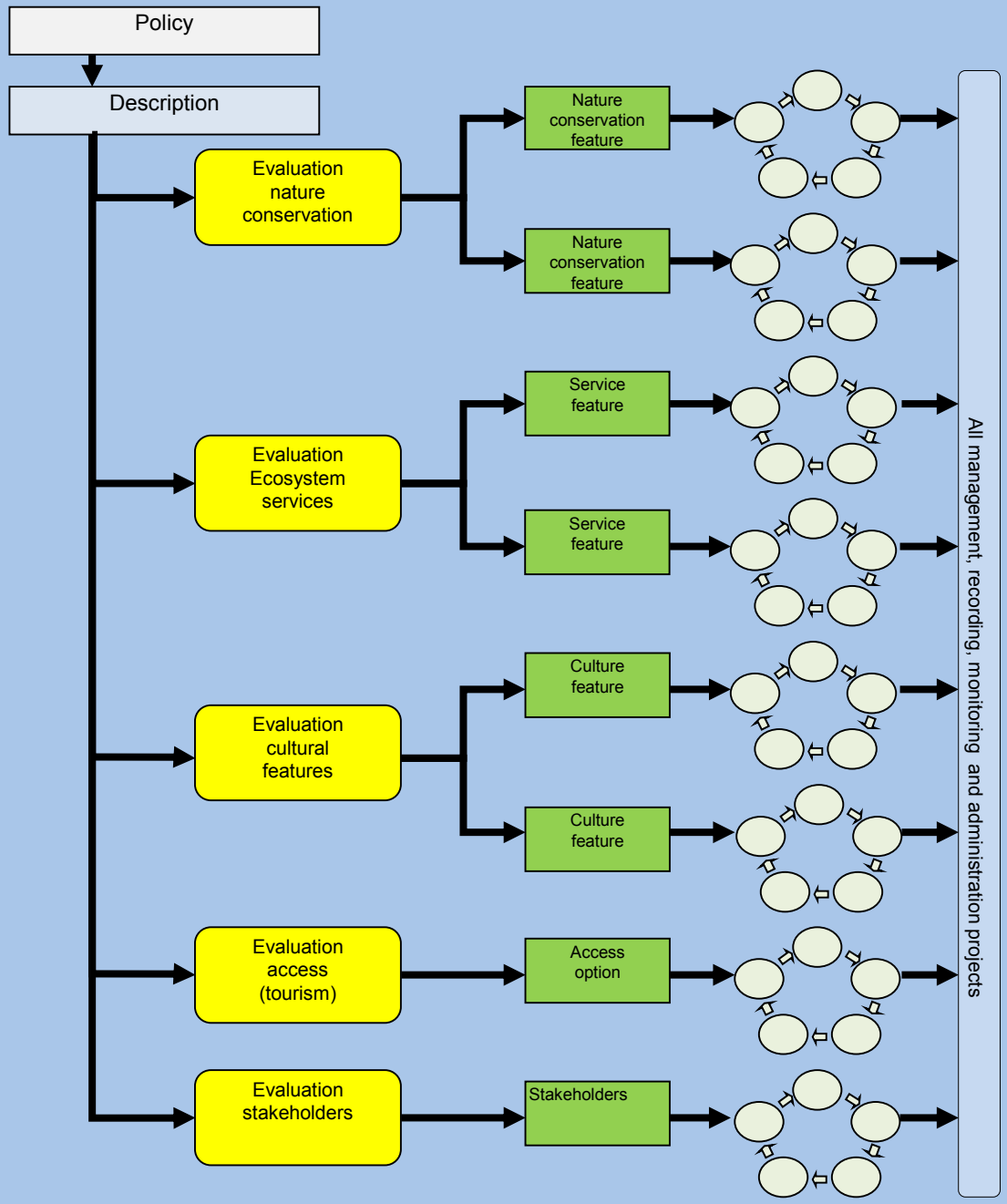
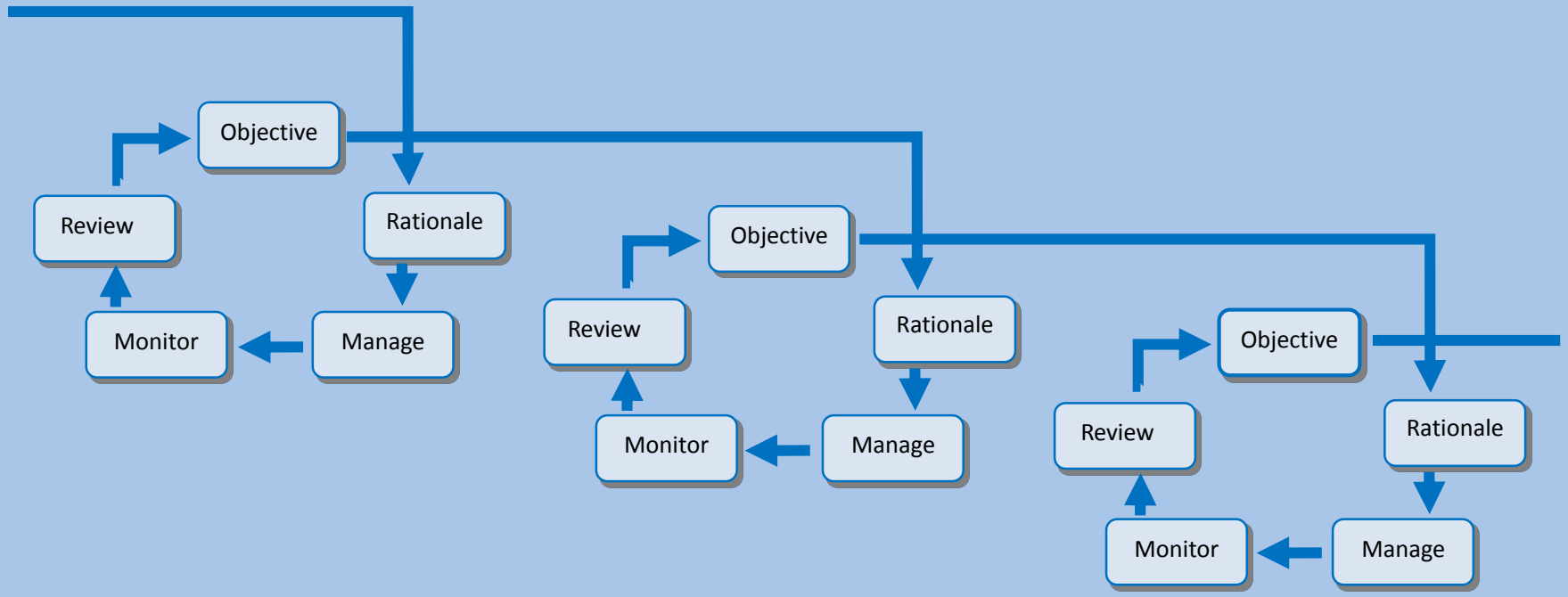

Policy
Description
Evaluation nature conservation
Evaluation Ecosystem services
Evaluation cultural features
Evaluation access (tourism)
Evaluation stakeholders
Nature conservation feature
Nature conservation feature
Service feature
Service feature
Culture feature
Culture feature
Access option
Stakeholders
All management, recording, monitoring and administration projects

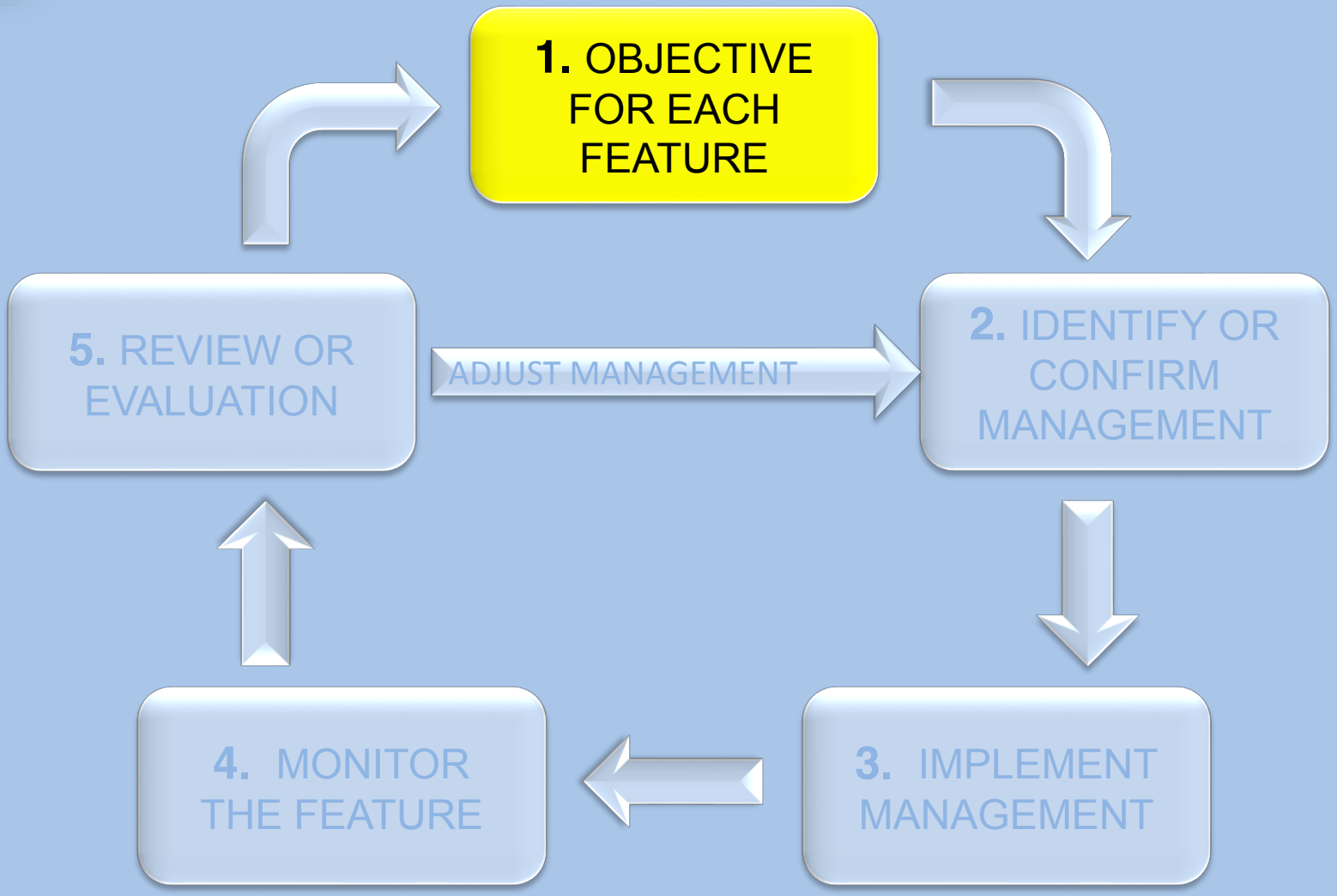
Management planning should be a continuous cyclical, iterative and developmental process.



Adaptable management, why bother?

- WE must learn through experience (learning to manage by managing to learn.)
- WE must be able to take account of, and respond to, the varying factors that affect the features
- WE must continually develop or refine management processes
- WE must be able to demonstrate whether or not management is appropriate

THE MOST IMPORTANT COMPONENT OF ADAPTIVE MANAGEMENT:



50%

NATURE CONSERVATION OBJECTIVES

- are not policies.
- must not be prescriptive.

LONG TERM CONSERVATION OBJECTIVES SHOULD BE:

Specific

Measurable

Achievable

(Aspirational)

Relevant

Time-based

STEPS TOWARDS PREPARING MEASURABLE OBJECTIVES

1. Prepare a vision for the feature (This is the status that we require for a feature (FCS)

2. Identify the performance indicators

FAVOURABLE CONSERVATION STATUS (FCS)

For a habitat feature to be considered to be at FCS, ALL of the following must be true:

- The area of the habitat must be stable in the long term, or increasing,
- its quality (including in terms of ecological structure and function) must be maintained,
- any typical species must also be at FCS,
- the factors that affect the habitat, including its typical species, must be under control.


Suomalainen aarniometsä elää • Den finska urskogen lever • Virgin Taiga Forest in Finland

HABITAT

UPLAND OAK WOODLAND

Vision statement for an upland acidic oak woodland

FCS

- Its quality (including ecological structure and function) must be maintained.

Vision

- The woodland is naturally regenerating, with plenty of seedlings and saplings particularly in the canopy gaps. There is a changing or dynamic pattern of canopy gaps created naturally by wind throw or as trees die.

Vision statement for an upland acidic oak woodland

FCS

Any typical species must also be at FCS.

Vision

The woodland has a canopy and shrub layer that includes locally native trees of all ages, with an abundance of standing and fallen dead wood to provide habitat for invertebrates, fungi and other woodland species. The field and ground layers will be a patchwork of the characteristic vegetation communities developed in response to local soil conditions. These will include areas dominated by heather or bilberry, or a mixture of the two, areas dominated by tussocks of wavy hair grass or purple moor grass, and others dominated by brown bent grass and sweet vernal grass with abundant bluebells. There will also be quite heavily grazed areas of more grassy vegetation. Steep rock faces and boulder sides will be adorned with mosses and liverworts and filmy ferns. The lichen flora will vary naturally depending upon the chemical properties of the rock and tree trunks within the woodland. Trees with lungwort and associated species will be fairly common, especially on the well-lit woodland margins.

Visions for enabling natural processes, e.g. a coastal dune system.

Visions for extremely dynamic features, e.g. a coastal dune system.

- A sufficient area of sand dune habitat exists to support the full complement of dependent plant communities and typical dune species.

- The system consists of a dynamic, shifting mosaic of sand dune communities where the actual composition and structure is governed by natural processes.

- The distribution of plant communities and populations of typical species are also governed by natural process.

- The factors that influence, or may influence, the sand dune system are under control.

SPECIES

Vision statement for a species - Guillemot

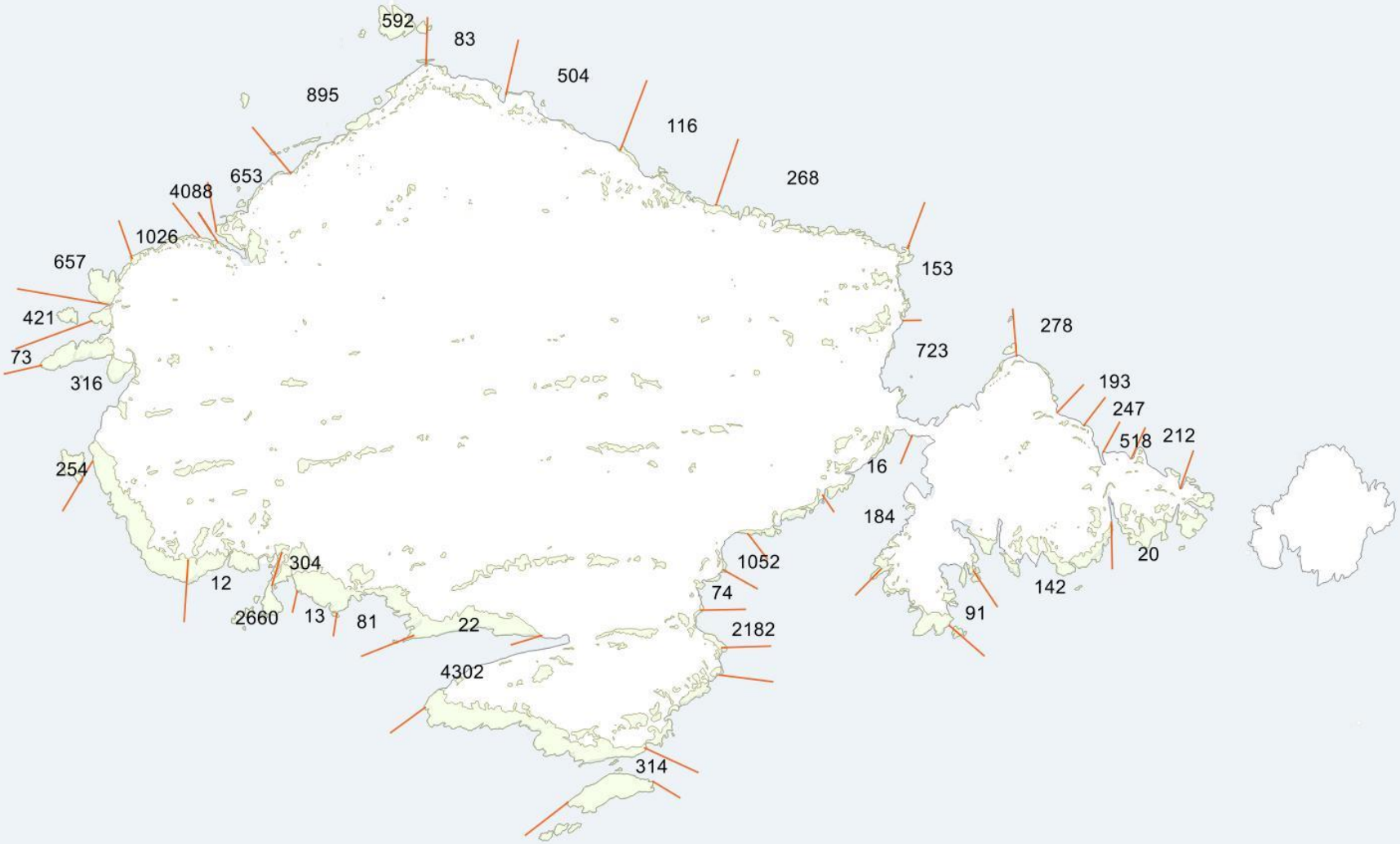
FCS

- The range of the population must not be contracting.

Vision

- The distribution of the colonies (shown on the attached map) is maintained or increasing.

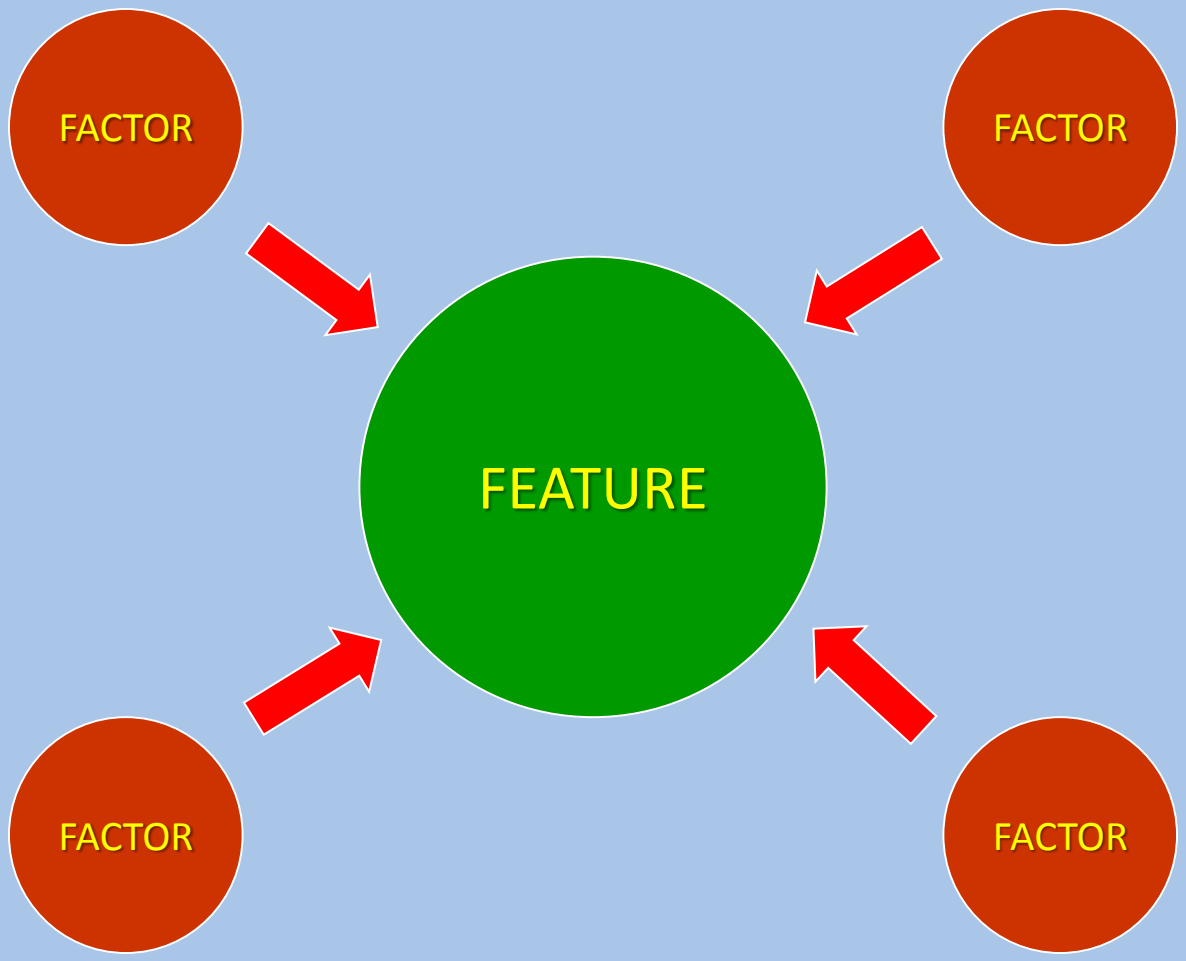
Guillemot distribution and 2015 total island count (23,746 individuals)



Performance Indicators

- Performance indicators provide the evidence that we use to determine whether or not we are meeting our conservation objectives.
- A conservation objective is more than the sum of the performance indicators.
- Performance Indicators encompass both factors with limits and attributes with limits.

FACTORS



Factors are anything which have, are or could change a feature.

Factors can be both positive and negative.

Factors can be anthropogenic or natural.

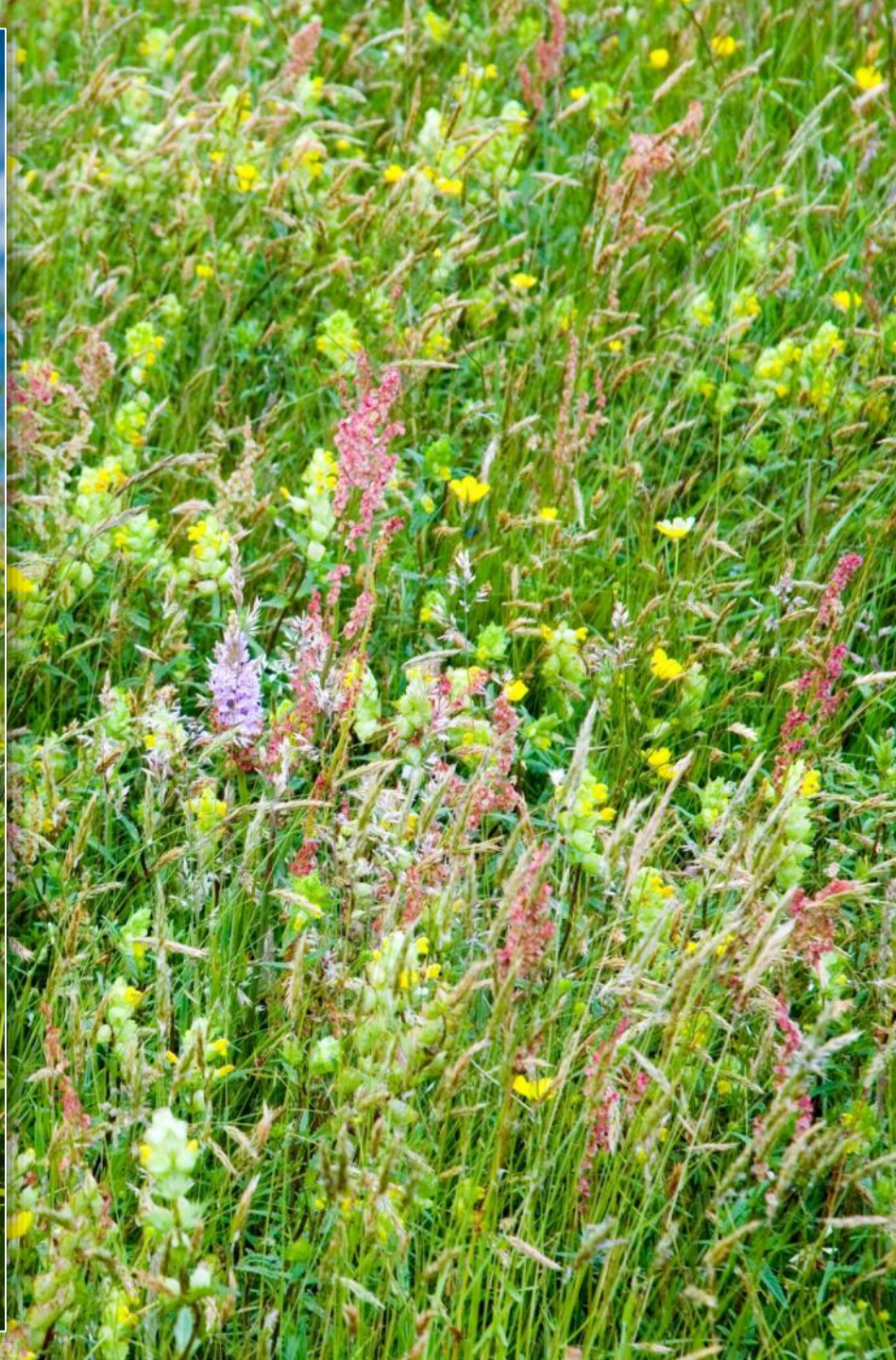
Factors can operate both on and off site.

FACTORS

Factors are agents of change.

If we can identify current and future factors we will in some cases be able to predict the direction of change and in particular be able to identify the attributes of a feature that are most likely to demonstrate the change.

This relationship between factors and attributes is the reason why factors are considered at this stage in the plan before we identify attributes.



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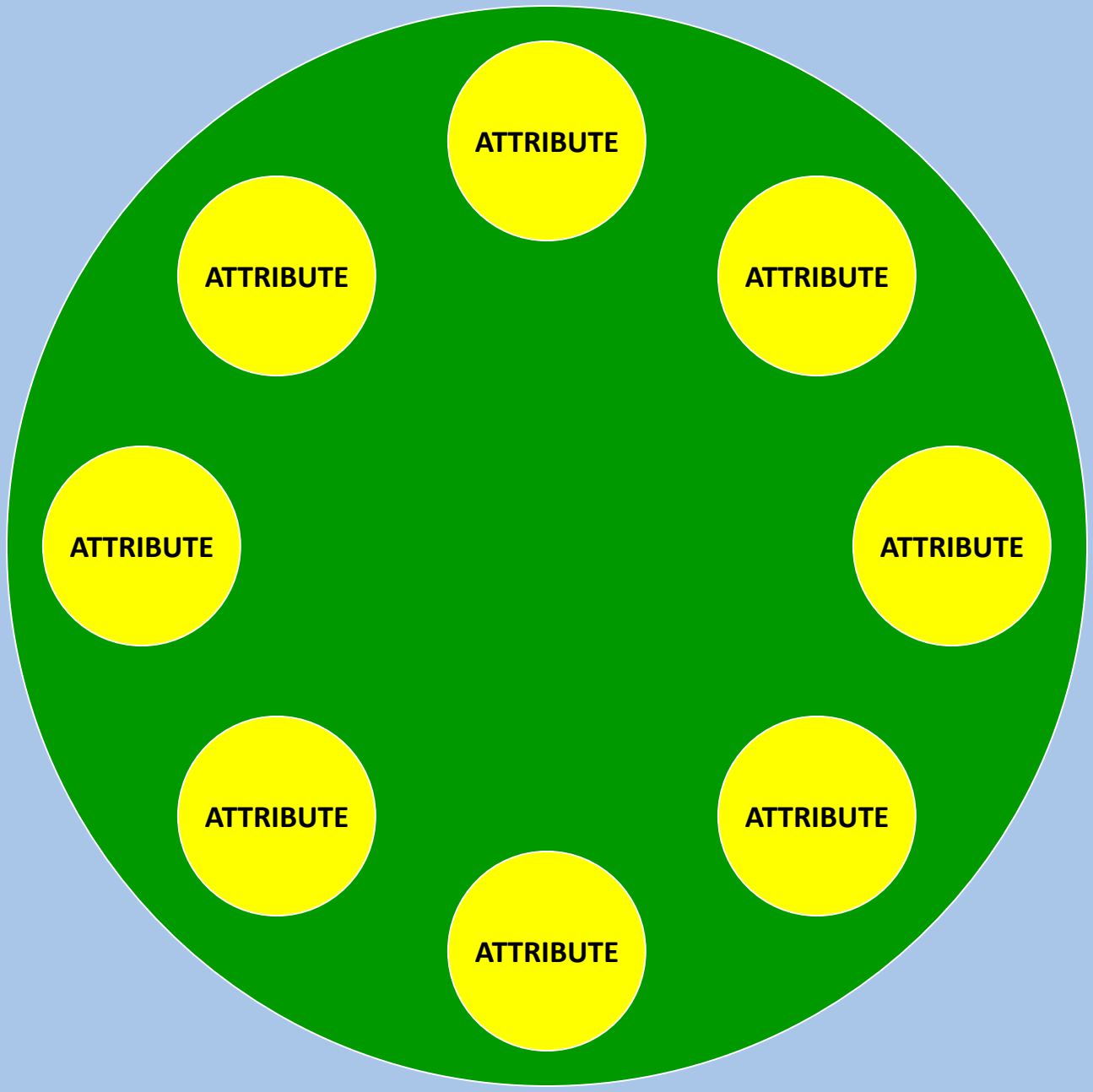
ATTRIBUTES

FEATURE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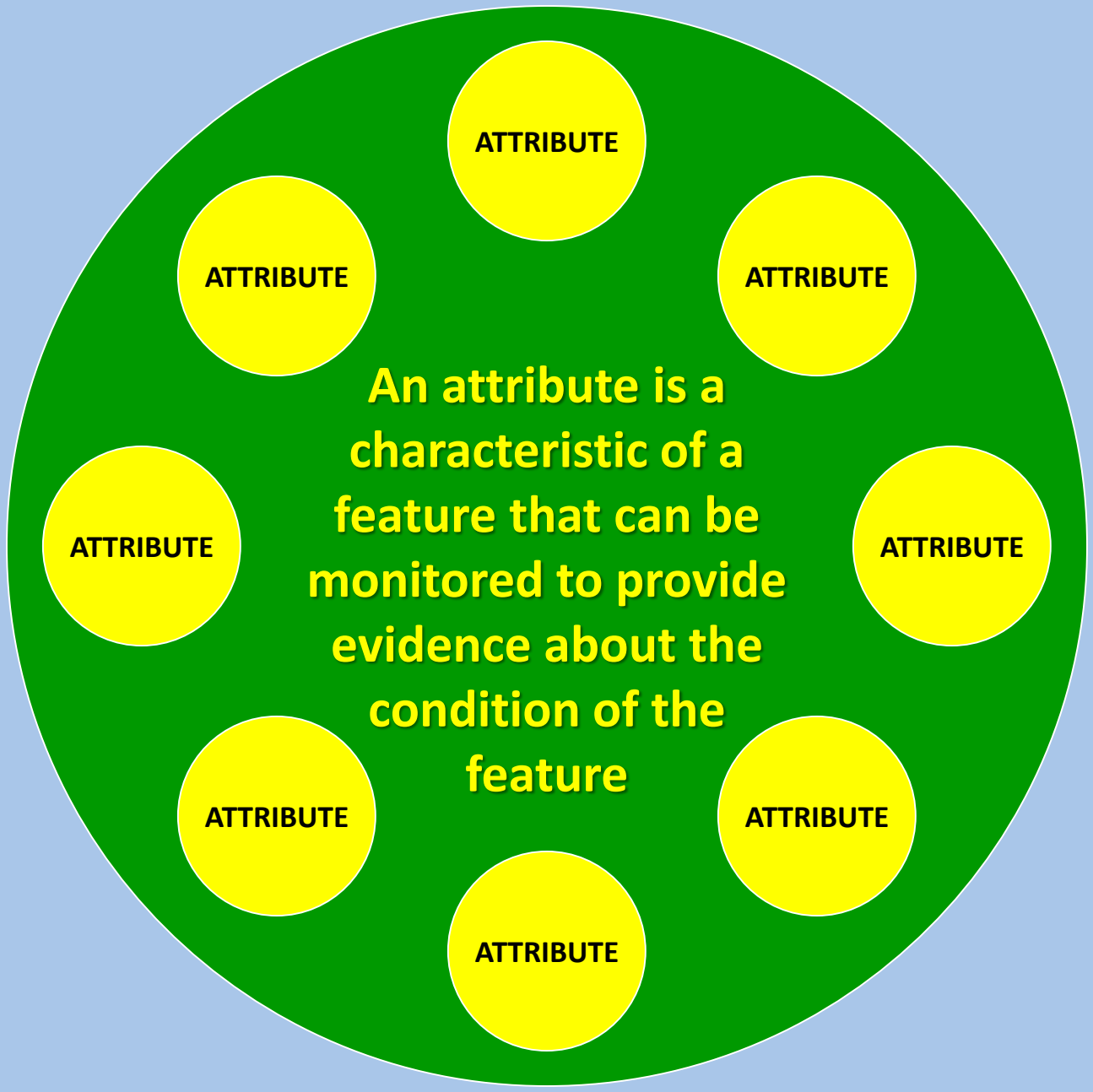
ATTRIBUTE
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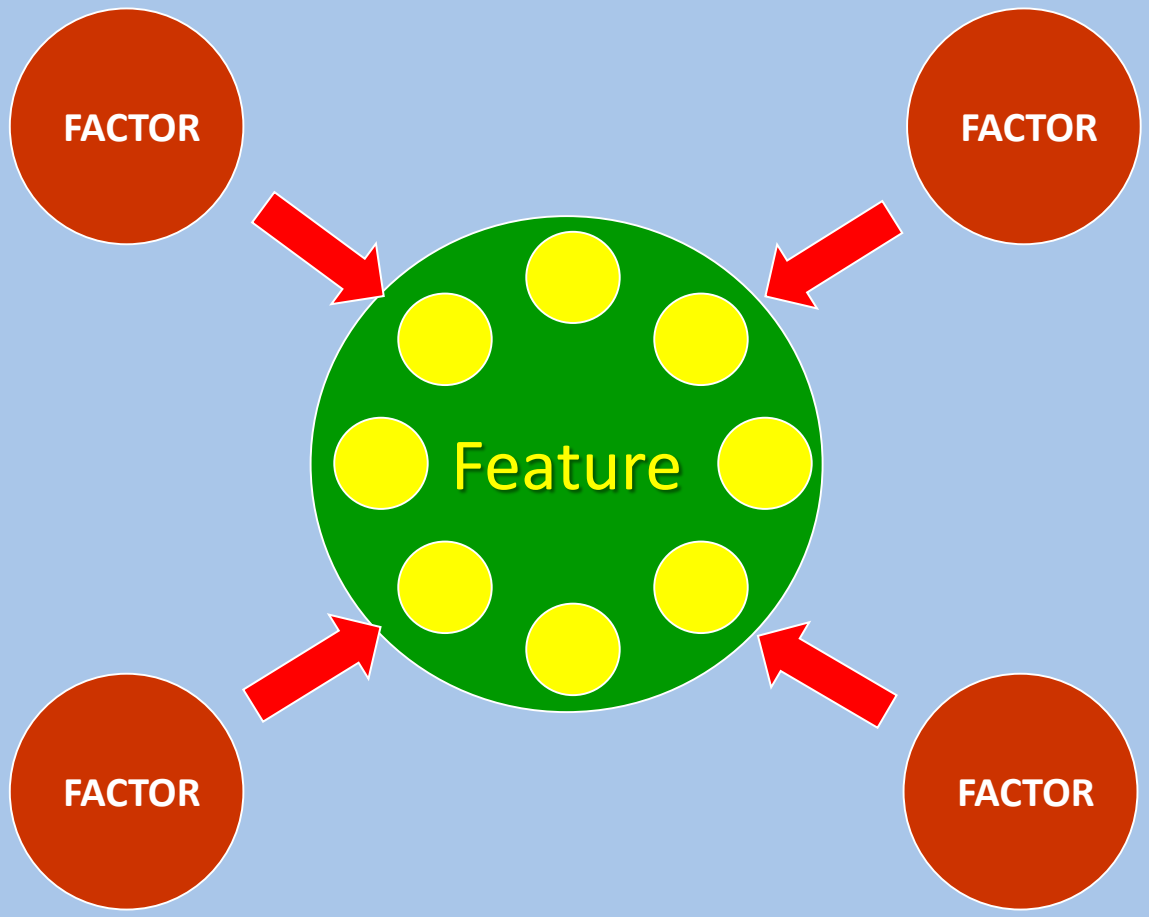
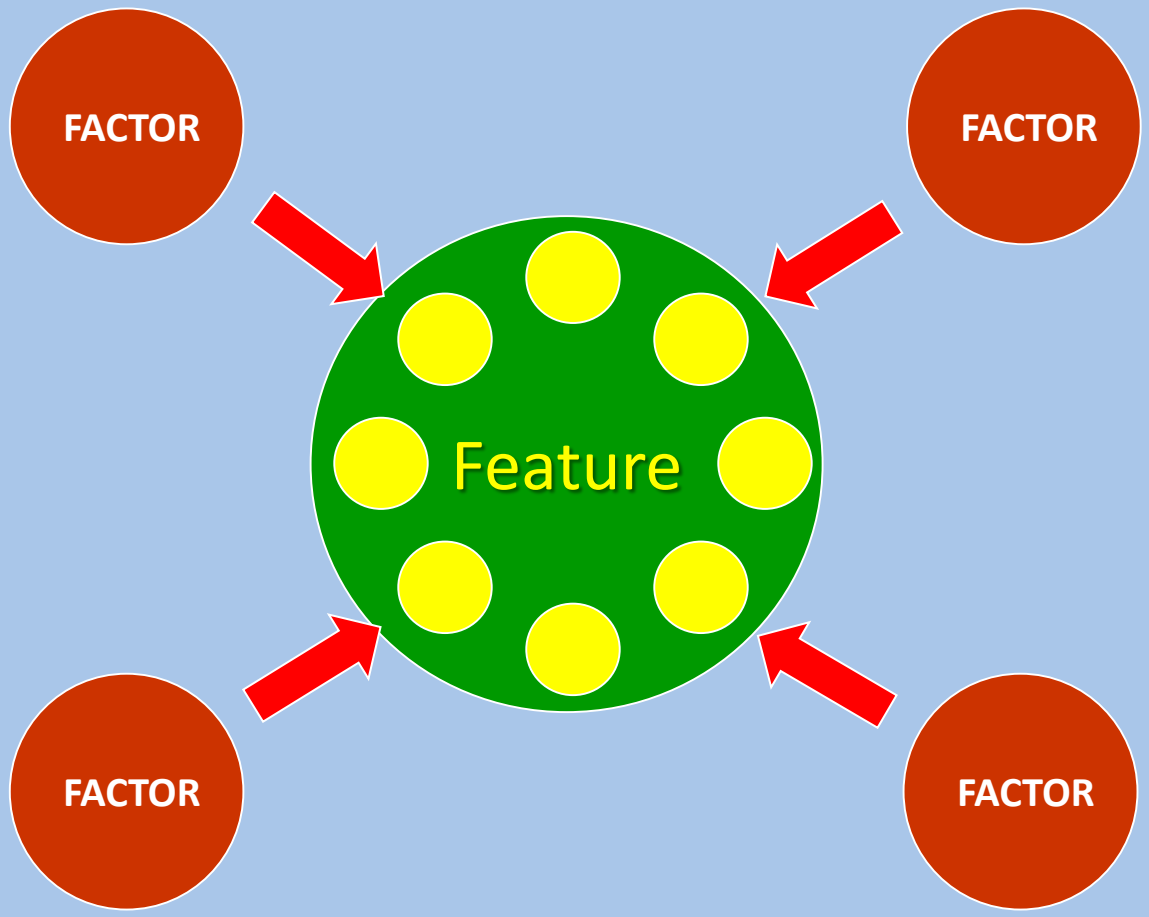
An attribute is a characteristic of a feature that can be monitored to provide evidence about the condition of the feature


FACTOR
FACTOR
Feature
FACTOR
FACTOR


FACTOR
FACTOR
Feature
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FACTOR

Attributes should be indicators of the general condition of a feature.

Attributes must be measurable

Attributes should, whenever possible, be indicators of the future rather than the past

Attributes should be economical surrogates. (cheap alternatives)

ATTRIBUTES FOR SPECIES

- Size of population
- Extent
- Distribution
- Survival rates
- Age structure
- Productivity

Returning to

Guillemots

Vision statement for a species - Guillemot

FCS

The population must be sustainable in the long term.

Vision

At least 80% of the breeding adults survive from one year to the next, and at least 70% of the breeding pairs raise a chick each year. This will help to ensure the long term survival of the population.

SPECIFIED LIMITS not LACs

- Specified limits were developed to take into account natural dynamics in habitats and populations.
- Specified limits define the degree to which the value of a performance indicator is allowed to fluctuate without creating any cause for concern.
- Ideally, two values are required, an upper limit and a lower limit.
- Limits are an early warning system requiring action long before it is too late. Therefore they should not be set close to a point of possible extinction or irrevocable damage.

Vision statement with attributes for a species - Guillemot

FCS

The size of the population must be maintained or increasing.

Vision

Skomer Island is a very important breeding site for a large, robust and resilient population of guillemots. The size of the population is stable or increasing (in 2006 the population was 16,500).

Attributes

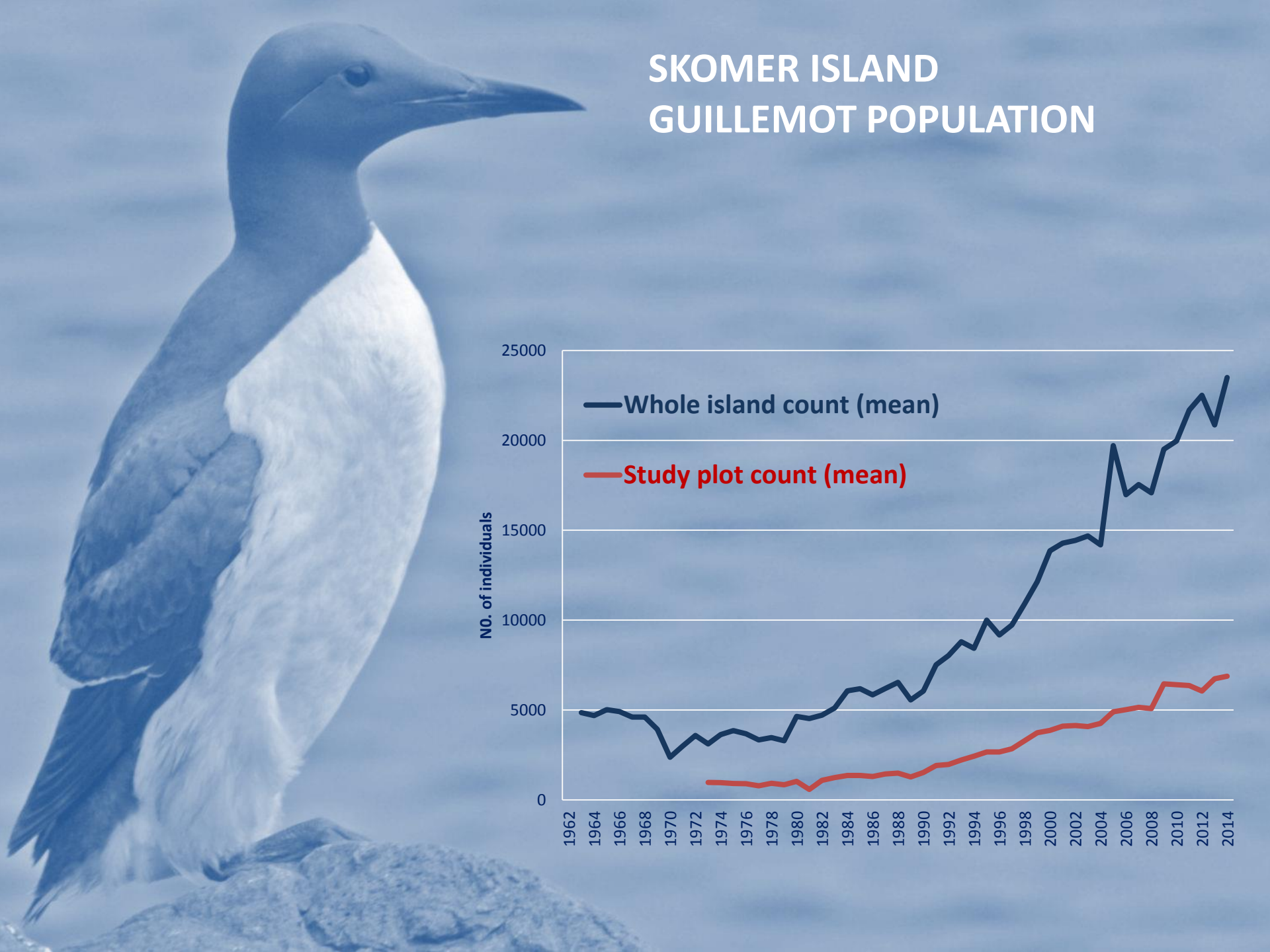
The total island population;

lower limit: 3 consecutive years of at least 15,000 individuals

The study plot population;

lower limit: 3 consecutive years with at least 8% of the UK study

SKOMER ISLAND GUILLEMOT POPULATION



Vision statement with attributes for a species - Guillemot

FCS

The population must be sustainable in the long term.

Vision

At least 80% of the breeding adults survive from one year to the next.

This will help to ensure the long term survival of the population.

Attributes

The annual survival rate of breeding adults;

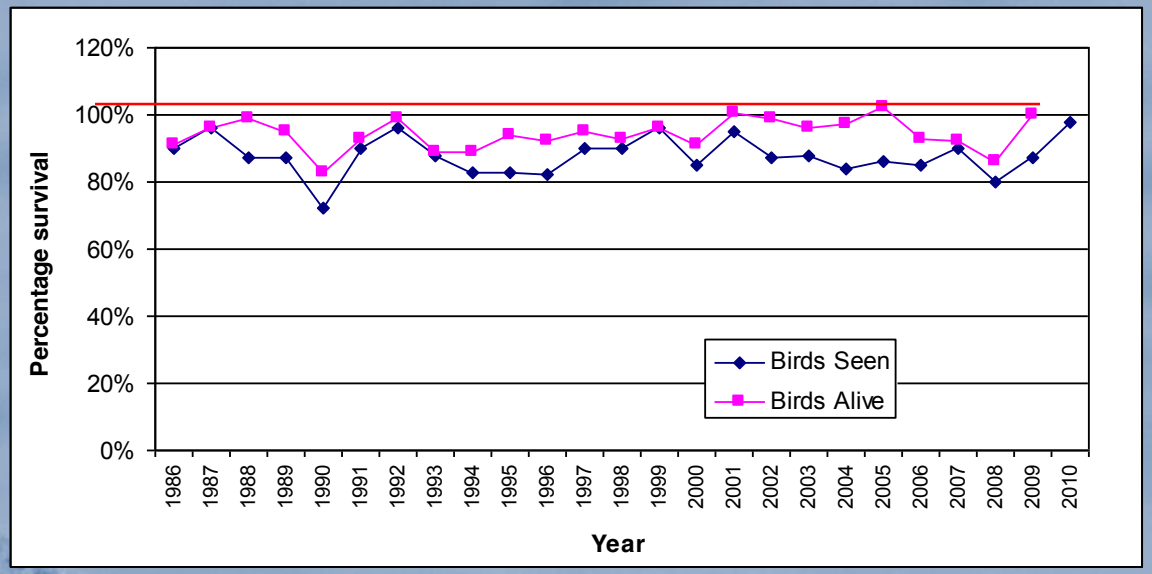
lower limit: 3 consecutive years with a survival rate of at least 80%

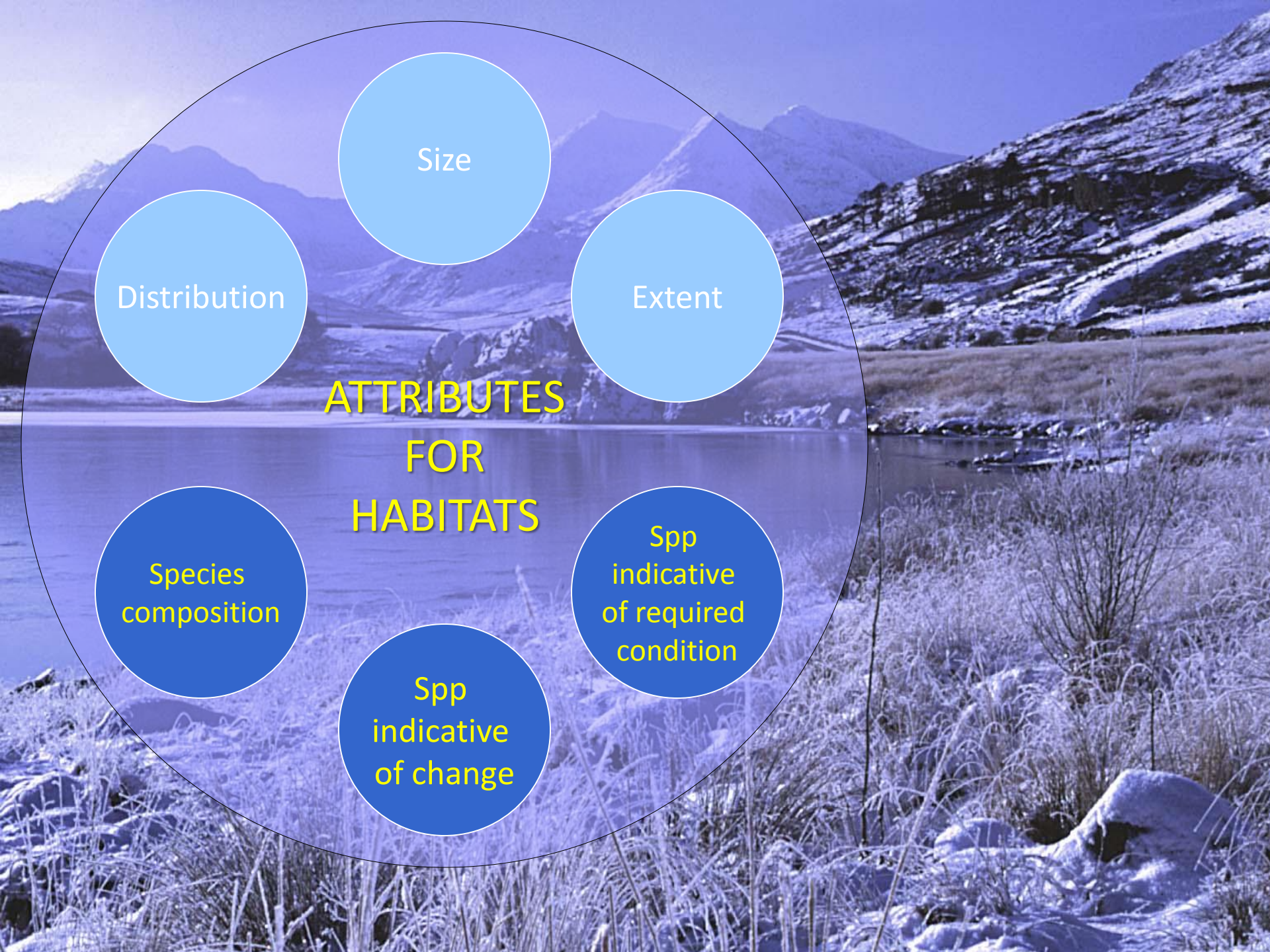
GUILLEMOT ADULT SURVIVAL

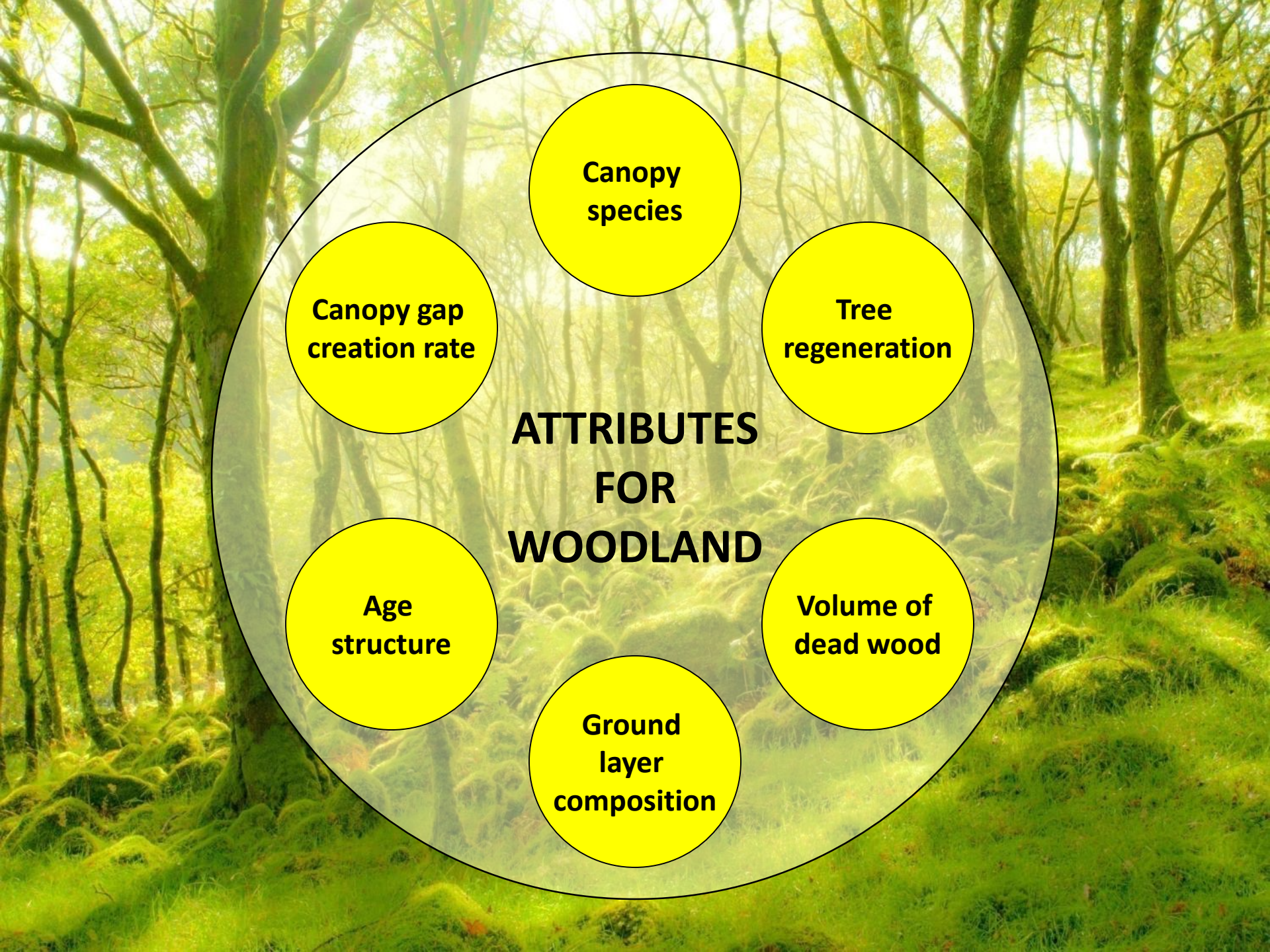
The annual survival rate of breeding adults;

lower limit:

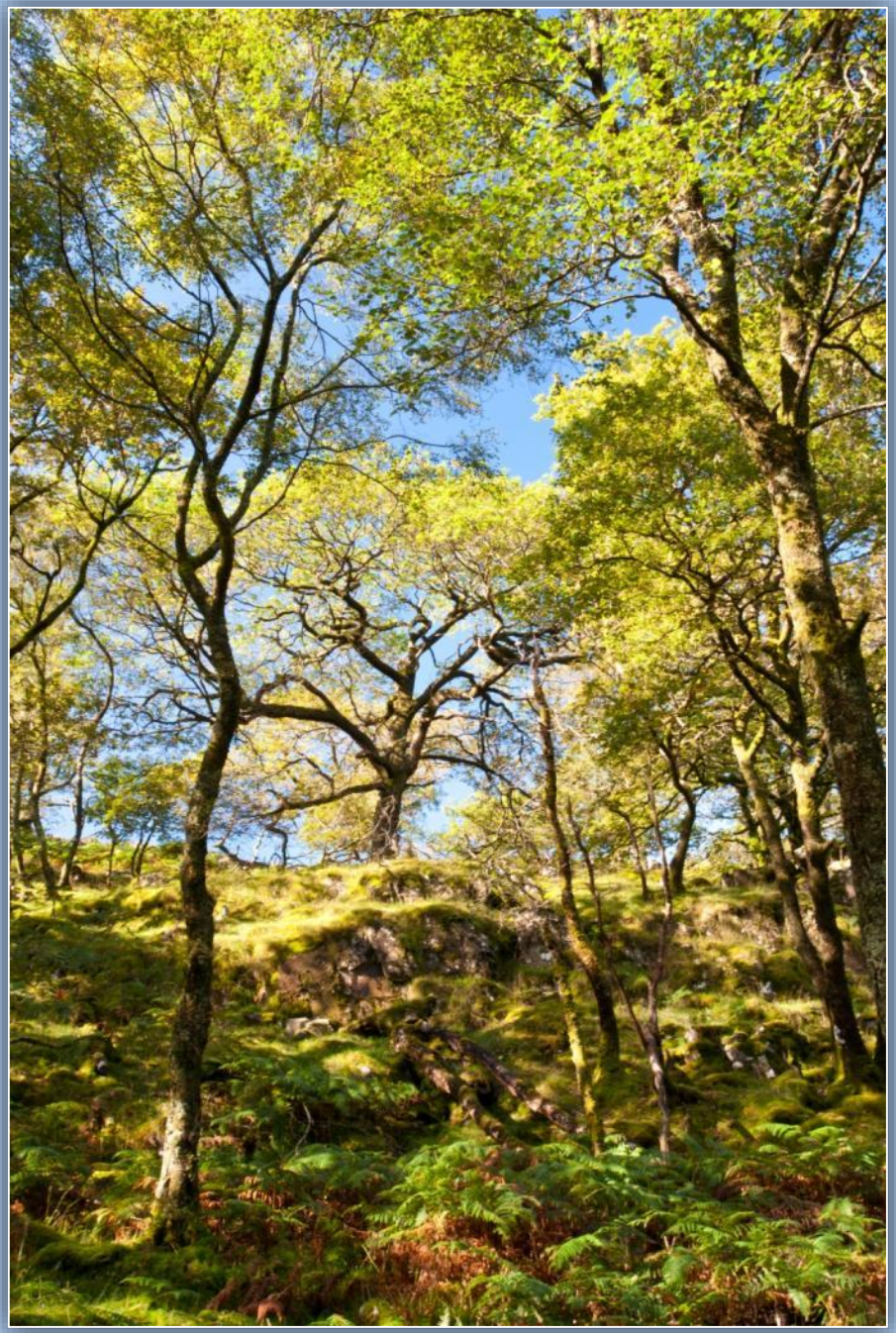
3 consecutive years with a survival rate of at least 80%




ATTRIBUTES FOR HABITATS
Size
Distribution
Extent
Species composition
Spp indicative of required condition
Spp indicative of change


ATTRIBUTES FOR WOODLAND
Canopy species
Tree regeneration
Volume of dead wood
Ground layer composition
Age structure
Canopy gap creation rate

Returning to an upland oak woodland



Vision statement with attributes for an upland acidic oak woodland

FCS	Vision	Attributes
Its quality (including ecological structure and function) must be maintained.	The woodland is naturally regenerating, with plenty of seedlings and saplings particularly in the canopy gaps.	Natural regeneration of canopy trees (in gaps). Upper limit: not required Lower limit: 2 viable saplings per 0.01 Ha of gap .
	There is a changing or dynamic pattern of canopy gaps created naturally by wind throw or as trees die.	Canopy gap creation rate. Upper limit: 0.5% of the canopy per annum Lower limit: 0.25% of the canopy per annum