# Setting Practical Indicators

**Keith McClain,** Ph.D., R.P.F.

The McClain Forest Co. Ltd.

Prince George, BC

January 22, 2003

The McClain Forest Co. Ltd.

# *Setting Practical Indicators*

## *Outline*

- Our reality
- A context for achieving SFM
- Monitoring
- Characteristics of practical indicators
- Examples
- Challenges

# *Resource management*

## *Our reality*

- Increasingly complex

- Public scrutiny / involvement

- Better management - achieve SFM

- What is SFM, anyway?

- A sense that SFM will solve all social problems

- Provincial and national reporting

- Continual improvement (& demonstrate)

# *Other challenges. Opportunities?*

**Inventory Data**

**Opportunities**          **Planning Tools**

**Diverse Values**          **Scenario Forecasts**
                            **Expectations**

**Indicators - Selection & Monitoring**

**Regulations**          **Public participation**

**Changing legislation**

**Communications & Reporting**

**Management Strategies**

# *Desired Future Forest*

**McGregor** model forest

# A common commitment

## "Making progress toward sustainability"

- ✑  **Definition of SFM required (CCFM)**

- ✑  **Framework** *(all the parts)*
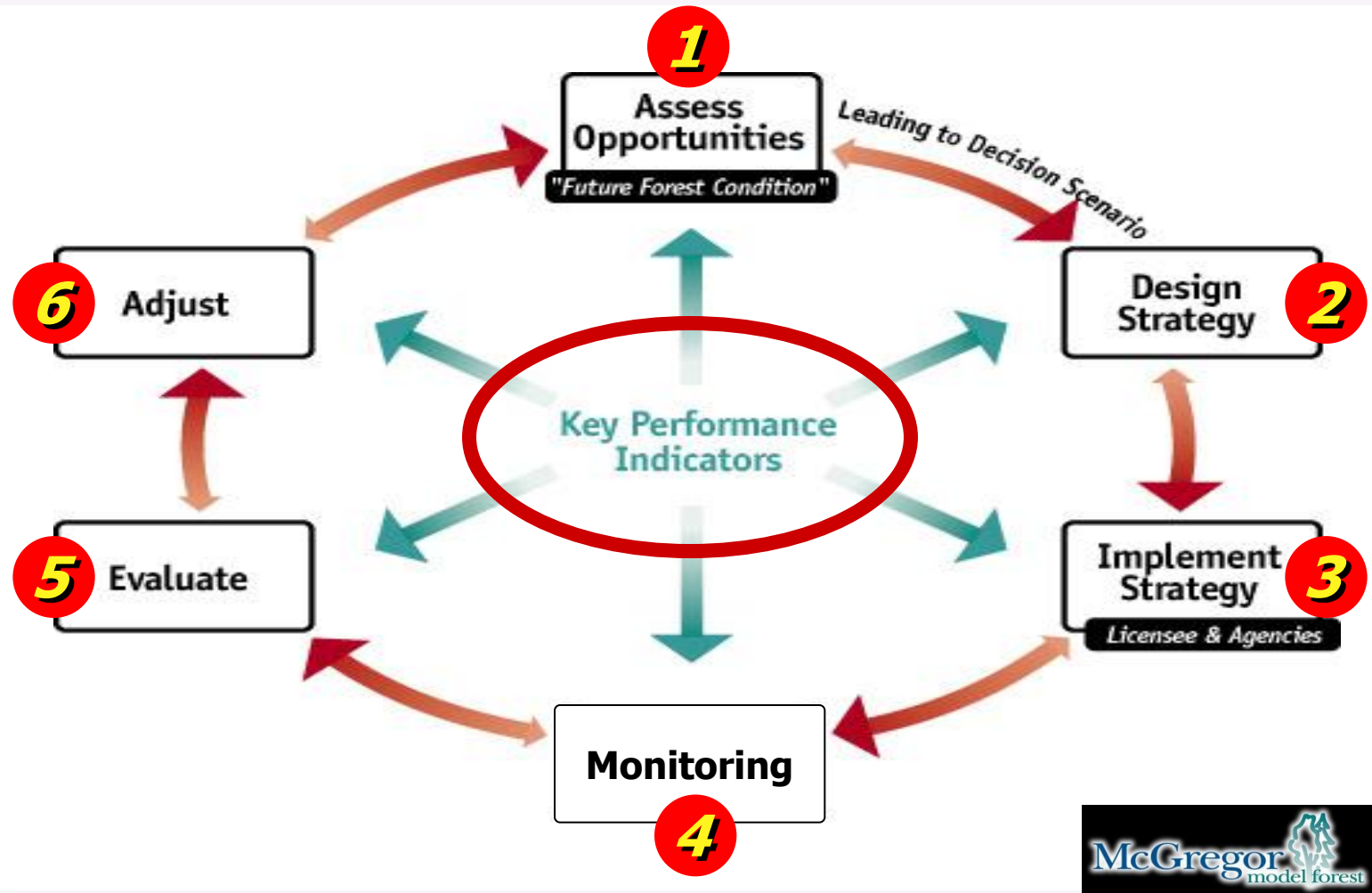
- ✑  **Process** *(how to do things)*

- ✑  **Evaluating progress**

  - ✑ How, what, when, and why?

  - ✑ Now what?

# *An Orderly Approach -* *framework*



**1** Assess Opportunities
*"Future Forest Condition"*

*Leading to Decision Scenario*

**2** Design Strategy

**3** Implement Strategy
*Licensee & Agencies*

**4** Monitoring

**5** Evaluate

**6** Adjust

Key Performance Indicators

McGregor model forest

# *Collecting data over time - monitoring*

*…….a process of collecting data over time for comparison to an explicit standard or a defined outcome at a specific time and space*
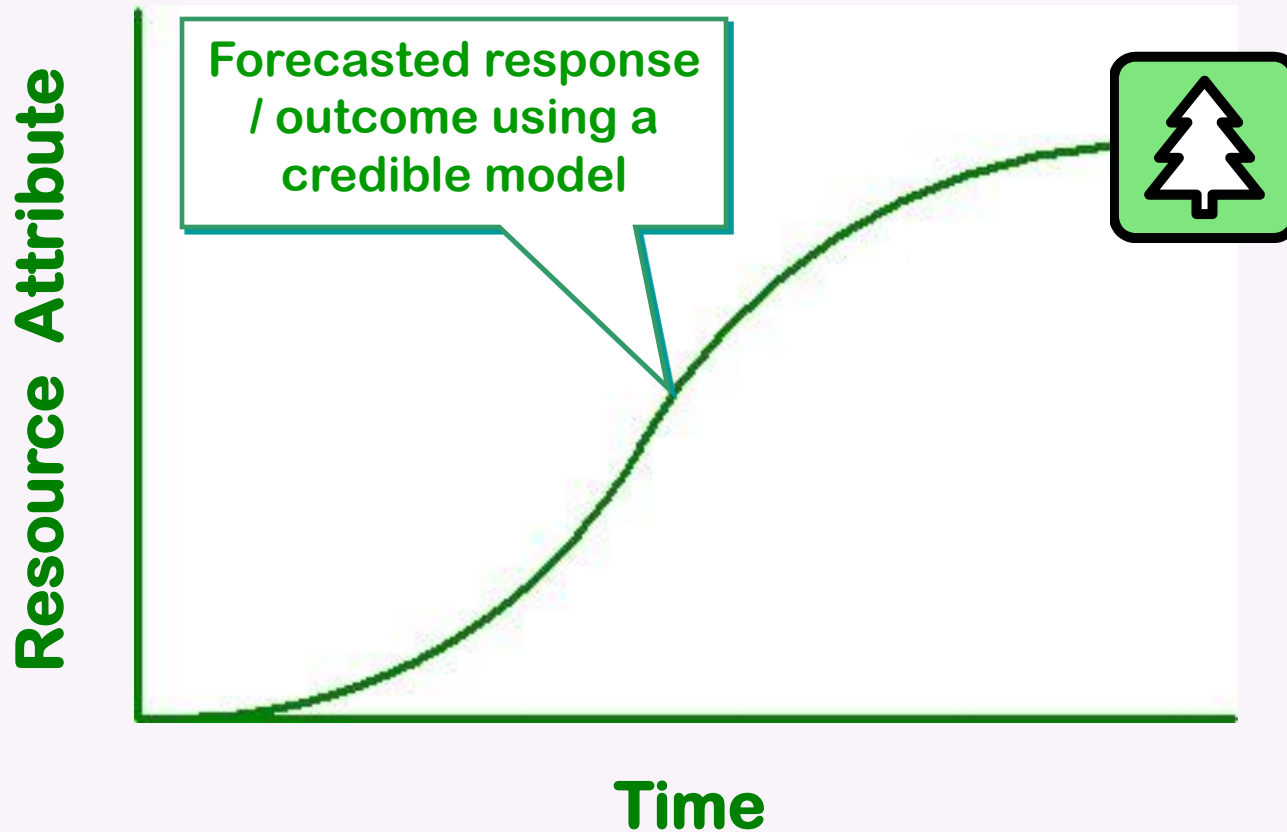
## Three common types of monitoring

1. *Implementation:* is management direction accurately interpreted and followed?

2. *Effectiveness:* is progress being made toward the intended objective (s)?

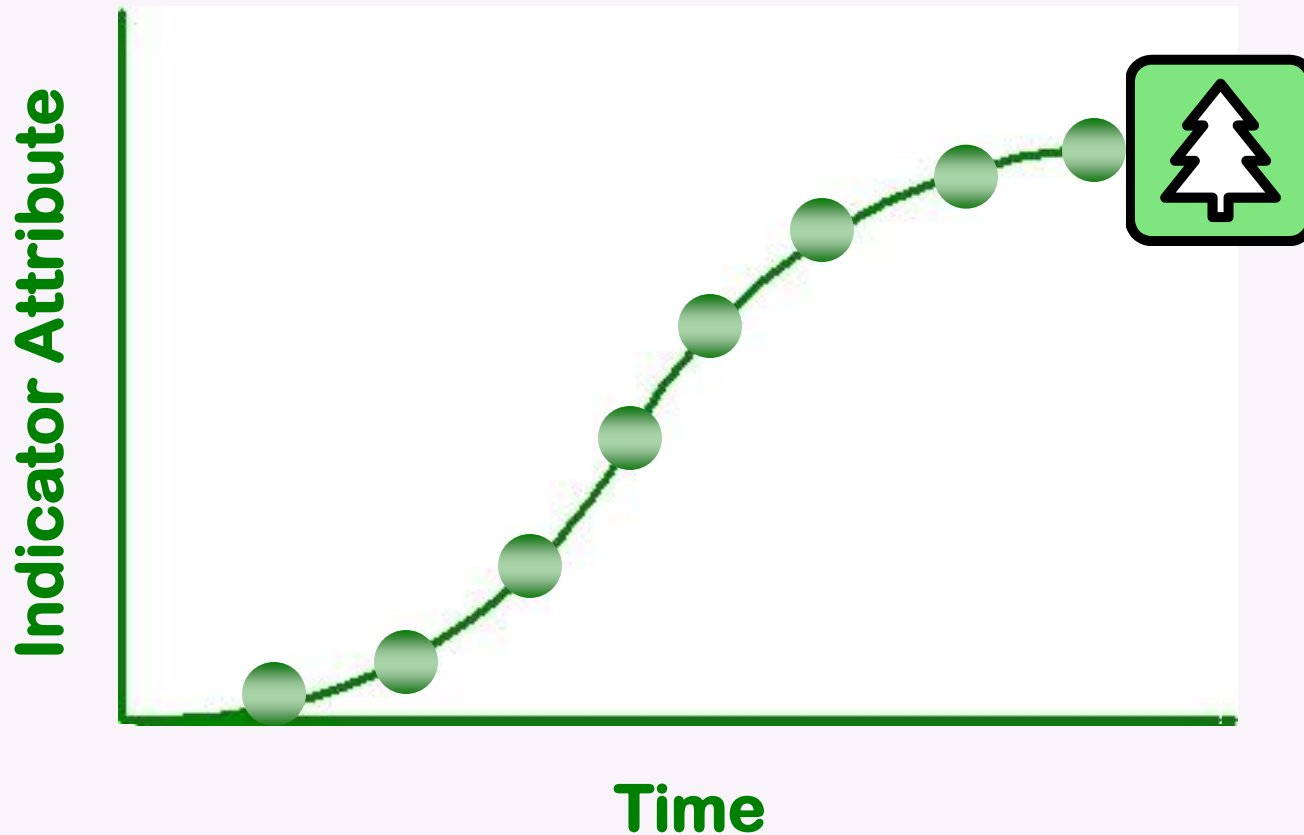3. *Validation:* are the assumptions used in developing management strategies valid?

# Effectiveness monitoring
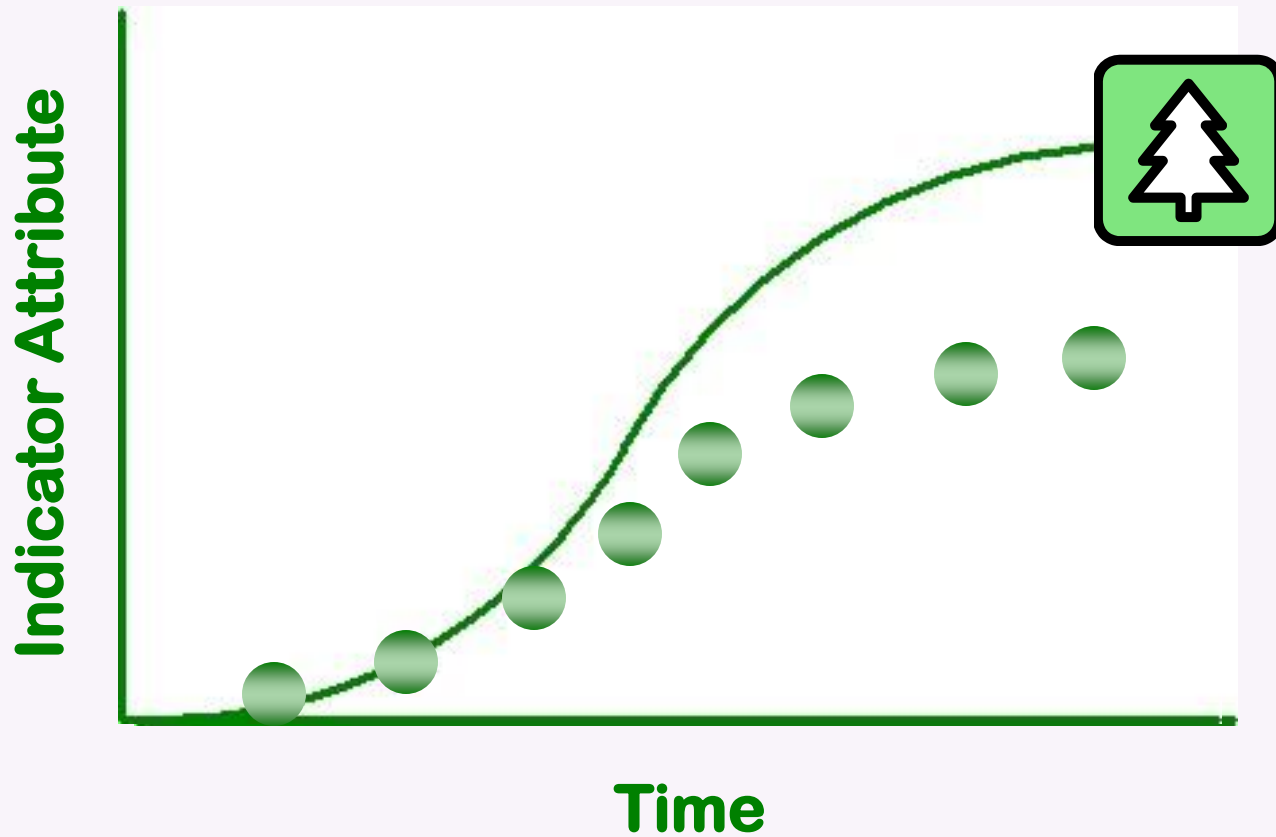
## Forecast indicator over time



**Resource Attribute** (y-axis)

**Time** (x-axis)

Forecasted response / outcome using a credible model

# Effectiveness monitoring

**Measure and ideally, OB values = Expected values**

# *Effectiveness monitoring*

## *But what does this mean?*



The McClain Forest Co. Ltd.

# *Effectiveness monitoring*

## *What's going on?*

**Wrong forecast?**

**Quality of indicator?**

**Indicator Attribute**

**Monitoring protocol?**

**Assumptions incorrect?**

**Plan not implemented fully?**
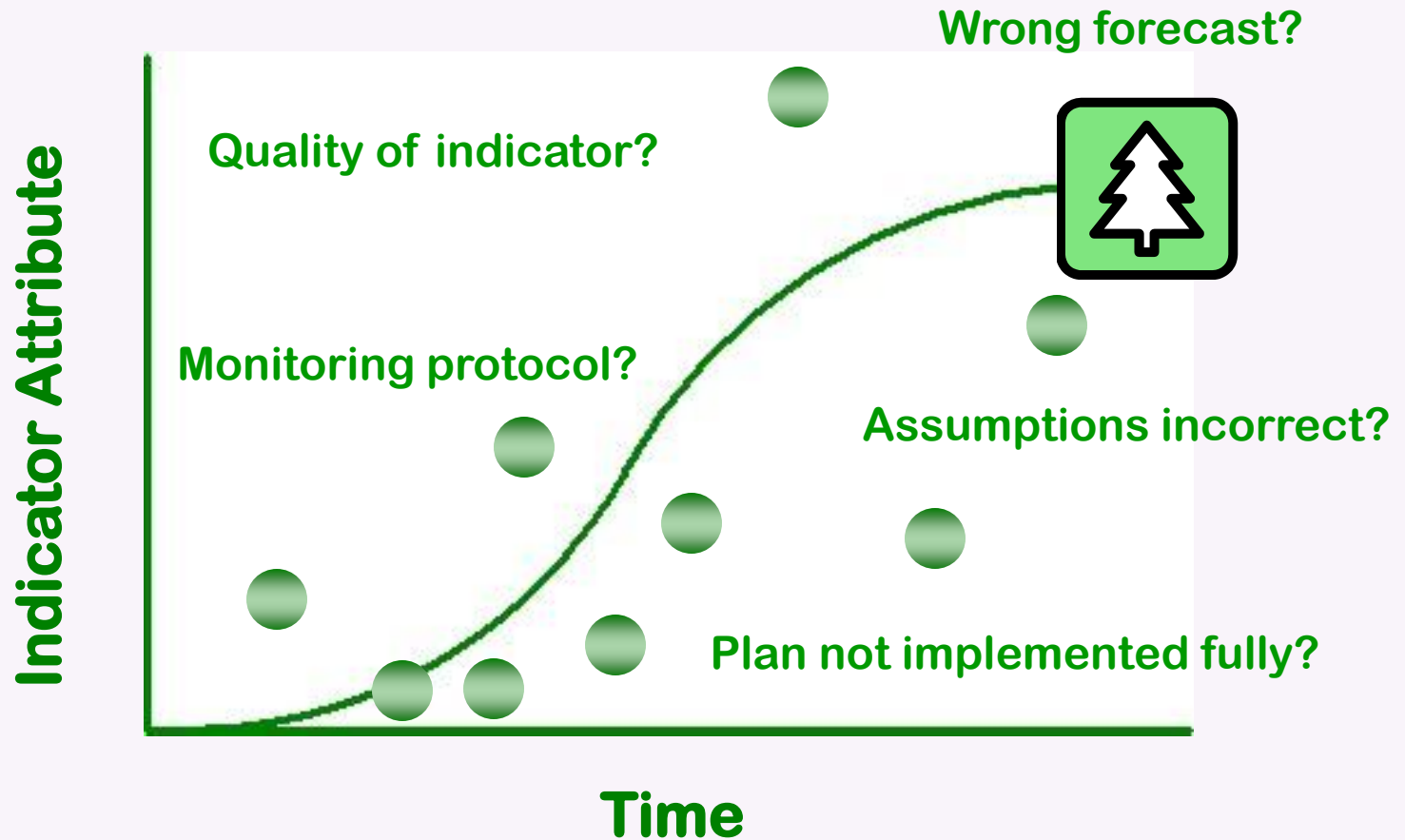
**Time**

# Setting practical indicators starts with well thought out objectives

**Need to start with -**

☑ S • M • A • R • T objectives

**SMART objectives are:**

**S** - *specific*

**M** - *measurable*

**A** - *achievable*

**R** - *realistic*

**T** - *time bound*

*Landscape - Sustainability Objectives*

*Operational - Stand Level Objectives*

# *Defining what we will measure*

## *Re: Sustainability - Criterion*

   Ø   **A category of conditions or processes by which sustainable forest management may be assessed (CCFM – 6 Criteria)**

## *Indicator*

   Ø   **A measure (measurement) of an aspect of the criterion that is influenced by action**

   Ø   *"Results count, so count results"*

# *Practical indicators are…*

## *Representative*

- ☑ **Addresses criteria, shows trends over time**
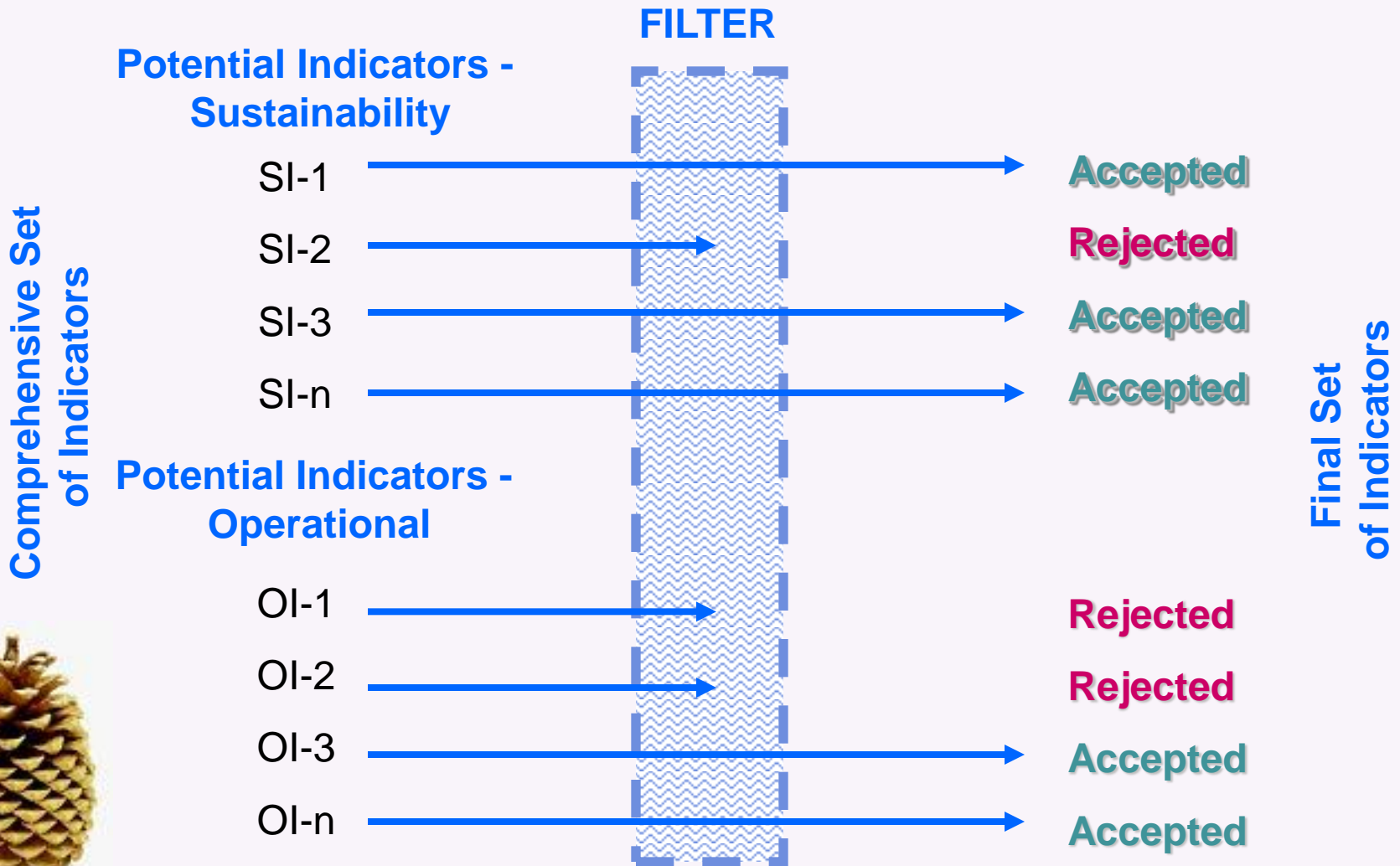
## *Reliable*

- ☑ **Reflects achievement of objective, well founded and can be measured in a standardized way**
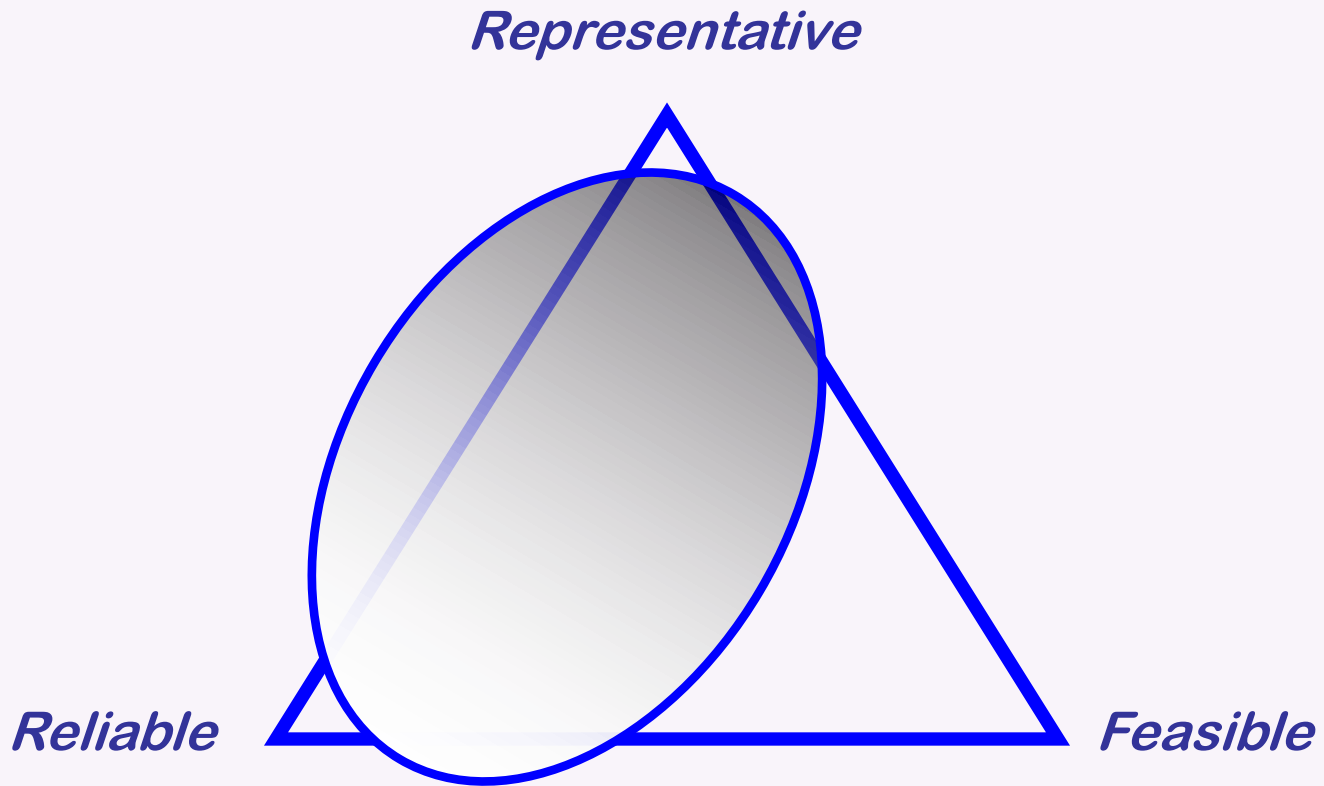
## *Feasible*

- ☑ **Based on available or collectable data**

# *Selecting a set of practical indicators*

**FILTER**

**Potential Indicators - Sustainability**

SI-1 → **Accepted**

SI-2 → **Rejected**

SI-3 → **Accepted**

SI-n → **Accepted**

**Potential Indicators - Operational**

OI-1 → **Rejected**

OI-2 → **Rejected**

OI-3 → **Accepted**

OI-n → **Accepted**

**Comprehensive Set of Indicators**

**Final Set of Indicators**

# *Selecting practical indicators – making choices*

Representative

Reliable

Feasible

*Selecting indicators -*

*Filtering based on*

- ✍ *Sensitivity* -  reflects change in resource value rather than reflecting factor that affect it (results count so count results)

- ✍ *Availability of data* - readily available, easily collected, measurable (vs. qualitative)?

- ✍ *Relevance* – is it measuring what is intended?

# *Selecting indicators -*

## *Filtering based on*

- ✆ *Can be forecasted* - expected outcomes relative to silviculture strategy

- ✆ *Understandable*

- ✆ *Acceptable* to the public

- ✆ *Straight forward*, void of confounding influences

# *Selecting indicators -*

## *Filtering based on*

- ☑ <u>*Cost effective*</u> **- (expertise, equipment etc)**

- ☑ <u>*Easy to analyze*</u> **- and interpret**

- ☑ <u>*Supported*</u> **- science based,**

# *Purposes of monitoring practical indicators*

## *From landscape / operational perspectives are:*

- to assess the status and determine emerging trends relative to management (*are stand level objectives being achieved and ecosystems being maintained?*)

- to identify what we still need to know about ecosystem dynamics that support the achievement of the objective

- to support management decisions

- to identify the need for specific support from science

- To support certification

# *Setting practical indicators*





*Experience – Chiloé*

*People – sharing, deciding*

- Professionals
- Local communities

*Values*

- Sustainable communities

*Goals*

- Provide for family needs

*Objectives*

- Firewood supply

*Measures of achievement - Indicators*

- A management issue
- Education
- Indicator – Woodlot training
- Verifier – firewood supply

# *Setting practical indicators*

**Scenario Planning Project – Tesera Systems Inc**

- Ⅾ **Community Advisory Group**
  - Ⅾ **Discussing, sharing, deciding**
- Ⅾ **Values**
- Ⅾ **Goals**
- Ⅾ **Objectives**
  - Ⅾ **Indicators**
- Ⅾ **Assumptions ➜forecasting**
- Ⅾ **Detailed output for decision making and planning**

**Robson Valley**

**E F M P P**

# *Developing indicators*

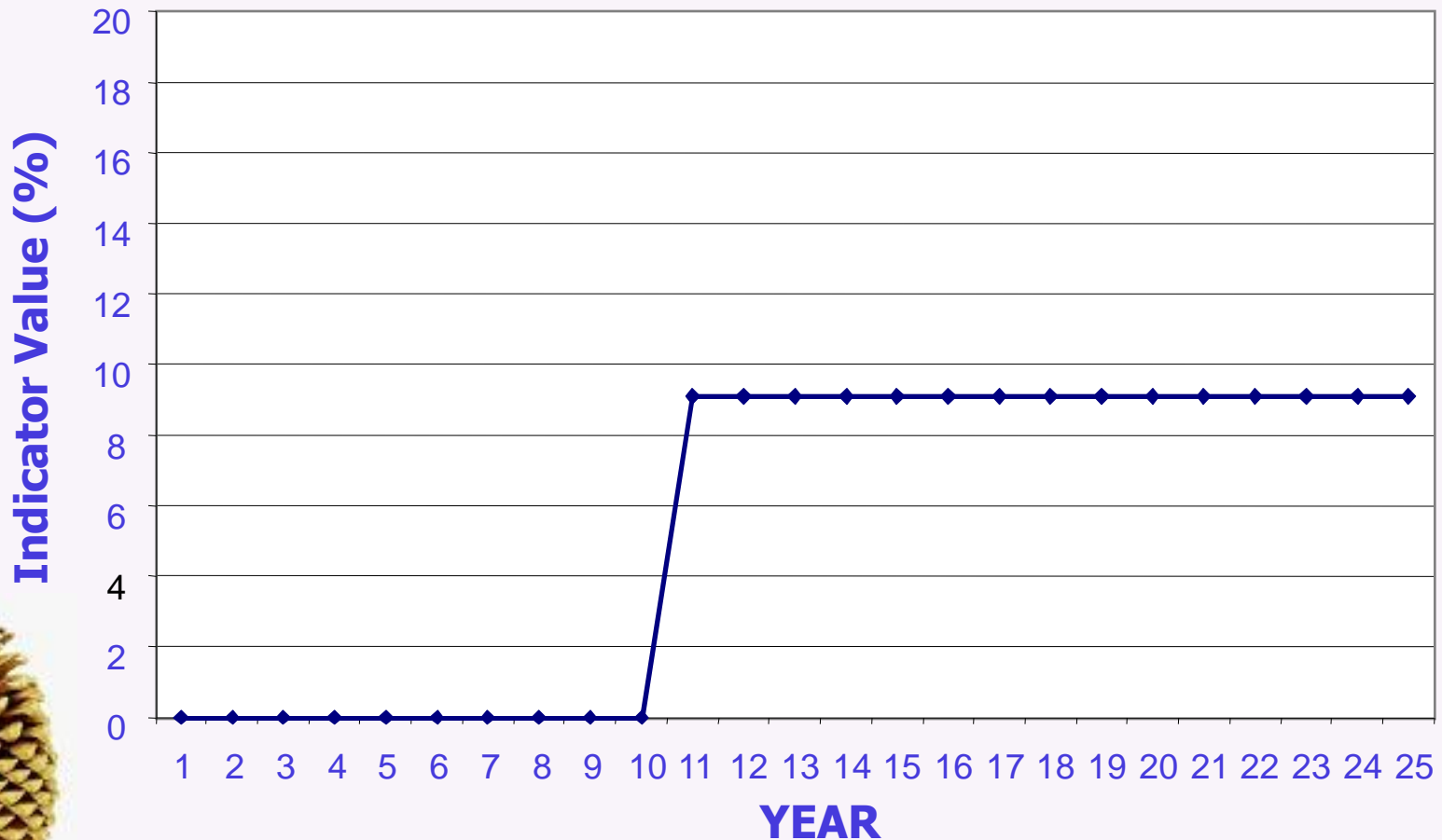## *What's in common?*

- Interested people seeking a solution for a common good

- Based on values, goals, objectives
    - Measure attributes related to forest capability and production, and
    - What is understood by those involved
    - Related to human condition – business / family

- Interested in outcomes and change for the better
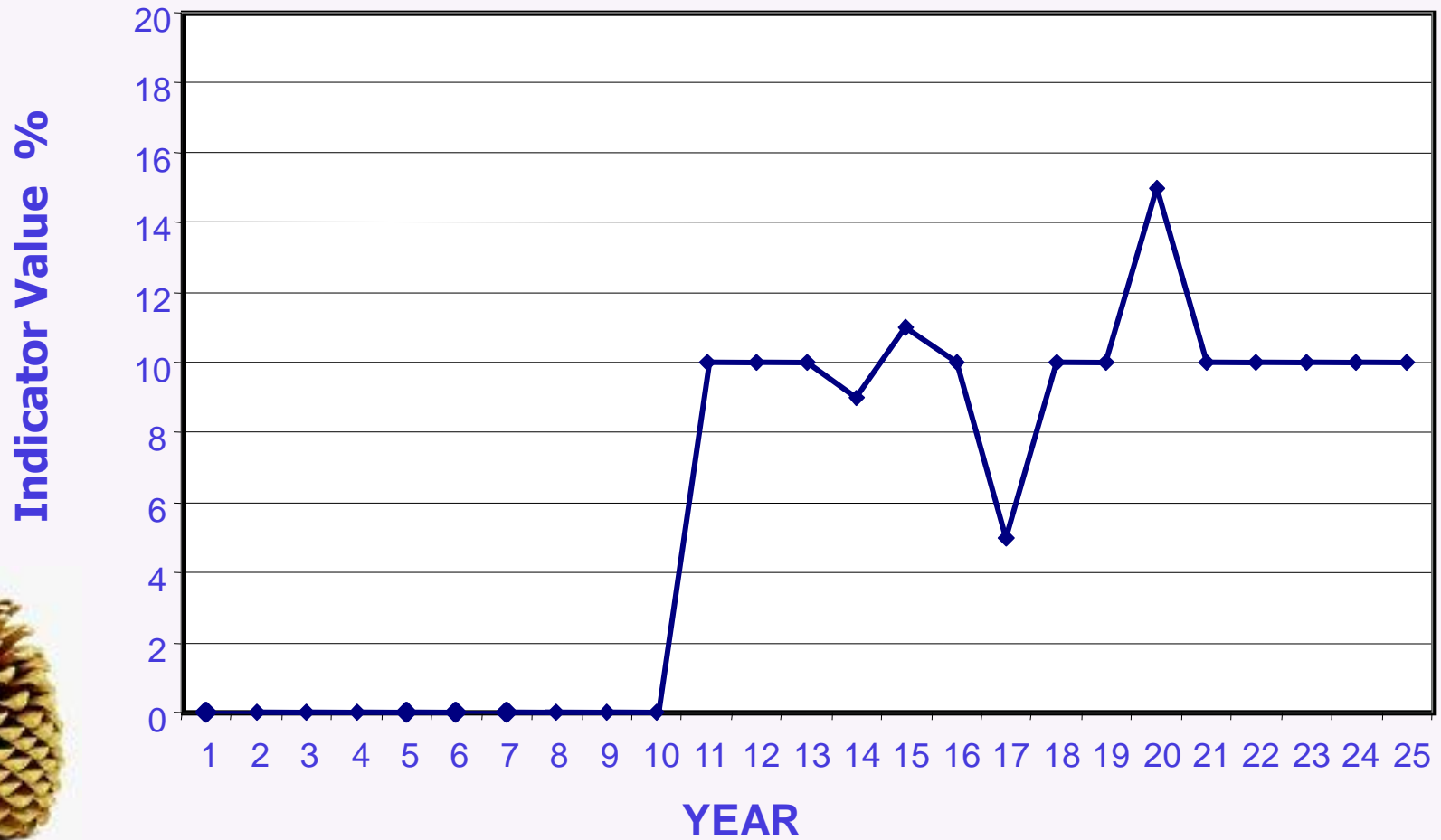
# *Forest renewal:* *an example of a simple indicator*

**Rate At Which Free Growing Status Is Declared**
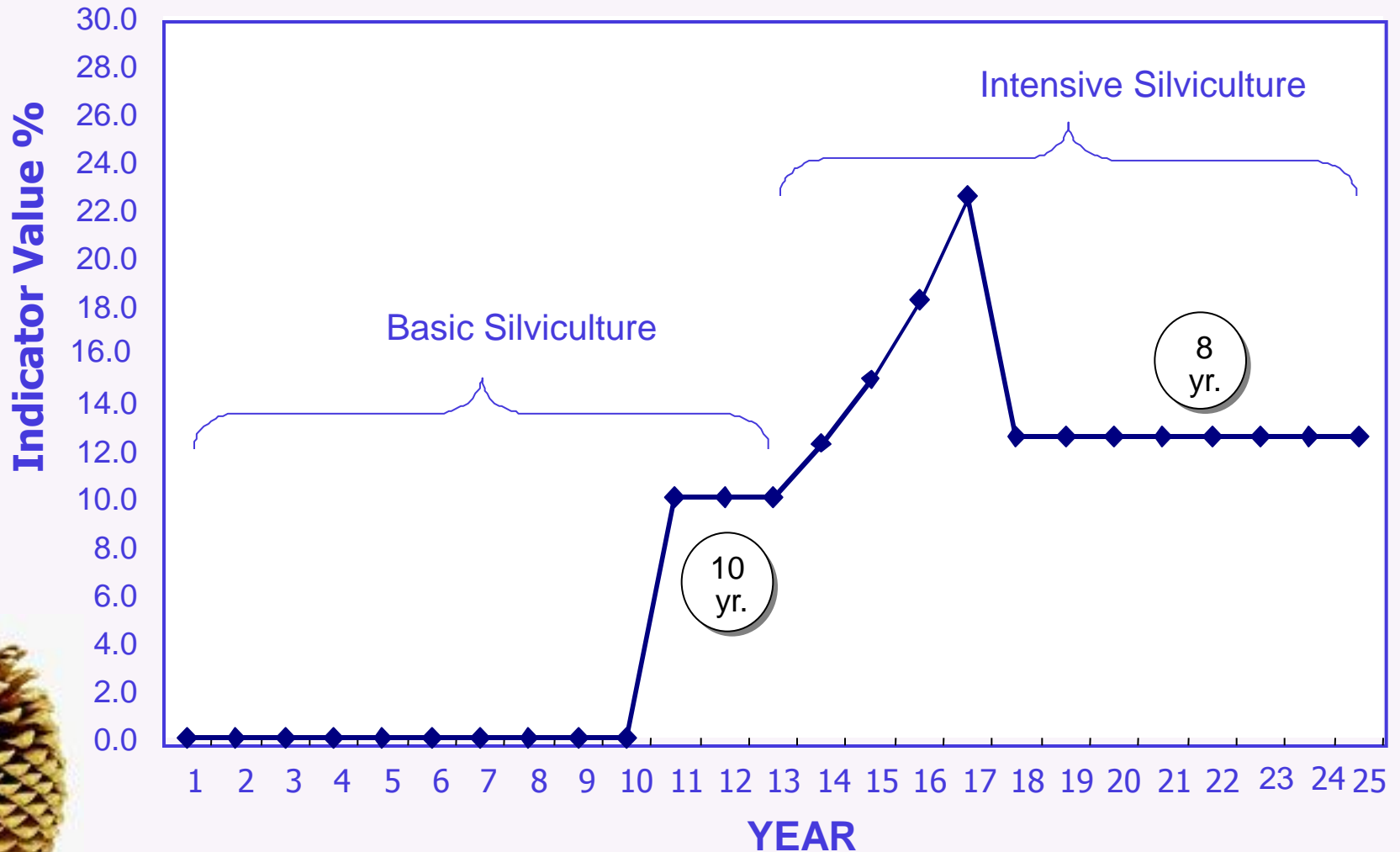


Chart — X-axis: YEAR (1–25); Y-axis: Indicator Value (%) (0–20). The indicator value is 0 for years 1–10, then jumps to approximately 9 for years 11–25.

# Forest renewal

**Rate At Which Free Growing Status Is Declared**

# Forest renewal

**Rate at Which Free Growing Status is Declared**

# *Interpretation*

## *Operational considerations*

☑ **Effective silviculture program**

    ☑ **Inferences re: stock, site management**

## *Landscape considerations*

☑ **Sustainability**

    ☑ **Inferences on habitat, hydrology, forest health, aesthetics, social acceptability**

**Values & Goals Determined**

**Define "SMART" Operational Objectives**

**Identify Key Components of Objectives for Next Step**

**Indicators Screened & Selected**

**NO**

**YES**

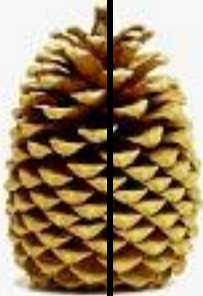**Forecast Indicators & Clarify Assumptions**

**Establish Monitoring & Sampling Protocol**

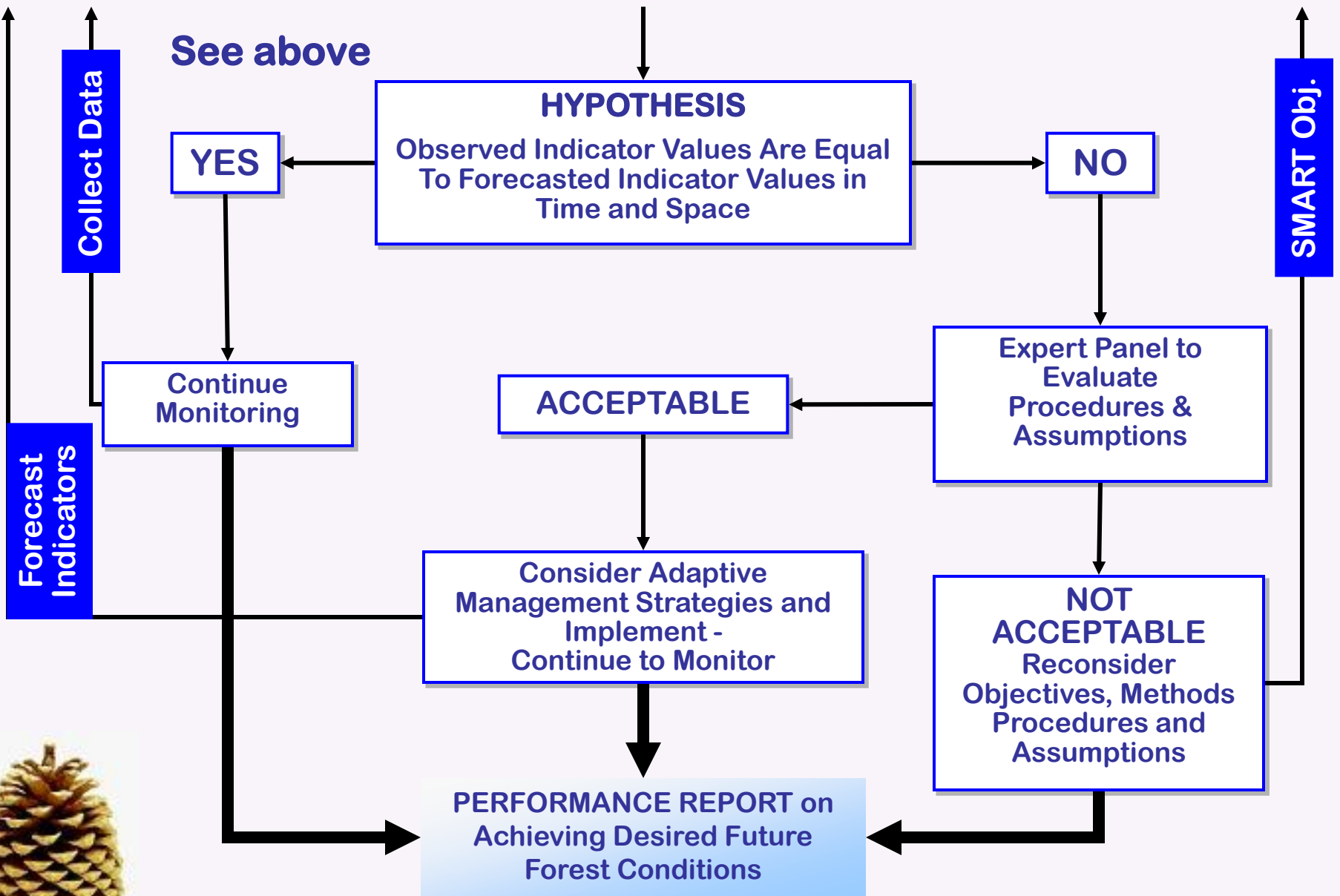**Implement Monitoring (collect data)**

**Quality Assurance for Analysis & Interpretation of Data Validation of Models & Confirm Scope of Inference**

*SCENARIO PLANNING*

*MANAGEMENT STRATEGIES IMPLEMENTED*

**See below**

The McClain Forest Co. Ltd.

McGregor *model forest*

See above

**HYPOTHESIS**

**Observed Indicator Values Are Equal To Forecasted Indicator Values in Time and Space**

**YES**

**NO**

Collect Data

SMART Obj.

**Continue Monitoring**

**ACCEPTABLE**

**Expert Panel to Evaluate Procedures & Assumptions**

Forecast Indicators

**Consider Adaptive Management Strategies and Implement - Continue to Monitor**

**NOT ACCEPTABLE Reconsider Objectives, Methods Procedures and Assumptions**

**PERFORMANCE REPORT on Achieving Desired Future Forest Conditions**

**The McClain Forest Co. Ltd.**

# *Summary*

- Assessing the system (human, ecological) allows for a determination to be made of sustainability

- Indicators reflect an aspect of the system (they must be representative, reliable & feasible)

- Setting practical indicators requires understanding of the relationship involved between management and system response

- Simplicity over complexity

- Question: Sustainable?  For whom? For what? For how long? Over what area?

- We need to maintain a social consensus on the value of sustainability (defining it precisely, not advised)

# *Challenges*

- Selecting indicators that work together to provide understanding

- Interpretation – one indicator tells one story, 40 indicators tell 40 stories

- Simplify the process of selection

- Indicators are tools, dare to change

- Not falling into the trap of managing indicators, and forgetting the forest