

# ***Resource assessment methods for medicinal and aromatic plants***



Factors to be assessed	Explanation	Ref
Harvest characteristics (Table 1)		1
• Type of harvest	• Harvesting regime: extractive versus non extractive harvesting, har-	1, 2

Factors to be assessed	Explanation	Ref
	• Specificity • Habitat threat	
• Risk of mortality after harvest / be-	• For species where trade is primarily in live specimens	3

## Factors to be considered during a CITES Non-Detriment Finding

### Uwe Schippmann<sup>1</sup>

This table summarizes the “relevant elements that should be taken in consideration in order to formulate adequate NDFs”<sup>2</sup>. This synopsis follows primarily the tables 1 and 2 of the IUCN NDF Checklist and also takes on board additional elements from other documents:

- (1) IUCN NDF Checklist<sup>3</sup>
- (2) Cancun Workshop Case Study Format<sup>4</sup>
- (3) EU-SRG Guidance Paper<sup>5</sup>
- (4) International Standard for the Sustainable Wild Collection of Medicinal and Aromatic Plants, ISSC-MAP<sup>6</sup>
- (5) Susceptibility Matrices provided by Cunningham and Peters<sup>7</sup>.

With the ISSC standard it was possible to underpin the factors “Management Plan” and “Monitoring Methods” with more detailed criteria. These sections are shaded in blue and green. A third factor imported from ISSC-MAP is the “Role of the species in the ecosystem” (shaded red) which is currently not covered in the IUCN Checklist.

Factors to be assessed	Explanation	Ref
• Information quality	• Assess the quality of the information and where necessary, prioritise steps to improve data quality	1
Harvest management		
• Illegal harvest or trade	• How significant is the national problem of illegal or unmanaged harvest or trade? Assess the levels of both unmanaged and illegal har-	1

Factors to be assessed	Explanation	Ref
ure	private landowner is responsible for managing and regulating the harvest	
• % of harvest in open access areas	• What percentage of the legal national harvest occurs in areas where there is no strong local control, giving de facto or actual open access?	1
• Confidence in harvest management	• Do budgetary and other factors allow effective implementation of	1

# International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP)

## International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP)

Version 1.0

Medicinal Plant Specialist Group  
Species Survival Commission  
IUCN The World Conservation Union



**Wild collection and conservation requirements:**

**Resource and habitat assessment and management**

**Legal and ethical requirements:**

**Resource tenure, access and benefit sharing**

**Responsible management and business practices**

Factors to be assessed	Explanation	Ref
<b>Harvest characteristics</b> (Table 1)		1
• Type of harvest	<ul style="list-style-type: none"> <li>Harvesting regime: extractive versus non extractive harvesting, harvesting effort, harvesting method, harvest season; extent to which utilization is from artificially propagated or wild specimens</li> <li>Distinguish Non-lethal harvesting; removal of whole plant (incl. bulbs); killing of individual by removal of seeds, leaves, bark, roots, wood</li> </ul>	1, 2
• Harvest specificity	• Indiscriminate collection of other species vs. target species easy to identify	5
• Multiple use	• Multiple, conflicting uses vs. single use or non-competing	5
• Demographic segment of population	• Are mature and immature plants harvested?	1, 2
• Relative harvest volume	<ul style="list-style-type: none"> <li>Quantitative information on numbers or quantity, if available; otherwise, a qualitative assessment; include also illegal trade</li> <li>Trade level: High – medium – low</li> <li>Yield per plant: Low – medium – high</li> </ul>	1, 5
• Utilization trend	• Increasing fast <> Slowly increasing <> Stable or decreasing	5
• Regulated / unregulated	<ul style="list-style-type: none"> <li>"Regulated" refers to a sanctioned (government approved or otherwise official) harvest that is under the full control of the manager</li> <li>Quantify the level of legal and illegal national use plus export</li> </ul>	1, 2
• Reason for harvest	• Forces driving the harvest, e.g. commercial, medicinal, subsistence hunting, sport hunting, trophies, pet, food	1, 2
• Commercial destination	• Local, national, international	1, 2
• Information quality	• Assess the quality of the information and where necessary, prioritise steps to improve data quality	3
<b>Biological characteristics</b> (Table 2)		
• Scientific (and common) names	• Correct taxonomy and nomenclature, incl. synonyms	2
• Life form	• Basic life forms for plants: tree, shrub, perennial, annual, bulb, climber, epiphyte, etc.	1, 5
• Reproduction	<ul style="list-style-type: none"> <li>Regeneration or reproductive strategy: dioecious, sexual, asexual</li> <li>Pollination: biotic (specialised vector?), wind</li> <li>Pollinator abundance</li> <li>Flower/Fruit phenology: annual, supra-annual, unpredictable</li> </ul>	2, 5
• Dispersal	<ul style="list-style-type: none"> <li>Seed germination: viability, dormance</li> <li>Seed dispersal strategy</li> <li>Disperser abundance</li> <li>Dispersal efficiency</li> </ul>	1, 5
• Regeneration	<ul style="list-style-type: none"> <li>Capacity of the species to reproduce; four basic types of regeneration potential are distinguished</li> <li>Growth rate</li> <li>Sprouting capability</li> <li>Regeneration Guild: Early Pioneer &lt;&gt; Late Secondary &lt;&gt; Primary</li> </ul>	1, 5
• Habitat	• Preference: Types of habitats occupied by the species and, when relevant, the degree of habitat specificity	1, 2, 5

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Factors to be assessed	Explanation	Ref
	<ul style="list-style-type: none"> <li>Specificity</li> <li>Habitat threat</li> </ul>	
• Risk of mortality after harvest / before export	• For species where trade is primarily in live specimens	3
• Role of the species in its ecosystem	• Negative impacts caused by [...] collection activities on other wild species, the collection area, and neighbouring areas shall be prevented.	2, 4
	2.1 Rare, threatened, and endangered species and habitats that are likely to be affected by [...] collection and management are identified and protected.	4
	2.1.1 Existing species and habitat conservation strategies relevant to the collection area are recognized and included in the management plan.	4
	2.1.2 Knowledge of special functions in the ecosystem / dependent relationships between target [...] and other species is documented and incorporated into management and monitoring.	4
	2.2 Management activities supporting wild [...] collection do not adversely affect ecosystem diversity, processes, and functions	4
	2.2.1 The habitat management practices applied in the collection area are described.	4
	2.2.2 Negative impacts of [...] collection practices and management activities on the collection area are identified in the management plan.	4
	2.2.3 Implemented collection methods & tools are appropriate; damage to the plant/plant population is minimised.	4
	2.2.4 The management plan [...] includes strategies to prevent or reduce negative impacts on other species and the collection area.	4
	2.2.5 Changes in ecosystem structure, function, and services are monitored and reported	4
	2.2.7 Landscape-level and intensive management practices promoting [...] resources (e.g. overstory reduction, enrichment planting) do not negatively affect sensitive species or the ecosystem structure, diversity processes and functions in the collection area.	4
<b>Population status</b>		
• Distribution	• Currently known global range of the species	2, 5
• Global conservation status	• According to IUCN Red List	2
• Global population size and trend	• this type of data also needed to evaluate the IUCN red listing criteria: population reduction, extent of occurrence, area of occupancy, population size, number of populations	2
• National conservation status	•	2
• National distribution	• Currently known range of the species in the country; indicate whether or not the distribution of the species is continuous, or to what degree it is fragmented. If possible, provide a map	1, 5
• National abundance	<ul style="list-style-type: none"> <li>Local population sizes: Everywhere small &lt;&gt; Large to medium &lt;&gt; Often large</li> <li>Spatial distribution: Scattered &lt;&gt; Clumped &lt;&gt; Homogeneous</li> </ul>	1, 5
• National population trend	• Population increasing or decreasing? to be measured over a time period independent of the harvest	1
• Major threats	<ul style="list-style-type: none"> <li>Assess severity of the impact of the major threat</li> <li>habitat loss / degradation; invasive alien species (directly affecting the species); harvesting; persecution (e.g. pest control); pollution (affecting habitat and/or species)</li> </ul>	1, 2

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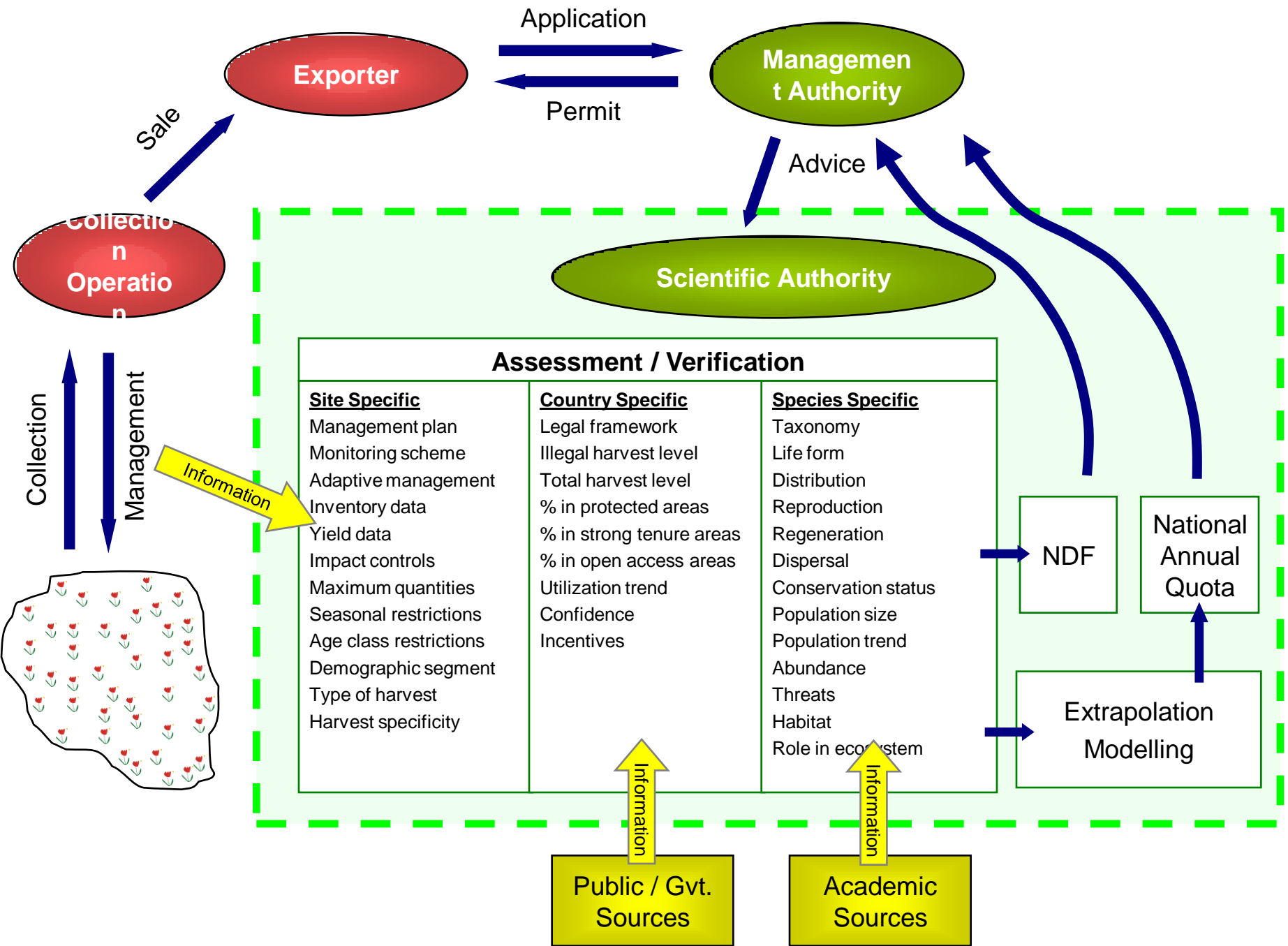
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Factors to be assessed	Explanation	Ref
ure	private landowner is responsible for managing and regulating the harvest	
• % of harvest in open access areas	• What percentage of the legal national harvest occurs in areas where there is no strong local control, giving de facto or actual open access?	1
• Confidence in harvest management	• Do budgetary and other factors allow effective implementation of management objectives and key objectives?	1



Factors to be assessed	Explanation	Ref
	area).	
	5.1.12 Written internal instructions exist for each collection area on: <ul style="list-style-type: none"> <li>a) collection sites,</li> <li>b) collection methods,</li> <li>c) maximum collection quantities,</li> <li>d) maximum allowed collection frequency, and</li> <li>e) periods to avoid and concentrate collection activities.</li> </ul>	4
• Aim of harvest	• What is harvest aiming to achieve? Conservation benefit, population control, commercial benefit?	1
• Quotas	• Is the harvest based on a system of quotas? What is their basis?	1
• Restoration or alleviation measures	•	2
• Legal framework and law enforcement	• National and international legislation relating to the conservation of the species	2
<b>Control of harvest</b>		
• % of harvest in state PA	• What percentage of the legal national harvest occurs in State-controlled Protected Areas?	1
• % of harvest in areas of strong tenure	• What percentage of the legal national harvest occurs in areas with strong local control over resource use? e.g.: a local community or a private landowner is responsible for managing and regulating the harvest	1
• % of harvest in open access areas	• What percentage of the legal national harvest occurs in areas where there is no strong local control, giving de facto or actual open access?	1
• Confidence in harvest management	• Do budgetary and other factors allow effective implementation of management plan(s) and harvest controls?	1
<b>Monitoring of harvest</b>		
• Monitoring method	• What is the principal method used to monitor the effects of the harvest? Direct population estimates; quantitative indices; qualitative indices; national monitoring of exports	1, 2
	1.2 [...] Collection and management practices are based on adequate identification, inventory, assessment, and monitoring of the target species and collection impacts.	4
	1.2.2 Management strategies are defined and implemented to reduce identified threats to species considered "vulnerable" according to the IUCN Red List.	4
	1.2.3 [...] Species targeted for collection and their geographic sources are accurately and adequately identified with voucher specimens from the collection site.	4
	1.2.5 Internal collection instructions define collection methods for each target [...] species / part of plant based on appropriate sources of information and knowledge of biological characteristics of the species.	4
	1.3 The rate (intensity and frequency) of [...] collection does not exceed the target species' ability to regenerate over the long term.	4
	1.3.1 Baseline information is available on target species' population size, distribution, and structure (age classes) in the collection area.	4
	1.3.2 Maximum allowed collection quantities are defined in the internal collection instructions for each species / part of plant and for each collection area.	4
	1.3.3 Collection quantities are defined using reliable and practical measurements (e.g., volume, weight, timber).	4

Factors to be assessed	Explanation	Ref
	1.3.4 When appropriate and adequate knowledge / information is not available, a data collection programme is undertaken and any ongoing collection takes a precautionary approach (collected quantities below potential production).	4
	1.3.5 The proportion of mature, reproducing individuals to retain in the target populations for collection is determined to maintain a baseline population density and a baseline structural and genetic diversity.	4
	1.3.6 Minimum and maximum age / size class allowed for collection is defined for the target species and collection site in the internal collection instructions.	4
	1.3.7 The age / size-classes are defined using reliable and practical characters (e.g., plant diameter / DBH, height, fruiting and flowering, local collectors' knowledge).	4
	1.3.8 Maximum allowed frequency of collection of the target species, defined in the collection instructions, does not exceed the rate of replacement of adult individuals or plant part collected in the collection region.	4
	1.3.9 Periods allowed for collection are determined using reliable and practical indicators (e.g., seasonality, precipitation cycles, flowering and fruiting times) and are based on information about the reproductive cycles of target [...] species.	4
	1.3.10 Consolidated data on collected quantities are available (species/year) and confirm compliance with collection instructions.	4
	1.3.11 Collection quantities, periods and frequency of collection are recorded and confirm compliance with collection instructions.	4
	5.2 Management of [...] wild collection is supported by adequate and practical resource inventory, assessment, and monitoring of collection impacts.	4
	5.2.1 Assessment and regular monitoring of the target [...] resources and habitats, and of social / cultural and economic issues related to [...] collection are performed, documented, and incorporated into the management plan.	4
	5.2.2 Collection instructions specify observations required to monitor collection impacts.	4
	5.2.3 Periodic regeneration surveys are conducted within the management area using repeatable, comparable survey methods.	4
	5.2.4 Population size, distribution, and structure (age/size-class distribution) as recorded in the regeneration survey remain equal to or above baseline values and reflect a healthy population.	4
	5.2.5 Periodic monitoring within the management area confirms that availability, viability and quality of the target resource / part of plant remain stable or increase.	4
• Confidence in monitoring	• Do budgetary and other factors allow effective harvest monitoring? Evaluation of data quantity and quality	1, 2
<b>Incentives and benefits from harvest</b>		
• Effect of harvest compared with other threats	• What is the effect of the harvest when taken together with the major threat that has been identified for this species?	1
• Species conservation incentive from harvesting/trade	• At the national level, how much conservation benefit to this species accrues from harvesting?	1
• Habitat conservation incentive from harvesting / trade	• At the national level, how much habitat conservation benefit is derived from harvesting?	1
• Other conservation benefits	•	3
• Local and other benefits	•	3
<b>Protection from harvest</b>		



An aerial photograph of a coastal city, likely Dubai, showing a long, narrow strip of land with a white sandy beach and turquoise water. The city is densely packed with modern buildings, including several tall skyscrapers. The water transitions from shallow turquoise near the shore to deep blue further out. The sky is filled with large, white clouds.

NDF...?

... No Data Found

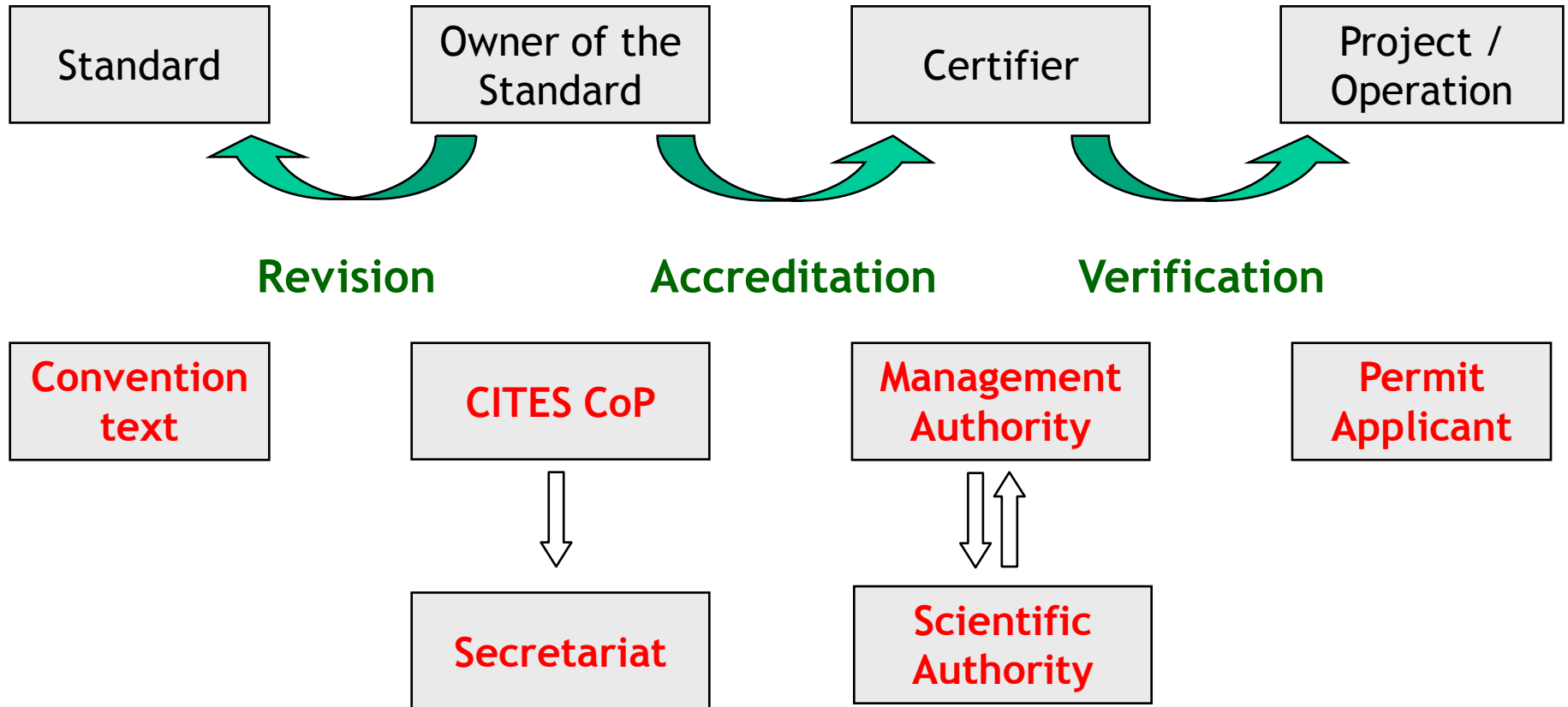
An aerial photograph of a coastal city, likely Miami Beach, Florida. The image shows a long, narrow strip of land with a wide, sandy beach and turquoise water. The city is built along the coast, with numerous high-rise buildings and hotels. The sky is blue with some clouds. The text "NDF...?" is overlaid in yellow on the left side of the image.

NDF...?

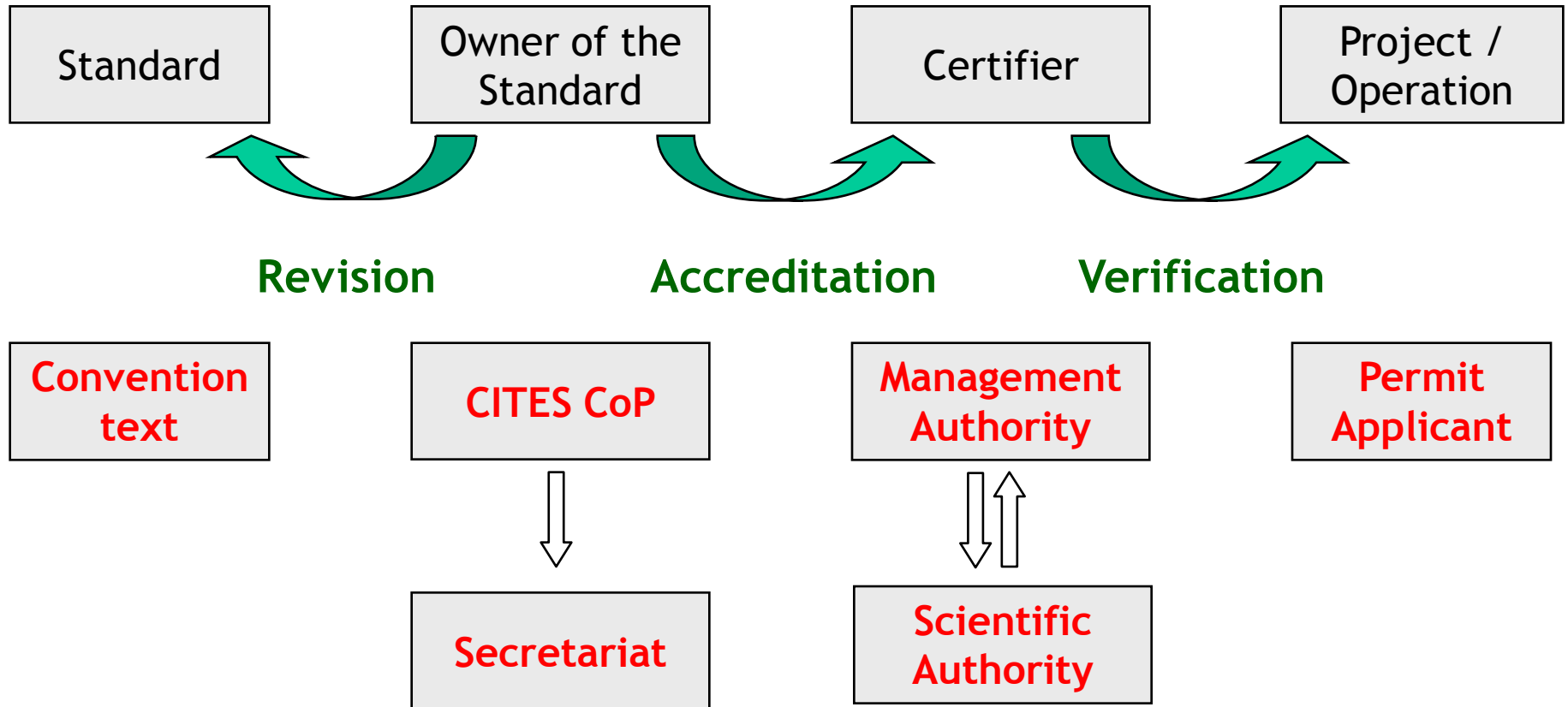
... Naturally Data Free



# CITES is a Certification Tool



# CITES is a Certification Tool



# Key topic: **Resource assessment methods**

What kind of **field studies** can be considered appropriate by a SA in NDF Making?.

- IUCN checklist does not give overview of reliable resource assessment methodologies.
- The International Standard for the Sustainable Wild Collection of Medicinal and Aromatic Plants, **ISSC-MAP**, provides guidance to this effect.



WestLB

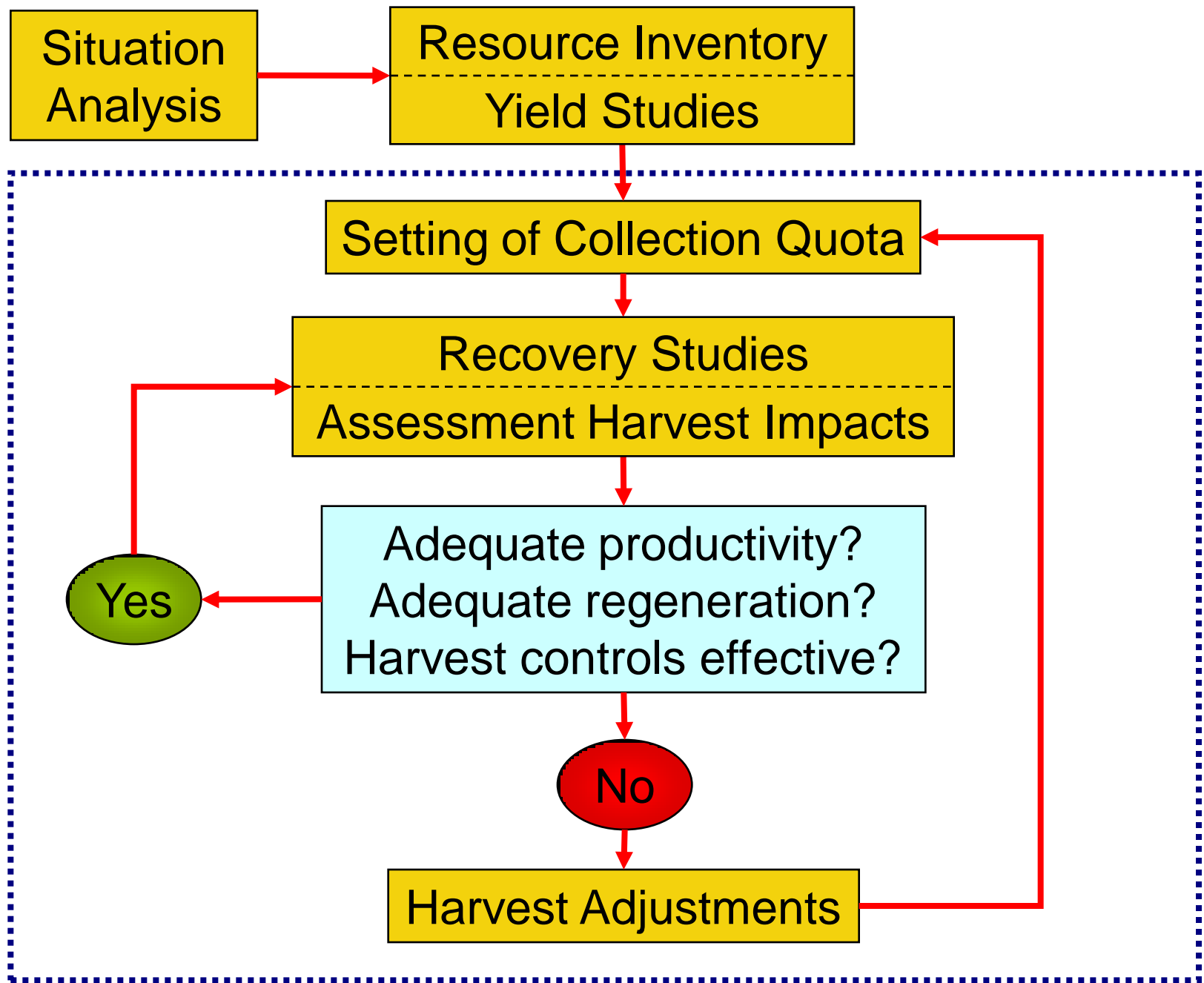
New Answers in Banking



The WestLB principle:

First we take measurements, then  
we take measures.

Process of assessing, monitoring and adjusting the annual sustained yield



Periodic Monitoring = Adaptive Management

# Devil's claw in Namibia: Yield studies



# Key topics

- Resource assessment methods
- Appropriate precision
- Annual quotas
- Definition of „detrimental“
- Adaptive management

# Key topic: **Appropriate precision**

Some species are more resilient or vulnerable than others.

- Biological factors for perennial plant species which constitute their resilience or susceptibility need to be identified.
- Management requirements set by the NDF need to be tailored to **appropriate precision**.
- Variables: Adjust sampling intensity of inventories or yield studies; Frequency of harvest impact controls



# Key topic: **Annual quotas**

Permit-by-permit NDF have only limited value.

- Need for broad-scale assessments that include information on populations, management and sustainable yields.
- Extrapolation of field data on sustainable yields for a regional collection operation to a national scale through modelling and other methods
- Which methods can be used / are helpful?

# Key topic: **Adaptive management**

- The implementation of an **adaptive management** scheme based on regular monitoring is essential to a management plan.
- The essential elements for adaptive management need to be identified to assist in the NDF process.

# Key topic: **Definition of „detrimental“**

- An accepted **definition** needs to be developed on what the threshold of “**detrimental**” is.
- What level of impact is tolerable / acceptable?  
What is considered damage

# Terminology: Descriptive vs. Normative

**Descriptive** Language of Science

Impact, Change

Neutral denomination

Negative impact =  
Impairment

Qualitative normative  
evaluation

Significant impairment  
= Detriment, Damage

Quantitative  
evaluation

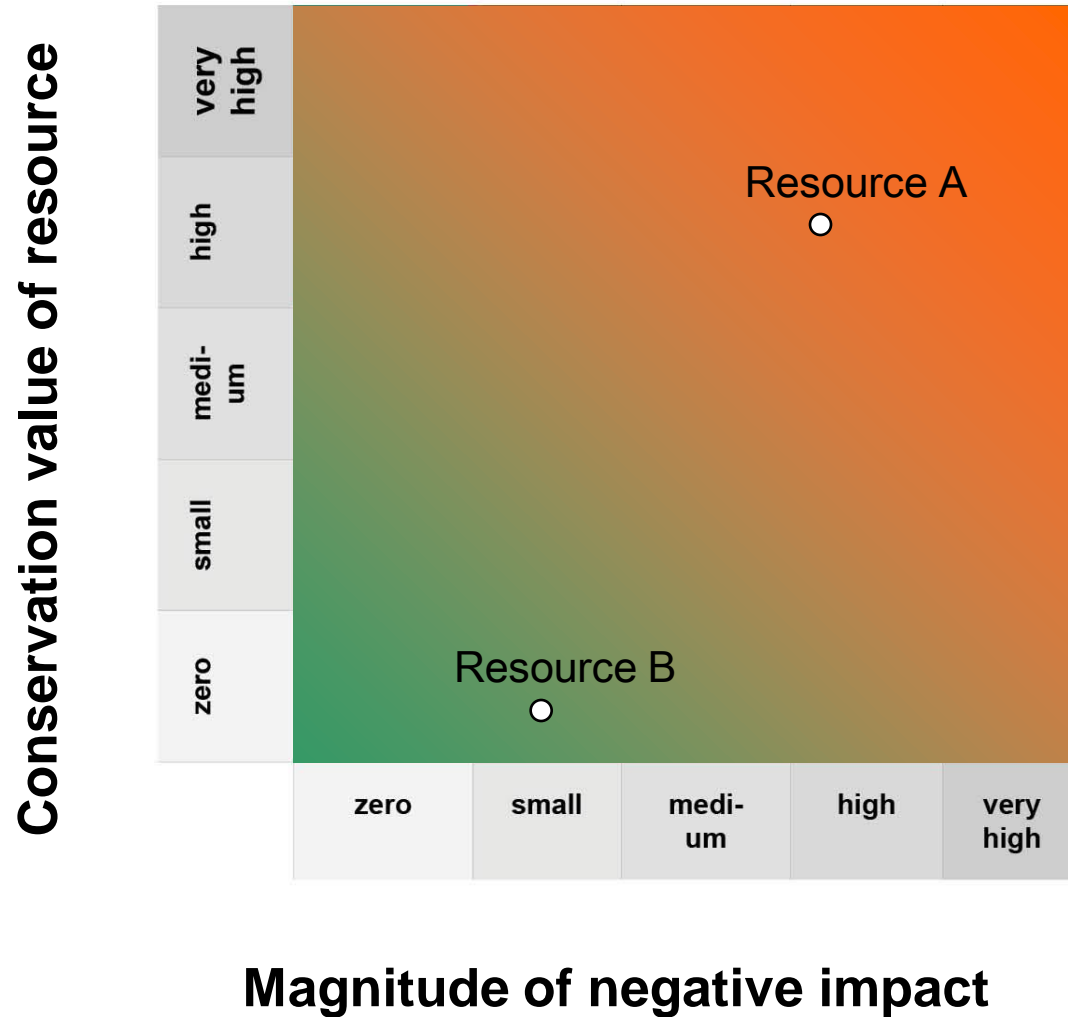
**Normative** Language of Evaluation



# Evaluation matrix

## Criteria:

- Rarity & Threat
- Legal protection
- Naturalness / Disturbance
- [...]



# Evaluation matrix

The matrix is a 5x5 grid. The vertical axis is labeled 'Value of affected conservation resources' and has categories: very high, high, medium, small, zero. The horizontal axis is labeled 'Intensity of adverse effects' and has categories: zero, small, medium, high, very high. A red line starts at the top-left corner of the 'small' row and 'small' column, moving right to the 'medium' column, then down to the 'small' row, then right to the 'high' column, and finally down to the 'zero' row. The area to the left and below this line is green and contains 'D<sub>0</sub>'. The area to the right and above this line is orange and contains 'D<sub>1</sub>' through 'D<sub>4</sub>'.

	zero	small	medium	high	very high
very high	D <sub>0</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>4</sub>
high	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>
medium	D <sub>0</sub>	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>
small	D <sub>0</sub>	D <sub>0</sub>	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>
zero	D <sub>0</sub>	D <sub>0</sub>	D <sub>0</sub>	D <sub>0</sub>	D <sub>0</sub>

The matrix indicates the significance of adverse effects: Beyond the red line four different grades of damages  $D_1$  to  $D_4$  can be distinguished.

# Resource Assessment Questions

Questions to be answered through a sound resource assessment in the collection area:

- How **many** are there?

**Inventory**

- How **old** are they?

**Demography**

- How **much** do they produce?

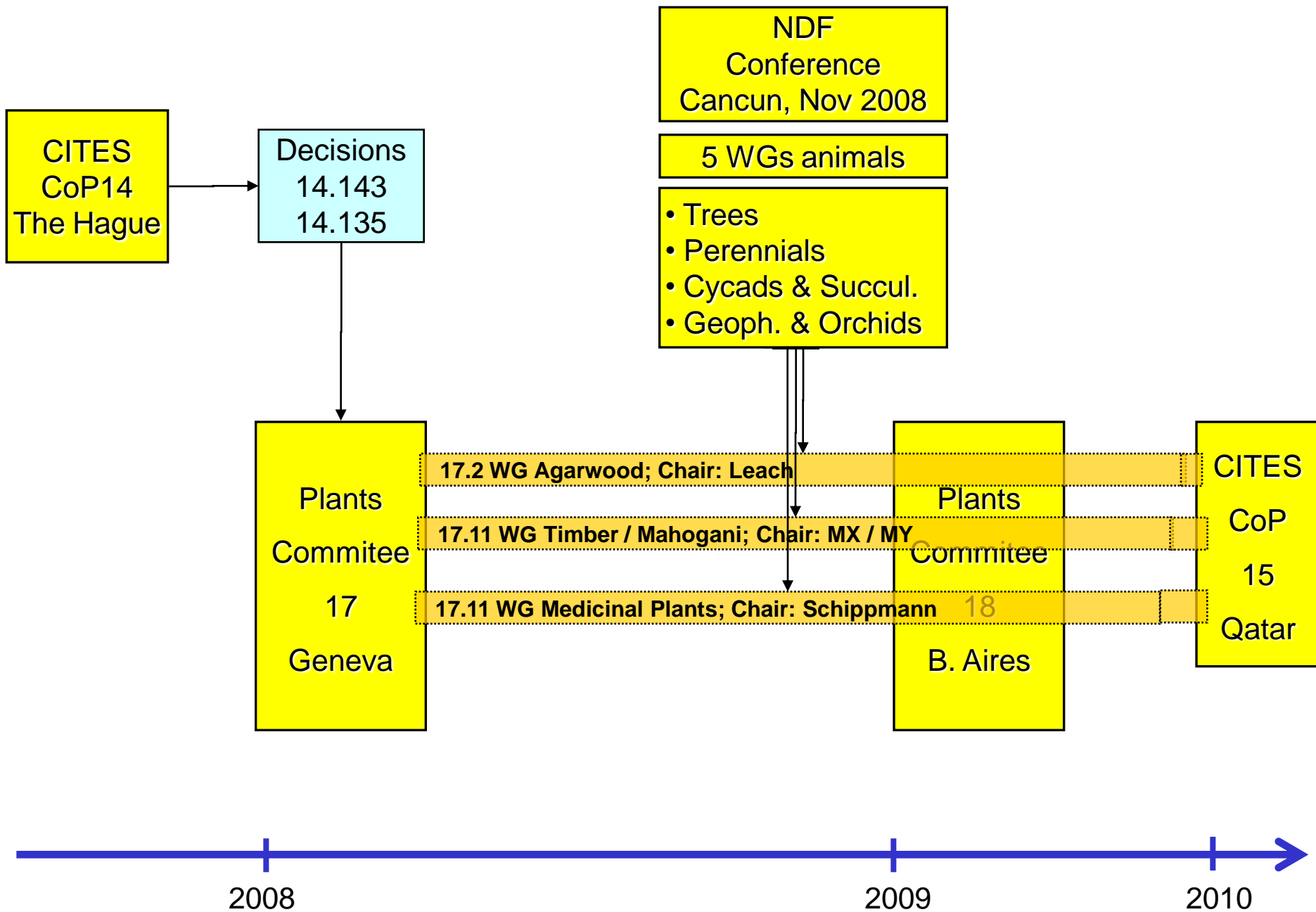
**Yield**

- How **quickly** do they regenerate?

**Recovery**

- How **many** do they reproduce?

# Development of Principles & Criteria for Non-Detriment Findings





# Susceptibility to overcollection as a function of *Life Form* and *Plant Parts Used*

	wood	bark	root	leave	flower	fruit/ seed
annual	---	---	high	medium	medium	high
biannual	---	---	high	medium	medium	high
perennial	---	medium	high	low	low	low
shrub	medium	medium -high	medium -high	low	low	low
tree	medium	medium -high	medium -high	low	low	low

Caoba? Caoba? Wasn't he  
just elected president?

Is there an elephant in  
the room or is this hotel  
shrinking?

NDF? I thought it stood  
for "never did finish".

I don't care to belong to  
any working group that  
accepts people like me as  
members.

Hasta la NDF, Baby

... may the NDF  
be with you!

NDF is better  
than none

From the moment I  
picked up your case study  
until I laid it down I was  
convulsed with laughter.  
Someday I intend reading  
it.

Swap Geneva for Cancun?  
Now that is a significant  
trade.

Get that shark out of my  
ranch before it eats all  
the monkey-puzzles.

I have had a perfectly  
wonderful workshop, but  
this wasn't it.

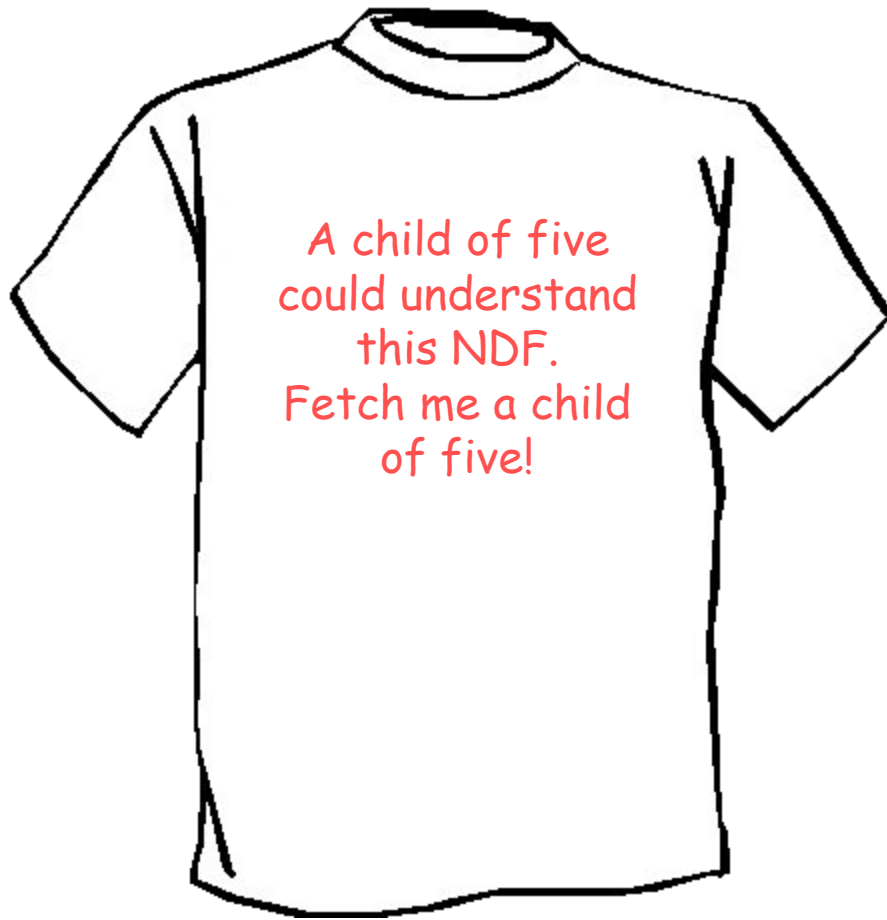
I came to Mexico for  
NDF advice and all I got  
was a lousy T-Shirt!

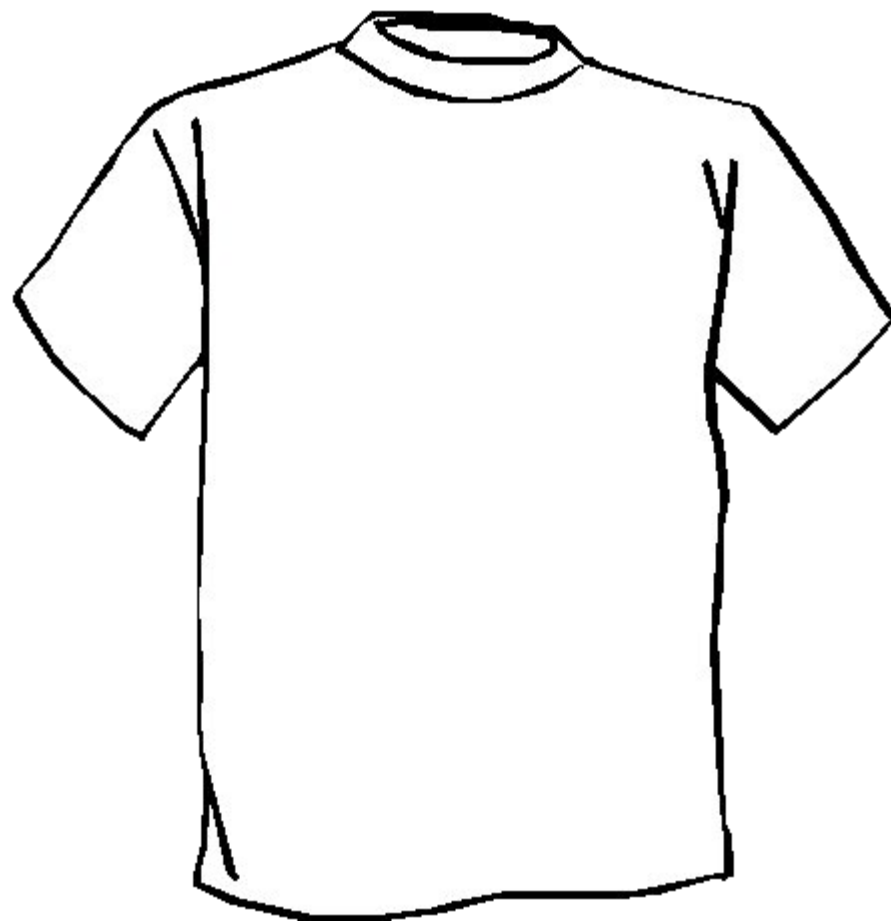
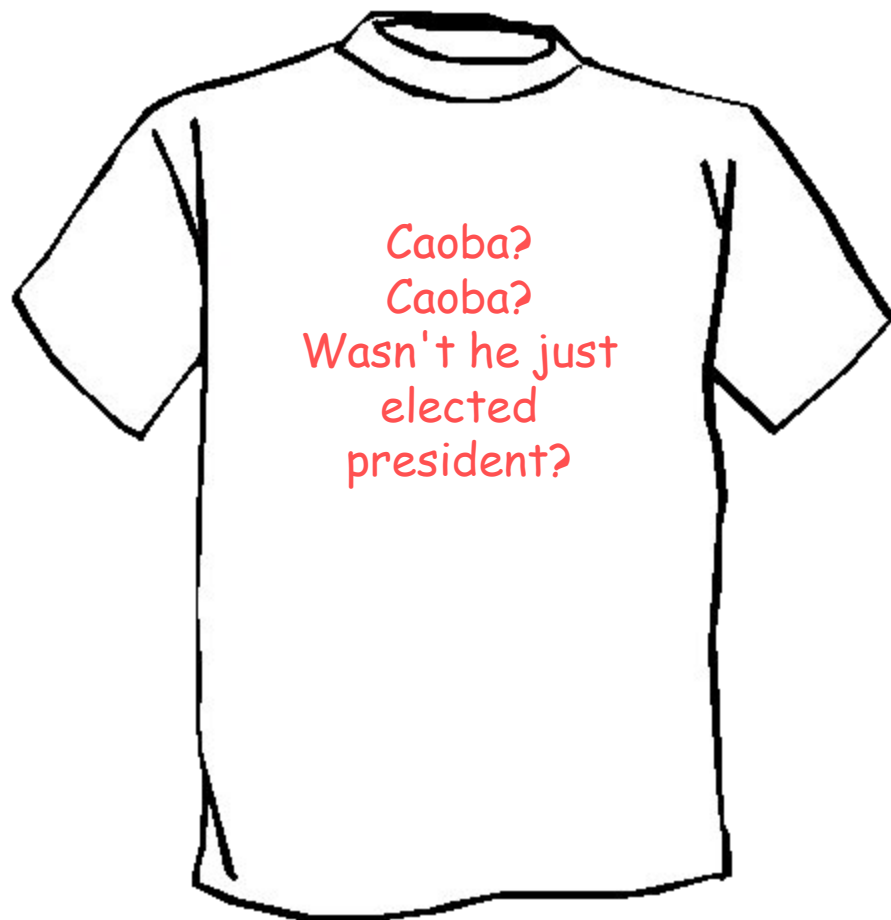
NDF  
Naturally  
Data Free

NDF  
Never Did  
Findout!

NDF  
No Data  
Found

NDF  
No Data!  
F...!





Caoba? Caoba? Wasn't he just elected president?

Is there an elephant in the room or is this hotel shrinking?

Swap Geneva for Cancun? Now that is a significant trade.

NDF? I thought it stood for "never did finish".

Get that shark out of my ranch before it eats all the monkey-puzzles.

A child of five could understand this NDF. Fetch me a child of five.

I have had a perfectly wonderful workshop, but this wasn't it.

I don't care to belong to any working group that accepts people like me as members.

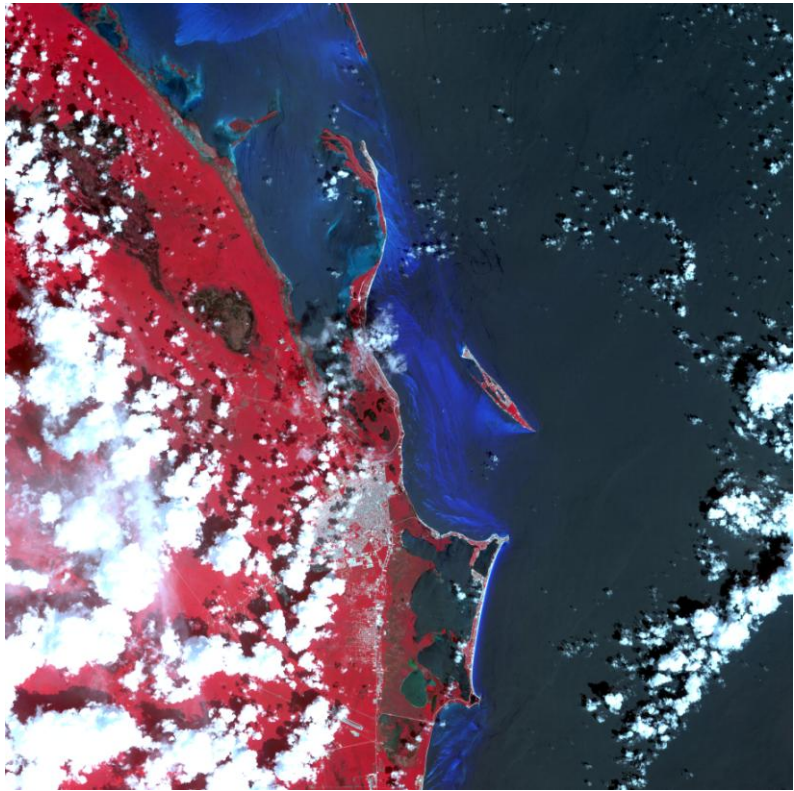
From the moment I picked up your case study until I laid it down I was convulsed with laughter. Someday I intend reading it.

Hasta la NDF, Baby (Colman)

I came to Mexico for NDF advice and all I got was a lousy T-Shirt! (Matt)

... may the NDF be with you! (Noel)

NDF is better than none



## **The Unknown**

As we know,  
There are known knowns.  
There are things we know we know.  
We also know  
There are known unknowns.  
That is to say  
We know there are some things  
We do not know.  
But there are also unknown unknowns,  
The ones we don't know  
We don't know.

Secretary of Defense Donald Rumsfeld

*Feb. 12, 2002, Department of Defense news briefing*

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**International Expert Workshop on CITES Non-Detriment Findings**  
**Cancun, Mexico, November 17th to 22nd, 2008**

Initial point



Process

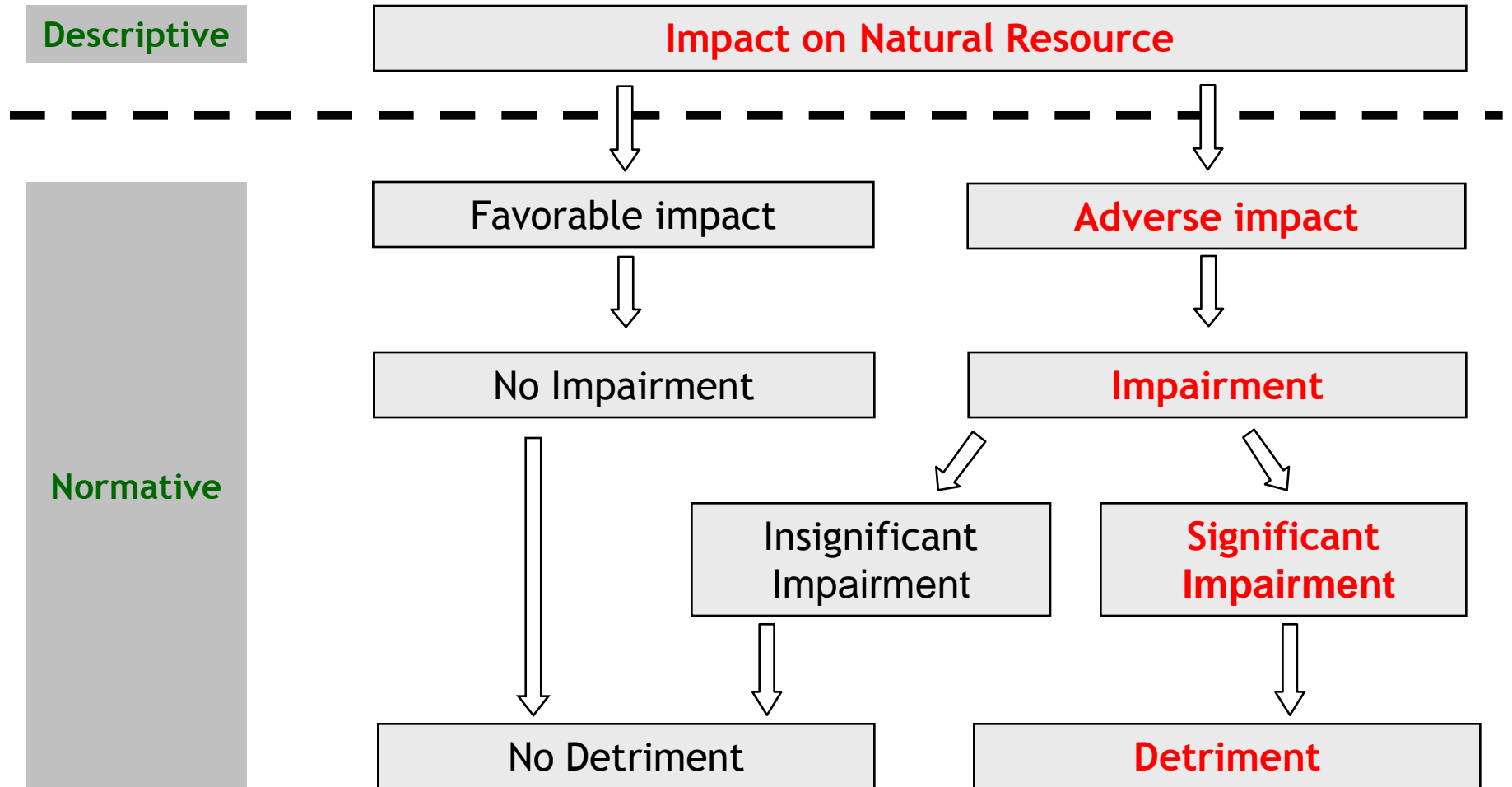


Effect



**Damage concept focuses on impact on resource**

# Defining detriment: Descriptive vs. Normative



# Evaluation matrix

The diagram shows a 5x5 grid. The vertical axis is labeled 'Value of affected conservation resources' with an upward-pointing arrow. The horizontal axis is labeled 'Intensity of adverse effects' with a rightward-pointing arrow. The grid is divided into five rows and five columns. The rows are labeled 'zero', 'small', 'medium', 'high', and 'very high' from bottom to top. The columns are labeled 'zero', 'small', 'medium', 'high', and 'very high' from left to right. A red diagonal line runs from the bottom-left corner (zero resources, zero effects) to the top-right corner (very high resources, very high effects). The area above and to the right of this line is shaded light gray, while the area below and to the left is white.

	zero	small	medium	high	very high
very high					
high					
medium					
small					
zero					

The matrix indicates the significance of adverse effects: Beyond the red line four different grades of damages  $D_1$  to  $D_4$  can be distinguished.

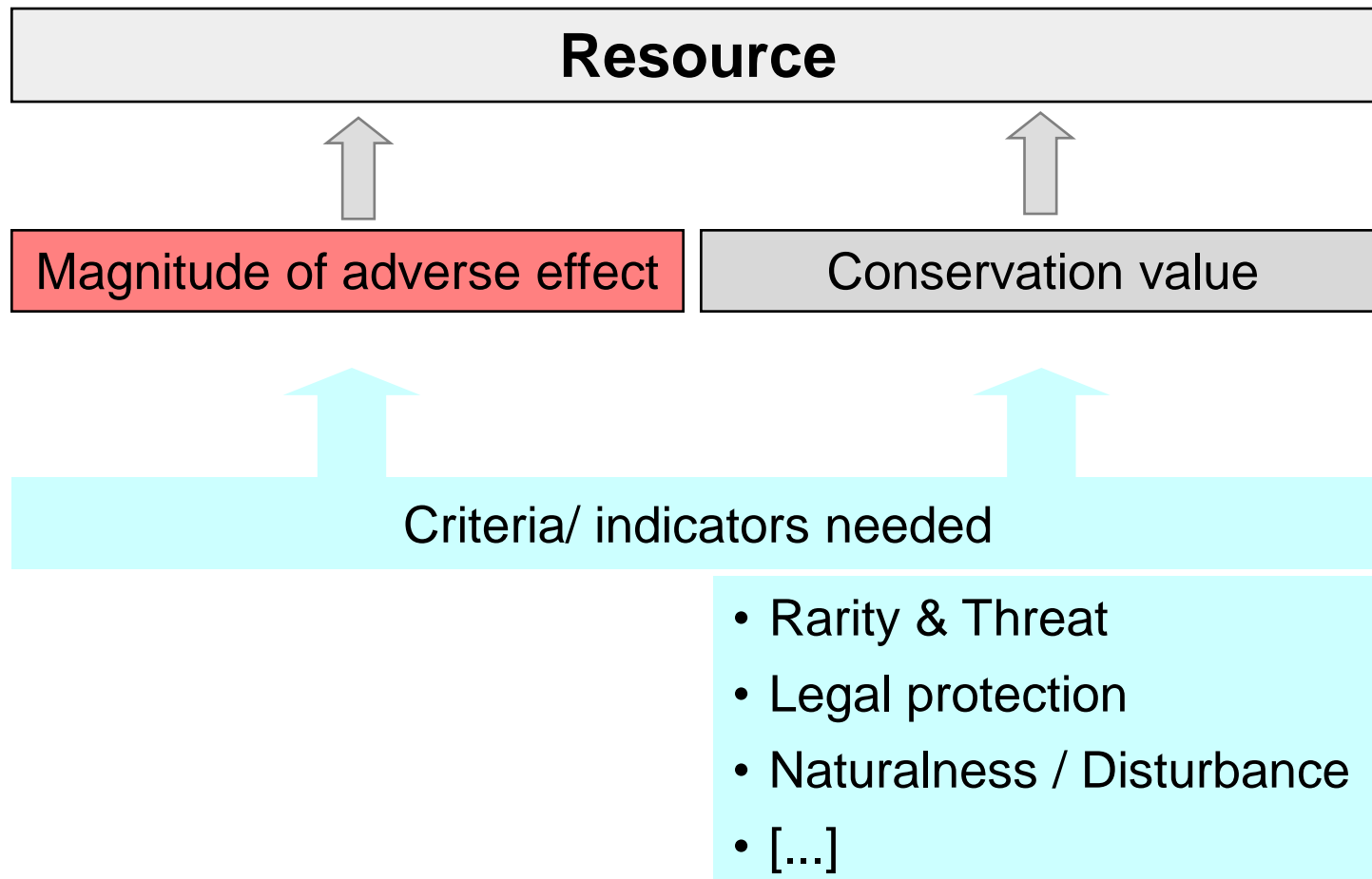
# A definition of ecological damage

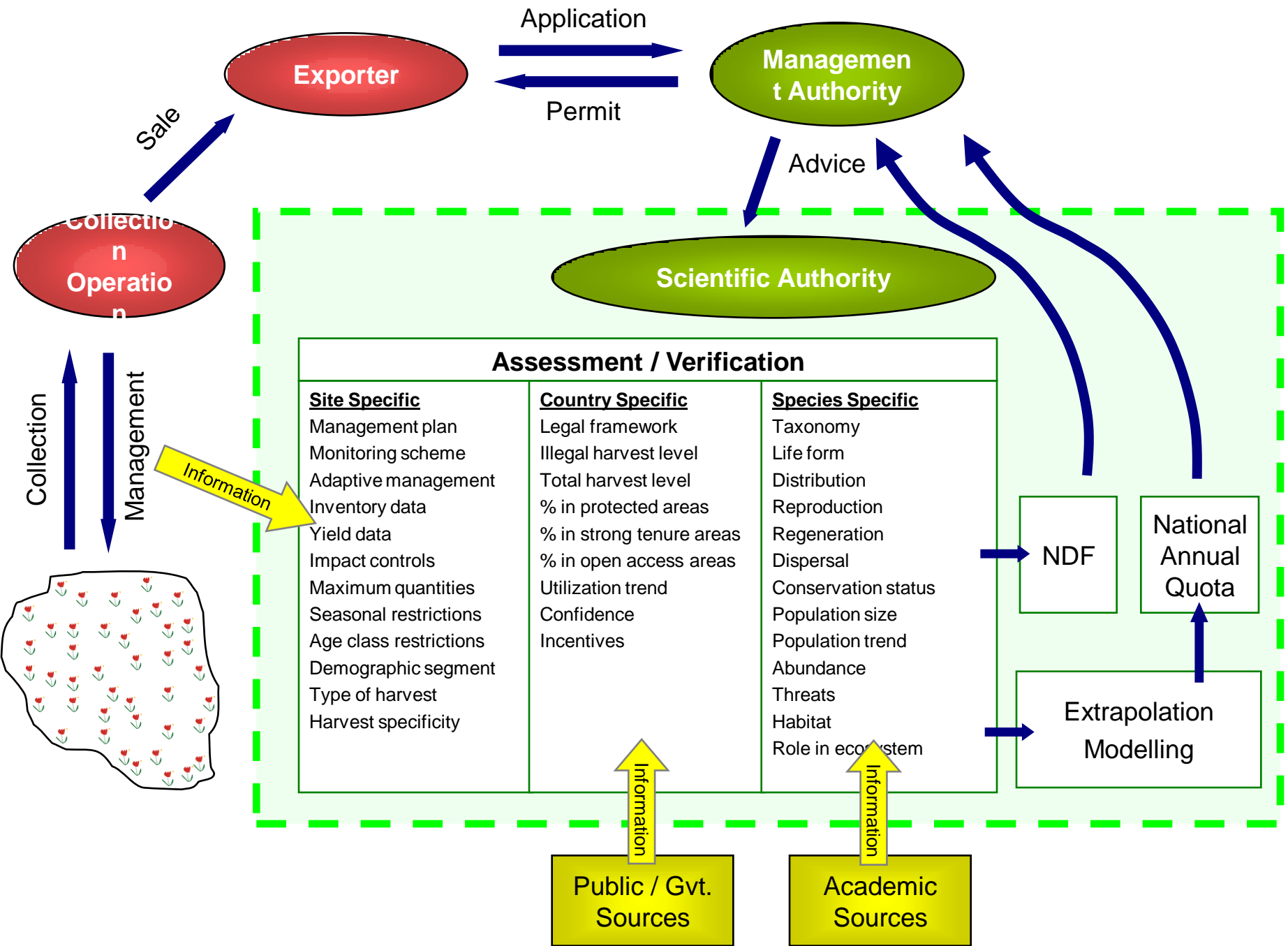
An **ecological damage** is a **significant impairment** of a **biotic resource** (animals, plants, fungi, microorganisms) or an **abiotic resource** (soil, water, air/climate), inter alia

- concerning its constituents or its entirety,
- concerning its ecological functions, or
- concerning the sustainable use of the conservation resources and its functions.

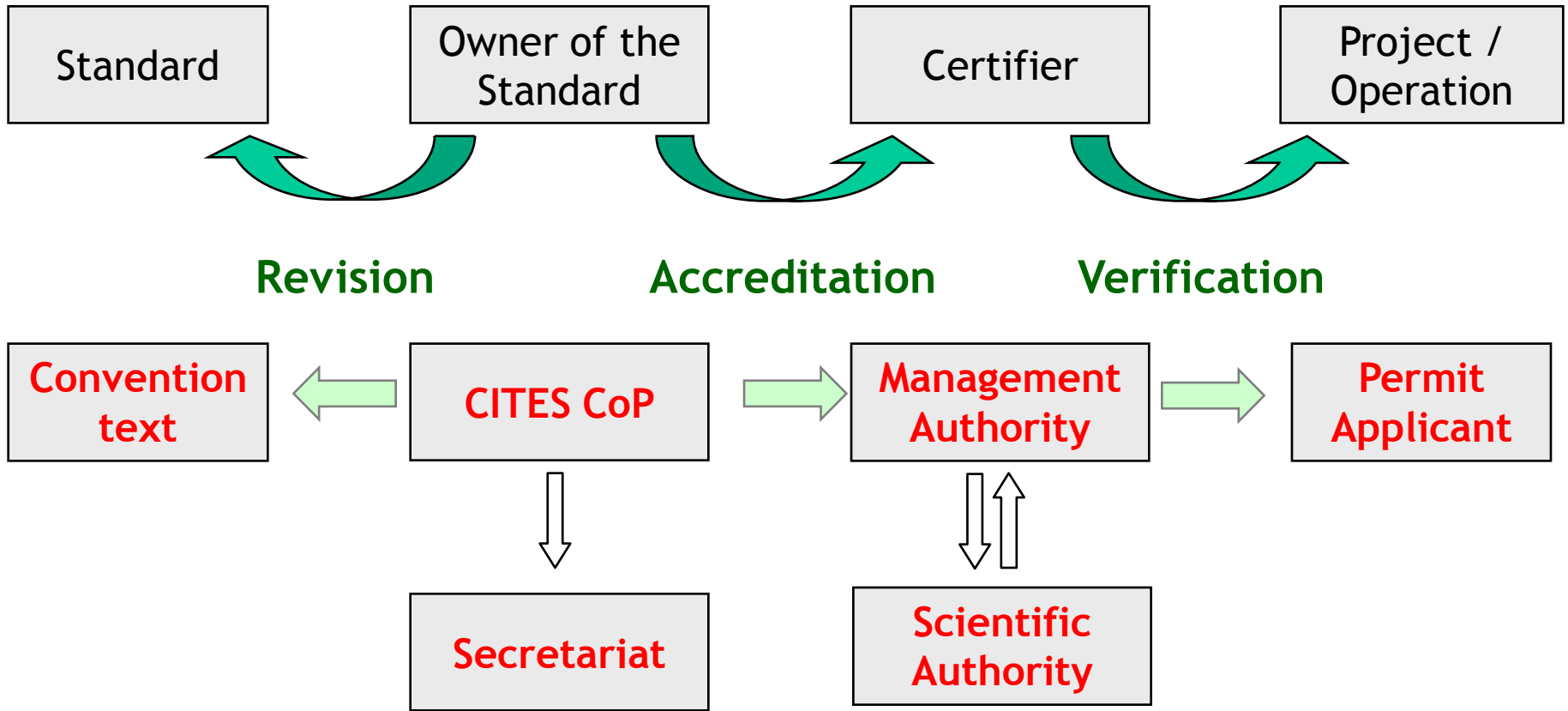
# How to determine the significance of an adverse effect?

Two components of evaluation:



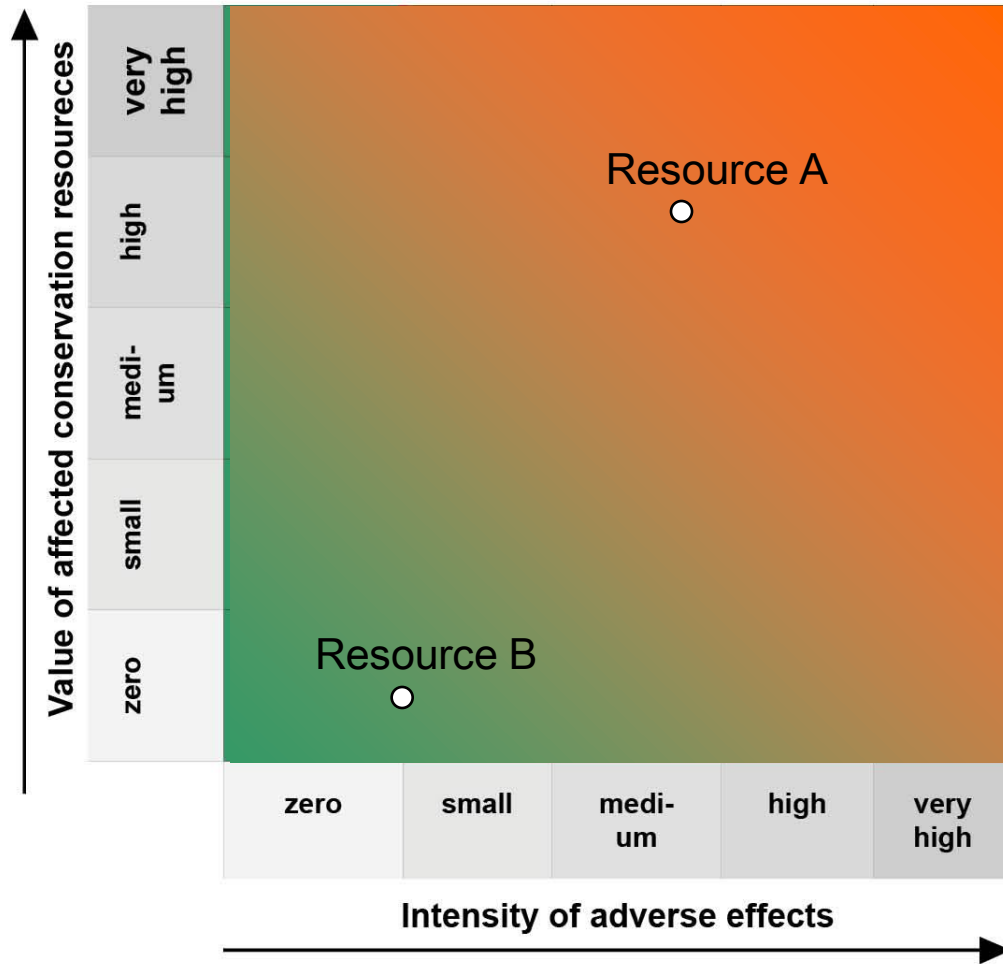


# CITES is a Certification Tool





# Evaluation matrix



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