

UNIVERSITY OF PRIMORSKA
Faculty of Mathematics, Natural Sciences and Information
Technologies

HUMAN DIMENSION OF CONSERVATION

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OTHER STUDY TEXTBOOK

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TABLE OF CONTENT

Human Dimensions of Conservation	1
Human dimensions –captivity and its implications for conservation	15
Introduction to Human Dimensions of Conservation	25
Human behaviour	52
Triage	74
Decision support tools	92
Human Dimensions	111
Questionnaires (or structured interview)	141
Euro Turtles example	165
How much is an Ecosystem worth?	178
Valuation techniques	213
Conservation Marketing & Changing Behaviour	237
The International Whaling Commission	253
Protected Areas	263
Paper parks	299
Protected area downgrading, downsizing and degazettement (PADDD)	320
The policy process	331
Biodiversity policy	354
European Union Directives	374
Farming and Natura 2000 sites	407

Human Dimensions of Conservation

Peter Mackelworth

Why?

- Why did you become a biologist?
 - Love of nature?
 - Desire to understand and protect nature?
 - Working outdoors away from the urban society?
 - To work with physical and biological resources?
 - To work with people?
- For the \$\$\$ MONEY?

What is your background and interest?

- Urban
- Biologist
- Terrestrial
- Species
- Protected species
- Rural
- Other
- Marine
- Habitats
- Protected Areas

Natural resource managers

- Main task of managers is to identify, engage in and resolve **social value conflicts**
- Identify and accommodate **social values**
- Who has the skills to manage people?
 - Biologist
 - Social worker
 - Lawyer
 - Sociologist
 - Psychiatrist?

The Challenge

*'One of the anomalies of **modern ecology** is the creation of two groups, each of which seems barely aware of the existence of the other.*

The Challenge

*The one studies the human community, almost as if it were a **separate entity**, and calls its findings sociology, economics and history.*

The Challenge

*The other studies the plant and animal community and comfortably relegates the **hodgepodge of politics** to the liberal arts.*

The Challenge

*The **inevitable fusion** of these two lines of thought will, perhaps, constitute the outstanding advance of this century.'*

Aldo Leopold 1935

Why?

1. Why is the Human Dimension (HD) important?
2. Why would we want to incorporate human behaviour patterns into conservation?
3. Why would we be interested in human values?

Why?

- Humans are an integral part of the ecological system...
- There is invariably a legal obligation to do so...
- Failure to consider HD results in failed management...



Human Dimensions of Conservation

Definition :

'The term human dimensions refers to how and why humans value natural resources, how humans want resources managed, and how humans affect or are affected by natural resources management decisions.

Human dimensions inquiries strive to understand human traits and how to incorporate that understanding into management planning and actions. It covers a variety of ideas and practices including cultural, social, and economic values; individual and social behavior; demographics; legal and institutional frameworks of management; communication and education; and, decision-making processes of management.'

Decker *et al.*, 2001

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Human Dimensions of Conservation

1. How and why humans value nature
2. How humans affect nature
3. How humans want nature managed

1. How and why humans value nature

- Individual behaviour towards wildlife and nature is dictated by **beliefs** and **affective responses**
- **Beliefs** are information we hold **as true**
- **Affective responses** refers to **'feelings' or 'emotions'**, both positive and negative that we experience
- Beliefs and affects are key components of:
 - Attitudes
 - Norms
 - Values

2. How humans affect nature?

Human Behaviour includes all forms of **passive and active human behaviour** or human activities. The following are four broad categories relate to human behaviour towards natural environments:

1. Recreation, tourism & leisure
2. Urbanisation
3. Commerce, transportation and industry
4. Stewardship and public involvement

3. How humans want nature managed

Management of wildlife and protected areas:

- **Maintenance** of game populations
- **Sustainable use** of natural resources
- Preservation of **biological diversity**
- Preservation of **traditional lifestyles**

Student Exercise

Tilikum the killer whale



Tilikum the killer whale

- On February 24, 2010 Tilikum **killed** Dawn Brancheau, a **trainer at SeaWorld**
- Tilikum **pulled the trainer** into the water
- Brancheau's autopsy indicated **death by drowning and blunt force trauma**.



Captivity debate?

- What would **you** do with Tilikum?
- **Why?**
- How does your **background, education** and **values** influence your decision?
- You have **three options...**



Decision?

- Freedom
- Continued captivity
- Euthanize

Ah, i forgot to say...

- Tilikum is a **serial killer**...
- On February 21, 1991 a **trainer was drowned** by Tilikum and two other Orcas.
- On July 6, 1999, a **27-year-old man, was found dead** draped over Tilikum's back

Decision?

- Freedom
- Continued captivity
- Euthanize

Student exercise

- Split into 3 groups – you have 10 minutes:
 - Freedom
 - Continued captivity
 - Euthanize
- 2 minute presentation
 - Highlight **only the positives of your case**
 - And, the **negatives of the others**
 - You need to **sell your opinion** to the class

Decision?

- Freedom
- Continued captivity
- Euthanize

Decision?

You could have considered:

- Freedom
 - Cost, effort, legal obligation
- Continued captivity
 - Threat to trainers, public, other Orca
- Euthanize
 - Public image, threat to business

What did you consider?

Conclusion

- **Your values** have an **affect on your decisions and actions** as a professional;
 - Often there are **shared values between conservation** professionals that make their **decisions predictable**;
 - Stakeholders from other backgrounds will have **different value systems** that define their decisions;
 - **Understand their value systems** and their decisions will be more predicable;
 - You will be able to **plan and mitigate decisions and actions** to recognise this and reduce conflict.
-
- By the way, **Tilikum returned to performing at SeaWorld Orlando on 30 March 2011**, just 1 year and 1 month after the Dawn Brancheau incident.
 - Tilikum **died in captivity on 6th January 2017** – born (c. December 1981. He was captured in Iceland in 1983. In total he was 34 years in captivity.

Human dimensions – captivity and its implications for conservation

Peter Mackelworth

Captivity



Current state

- The Born Free Foundation:
- in 2012, more than 2,100 dolphins and whales are being held in captivity
- There are 343 facilities globally;
- 63 countries, but concentrated in:
 - Japan, China, the US and Mexico.



Current state

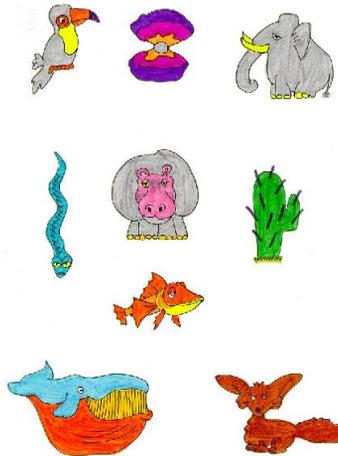
- In North America, many of these parks have become the **subject of wildlife campaigns**.
 - Vancouver Aquarium is currently under **intense pressure** to phase out its keeping of whales and dolphins
 - <https://www.theguardian.com/environment/2018/jan/20/vancouver-aquarium-wont-keep-whales-or-dolphins-captive-after-public-outcry>
 - **lawmakers in New York, Texas and Florida** are also considering bans on captive killer whales and other cetaceans.



History

- 1860: 2 Beluga in US - PT Barnum circus
 - Died within days of being placed in fresh water tank
- 1913: 5 Bottlenose dolphins – NY Museum
 - The last died after 21 months in captivity
- 1938: Bottlenose dolphins in Florida
 - Cecil M Walker started to train
- 1956: Amazon river dolphin in Texas
- 1961: Killer whale in California
- 1966: First dolphin exported to Europe
- End of 1960's 286 bottlenose dolphins in US

Convention on International Trade of Endangered Species (1980)



CITES, 175 parties to the agreement

3 categories:

- Appendix I: Endangered species –commercial trade prohibited – Import & Export permit required
- Appendix II: Commercial trade regulated – Import Only
- Appendix III: Trade of protected species regulated by individual states



Cetaceans are protected under
Appendix I and II

CITES rules regarding the maintenance of marine mammals in captivity

- Consent for display of marine mammals in captivity is only for:
 - Education
 - Research
 - Reproduction



Meet Our Dolphins Face-to-Face

Pricing
\$160 Per Adult or Youth
\$240 Adult + 1 Child*

Book Today
Booking office hours:
Monday to Friday, 9:30 a.m.
to 4:30 p.m.
001-688-9555
1-800-931-1186
programs@vanaqua.org

Highlights
Go behind the scenes into the dolphin habitat and marine mammal kitchen to make a fishy snack, and get hands-on by feeding and interacting with the dolphins.

Duration: 90 minutes
All prices include GST

Animal Prices

- untrained bottlenose dolphin \$ 20,000
- trained bottlenose dolphin \$ 40,000
- trained dolphins for 'swim with programme' \$ 100,000

Animal Prices

- untrained killer whale \$ 150,000
- trained killer whale \$ 275,000
- reproductive killer whale \$ 1,000,000

Acclimatisation & Transportation

- Introduced to human contact
- A minimum of 30 days acclimatisation with space restrictions and consumption of dead fish
- Sensory deprivation

Bottlenose dolphins (*Tursiops truncatus*)

In nature:

- Live in Groups
- Live up to 50 years
- Range tens of km per day
- Aerial socialisation – 7% of overall activities

In captivity:

- Usually maximum of 5 together
- Maximum of 30 years
- 400m² minimum pool size
- Aerial socialisation is the primary attraction

CITES requisites for captive killer whales

- Life Span – up to 80 years
- Size – males 8-10m
- Dive between 60 – 80 metres
- Travel up to 160 km daily
- Social animals - 10-15 animals in a pod
- Different dialects for each pod
- Two orcas:
 - 3.7m deep & 14.6m long (USA)
 - Since 1961 – 134 captured
 - 80% mortality
 - Length of survival in captivity - av. < 6yrs
 - Average age < 30 yrs
 - April 2001 – 49 orcas (26 wild, 23 captive born)
 - Birth in captivity – 38% survival rate

Sea World – Anheuser Busch

- Sea World: 22 orcas (44% of the tot. captive)
- Around 10 million people visit Sea World parks annually.
- One day ticket to Sea World costs 42 \$
- 70% of its income derives from visitors attracted by the orca shows.

Sea World – New Ideas

- Petting Pools
 - comprise a group of dolphins competing to be fed small dead fish by tourists
- Swimming With Dolphins
 - disease transmission between dolphin and human, plus the danger of potential aggressive behaviour
- Dolphin Assisted Therapy
 - touching and feeding to swimming with dolphins are increasing in range and popularity

Conclusion

- How do the visitors to these parks view cetaceans?
- How does this affect their attitudes and beliefs?
- How have attitudes changed?
- What is the role of CITES, is it effective?

Why is this important for conservation?

- Associate captive behaviour with natural behaviour shown in the wild
- Transmission of disease
- Anthropomorphism of the wild animal
- Decline of respect for the animals on display



New vote

1. Freedom
2. Continued captivity
3. Euthanize

Conclusion

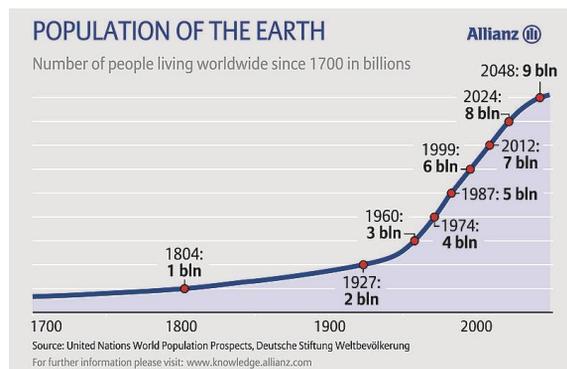
- How do you view the topic now?
- Have you changed your attitude?
- Have I manipulated you?

Introduction to Human Dimensions of Conservation

Peter Mackelworth

Why?

- Why is the Human Dimension (HD) important?
- Why would we want to incorporate human behaviour patterns into conservation?
- Why would we be interested in human values?



The publication of this graphic is free of charge provided that users credit Allianz SE. Graphics are available in the media section of the Allianz Knowledge Site. www.knowledge.allianz.com/en/media/graphics

Why?

- Humans are an integral part of the ecological system...
- There is invariably a legal obligation to do so...
- Failure to consider HD results in failed management...



Human Dimensions to Conservation

3 questions

1. How and why humans value nature
2. How humans affect nature
3. How humans want nature managed



As society changes so will public perception of wildlife and its conservation

1. How and why humans value nature

Individual behaviour towards wildlife and nature is dictated by **beliefs** and **affective responses**

- beliefs are **information we hold as true**
 - Night follows day
 - Snow is white
 - Sharks are dangerous?
- certain beliefs are **individual**
- others are **societal**

1. How and why humans value nature

- **Affective responses** refer to 'feelings' or 'emotions', both positive and negative that we experience
 - pleasure or joy
 - pain or sorrow
 - desire or appetite
 - fear or loathing
- for example: the feeling of **pride and satisfaction** when winning, or the **feeling of disappointment** when losing;
- **But**, also affects can **be irrational**
 - such as **phobias** – fear of spiders, fear of flying

1. How and why humans value nature

Beliefs and affective responses are **key components** of:

- **Reactive responses:**
 - Attitudes
 - Norms
- **Values**

Reactive responses

Attitudes

- determine whether people **like or dislike** things, and hence how they behave towards them
- Perceptions and **opinions**
- **Subjective evaluations** of situations or objects (including people, wildlife, nature)
- Attitude may refer to the distinct concept of **mood**

Reactive responses

Norms

- **Customs** and traditions
- Informal **understandings** that govern society's behaviours
- Our understanding about **what others expect us to do**
- norms have two dimensions:
 - how behaviour is **exhibited**; and,
 - how the group **approves** of that behaviour
- If you move to work in another country or social group, it is important to **understand the informal rules** that govern that society or group

Reactive responses

Both attitudes and norms are **immediate causes** of individual behaviour which may vary according to situations:

- The social company
- The location
- The time
 - Example – pub or club vs. home with parents (multiple identities)

Often individuals will display different attitudes and norms according to the group they are **socialising** with at the time

Reactive responses

In a conversation perspective, the **setting** in which you hold a conversation may create **different responses**:

- In a **formal setting**; university, ministry or office **stakeholders may be uncomfortable** and therefore **unlikely to be open** to new ideas
- In an **informal environment**; bar, café or workplace you may get a better response
- Responses may also be influenced by **who is listening** into the conversation.
 - can your **conversation be overheard by others** that may influence the response?
- **Be aware** of your setting and how this may influence the person or group you are working with.

Values

Values

- Predominant **guidelines** for what we think or do, provide the **consistent guides** for our **behaviour**:
- They are **longer term beliefs** shaped particularly in youth
- Form over **many years** and through **experiences**
- There are **values that are more important** in most cultures, including:
 - fairness and justice
 - compassion and charity,
 - **duties** and rights,
 - human survival and well-being.

Values

- Various forms of values
 - Ethical or moral values
 - Doctrinal or ideological
 - Social or aesthetic
- Although values **can change** or be **contingent on various contexts** they tend to be **longer term** than attitudes and norms, and hence **more difficult** to change.
- Values can be **very personal**, but can be changed particularly by influential personal **role models**

Values

- Held Values
 - **Precepts or ideals** held by an individual
 - **Applied to objects** held values are conceptual
- Assigned Values (economic values)
 - **Relative importance** or worth of something
 - Focus on objects and **indicate its worth**
- Held values are the **underlying values** that **assign a relative** value to an object.

Values

- We associate **held values** with:
 - Ideas
 - Behaviours
 - Outcomes
 - Experiences
- and, **assigned values** with:
 - Goods
 - Services
 - Opportunities

An example:

A farmer perceives (**held value**):

‘wolves are bad’...

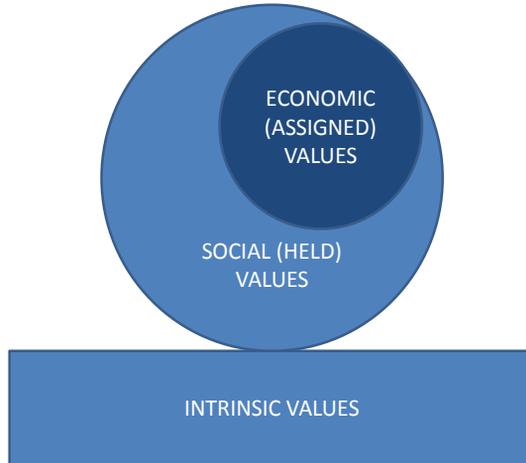
...tracing this through the thought process ...

1. Wolves eat sheep
2. Sheep (**assigned monetary value**) provide income for my family
3. Income provides security (**held value**) for my family

How would you intervene to **change the held value of the farmer to conserve the wolf?**

Intrinsic values

- **Intrinsic values** are an **ethical or philosophical** value
- Should be **independent of human perception** and preference
 - In this instance can be related to **ecosystems and ecosystem services**
 - Provides the **basis for other values** to be defined
- E.g.: clean air, water



Social values

Social Values directly deal with the **functioning of society and individuals** and may feature in the way people can be influenced

- Cultural values
 - Ethics or values that determine **how societies behave**
- Societal values
 - Relating to the **relationships between people**
- Psychological values
 - The concept of **well-being** and mental health
- Physiological values
 - values placed on **physical health and capacity**

Social values

Within all communities these **social values** are **unevenly distributed** for instance:

- Access to **power and wealth**
- Access to **knowledge and skills**
 - May be defined by your **social status, familial links,**
 - **geographic location**
 - The **political system**
 - All linked to the other aspects of **social processes**, such as **situation**
- Individuals and groups within society may have **greater influence over policy** or decision makers
 - concept of **common good versus special interests**

Social Processes

*We will consider **social processes, policy development** and **access to power** later...*

*Now, we will deal with **society as a whole**...*

Social values

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Cultural values

- Personal values can be **closely linked** to cultural values
 - Transference of **culture between generations**
 - **Individual and societal** values
- Collective values
 - **Community** or nationality
 - Ethnic or **group values**

To understand people we must come to **understand the values, beliefs and assumptions** that motivate their behaviour.

How are values formed?

- One image may provoke **different reactions in different people** in different ways;
- Different images of **similar subjects may provoke different responses** from the same person;
- The same image may provoke a **different response in the same person in a different context.**



Ahhhh...

Wolves awaken different interests in particular:

- Ranching
- Hunting
- Culture
- Popularist notions related to a **charismatic species**



Ranching – assigned value



Hunting – assigned value



Culture – held value

- Canada's First Nation Nisga'a people in ceremonial head-dress
 - Teachers or **path-finders**
 - Cautious (of strangers) but curious
 - Elusive by nature
 - Attuned to environment
 - **family orientated**
 - Devoted
 - Loyal
 - Fearless
 - Cooperative
 - Playful
 - **Social**
 - **Intelligent**
 - Expressive communicators
 - **Loving**



Moral stories – held values

- Little boy who cried wolf (1687)
- The three little pigs (1840)
- Little Red riding hood (1927)
- Peter and the Wolf (1936)



Human value classification system (Kellert, 1996)

Kellert (1996) identified 9 major categories in the human relationship with nature and biodiversity

Utilitarian	Aesthetic	Moralistic
Naturalistic	Symbolic	Dominionistic
Scientific	Humanistic	Negativistic

Human Value Classification (Kellert, 1996)

Value	Definition	Function
Utilitarian	Practical Material exploitation of nature	Physical sustenance Food Clothing Security
Animals and habitats provide food and income to people. Hunting is an important source of income and sustenance in isolated areas.		

Human Value Classification (Kellert, 1996)

Value	Definition	Function
Naturalistic	Direct experience and exploration of nature	Curiosity Discovery Recreation
<p>Motivation for much of people's outdoor recreation. Experiencing nature and seeing animals in their natural settings has great appeal.</p>		

Human Value Classification (Kellert, 1996)

Value	Definition	Function
Scientific	Systematic study of structure Function and relationship with nature	Knowledge Understanding Observational skills
<p>People have a deep seated need to explain things we observe. Using their own experience and other forms of information, people will come up with explanations for their observations and questions. This is the first step in scientific inquiry.</p>		

Human Value Classification (Kellert, 1996)

Value	Definition	Function
Aesthetic	Physical appeal Beauty of nature and wildlife	Inspiration Harmony Enjoyment
<p>Mega flora and fauna provide dramatic images. Explains their popularity in photos and artwork. The primary basis for the development of the first protected areas</p>		

Human Value Classification (Kellert, 1996)

Value	Definition	Function
Symbolic	Use of nature for language or communication	Communication Exemplars of a skill
<p>Nature can symbolise many things, intelligence, character, empathy For instance: predators are symbols of sports teams around the world because of what they represent to people.</p>		

Human Value Classification (Kellert, 1996)

Value	Definition	Function
Humanistic	Strong emotional attachment 'love' for aspects of nature	Bonding Cooperation, Companionship Extreme is anthropomorphism
<p>Seeing animal actions, expressions, sounds, and behaviors in human terms is easy. Brings forth an emotional affinity for wildlife in many people.</p>		

Human Value Classification (Kellert, 1996)

Value	Definition	Function
Moralistic	Spiritual reverence Ethical concern for nature	Order Meaning Kinship, Altruism
<p>An ethical responsibility to animals and nature. Some of these ethics are written into laws, others are assumed. Many people feel that animal welfare should be considered and others feel that animals should be granted rights the same as those granted to people.</p>		

Human Value Classification (Kellert, 1996)

Value	Definition	Function
Dominionistic	Mastery Physical control Dominance of nature	Mechanical skills Ability to subdue - hunting and mounting
<p>European culture promotes the conquering and taming of nature. Management on many ranches has the idea of controlling the land to make it look the way we want it to. An animal mount hanging on a wall may represent a conquest, or of a difficult hunt. Specimens are usually mounted in a fierce pose with their teeth bared.</p>		

Human Value Classification (Kellert, 1996)

Value	Definition	Function
Negativistic	Fear Aversion Alienation from nature	Protection Safety
<p>Wildlife can cause problems for people, this may give a negative view of wildlife. Predators may predate livestock, grazers may invade crops A lack of understanding can lead to phobias</p>		

Examples of Human Values in the US

- Indigenous peoples
 - Utilitarian - exploitation for food
 - Moralistic - spiritual importance
 - Symbolic - cultural importance



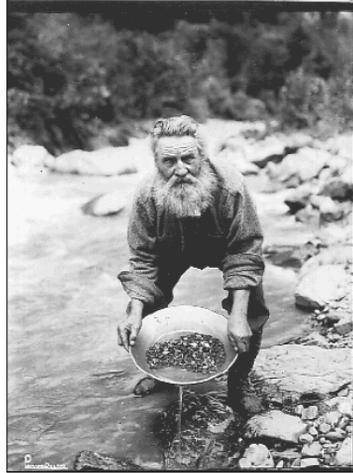
Examples of Human Values in the US

- European settlers
 - Utilitarian - exploitation for food
 - Negativistic - protection from predators
 - Dominionistic - control of the wilderness



Examples of Human Values in the US

- Western frontier
 - Utilitarian - exploitation of resources/market forces
 - Negativistic - protection from predators/natives
 - Dominionistic - competition for natural resources



Examples of Human Values in the US

In the early 20th Century views began to change due to:

- Influx of **immigrants**
 - Often those from **lower social backgrounds**
 - **Opportunities** beyond those found in the highly structured social environment of their origin
- Growing difference in perceptions of **urban and rural** residents
 - **Urbanisation**, the American dream
 - Changes between **east-west coast and central US**

Examples of Human Values in the US

- Utilitarian values **less common**
 - Predators remain “**bad**” - perceived threat to human safety
 - But, realisation that settlers could **utilise wildlife and nature** was important lesson
 - Later, economic needs of **livestock producers dominate**
 - Feeding a growing nation

Examples of Human Values in the US

- Moralistic values emerge
 - **Conflict** between market and sport hunters
- **Elimination on reliance** on wildlife and nature as source for food/materials
- **Indirect learning** about nature, less first hand experience
- **Wildlife perceived more as companions**, less as threat or resource

Levels of social development

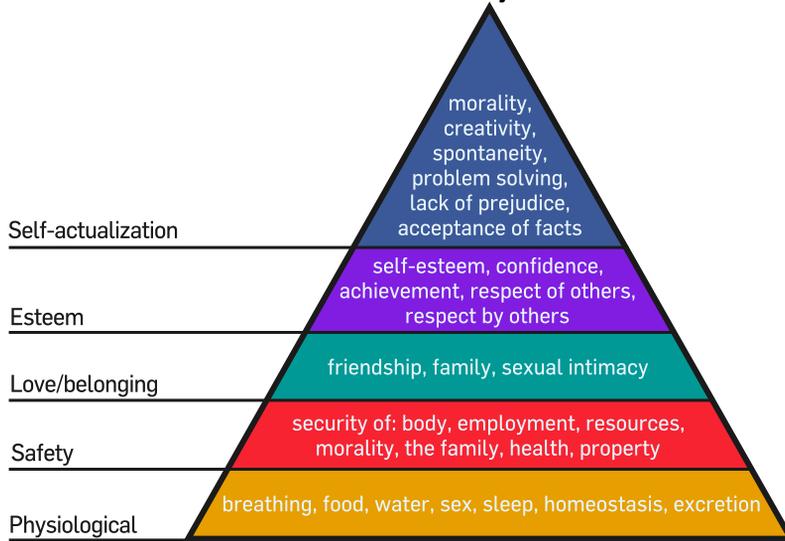
- **Every culture has a different relationship to wildlife and conservation**
 - What may work in the US may not work in Slovenia or Croatia
 - Everything is dependent on context
- ‘Fishing revolt on Pag (island): dolphins rob us of bread’



Know your community

- If the society that you are promoting conservation in **is reliant on utilising the resource** you are trying to protect to survive it is unlikely that you will be successful
 - Knowing the **needs of your audience** can help you develop **appropriate messages** to influence values
- However, if you show that **conservation can sustain a resource** longer then **this may be a message** that can be understood by your target community
 - **Simple messages**, pitched at the **appropriate level** can make a difference
 - **Be consistent**, don't change your argument to appease the person or group in front of you

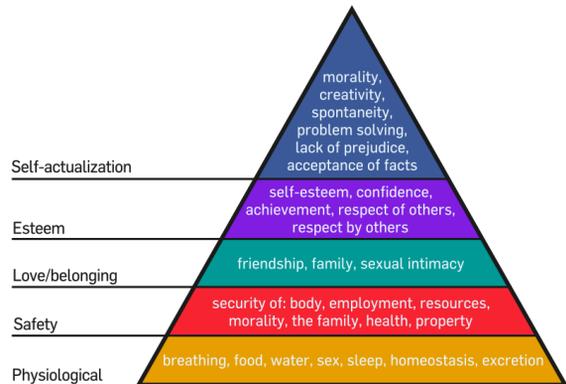
Maslow's hierarchy of needs



Applied to conservation, using protected areas as a proxy

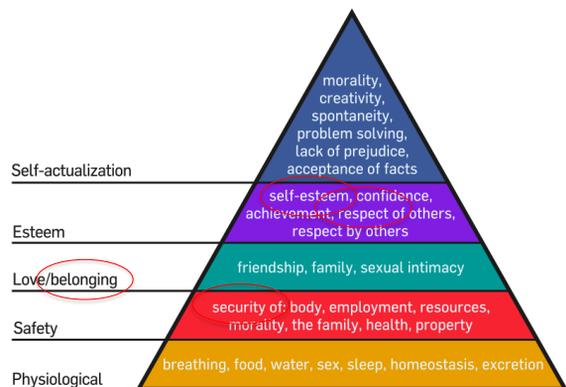
Maslow (1954)

- **Abstract issues** at the higher levels of the pyramid **cannot be achieved** unless the **basic needs are met**;
- **Where** in the pyramid should **conservation** fall?
 - Sense of **belonging**?
 - Fulfil **aesthetic** needs?
 - **Sense of purpose**?
- **Wealthier members** of the community may be able to **meet their needs** and therefore have an **interest in conservation**
- Does this have **implications for conservation and democratic rights**?



Maslow (1954)

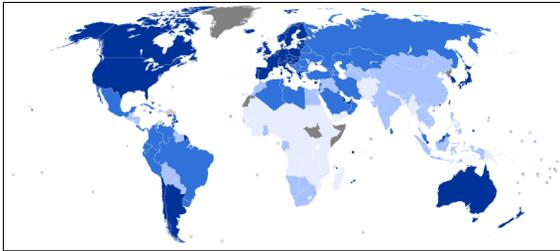
- **Abstract issues** at the higher levels of the pyramid **cannot be achieved** unless the **basic needs are met**;
- **Where** in the pyramid should **conservation** fall?
 - Security?
 - Belonging?
 - Respect?
- **Wealthier members** of the community may be able to **meet their needs** and therefore have an **interest in conservation**
- Does this have **implications for conservation and democratic rights**?



Human development index

- Correlation between **protected area management effectiveness and HDI**
- **Designating protected areas enhances self-esteem** through perceived altruism and peer positive reinforcement.

Leverington et al 2010



Values

- **Can value and perception change** according to context?
- What **values form the basis** for our attitudes towards wildlife?
- Why do **different individuals** hold **different values**?

- How **can we alter values** so that individuals appreciate and want to conserve nature? If so who and when?

Human behaviour

Peter Mackelworth

2. How humans affect nature?

Human Behaviour includes all forms of passive and active human activities. The following are considered to be the **four key categories** of human behaviour related to natural environments:

1. Urbanisation
2. Commerce, transportation and industry
3. Recreation, tourism & leisure
4. Stewardship and public involvement

(Decker et al. 2001)

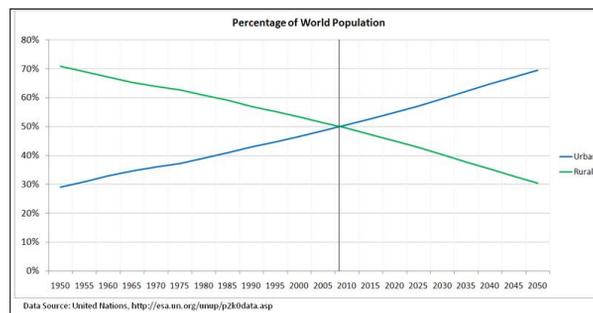
Urbanisation

- Subdivision and fragmentation
 - Hardening of land surfaces
 - Faster water runoff
- Residential development
 - Small parcels of land often with non-native species
- Infrastructure development
 - Massive developments and machinery
 - Noise and physical disturbance
- Commercial development
 - Large areas of featureless land



Urbanisation

- In 2007, at least **50 per cent** of the world's population is living in cities
- By **2030**, that number will jump to **60 per cent**, with nearly **2 billion new city residents**, many migrating from rural areas.



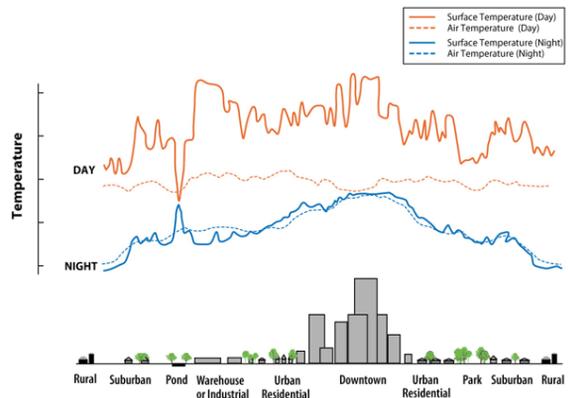
Urbanisation

- the equivalent of a **city the size of Vancouver** is being built every week
- Most of the growth is occurring in **developing countries in Asia and Africa,**
- But, ecologically rich areas such as **coasts and islands** are also at risk.

Urbanisation

Biological/Ecological effects

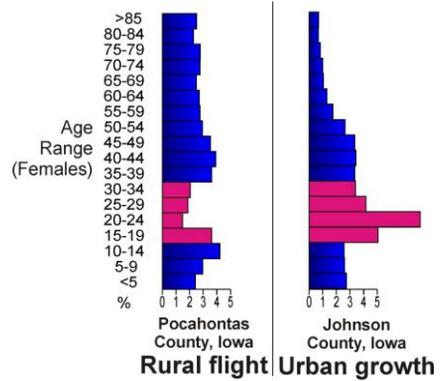
- Land **fragmentation**
- **Loss of vertebrate species** especially **predators**
- Changes to **water flows and micro-climates**
- **Heat islands**
- Social effects?



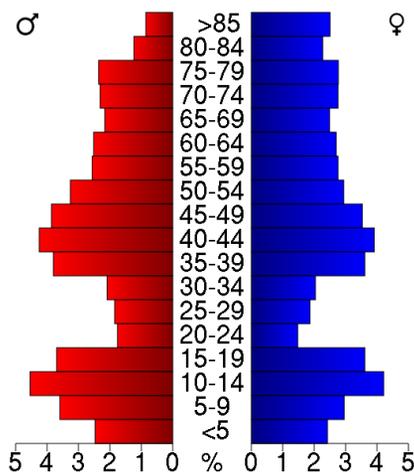
Urbanisation

Social effects

- Reduced **birth rates**
- Less interaction with the **natural environment**
- Reliance on **3rd party information** about nature
- **Voting patterns**
- Changes in **demographics**
 - **Ethnic origin?**
 - **Ethnic balance** to the population

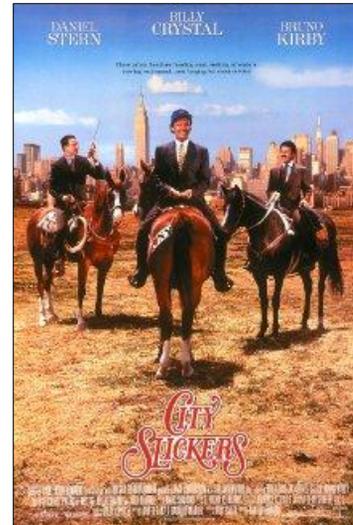


When the girls go...



Educating Urbanites

- **Ecologically informed** public
- Economically and politically **powerful**
- **Higher opinion** on species conservation
- Politically more **democratic**
- Lost **touch with nature?**



Educating Urbanites

- But, many urbanites have a distorted view of nature and conservation...
- McKinney 2002



Commerce, transportation & industry

Commerce, transportation & industry

Farming

- Removal of hedgerows, monoculture
- Pesticides, insecticides, fungicides



The bee

- Bees pollinate **two thirds of all our food**
- European Union voted for a two-year ban on a class of pesticides, known as **neonicotinoids**
- That has been associated with the **bees' collapse**.



Commerce, transportation & industry

Forestry

- Planting of commercial non-native species
- 'Farming' trees as a monoculture



Commerce, transportation & industry

- Commercial fishing
 - Destructive practices such as trawling
 - Bycatch
- Aquaculture
 - Use of high levels of feed and antibiotics



Commerce, transportation & industry

Waterfront development

- **Hardening** of the water-land interface
- **Reclamation of land**
- Removal of **natural flood defences** such as mangroves, sea grass beds, salt marshes and construction on flood plains
- **Dredging and canalisation** of harbours, estuaries and rivers
- **Managed realignment**



Commerce, transportation & industry

Brownfield redevelopment

- Reuse of **previously developed** land
- **Saves greenfield sites** and reduces urbanisation
- Problems with **residues** from the previous use
- Often **more costly** to develop than virgin sites



Commerce, transportation & industry

Transportation

- Terrestrial modes
 - Roads and train lines **provide physical barriers** to movement of species, fragmentation of habitats
- Aerial
 - Airports are synonymous with **noise and air** pollution

Commerce, transportation & industry

Transportation

- Shipping
 - Disturbance, air, noise and water pollution, yet **still considered to be the most effective** method to move people and goods
 - **By 2020 the EU contribution** to SO_x and NO_x emissions from **shipping** will surpass **all EU land-based stationary and mobile sources**

Recreation, tourism & leisure

Recreation, tourism & leisure

- Hunting and Fishing
- Photography and painting
- Wildlife viewing, beachcombing, and nature study
- Hiking, biking, skiing, surfing, and sailing
- Scuba diving, canoeing and power boating



Hunting and fishing

- Strangely, these categories of recreationalists are often the strongest supporters of conservation
- Why?

Hunting and fishing

- They want their **prey managed correctly** for their long-term enjoyment
- They are most **often in the 'wild'** and notice changes
- They are often **more affluent** with time and disposable income

Tourism

Tourism is often forwarded as the **perfect industry for environmental protection and biodiversity conservation**, protected areas often promote tourism as one of their objectives

- There are **many forms of tourism**
 - Mass tourism
 - Specialist tourism
 - Eco-tourism
- Even in low numbers tourism may have a **significant effect** on the environment
- Often different forms of tourism may be in **conflict over resource use**

Mass tourism

- Often a **driver of environmental change** at local level
- **Threatens environmentally and culturally** important sites
- **Destroys the features** that attracted the visitors in the first place



Cruise tourism

- There are **230 registered cruise liners worldwide** (0.2% of the global commercial shipping fleet, 2011) yet **24% of all waste produced** by shipping comes from this sector;
- Cruisers tend to **concentrate their activities in interesting and specific** coastal regions and ports
- One large vessel may **contain 3000 passengers and 1000 crew**



Cruise tourism

- Organic and inorganic waster
 - Plastics and packaging
 - Waste food
- Hazardous wastes
 - Hydrocarbons
 - Heavy metals
 - Detergents
- Air emissions
 - SO_x, NO_x
 - Aerosols
- Waste water (per passenger per day)
 - 40 litres of 'black water'
 - 340 litres of 'grey water'
- Ballast water



Ecotourism

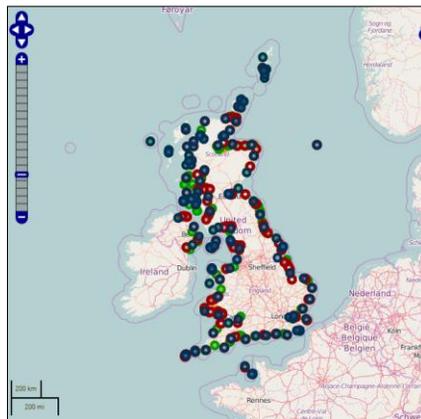
- 1970s - ecotourism **grew out of the global environmental movement**
- 1990s - ecotourism, along with nature-based, cultural, heritage and adventure tourism, had become among the **fastest growing sectors of the tourism** industry worldwide.
- The concept that **tourism can and should benefit conservation** and host communities.
- Helping to **mainstream sustainability** within the travel and tourism
- Promoting **principles and good practices of ecotourism** and applying them to wider market

Stewardship & public involvement

Stewardship & public involvement

Restoring habitats

- Volunteers using free time to restore local habitats
- Community-based management and monitoring
- Marine Conservation Society runs 'beach-watch'



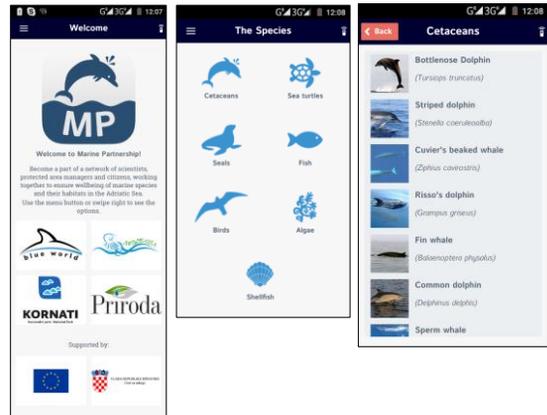
Stewardship & public involvement

Eco-volunteering

- **Restoration of Sea turtle populations** – tourists pay to be part of the actions
- Resource **management, education, and research** can all be funded

Citizen Science

- providing **easy opportunities to engage** locals and visitors
- encouraging **ownership** and a sense of pride



Stewardship & public involvement



How humans want nature managed

3. How humans want nature managed

Management of wildlife and development of protected areas policy

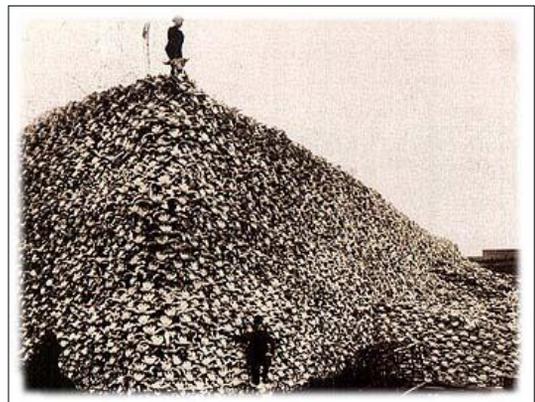
1. Maintenance of **game** populations
2. **Sustainable use** of natural resources
3. Preservation of **biological diversity**
4. Preservation of **traditional lifestyles**

Historically

- 1872 Yellowstone National Park
- 1916 US National Park Service created
 - Blueprint for development of most wildlife management worldwide
 - Tourism to national parks was considered to be limited to the elite in society
 - Hunting was an important aspect of tourism

Impetus for management

- European settlers coming from already 'subdued' wilderness to **abundance of nature**
- America offered an **unlimited nature and freedom** from the **European class system**
- Led to **over-exploitation of resources** such as the buffalo
- Management was a **reaction to the decline** in wildlife populations



Management by game wardens

- Aimed at '**perpetuating**' wildlife
- Restrictions would **extend** the virgin **supply** of wildlife and nature **for the development** of American industry
- Many wildlife managers were **hunters or anglers**
- **Management of target species** to increase revenue or to sustain stocks in the long-term
- Little interest in the **broader habitat** concept
- Often quite **elitist**

Management by biologists

- Teddy **Roosevelt**, Gifford **Pinchot** and John **Muir** catalysed change at the turn of the century
- **Science applied to management**
- University courses for '**whole organism**' and '**population management**'
- Development of the '**wildlife**' biologist
- High levels of **public trust in 'expert'** management

- Yet, still '**people**' **problems** generally ignored

Current management

- Until 1960s wildlife management **focused on providing game** for hunters and anglers
- **Biology remains the justification** for most wildlife and nature management
- **Decline in traditional consumptive use** and **increase in 'non-consumptive'** use such as tourism
- Increase in **inter-disciplinary studies**
- Increasing interest in the **'human element'** of conservation

Emerging management

- **Attitudes** to wildlife and nature are changing
- **Decline in traditional constituent** and lobby
- Increasing **non-consumptive use** and lobby
- **New aspects** of conservation
 - **Urban** wildlife
 - Wildlife **farming**,
 - **Re-introduction and re-habilitation**

Economic, Social and Environmental Challenges

Economic Change

- Global
 - Current **economic crisis**
 - Changes in **the political standards**
- Regional
 - Change of **political regime - Socialism to Capitalism, Democracy to Dictatorship**
 - Market **integration**, market **disintegration**
- Local
 - Opening of **new markets**
 - **Change in market structure** - Fishery to Tourism
- Individual level
 - **Job loss**

Social Change

- Demographics
 - **Migration**
 - Changes in **birth rates** in different minorities
- Rising expectations
 - **Technology**, GPS, off road vehicles
- Land tenure
 - **Decline in common property**
- Force Majeure
 - **war and terrorism**, uncertainty

Biophysical change

Increasing uncertainty, yet a move towards **Ecosystem based management (EBM)**

- Climate change
 - **Warming**
 - **Ocean Acidification**
- Habitat change
 - **Shrinkage**
- Invasive species
 - *Caulerpa spp.*
- Force Majeure
 - Earthquake, Tsunami, Storms



Management Challenges

- These are the **challenges for the future generations** of researchers and managers, i.e. YOU
- Human dimensions are an **integral part of conservation**
- As you proceed through your **career, further and further away from the field, dealing with humans** will become an even more **important aspect** of your work

Triage

Peter Mackelworth

Triage

- Triage, is a process of **prioritisation**
 - derived from the French word 'trier' meaning 'to sort'
- Medically, triage is used to **allocate limited resources** for **the greatest good** for the **largest number** of people
- The treatment of patients is prioritised by:
 - Injury **severity**
 - The **consequence** of delaying treatment
 - **Net benefits** of different treatments
 - The **probability of recovery** with or without treatment

Conservation Triage

- Triage in a **conservation context** is the process of:
 - **Prioritising the allocation** of limited financial resources to **maximise conservation** returns, relative to the conservation goals, under a constrained budget.
- This is achieved by explicitly accounting for:
 - The **costs**
 - **Benefits**
 - **Likelihood of success** of alternative conservation actions (e.g. protection, restoration, pest eradication, education, training, etc.).

Bottrill et al 2008

Triage

- Conservation is a **crisis discipline** (Soulé 1985)
 - Decisions must be made with **limited biological knowledge**
 - **Limited data on the costs** of conservation actions
 - The results of conservation may take **generations to show**
- **Limited funding** available
 - Need to **prioritise conservation** actions
 - Aim to **conserve species-habitats** and address **specific threats**
 - Greater emphasis on **keystone species** and **critical habitats**

Triage

Is the use of triage **defeatism**?

Or

A **logical step** forward for allocating limited funds?

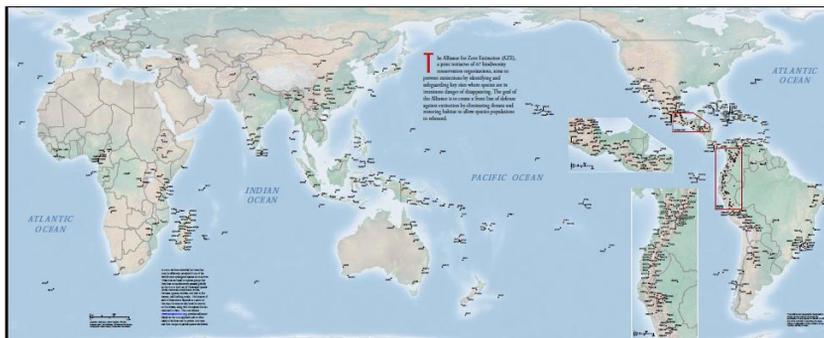
Does it provide an **excuse to abandon** those habitats and species that are deemed to be '**to expensive**' to save?

Triage

Alliance for Zero Extinction

Priority Sites for AZE

- Formed in 2000, with **93 members** from **37 countries**
- Focuses on **587 sites** for **920 species** evaluated to be **Endangered** or **Critically Endangered** under IUCN criteria
- And are restricted to **single remaining sites**.



Alliance for Zero Extinction

A site must meet the following three criteria to be on the priority list of AZE:

1. Endangerment

- must contain **at least one Endangered (EN) or Critically Endangered (CR)** species, as listed on the IUCN Red List.

Alliance for Zero Extinction

2. Irreplaceability

- should only be designated if it is **the sole area** where an EN or CR species occurs
- contains the overwhelmingly **significant known resident population (>95%)** of the EN or CR species
- or contains the overwhelmingly **significant known population (>95%) for one life history segment** (e.g. breeding or wintering) of the EN or CR species.

Alliance for Zero Extinction

3. Discreteness

- must have a **definable boundary** within which the character of **habitats, biological communities**, and/or **management issues** have more in common with each other.

Alliance for Zero Extinction

Aim of AZE:

- to **prevent extinctions** by identifying and safeguarding key sites, each one of which is the **last remaining refuge** of one or more Endangered or Critically Endangered species.
- This should be done **regardless of cost**

Triage

Supporters of conservation triage suggest that:

1. It is a **logical step to identify the economic cost** of conservation
2. **Funders**, are interested in the **most results** for their money
 - This can be **tax payers money**
 - **Private foundations**
3. Need for a **framework** for more **sophisticated funding allocation decisions**

Science & Society

Cel
PRESS

Is conservation triage just smart decision making?

Madeleine C. Bottrill¹, Liana N. Joseph¹, Josie Carwardine¹, Michael Bode¹, Carly Cook¹, Edward T. Game¹, Hedley Grantham¹, Salit Kark^{1,2}, Simon Linke¹, Eve McDonald-Madden¹, Robert L. Pressey^{1,3}, Susan Walker⁴, Kerrie A. Wilson¹ and Hugh P. Possingham¹

¹ The University of Queensland, The Applied Environmental Decision Analysis Centre, The Ecology Centre, Brisbane, QLD 4072, Australia

² The Biodiversity Research Group, Department of Evolution, Systematics and Ecology, The Institute of Life Sciences, The Hebrew University of Jerusalem, Jerusalem 91904, Israel

³ Australian Research Council Centre of Excellence for Coral Reef Studies, James Cook University, Townsville, QLD 4811, Australia

⁴ Landcare Research, Private Bag 1930, Dunedin 9054, New Zealand

Triage

Smart decisions must consider:

1. Information on **values of biodiversity** held by stakeholders
2. The **benefit to biodiversity** from a conservation action
3. The probability that an **action will succeed**
4. The **cost of action**.

(Bottrill et al. 2008)

1. Value (Bottrill et al. 2008)

- How do we value biodiversity?
- Underlying **assigned values** (\$\$) are based on:
 - Held values
 - Intrinsic values
 - Beliefs
- How do we **access these values**?

1. Value (Bottrill et al. 2008)

- There are **different values associated** with biodiversity:
 - Ecological
 - Evolutionary
 - Social
 - Cultural
 - Economic attributes

1. Value (Bottrill et al. 2008)

Who does the valuation?

- In society higher value is often given to **charismatic species or places**, or those features that provide functional support to ecosystems or people

2. Biodiversity benefit (Bottrill et al. 2008)

- The benefit of an action is the amount gained from that action in progress **toward the conservation objective**
- **Actions** that provide the **greatest benefits** to biodiversity persistence should be **higher priorities**.
- **Net biodiversity benefits** are measured as the **difference in outcomes** with and without the action taking place, accounting for the **relative threat facing each species or habitat**.
- If a species or habitat is **likely to persist without a particular action**, then the action will have a **low net biodiversity benefit**.

2. Biodiversity benefit (Bottrill et al. 2008)

- But, how easy is it to **evaluate the change** to an ecosystem?
 - **Changes occur over years**, even decades and species generations
 - There are issues concerned with **‘natural’** change and **‘anthropogenic’** change
 - Yet, some conservation actions, eg stopping deforestation can have **an immediate effect**
 - need to identify the **primary threats**, those that **fundamentally threaten** the species or habitat

3. Probability of success (Bottrill et al. 2008)

- Priority should be given to actions that have a **higher chance of success**
- The probability of success can be estimated using:
 - Data on **threats**
 - **Biological potential** of a species or habitat to recover or persist
 - Existing **social or legislative** conditions
 - The willingness or capacity of relevant **social or management groups** to facilitate the action

3. Probability of success (Bottrill et al. 2008)

- **Uncertainty** whether an action will achieve its stated goal is the **most overlooked parameter** in conservation investments. ***Resources may be wasted on impossible endeavours.***
 - Identification of local, regional and international **scale of threats**
 - **Synergies between threats and activities**
 - Intimate knowledge of the **biological potential** of species and habitats

4. Cost (Bottrill et al. 2008)

- The **explicit cost component** of conservation is a crucial part of the decision making process but **rarely considered**
- A **cheaper action should be prioritised** over a more expensive action '**value for money**'
- If costs are **considered in planning**, decision makers are aware of the opportunity cost of funds that are directed away from particular conservation actions, leading to **greater returns on investment**

4. Cost (Bottrill et al. 2008)

- **Some more expensive actions**, over the longer term, **maybe more effective** than cheaper short-term fixes
- Often it is **difficult to relate cost to benefit**, it is rare for the ecological **result to be linear** to the investment
- **Decision makers** often work to **shorter time spans** than required by biodiversity conservation actions
- **Industrial lobbies are strong opponents** to those biodiversity actions that may limit exploitation

Bottrill et al. 2008

- **Choices** about how and where to invest conservation resources **are complex**
 - Decision makers must reconcile **conflicting benefits and values** with multiple actions at **various scales**.
 - They also face the challenge of **finding consensus** among **multiple stakeholder groups**, including scientists, donors, industry and local communities.
 - **Costs are not always \$\$** - public willingness and political leverage are often more of a concern for politicians than \$\$

OPEN ACCESS Freely available online

PLOS BIOLOGY

Conserving Biodiversity Efficiently: What to Do, Where, and When

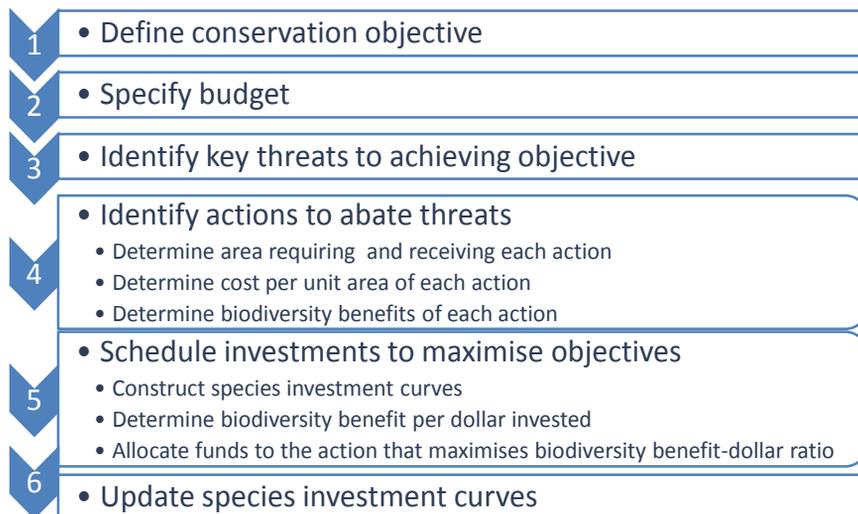
Kerrie A. Wilson^{1*}, Emma C. Underwood², Scott A. Morrison³, Kirk R. Klausmeyer⁴, William W. Murdoch⁵, Belinda Reyers⁶, Grant Wardell-Johnson⁷, Pablo A. Marquet^{8,9,10,11}, Phil W. Rundel^{12,13}, Marissa F. McBride¹⁴, Robert L. Pressey¹, Michael Bode¹, Jon M. Hoekstra¹⁵, Sandy Andelman¹⁶, Michael Looker¹⁷, Carlo Rondinini¹⁸, Peter Kareiva¹⁵, M. Rebecca Shaw⁴, Hugh P. Possingham¹

¹ The Ecology Centre, School of Integrative Biology, University of Queensland, St. Lucia, Queensland, Australia, ² Department of Environmental Science and Policy, University of California Davis, Davis, California, United States of America, ³ The Nature Conservancy, San Diego, California, United States of America, ⁴ The Nature Conservancy, San Francisco, California, United States of America, ⁵ Department of Ecology, Evolution and Marine Biology, University of California Santa Barbara, Santa Barbara, California, United States of America, ⁶ Natural Resources and the Environment, Council for Scientific and Industrial Research, Stellenbosch, South Africa, ⁷ School of Natural and Rural Systems Management, University of Queensland, Gatton, Queensland, Australia, ⁸ Center for Advanced Studies in Ecology and Biodiversity, Santiago, Chile, ⁹ Departamento de Ecología, Facultad de Ciencias Biológicas, Pontificia Universidad Católica de Chile, Santiago, Chile, ¹⁰ Instituto de Ecología y Biodiversidad, Santiago, Chile, ¹¹ National Center for Ecological Analysis and Synthesis, University of California Santa Barbara, Santa Barbara, California, United States of America, ¹² Department of Ecology and Environmental Biology, University of California Los Angeles, Los Angeles, California, United States of America, ¹³ Center for Embedded Networked Sensing, University of California Los Angeles, Los Angeles, California, United States of America, ¹⁴ School of Botany, University of Melbourne, Parkville, Melbourne, Australia, ¹⁵ The Nature Conservancy, Seattle, Washington, United States of America, ¹⁶ Tropical Ecology, Assessment and Monitoring Program, Conservation International, Washington, D.C., United States of America, ¹⁷ The Nature Conservancy, Australia Program, Carlton, Victoria, Australia, ¹⁸ Dipartimenti di Biologia Animale e dell'Uomo, Università la Sapienza, Rome, Italy

Wilson et al. 2007

- Wilson et al 2007 argue that while there are sophisticated approaches exist for **identifying priority areas for conservation** at a global scale.
 - Typically these regions are identified with **little concern for economic costs**
 - **Land acquisition and protected areas** are used as a surrogate for the **broader range of actions** available to protect biodiversity
 - Need to focus on threat **specific conservation actions**

Wilson et al. 2007



- Triage is an **ongoing process within conservation** that is often **not explicitly** acknowledged
- **What is the priority?**
 - Conservation?
 - Money?
 - Threat removal?

Literature:

Hunter & Hutchinson 1994

Bottrill et al. 2008

Wilson et al. 2007

Website:

<http://www.zeroextinction.org/>

Student exercise

I am the minister of the environment...

*Sadly there is a **financial crisis**, and we now need to prioritise our spending...*

*I have **20,000 euro** available for conservation in Slovenia this year...*

Student Exercise

In groups of four persons

*Go away and select a **species** found locally*

Your objective is to make me, and the rest of the class care about it

Student Exercise

- You will have to make a **20 minute presentation**, with both scientific and moral arguments, aimed to develop our interest for the species, ***examples of ideas***:
 1. Biology and background
 2. Research programme
 3. Education programme
 4. Conservation programme
 5. Importance for conservation
 6. Budget
- Each of you will **present**
- The final slide will be presented by the **principal investigator**

Student Exercise

Take this seriously... this is a competitive tender...

the grade will be affected by the funds that are allocated to your species. I will allocate but also your colleagues will also be given the option to allocate funds...

When allocating funds, you will choose from the other competitors, you cannot allocate funds to your species...

- Species that are NOT allowed anymore...:
 - Loggerhead sea turtle
 - Bottlenose dolphin
 - European beaver
 - Spiny dogfish
 - European otter
 - Grey wolf

Decision support tools

Peter Mackelworth

Decision science

- **Should** I take my umbrella today?
- **How** shall I get to work?
- **What** should I eat for lunch?
- **Where** should I go on vacation?
- **Should** I marry X?
- **Should** I go to lectures or go back to sleep?

Decision science

- **Where** do we put marine reserves?
- **How** much \$ to allocate to different projects?
- **Where**, and **how much**, should I invest in reducing land-based threats?
- **How** many boats shall I allow to fish?
- **Should** we invest in more data or more management?

Why use tools?

- **Decision Support Tools can assist in complicated problems beyond human intuition or conventional approaches**
 - **Save time**
 - **Guide user** through difficult decision making processes
 - Repeat analysis and **reduce redundancy** “Stop reinventing the wheel”
 - Explore a wider range of **alternatives**
 - **Document** decisions
 - **Integrating sector tools** can help integrate planning across sectors

DST in Marine Spatial Planning

- **Growing conflict between uses and users** has resulted in **some regions be over exploited**,
 - for example, in the **Belgium North Sea**, the **total demand for marine space is at 264%**, considering the legislative total claims of each industry
- DSTs have the **capacity to make informed decisions** in a timely manner combining:
 - **environmental data**,
 - **socio-economic information** and
 - **stakeholder opinion**.
- It provides **support for the development of policy options and alternatives** for decision makers.

What is Decision Science???

- **Setting your requirements** (research question) is 90% of the challenge:
 - Set **explicit** goals;
 - Have **quantitative** objectives,
 - **Identify** possible constraints
- If done well, we can **translate these into mathematics** and provide possible solutions using decision-support tools (DST)
- And, provide **systematic, rational** and **transparent** decisions

What is Decision Science for Spatial Conservation???

- Goals: I want a **well connected system** of marine reserves (sites) that **protect all aspects of biodiversity** and **irritates as few people and industries as possible**
- Objectives: I want all of our **biodiversity to have at least 20%** of their habitats or ranges in the reserve system...
- Constraints: **Every site can be either in or out** of the protected area network.

What is Decision Science for Spatial Conservation???

$$\text{minimize } \sum_i^{N_s} x_i c_i + b \sum_i^{N_s} \sum_h^{N_s} x_i (1 - x_h) c v_{ih}$$

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$$x_i \in \{0,1\} \quad \forall i$$

What is Decision Science for Spatial Conservation???

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Irritate as few people as possible

What is Decision Science for Spatial Conservation???

$$\text{minimize } \sum_i^{N_s} x_i c_i + b \sum_i^{N_s} \sum_h^{N_s} x_i (1 - x_h) cv_{ih}$$

$$\sum_i^{N_f} x_i r_{ij} \geq T_j \quad \forall j$$

$$x_i \in \{0,1\} \quad \forall i$$

Irritate as few people as possible
Make the system connected

What is Decision Science for Spatial Conservation???

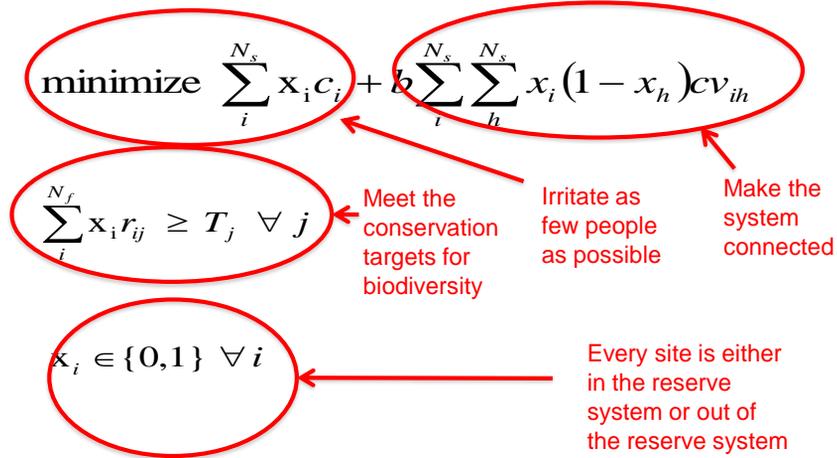
$$\text{minimize } \sum_i^{N_s} x_i c_i + b \sum_i^{N_s} \sum_h^{N_s} x_i (1 - x_h) cv_{ih}$$

$$\sum_i^{N_f} x_i r_{ij} \geq T_j \quad \forall j$$

$$x_i \in \{0,1\} \quad \forall i$$

Meet the conservation targets for biodiversity
Irritate as few people as possible
Make the system connected

What is Decision Science for Spatial Conservation???



SPECIES	SITE								Range
	A	B	C	D	E	F	G	H	
Powerful Owl	1	1	1	1	1	1	0	1	7
Red Goshawk	1	1	1	1	0	0	0	1	5
Olive Whistler	1	1	0	1	1	1	0	0	5
Albert's Lyrebird	1	1	1	0	0	0	1	1	5
Coxen's Fig Parrot	1	1	1	1	0	0	1	0	5
Diamond Firetail	1	0	0	0	1	1	1	0	4
Black-b Button-quail	1	0	1	1	0	0	0	0	3
Eastern Bristlebird	1	1	1	0	0	0	0	0	3
Rufous Scrub-bird	0	1	0	0	1	0	0	0	2
Ground Parrot	0	0	1	0	0	0	0	0	1
Site Richness	8	7	7	5	4	3	3	3	40



SPECIES	SITE								Range
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Diamond Firetail	1	0	0	0	1	1	1	0	4
Black-b Button-quail	1	0	1	1	0	0	0	0	3
Eastern Bristlebird	1	1	1	0	0	0	0	0	3
Rufous Scrub-bird	0	1	0	0	1	0	0	0	2
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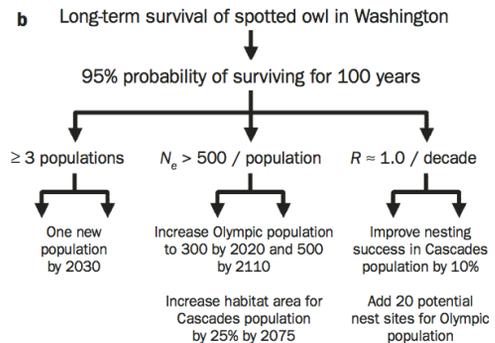
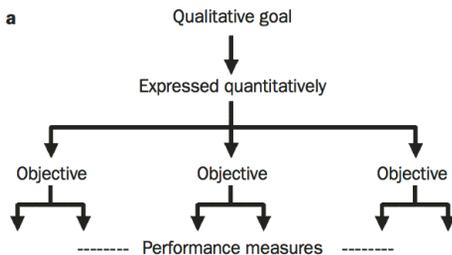
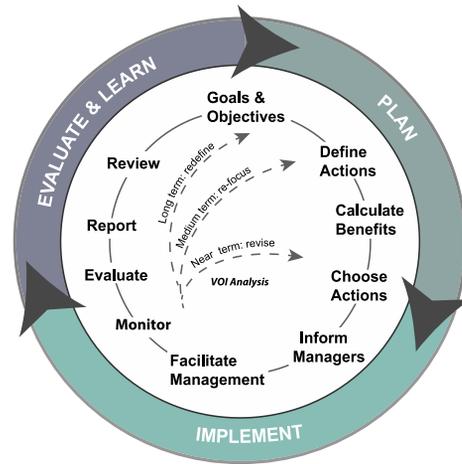


What tools **DO NOT DO**

- **Make decisions** (provide decision support – do not make decisions on behalf makers)
- **Replace** need for intensive **human interaction** and collaboration (do not replace stakeholder inputs)
- Come with all the **data** they need
- **Overcome people problems** of politics, turf, mistrust, and technophobia
- **Replace needs for project-specific analyses**

Problem formulation

- **Goals/Aims:** Overarching desired outcomes of the process (e.g. “preserve ecosystem diversity”)
- **Objectives:** Quantitative expression of goals (within spatial prioritization this is achieved through “Targets” e.g. “protect 20% of species and habitats”)
- **Actions:** List possible actions to achieve objectives (costs, feasibility, probability of success)
- **Performance metrics:** Identified to drive monitoring



Problems

- **competing claims** between groups of stakeholders
- human activities have **varying impacts and compatibilities**
- some habitats / species are **more vulnerable** to certain activities
- decisions must take into account **multiple criteria from multiple stakeholders**

Establishing new sites in a network brings new considerations

- **Existing protected areas usually have to be factored in**, even if they are not ideal
- **Special places (“jewels”)** recognised for their **unique** / irreplaceable ecology
- **Threats in some places** are more pressing than in others
- Achievable?
 - Financially
 - Legally
 - Who has the mandate to act?
- **Broadly supported?** (now and/or in the future?)

DST

- decision makers face balancing **multiple conflicting objectives**, with each user having **equally legitimate rights and opinions**
 - geographic information systems (GIS) itself does not adequately support decision making due to a **lack analytical modelling capability** and the possibility to factor in **variations in context and policy processes** (Densham, 1991).
 - DSS can be used to **reduce use-use conflicts** and **use-ecosystem conflicts** (Portman, 2016).
 - Increasingly the **need to involve stakeholders and non-decision-making actors** adds complexity to the process,
 - but conversely, can **provide legitimacy and reduce conflict in the long-term**, provided that the DSS is transparent and the interface is intuitive and easily accessible.

GIS or DST?

- Integrating **diverse data and information** into a useable management tool **requires greater analysis than utilising add-ins within a Geographic Information System (GIS)**.
- DSS is an **understanding of the processes involved**, by comprehending all the elements of the picture you can **understand the problem and hence manage conflict and include any uncertainty**.
- **Early environmental DST** were mainly **ranking or scoring systems for species and habitats**, the development of **mathematical algorithms** allows users to ask **specific questions about the multiple objective planning process**.
- **Stakeholders and non-decision-making actors** add complexity to the process, but **provide legitimacy and reduce conflict in the long-term**, provided that the **DST is transparent** and the interface is easily accessible.
- DSTs can be used to **reduce use-use conflicts** and **use-ecosystem conflicts** (Portman, 2016).

DSTs

- DST computer platforms come as packages or free software, in either circumstance they need to be **modified to suit the specific purposes of the hypothesis**
 - One of the underlying problems with these tools is the **lack of integration between researchers and policy makers**.
 - In most cases these tools have **lacked a participatory and transparent** process.
 - The **marine planning process** requires integrated assessment of:
 - a) **multiple objectives**;
 - b) **conflicts and synergies** of marine uses;
 - c) risk of **cumulative effects** of human activities;
 - d) **spatial zoning or management options**; and,
 - e) **scenario testing** (Stelzenmüller et al., 2013, p215).
-
- Two open-source DSSs that have been widely in environmental and conservation planning are **Marxan and Zonation**.
 - Both use **heuristic algorithms** to find the best conservation options given particular targets and constraints

Zonation

- **Zonation** provides a hierarchical scheme of zoning.
 - It uses a **reverse step approach** starting with the **full landscape and removing those cells which result in the smallest loss of overall conservation** value while accounting for the overall and individual features, connectivity and weighting given to those features.
 - The **'least' valuable conservation cells are sacrificed first** while the cells with the greatest biodiversity are kept to the end of the process
 - It produces a **complementarity-based and balanced ranking of conservation** priority over the entire land or sea-scape (Moilanen et al., 2005).
 - Zonation **can also be used for identification of cells and units within a wider landscape** based on non-environmental values.

Marxan

Marxan uses planning units (PUs) defined by the **user based on targets and costs**.

- It focusses on the **desirability of these targets** but takes into consideration design factors such as boundary length versus continuity of area.
- **PUs are continually added to runs** of the application **until targets are met**.
- The **optimal solution for conservation will depend on the frequency that individual PUs are selected** during multiple runs of the application.
- While Marxan uses a **binary 'in or out' concept**
- **Marxan with zones** expands on the basic reserve design, in this manner it can be used for **spatial planning and resource management**.
- Marxan has been broadly used in the **marine environment for MSP** and is considered as one of the better tools on which to **base stakeholder involvement** (Stelzenmuller et al., 2013).

Marxan

Marxan stands for '*marine reserve design using spatially explicit annealing*';

however, it is just as **applicable to terrestrial conservation** planning problems

Marxan

Bearing in mind our **original objectives - *mitigate threats to the marine and coastal biodiversity.***

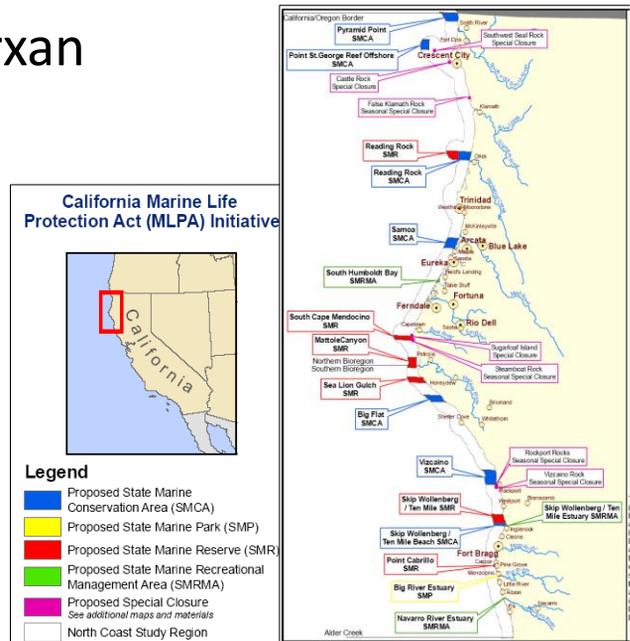
- Marxan provides **options not solutions**
 - while software can **identify potential synergies and conflicts** it can only inform decision makers
 - the software is **only as good as the data provided and the objectives** that are set
- Reduction of ***ad hoc* marine conservation decisions**
 - *ad hoc* are often **expensive and controversial**
 - potentially **compromise conservation objectives**, particularly in the marine environment

Marxan

- Marxan is one of the most widely used **decision support tools in conservation** and resource use planning.
- It is particularly known for **supporting marine/maritime spatial planning** management regimes.
- Marxan has been employed extensively to **generate potential solutions for representing the biodiversity** of an ecoregion.
- This approach is based on a representation analysis which assumes that the objectives for conservation are **to protect viable examples of species and ecosystems** within managed areas.
- Based on this assumption, **“efficient” solutions** are sought that meet representation goals at the least total cost in terms of total area and other associated factors.

Marxan

- In 1999, the California Department of Fish & Game began to **implement the Marine Life Protection Act**.
 - **Master Plan Team** of scientific experts and governmental agencies
- In 2002, the MLPA was implemented for a **second time**.
 - **Master Plan Team**
 - **Seven Working Stakeholder Groups**
- In 2004 the coast was divided into sequential regions
 - **Task Force** on Marine Protected Areas
 - **Science Advisory Team**,
 - **Regional Stakeholder Group**
- In 2007 the Fish and Game Commission **established 29 MPAs (18%) of state waters**



1. Marxan with zones

- Allows **multiple complementary and opposing management types** to be considered within a planning area.
 - successfully used for MSP in California, US and zoning the Great Barrier Reef, Australia
- Marxan can be used in **real-time** allowing **stakeholders and managers the ability to see** how it is working and how their preferences drive solutions.
- It is **simple enough for people to understand**, but technical enough so that not everybody can just produce a map of priorities.

Marxan algorithm

- Marxan uses a **spatial grid composed of planning units (PUs)**.
- All **ecological features** (e.g. habitat types) are **overlaid within the grid** and the **quantity of each feature in each PU** is calculated.
- Then a **target is assigned to each conservation feature** (e.g. 30% of each habitat type).
- Marxan is designed to **test different combinations of PUs until it finds a combination that meets all targets at the lowest possible cost**.
- This **cost can be associated with the area covered, a socio-economic cost or other costs**.
- Marxan **selects sites based on a heuristic algorithm known as “simulated annealing”**.
- The goal of the algorithm is to **keep the total score of a solution to a minimum while achieving all conservation targets**.

Marxan score

- The **total score** (which must be reduced) is made up of **three user-defined components**:

$$\text{MARXAN score} = \Sigma \text{PU cost} + \Sigma \text{SPF} \times \text{Penalty} + \text{BLM} \times \Sigma \text{Boundary Length}$$

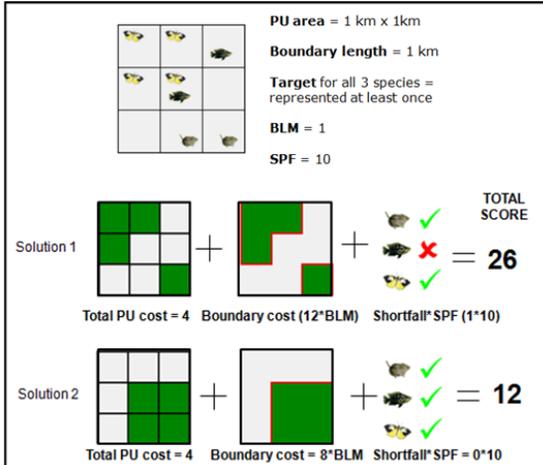
- Sum of the cost of each planning unit (**Σ PU cost**): equal to the **sum of area or the socioeconomic cost associated with the PUs**.
- Penalty for not achieving all conservation targets (**Σ SPF x Penalty**): The species penalty factor (SPF) multiplied by the **percentage of the target not achieved** (penalty).
- **Each ecological feature has an SPF and a target**. The SPF is generally **associated with the significance of meeting conservation targets**. The **higher the factor**, the **more the Marxan algorithm focuses on achieving this target first**.

Marxan score

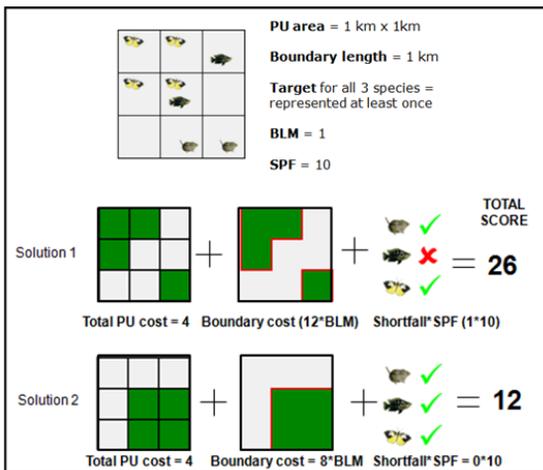
- The total score (which must be reduced) is made up of three user-defined components:

$$\text{MARXAN score} = \Sigma \text{PU cost} + \Sigma \text{SPF} \times \text{Penalty} + \text{BLM} \times \Sigma \text{Boundary Length}$$

- Total boundary length cost (**$\text{BLM} \times \Sigma \text{Boundary Length}$**): Equal to the **total perimeter of the solution multiplied by the boundary length modifier (BLM)**.
- The **BLM is directly related to the fragmentation of a solution**. The **higher the BLM a more compact solution will Marxan produce**.
- Using **this cost is optional, but recommended as it will likely create a network of sites that is more compact and hence easier to implement**.



- This example has **three ecological features**, and we want to **include at least one individual per species** in our reserve system.
- After we run Marxan we obtain **two possible alternatives**, each with **four PUs**.
 - The **cost associated with the PUs is the same (4)**
 - The **total cost is very different (16 vs. 32)**.



- Solution 1 has a higher cost than solution 2 because the **PUs selected are less aggregated**, which results in a **greater total boundary length**.
- Also, **no PUs were selected for a fish species** in solution 1, so the **target was not achieved**, resulting in a **penalty (SPF = 10)** for this feature.
- Marxan follows the same logic on a larger scale to produce **different options with the lowest possible total cost**.
- The **user can vary the PU cost**, the **BLM** (which influences fragmentation) and the **SPF**.

Human Dimensions

Peter Mackelworth

Mapping social processes

3.1. Identifying stakeholders

HD and Management

- Who is a **stakeholder** and what do they want?

*'a stakeholder is any person who is **affected by or affects wildlife or wildlife management** decisions or actions'*

(Decker et al., 1996)

Gathering data

- Gathering **data on social** processes:
 - **Participants** and their perspectives
 - **Situations**
 - Base **Values**
 - **Strategies**
- From **reports, interviews**, publications, newspapers, conversations, **questionnaires**, letters, meetings and **observations**

What information do we need?

- **Individual** Stories
- Attitudes of **groups** of people
- Effects on **communities**
- **Political** view point
- **Cultural** view point
- **Demographic**, technical changes

Each is a **different viewpoint** and may require a **different technique**: Example: fishing decline

What information do we need?

How do we get that information?

Well, generally the best method is **to ask**

- Individuals
- Groups
- Communities

Aims and Objectives

- Define **what** it is we want to know
 - what is the **research goal**?
- Define our sample population
 - **who** is in and who is out
 - better to be **inclusive** than exclusive
- Outline **which** theoretical framework
- Decide the **what** method
 - often **linked to the theoretical** framework
- **Implement** the study

Theoretical Framework

- No research takes place in a **theoretical vacuum**.
- Even if not explicitly said, all research is guided by a set of **philosophical beliefs**.
- These beliefs **influence the selection of topics** for research
- the **methods for research** and analysis
- the manner in which completed projects are **evaluated**

Theoretical Paradigms

- **Three main research traditions** used in social sciences;
- Positivism
- Phenomenology
- Post-modernism

Positivism

- Demands the formulation of **theories** which can be **tested and verified**
 - Uses **similar methods** to natural sciences;
 - The **objective collection of data** regarding a social phenomenon;
 - Allows us to **determine rules to predict and explain human** behaviour in terms of cause and effect;
 - Research should be **detached and objective**;
 - Researchers should **suppress their values and prejudices**;

Contemporary Strands of Positivism

Two main strands of contemporary positivism:

- Logical positivism
 - defines **precise scientific principles**
 - uses **formal logic to verify theory**:

‘the ultimate **basis of knowledge** rests upon public **experimental verification** rather than upon personal experience’

- **Repeatedly confirming** that a theory is correct

Contemporary Strands of Positivism

- Critical rationalism;
 - argues that the **truth does not depend** on the number of times **it is verified**, but rather if can it **be falsified**;

Scientific validation should be preceded by the identification of circumstances which may **lead to the rejection of a theory** (null hypothesis);

- An ongoing process which allows scientists to **continually question knowledge** that is held to be 'true';
- Hence **knowledge is objective** and hence **truth is objective**

Positivism

- In social science positivism is closely related to **quantitative methods**:
 - **Questionnaires**
 - **Structured** interviews
 - **Structured** non-participant observation
 - Official **statistics**
- It is an **attempt to be objective**, recreate scientific processes and **test assumptions**
- Sources of **primary data**:
 - In the field the use of **questionnaires and structured** interviews provide a **degree of consistency that can be replicated**

Phenomenology

- Argues that positivists **ignore their own involvement** in the research process by trying to be 'objective' they can not really understand the world,
- In fact **all knowledge is subjective**.
 - Researchers should **study their subjects free of pre-conceived theories** about how they act
 - The search for **understanding** is the goal of social science, not seeking explanation
 - The researcher should seek to **interpret the action of the actors** in society

Phenomenology

- Phenomenology **recognises subjectivity**
 - Aims is to **reconstruct** the worlds of individuals under study
 - Attempt to attach phenomena to **understand their behaviour** and actions
 - Through this you can **attach meaning**
- Sources of primary data:
 - **In-depth** interviews
 - **Focus** groups
 - **Ethnographic** approaches

Post-Modernism

- Argue that these narratives have failed to adequately account for **differences within society**
- Knowledge is both **local and contingent**
 - There are **no standards beyond a particular context**
 - There is **no truth only interpretations** of action
 - They offer '**readings**' rather than 'observations', and '**interpretations**' rather than 'findings'
- Critics of post-modernism suggest that **in arguing there is no one answer**, no one position that is superior or dominant, the world **becomes devoid of meaning** or absolute values

Research Methods

3.2. Defining and planning research

The HD researcher's toolkit

1. Document, **review** and **analyse historical documents** and previous studies
2. **Interviews with individuals** from stakeholder groups and relevant authorities
3. **Focus groups**, utilising homogeneous or heterogeneous participants
4. **Questionnaires** through different means, such as postal, telephone, email or internet surveys
5. **Direct observation** in the field, participating or observing interactions between individuals and groups

1. Document review and content analysis

- Published documents allow you to **identify issues and opinions**
- Provides **legitimacy** to the project
- Gives political, social & economic **rationale**
- Reviewing international, regional, national and local **documentation**
 - Law & Policy
 - Environmental planning & Sustainable development
- Allows the **identification of key individuals** for a topic for follow up using other methods, such as a focused interview

1. Document review and content analysis

*ALSO,
SO THAT YOU DO NOT LOOK FOOLISH
IN YOUR INTERVIEWS OR GROUP SESSIONS*

Gaining access to a community

Gaining Access and Snowballing

- Document review can allow the **identification of key individuals** for a topic
- Then **access** to the community under investigation is usually **negotiated through gatekeepers**
 - These are **influential members of society** that have access to people and respect
 - It is important to **identify multiple entry points** to your research community as gatekeepers can manipulate access to a community according to a hidden agenda
- Further contacts are established through a process called **snowballing** in which you **ask respondents to recommend** interviewees
 - Again, **be careful** with the information as respondents will normally **suggest other people with similar opinions** to the topic

2. Individual interviews

- ‘An interview is a **purposeful discussion** between two or more people’ (Kahn & Cannell, 1957)
- Individual, in-person interviews allow researchers to **probe deeply for reasons** for a response.
 - These **three types of approach** are used, but **are not mutually exclusive**, all can be used during the **same interview session** depending on what sort of information is sought
 1. The **structured** interview
 2. The interview **guide** approach
 3. The **informal** conversational interview

Structured Interview

- Conversation **highly controlled** by interviewer
 - **Standardised questions** asked in same order
 - **Closed and open-ended questions** dependent on research goals
 - **Very structured** format
 - Allows for a **structured analysis**
- Critics point out, **little flexibility**
 - **Pre-defined questions** and topics
 - Researcher makes **assumptions** about what is important

Interview Guide Approach

- Approach **less structured** than in a standardised open-ended interview
 - **Topics and issues** to be covered **specified in advance** in outline form given to the interviewee
 - Provides **greater freedom** to explore avenues of enquiry, specific or of importance to the interviewee
- But, flexibility
 - Questions posed to interviewees **may vary, reducing comparability** of responses
 - Makes **analysis more difficult**

Informal Conversational Interview

- **Lacks any** formal structure
 - **no predetermination** of question topics or wording
 - Questions asked **emerge from the conversation**
 - Respondents encouraged to **relate their experiences**
 - **Challenges the assumptions** of the researcher
 - This method provides **rich and detailed material**
- **But,**
 - the **data can vary** substantially for each respondent
 - data can be **difficult to organise and analyse**

Response issues

Symptom	Possible cause	Solution
Participant is only willing to give yes-no answers	<ul style="list-style-type: none">• Worries about anonymity• Time limited	<ul style="list-style-type: none">• Careful introduction to the interview
Participant uses long answers and loses focus	<ul style="list-style-type: none">• Confusing question	<ul style="list-style-type: none">• Clarify the question
Participant asks for your opinion	<ul style="list-style-type: none">• Lack of knowledge of the topic	<ul style="list-style-type: none">• Include 'no opinion' options
Participant starts to lecture you on your research	<ul style="list-style-type: none">• Strong opinion on the topic	<ul style="list-style-type: none">• Listen and be confident in your hypothesis
Participant become upset in the interview	<ul style="list-style-type: none">• Embarrassing topic	<ul style="list-style-type: none">• Give the participant time to answer• Allow them the option to close the interview

Recording the Material

- You may be **interested in the connections** people make, how they explain their position or behaviour.
 - In the process of **note-taking** you are unable to produce a full record of what is being said;
 - It means that you are immediately **sifting the material**, synthesising it, interpreting what is being said.
- In addition, when people speak their thoughts are **often un-systematic**, they **jump between things**, contradict previous statements.
- However, **taping may inhibit the respondent** to impart sensitive information or express controversial views

Interview Transcripts

- **Transcribing data takes a lot of time**, normally 6x the interview time
 - (1 hour interview = 6 hours transcribing)
- Full or **partial transcription** depends on the study
 - **Exploratory interviews** may only require partial transcription of relevant sections,
 - **Main interviews** are part of main fieldwork, full transcription is good practice
- Ethically you **must to return transcript** to interviewee **for confirmation** of 'on the record' material

3. group research techniques

- A focus group
 - **One-off meeting** between 6 and 12 individuals
 - **Participants asked simply to talk** to each other about the topic
 - Or perform a **series of simple tasks** – such as identifying important areas on a map
 - Participants can be a **homogeneous or heterogeneous group** depending on the topic and the opinions sought

3. group research techniques

- In-depth discussion groups
 - Meet on **several occasions** – group members are consistent
 - Issues explored in **greater depth**
 - Allows a trusting **relationship to develop** between group members
 - **Open and honest discussion**
 - Participants can be a **homogeneous or heterogeneous group** depending on the topic and the opinions sought

The Benefits of groups

- Individuals placed in a **group context**
- Dialogue between individuals **using their own words** and meanings
 - Individuals are **free to challenge** the interpretations, opinions or assumptions of other group members
 - Opportunity to **study group dynamics** – but be aware of the **potential for conflict** if you bring different stakeholders into the group

The Benefits of groups

- Focus groups allow the researcher to **gain insight** into the **social, cultural, political, economic** and personal dimensions of an issue – its 'discourse'
- Both **participants and researchers can learn** from the process
 - Conversations take on their **own dynamic, spontaneous debates** can reveal unexpected findings

Composition of the Group

- The **selection of group** members is as important as the techniques used to run them
- Choice of participants **justified by the theoretical-conceptual issues** underpinning the research
 - Group **homogeneity**
 - Seeking to identify key issues **within a sector** of society
 - Group **heterogeneity**
 - When seeking to **investigate and transfer knowledge** between groups that don't normally associate

Practical issues of running a group session

- Practical and procedural issues
 - **Drop-out rates**
 - Dependent on the topic and it's interest to the community
 - **Choice of venue**
 - Aim is to make participants relaxed

Practical issues of running a group session

- Practical and procedural issues
 - Refreshments
 - **Non alcoholic**, especially in heterogeneous groups
 - Posters and post-its
 - **Graphics are often better for transfer** of information and clarity, also provides documentation
 - Lay-out of room
 - chairs **arranged in circle** without table
 - check **recording equipment**

Running a group session

- Introduction
 - **Short introduction** by facilitator describing research and reasons for discussion
 - Ground rules
 - ‘**Chatham house**’ rule – **information may be used by all**, but **without identification** of the origin
 - **One person** to speak at one time, **no side conversations**
 - Name exercise
 - **Beginning with facilitator**, write name on flip-chart
 - Establish **equity** between group members
 - **Identity not defined by position** or organisational affiliation

Role of Facilitator

- Ask a **few key questions** to structure the discussion;
- Give **people time and space** to express their views
- **Intervene if the discussion is deviating** too far from subject matter
- Ask **follow-up questions** to pursue interesting topics
- Maintain an **objective position**, not provide their perception

Role of Facilitator

- Intervene to **prevent disputes**, or to **quieten dominant characters**, or draw in non-contributors
- Facilitator accompanied by a **participant-observer**.
 - Observer responsible for **watching the dynamics** of the group
 - **debrief facilitator** during any breaks
- **Independent professional facilitators** are often good mediators

4. Questionnaires

- Mail surveys
 - **Cost effective** method of gathering information.
 - Ideal for **large sample sizes**
 - Sampling a **wide geographic area**.
 - **No interviewer bias**.
- BUT,
 - **Lack of detailed** information
 - May take a **long time to complete**
 - **Non-reporting**
 - **No selection** process

4. Questionnaires

- Telephone surveys
 - **Fastest method** for a **relatively large** sample (100-400).
 - The interviewer follows a **prepared script** that is essentially the same as a written questionnaire.
 - Telephone surveys generally **last less than ten minutes**.
 - Telephone survey allows the **opportunity for some opinion probing**
- BUT,
 - Typical **costs can be high**
 - Lots of people consider them to be **harassment calls**

4. Questionnaires

- E-mail and internet surveys
 - The most **cost effective**
 - **Fastest method of distributing** a survey

 - BUT,
 - Relatively little is known about the **effect of sampling bias**
 - The **demographic profile** of the internet user may **not represent the general population**
 - Many are considered as **SPAM**

4. Questionnaires

- Interview questionnaire
 - Good method for a **relatively small sample** (100-200).
 - The interviewer has the **opportunity to add additional information** for clarity
 - Opportunity to **see body language**

 - BUT,
 - Problems with **consistency if more than one interviewer** is used
 - Typical **costs can be high**

5. Direct observation

- Researcher can visit sites and **observe behaviour** and activities directly.
- Most often done where understanding in **social and cultural context** is important,
- Particularly those **strongly dependent on the resource**



Clifford Geertz - Notes from a Balinese Cock Fight

Ethnographic Approaches

- Participant observation
 - **Makes no assumptions** about what is important,
 - **Does not impose** researcher assumptions
 - Ideas are **developed from observations**
- Engaging in and **experiencing a social scene**
- Immersing yourself in the **day-to-day practices** of the people you are attempting to understand
 - Allows **insight into understanding action** and how people respond to changing circumstances

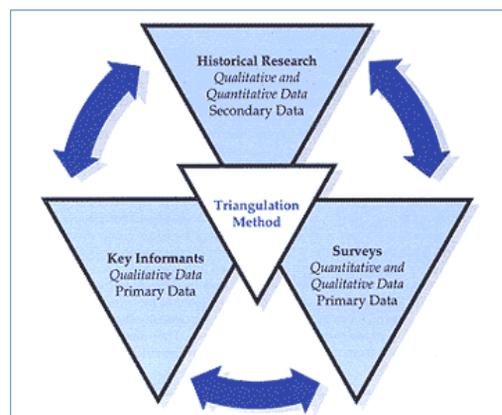
Participant Observation in Practice

Data recording

- Extensive **note-taking**
 - Focus on **social processes**,
 - negotiation of **changing situations**,
 - people's **actions and motivations**,
 - the **nature of relationships**,
 - the **order and setting** in which events take place,
- Contextual descriptions,
 - use of **language**,
 - as well as the **observer's analytical notes**
- Use of a **research diary**

A Mixture of Approaches?

- Linking **two or more approaches** is useful for pragmatic reasons
 - Affords **triangulation** of the results.
 - Helps **validate** material
 - Allow **cross-checking**
 - Results **more complete**
 - Ensures **authenticity**



A Mixture of Approaches?

- Is there a specific **chronology to the order** in which these different methods are used?
 - Conducting a **broad-brush survey** first
 - the other way round?



Collating results and analysis

Analysis

- What do you do with the transcripts?
 - 30-40 interviews, **200 pages** of transcripts
 - 3-4 focus groups, **200 pages** of transcripts
 - 100-200 questionnaires, **200-400 pages**
 - Research diary, **200 pages**
- Review and content analysis
 - Development of deductive and inductive codes

Analysing the Material

Coding

- A code is a **word or phrase that is representative** of your theory or a part of your theory
 - Quantitative technique
 - Content analysis – **codes or words counted for number of times** they appear in the interview
 - Qualitative approach
 - not how often words or phrases appear, but **what they imply and how they are connected**

Analysing the Material

- Two approaches to coding and analysing the material using a theoretical framework:
 - A deductive approach
 - Grounded theory - an inductive approach

Deductive analysis

Deductive analysis tests an **established theory**

- Applying a **pre-conceived theory** to your data
- Drawing up a **list of codes prior** to your survey and then applying them to your data
- This is **validation or non validation** of your hypothesis
- Applied to both quantitative and qualitative methods, but favoured **more for quantitative methods**.

Grounded Theory - an inductive approach

Grounded Theory is **derived from the data**

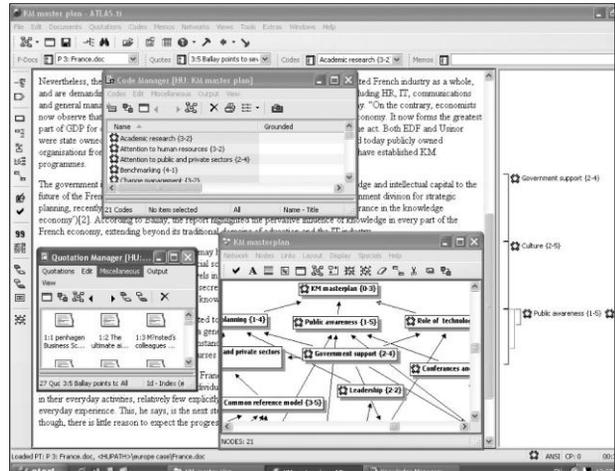
- **No pre-determined** theoretical position,
- **Few assumptions** in relation to the research question
- Theory is **built up from what people say**
- An **open approach to interviewing** is used so as not to close off any avenues of investigation
- More often used in **qualitative methods**

Coding and Analysis in Practice

- In reality a **mix** of these two techniques are normally undertaken
 - Most researchers have **some theory in mind** when undertaking research
 - Most start with a **rough coding frame**
 - **New areas of interest emerge** and
 - **Some codes are then rejected** as obsolete
 - **Relationships between codes** may then be elaborated
 - Codes may also be **merged as participants use different words** and phrases for the same meaning

Tools for analysis

- Old school
 - Post-it notes
 - Highlighter pens
- **Computer-Assisted Qualitative Data Analysis**
 - The Ethnograph
 - QUALOG
 - SONAR
 - NUDIST
 - Atlas Ti



The Politics of Qualitative Research

Researcher responsibility

- Managing **expectations**
 - Expectations of **change** brought about by the study
- **Extraction** from the research community
 - **Maintaining links** to academic or institution
- **Feeding back**
 - Creating a 'lay-paper'
- **Ethics**
 - Honesty

The Politics of Qualitative Research

Researcher **positionality**

- **Relationship** between researcher and researched
- 'Going **native**'
- Researcher **fatigue**
- Study group **fatigue**

- No researcher is **truly objective** as each will be influenced, either implicitly or explicitly, by **their life experiences**.
- The **detached, cool, calm, and collected fieldworker** does not exist.
- We are equally capable as researchers **of changing and being changed by the societies** in which we live and study along with our 'subjects' (Cook & Crang, 1995).

Conclusion

- What is your **motivation** for this research?
 - Advocacy?
 - Science?
 - Management?
- Your **results should fulfil your aims** and objectives

Questionnaires

(or structured interview)

Peter Mackelworth

What is a questionnaire?

- A series of questions designed to **generate information** from a specified demographic group;
- Questions should be devised with an **objective or objectives** in mind;
- How you develop these questions will **influence the respondents** participation and even information that they give you.

Theoretical framework?

Positivism – seeking to **validate or test** a hypothesis

Design considerations

- The **validity** of the research is dependent on defining a **good questionnaire**
 - Bad questionnaires make **analysis difficult** and can even **invalidate the process**

Design considerations

- Time spent on **design** will reduce time spent in analysis
 - Each question must provide a **valid and reliable** measure
 - Questions must **clearly communicate** the research intention to the respondent
 - There must be a **logical flow** to keep the respondent interested

Goal is to collect information that is:

- Valid – **appropriate** to the research hypothesis
- Reliable – is **consistent** and reproducible
- **Unbiased** – does not over or under estimate the true values
- **Discriminating** – can distinguish between respondents responses

- Are the questions **relevant**?
 - Do they **reflect** the research problem?
- Are the questions **accurate**?
 - Do they accurately depict the attitudes, behaviours, etc. they are intended to investigate ?
- Do respondents **have the necessary information**?
 - is this the right demographic group for the study?

- Do respondents **understand and interpret** the question correctly?
- Will respondents **give the information**?
 - are the question you are asking sensitive, is there a potential to upset the respondents?

Design considerations

1. What are the **primary and secondary aims** of the study?
2. **What information** do you want to collect related to these aims?
3. What does the **current literature**, including previous Qs, say?
4. Compose a **first draft** of the Q
5. **Pre-test** the Q
6. **Revise** the Q
7. Assemble and **undertake** the final Q
8. **Analyse** the data

1. Aims

- What is your hypothesis?
 - Write out the **primary aim**
- Is there the opportunity to look at **secondary aims**?
 - Write out secondary aims
- Define your **target population** in association to the primary and secondary aims
 - General population
 - Sub-category of a population
 - Gender, age, occupation?

2. Information

- What **information** are seeking to access?
 - Attitudes
 - Behaviour
 - Demographic data
 - Preferences
- How can you **convert these concepts** into a measurable outcome?
 - Different forms of questions, dichotomous, scaled...
 - Consider your analysis

3. Literature

- Review the **current literature** to identify related survey and similar concepts
- May **save you time and allow** comparisons, however,
- If you 'borrow' a concept from another Q, ensure that you know the **underlying hypothesis** and that it is comparable to your hypothesis

4. 1st Draft

- **Mode** of survey
 - **Face to face** interviews
 - Telephone interviews
 - Internet
 - Self completed
- **Develop your theories** beyond the original scope and then cut back
- Try to consider **Q length, format and flow**
- Ensure **primary questions** are towards the **start** of the Q

5. Pre-test

- To ensure that the Q **meets the expectations** in terms of the information that will be obtained
 - Is a question **necessary**?
 - does it serve a purpose?
 - will the information be used?
 - Missing **important variables** in the potential answers?
 - does it provide the info needed
 - **Match** questions to objectives

5. Pre-test

- Check specific questions for
 - **Unexpected** variations
 - **Double** meanings
 - **Difficulty**
 - Maintain **respondent interest** and attention
 - Ambiguous, **ill-defined**, loaded, double-barrelled questions
- For the whole Q
 - **Flow**
 - **Skip** patterns
 - **Length**
 - Maintain **respondent interest** and attention

- **Shorten** the set of questions for the study
- If a question **does not address** one of your aims, **discard it**
- **Refine** the questions included and their wording
- Ensure the **flow is natural**
- Verify that **terms and concepts are familiar** and easy to understand for your target audience
- Keep **recall to a minimum** and focus on the recent past

- Opening the Q clearly state:
 - **Your name, the name of organisation** you represent and the **reason** for survey and topic
 - State that **no selling will be involved and no personal data** other than for this study and your policy on confidentiality
 - Tell respondent **approximate time to complete**, reinforce that respondent's time is appreciated and invite to participate
 - Instructions on **how to fill out** the questionnaire
- Closing the Q
 - **Thank** for your time
 - Ask if they had a **positive experience** and remind them that **their opinions count**

- **Group questions** concerning **major subject areas together** and introduce them by heading or short descriptive statements.
- Order questions in order to **stimulate recall**.
- Order and format questions to **ensure unbiased and balanced** results.
- Include **white space** to make answers clear and to help increase response rate.

- **Space response areas** widely enough so that it is easy to circle or check the correct answer without accidentally including the answer above or below.
 - Open-ended questions: **the space** for the response should be **big enough** to allow respondents with large handwriting to **write comfortably** in the space.
 - Closed-ended questions: **line up answers vertically** and precede them with boxes or brackets to check, or by numbers to circle, rather than open blanks.
- Use **larger font size** (e.g., 14) and **high contrast** (black on white).

- There are **multiple programmes** for collating and analysis
 - Excel, Atlas Ti, SPSS
- Generally as Qs are **structured, analysis is similar** to natural sciences
- Excel **add-ins** available online
 - Solver
 - Data analysis tool-pack

RETURNING TO DRAFTING THE Q

- Open-ended questions - advantages
 - A **range of responses and information** can be obtained
 - Answers based on **respondent's frame of reference**
 - Lack of influence, **you don't channel** respondents thinking
 - Can help **interpret closed-ended questions** - why
 - Particularly useful as **introduction to survey** or topic
 - When it's important to **measure the salience** of an issue
 - When **too many possible responses** to be listed or unknown

- Open-ended questions - disadvantages
 - Based on the **ability and/or willingness** of respondent to answer
 - **Interviewer's attitude can** influences response
 - **Time consuming** (interview sessions, tabulation, classification, assignment, validation)
 - Difficulty in **coding** analysis
 - Require respondents to be **articulate**
 - Respondents may **miss important points**
 - **Non-response**

- Closed-ended questions – advantages
 - **Ease** of understanding
 - Requires **less effort** on part of interviewer and respondent
 - Ease of **tabulation & analysis**
 - **Less error** prone
 - **Less** interviewer **bias**
 - **Less time** consuming
 - Answers **directly comparable** from respondent to respondent

- Closed-ended questions – disadvantages
 - **Middle/Neutral categories often** selected inappropriately (ignorance, safety)
 - **Less opportunity for self-expression** or subtle qualifications
 - **Less involving** for respondents
 - Order of **response categories** can have major impact on results

Forms of questions

- Dichotomous questions

Yes No

Agree Disagree

- **Easy** to administer and analyse
- But, polarised responses, **no variation**, absence of grading

Forms of questions

- Multiple choice

1 2 3 4 >5

- More **detail and differentiation** between respondents
- But, are **all the alternatives included, too many alternatives?**

Forms of questions

- Scaled response (eg Likert scale)

1 2 3 4 5

Where 1 is like a lot and 5 is dislike intensely

- **Easy to code and more powerful statistically**
- But, easy for respondents to **misunderstand and error prone**

Forms of questions

- Filter questions
 - **screens out respondents who are not qualified** to answer a second question
- Pivot questions
 - is a type of **filter question that is used to determine what version of a second question** to ask.
- Transition questions
 - **Movement between sections or topics**

Q. How many cups of coffee or tea do you drink in a typical day?

Ask a question in **only one dimension**, separate into **two distinct questions**:

- ✓ How many cups of coffee do you drink in a typical day?
- ✓ How many cups of tea do you drink in a typical day

Wording

- Use **simple, direct, conversational language**
- Do not use **leading questions** that suggest or imply certain answers
- Do not use **loaded questions** that suggest social desirability, or are emotionally charged
- Words such as “often”, “occasionally”, “usually”, “regularly”, “frequently”, “many”, should be **used with caution**.

Q. Which mobile phone do you have?

1. iPhone
2. Samsung

Avoid assumptions, accommodate all possible answers

- ✓ Do you own an iPhone?
- ✓ Do you own a Samsung mobile phone?

or

✓ What brand of mobile phone do you have?

1. iPhone
2. Samsung
3. HTC
4. Other
5. ...
6. ...

or

✓ What brand of mobile phone do you have?

1. iPhone
2. Samsung
3. HTC
4. Other
5. I have two, three or four... (circle all that apply)
6. ...

or

✓ What brand of mobile phone do you have?

1. iPhone
2. Samsung
3. HTC
4. Other
5. I have two, three or four... (circle all that apply)
6. Don't own a mobile phone

Q: Have you had pain in the last week?

Never Seldom Often Very often

- **Make sure the Q and answer options match**, reword either question or answer to match.

Q: How often have you had pain in the last week?

Never Seldom Often Very Often

Q: Where did you grow up?

1. Country
2. Farm
3. City

Avoid questions having non-mutually exclusive answers, design the question with mutually exclusive options.

Where did you grow up?

1. House in the country
2. Farm in the country
3. City

Q: Do you currently have a life insurance policy?

(Circle: Yes or No)

If no, go to question 3.

(3) How much is your annual life insurance premium?

- **Avoid branching as much as possible to avoid confusing respondents**, if possible, write as one question.

How much did you spend last year for life insurance?

(Write 0 if none).

- The **layout and physical attractiveness** of a questionnaire are important aspects – **if you are allowing self-administrating**
- Questionnaires should be **designed to appear as short as possible**
- Questionnaires **should not appear overcrowded**
- Leave **lots of space** for open ended questions

- When writing questions and assembling the final questionnaire, edit with a view towards **clarity**:
 - relevance
 - importance
 - interest of the survey to the respondent
- Consider **pre-notifying those in your sample or sending reminders** to those who received the survey (if self-administered).
- Studies have shown that making **contact with the sampled individuals increases the response rate.**
- If possible, offer an **incentive.**

- Some **people will not respond regardless** of the interest, incentives or importance of the topic;
- Understanding the **characteristics** of those who did not respond to the survey **is important to quantify** what, if any, **bias exists in the results**.
- **Do not take it personally!**

Questionnaire structure

- Initial questions – screening and rapport questions
 - Hello.
 - My name is ____ and I am undertaking a study as part of my course work for the University.
 - We are talking to individuals today about ____.
- Main body
 - Topic specific questions
- Final - demographic questions
 - Gender
 - Age
 - Income
 - Origin (where are you from)

- Time spent on design will reduce time spent in analysis
 - Ensure your hypothesis is well considered and relevant
 - Discuss the research problem with your peers
 - Review, revise and test the Q
 - Ensure that the Q is replicable and easy to follow

Student Exercise

The questionnaire

Student exercise

In groups (one from each of the previous groups from the triage exercise)

*select a current **environmental issue***

Devise the primary and secondary objectives of the study.

*Your objective is to interview **20 people each** and make a basic analysis of public opinion on the issue*

- You will have to make a **20 minute presentation**
 - The **opinions of the people** you interviewed
 - How to **resolve the issues** raised by your topic
- Each of you will **present**
- *the **grade** will be allocated based on:*
 - the **construction of your Q** – please **email** me a **copy in English**
 - the **presentation and analysis of the results of the Q**
 - you will be graded on the **overall presentation AND your individual skills**
 - the **potential solutions** to mitigate your environmental issue

- Basic use of **excel to analyse proportions** in the data and draw any **simple conclusions** on the questionnaire
- Look at potential **links between demographics and opinions**
- Consider how would you **create an educational programme** to overcome issues of lack of awareness of your issue

EuroTurtles example

Peter Mackelworth

D1

- Monitoring of the impact of the project actions (mandatory)
- ACTION D1 : Assessment of the socio-economic impact of the project on the local community and population
- Two Questionnaires designed:
 - Q1 – targeting local stakeholders (fishers and tourism workers)
 - Q2 – targeting tourists and visitors

Q2

- Questionnaire 2 is designed to **access information from tourists and visitors** to the region to assess their **level of knowledge and their valuation** of the importance of sea turtles;
 - It will provide information about where to **target structured educational programmes** for public awareness;
 - It will provide information on the **awareness of real and perceived threats** to sea turtles in the regions covered by the project;
 - It will provide details on **potential solutions to mitigate threats and identify funding mechanisms** to offset unsustainable practices and provide funding for management;

Two important issues: region and respondent

REGIONS

- Interviewers should be careful **how a respondent might perceive a ‘region’**.
 - **The definition ‘region’** may not be the same for everyone. For someone from US coming to Croatia for the first time, the region is probably, Croatia. Someone who has visited Croatia 10 times, the region may be smaller than that defined by you.
 - It is **important that the ‘region’ is consistently applied** otherwise it will be **extremely difficult to interpret the results**;
- The definition of the ‘region’ also has **implications for defining the sample respondents**.

Two important issues: region and respondent

RESPONDENTS

- **Respondents** are **domestic and foreign visitors/tourists** visiting your region;
- However, please be aware that **same-day visitors and tourists** have different definitions
 - **Same-day visitors** are people on a **day trip**;
 - **Tourists are overnight visitors**;
- This has **implications for their motivations** to be in your region;
- Are **same-day visitors of interest** in this survey for your region? E.g., a region of interest may have **no accommodation facilities**, so the majority of visitors to that region are **same-day visitors** (without overnights within the region);
- If not **Q2 can act** as a filter question;
 - If the **answer is 0**, then the respondent is a **same-day visitor**;
 - If the **answer more than 0**, then the respondent is a **tourist**.

Two important issues: region and respondent

RESPONDENTS

- Another issue is, are you interested in **all tourists within the region**, regardless the type of accommodation type?
 - Those in non-commercial accommodation may have **different motivations for being in the region** – a cheap holiday, visiting friends or family; this may complicate the distribution of respondents, as there is **usually no official data on this segment of the industry**.
 - **Q1** can act as a filter question – are you interested in those staying **only in commercial accommodation facilities**?
 - If the response is **point 4**, then this is a **non-commercial tourist**
 - Any **other response**, then this is a **commercial tourist**

How to fill the Q

- **Each question has its own instructions.** The most common type of answering to the questions is either **yes/no** or, **circle just one answer**. Questions follow one after the other, there are **three exceptions** that are used **to pivot respondents to other questions** depending on their answer:
 - Depending on the answer to **Q16**, continue to **Q17** or **Q18**.
 - Depending on the answer to **Q18**, continue to **Q19** or **Q20**.
 - Depending on the answer to **Q20**, continue to **Q21** or **Q22**.
- The **most important part of the questionnaire** are the scenarios on the threats and mitigations to the sea turtle populations (**Q13 - Q14**) and the questions on willingness to pay (**Q15 – Q21**). **IT IS IMPORTANT TO READ THE SCENARIOS AND THE QUESTIONS ON WILLINGNESS TO PAY** as they are written.

Q1. – Q.3

- **Q. 1 – Q. 3 – reinforce the definition of the ‘region’ and identify the ‘category’ of tourist/visitor (see section 2; regions and respondents) this linked with Q22 (country of permanent residence) provides information about the representatively of the sample; Q.1 and Q.2 can be used as filter questions according to your contextual situation, see section 2 for details.**

Q1. – Q.3

Q. 1 – circle one answer; this **identifies the ‘category’ of visitor/tourist**, which applies to the structure of the **sample to be representative in your region**;

- point 3 refers to a small-scale Bed & Breakfast, private apartments and would include Air BnB;
- point 4 implies that there are **no accommodation costs** incurred;
- point 5 maybe a **‘live-aboard’ boat or personal rental only**, if it owned by the respondent or friends then it should go under point 4 as there are no costs incurred;

Q. 2 – number of nights sleeping in this **region**;

- This is a regional question and **your definition of ‘the region’** should be reinforced;

Q. 3 – circle one answer;

- point 1 means that this is **their first time** to visit the region;
- This is a regional question and **your definition of ‘the region’** should be reinforced;

Q4. – Q.8

- **Q. 4 – Q. 8 – linking marine environmental quality and sea turtles, identifying if they are considered as environmental ‘indicators’ by the respondents, can we establish a link between sea turtles – marine environmental quality – tourism satisfaction?;**

Q4. – Q.8

Q. 4 – circle one answer; motivational question;

- this specifically looks at the **motivation of the respondent** and the **importance of the marine environmental quality in the decision making process** of selecting their visit/holiday;

Q. 5 – circle one answer; satisfaction question;

- this follows up from the previous question to **ascertain their satisfaction** with marine environment on their **trip to this region**;

Q4. – Q.8

Q. 6 – circle one answer; conversion to action question;

- following the logic of the previous 2 questions, does their **satisfaction convert into action**, i.e. another visit and hence more expenditure in the region;

Q. 7 – this ascertains the level of knowledge of the respondent;

- This is contextual to the region linking **Q5** and **Q8**;

Q. 8 – circle one answer only; this seeks an opinion

- to find out if there is a connection **between sea turtles and marine environmental quality** and can be related to **Q5**.

Q.9 – Q.12

- **Q. 9 – Q. 12 – marine policy – specifically looking at the Natura 2000 aspect of the project, can this LIFE project identify a link between sea turtle species and habitat protection?**

Q.9 – Q.12

- Q. 9** – this ascertains the level of knowledge;
– and sets up for the next section **Q. 13 – Q.14**; potentially **identifies where more public awareness activities** are required;
- Q. 10** – this ascertains the level of knowledge;
– following the logic from the Q9, this is a **specific policy question**; **again offers an insight into where public awareness** could be focussed;
- Q. 11** – this is a decision question;
– This specifically refers to **policy and is clearly differentiated from the economic questions**; this may have wider **implications for support of Natura 2000** designations;
- Q. 12** – circle one answer, this is an opinion;
– forms the **link between Q11, Q8 and by association Q5**; potentially identifies a link between these concepts;

Q.13 & Q.14

- **Q. 13 – Q. 14 – specific threats with the target ‘region’ – this should be specific to the countries and regions involved – identifies levels of knowledge**

Q.13 & Q.14

- Q. 13.1** – circle one answer only; this seeks an opinion;
– one potential **direct effect of boating tourism** that could be mitigated by **direct local management actions**;
- Q. 13.2** – circle one answer only; this seeks an opinion;
– this is a **general anthropogenic threat** in the region;
- Q. 13.3** – circle one answer only; this seeks an opinion;
– bycatch in commercial fisheries is accidental catch, not hunting, that could be mitigated by **direct local management actions**;

Q.13 & Q.14

- **Questions related to tangible commitments – which vary in their requirements to commit in both financial and behaviour actions; these questions show a step-wise commitment:**
 - **1. Speed limit – small commitment especially to most tourists without a boat;**
 - **2. No plastic bags – small financial (one off payment) and behavioural commitment;**
 - **3. Certified products – larger financial (repeated payment) and behavioural commitment**

Q.13 & Q.14

- Q. 14.1** – this seeks a commitment related to Q13.1;
 - This ascertains **support for management actions** but **no financial commitment**
 - and in most cases **no, or a small, behavioural commitment;**
- Q. 14.2** – this seeks a commitment related to Q13.2;
 - This ascertains the motivation for a **small financial and behavioural commitment** by the respondent;
- Q. 14.3** – this seeks a commitment related to Q13.3;
 - This ascertains the potential for a **market for ‘certified’ products** from the region
 - **Explicitly** seeks the potential for a **stronger financial and behavioural commitment** from the respondent;
 - **Eco-methods would include TEDs, LED light, rounded hooks, education of fishermen and certification**

Q.15 – Q.21

- **Q. 15 – Q21 – This section provide three distinct willingness-to-pay scenarios.**
 - Two scenarios are termed as having a ‘use-value’, i.e. the respondent would receive some **tangible benefit in return for a payment**. These provide information on the **viability of the creation of alternative livelihoods in the region**, such as wildlife watching and rescue-education centres.
 - The third scenario is a ‘non-use-value’, which refers to a payment made which has no tangible benefit to the respondent. This final scenario provides information on the **potential for funding for management and enforcement if a Natura 2000 site were created**.

IT IS IMPORTANT TO READ THIS SECTION VERBATUM. PLEASE DO NOT DEVIATE FROM THE TEXT

Q.15 – Q.21

- Q. 15** – this is a question which identifies **visibility of the species in the wild**;
 - **Sets up following Qs looking at the demand** to interact in some way with sea turtles;
- Q. 16** – this is a pivot question;
 - Looking at the potential for **alternative livelihoods** related to the presence of sea turtles in the region;
- Q. 17** – circle one answer only; this investigates the **demand for a ‘use-value’** associated with turtles – marine wildlife;
 - asks the recipient to **pay a premium for a dedicated ‘wildlife product’**, which provides a **tangible experience for the respondent**
 - provides information on the **potential for alternative livelihoods** based on a ‘wildlife product’

Q.15 – Q.21

Q. 18 – this is a pivot question;

- this looks at the **potential to combine alternative livelihoods with the demand for rescue and educational centres**;

Q. 19 – circle one answer only; provides a **'use-value'** where the recipient to pay for a **tangible experience**;

- ascertains the **financial sustainability for new rescue and education centres**;
- identifies **potential for new educational resources and financial sustainability**;

Q.15 – Q.21

Q. 20 – this is a pivot question

- looks at a **'non-use-value'** – i.e. there is no direct benefit for the recipient;

Q. 21 – circle one answer only; looks at the potential for developing a conservation fund;

- the creation of an **alternative funding mechanism for the sustainability** of conservation actions;
- possible **provision of funding for management and enforcement strategies**;

Q.22 – Q.26

- **Q. 22 – Q. 26 – about you – provides contextual information about the respondent, many of the questions are self explanatory and some are to ensure the sample structure is appropriate**

Q.22 – Q.26

Q. 22 – this identifies the origin of the tourist/visitor and will help to structure the sample to be representative

- this data can also be utilised to look at the **different strategies** that can be put into place **to educate visitors before they come to the region;**

Q. 23 – for this data it is important to interview one person only at a time, and will help to structure the sample to be representative

Q. 24 – for this data it is important to interview one person only at a time, and will help to structure the sample to be representative

Q.22 – Q.26

Q. 25 – indicate in this question the highest level of education attained;

- education is often **associated with deeper knowledge** about ecological systems;

Q. 26 – circle one answer only; this question can be a **little tricky**, some people will not be prepared to answer this, you can reiterate that this is an **anonymous survey**, but if necessary leave this blank;

- income is also often **associated with great knowledge** of environment and ecology;

How much is an Ecosystem worth?

Peter Mackelworth

Ecosystem Definition:

*A **dynamic complex** of plant, animal, and microorganism communities and the non-living environment, interacting as a **functional unit**. **Humans** are an **integral part** of ecosystems (Millennium Ecosystem Assessment, 2005)*

Motivation

- The international community is pushing to reduce biodiversity loss by 2020
 - **Aichi strategic goals**
- We are in the middle of the '6th great extinction event'
 - **Natural vs anthropogenic** variability, resilience and thresholds
- One reason suggested for the lack of advancement is **the inability** for people to **economically value** biodiversity and ecosystems
 - **Ecosystem services and goods**

Aichi 2010

- The **tenth meeting** of the Conference of the Parties to the Convention on Biological Diversity (CBD), held October 2010, in Nagoya, Aichi Prefecture, Japan.
 - Adopted a revised and updated **Strategic Plan for Biodiversity**, including the Aichi Biodiversity Targets, for the **2011-2020 period**.
 - This plan provides an **overarching framework on biodiversity**, not only for the biodiversity-related conventions, but for the **entire United Nations system** and all other partners engaged in biodiversity management and policy development.
- Parties agreed to translate this overarching international framework into revised and updated **national biodiversity strategies and action plans within two years**.

Aichi

Some examples of the **Aichi Biodiversity Targets** are:

- **At least halve** and, where feasible, bring close to **zero the rate of loss of natural habitats**, including forests
 - conservation target of **17% of terrestrial and inland water** areas
 - and **10% of marine and coastal** areas
- **Restore at least 15% of degraded areas** through conservation and restoration activities

Aichi strategic goals

- **Strategic Goal A:** Address the **underlying causes** of biodiversity loss by **mainstreaming** biodiversity across government and society
- **Strategic Goal B:** Reduce the **direct pressures** on biodiversity and promote sustainable use
- **Strategic Goal C:** Improve the status of biodiversity by **safeguarding** ecosystems, species and genetic diversity
- **Strategic Goal D:** Enhance the **benefits to all** from biodiversity and ecosystem services.
- **Strategic Goal E:** Enhance implementation through **participatory planning, knowledge management and capacity building**

Aichi strategic goals

Strategic Goal A:

*Address the **underlying causes** of biodiversity loss by **mainstreaming** biodiversity across government and society*

Aichi strategic goals

Strategic Goal A:

Target 1

*By 2020, at the latest, people are **aware of the values of biodiversity** and the steps they can take to conserve and use it sustainably.*

Target 2

*By 2020, at the latest, **biodiversity values have been integrated into national and local development plans...***

Aichi strategic goals

Target 3

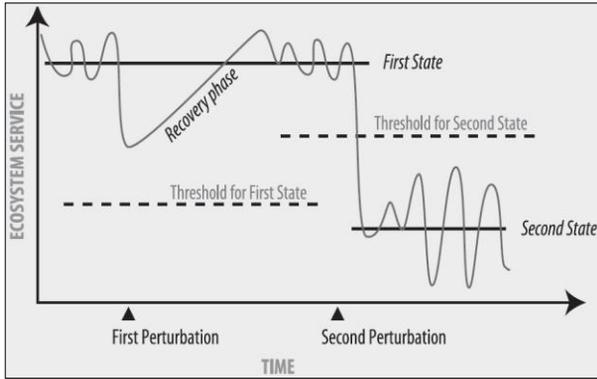
*By 2020, at the latest, **incentives, including subsidies, harmful to biodiversity are eliminated**, phased out or reformed in order to **minimize or avoid negative impacts**, and **positive incentives for the conservation and sustainable use of biodiversity** are developed and applied*

Target 4

*By 2020, at the latest, **Governments, business and stakeholders** at all levels have taken steps to achieve or have implemented plans for **sustainable production and consumption** and have kept the **impacts of use of natural resources well within safe ecological limits**.*

The 6th great extinction event?

Uncertainty & Variability

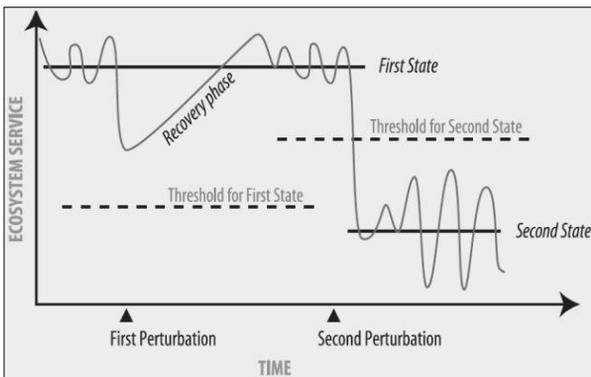


Variability

- **Changes** in the stocks and flows over time
 - **Seasonal** variability
 - **Population** variability
- **Past conditions** and processes provide **context and guidance** for managing ecological systems today
- Defining the **difference between natural and anthropogenic** caused variability

Ecosystems and Human Well-being: A Framework for Assessment

Uncertainty & Thresholds



Thresholds

- Small change may be the **'tipping' point** in an ecosystem
- Represent dramatic and sudden changes to a system **outside the normal** variability
- Can be **very difficult or impossible** to recover to the original state

Ecosystems and Human Well-being: A Framework for Assessment

Resilience

'the ecosystem's ability to repair itself following disturbance and inertia to its ability to resist change when stressed' (Westman, 1978)

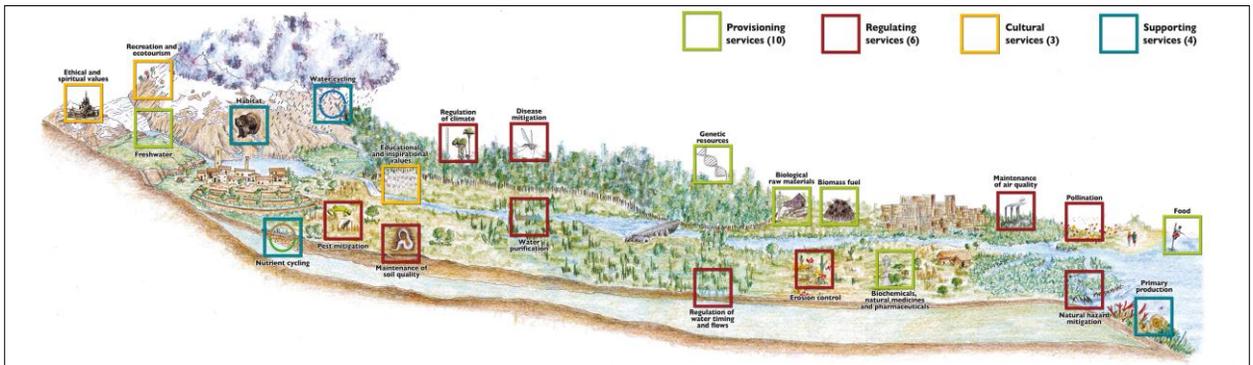
- a measure of the **ability of a system to return to its original** state after a perturbation— **a deviation in conditions that is outside** the range experienced **over a decade or more**
 - **a natural example:** large-scale fire or an unusually severe drought.
- When the duration of the **recovery phase is short** in comparison to other systems, the system is **considered to be more resilient** than the others.

Valuing ecosystems

Ecosystem goods and services

The world's ecosystems provide a **wide range of services and goods** that enable human well-being

- Provision
- Regulation
- Cultural
- Supporting



Costanza et al. 1997:253

*Ecosystem **goods** (such as food) and **services** (such as waste assimilation) represent the **benefits human populations derive**, directly or indirectly, from ecosystem functions*

Main ecosystems and their services (MEA, 2005)

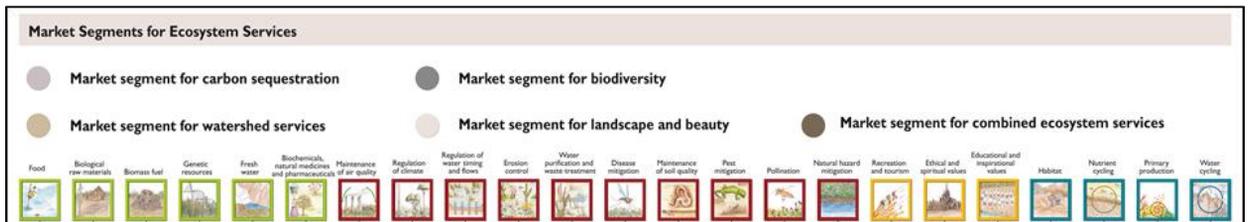
Ecosystem service	Ecosystem									
	Cultivated	Dryland	Forest	Urban	Inland Water	Coastal	Marine	Polar	Mountain	Island
Freshwater			•		•	•		•	•	
Food	•	•	•	•	•	•	•	•	•	•
Timber, fuel, and fiber	•		•			•				
Novel products	•	•	•		•		•			
Biodiversity regulation	•	•	•	•	•	•	•	•	•	•
Nutrient cycling	•	•	•		•	•	•			
Air quality and climate	•	•	•	•	•	•	•	•	•	•
Human health		•	•	•	•	•				
Detoxification		•	•	•	•	•	•			
Natural hazard regulation			•		•	•			•	
Cultural and amenity	•	•	•	•	•	•	•	•	•	•

Main ecosystems and their services (MEA, 2005)

Ecosystem service	Ecosystem									
	Cultivated	Dryland	Forest	Urban	Inland Water	Coastal	Marine	Polar	Mountain	Island
Freshwater			•		•	•		•	•	
Food	•	•	•	•	•	•	•	•	•	•
Timber, fuel, and fiber	•		•			•				
Novel products	•	•	•		•		•			
Biodiversity regulation	•	•	•	•	•	•	•	•	•	•
Nutrient cycling	•	•	•		•	•	•			
Air quality and climate	•	•	•	•	•	•	•	•	•	•
Human health		•	•	•	•	•				
Detoxification		•	•	•	•	•	•			
Natural hazard regulation			•		•	•			•	
Cultural and amenity	•	•	•	•	•	•	•	•	•	•

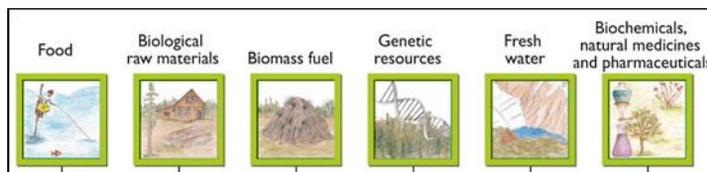
MEA

- The millennium environmental assessment identifies 23 different ecosystem services with potential market interest:



Provisioning services

- Food
 - Food products – fruit, veg, meat, fish
- Biological raw materials
 - Skins and materials for clothing & building
- Fuel
 - Wood, faeces, other energy sources
- Genetic resources
 - Genetic information and genes
- Fresh water
 - Links also to regulating services
- Bio-chemicals, natural medicines and pharmaceuticals
 - Most medicines are derived from natural resources



Regulating services

Air quality
Filtering through habitats

Climate regulation
Shading and protection of soils

Water regulation
Seepage into soil

Erosion control
Binding of soils

Water purification and waste treatment
Wet land filtration

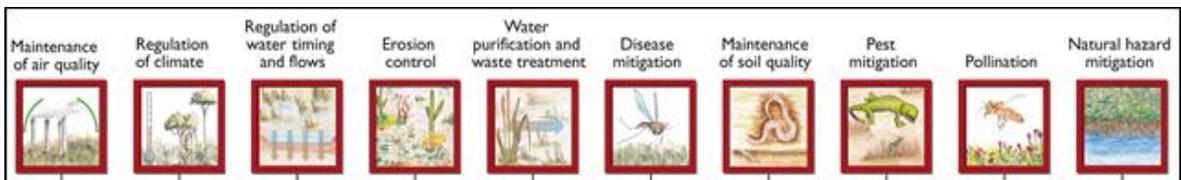
Disease mitigation

Soil quality
Soil mixing

Pest mitigation
Insect predation

Pollination

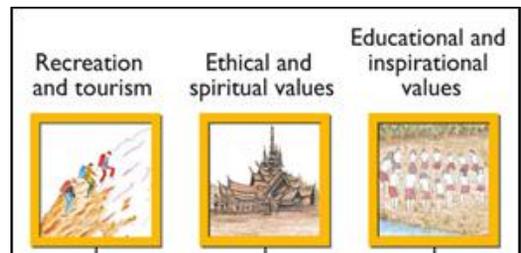
Natural Hazard Mitigation
Storm protection



Cultural services

Non material benefits to mankind

- Recreation and tourism
 - Aesthetic **values and leisure time**, can also be \$\$ valued
- Ethical and spiritual values
 - **Cultural diversity and heritage**, religious values, social relations, sense of place
- Education and inspirational values
 - Knowledge systems (LEK), national and **community symbols**

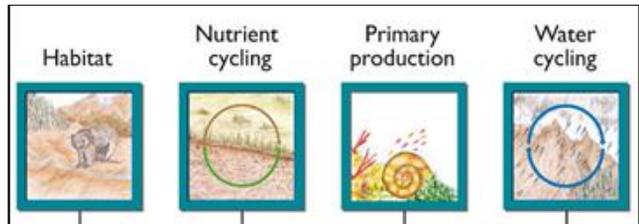


Supporting services

Indirect services that are often longer term

- Habitat
- Nutrient cycling
- Primary production
- Water cycling

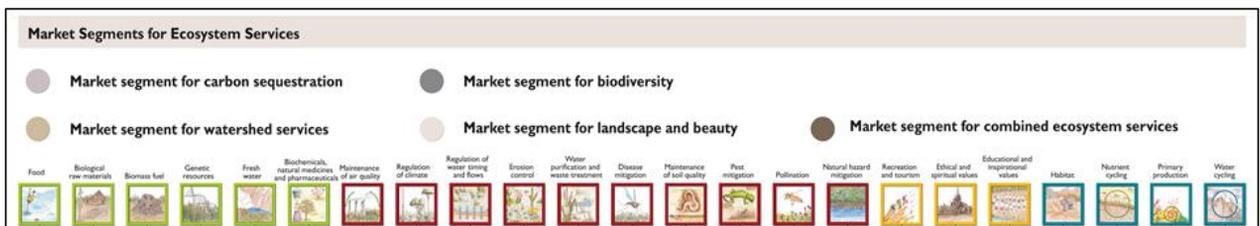
Often the **basis for other services**, such as provisioning and regulating services.



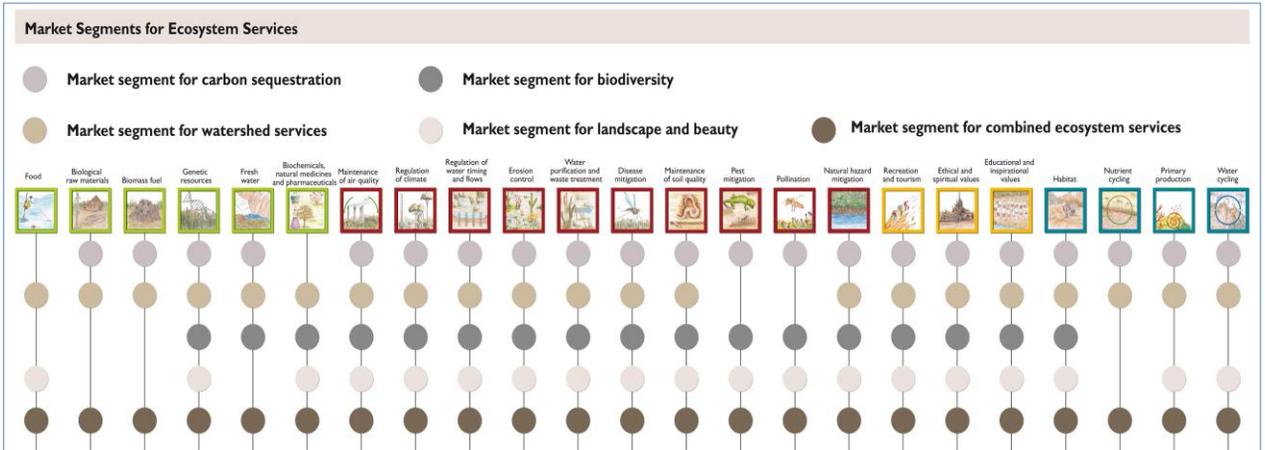
Markets

Market based instruments **to promote conservation**

- **Creation of products**
 - Environmentally **responsible harvesting** of resources
 - Easements on private lands – **tax incentives** for land owners
 - **'trading' systems** – compensation of damage in one location for improvement in another



Markets



Forest Stewardship Council

FSC

- an international NGO, **promoting the responsible** management of forests worldwide
- originally set up by **timber users and traders**
 - Forest **Management**
 - Chain of Custody **certification**.
- A template for the **Marine Stewardship Council** and others
 - use of the **ecolabel and fishery certification** program contributes to the health of the world's oceans
 - **recognising and rewarding sustainable fishing practices**,
 - **influencing** people make when buying seafood,
 - **working to transform** the seafood market to a sustainable basis.

Forest stewardship council (FSC)

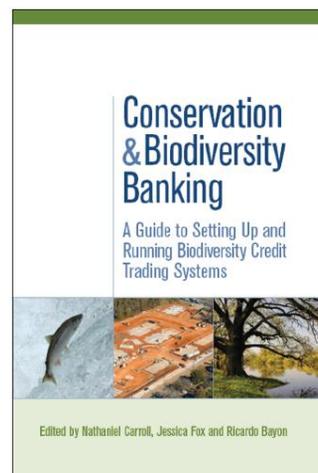


Conservation easements

- Is a **voluntary legal agreement** between the land owner and either a land trust or governmental body
 - **Maintain and improve** water quality;
 - Perpetuate and **foster the growth** of healthy forest;
 - Maintain and **improve wildlife habitat** and migration corridors;
 - Protect **scenic vistas** visible from roads and other public areas; or
 - Ensure that lands are managed so that **they are always available** for sustainable agriculture and forestry.
- As they are **written into the deeds** of the property they are perpetual

Trading

- Biodiversity credit trading system
 - where biodiversity values will be **reduced through development** developers are required to **source biodiversity credits** through a market mechanism to offset biodiversity loss.
- Mitigation banking
 - **requires developers avoid harm** to lands, but if harm is considered unavoidable,
 - then **similar lands of similar functions and values** must be "protected, enhanced or restored" in compensation for those that will be damaged



Conservation banking

On February 13, 2014, the Goldman Sachs **Environmental Finance Innovation Summit** was held in New York:

- aim to **scale-up greater investment** in environmental markets:
 - **clean tech**
 - energy **efficiency**
 - water and **green infrastructure**.
- Including personnel from
 - **corporates, investors, multi-lateral development banks** and non-governmental organizations and policymakers
 - topics ranged from **securitization and yield vehicles to green bonds** and innovative **public-private-partnerships**

Environmental Market Opportunities:

<http://www.goldmansachs.com/citizenship/environmental-stewardship/market-opportunities/>

Valuing Ecosystems and Biodiversity

- Valuing ecosystems and biodiversity
 - With few exceptions, there is **little reward for conserving biodiversity**
 - And, conversely
 - **Very little penalty for destroying it**

Pagiola et al. 2004

Why valuations?

- **Growing demands on ecosystems** for:
 - Fresh water
 - Fibre
 - Soil fertility
- **Pressures on ecosystems** to absorb:
 - Waste
- Yet, a **reduction** in the **'pristine'** areas that provide the **services** that we rely on.

Valuation

The purpose of valuation is to **obtain reliable, objective information** on the **benefits and costs** of conserving ecosystems so as to **inform decision-making**

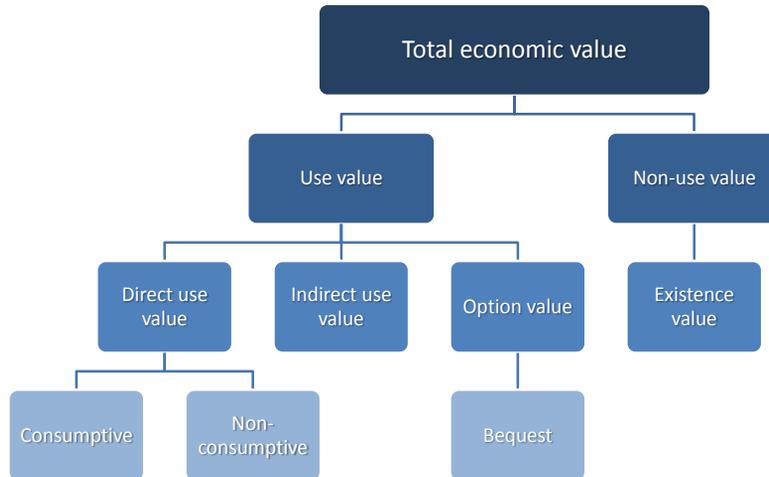
- Although economic valuation methods are **far from perfect**, and are not the only way to assess ecosystem benefits, they are **useful for illuminating trade-offs and guiding decision-making**.
- **Valuation by definition is anthropocentric** focussing on values for human well-being
- **Intrinsic value** remains an **illusive economic value**

Valuation

- Valuation is not a **single activity**, it can be interpreted in many different ways:
 - The value of the **current flow** of benefits provided by that ecosystem
 - The value of **future flows** of benefits.
 - The value of conserving that ecosystem **rather than converting** it to some other use.
- These are **often treated as the same thing**, but, they are in fact **very different questions**.

Total economic valuation (TEV)

Total economic value



Direct use value

- **Consumptive use**
 - Harvesting of food products
 - Timber for fuel or construction
 - Medicines
 - Hunting or fishing
- Direct consumptive uses are the **easiest to value due to the observable quantities** of a product derived from the source

Direct use value

- **Non consumptive use**
 - Recreation
 - Tourism
- **Non-consumptive uses** such as **tourism can be valued** looking at ***per diem* expenses and transport costs**
- **Willingness to pay (WTP)** analyses can also be carried out to obtain values

Indirect use value

- **Provide benefits outside the ecosystem** itself
 - Natural water **filtration**
 - Storm **protection**
 - Carbon **sequestration**
- Indirect use values are **more difficult to assess** due to the absence of **clearly defined quantities**
- Problems with establishing a **price per unit** if there is **no definable market value**

Option value

- Preserving the **option to use the ecosystem goods** and services in the future
- Difficult to assess as generally **open to subjective** choices and valuations

Non-use value

- The value that someone **places on a resource despite not** utilising that resource themselves
- This is the **difficult value to estimate** due to the absence of behavioural change
- **Voluntary contributions to 'good causes'** can be attributed to non-use value
- Surveys with **WTP analyses can provide an estimate**

How valuable to whom?

The benefits provided by a given ecosystem often fall **unequally** across different groups.

- Ecosystem uses may be **highly valuable to one group** but **cause losses** to others
- Answering the question from the **cumulative perspective** of all groups (as is often the case in economic analysis), would give **very different answers** to answering it from the **perspective of a particular group**.
- Understanding the **distribution of costs of benefits** is important to consider how to mobilize funds for conservation.
 - **Knowing** that an ecosystem is valuable **will not ensure that it is conserved**.
 - Valuation can **provide important insights** into how conservation might be made financially sustainable—provided it is used the right way.

Approaches to making valuations

Approaches

- There are **four main approaches** to value an ecosystem, which are similar but are different perspectives
 1. **total flow**
 2. **interventions**
 3. **distribution**
 4. **financing conservation**

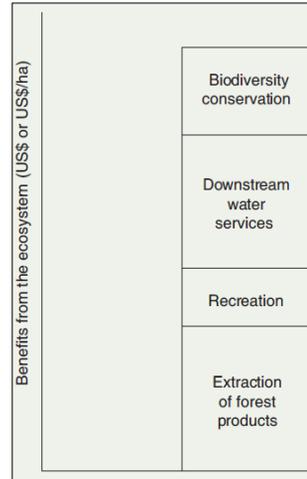
Total flow

1. Determining **the value of the total flow** of benefits from an ecosystem
 - Determining the **value of an ecosystem** in terms of the **national context**
 - Refers to the **sum total value** of an ecosystem

Total flow

Total economic benefits from ecosystems can provide a **more accurate sense** of their importance to policy makers

- Direct benefits
 - **Consumptive uses** – minerals, wood, hydrocarbons
 - **non-consumptive uses** – recreation and tourism
- Indirect uses
 - Water filtration
 - Flooding prevention
- Non use values
 - Cultural and ethical values



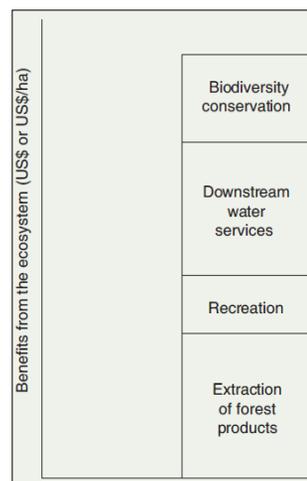
Total flow

Creating a result like this provides for a **better comparison** with other sectors of society

- **GDP figures**
- **Extractive Industries**

Clarifies the **relative importance** of the environment and particular ecosystems **in economic terms**

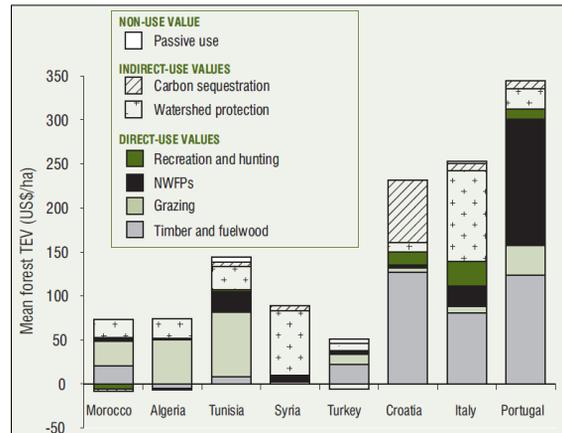
- Guide **investment strategies** at national level



Total flow

Flow of benefits from forests in Mediterranean countries

- Shows the importance of forests to society
 - Around **150US\$ per person** per year
 - Estimate comes to about **1% of GDP**
- Shows the balance of uses in the ecosystem
 - **Direct use** patterns are normally associated with **local communities**
 - **Watershed protection** is important in the **Mediterranean context**



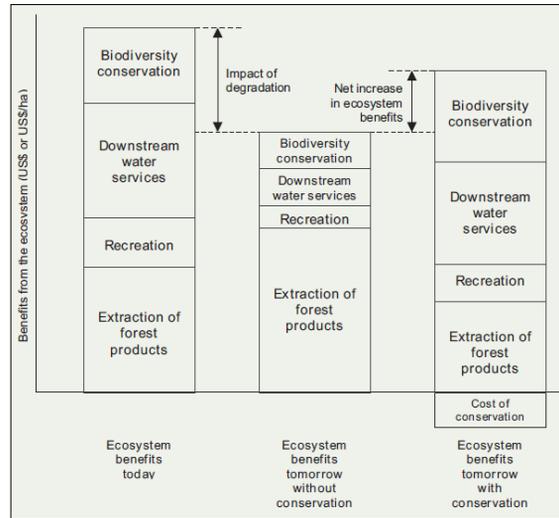
Interventions

2. Determining the net benefits of interventions that **alter ecosystem conditions**
 - **Would the benefits** of a given conservation investment **justify its costs?**
 - Addresses **changes to the flows of costs and benefits**

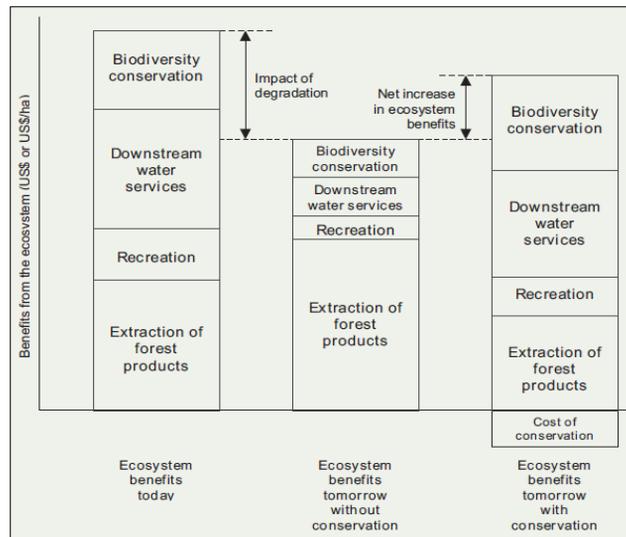
Interventions

how will the flow of benefits **change**?

- even a logged forest replaced with monoculture will **maintain some ecosystem services** on top of the agricultural goods it will produce
- the **mix and the magnitude** of services and goods will be different
- comparison of ecosystem benefits **'tomorrow'** between conservation and non-conservation



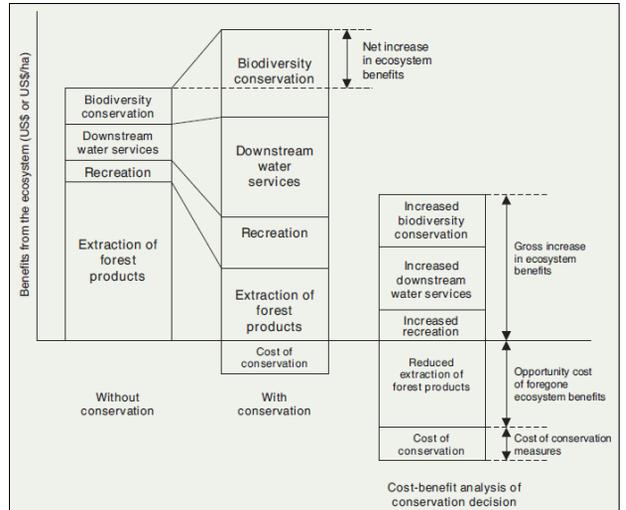
Which 'tomorrow' provides the **greater net value**?



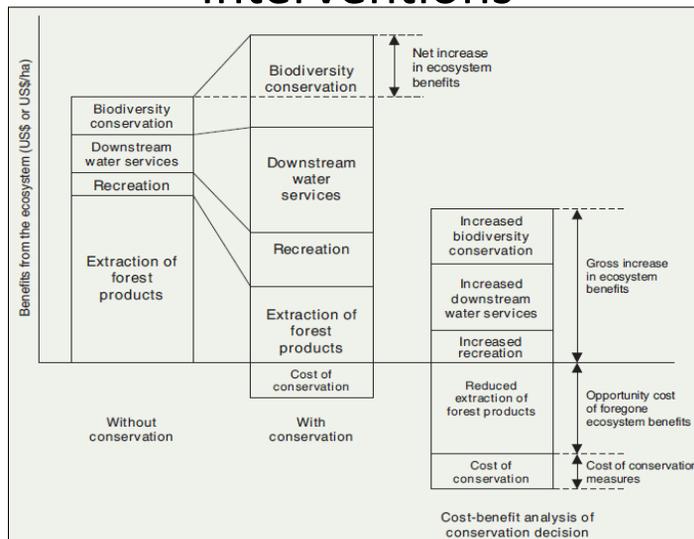
Interventions

comparison of various services directly

- **direct costs of conservation**
- **opportunity costs of lost revenue from forest products**
- **does the gross increase in ecosystem benefits outweigh the total costs?**



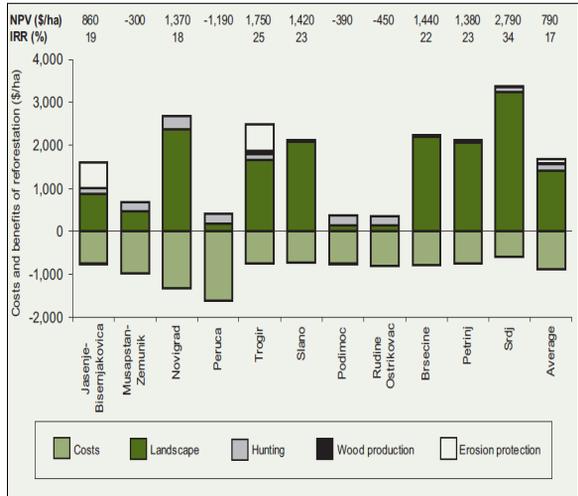
Interventions



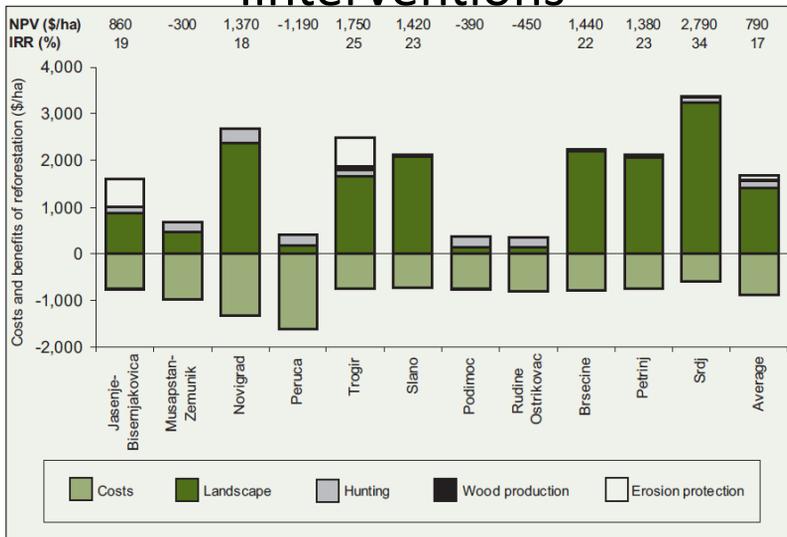
interventions

cost-benefit analysis applied to **Croatian coastal reforestation**

- changes to services from **proposed conservation measures**
- **conservation and opportunity costs** are measured
- some sites, particularly those with **steeper slopes were more costly to reforest**
- **significant differences between sites**



interventions



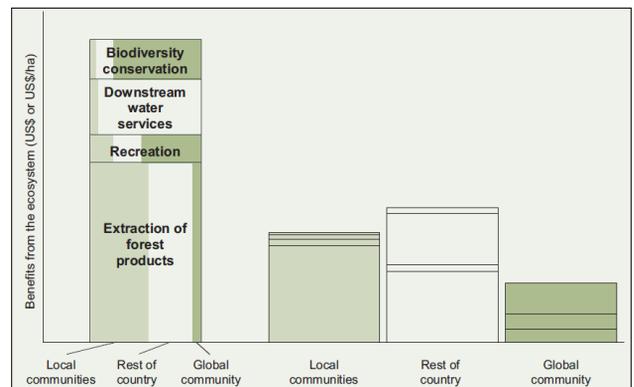
Distributions

- Examining **how the costs and benefits** of an ecosystem are distributed
 - **Different stakeholder groups** are affected in different ways by a **conservation intervention**
 - The **balance of equity**, who bears the costs and who benefits the most?

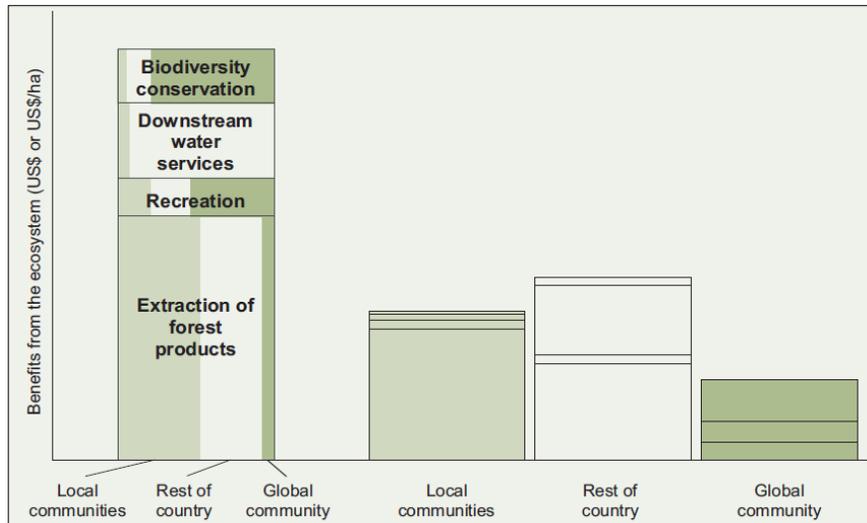
Distributions

who will receive the benefits and suffer the costs?

- the previous techniques looked at **aggregate costs and benefits**
- the balance between **international conservation objectives** and **local development desires** lies at the basis of conservation
- **ethical and management** consequences



distributions



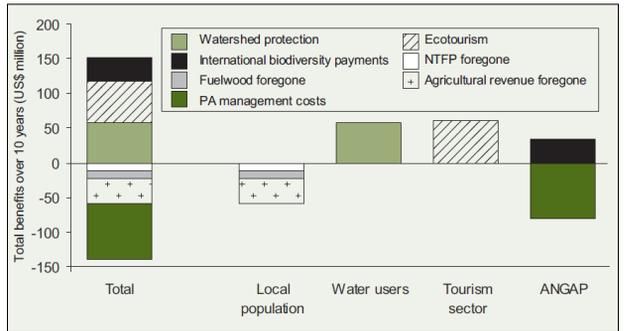
Distributions

- local communities are those with **generally the greatest to lose or gain**
 - if there is a **net benefit for the local community** they will **support** an action
 - equally if there is a **net loss for the local community** they will not **support** an action
- **understanding who may gain from an action will provide insight into their incentives** and allow **greater predictability** in the process and allow for the **development of conflict mitigation**

Distributions

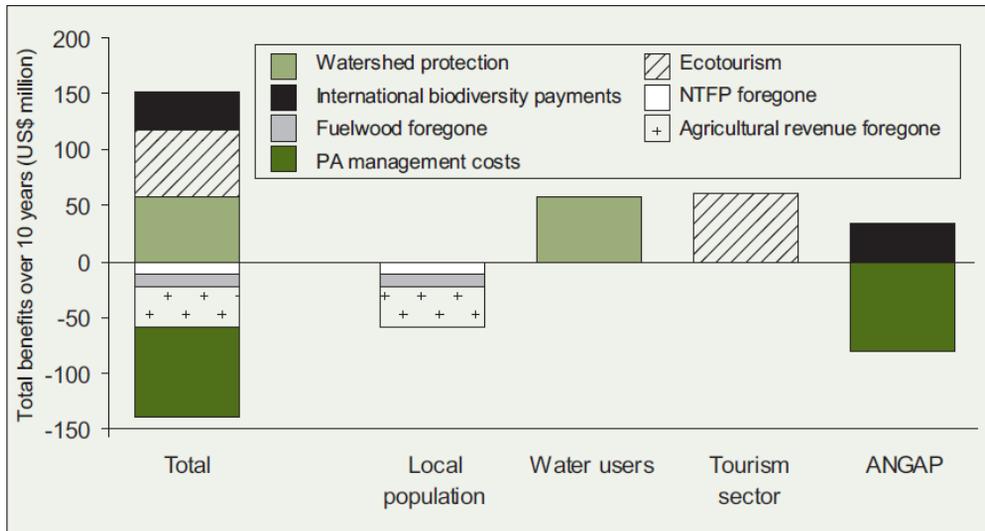
Tracking costs and benefits to different stakeholder groups

- **small costs in the overall process** may equate to **large costs to a specific group**
 - selective mitigation measures may be applied to that group
- identification of the **specific services used by specific groups**



costs and benefits of Madagascar's PA system

Costs and benefits of Madagascar's PA system

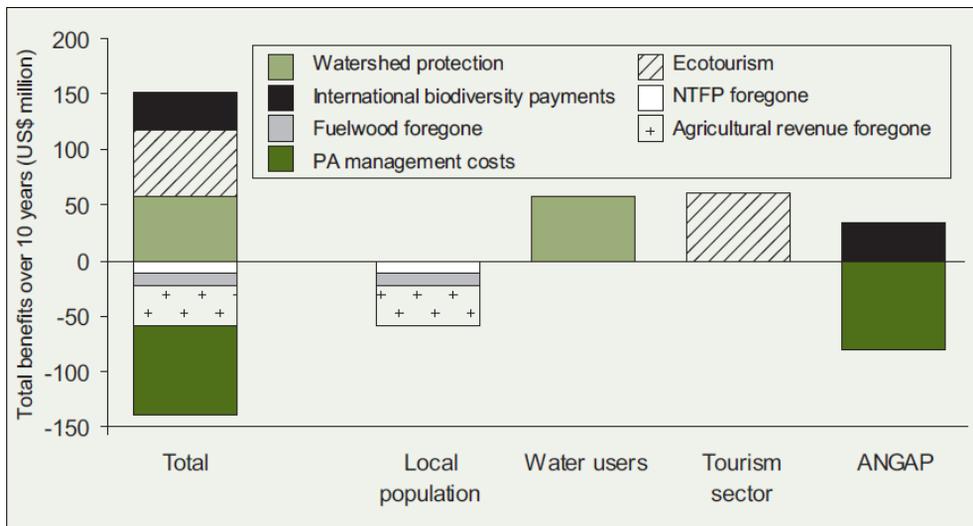


Distributions

Madagascar, **costs are borne by local communities and protected area management authority**, benefits are for **tourism and water downstream water users**

- **tourism sector** has largest benefit – but this could potentially be external investors
- **downstream farmers** also benefit
- costs to **National Parks Service (ANGAP)** are **offset by international payments and tourism licensing**
- local communities are **left worst off excluded from collecting wood**, Non Timber Forest Products and small scale agriculture

Solutions?



Financing conservation

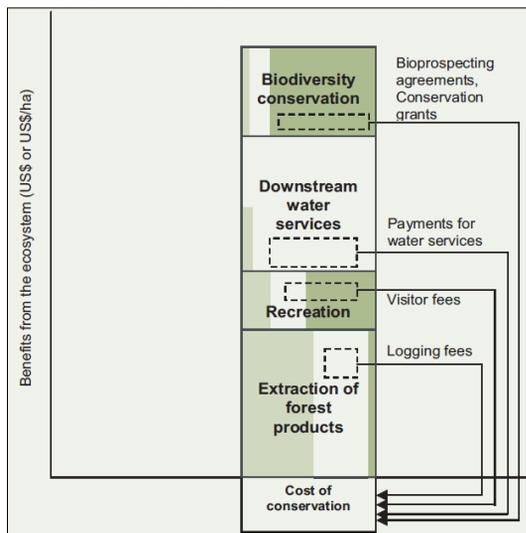
4. Identifying **potential financing sources** for conservation

- Can help identify the **main beneficiaries of conservation** and the size of those benefits
- Enables the **development of strategies** to access some **benefit and convert into financing** for conservation

Financing conservation

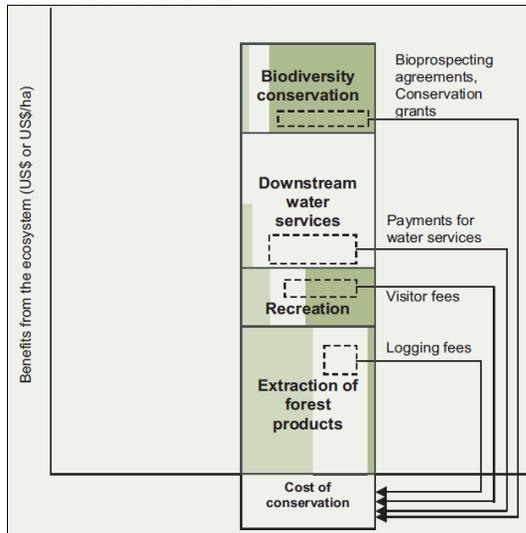
conservation funding is always **inadequate**

- **demonstration of the economic benefits** through changes to the value of ESG
- identification of **which sectors of the community** are the major beneficiaries



Financing conservation

- recreation and tourism
 - funding through **entry fees and licences** to operators
 - **international visitors** or locals?
- extraction
 - **licencing for extraction**
 - **local users** or industrial loggers?
- downstream users
 - **compensation** from downstream to upstream for **responsible land use** (payments for environmental services)



Financing conservation

international agreements and foundations

- generally **not long-term** solutions
- foundations often fund **innovative projects** and lose interest in the **mundane management phase**
- **beware of aid dependence**

Summary

Approach	Motivation	Methods
Total value of the current flow of benefits from an ecosystem	Understand the contribution that ecosystems make to society	<ul style="list-style-type: none"> • Identify all mutually compatible services provided • Measure the quantity of each ESG • Multiply by the unit value
Net benefits of an intervention that alters ecosystem conditions	Assess whether the intervention is economically worthwhile	<ul style="list-style-type: none"> • Measure the change in the quantity of each ESG as a result of the intervention in comparison to no intervention • Multiply by the marginal value of each ESG
Examine the distribution of costs and benefits	To identify winners and losers for ethical and practical reasons	<ul style="list-style-type: none"> • Identify relevant SH groups • Determine the specific ESGs and their values
Identify potential funding sources for conservation	Make ecosystem conservation financially self –sustaining	<ul style="list-style-type: none"> • Identify groups that receive most benefit and methods for extracting funding for conservation

Valuation techniques

Peter Mackelworth

- Measures of economic value are based on what people want
 - their **preferences**.
- People **express their preferences** through the choices and trade-offs that they make, given certain constraints
 - such as **income or available time**.
- Thus, economic value is measured by **the most someone is willing to give up** in other goods and services in order to obtain a good or service
 - **In a market economy, currency is** exchanged 'given up' for a good or service [**assigned value**]
 - **\$\$ or €€ are the universally accepted** measure of economic value.

How do we apply a \$\$ value to ecosystems?

Three techniques are generally used to value an ecosystem:

- look directly at **how much \$\$** someone will give for an ecosystem
 - create **different scenarios** for comparison
 - look at **cost of repairing or replacing** an ecosystem
-
- There are **multiple variations** on these techniques as **none are universally accepted** as best practice

valuation methods

1. Market Price Method

2. Productivity Method

3. Hedonic Pricing Method

4. Benefit Transfer Method

5. Travel Cost Method

6. Damage Cost Avoided,

**Replacement Cost, and
Substitute Cost Methods**

7. Contingent Valuation Method

8. Contingent Choice Method

Market Price Method

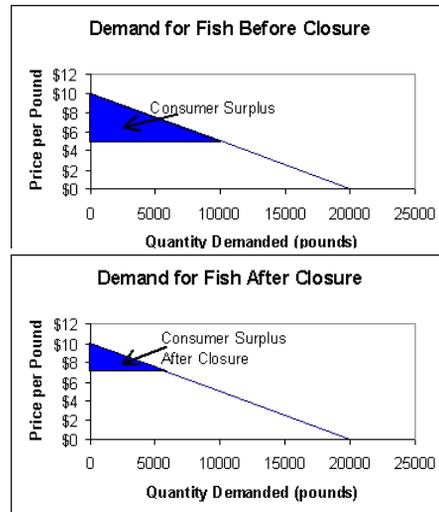
Market Price Method

- Estimates **economic value for ESGs that are bought and sold** in the commercial market;
 - fish, wood, fuel
- It uses standard economic techniques to measure the economic benefits from goods
 - based on the **quantity supplied** at different prices
 - and the **quantity demanded** at different prices.

Market Price Method

- For measuring the **use value** of resources traded in the marketplace
- an estimation of **consumer surplus and producer surplus** using market price and quantity data.

example: closure of a fishery



Market Price Method

Advantages

- **Reflects an actual willingness to pay** for costs and benefits of goods that are bought and sold in markets.
- Values are likely to be **well-defined**
 - fish, timber
- Price, quantity and cost **data are relatively easy to obtain** for established markets.
- Observed **data of actual consumer preferences**.
- Standard, **accepted economic techniques**.

Market Price Method

Issues and Limitations

- Market **data may only** be available for a limited number of **ESGs**
- May not reflect the **value of all productive uses** of a resource.
- Subject to **market imperfections** and/or policy failures.
 - **Subsidies and market interventions**, e.g. fisheries subsidies
- **Seasonal variations** and other effects on price must be considered.
- May not **deduct the market value** of other resources used to bring ecosystem products to market
 - example **hydrocarbons**

Productivity Method

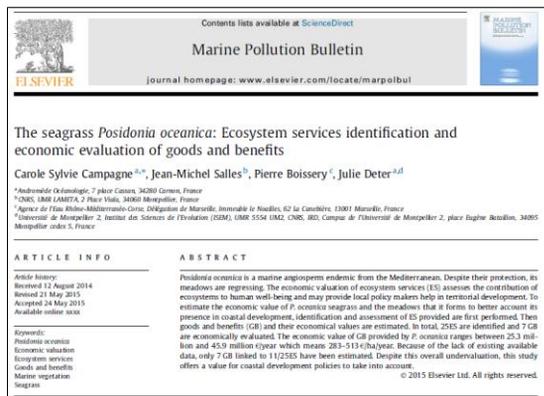
Productivity Method

- Is used to estimate the economic value of ESGs that contribute to the **production** of a commercially market good.
- Identifies the functional relationship between the **inputs and outputs**
- Estimate the **cost of the production function**
 - Example drinking water - calculate the **quantities of purification chemicals and filters** needed for different levels of water quality, then be multiplied by their costs.
- Estimate the **economic benefits** of protecting the source from contamination
 - If **polluted runoff into a reservoir is eliminated**, the water will need less treatment and the **purification costs for drinking water will be reduced**.
 - Compared to the **cost of purifying water if runoff is not controlled**.

Productivity Method

Example

- the value of *Posidonia oceanica*
 - ecosystem value as **nursery area** for fisheries
 - ecosystem value as **carbon sequestration**
 - ecosystem value as **flood and storm prevention**
 - ecosystem value as **sink for heavy metals**
- Cost to maintain meadows
 - reduced **sedimentation** from land-based sources
 - no **trawling**
 - no **anchoring**



Productivity Method

Advantages

- In general, the methodology is **straightforward**.
- Data requirements are limited, and the relevant data may be readily available, so the method can be **relatively inexpensive** to apply.

Productivity Method

Issues and Limitations

- Limited to valuing resources used as **inputs in production** of marketed goods.
- **Not all ESGs** will be related to production of marketed goods.
- **Information** is needed on the **actions to improve quality or quantity** and the outcomes of those actions.
- If the changes in the resource **affect the market price** of the final good, or the **prices of production inputs**, the method becomes much more **complicated and difficult to apply**.

Hedonic Pricing Method

Hedonic Pricing Method

- to estimate **economic values for ecosystems** or ESG that **directly affect market prices**.
- It can be used to **estimate economic benefits or costs** associated with:
 - **environmental quality** including:
 - air pollution,
 - water pollution,
 - or noise
 - **environmental amenities**, such as:
 - aesthetic views or
 - proximity to recreational sites

Hedonic Pricing Method

- The price of a marketed good is **related to its characteristics, or the services it provides**.
 - often used to **value environmental amenities**, such as the **value of land/property**, price of residential vs the definition of a protected area
 - **Land prices vary** according to the **use of the adjacent plots**
 - roads, open space, agriculture
 - Specific land parcels may be under **consideration for protection**.
 - value can be used to **determine the benefits** of preserving each parcel, which can then be compared to the cost.

Hedonic Pricing Method

Advantages

- It can be used to estimate **values based on actual choices**.
- Property markets are **relatively efficient in responding to information**, so can be good indications of value.
- Property **records are reliable**.
- **Data** on property sales and characteristics **are available**, and can be **related to other secondary data** for descriptive variables for analysis.
- The **method is versatile**, and can be adapted to consider **several possible interactions between market goods and environmental quality**

Hedonic Pricing Method

Issues and Limitations

- Environmental **benefits are limited to relations** to land prices.
- Only captures **WTP for perceived differences** in environmental attributes.
- **Assumes that people** have the **opportunity to select** the combination of features they prefer, **given their income**.
- **Complex** to implement and interpret, **requiring statistical expertise**.
- The results depend heavily on **model specification**.
- **Large amounts of data** must be gathered and manipulated.
- Depends on the **availability and accessibility of data**.

Benefit Transfer Method

Benefit Transfer Method

- Is used to estimate **economic values for ESGs** by transferring available information **from studies already completed in another location** and/or context.
 - **Values for recreational fishing** in a particular state may be **estimated by applying measures of recreational fishing values** from a study conducted in another state.
- the basic goal is to **estimate benefits for one context by adapting an estimate of benefits from some other context.**
- Benefit transfer is often used when it is **too expensive and/or there is too little time available to conduct an original valuation** study, yet some measure of benefits is needed.

Benefit Transfer Method

Advantages

- is **less costly than conducting an original valuation study.**
- Economic benefits can be **estimated more quickly**
- can be used as a **screening technique** to determine if a more detailed, original valuation study should be conducted.
- can be **easily and quickly be applied for making gross estimates of recreational values.**
- The **more similar the sites and the recreational experiences**, the fewer biases will result.

Benefit Transfer Method

Issues and Limitations

- **may not be accurate**, except for making **gross estimates of recreational values**, unless the **sites share all** of the site, location, and user specific **characteristics**.
- **Good studies** for the policy or issue in question **may not be available**.
- It may be **difficult to track down appropriate studies**, since many are not published.
- **Extrapolation beyond the range of characteristics** of the initial study is not recommended.
- Benefit transfers can **only be as accurate as the initial value estimate**.

Travel cost method

Travel cost method

- Used to **estimate economic use values** associated with ecosystems or sites that are used for **recreation**, the **economic benefits or costs from changes** such as:
 - changes in **access costs for a recreational site**
 - **elimination** of an existing recreational site
 - addition of a **new recreational site**
 - **changes in environmental quality** at a recreational site

Travel cost method

- The **time and travel cost expenses** that people incur to visit a site **represent the “price”** of access to the site;
 - the more **unique the site or species** the more likely people will **travel from a greater distance** to visit it;
- a value can be **estimated based on the number of trips** that they make at different travel costs and hence their willingness to pay these costs.
 - **distance travelled, the mode and time** taken an evaluation of value can be applied
 - various sub-methods can be applied
 - **zonal** - using mostly secondary data, with some simple data collected from visitors
 - **individual** - using a more detailed survey of visitors
 - **random utility** - using survey and other data, and more complicated statistical techniques

Travel cost method

Advantages

- Closely **mimics the conventional empirical techniques** used by economists to **estimate values based on market prices**.
- The method is **based on actual behaviour**, than stated WTP.
- The method is **relatively inexpensive to apply**.
- **On-site surveys provide opportunities** for large sample sizes, as visitors tend to be interested in participating.
- The results are **relatively easy to interpret** and explain.

Travel cost method

Issues and Limitations

- **assumes that people perceive** and respond to **changes in travel costs** the same way that they would respond to **changes in admission price**.
- Simple models assume that individuals **take a trip for a single purpose**
- Defining and measuring the **opportunity cost of time**, or the **value of time spent traveling**, can be problematic.
- The **availability of substitute sites** will affect values.
- **Those who value certain sites** may choose to live nearby
 - Hedonic behaviour
- Interviewing visitors on site can introduce **sampling biases** to the analysis.

Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods

Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods

- **Estimate values** of ecosystem services based on:
 - the **costs of avoiding damages** due to lost services,
 - the cost of **replacing ecosystem services**, or
 - the cost of **providing substitute services**
- If people **incur costs to avoid damages** caused by lost ecosystem services, or to replace the services of ecosystems, then **those services must be worth** at least what **people paid to replace them**.
- Most appropriately applied in cases **where damage avoidance or replacement expenditures have actually been, or will actually be, made**.

Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods

Advantages

- Provide a **rough indicator of economic value**, subject to data constraints and the degree of similarity or substitutability between related goods.
- It is **easier to measure the costs** of producing benefits **than the benefits themselves**, when goods, services, and benefits are non-marketed.
- **Data or resource limitations** may **rule out valuation methods** that estimate WTP.
- The methods provide **surrogate measures of value** that are consistent with the **economic concept of use value**, for services which may be difficult to value by other means.

Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods

Issues and Limitations

- **Assume that expenditures to repair or replace** ESGs are valid measures of the benefits provided.
- Few environmental resources have such **direct or indirect substitutes**.
- These approaches should be used **only after a project has been implemented** or if society has demonstrated their willingness-to-pay for the project in some other way.
- **Do not** consider **social preferences for ESGs, or individuals' behaviour** in their absence. Thus, they should be used as a **last resort to value ecosystem services**.

Contingent Valuation Method

Contingent Valuation Method

The contingent valuation method is referred to as a **“stated preference” method**, because it asks people to **directly state their values**, rather than **inferring values from actual choices**.

Contingent Valuation Method

- Used to estimate economic values for **all kinds of ecosystem and environmental services**.
 - **Both use and non use values**, and it is the **most widely used method** for estimating **non-use values**.
 - Involves **directly asking people**, in a survey, **how much** they would be WTP for **specific environmental services**.
 - **In some cases**, people are asked for the **amount of compensation** they would be willing to accept **to give up specific environmental services**.
 - It is called “contingent” valuation, because people are **asked to state their willingness to pay, contingent on a specific hypothetical scenario** and description of the environmental service.

Contingent Valuation Method

Since people **do not economically reveal** their willingness to pay for **non-use values through their purchases** or by their behaviour, the **only option for estimating a value** is by asking them questions.

Contingent Valuation Method

- CV is based on **what people say** they would do, as opposed to **what people are observed to do**, is its greatest strength and its greatest weakness.
- Contingent valuation is **one of the only ways to assign dollar values to non-use values** of the environment
 - **basic life support functions** associated with ecosystem health or biodiversity,
 - to the **enjoyment of a scenic vista** or a wilderness experience,
 - to **appreciating the option to fish or bird watch in the future**,
 - or the **right to bequest those options** to your grandchildren.
 - It also includes the **value people place on simply knowing** that giant pandas or whales exist.

Contingent Valuation Method

Advantages

- **Enormously flexible** in that it can be used to **estimate the economic value of virtually anything**.
 - It is best able to **estimate values for goods and services** that are **easily identified and understood by users** and that are consumed in discrete units (e.g., user days of recreation)
- The **most widely accepted method** for estimating total economic value , including all types of non-use
- CV can estimate **use values** , as well as **existence values, option values, and bequest values**.

Contingent Valuation Method

Advantages

- The nature of CV studies and the results of CV studies **are not difficult to analyse and describe**.
- Dollar values can be **presented in terms of a mean or median value per capita or per household**, or as an **aggregate value** for the affected population.
- CV has been **widely used**, and a great deal of **research is being conducted to improve the methodology**, make results more valid and reliable, and better understand its strengths and limitations.

Contingent Valuation Method

Issues and Limitations

- **Assumes that people understand the good in question** and will reveal their preferences in the contingent market just as they would in a real market.
- The **expressed answers** to a WTP question in a contingent valuation format may be **biased because the respondent is actually answering a different question** than the surveyor had intended.
 - Respondents may express a positive willingness to pay because they **feel good about the act of giving for a social good** (referred to as the “warm glow” effect)
 - Respondents **may value the good**, but state that they are **not willing to pay for it**, because they are **protesting some aspect** of the scenario, **such as increased taxes**.
 - Respondents may **fail to take questions seriously** because they will not actually be required to pay the stated amount.
- **Policy-makers and economists** may not believe the results of CV.

Contingent Choice Method

Contingent Choice Method

- used to estimate economic values for **virtually any ecosystem or environmental service**, and estimate non-use as well as use values.
 - differs from CV because it **does not directly ask people** to state their **values in \$\$**.
 - **values are inferred** from the **hypothetical choices or trade-offs**.
 - the respondent to **state a preference between one group of ESGs** at a given price, and **another group of ESGs at a different price**
- is especially suited to **policy decisions where a set of possible actions might result in different impacts** on natural resources or environmental services

Contingent Choice Method

- contingent choice can be **used to estimate dollar values**, the results may also be **used to simply rank options**, without focusing on dollar values
 - use of this method for the siting of **environmental processing services**, related to local **environmental damage** and **costs of transportation**
- Example – **balancing costs between potential national park sites** with similar ecosystem service, based **balancing the value of the services** against on the **expenses incurred** to tax payers due to management, remoteness and dislocating users. Often used to short list potential sites.

Contingent Choice Method

Advantages

- can be used to **value the outcomes of an action as a whole**, as well as the **various attributes or effects of the action**.
- allows respondents to **think in terms of tradeoffs**, which may be easier than **directly expressing dollar values**
- Survey methods may be better at estimating **relative values than absolute values**.
- even if the absolute dollar values estimated are not precise, the **relative values or priorities** elicited by a contingent choice survey are **likely to be valid and useful for policy decisions**.
- The method **minimizes many of the biases** that can arise in **open-ended CV studies** where respondents are presented with the **unfamiliar and often unrealistic task of putting prices on non-market amenities**.
- The method has the potential to **reduce problems such as expressions of symbolic \$ values**, protest bids, and some of the **other sources of potential bias associated with CV**

Contingent Choice Method

Issues and Limitations

- Respondents may find some **tradeoffs difficult to evaluate**.
- Respondents may resort to **simplified decision rules if the choices are too complicated**, which can bias the results of the statistical analysis.
- When presented with a large number of tradeoff questions, **respondents may lose interest or become frustrated**.
- By only providing a **limited number of options**, it may **force respondents to make choices that they would not voluntarily make**.
- **Contingent ranking requires more sophisticated statistical techniques** to estimate WTP.
- **Translating** the answers into **dollar values**, may lead to **greater uncertainty** in the actual value that is placed on the good or service of interest.

Conclusions

- multiple methods for different forms of valuation
- all have pros and cons
- valuation is only a part of the decision making process
- transferring \$\$ into policy requires multiple skills

Conservation Marketing & Changing Behaviour

Peter Mackelworth,

Conservation marketing

- people are **bombarded with information** and have access to **24 hour entertainment**
 - reaching a target audience about conservation issues is difficult
- there is a **culture of hopelessness** within the conservation profession
 - convincing others to support conservation is difficult if you have doubts
- there are issues with the **negative perception of environmental activists** by the general public
 - activists are perceived and stereotyped as militant and eccentric

Conservation marketing

- traditional methods utilised by conservationists **are generalised** and seek to promote the **values of the conservationist** on the audience
- conversely, marketing places the **target audience at the core** of the process to ensure that **what is being offered meets their needs** and demands
 - similar marketing principles and tools could be used to promote conservation
- **without the ability to influence human behaviour** the role of conservation is academic

Marketing principles

marketing always focuses on the **audience's perspective**

- a target audience is **defined using a specific set of values** and interests:
 - demographics
 - geographic segmentation
 - behaviours
 - political values
 - social status
 - etc.

Marketing objectives

1. to **create awareness** and ensure an intended audience understands **the basic concept behind an idea** and its **relevance to them**;
2. to **reduce or remove barriers** surrounding an idea so that a **proposed action takes minimal effort**; and,
3. to **develop and manage relationships** with the intended audience

- an audience need to be aware for need for change
- they should also perceive that others are also acting
 - by targeting audiences at precise moments that most influence decisions, behaviour can be changed

Conservation Marketing

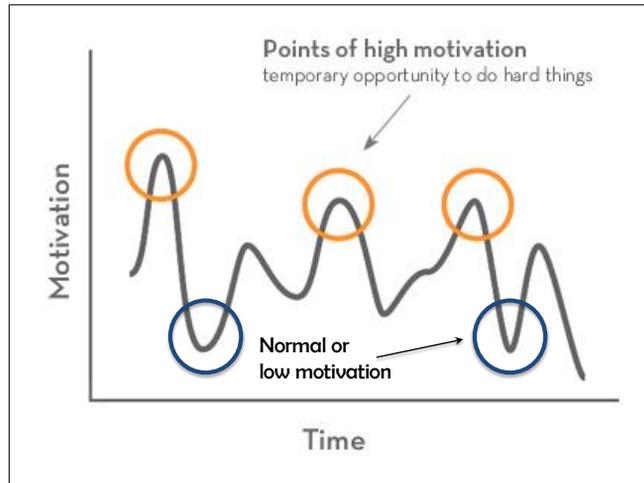
- <http://captology.stanford.edu/>

The behaviour grid

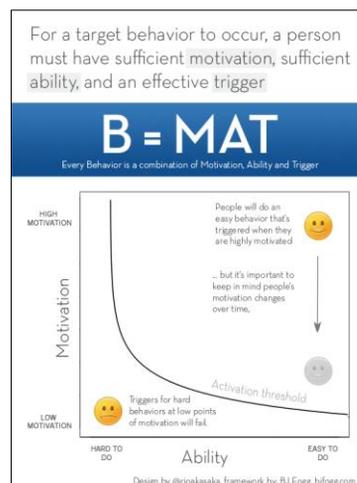
(BJ Fogg)

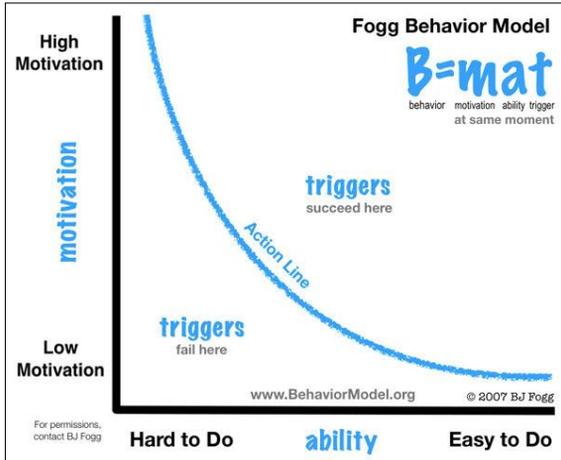
	Green New behaviour	Blue Familiar behaviour	Purple Increase a behaviour	Grey Decrease a behaviour	Black Stop doing a behaviour
Dot – Is done once	new behaviour once	familiar behaviour once	increase behaviour once	decrease behaviour once	stop behaviour once
Span – a defined duration	adopt new behaviour for a period	do a familiar behaviour for a period	increase a behaviour for a period	decrease a behaviour for a period	stop a behaviour for a period
Path – a permanent change	start new behaviour from now	do a familiar behaviour from now	increase a behaviour from now	decrease a behaviour from now	stop a behaviour from now

Motivation for change

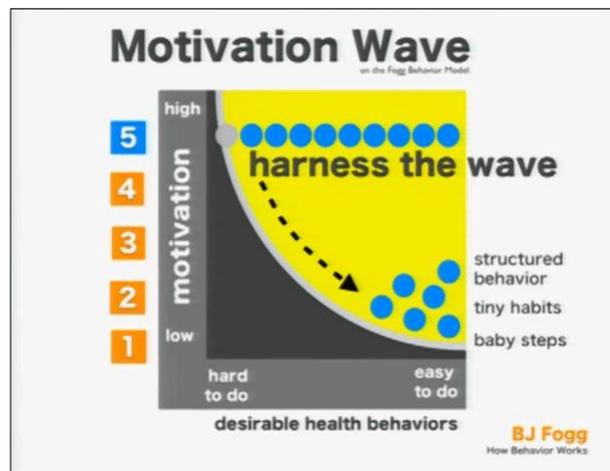


- behaviour change
 - motivation
 - ability
 - trigger





- No behaviour happens without a trigger



How do we apply this to conservation and changing human behaviour?

- It is up to us, as conservation professionals to make engagement in conservation easy
 - provide simple path to support a desired behaviour
 - where failures happen simplify the path
 - make undesirable behaviours more difficult

- causality must be clear and apparent and timely
- this is why feedback is so essential in conservation
- reward good behaviour
- quantitate behaviour

- Generally humans will make rational decisions if correctly informed
- changing behaviour can require a change in attitude, however attitude change does not always equate to behaviour change:
 - motivation
 - trigger
 - ability / opportunity
- most humans seek to be accepted and abide by social norms

BJ Fogg

“MOST OF THE TIME WHAT WE DO IS WHAT WE DO MOST OF THE TIME.

SOMETIMES WE DO SOMETHING NEW”

TOWNSEND, D. J., & BEVER, T. G. (2001). SENTENCE COMPREHENSION: THE INTEGRATION OF HABITS AND RULES. CAMBRIDGE, MA: MIT PRESS.

A habit is a learnt behaviour that:

- is frequently repeated
- has a high degree of automaticity
- is performed in response to stable contextual cues

‘Automatic’ = without conscious awareness

Orbell, S. and Verplanken, B., 2010. The automatic component of habit in health behavior: habit as cue-contingent automaticity. *Health Psychology*, 29 (4), pp. 374-383.

- Hot triggers
 - user can take action right NOW!
- Cold trigger
 - user cannot take action right now.

Learn what already works for your target behaviour and target group

Motivation

1. Pleasure / Pain
 - Powerful motivator
 - Primitive response with an immediate result, little time to think or anticipate
 - lower form of motivation – e.g. hunger
2. Hope / Fear
 - anticipation of an outcome
 - longer term concept with regards to P/P motivation
 - most ethical and empowering motivator
3. Social Acceptance /Rejection
 - a social dimension
 - people are motivated by behaving in a socially acceptable way
 - they may have fear about being socially rejected
 - social networks work on this basis

Ability

1. Time
 - if a target behaviour requires time and your target audience does not have time, then the behaviour is not simple
2. Money
 - target behaviour that is prohibitively expensive is not simple
 - time and money can be a trade-off or an exclusionary ability
3. Physical Effort
 - behaviours that require travel or physical exertion may prohibit target audiences

Ability

4. Brain Cycles
 - the requirement to put thought into a process, deep thinking or thinking in new ways may be a difficult process
5. Social Deviance
 - going against a social norm or breaking the rules of society
6. Non-Routine
 - behaviours are simple if they are routine

Ability

- People are **fundamentally lazy**, so it is up to us to make behavioural change as easy as possible
- generally, the **simpler** the task the greater number of people will be able to perform it
 - what is simple for some people may not be for others
 - some people have time, money or differing abilities which will vary according to the individual and the context
 - simplicity is a factor of an individual's scarcest resource at the moment a behaviour is triggered
 - when looking at changing behaviour we should consider which is the scarcest resource for our target audience
 - once we know which is the scarcest resource we can trade this off with motivation

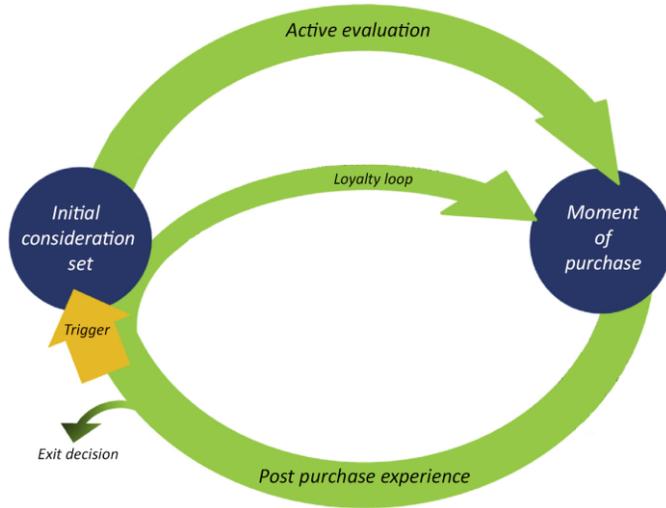
Trigger

- something that 'tells' a person to a behaviour now
- not all triggers function in the same way

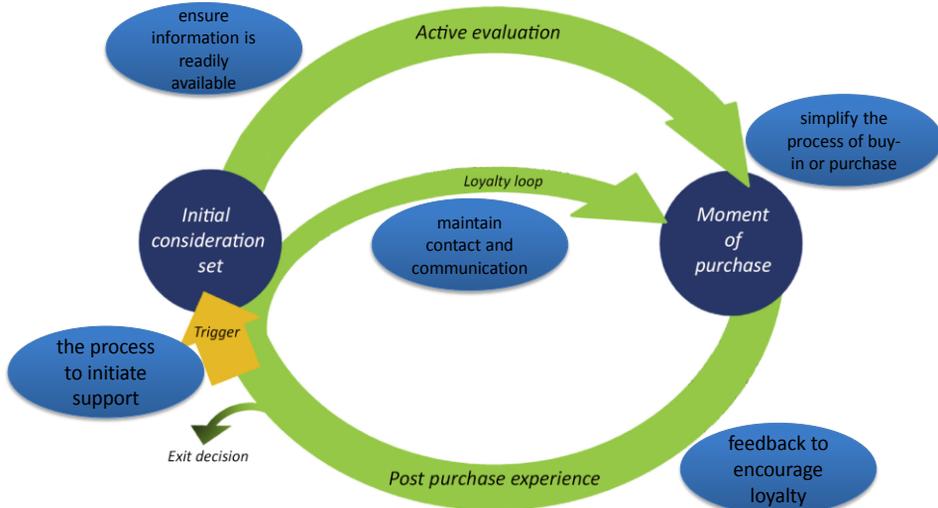
Trigger

1. Spark
 - trigger should be designed in tandem with a motivational element
2. Facilitator
 - high motivation but low ability – informs target groups that the target behaviour is simple
3. Signal
 - works as a reminder when people have both the ability and motivation to undertake a behaviour

Wright et al 2015 p46



from Wright et al 2015 p46



Branding

- brands develop loyalty and build a relationship with consumers
- consumers are willing to pay extra according to the trust they have in a brand
- creating a meaningful relationship between conservation and target audiences is vital
- commonly focal species or protected areas are the flagships for conservation
- names are a key part of any brand

Conservation branding

greater conservation support may be gained through re-branding or re-naming species

- renaming into region or country specific names may increase local support for conservation
 - (*Sousa chinensis*)

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Conservation branding

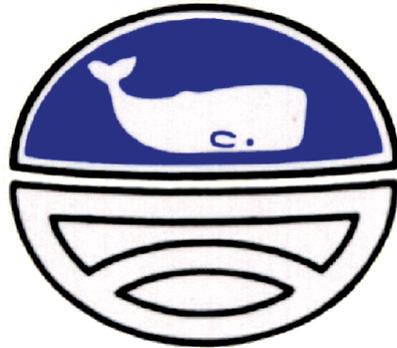
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 - aka Hong Kong pink dolphin



The International Whaling Commission

Peter Mackelworth



History of Whaling

- Traditional subsistence whaling
- Modern subsistence whaling
- 1864 – industrial whaling
- Stock exhaustion – 1930's

History of the IWC

- 1930 – Bureau of International Whaling Statistics
- 1932 – Convention for the Regulation of Whaling – 1st Draft
- 1937 – Convention for the Regulation of Whaling – 2nd Draft
- 1946 – IWC set up under the International Convention for the Regulation of Whaling

Aims of the Convention

- Safeguard whale stocks for future generations
- Sustainable resource
- Optimum stocks without causing economic or nutritional distress
- Need for regulation to ensure proper and effective conservation and development of stocks

'provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry'

Convention Articles

- 11 Articles
- Important Articles
- Article I-III - general rules, scientific terms, selection procedures & voting rules
- Article IV - data gathering, statistical analysis, review & dissemination of information
- Article V - allows the amendment of the provisions of the convention
- Article VIII - issuance of permits authorising take of whales for scientific purposes

Article I-III

- Definition of scientific terms and also the procedure for post holders, voting and passing of proposals
- In summary
 - open to accession
 - equal voting rights
 - $\frac{3}{4}$ majority

Article IV

- Statistical analysis
- Dissemination of information regarding whale stocks

Article V

- Amendments of whaling regulations

'the commission may amend the provisions of the schedule by adopting regulations with respect to conservation & utilisation of whale resources'

- 1938 – Antarctic Sanctuary
- 1979 – Indian Ocean Sanctuary
- 1982 – Moratorium Vote
- 1994 – Southern Ocean Sanctuary

Article VIII

- Issuing of permits authorising to kill, take and treat whales for scientific research
- Since 1982 - 100 permits issued
- - 3 countries
- 1996 - 15,000-18,000 whales 'legally' taken since 1986

Antarctic Sanctuary

- Opened in 1938 before the inception of the IWC
- South of the 40° S parallel
- Between the 70° W & 160° W longitude
- Closed in 1955 at the inception of the IWC

Indian Ocean Sanctuary

- Established in 1979
- Established as an area for the protection of breeding areas for the migratory large whales and the tropical Brydes Whale.
- Extending the south of the 55° S parallel
- Initially established for 10 years
- Extended twice since - 2009

Moratorium

- Voted into force 1982
- Came into force 1986 – provisional period
- Revised Management Procedure

Revised Management Procedure

- Absence of knowledge of whale stocks
- Requirement for further scientific investigation

Southern Ocean Sanctuary

- Adopted in 1994
- Northern boundary follows the 40° S parallel – except where it meets the Indian Ocean Sanctuary at the 55° S parallel, and South America and South Pacific boundaries are at 60° S parallel
- Prohibition will be reviewed ten years after it's inception and at succeeding ten year periods.

Politics

- 1960's – whale becomes symbol of environment
- Pelly & Packwood
- USA leads the change
- Recruitment of non-whaling nations

Politics

- Japanese lead the pro-whaling
- Offer of economic aid to non whaling countries
- Agreement with African Nations regarding the opening of Ivory trade
- CITES – convention on the international trade of endangered species

Whale Watching

- 1993 – preliminary assessment
- Sustainable use of cetacean resources
- \$ 1 B US business
- 9 million people participating
- 87 countries – of which 85% of the IWC members take part
- Provides more money than whaling did at its peak
- 1996 – Role of monitoring and advising
- Original Objectives of IWC?

The Irish Proposal

- Extraordinary meeting held in January 1997
- Proposal that small scale whaling be allowed within Exclusive Economic Zone (EEZ)
- High seas global whaling sanctuary
- Majority of whale stock migrate within 200nm of the coast and hence available for exploitation

What of the Future of the IWC?

- International Convention on the Regulation of Whaling 1932
- Changing principles from 'whaling club' to 'bastion of conservation'
- IWC – 'cultural imperialism'
- Divergence of the two groups

- 'here we have a fisheries convention which is being used not for regulating a fishery but for preventing a fishery' (Gambell 1996)

Protected Areas

Peter Mackelworth

Why do we protect an area?

Why do we protect an area?

Biodiversity?

Representative?

Habitat?

Species?

Well...

More often because it is pretty or has pretty flora or fauna?

Human Dimensions of Protected Areas

- **Historic** look at Protected Area development
- **Changes** to Human Dimensions and Protected Area paradigm
- **Techniques** to develop Protected Areas
 - Management techniques
 - Co-management
 - Local Ecological Knowledge
- **Other** issues
 - Paper parks
 - Protected Area Downgrading, Downsizing and Degazettement

Origins of PA designation

- Inspiring landscapes
- First protected areas the sequoias of Mariposa grove.
- Originally for **aesthetics**
 - Landscapes
 - **Beauty**
 - Charismatic species
 - Mega-species
- **Two paradigms**
 - **Preservation** of the 'natural' state
 - **Conservation** of resources



Preservation

- Wilderness as a refuge
- **Intrinsic (held) value**
- Spiritual concept

Conservation

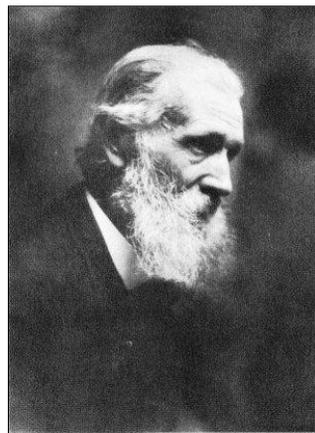
- Conserving economic value
- **Instrumental (assigned) value**
- Pragmatism



- Two primary strands in the original debate, epitomised by the **two main protagonists**
 - John Muir
 - Gifford Pinchot
- The question is, **how different** were their views and how were their views **influenced** by the individual backgrounds

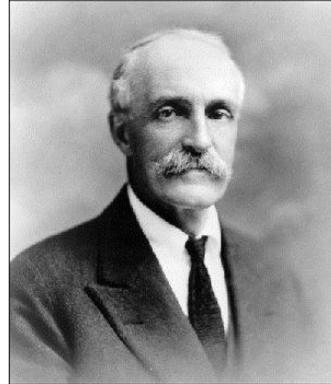
John Muir 1838-1914

- **Preservationist**
- **Protection** of wilderness against the advances of modern life
- Sought to encourage the use of wilderness as a **refuge** from modern society
- Passionate, **skilled amateur**
- Founded the Sierra Club in 1892
- **Religious connotations**
 - 'god began the reservation system in Eden - this first reserve included only one tree'
- **Inter-connectedness** of man and nature

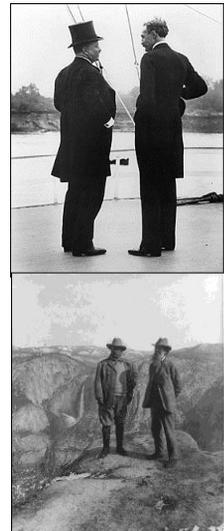


Gifford Pinchot 1865-1946

- America's first **professional** forester
- Trained in France
- Background of **extreme wealth**
- Called for **management by 'experts'**
- Head of the U.S. Forest Service 1905 - 1910
 - **Regulation** of forestry
 - **Selfish interests impede** national progress
 - Conservation is protection against **greed** and profiteering



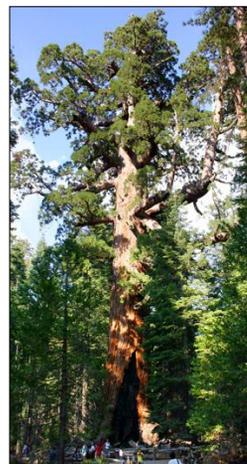
- Both men **opposed reckless exploitation** of natural resources;
- Conservation means the **greatest good to the greatest number** of people for the longest time:
 1. To **wisely to use, protect, preserve**, and renew the natural resources of the earth.
 2. To **control the use** of the natural resources and their products in the **common interest**, and to **secure their distribution to the people** at fair and reasonable charges.
 3. To see to it that the **rights of the people** to govern themselves **shall not be controlled by great monopolies through their power** over natural resources.



- Muir looked towards the **urban middle class** of America, promoting ‘**re-creation**’ in the National Parks
- Pinchot was **naive** to the **dominance** of the forestry industry by plutocratic individuals and organisations
- Fundamentally both paradigms were **undemocratic** with **populations living next to or in the PAs bearing the brunt of restrictions**
 - Removal from their traditional lands
 - Restrictions on access to protected areas
 - Damage to crops, property, human life

Yosemite 1864

- **First time** in history that a federal government had **set aside scenic lands simply to protect them and to allow for their enjoyment** by all people.
- On June 30, **1864**, President Abraham Lincoln signed a bill granting **Yosemite Valley and the Mariposa Grove of Giant Sequoias** to the State of California as an inalienable public trust.
- In **1891** - comes under Federal jurisdiction of US Army



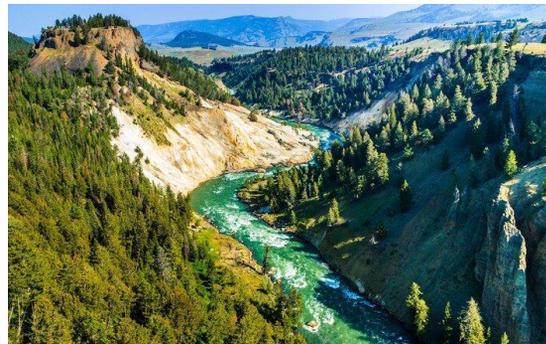
American Civil War 1861-1865

White men drive my people out of my Yosemite - Chief Totuya (1929)

- The **true ownership** of the wilderness belongs in the highest to those who love it most. John Muir (1912)
- **Yosemite originally State land** - no state policy for removal
 - Seen as a tourist attraction: *'complemented the scenery'*
- Federal land - **'unofficial' removal** of the native groups in the **1930s**



- In **Yellowstone** native Americans were **forcibly removed in the 1880s**
- Lands were **federally controlled**.



- Created in **1916** by President Woodrow Wilson
- The American system of national parks was the **first of its kind in the world**, and provides a model for other nations.
- Created to take over **National Parks and other monuments** and historical or natural sites
 - Department of the Interior
 - War Department
 - Forest Service of the Department of Agriculture

National Park System

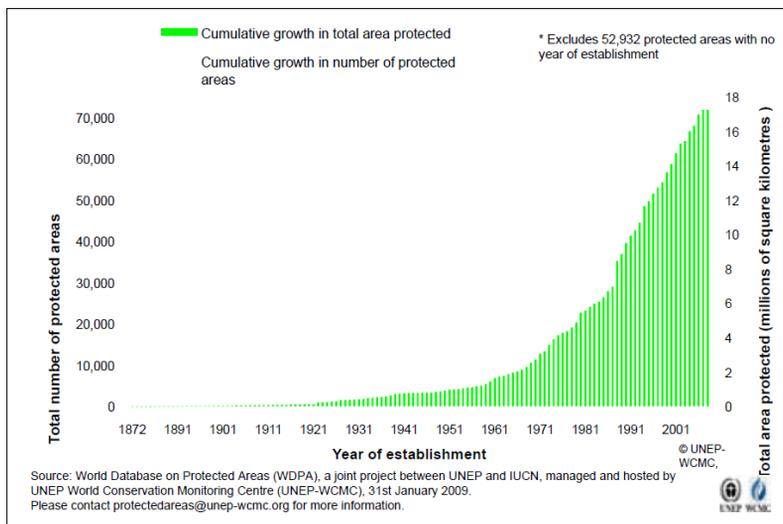
Yellowstone's children

- In 2015 there were **407 sites** in National Park system
 - 59 **National Parks**
 - 106 (78 managed by NPS) **National Monuments**
 - 19 **National Preserves**
 - 49 **National Historical Parks**
 - 90 (78 NPS) **National Historic Sites**

etc.



- **Yosemite** in 1864 and **Yellowstone** in 1872 became the ‘**blueprint**’ for all of the protected areas in the United States
- Adopted in **Europe and Colonial** regimes
 - African Wildlife Reserves - Kruger National Park 1898
- Designation and management following an almost **autocratic elitist style**
- **Exclusion** of local communities and livestock



Up until this point the designation and management of most protected areas was **elitist and exclusionary**, particularly to the local communities living in or near the area

1st aspect of change:
growth of civil society

Sierra Club 1892

- Founded by **John Muir** and others
- US based organisation, originally for protection of the **Sierra mountains**
- Expanded to include chapters throughout **all the states** and protectorates of the US



FFI founded 1903

- Pioneering work of its **founders in Africa** led to the creation of numerous protected areas, including Kruger and Serengeti National Parks.
- **1960s** - The translocation of the Arabian Oryx in 1962, and its successful reintroduction ten years later, saved this species from extinction in the wild.
- **1970s** - The mountain gorilla project launched in Rwanda is regarded as one of the most successful ventures of its kind.



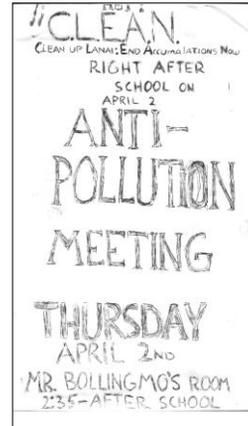
IUCN Founded 1948

- More than **1,200 member** organizations including 200+ government & 900+ NGOs
- **11,000** scientists and experts, in six Commissions in 160 countries
- A neutral forum for **governments, NGOs, scientists, business and local communities** to find solutions to conservation and development
- **Funded** by governments, bilateral and multilateral agencies, foundations, member organizations and corporations
- Official Observer Status at the **United Nations General Assembly**



- Growing **civil consciousness** about human rights and environment
- World population hits **3 billion** 1960
- **World Wildlife Fund** Est. 1961
 - ‘Launching the new ark’ (Jeanrenaud, 2002)
- Rachel Carson - **The Silent Spring** 1962
 - Pesticides in the environment
- IUCN drafts **CITES** 1963

- The Icelandic **fish stock collapses** from fishing pressure and deteriorating environmental conditions
- **Friends of the Earth** Est. 1969
 - David Brower - Sierra Club
- **Earth Day 22nd April 1970**



Earth Day 22nd April

- Gaylord Nelson, a US Senator, called for an Earth Day, to be held on **April 22, 1970**.
- Over **20 million** people participated in 1970
- Earth Day is now observed each year on April 22 by more than **1 billion people** and national governments in 192 countries.



Events of the 1970s

- Environmental Events
 - **3 Mile Island** nuclear accident
- 1971 - **Greenpeace** established
 - Initially affiliated to the Sierra club
 - 1979 structured into a global organization
- While the **1960s** saw the development of the **civil society**, the **1970s** brought **legal changes**



- Man and Biosphere programme of **UNESCO** (1970)
 - Recognising the role of humans in the environment
- UN Conference on the Human Environment (**Stockholm, 1972**)
 - The **fundamental human right to freedom, equality and adequate conditions of life**
- United Nations Environment Programme 1972
 - **Regional Seas programme** 1974 – Mediterranean
- **CITES** (Washington 1973)



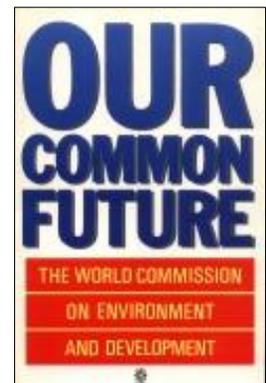


- **World Conservation Strategy** (1980)
- Bhopal 1984, Union Carbide disaster
- 'Our common future', **Brundtland report**, 1987

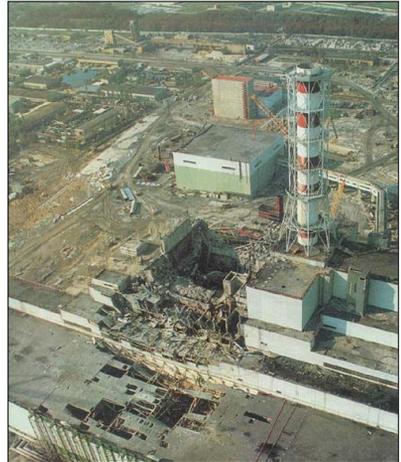
"about the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development."

The UN General Assembly:

*"**Sustainable development** is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*



- International Whaling Commission **moratorium** 1986
- **Chernobyl** nuclear disaster 1986
- World population reaches **5 billion**, 1987
- **Exxon Valdez**, Alaska 1989
- Antarctic hole in the **ozone** layer discovered



Events of the 1990s

- The United Nations Conference on Environment and Development (**Rio 1992**)
- Canadian government closes all **eastern seaboard fishing** grounds (1992)
- Trial and award of damages against **Exxon 1994**
 - US\$287 million in compensatory damages and US\$5 billion in punitive damages
- United Nations Framework Convention on Climate Change (**Kyoto, 1997**)
- World Population reaches **6 billion** (1999)

The United Nations Conference on Environment and Development
(Rio 1992)

- The **Earth Summit**, held in Rio de Janeiro from June 3 to June 14
- United Nations Framework Convention on **Climate Change** opened for signature on 9 May
- The international **Convention on Biological Diversity** opened for signature on 5 June.
- **World Ocean Day** began on 8 June

2000s

- Hurricane Katrina 2005
- Fukajima?
- Tsunami

2010s

- Deepwater Horizon 2010

2nd aspect of change:
recognition of uncertainty

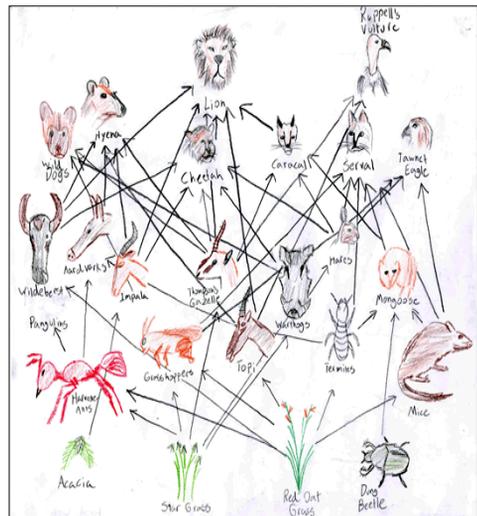
PAs for Conservation

Recognition of environmental uncertainty

- Need to access **local ecological knowledge**
- **Long term monitoring** limited by financial restraints, knowledge by other means
- Increasing **knowledge in society**, need to address societal concerns and greater transparency

Biological uncertainty

- Few **linear** cause and effect relationships in biology
- Need for biologists and managers to recognise and debate **uncertainty**
- Recognise that the '**non-biologist**' craves certainty



Local Ecological Knowledge (LEK)

Advantages of LEK

- Accumulation of information over **longer periods** of time
 - Often generational
- Wide **variety** of source information
 - Different stakeholders, can allow for verification of information
- Saves **money**
 - If you can access the information
- Implies **respect** for locals from researchers
 - Development of cooperative research programmes
 - Formal recognition of LEK

Local Ecological Knowledge (LEK)

Problems with LEK

- Subject to **bias**
 - LEK should be approached with the **same 'methodological hand'** as science
- Shifting **baselines**
 - Each generation will observe changes differently
- Must be seen to **incorporate** LEK
 - Need the same robustness as 'formal' biological knowledge
- Not applicable beyond **local context**

LEK and management

- LEK provides for more **rounded knowledge** for management
- Stakeholders have become aware of that LEK they possess **entitles** them to some return
- Stakeholders seek to **access** the process of rulemaking that govern both the resource and themselves
- If the knowledge needed for management is contributed to, shared and controlled by more stakeholders, this helps management to be more **equitable**

Development of protected area policy

	Pre 1970s	Post 2000
Objectives	Set aside for conservation	Run also with social & economic objectives
	Established mainly for spectacular wildlife & scenic protection	Often set up for scientific, economic & cultural reasons
	Valued as wilderness	Valued for cultural importance of so-called wilderness

Development of protected area policy

	Pre 1970s	Post 2000
Governance	Run by central government	Run by many partners
Local people	Planned & managed against local people	Run with, for & in some cases by local people
	Managed without regard to local opinions	Managed to meet the needs of local people

Development of protected area policy

	Pre 1970's	Post 2000
Perceptions	Viewed primarily as a national asset	Viewed also as a community asset
	Viewed only as a national concern	Viewed also as an international concern
Management techniques	Managed reactively within a short timescale	Managed adaptively in long-term perspective
	Managed in a technocratic way	Managed with political considerations

Development of protected area policy

	Pre 1970's	Post 2000
Management skills	Managed by scientists & natural resource experts	Managed by multi-skilled individuals
	Expert led	Drawing on local knowledge
Finance	Paid by tax-payer	Paid for by many sources

World Parks Congress

5th WPC - Durban 2003

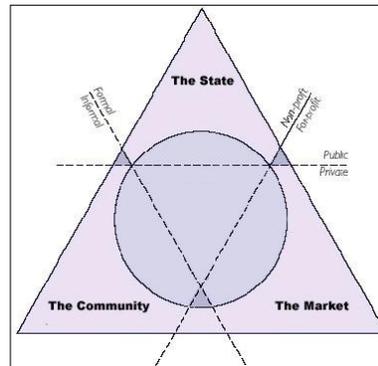
Benefits beyond boundaries

- More **people orientated** management
 - Engaging with the broad array of **local people** who reside near and around PAs;
 - PAs provide valuable **ecosystem services**
 - importance of providing resources and training for protected areas **managers**.
 - Less impetus on **biological data** and monitoring

Government or governance?

Paradigm change has required **governance** change:

- Interactions between **different actors** who may have conflicting objectives
- Requirement to find **consensus**
- Invariably all **three spheres** of society are involved
- Refers to **formal and informal** regimes
- **Interaction and co-operation** between public and private actors
- The development of **civil society**



Management types

Management forms

Before we look at

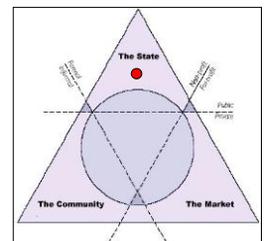
- **Co-management**

Should be aware that **context** may require other forms of management:

- **Centralised** management
- **Traditional** management
- **Private** management

Centralised management

- **Strong** national governments
 - Policy and planning undertaken by a centralised **specialist** body, such as NOAA.
 - Consultation focuses on **specific stakeholder** organisations particularly science and industry
- Perceived as being **efficient and scientifically** grounded
- Using elaborate software **modelling**
 - GIS
 - MARXAN
 - ECOPATH



Centralised management

However,

- Local stakeholders maybe **distrustful**
- Centralised planning may be **insensitive** to local environment

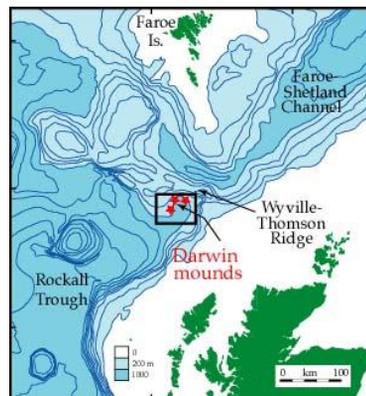
And,

- There often remains a **legal requirement** for public participation

Centralised management

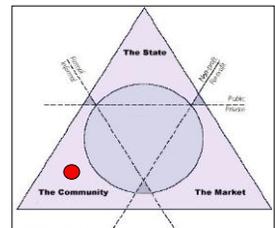
Applicable to:

- **Internationally** important habitats
 - Migration routes
- **Remote** areas
 - Few stakeholders



Traditional management

- Responsive to **local conditions**;
 - Based on traditional **LEK**;
- **Engages** resource users;
 - Leads to a sense of **trust**, collaboration, ownership and **local pride**;
- Often based on **pre-colonial** management systems;
 - Existed for millennia.



Traditional management

But,

- Countries with **weak formal institutions**
 - **Lacking** financial or technical resources
 - **Lacking** human capital
- Can be **undermined** by colonial systems and/or globalisation

And,

- May require **outside funding** and support

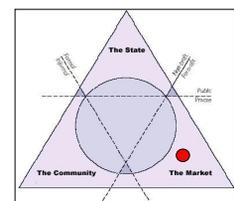
Applicable to:

- More isolated **developing** countries
- Local **cultural systems** in place 'taboo systems'



Private management

- Explicitly or *de facto* **privately** managed
 - **Contract** given to an organisation
 - Management organisation taken over by one **strong stakeholder**
 - Or an **NGO**
- Can lead to conflict and development of **un-democratic system**



The Nature Conservancy

The **TNC** – private lands conservation policy

1. Acquiring lands - principal tool of conservation in USA – purchased over **60,000km²**
2. Conservation easements - legally binding **agreement** limiting land use, donated or sold by landowner, **with tax benefits**
3. Conservation buyer projects - **land is bought**
 - **critical conservation areas**
 - **conservation easements** are designed to protect natural features
 - **land is resold** to individuals or groups supportive of the protective conservation measures

The Disney Wilderness Preserve

- Disney purchased an '**at risk**' parcel of 35km² at the headwaters of the Everglades in 1993.
- Disney's **\$45 million** investment
- Collaboration with the **Florida** Department of Environmental Protection, Florida water management districts, the **Audubon Society** and **TNC**.



Hotel PAs

- Even in the marine environment where property rights regimes are undefined
- Potential for effective management
 - Chumbe Island Coral Park



Hotel PAs

- Tend to be **exclusive** resorts
 - **Small** areas
 - **Strict** protection
 - Leased areas of **limited duration** (20 years)
- **Undemocratic**
 - Bias towards **eco-tourism**
 - **Isolation** of fishery and traditional use
- Often **funding is external** and little funding replaced into the local community

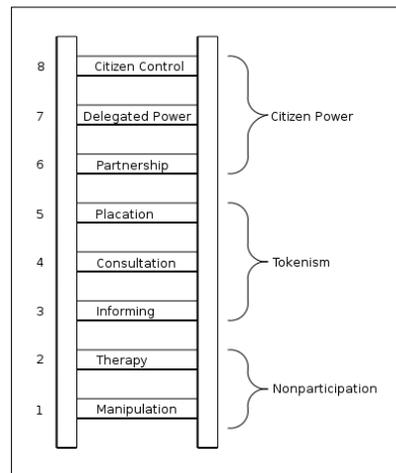
Co-management

*Co-management is a **collaborative** and **participatory** process of regulatory decision-making between **representatives** of user-groups, government **agencies** and research **institutions**.*

(Jentoft 2000)

Co-management

- **Community** – power devolvement
- **Collaborative** – power sharing
- **Cooperative** – power sharing
- **Consultative** – purely advisory
- **Coercion** - power application



Arnstein's ladder of citizen participation

- Resource users and formal policy makers make **joint decisions** on the rules for the Protected Area
- **Compromise** between bottom-up management and centralised management
 - **Engages** both resource users and government
 - Allows **transparent** planning
 - **Formally** recognised and sanctioned

Traditional to Co-management

Maturation of traditional or bottom-up management

- Policy makers **recognise** the work of local communities by **codifying** informal protection into law
- Used to **strengthen** historically established rights
- **Personal** motivation by individuals within the State mechanism
- Increasing **Globalisation** makes the element of isolation less likely
- Increasing pressure to '**conform**' to international models of management
- Cynical **political** motivation to 'hit' international conservation targets
- **Economic** reasoning – development of tourism

Centralised to Co-management

- International and national requirements for community participation -
Principle of subsidiarity -

'management authority should be vested with the lowest possible organization with the capability to manage an area'

- **Economic reasoning** – funding generally resides at the management level
- Day to day **management** generally improves with local context

Community Participation

BUT,

- Participation is not an **unqualified** good
 - More effective in **non-technical** projects.
- Participation can lead to **policy failure**
 - **Trade-off** between legitimacy and effectiveness
- Democratic participation takes **time**
 - Decision making can be a **long process**.
- **'Who is the community?'**
 - Difficulties in identifying and accessing the **'community'**
 - **Inclusion/Exclusion** issues within the community
 - **'High-jacking'** by influential groups

What is the role of conservation?

- Can protected areas **solve** the problems?
 - Poverty
 - Democracy
 - Globalization
 - The rights of indigenous people
 - Climate change
- Is **sustainable use** of natural resources equivalent to **biodiversity protection**?
- Is there a continual **reclassification** of ‘conservation’ to the point where any sustainable development project is defined as conservation?

Should **biological conservation** should be the **primary goal** of the development of PAs?

- Are the **targets** set by international organisations requiring a re-definition of a PA for States to hit them?
- Is the **Muir – Pinchot** debate over conservation and preservation still valid in the present day?

3rd aspect of change:
Legal requirement to facilitate participation

Legal requirement to facilitate participation

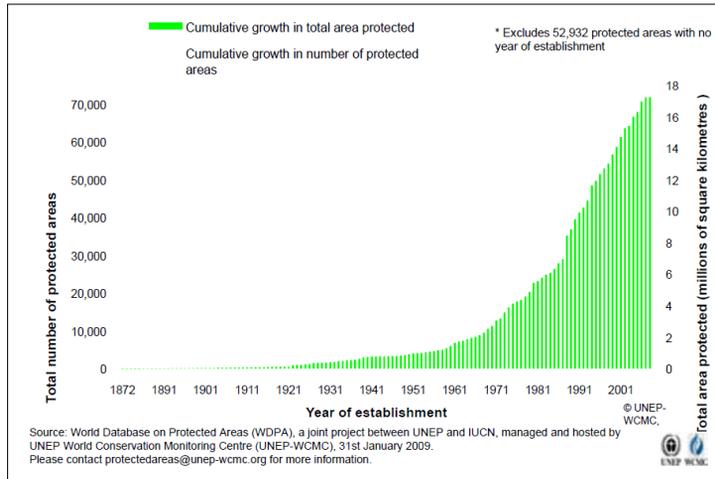
- **International** conventions
- **Regional** agreements
- National **harmonisation of international** environmental policy

Paper parks

Peter Mackelworth

IUCN

*'[An] area of land and/or sea especially **dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means**' (IUCN, 1994: 7).*



- Protected areas are the **cornerstone** of the biodiversity conservation programme in most countries.
- They are the most often used **tool for preserving** ecosystem services and goods
- But **how effective** are they?

*until recently the **primary goal** was to **get PAs in place**, now there is a greater interest in their **functionality***

Paper park

*'A legally established protected area where experts believe **current protection activities are insufficient** to halt degradation'*

Effectiveness

- The need to evaluate PA management effectiveness has become **increasingly recognised** over the past ten years
- in both developed and developing countries that declaration of PAs does not always result in **adequate protection**
- the total number of protected areas continues to increase, so too do calls for **proper accountability, good business practices and transparency** in reporting
- other strategies for **'off-park' conservation and multi-use reserves** have developed, and as concern for rural poor and Indigenous rights has increased, there has been more questioning about the role and effectiveness of PAs

Global study on PAME

- The Global Study recorded over **9,000 assessments of protected area management effectiveness evaluation (PAME)**
 - **140** countries.
 - Original data was obtained and analysed for **4,151 sites**
 - Over **50 evaluation reports** were reviewed.
 - but, this represents **just 6%** of the more than 100,000 protected areas included in the WDPA

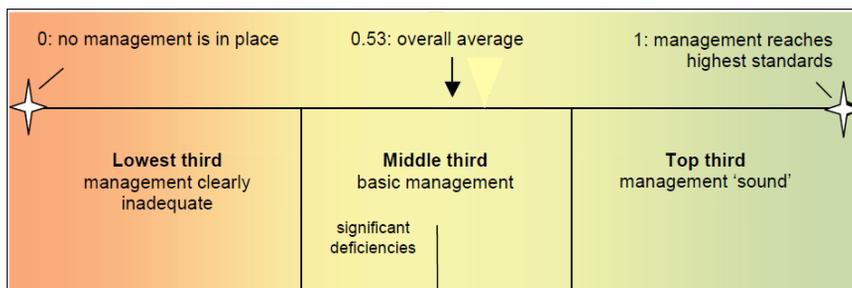
Leverington et al. 2010

How bad is it?

Global Study

2010 Biodiversity Indicators Partnership – TCN, WWF, UQ, IUCN, WCPA

- 13% - 'clearly **inadequate**'
- 62% - '**basic** management'
- 24% - '**sound** management'



Global Study

	Africa	Asia	Europe	LAC	Oceania
Number of assessments	644	634	794	853	1193
Overall mean	0.49	0.53	0.57	0.51	0.56
Management level	Proportion of assessments in each level				
'Clearly inadequate' (<.33)	22%	16%	8%	13%	11%
'Basic but with major deficiencies' (.33 - .5)	31%	25%	23%	33%	25%
'Basic' (.5 - .67)	31%	34%	39%	37%	35%
'Sound' (>.67)	17%	26%	29%	16%	29%

Global study

There are **clear patterns** in the strengths and weaknesses of management, which were consistent across most methodologies and regions

- Many protected areas **lack basic requirements** to operate effectively
- Many do not have an **effective management presence**, with overall management effectiveness was strongly linked to:
 - adequate **infrastructure**, equipment and information;
 - good **administration**;
 - **communication**, adequacy of information, staff **training** and good management **planning**.

Global study

Threats to PAs

- in most regions:
 - **hunting**, killing and collecting animals;
 - **logging** and wood harvesting;
 - gathering **non-timber forest** products;
 - **recreational** activities;
 - and the management of **adjacent lands**.
- These show some consistency across regions, though differences are seen in **countries like Australia**, where:
 - **invasive** species
 - **fire management** are more serious threats.

Outputs from PAs

- The condition of **PA resources** were most strongly correlated with:
 - the **support and constraint** of the external environment (a measure of context), including financing and policy support
 - with **inputs and processes** including:
 - **research** and monitoring,
 - **staff numbers** and training,
 - effectiveness of **administration** and natural resource management
 - **communication**.
- The **effect of the PA** on the local community was most strongly linked with:
 - communication, **involvement of communities** and programs of community benefits

Global study - recommendations

- agencies, partners and funders cooperate to help PAs achieve **minimum basic standards**, particularly in low HDI countries
 - The **average score for management** was seen to vary significantly according to the Human Development Index (HDI),
 - Protected areas from the low-HDI countries scoring on average **one-third lower** than those from high HDI countries.
- Provision and maintenance of **adequate facilities**, equipment and infrastructure
- national governments provide better **policy support** for tenure resolution and appropriate development planning and control around PAs

Global study - recommendations

- greater effort should be put into **communication, community involvement** and programs of community benefit
- boost resource **management and research and monitoring** to achieve conservation of PA values.
- **visitor management** needs to be improved for those areas where tourism is a significant function of PAs, as it scores poorly in most.
- managers need to build better **pro-active management capacity**, linking management planning, actions, research and monitoring, and evaluation.

Parks in Peril programme

www.parksinperil.org



Parks in Peril Program

- to **understand the processes and capacities** needed for the conservation of individual PAs and to allow managers to measure progress
- focuses on **strengthening local conservation NGOs and agencies** in countries where PAs may have been designated on paper but the means for protecting them does not exist
- **fosters local support** for PAs through a process 'site consolidation'
 - bringing together **financial, technical, human** resources for management
 - developing **infrastructure**
 - **political support**
 - advancing **ecological data**

Parks in Peril Program

- Site Consolidation Scorecard utilises **17 indicators** was designed to measure the effectiveness of the investment in PAs in the program. It serves to:
 - Set **multi-year, life-of-project objectives** for sites using standard criteria ;
 - Allows project managers to **track progress** towards site consolidation over time;
- Four major categories:
 - **strategic** planning;
 - basic **onsite protection**;
 - long-term **financing**;
 - developing a supportive **local constituency** for the PA.
- Five benchmarks
 - 5 – excellent, to, 1 – no work has been done

Parks in Peril Program

- **40 countries** in Latin America and the Caribbean region since 1990.
- The Scorecard has been used **271 times** across 45 protected areas since 1997.
- It was **revised in 2004**, with
 - **Greater integration** – elements are cross-referenced
 - **Vision-based** consolidation (strategic planning first)
 - **Documentation** section
 - **Site constituency** section enhanced

Balloffet & Martin 2007.



Parks in Peril Program

- Run in cooperation with funding agencies and other partners
 - primary funder is **USAID** contributed US\$**77M**
 - direct funding, including USAID, US\$**104M**
 - indirect funding through leverage and other partners US\$**450M**

Marine Protected Areas

MPAs

- 1,306 MPAs assessed in **1995** only management information available for **383 (29%)** for the assessment to take place, of that:
 - 117 MPAs (**31%**) were hitting targets
 - 155 (**40%**) were partially hitting targets
 - 111 (**29%**) were failing
- Taking the 117 as the operational MPAs equates to around **9% of MPAs being successfully governed**

Kelleher et al., 1995

quantity or quality?

How do global targets affect quality?

2011-2020 is the United Nations Decade for
Biodiversity



Aichi biodiversity targets

The vision:

*'By 2050, biodiversity is **valued, conserved, restored and wisely used**, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.'*

20 targets under 5 strategic goals

Aichi goals

Target 11:

*By 2020, at least **17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas**, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.*

Role of the IUCN in PA development and management

IUCN categories of PAs

Category	Description
Ia	Strict Nature Reserve: Protected Area managed mainly for science
Ib	Wilderness Area: Protected Area managed mainly for wilderness protection
II	National Park: Protected Area managed mainly for ecosystem conservation and recreation
III	Natural Monument: Protected Area managed for conservation of specific natural features
IV	Habitat/Species Management Area: Protected Area managed mainly for conservation through management intervention
V	Protected Landscape/Seascape: Protected Area managed mainly for landscape/seascape conservation and recreation
VI	Managed Resource Protected Areas: Protected Area managed mainly for the sustainable use of natural ecosystems

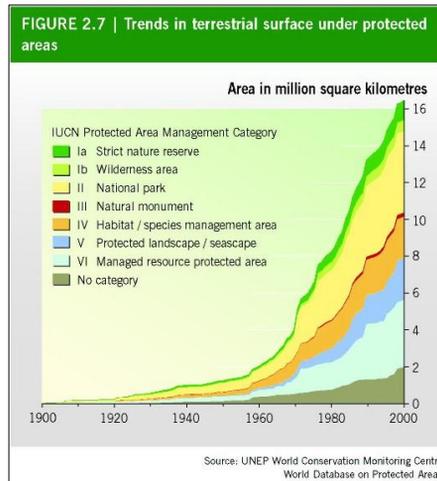
Management objective	Ia	Ib	II	III	IV	V	VI
Scientific research	1	3	2	2	2	2	3
Wilderness protection	2	1	2	3	3	–	2
Preservation of species and genetic diversity (biodiversity)	1	2	1	1	1	2	1
Maintenance of environmental services	2	1	1	–	1	2	1
Protection of specific natural/ cultural features	–	–	2	1	3	1	3
Tourism and recreation*	–	2	1	1	3	1	3
Education	–	–	2	2	2	2	3
Sustainable use of resources from natural ecosystems	–	3	3	–	2	2	1
Maintenance of cultural/traditional attributes	–	–	–	–	–	1	2

Key: 1 = Primary objective; 2 = Secondary objective; 3 = Potentially applicable objective;
– = not applicable.
* *Emphasis added for this publication*

IUCN

Characteristic	Typical II National Park	Typical V protected landscape/seascape
Natural environment	'natural' system	Greatly modified system
Management objectives	Ecosystem conservation & tourism	Landscape protection, tourism, local sustainable economic use
Principle economic use	Tourism	Farming, forestry, fishery, tourism
Ownership	State	Private
Management agency	Central/provincial Government	Provincial/local government
Settlement	Limited	Established

Categories



What is the role of conservation?

- How can protected areas solve the problems of:
 - poverty,
 - globalization,
 - the rights of indigenous people,
 - climate change
- and still maintain the core goal of conservation, the maintenance of biodiversity?
 - if there is a continual reclassification of what constitutes 'conservation'

McClanahan (2004)

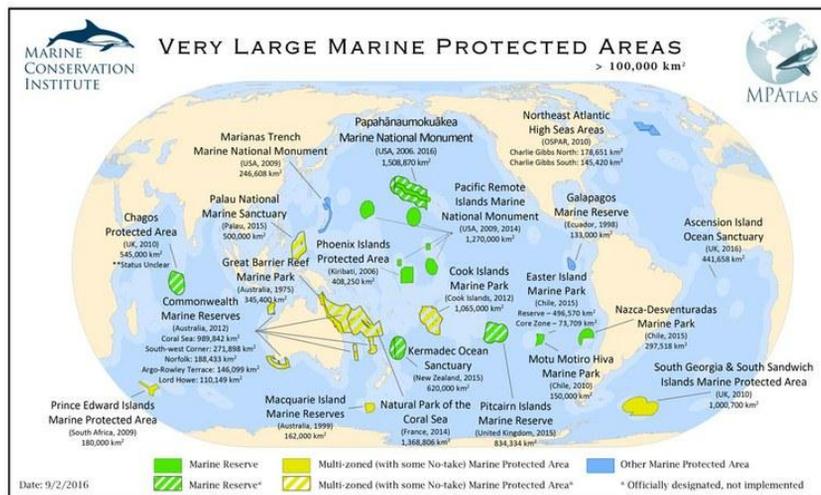
Are marine areas as easy pickings?

IUCN Category	Number of sites	Total Marine Area (km ²)	Average size (km ²)
Ia	419	189,439	452
Ib	49	5,916	121
II	666	279,654	420
III	133	3,819	29
IV	1,494	305,329	204
V	571	73,279	128
VI	159	809,354	5090

After Mulongoy & Chape, 2004: 29

- Since **1997**, the US, Australia, and the UK have created huge marine reserves that have banned fishing in more than **1.9 million square kilometers** of ocean
 - an area equivalent to the size of Mexico.
- In 2006, then-President Bush designated some 362,000 square kilometres around the **Northwestern Hawaiian Islands** as a U.S. Marine National Monument in which all exploitation would be banned.
 - In August 2016, President Obama expanded the area of the monument by roughly four times
- In 2010 the UK created a reserve around the **Chagos Islands** in the Indian Ocean > 650,000 sq km.
- In 2012 Australia banned all fishing in much of the **Coral Sea** at 989,842 square kilometres, the biggest no-take zone in the world.

Jones & De Santo, 2016



Is the race for remote, very large marine protected areas (VLMPAs) taking us down the wrong track?

- do they **undermine the principles** of the Aichi targets?
- **effectiveness, representativeness, connectivity**
- what about **MPAs close to home**?
- social justice, how are **local communities** consulted or co-opted?



Detection methods

One of the underlying problems for these MPAs is **monitoring**

How do you monitor such **large areas**?

- Vessel Monitoring Systems (VMS)
- Aircraft
- Drones
- Satellite imaging

From paper parks to real parks

- Can paper parks serve the purpose of **'holding'** an area for conservation?
- Formal designation of a protected area can **provide a framework** for protection that can be later improved and revised
- for monitoring technologies to **'catch up'** with exploitive technologies

(Spalding, 2010)

Conclusions

- paper parks are a wide-spread **global problem**, but more significantly in developing nations
- only around **25% of PAs** are reaching their conservation target
- the push for hitting **international targets** by 2020 is likely to make paper parks an even bigger issue
- MPAs appear to be a **soft target** due to their remoteness and absence of stakeholder

Protected area downgrading, downsizing and degazettement (PADDD)

Peter Mackelworth

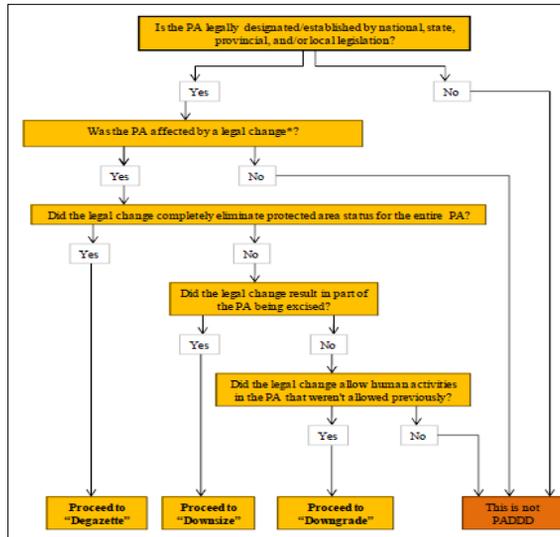
Spring 2018

PADDD

Protected Areas are generally regarded as the **cornerstone** of conservation policy:

- It is assumed that PAs are **permanent** fixtures in conservation
- However PADDD is an ongoing feature of conservation, **often overlooked** by international authorities

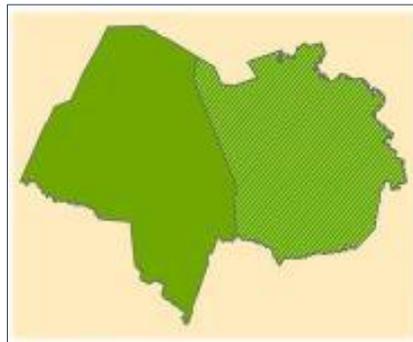
PADDD decision tree



Downgrade

*'A decrease in legal restrictions on the number, magnitude, or extent of human activities within a protected area by the relevant authority.'**

*Note that an activity may be only *permitted*; it need not be implemented or practiced.



Downgrade

Further **criteria** for qualification as a downgrade include:

- If an activity is carried out and **is not in violation of existing laws**, this does not constitute a downgrade.
 - For example, if a permit for **oil exploration** is issued when **oil exploration is legally permitted**, this does *not* constitute a downgrade (as the authorizing legislation already exists, and no legal change has taken place).
 - However, a national or protected area level **decision to allow** an activity when it was **not previously allowed** constitutes a downgrade.
- An increase in **illegal activities** does not constitute a downgrade.

Downgrade

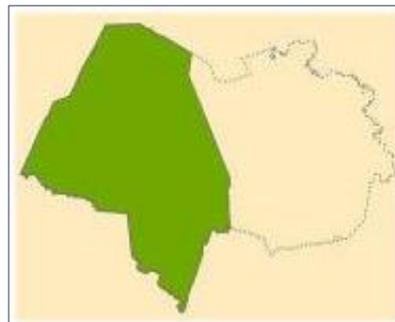
- Devolution of authority from **higher to lower levels of government** (e.g. federal to state, or state to community)
 - Constitutes a downgrade only if the devolution of power is accompanied by an **increase in the legally** permitted types, magnitude or extent of human activities
 - *and* if the land remains a part of the national protected area system.
- Devolved authority from **state actors to private** ownership constitute downgrades:
 - only if the devolution of power is accompanied by an **increase in the legally** permitted types, magnitude or extent of human activities
 - *and* if the land remains a part of the national protected area system.

Downgrade

- Downgrades can be reflected in the **protection status** given to the protected area by the country's authority,
 - change in name and protection from a “**National Park**” to an “**Extractive Forest Reserve**”,
 - or when the **new legal framework** authorizes an increase in the type, magnitude, or extent of human activities.
- Changes in **IUCN category alone do not count** as a downgrading event by themselves;
 - additional supporting documentation is required to **demonstrate legal increase** in the types, magnitude, or extent of human activities permitted.

Downsizing

*‘A **decrease in size** of a protected area as a result of excision of land or sea area through a legal boundary change’*



Downsizing

Further operational criteria for qualification as a downsize include:

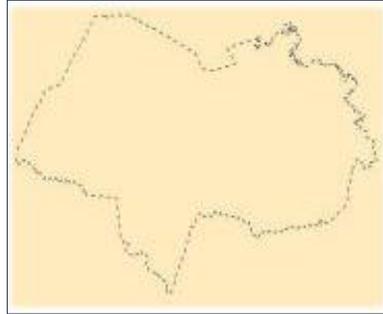
- The **change in size** of a protected area must be through **legal, regulatory, or legislative** means and documented as such by the appropriate authoritative body.
- If **less than 100%** of the protected area territory is **legally transferred to private, community, or indigenous group** ownership while losing government protection, it qualifies as a downsize.

Downsizing

- If **less than 100%** of a protected area is absorbed into a new or existing protected area(s), it qualifies as a downsize.
 - For example, if Park X of 100 km² is **legally degazetted** and **two smaller parks of 45 km²** each are gazetted in within the former boundaries of Park X, it qualifies as a **functional downsizing** for the purposes of this project.
- Protected area boundary changes resulting solely from the **correction of cartographic, GIS, or survey error** do not represent a functional downsize

Degazettement

Loss of legal status for a protected area under government administration (national, state, provincial, or local)



Degazettement

Further operational criteria for qualification as a degazettement include:

- An elimination of protected area status must be **legally documented** by the relevant authoritative body.
- When there is a **legal transfer of a protected area** to private, community, or indigenous group ownership, 100% of the protected area territory (i.e. area)
 - must be legally transferred while **losing government protection**
- When there is a **legal transfer of a protected area** to a private, community, or indigenous group, and the associated transfer of authority is partial or ambiguous, it qualifies as a degazettement only if the protected area is **removed from the relevant government** authority's official list of protected areas.

<http://www.paddtracker.org/>

Degazettement

- Protected areas that are **no longer legally considered** to be a part of a protected area system by the applicable authority (national, state, provincial, or local).
 - E.g. An existing category of protected area is **no longer considered** by a country’s government to be part of their **protected area system**, but the area is still held as federal land.
- A protected area “**shut down**” for war, political unrest, or budgetary constraints **does not qualify as degazetted**, unless the above definition and applicable criteria have also been met.

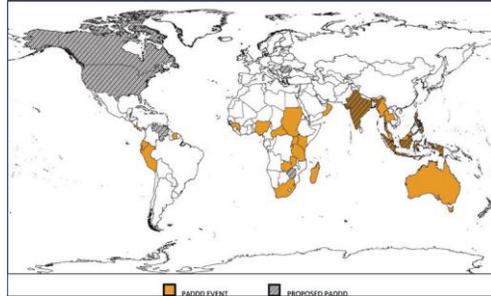
History

- In 1903, the **British imperial government** proposed degazetting the White Nile Reserve in Sudan, with the understanding that another game reserve—more distant from Khartoum—would be established instead
- The proposal was **successfully fought** by a group of social and political elites in England
- These individuals formed the Society for the Preservation of Wild Fauna of the Empire, the conservation organization known today as **Fauna and Flora International**.
- In the **1930s** the White Nile Reserve was degazetted, and “replaced” by the Zeraf Game Reserve hundreds of kilometers to the south

PADDD

Since 1900 **89 PADDD historic** instances in **27 countries** have been recorded

- PADDD is being currently considered in **12 countries**



Mascia & Pailler (2011)

Motivations

- The reported **causes** of PADDD range from:
 - **political bribes** to tsetse fly abatement,
- **Three** main drivers:
 - industrial-scale commodity **production and extraction**,
 - **infrastructure** development, and
 - **local land claims** and human settlement.

Motivations

- In some cases, PADD resulted from an *ex post facto* **rationalization of environmental degradation**, where authorities reconfigured land or sea governance **because the PA had failed to meet its management objectives**

Contemporary PADD

- **New Zealand** successive governments have granted permits for “prospecting and exploration” in **42 PAs**,
- Currently pending proposal to downgrade an unspecified number of PAs—including 20% of the **Mt. Aspiring National Park**, a World Heritage Site
- for the permit of **industrial-scale mineral extraction**



- In **India** the Pench National Park is proposed to be downgraded
- For the National Highway Authority of India (NHAI) to connect Srinagar and Kanyakumari wants to build a 56 km stretch highway
- Highly critical area for tigers



contemporary PADDD

- In Peru and Ecuador 15 large (>100 km²) **state-administered forest PAs** were established between 1940 and 1987.
 - typically, local communities were **not consulted** when the PAs were created
 - as PA regulations were implemented, **“conflict erupted”** with resource-dependent local residents.
 - in the **1970s and 1980s**, managers at some PAs tried to prevent resource use by force, in some instances leading to **public outcry and occasional violent** protests

Contemporary PADDD

- Demand for **access to and use of natural resources** within these 15 PAs resulted in **nine cases of PADDD around 1993**
 - rather than attempt to **evict local people**
 - or **impose resource-use restrictions**,
 - PA boundaries were **legally changed to cede land back to local citizens**

Conclusions

- Changes to a PA **can be legitimate, even beneficial** to conservation
 - Address concerns of **drift towards fortress conservation**
 - **Address needs of indigenous** groups or local communities
- More often for **economic processes or political will**
 - Changes to **socio-political issues**
 - Global demand and **market pressure**
- In some instances there can be a **simultaneous establishment or upgrade of a PA** to compensate for the loss of protected lands or waters due to PADDD, termed as '**PADDD offsetting**'.

The policy process

Peter Mackelworth

The policy process

- Natural resource problems involve:
 - Social **complexity**
 - Public perception and **values**
 - Individuals **perception** and values
 - **Uncertainty**
- Much of this is related to **subjective choices** and **decisions**:
 - Policy decisions must be taken despite **incomplete knowledge** of the outcomes of these decisions
 - Otherwise **inaction** can result in **greater depletion** of biological diversity while decisions are being considered
 - The **precautionary principle**

The policy process

Policy is a social process of **authoritative decision making** by which members of a community to **clarify and secure** their **common interests** (Lasswell & McDougal, 1992)

- Individuals within a **community share expectations** about who has the **authority** to make decisions
- Decisions should be based on the **perspectives, identities, demands and expectations** of the community involved
- But, it should be noted that, policy decisions are **not always political** decisions

The policy process

- Three key questions that can be asked about **any policy**
 - Is it **rational**?
 - Is it politically **practical**?
 - Is it **morally** justified?
- Therefore the three standpoints of policy are:
 - **Rational**
 - **Political**
 - **Moral**

Natural resource policy

- The fundamental questions about managing natural resources are:
 - How are we going to **use natural resources**?
 - **Who gets** to make those decisions?
 - Who can **influence the decision** makers?

Policy analysis framework

Three principle dimensions:

1. **Social** process
 2. **Decision** process
 3. **Problem** orientation
- The purpose of the framework is to provide a **structure** for professionals in natural resource management to set aside **preconceptions** (their own ideas and values) and map a problem **so that conflict** between individuals **can be avoided**, or at least mitigated

Social processes

Social processes

1. Participants

2. Perspectives

3. Situations

4. Social values

5. Strategies

6. Outcomes

7. Effects

- There are **7 elements** that should be considered for **social processes for natural resource** policy development
- This is the framework to guide the **analysis of interactions** between people and the environment

(Clark, 2002)

Participants

Who is participating? The identification of:

- Individuals
- Groups
 - Local, regional, national, international
- Institutions / Organisations
 - And **who do they represent**
- Who **would like** to participate?
- Who is **demanding** to participate?

Participants

- Who has a **legitimate right** to participate?
 - It is important recognise these parties **early in the process**,
 - Some legitimate parties **may not be aware** of their rights
 - Some of them may **not be as obvious** as others
- The general rule is, always **look to be inclusive** rather than exclusive

Participants

- **Ignoring difficult** participants will only **delay** the process in the long-term
- If the process **excludes important parties** then there is a likelihood that **problems will not be solved** and even be made worse
- Be aware of those participants looking to **limit the participation of others** as a way of furthering their own interests or increasing their power

Perspectives

- What are the **perspectives of the participants**, and those wanting or demanding to be part of the process?
- Perspectives are **closely linked to identity** which can be manifested in **certain demands and expectations**
 - What are their **demands**?
 - What are their **expectations** from the process and the results?
- Each participant is likely to have a **different perspective**
 - It is important to **understand** differences and try to find common interests

Perspectives

- What is **your** goal?
 - Clarify **your aims and objectives** as a manager-scientist
- What would **you** like perspectives of the participants to be?
 - And **how** will you get towards that aim?
 - Form your **strategies**
 - **Identify** other participants with potentially converging goals

Situations

Situation refers to the **area in which social interactions** take place which has 4 dimensions:

1. **Spatial** component

- **where do interactions** take place? in the field?
- Or is there a **more formal institutional** component? like a university?

2. **Temporal** component

- **When do the interactions** take place?
- Over what **period of time** are participants involved in the policy process?

Situations

3. Political component

- how much control is applied from the **State institutions**
- Is there a **regional or international** component?
- How much power can be **devolved** to the co-management process?

4. Crisis component

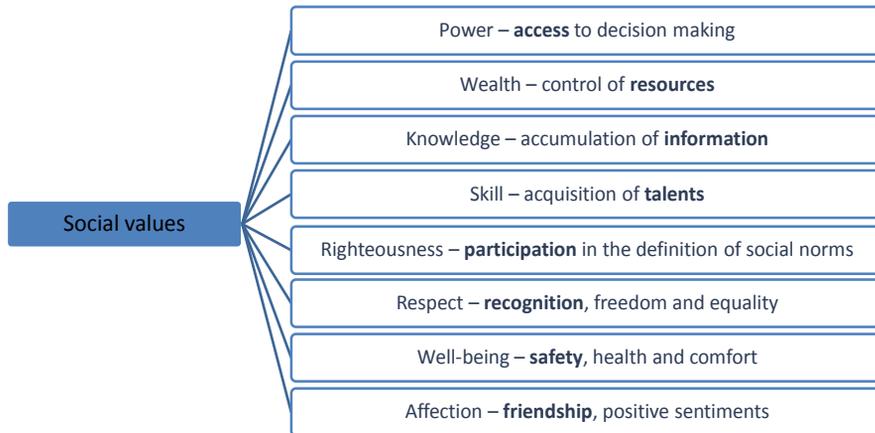
- **How critical** is the decision making process?
- **Perspectives can change** in a crisis situation
- Is it critical for **all participants** or specific to certain stakeholders?

Social values

- In all communities **social values** are **unevenly distributed**
- May be defined by your **social status**, such as familial links, geographic location
- **Political system** may also influence how the social values are distributed, example, democracy vs dictatorship
- Social values are linked to the **other aspects** of the social processes, such as situation.
- There are **seven categories** of social values

Social values

- What assets can participants bring to the negotiation?



Social values

- What assets would **you** like to use?
- Or see other participants use?
- This may also affect the **strategies used** by other parties involved

Strategies

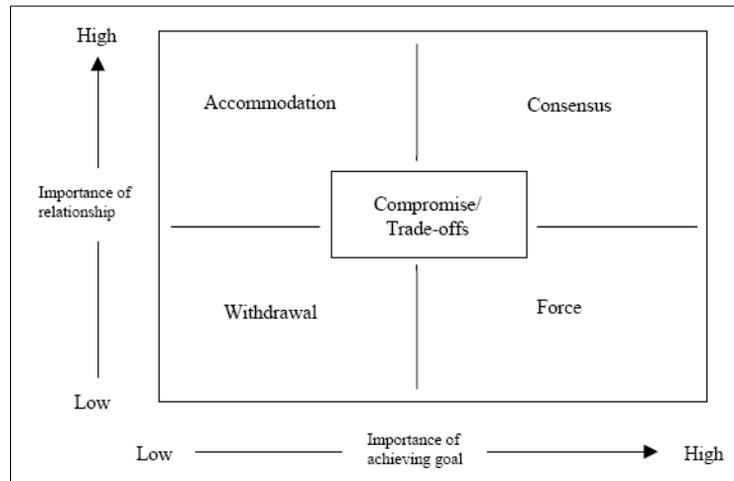
What **strategies** do participants employ in their efforts to achieve their goals?

- Diplomacy
 - Negotiations between **participants with access to power**
- Ideological
 - **Efforts to change** other participants opinions on the matter
 - Propaganda or **materials for 'education'**
- Economic
 - Efforts to **change the economic balance**
 - **Trade wars** and boycotting goods
- Force
 - **Direct action**
 - **Blockading** a transportation route

Strategies

- Which strategies are applicable for **you**?
- Which are **appropriate and effective**?
- Where there is a **conflict between the values** of stakeholders there may be a need for the development of **conflict management strategies**

Managing conflict



Force

One party has the **means and inclination** to win regardless of if another party loses or the fact that winning undermines future relationships.

- **Not all parties** will have the opportunity to use force, it is related to the **power relations** between groups
 - **Economic** - bribery, corruption, buying out of opposition
 - **Legal** - appealing lost cases - tying up the process
 - **Manipulation** of the system - electoral, media
 - Some of the more extreme uses of **force**, include **violence or threats** of violence

Withdrawal

Often used as a **counter measure to power** imbalance to improve process legitimacy and a desire to avoid confrontation

- Withdrawal may take **various forms** such as
 - **Funding** withdrawal
 - Opting out of the **negotiation process**
 - **Delaying** tactics
 - **Postponing** project decisions
 - **Boycotts** and strikes

Accommodation

When one party in a conflict situation values a **strong and continuing relationship** with one or more of the other parties above the attainment of their own specific goals

- **Securing good relations** and good will for the longer term
- Maybe to **concede** some part of the project to **keep the whole project** from collapsing

Compromise

To **compromise in a negotiation** may sound positive, but it means that at least one party has had to **sacrifice something**. Or **perceives** that they have lost out.

- A compromise approach seeks to **minimise inevitable trade-offs**
- To **concede one aspect to gain** in another - a trade off
- Perceived as a **win-loss** situation

Consensus

Although processes of consensus-building sometimes contain **elements of compromise** within the final agreement, there are some key differences between the two approaches:

- Consensus-building explicitly **sets out to avoid trade-offs**, seeking instead to achieve a **'win-win'** outcome.
 - Steering parties from **negotiating over immediate demands** and hostile positions
 - Seeking **underlying needs** which are the **motivations behind conflicts**
 - Seeking **multiple solutions** to meet underlying needs
 - Seeking **clarity in demands** and solution options

Outcomes and Effects

Outcomes

Outcomes are **short term events** that provide or deprive participants of their goals

- Outcomes may have a **longer effect** on the social process e.g.
 - Negatively, the creation of a longer-term **resistance** to an idea
 - Positively, an outcome that can be **built upon** through other social processes
- What are the outcomes **you** are looking for?
- Can a **short-term gain** lead to a long-term loss?
 - example Peace Parks concept

Effects

Effects are **longer term outcomes**

- Largely seen by the **change in institutions or institutional decision making**
- **Change in policy** of institutions
- **Changes in day to day** practices of stakeholders
- **Changes to base values** and value systems of stakeholders
- Development of **new practices and values**

Ultimately the questions you can ask yourself are:

- Who ended up with **more power**?
- Who has been **undermined** by the process?
- Do these outcomes **favour the common interests** of the community?

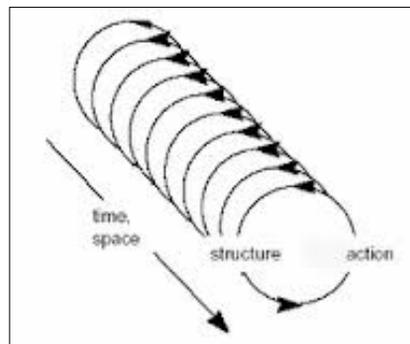
Understanding the social processes

- The social processes provide the **context** in which policy decisions are based
- Understanding the **7 elements** of the framework should provide you the underlying knowledge on which to base decision-making

Decision processes

Decision making

- **Continuous process** involving many different stakeholders
- The construction of the **rules or norms** in which the community functions
- The aim is to work towards the **common interest** of a community



Common Interest

*'are those interests that are **widely shared** within a community and demanded **on behalf of the whole community**'*

- Examples:
 - Safe drinking water
 - Clean air
 - Others?
- It is important to **clarify and secure** community common interests
- And **solve problems** related to these **common interests**

Special Interest

*'Are those interests that benefit **only a part** of the community at **the expense of the rest** of the community'*

- Examples:
 - Industrial fishery
 - Oil and gas exploitation
 - Others?
- **Often special interests are hidden** behind language and symbols of the common interest,
- **Justifying themselves** in terms of what they will add to the common good

Defining a common or special interest

Ask the following three questions:

1. Is it **inclusive and open** to broad participation?
2. Does it meet the valid expectations of **all participants**?
3. As the policy is implemented or tested, **is it responsive and adaptable** in achieving the goals as the context changes?

If, you can answer 'yes' to these questions then it is **probably a common interest**

Cromley (2001)

Decision making functions

Decision making functions

Elements to consider to **ensure good decision making**, is based on these principals:

1. Intelligence (planning)
2. Promotion (creating support)
3. Prescription (rule making)
4. Invocation (creating the support structures)
5. Application (interpretation)
6. Appraisal (assessing the effectiveness)
7. Termination (removal)

Intelligence (planning)

- The process of **obtaining and processing** information and giving it to decision makers and other stakeholders
- Biological, economic, and social **data** on past, present and projected future trends
- Includes **biological field work**, social surveys, modelling

Intelligence (planning)

- Often carried out by **specialist organisations**, such as State Institutes and Universities
 - Which data is **being collected**?
 - Which data is **being ignored**?
 - And **why**?
- An example would be **baseline data** for the creation of a **conservation management plan**

Promotion (creating support)

- The process of **recommending and mobilising** support for policy alternatives
- The creation of a '**critical mass**' for change requires public awareness activities, lobbying and general **dissemination of information**

Promotion (creating support)

Development of **policy alternatives** based on intelligence process:

- **Different stakeholders will forward different intelligence** which should result in open active debates
 - LEK – ensuring the accuracy of the information being given
 - the BINGOs (big international non governmental organisations) specialise in environmental campaigning
- Who's perspective is being promoted?

Prescription (rule making)

Prescription is the **writing of policy into law** and legislation

- It requires **clearly stated goals**
- **Clarity** over the rules and their application
- Outlining **potential sanctions** for rule breakers
- Defining what **assets** should be made available for monitoring compliance

- To carry authority, it is important to ensure that the **relevant authority** is in place to apply the law
- And the relevant authorities must **communicate their intent** to implementing the law and impose sanctions

Invocation (creating the support structures)

The practical, effective and **complete application** of the law

- Ensuring **consistency** with the other rules of the community, including other complementary laws
- Ensure that the **monitoring and enforcement** of the law is consistent
- Set up the **administrative arrangements**
 - The **allocation of resources** and people to ensure that the law is applicable
 - Creating the **review** process
- Preparation of **management plans** for a PA is an example

Application (interpretation)

No law is absolute until it is **tested in a court** of law, i.e. a precedence is set

- The **final definition** of the behaviour of individuals in relation to the prescription
- The **testing** of the prescription in a court of law
- Ensuring that the interpretation of the law is **consistent** and a court precedence is set
- Continuous **review** and approval or change to the law is required
- **As Society changes** and the application of a law will change with it (Giddens, 1984)
- An example: Trump's law about banning Muslim travellers to the US

Appraisal (assessing the effectiveness)

- **Assessment** of the decision making process as a whole and its success in achieving the goals
- **A review of the whole system** in place, including the invocation and application processes
- **Independent reviews** are often the best way of analysing how the decision making process is being applied
- Example is the on going **reviews of the EU fisheries** and agricultural policies

Termination (removal)

- Termination is the **removal or large-scale adjustment** of a prescription (law)
- May also involve **compensation** to those parties that were affected in the past by the law
- Can be used to **terminate actions** that have been successful and have been completed
- A function of decision-making that is **often overlooked**
- Example: the **delisting of the wolf populations** on the endangered species lists, or the potential to **downgrade sea turtles** in European law

- While the social processes are the **key context** in which decisions are made
- The **decision-making process** lies at the heart of defining policy and law
- **Analysis of the framework** will allow you to see where decision functions have been badly carried out
- It will enable you to **identify where potential conflict** areas will develop

Biodiversity policy

Peter Mackelworth

There are a multitude of conventions and agreements that have **potential affect** on your work, this list is not exhaustive, but they are the **major legislative instruments** that you may come across...

International

- **Man and Biosphere** programme of United Nations Educational, Scientific and Cultural Organization (UNESCO)(1970)
- The Convention on **Wetlands** of International Importance (**Ramsar**, 1971)
- The Convention on **International Trade** in Endangered Species of Wild Fauna and Flora (**CITES**, 1975)
- The Convention for the **Protection** of the Marine Environment and the Coastal Region **of the Mediterranean (Barcelona Convention**, 1976, amended 1995)

International

- Convention on the **Conservation of European Wildlife** and Natural Habitats (Bern, 1979)
- Convention on the **Conservation of Migratory Species (CMS)** (Bonn, 1979)
- Convention on the **Conservation of Biology Diversity (CBD)** (Rio, 1992)
- Convention on Access to Information, **Public Participation** in Decision-Making and Access to Justice in **Environmental Matters (Aarhus Convention, 1998)**.

International Agreements and Conventions

Rio 1992

UN Conference on **Environment and Development** (Earth Summit) (1992) - 27 principles to guide decision makers

- Principle 1. '*Human beings are at the **centre of concern** for sustainable development. They are entitled to a **healthy and productive life in harmony with nature.***'
- Principle 3. '*The **right to development** must be fulfilled so as to equitably meet developmental and environmental **needs of present and future** generations.*'
- Principle 10. '*Environmental issues are **best handled with the participation of all concerned citizens**, at the relevant level.*

Convention on Biological Diversity (CBD)

The Convention on Biological Diversity was opened for signature on 5 June 1992 at the Rio "**Earth Summit**".

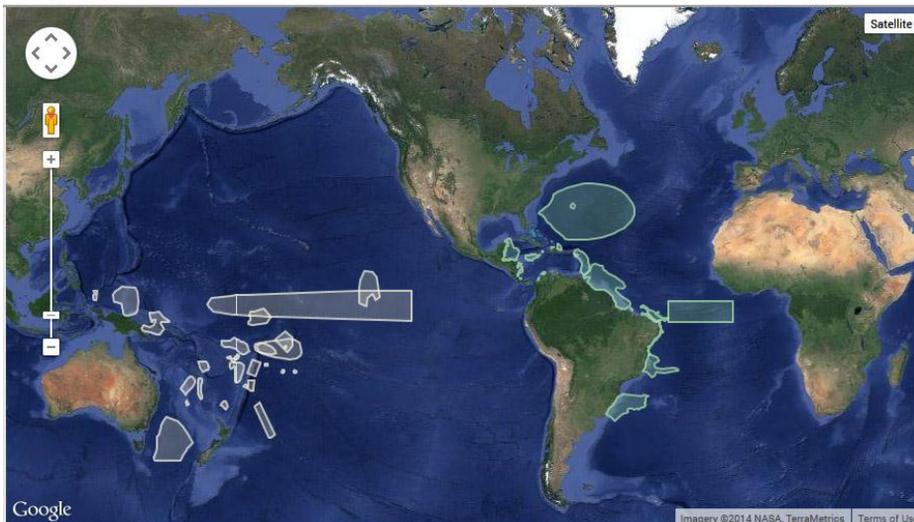
- It remained open for signature until 4 June 1993, by which time it had received 168 signatures (**now 180 ratifications**).
 - The **most signed** international convention relating to biodiversity
 - Remains a **significant tool** on which other agreements base their logic
- The Convention entered into force on **29 December 1993**, which was 90 days after the 30th ratification.

Convention on Biological Diversity (CBD)

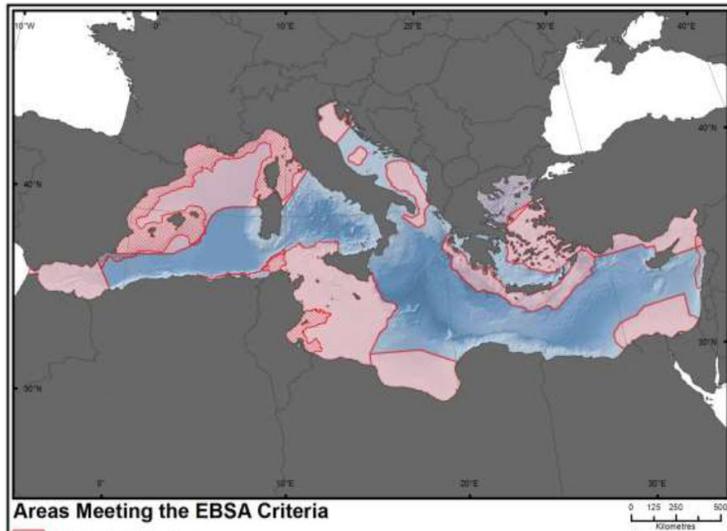
The Convention on Biological Diversity has 3 main objectives:

1. The **conservation** of biological diversity
 2. The **sustainable use** of the components of biological diversity
 3. The **fair and equitable** sharing of the benefits arising out of the utilization of genetic resources
- Provides the basis for the **development of regional action** plans such as the 'Ecologically or Biologically Significant Areas' (EBSAs)

EBSAs



Mediterranean EBSAs



Northern Adriatic EBSA

- Tegnue Limestone Outcrops
- Bottlenose Dolphins
- Monk Seal
- Loggerhead Turtle
- Blue Shark
- Thresher Shark
- Sandbar Shark
- Mediterranean Shag
- Common Tern
- Posidonia
- Zostera
- Cymodocea

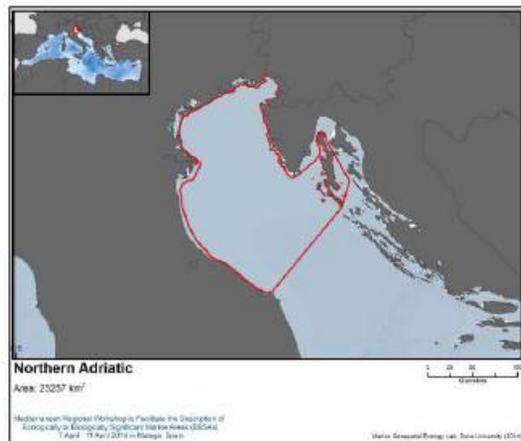
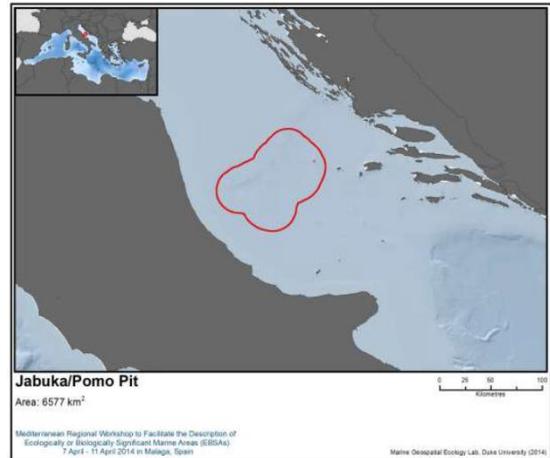


Figure 1. Area meeting the EBSA criteria.

Jabuka Pit EBSA

- Geomorphological and Oceanographic Features
- European Hake Spawning
- Norway Lobster
- Black bellied Angler Fish
- Horned Octopus
- Giant Devil Ray



South Adriatic Ionian Strait EBSA

- Cuvier's Beaked Whale
- Giant Devil Ray
- Striped Dolphin
- Monk Seal
- Loggerhead Turtle
- Deep Sea Coldwater Corals



Ramsar Convention (1971)

The Convention on Wetlands of International Importance (Ramsar 1971)

- The **only global environmental treaty** that deals with a **particular ecosystem**.
- The Convention's mission is

*"the conservation and **wise use of all wetlands** through local and national actions and international cooperation, as a contribution towards **achieving sustainable development** throughout the world"*

Ramsar Convention (1971)

Definition of the types of wetlands covered in its mission includes:

- lakes and rivers
- swamps and marshes
- wet grasslands and peatlands
- oases
- estuaries
- deltas and tidal flats
- near-shore marine areas – to a depth of 6m at mean low tide
- mangroves and coral reefs
- **human-made sites** such as fish ponds, rice paddies, reservoirs, and salt pans.

Ramsar Convention (1971)

Wetlands provide:

- Fundamental **ecological services** and are regulators of water regimes and sources of biodiversity at all levels - species, genetic and ecosystem.
- A resource of great **economic, scientific, cultural, and recreational** value for the community.
- A vital role in **climate change** adaptation and mitigation.

Ramsar Convention (1971)

Promotes the **wise use**

- *"the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of **sustainable development**"* for the benefit of humankind.
- While **not affiliated** with the United Nations system of Multilateral Environmental Agreements it works closely with other agreements
- Has 168 contracting parties

Ramsar Convention (1971)

Wetlands are **extremely rich in biodiversity**, particularly waterbirds:

- herons
- egrets
- swans
- ducks and geese
- waders
- Approximately **12% of all Globally Threatened Birds**, (146 species) depend on wetlands.
- Importance for **large congregations** of waterbirds.
- The most important types of wetlands for these birds are lakes and pools; rivers and streams; bogs, marshes and swamps; and coastal lagoons.

Ramsar Convention (1971)

Ramsar sites in Slovenia?

1. Krajinski park Sečoveljske soline
2. Notranjski regijski park
3. Park Škocjanske jame

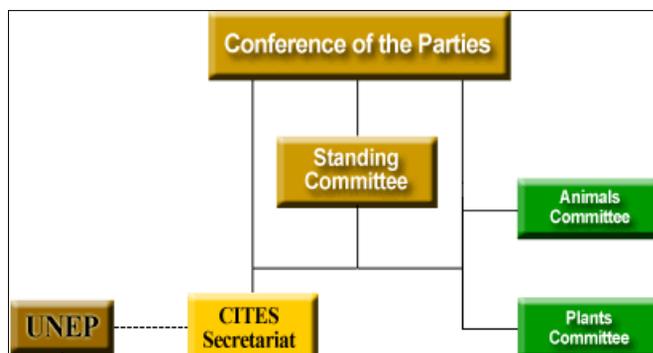
CITES (Washington, 1975)

The species covered by CITES are listed in **three Appendices**, according to the degree of protection they need.

- Appendix I includes species **threatened with extinction**. Trade in specimens of these species is permitted only in exceptional circumstances.
- Appendix II includes species not necessarily threatened with extinction, but in which trade must be **controlled in order** to avoid **utilization incompatible** with their survival.
- This Appendix contains species that are protected in at least **one country**, which has asked other CITES Parties for assistance in controlling the trade.
- **Changes to Appendix III** follow a distinct procedure from changes to Appendices I and II, as **each Party's is entitled to make unilateral amendments** to it.

CITES (1975)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora(CITES, 1975)



Bonn Convention (1979)

Convention on the **Conservation of Migratory Species** of Wild Animals (CMS) (Bonn, 1979) fulfils its obligation in two manners

- Appendix I - Species identified as being **in danger of extinction** are protected directly by **imposition of strict conservation objectives** on party States.
- Appendix II - Species that have an **unfavourable conservation status** or would benefit from international cooperation are protected by **regional agreements convened** under the convention

Agreements concluded under CMS

Several Agreements have been concluded to date under the auspices of CMS. They aim to conserve:

- Populations of **European Bats** (EUROBATS)
- Cetaceans of the Mediterranean Sea, Black Sea and Contiguous Atlantic Area (**ACCOBAMS**)
- African-Eurasian **Migratory Waterbirds** (AEWA)

- Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (**ASCOBANS**)
- **Seals** in the Wadden Sea (Wadden Sea Agreement)
- **Albatrosses and Petrels** (ACAP)
- **Gorillas** and Their Habitats (Gorilla Agreement)

Regional conventions and agreements

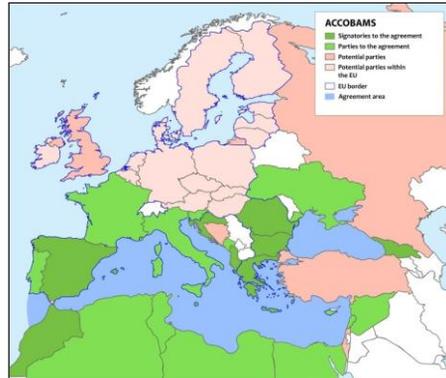
ACCOBAMS

- Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)
- Concluded under the Convention on the **Conservation of Migratory Species** of Wild Animals (Bonn, 1979) Article IV (4):

*'to take action with a view to **concluding agreements for any population** or any geographically separate part of the population of any species or lower taxon of wild animals, numbers of which **periodically cross one or more national jurisdictional boundaries**'*

ACCOBAMS

- Entered into force **1st June 2001**
- Participation is **open to the range States**
- but also States that **do not belong to the area** can apply to become a party



ACCOBAMS

- The main obligations:
 - To take coordinated measures to achieve and maintain a favourable conservation status for cetaceans
 - To prohibit and take all necessary measures to eliminate, where it is not already done, any deliberate **taking*** of cetaceans

* Broadly defined by Article 1 of the Bonn Convention as *'taking, hunting, fishing, capturing, harassing, deliberate killing, or attempting to engage in such conduct'*

ACCOBAMS

- Exceptions to the prohibition of taking are allowed only in two cases which are defined by Article II(2):
 - *‘emergency situations requiring the adoption of immediate measures to avoid deterioration of the conservation status of one or more cetacean populations’*,
 - and, *‘after having obtained the advice of the Scientific Committee, for the purpose of **non-lethal in-situ*** research aimed at maintaining a favourable conservation status for cetaceans’*

*‘non-lethal’ and ‘in-situ’ are basic elements qualifying in what cases the ‘taking’ can be permitted. The **killing of cetaceans or the removal** from their range area is always prohibited, even if it is allegedly done for the purpose of scientific research.

ACCOBAMS structure

Coordination bodies:

Bureau
Extended Bureau
Permanent Secretariat
Coordination Units



ACCOBAMS MOPs

The Meeting of the Parties is the decision-making body of the Agreement.

- Ordinary sessions of the MOPs occur at intervals of **not more than three years**, unless the MOP decides otherwise.
- The **decisions of the MOPs are adopted by consensus**.
 - However, if consensus cannot be achieved on matters covered by the annexes to ACCOBAMS, a decision may be adopted by a **two thirds majority** of the Parties present and voting.
- In the event of a vote any Party may, within 150 days, notify the depositary in writing of **its intention not to apply what has been decided** by the MOP (Article III(6)).

ACCOBAMS partners

- ACCOBAMS Partners include **Organisations and Institutions technically qualified** in Cetacean Conservation playing a significant role in the relevant activities of the Agreement.
 - **Approximately 30 partners**, many of whom are NGOs and Universities as well as State Institutes and Governmental bodies
 - Included in this are the international **NGOs**: IUCN, WWF, ECS, IFAW, and WDCCS
- Partnership is important to the agreement as **much of the research is carried out by NGOs**
- For the NGOs, ACCOBAMS partnership gives **international institutional support and credibility**

Barcelona Convention (1976) amended (1995)

- Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean with seven protocols:
 1. Protocol for the Prevention and Elimination of Pollution of the Mediterranean Sea by **Dumping** from Ships and Aircraft or Incineration at Sea
 2. Protocol concerning Cooperation in Preventing **Pollution from Ships** and, in Cases of Emergency, combating Pollution of The Mediterranean Sea
 3. Protocol for the Protection of the Mediterranean Sea against Pollution from **Land-Based Sources** and Activities

Barcelona Convention (1976) amended (1995)

4. **Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean**
5. Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from **Exploration and Exploitation** of the Continental Shelf and the Seabed and its Subsoil
6. Protocol on the Prevention of Pollution of the Mediterranean Sea by **Transboundary Movements** of Hazardous Wastes and their Disposal
7. Protocol on **Integrated Coastal Zone Management** (ICZM Protocol)

Barcelona Convention (1995)

- Parties to the MAP have adopted action plans to **conserve certain species** considered to be **especially threatened**, such as the Action Plan for the Conservation of Cetaceans in the Mediterranean Sea (Cairo, 1991).
- SPAMI Protocol
 - is applicable to **all the marine waters of the Mediterranean, irrespective of their legal condition**, as well as to the seabed, its subsoil and to the terrestrial coastal areas designated by each party, including wetlands.
 - On the contrary, the **original application of the previous 1982 Protocol was limited to the territorial sea** of the parties and did not cover the high seas.
 - The extension of the geographical coverage of the protocol was necessary in order **to protect also those highly migratory marine species** (such as marine mammals) which, by definition, do not respect the artificial boundaries drawn by man on the sea

Barcelona Convention (1995)

- The SPAMI List may include sites which:

'are of importance for conserving the components of biological diversity in the Mediterranean; contain ecosystems specific to the Mediterranean area or the habitats of endangered species; are of special interest at the scientific, aesthetic, cultural or educational levels' (Article 8(2)).

- This list includes the Mediterranean Sanctuary for Marine Mammals
 - Signed in: 1993; came into force: 1999
 - Eight cetacean species present
 - 96,000 km²



Aarhus Convention

- Convention on **Access to Information, Public Participation** in Decision-making and **Access to Justice** in Environmental Matters
 - adopted on 25th June 1998 in the Danish city of Aarhus at the Fourth Ministerial Conference in the '**Environment for Europe**' process.
 - Links **environmental rights and human rights**
 - Acknowledges that we owe an **obligation to future generations**
 - Establishes that **sustainable development** can be achieved only through the **involvement of all stakeholders**
 - Links **government accountability** and **environmental protection**
 - Focuses on **interactions between the public and public authorities** in a democratic context.

Bern Convention (1979)

Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979)

- Parties shall take appropriate and necessary legislative and administrative measures to ensure the **conservation of the habitats of the wild flora and fauna species** especially those specified in
- Appendix I (Strictly Protected Flora Species),
- Appendix II (Strictly Protected Fauna Species),
- The conservation of endangered natural habitats (Art. 4, para. 1).

Bern Convention (1979)

The convention also seeks to get States to undertake to give special attention to the **protection of areas**

- Important for the **migratory species** listed in **Appendices II and III** (Protected Fauna Species)
- And which are appropriately situated in relation to **migration routes**, as wintering, staging, feeding, breeding or moulting areas (Article 4(3)).
- **Several marine animals** are listed in Appendices II and III.
- In **1996 Appendix II** was amended to cover all Mediterranean species of **cetaceans**.

EU Directives

The Bern Convention has been transposed into **EU directives**:

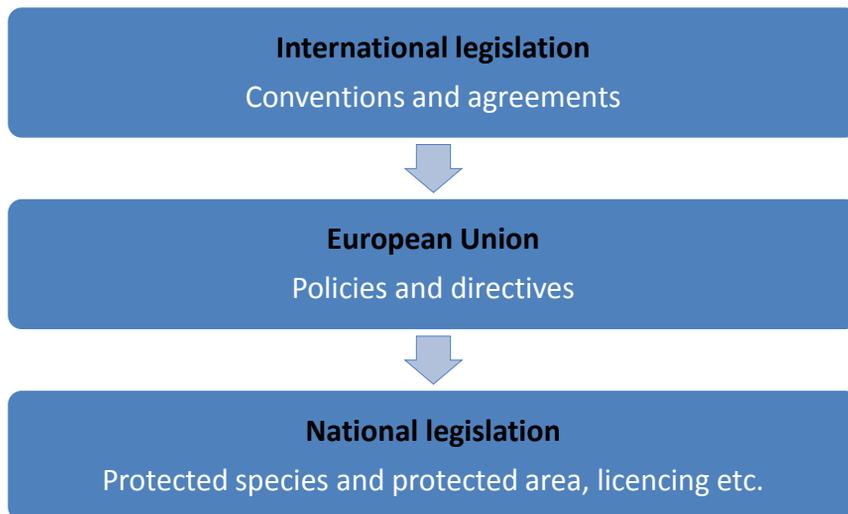
- Council Directive 79/409/EEC on the Conservation of **Wild Birds** (Birds Directive, 1979)
- Council Directive 92/43/EEC on the Conservation of **Natural Habitats** and of Wild Fauna and Flora (Habitats Directive, 1992).
- These are important in the development of **consistent national policies** in EU Member States and partnership with accession countries and other partners in the region.

European Union Directives:

Birds, Habitats, EIA, SEA Directives

Peter Mackelworth

EU legal instruments



- In 2010 the EU **target for biodiversity conservation**:

*"To **halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.**"*

- The Commission's EU 2020 Biodiversity Strategy, adopted in May 2011, sets out six main targets to ensure this overall objective is achieved by 2020. One of the targets is to **fully implement the Birds and Habitats Directives**.
- The Birds and Habitats Directives, are the **cornerstones of the EU's biodiversity policy**. They enable all 28 EU Member States to work together, within a **common legislative framework**, to conserve Europe's **most endangered and valuable habitats and species** across their entire natural range within the EU, irrespective of political or administrative boundaries.

- The two directives focus on a **sub-set of around 2000 animal and plant species** (out of the hundreds of thousands present in Europe) - which are in need of protection to either **prevent their extinction** or **enable their long-term survival**.
- Around **230 habitats** are also protected in their own right.
- They require that **Member States** do more than simply prevent the further deterioration of these species and habitat types.
 - undertake positive management measures to ensure their populations are maintained at, or restored to, a **favourable conservation status** throughout their natural range within the EU. Favourable conservation status can be described as a situation **where a habitat type or species is prospering** (in both quality and extent/population) and has **good prospects to do so in future**.

EU nature conservation policy

Two main directives

- Council directive (79/409/EEC) on the **conservation of wild birds** (1979)
- Council directive (92/43/EEC) on the **conservation of natural habitats and of wild fauna and flora** (1992)

Birds directive (79/409/EEC)

- The European Union meets its obligations for **bird species** under the **Bern Convention** and **Bonn Convention**
- The **oldest piece of nature legislation in the EU**, updated and codified with directive 2009/147/EEC (Birds Directive)
- The Directive provides a **framework for the conservation and management** of, and human interactions with, wild birds in Europe.
- It sets **broad objectives** for a wide range of activities, although the **precise legal mechanisms** for their achievement are at the **discretion of each Member State**

Birds directive (79/409/EEC)

- Applies to **all naturally occurring** wild bird species
 - Applies to **birds, eggs, nests and habitats**
- EU territory treated **as a whole**
 - **Migratory** aspect of many of the species listed
 - Regarded as a **common heritage**
- Habitat conservation measures
 - **Specially Protected Areas (SPAs)**

Birds directive (79/409/EEC)

The main provisions of the Directive include:

- The **maintenance of the populations of all wild bird** species across their natural range (*Article 2*)
- with the encouragement of various activities to that end (*Article 3*).
- The identification and classification of **Special Protection Areas (SPAs) for rare or vulnerable species** listed in *Annex I* of the Directive,
- as well as for **all regularly occurring migratory species**, paying particular attention to the protection of **wetlands of international importance** (*Article 4*).

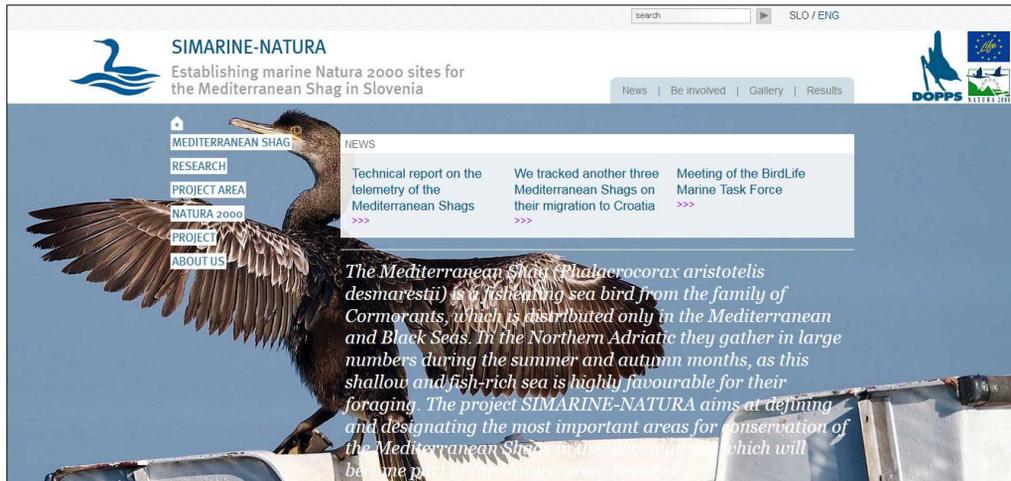
Birds directive (79/409/EEC)

- The establishment of a **general scheme of protection for all wild birds** (*Article 5*).
- Restrictions on the **sale and keeping** of wild birds (*Article 6*).
- Specification of the conditions under which **hunting and falconry** can be undertaken (*Article 7*). (Huntable species are listed on Annex II).
- Prohibition of **large-scale non-selective** means of bird killing (*Article 8*).

Birds directive (79/409/EEC)

- Procedures for **derogation from the provisions** of Articles 5-8 (*Article 9*) permission may be given for **otherwise prohibited activities**.
 - in the interests of **public health and safety**
 - Interests of **air safety**
 - Prevention of **serious damage** to crops, livestock, forests, fisheries and water
 - For **protection of other flora and fauna**
- Encouragement of certain forms of **relevant research** (*Article 10 and Annex V*).
- Requirements to ensure that introduction of **non-native birds** do not threaten other biodiversity (*Article 11*).

Slovenian project for marine SPA



Migration patterns



- Ante migrated to its birth place on the Oruda island near Lošinj where it probably returned before.
- Adult Shags are very faithful to their breeding grounds.
- Ante will return in spring, and it has been sexually mature for two to three years.

Council directive (92/43/EEC) on the **conservation of natural habitats** and of **wild fauna and flora** (1992)

'the habitats directive'

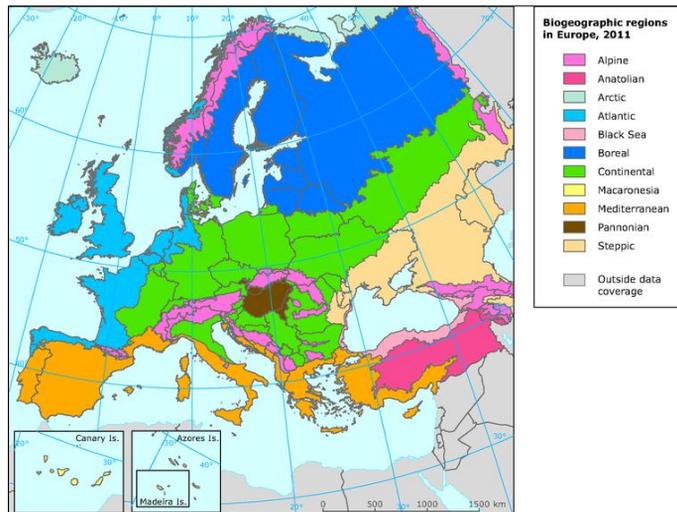
Habitats directive
(92/43/EEC)

- The HD divides the EU into 9 ecologically coherent *'biogeographical'* regions
- Working at the **biogeographical level** makes it easier to conserve species and habitat types under similar natural conditions across a suite of countries, irrespective of political and administrative boundaries:
 1. **Atlantic**
 2. **Continental**
 3. **Alpine** (which includes the Pyrenees, the Alps, the Carpathian mountains and parts of Scandinavia)

Habitats directive (92/43/EEC)

4. **Mediterranean**
5. **Boreal** (Finland, Sweden, Estonia, Latvia and part of Lithuania)
6. **Macaronesian** (Madeira, Azores and Canary Islands)
7. **Pannonian** (essentially Hungary and parts of the Czech Republic, Romania and Slovakia)
8. **Steppic**
9. **Black Sea** (parts of Bulgaria and Romania)

Biogeographical regions of the EU

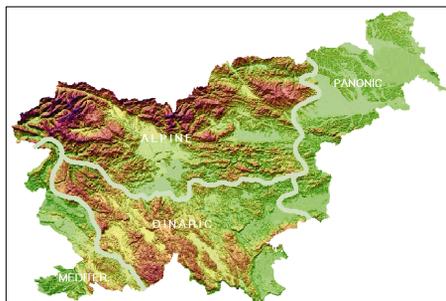


Biogeographical regions of Slovenia?

1. Atlantic
2. Continental
3. Alpine
4. Mediterranean
5. Boreal
6. Macaronesian
7. Pannonian
8. Steppic
9. Black Sea

Biogeographical regions of Slovenia

- Alps (30%)
- Continental (30%)
- Mediterranean Basin (10%)
- Pannonian plain (30%)



Habitats directive (92/43/EEC)

The provisions of the Directive require Member States to introduce a range of measures, including:

- **Maintain or restore** European protected habitats and species listed in the Annexes at a ***favourable conservation status*** as defined in Articles 1 and 2;

Habitats directive (92/43/EEC)

- Contribute to a coherent European ecological network of protected sites by designating **Special Areas of Conservation (SACs)** for **habitats listed on Annex I** and for **species listed on Annex II**. Together SACs and SPAs make up the **Natura 2000 network** (Article 3);
- Ensure **conservation measures** are in place to **appropriately manage SACs** and ensure **appropriate assessment of plans and projects** likely to have a significant effect on the integrity of an SAC.

Habitats directive (92/43/EEC)

- Projects may still be permitted if there are **no alternatives**, and there are imperative reasons of **overriding public interest**.
- In such cases **compensatory measures are necessary** to ensure the overall **coherence of the Natura 2000 network** (Article 6);
- Member States shall also endeavour to encourage the **management of features** of the **landscape** that support the Natura 2000 network (Articles 3 and 10);

Habitats directive (92/43/EEC)

- Undertake **surveillance of habitats and species** (Article 11),
- Ensure **strict protection of species** listed on **Annex IV** (Article 12 for animals and Article 13 for plants).
- **Report** on the implementation of the Directive **every six years** (Article 17), including **assessment of the conservation status** of species and habitats listed on the Annexes to the Directive.

Habitats directive (92/43/EEC)

The HD consists of 6 annexes:

- Annex I: **Natural habitat types** of Community Interest
 - around 220 habitat types
- Annex II: **Animal and Plant Species** of Community Importance
 - around 900 species
- Annex III: **Criteria** for selecting **sites eligible** for identification as sites of Community Importance

Habitats directive (92/43/EEC)

- Annex IV: **Animal and plant species** of Community Interest in need of **strict protection**
 - **over 400 species**, including some also listed in Annex II
- Annex V: Animal and plant species of Community Interest whose **taking in the wild and exploitation** may be subject to **management measures**
 - **over 90 species**
- Annex VI: Prohibited **methods and means** of capture and killing and modes of transport

Natura 2000 network

- SPAs under the birds directive
- SACs under the habitats directive
- Universal aim:

*'...maintain or restore, at **favourable conservation status**, natural habitats and species of wild fauna and flora of Community interest'*



Three stage process:

1. Responsibility for **proposing sites** lies with the **Member States (MSs)**
 - Require **assessment** of habitat types and species
 - Choice is **purely scientific**, based on **selection criteria specified in the directive**
 - Data communicated through **standardised forms (SDFs)** to the commission

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NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPAs),
Special Sites for Conservation (SSCs),
Sites of Community Importance (SCIs) and
For Special Areas of Conservation (SACs)

1111111111

SITE: HD3000161
REFERENCE: C001 - L0016

TABLE OF CONTENTS

- 1. SITE IDENTIFICATION
- 2. SITE CHARACTERISTICS
- 3. SITE MANAGEMENT
- 4. SITE MONITORING
- 5. SITE PROTECTION
- 6. SITE INFORMATION

1. SITE IDENTIFICATION

1.1 Type: I.1.3 Site code: HD3000161

1.2 Site name: C001 - L0016

1.4 Final Completion date: 2012-12 1.5 Update date: 2012-12

1.6 Respondent:

Name/Organisation: State Institute for Nature Protection
Address:
Email: info@szp.gov.pl

Date site proposed as SCI: 2013-07
Date site confirmed as SCI: No data
Date site designated as SAC: No data
National legal reference of SAC designation: No data

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<http://natura2000.eea.europa.eu/#>

Proposing Natura 2000 sites

2. The Commission then **must adopt the list** of 'sites of community importance'
 - **Scientific seminars** are convened by the commission to **analyse the proposals** forwarded by the MSs
 - Seminars are **open to representatives** of the MSs, other experts, **stakeholders**, land owners, other users and NGOs
 - Seminars aim to **establish the accuracy** of the sites proposed and their ability to ensure the '**favourable conservation status**' of the habitats and species within

Proposing Natura 2000 sites

3. Once the list of **'sites of community importance'** has been adopted
 - The MSs should designate all of the sites as **'Special Areas of Conservation'** (in the case of the Habitats directive) within a **6 year period**
 - **Priority** should be given to those sites that are **most threatened and/or important in conservation** terms
 - In this period MSs must take the necessary **management or restoration measures** to ensure the **'favourable conservation status'** of those sites

articles 4 to 6 are the bones of the habitats directive, and particularly important

Habitats Directive (HD) Article 4

4.1: On the basis of the criteria set out in Annex III (Stage 1) and relevant scientific information, each Member State shall **propose a list of sites** indicating which **natural habitat types** in **Annex I** and which **species** in **Annex II** that are native to its territory the sites host.

4.1: The **list shall be transmitted to the Commission**, within **three years of the notification of this Directive**, together with information on each site.

Habitats Directive (HD) Article 4

4.2: On the basis of the criteria set out in Annex III (Stage 2) and in the **framework both of each of the nine biogeographical** regions...

...the Commission shall establish, in agreement with each Member State, a **draft list of sites of Community importance** drawn from the Member States' lists.

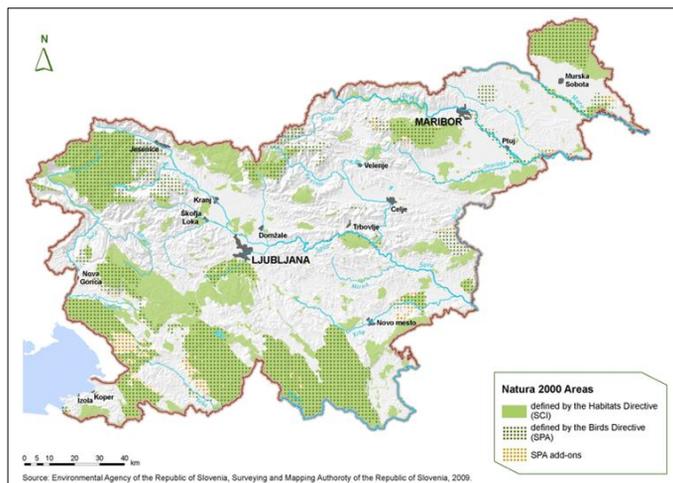
4.3: The list referred to in paragraph 2 shall be established **within six years** of the notification of this Directive.



- **Natura 2000 Network** - which currently contains over 27,000 sites across 28 EU Member States.
- Together they cover around **18 % of the land area** in the EU-28
- and a significant amount of marine areas.

October 2013 figures

Slovenian Natura 2000 network



Objectives of the habitats directive

1. To contribute towards **ensuring biodiversity** through the conservation of natural habitats and of fauna and flora:
 - Measures taken pursuant to this Directive shall be designated to maintain or restore, at **favourable conservation status**, natural habitats and species of wild fauna and flora of Community interest
2. To **provide for sustainable development** in the protected sites:
 - Measures taken pursuant to this Directive shall **take account of economic, social and cultural requirements** and regional and local characteristics

Habitats directive

- SACs are **not strictly protected**, human activity is allowed in **most cases**
 - However economic and social activities **may NOT have a negative impact** on the protected habitats or species (i.e. compromise the objectives of the site)
 - **Any plans and projects must be appropriately assessed** to ensure that they are compatible with the conservation objectives

Habitats Directive (HD) Article 5

5.1: In **exceptional cases** where the Commission finds that a **national list** as referred to in Article 4 (1) **fails to mention a site hosting a priority natural habitat type or priority species** which, on the **basis of relevant and reliable scientific information**, it considers to be **essential** for the maintenance of that **priority natural habitat type or for the survival of that priority species**, a **bilateral consultation** procedure shall be initiated between that **Member State and the Commission** for the purpose of **comparing the scientific data** used by each.

Habitats Directive (HD) Article 5

5.1: The **final decision** on whether a site should be included lies with **European Commission**

- This provides an **opportunity for researchers** to **bypass** the **national government** and submit to the **Commission directly** if required

Habitats Directive (HD) Article 6

1. Establishment of **appropriate conservation and management** of Natura 2000 sites
2. Requires **avoidance of habitat deterioration** and avoidance of **species disturbance**
3. Requires **appropriate assessment** of **plans or projects** that might have a **significant affect** on the site
 - Also plans or projects that may have a **cumulative or synergistic effect**
4. However, provides the **potential for exceptions** to the rules in place

Habitats Directive (HD) Article 6

*These provisions are mandatory and **must be transposed** into the legislation of Member States of the European Union*

Habitats Directive (HD) Article 6

6.1: For **special areas of conservation**, Member States shall establish the **necessary conservation measures** involving, if need be, **appropriate management plans** specifically designed for the sites or integrated into other development plans, and **appropriate statutory, administrative or contractual measures** which correspond to the **ecological requirements** of the natural habitat types in Annex I and the species in Annex II present on the sites.

Habitats Directive (HD) Article 6

6.2: Member States shall **take appropriate steps** to avoid, in the **special areas of conservation**, the **deterioration of natural habitats and the habitats of species** as well as **disturbance of the species** for which the **areas have been designated**, in so far as such disturbance could be significant in relation to the objectives of this Directive.

Habitats Directive (HD) Article 6

6.3: Any **plan or project not directly connected** with or necessary to the **management of the site** but **likely to have a significant effect** thereon, either individually or in combination with other plans or projects, **shall be subject to appropriate assessment** of its implications for the site in view of the site's conservation objectives.

In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the **competent national authorities** shall **agree to the plan or project only** after having ascertained that **it will not adversely affect the integrity of the site** concerned and, **if appropriate, after having obtained the opinion** of the general public.

Habitats Directive (HD) Article 6

- The key word in the text is **'likely'**, a project or plan may be **excluded from an assessment** only if the **relevant authorities** are **certain** there **will be no effect** on the site

European Court of Justice (ECJ)

The ECJ provides rulings on **the application of HD** by MSs

- The court has been called to **define** the terms '*plan or project*' and **its application** with regards to the **EIA requirements**

*'where a **plan or project** not directly connected with or necessary to the management of the site is likely to undermine the site's conservation objectives, it **must be considered to have a significant effect** on that site'... ...'in case of doubt as to the absence of significant effects... ...an assessment must be carried out' (C-127/02)*

- National Association for **Conservation of the Wadden Sea** & Netherlands Association for the **Protection of Birds vs Secretary of State** for Agriculture, Nature Conservation and Fisheries **regards** Cooperative Producers' Association of Netherlands **Cockle Fisheries**

ECJ Judgement for the requirement of an EIA

- Even in cases where the plan or project may **be located outside the site** it may be subject to an **appropriate assessment**:

*'the court finds that **by failing**, in respect of **certain projects carried outside the SAC** within the meaning of Article 4(1) of the directive, to require a **compulsory assessment of the impact** on the site, in accordance with Article 6 (3) and (4) of the Directive **whether or not such projects are capable of significantly affecting such an SAC...***

*... **Germany has failed to fulfil its obligations** under Article 6 (3)' (C-98/03)*

- **Commission** of the European Communities **vs Federal Republic of Germany**, **Failure** of a Member State to **fulfil obligations** — Directive 92/43/EEC — Conservation of natural habitats — Wild fauna and flora — Assessment of the **implications of certain projects** on a protected site — Protection of species

ECJ Judgement for the requirement of an EIA

- The HD does not distinguish between **activities planned outside or inside the SAC**, the **same assessment applies** (C-98/03)

Cumulative effect

- While a **plan or project** may **alone** considered to have **no significant effect** on the SAC there must be **consideration** of the **potential synergistic effect** of a plan or project **on other plans or projects** that have been previously **implemented or are proposed**.

ECJ Judgement for the definition of an appropriate assessment

- While there is no form or prescribed method for an **'appropriate assessment'** the ECJ ruled that:

*'with regard to the concept of **appropriate assessment** within the meaning of Article 6 (3) of the Directive 92/43, it should be noted that the latter **does not define any particular method** for carrying out such an assessment. The Court has, however, held that the **assessment must be organised** in such a manner that the **competent national authorities can be certain that a plan or project will not have adverse effects on the integrity** of the site concerned, given that, **where doubt remains as to the absence of such effects, the competent authority will have to refuse authorisation**' (C-304/05)*

Commission of the European Communities v Italian Republic. Failure of a Member State to fulfil obligations - Directive 92/43/EEC - Conservation of natural habitats and of wild fauna and flora - Directive 79/409/EEC - Conservation of wild birds - **Assessment of the environmental impact** of works to **modify ski runs.**

Article 6 - exemptions

6.4: If, in spite of a **negative assessment** of the implications for the site and in the **absence of alternative solutions**, a plan or project must nevertheless be carried out for **imperative reasons of overriding public interest**, including those of a **social or economic nature**, the Member State shall take all **compensatory measures necessary** to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Article 6 - exemptions

6.4 (continued): Where the site concerned **hosts a priority natural habitat type and/or a priority species**, the only considerations which may be raised are those **relating to *human health or public safety***, to **beneficial consequences** of primary importance for the *environment* or, **further to an opinion from the Commission**, to other **imperative reasons of overriding public interest**.

Over-riding Public Interest

To **grant an exception** to the rule the MS **must show**:

1. There is **no viable alternative**
2. That **public interest outweighs** the objectives of the Natura 2000 site
3. That **adequate compensation measures** are provided to ensure the coherence of the Natura 2000 network

ECJ Judgement

- Over-riding Public Interest

*'The power of the MSs to **reduce the extent of an SPA** can only be justified on **exceptional grounds**. Those grounds must correspond to a **general interest which is superior to the general interest represented by the ecological objective**' (C-57/89).*

- **Commission** of the European Communities v Federal **Republic of Germany**. Conservation of wild birds - Construction work in an SPA. Case C-57/89.

Compensation measures

- Should be **appropriate to the site** and **reflect the loss** caused by the project or plan
- Able to **maintain or enhance the overall coherence** of the **Natura 2000 network**
- Must be **feasible**
- Must **operational in a timely manner**

Compensation measures

Examples:

- Habitat **creation**
- Habitat **restoration**
- Habitat **enhancement**
- Creation of a **new site** under the habitats directive



Conclusions

The Habitats Directive **is considered worldwide** as one of the best examples of biological diversity legislation

1. It is science based (intelligence)
2. It was adopted by the international community and BINGOs at a very early stage (promotion)
3. It has clearly defined objectives (prescription)
4. While it is a legal obligation for MSs there is 'wiggle room' (invocation)
5. The European Court of Justice (ECJ) has jurisdiction over disputed sites and management practices (application)
6. There is site evaluation at EU level and changes have been made with the inclusion of new MSs (appraisal)
7. As yet there has been no requirement for termination

Other directives

The EIA and SEA Directives **do not replace the procedures** for the HD as the requirements for assessments is **stronger in the HD**

Environmental Impact Assessment Directive (85/337/EEC)

Applies to a wide range of defined **public and private projects**, which are defined in Annexes I and II with criteria for the EIA laid out in Annex III:

- **Mandatory EIA:** all projects listed in **Annex I** are considered as having **significant effects** on the environment and require an EIA
 - (e.g. long-distance railway lines, motorways and express roads, airports ≥ 2100 m, disposal of hazardous waste, disposal of non-hazardous waste, waste water treatment plants).
- Discretion of Member States: for projects listed in **Annex II**, the national authorities have to decide whether an EIA is needed. This is done by the "**screening procedure**", which determines the effects of projects on the basis of thresholds/criteria or a case by case basis.
- Criteria for EIA structure laid out in **Annex III**.

The EIA Directive of 1985 has been **amended four times**:

- Directive 97/11/EC harmonised with the **UN ECE Espoo Convention on EIA in a Transboundary Context**.
 - The Directive of 1997 widened the scope of the EIA Directive by **increasing the types of projects covered**, and the number of projects **requiring mandatory environmental impact assessment** (Annex I).
 - also provided for **new screening arrangements**, including **new screening criteria** (at Annex III) for Annex II projects, and established minimum information requirements.
- Directive 2003/35/EC to **align the provisions on public participation with the Aarhus Convention** on public participation in decision-making and access to justice in environmental matters.
- Directive 2009/31/EC amended the Annexes I and II of the EIA Directive, by **adding projects related to the transport, capture and storage of carbon dioxide (CO₂)**.

Environmental Impact Assessment Directive (85/337/EEC)

- The newly amended Environmental Impact Assessment (EIA) Directive (2014/52/EU) entered into force on 15 May 2014 to **simplify the rules for assessing the potential effects of projects on the environment**. Pays greater attention to **threats and challenges that have emerged** since the original rules came into force some 25 years ago.
- More attention to areas like **resource efficiency, climate change and disaster prevention**, which are now better reflected in the assessment process. The main amendments are as follows:
 - Member States now have a mandate to **simplify their different environmental assessment procedures**.
 - **Timeframes** are introduced for the different stages of environmental assessments: **screening decisions should be taken within 90 days** (although extensions are possible) and **public consultations should last at least 30 days**. Member States also need to ensure that final decisions are taken within a "reasonable period of time".

Environmental Impact Assessment Directive (85/337/EEC)

- The **screening** procedure, determining whether an EIA is required, is simplified. Decisions must be duly motivated in the light of the updated screening criteria.
- **EIA reports** are to be made **more understandable for the public**, especially as regards assessments of the **current state of the environment and alternatives** to the proposal in question.
- The **quality and the content of the reports** will be improved. Competent authorities will also need to prove their objectivity to avoid **conflicts of interest**.
- The grounds for **development consent decisions** must be clear and more transparent for the public.
- If projects do entail significant adverse effects on the environment, **developers will be obliged to do the necessary to avoid, prevent or reduce** such effects. These projects will need to be **monitored** using procedures determined by the Member States. Existing monitoring arrangements may be used to avoid duplication of monitoring and unnecessary costs.

Directive on Strategic Environmental Assessment (2001/42/EC).

An SEA is **mandatory for plans/programmes** which are prepared for:

- agriculture, forestry, fisheries, energy, industry, transport,
- waste/ water management, telecommunications, tourism, town & country planning

OR

- Land use and which set the **framework for future development** consent of projects listed in the EIA Directive.

OR

- have been determined to require an assessment under the **Habitats Directive**.

Directive on Strategic
Environmental Assessment
(2001/42/EC).

- Generally, Member States have to carry out a screening procedure to determine whether the **plans/programmes are likely to have significant environmental effects**. If there **are significant effects, an SEA is needed**. The screening procedure is **set out in Annex II** of the Directive.
- The SEA procedure can be summarized as follows:
 - an **environmental report is prepared** in which the **likely significant effects** on the environment and the **reasonable alternatives** of the proposed plan or programme are identified.
 - The **public and the environmental authorities are informed and consulted** on the draft plan or programme and the environmental report prepared.
 - The **environmental report and the results of the consultations** are taken into account.
 - Once the **plan or programme is adopted**, the environmental **authorities and the public are informed** and relevant information is made available to them.
 - In order to identify unforeseen adverse effects **at an early stage, significant environmental effects** of the plan or programme are to be **monitored**.

The SEA and EIA procedures are very similar, but there are some **differences**:

- the SEA requires the **environmental authorities** to be consulted at the **screening stage**;
- **scoping** (the content and extent to be covered in the SEA report to be submitted to a competent authority) is obligatory under the SEA;
- the SEA requires an assessment of reasonable **alternatives** (under the EIA the developer chooses the alternatives to be studied);
- under the **SEA Member States must monitor** the significant environmental effects of the implementation of plans/programmes in order **to identify unforeseen adverse effects** and undertake appropriate remedial action.
- the SEA obliges Member States to ensure that environmental reports are of a **sufficient quality**.

Farming and Natura 2000 sites

Peter Mackelworth

Farming for natura 2000

- Farming has been a major contributor to biodiversity, thanks to centuries of diverse farming traditions which has resulted in the development of an intricate patchwork of semi-natural habitats across the landscape. This has, in turn, attracted a wide range of species of fauna and flora.

Farming for natura 2000

- Natura 2000 sites are not strictly protected areas where all activities are systematically excluded.
- The Natura 2000 network recognises that humans are an integral part of nature and that the two work best in partnership with one another
- Many of the habitats and species that are protected under the Habitats and Birds Directives are dependent on, or associated with, agricultural practices (255 species and 57 habitat types of Community interest are closely associated with agriculture).
- These habitats and species are now dependent on locally tailored extensive farming systems and practices for their continued survival.
- Yet, in the last 50 years, through the combined effects of farm intensification and land abandonment, farmland biodiversity has undergone a dramatic decline.

Farming for natura 2000

- Farmland makes up around 40% of the total area included in Natura 2000.
- Because a high level of biodiversity usually coincides with low agricultural productivity, most of the farmland in Natura 2000 is located in the more marginal farming areas:
 - alpine meadows and pastures,
 - steppic plains,
 - open heathland
 - wet grasslands.
- A few Natura 2000 species are also found on intensively managed agricultural land. These include some internationally important wintering populations of geese and swans that graze intensive grassland and cereal crops in winter.

Farming for natura 2000

- Most of the low intensity farming systems have developed over time, with farming practices closely adapted to local conditions. Broadly, they include:
 - livestock systems where the forage areas are mainly semi-natural vegetation, including pastures, heath and scrub;
 - low intensity arable systems (for example on poor soils, dry, saline or waterlogged areas, or in remote locations), often in rotation with semi-natural fallow vegetation;
 - low intensity permanent crops, such as old traditionally managed orchards and olive groves; and
 - mixed farming systems with arable and/or permanent crops with livestock. Such farming systems also include farmland with a mosaic of low intensity agriculture and valuable landscape features, which can support a high species biodiversity.

- Farmed areas hosting habitats and species of Community interest are identified as High Nature Value (HNV) farmland.
- In some of these areas, existing farming systems and practices are already compatible with the conservation of the species and habitats for which the site has been designated under Natura 2000
- Emphasis should be placed on finding ways to continue to support these farming practices and give due recognition to the farmers involved.
- In others, traditional farming practices may have been abandoned or converted to another form of farming that is less compatible to nature
- to re-introduce compatible farming systems or adjust existing practices so that they are able to contribute once again to the conservation of the habitats and species of Community interest for which the site has been designated.

The main drivers and pressures on Natura 2000 farmland

two factors pressuring farmland habitats and species, at opposite ends of the spectrum:

1. abandonment of agricultural land – due to a combination of social, economic, political and environmental factors,
 - declining meat prices,
 - labour and time constraints,
 - poor access to markets,
 - ageing rural populations,
 - soil erosion,
 - and constraints to productivity and mechanisation posed by geographical factors such as steep slopes or low soil fertility

The main drivers and pressures on Natura 2000 farmland

2. the intensification of management.
 - Over the last hundred years and particularly since the 1950s, drivers of agricultural development (such as increasing commodity markets and prices, technological advances and market measures and support under the CAP) have led to widespread agricultural improvements and the intensification of management.
 - This has led to significant changes in agricultural habitats
 - many of the natural and semi-natural elements that remained have been lost,
 - resulting in highly modified and simplified agricultural systems.
- Many of the habitats are affected by a combination of abandonment in some areas and intensification in other areas.

- Farmers who deliver the essential management of key habitats and species often farm under difficult circumstances using labour-intensive systems on marginal land.
- They are extremely vulnerable to economic pressures to abandon their traditional farming systems and in some cases to cease production altogether.
- It is therefore important to build an integrated package of support for Natura 2000 farmers that first ensures the economic viability of the extensive farming system on which the beneficial management depends, and secondly addresses the specific management practices needed for the conservation of the key habitats and species.

- The first priority is to address the key threats of abandonment and intensification by ensuring that the farmer can continue (or resume) farming the land, and that the extensive farming system survives. The overall aim is to ensure the farming system is economically viable and support targeted at building the capacity of the farm infrastructure (and the farmer) and improving market income can help to achieve this aim.
- When the underlying support for the farming system is in place then the support for the specific Natura 2000 habitat and species management practices will complete the package. This integrated package of support can be built up using a wide range of measures from both Pillars of the CAP, as explained below, and their delivery and implementation can be supported by information and advisory services which can be provided under both Pillars of the CAP. Other EU instruments, such as LIFE and ERDF and other available private and public funds can also be used.

- Member States have a clear responsibility under the Birds and Habitats Directives to ensure all habitats and species of Community interest are maintained or restored to Favourable Conservation Status. Natura 2000 sites have a crucial role to play in achieving this overall objective since they harbour the most important core sites for these species and habitats.
- Each site must therefore be managed in a way that ensures it contributes as effectively as possible to helping the species and habitats for which it has been designated reach a favourable conservation status within the EU.
- Once a site has been included in the Natura 2000 Network, Member States are required to implement, on each site, the necessary conservation measures which correspond to the ecological requirements of the protected habitat types and species of Community interest present, according to the Habitats Directive (article 6.1); they must also prevent any damaging activities that could significantly disturb those species and habitats (article 6.2) and to protect the site from new potentially damaging plans and projects likely to have a significant effect on a Natura 2000 site (article 6.3 and 6.4).

- To ensure that each Natura 2000 contributes fully to reaching this overall target of FCS, it is important to set clear **conservation objectives** for each individual site. These should define the desired state, within that particular site, of each of the species and habitat types for which the site was designated.
- Once the conservation objectives have been set, the necessary **conservation measures** that are required in order to fulfil these objectives and targets should be identified and negotiated with all involved so that they are effectively implemented. These must correspond to the ecological requirements of the habitats and species for which the site is designated.
- A dialogue with all relevant stakeholders is needed to ensure that farmland management in Natura 2000 sites can contribute to the conservation of agricultural habitats and species. Farmers may have a very good understanding of previous land management that has led to conservation successes or failures.

- Conservation measures can include both site-specific measures (i.e. management actions and/or management restrictions), and horizontal measures that apply to many Natura 2000 sites over a larger area (e.g. measures to reduce nitrate pollution or to regulate hunting or resource use). Appropriate instruments for implementing these conservation measures can include management plans specifically designed for the sites or integrated into other development plans, and/or appropriate statutory, administrative or contractual measures.
- Agri-environmental agreements with farmers within the Rural Development Regulation are one example of a voluntary contractual measure aiming at maintaining a favourable conservation status of certain habitat types (eg. meadows, pastures) and species. The complexity of the necessary conservation measures may also require other kinds of contracts and agreements and other types of specific measures, including voluntary conservation management that does not involve any payment or incentive.

- Horizontal measures can be suitable for certain habitat types/species across a whole region or country, or to tackle diffuse pressures such as eutrophication from agricultural run-off. In some situations, a few simple requirements that can be applied across the whole farmed landscape may be useful. Measures may also require no action (passive management).
- Furthermore, these measures may not necessarily be new, as existing measures can also contribute to achieving the conservation objectives.
- On the other hand, more specific local approaches may be required in certain areas, including highly tailored and targeted measures that are best suited to the specific management needs of a particular species or habitat in a particular location. It is particularly important to understand the life cycle and ecological requirements of species when designing management measures for particular species. Local conditions can introduce some variation in the specific needs of habitats and species.

Farming practices that can contribute to maintain or improve the conservation status of key farmland habitats and species

- Low intensity agricultural management is necessary for the continued existence and conservation of key habitats and species linked to agricultural practices in Natura 2000 sites.
 - Restoration actions may also be necessary prior to the re-introduction of suitable long-term management.
 - These management measures will mostly be implemented by farmers and adequate support should be provided to them. Some farmers are already carrying out good management measures and it is important to recognise and support their role in conserving and managing these habitats. Others will need support to reinstate management on abandoned land or to refrain from intensification of farmland. Most of the agricultural habitats considered in this guidance are managed by **grazing**, which require defining suitable stocking rates, seasonality and timing, using adequate stock species or a combination of grazers when appropriate, and some form of rotational grazing in some cases. For many habitats, particularly in mountainous regions, **shepherding** is an important management measure with a long cultural tradition that needs to be maintained and supported.
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- **Mowing and hay cutting** is also an important farming activity for semi-natural grasslands (meadows), which requires considering the appropriate timing and frequency, using adequate equipment and machinery and taking into account whether removing or not the cut hay depending on the habitat type. In a number of habitats, grazing is used in combination with cutting.
 - As regards the **management of suitable areas for key farmland species** it is important to ensure that all feeding, breeding and shelter habitat requirements are provided across all seasons and within the species' home range area, which may require a mosaic of different habitat patches. Habitat patches must be sufficiently large to maintain viable populations, or sufficiently connected to support meta-populations. Farmland habitats such as hedges, dry stone walls, ponds and terraces are key habitats for species associated with extensive agriculture that should be maintained or restored.

- In areas where farmland habitats have been abandoned or are damaged by pressures from intensive agriculture, **restoration measures** may be needed to achieve favourable conservation status for key Natura 2000 habitats and species. Restoration actions may involve:
 - reversing soil enrichment and re-introducing vegetation,
 - reseedling to restore plant species diversity,
 - controlling scrub, controlling invasive weeds and alien species and
 - restoring hydrological management (e.g. by reversing drainage, restoring ground water levels and regimes, and flooding and river regulation).
 - Effective management of farmland habitats also needs to consider some crucial aspects. The **scale** at which conservation measures are implemented will influence their effectiveness. They must be targeted to a sufficiently large area to maintain or restore ecologically viable areas of suitable habitat or maintain minimum viable populations of species. The complex structure of some key habitats underpins their species richness. To maintain **habitat diversity and heterogeneity**, management type and intensity must be varied and edge habitats maintained.
-
- Management of farmland must be **locally adapted**. Agricultural measures must be tailored and targeted in order to be effective. The optimal regime can vary considerably between habitat sub-types and on a site-by-site basis, depending on factors such as soil, vegetation, altitude, climate, and management history. It is also important to consider site-specific management history, as habitats will often have adapted to and depend on the continuation of traditional regimes. Management planning should make use of both **expert conservation knowledge** and **local farming knowledge**.
 - **Conservation trade-offs** may be necessary, as different species will respond differently to management actions. Appropriate management strategies should either maximise the benefits to all species or favour sensitive or priority species, as defined by the conservation objectives.

EU funding for management of Natura 2000 farmland

- Opportunities for funding Natura 2000 have been included in each of the relevant EU funds for the 2014-2020 financing period. In particular, the Common Agricultural Policy (CAP) has been and will continue being an important financial source.
- In order to ensure a better use of the opportunities available for managing Natura 2000 sites under EU funds, the Commission has urged Member States to produce **prioritised action frameworks (PAFs)** for financing Natura 2000, which identify the strategic priorities and the measures to be carried out for the period 2014-2020 as well as the funding instruments that may be used to implement those measures.
- The Commission has also declared its intention to promote the use of innovative approaches and market-based instruments including private funding to support Natura 2000 management, although it recognises that these sources are likely to account for only a small proportion of the overall funding of the Natura 2000 network in the nearer future. Core public funding from the EU and Member States will continue to be required to deliver the conservation benefits of the network.

The reformed CAP as a key source of funding for Natura 2000 farmland from 2014

- The CAP represents one of the most important potential sources of EU funding for the management of farmland in Natura 2000 sites. The two Pillars of the CAP differ in terms of financing, functioning and structure although they have common objectives.
 - Pillar 1 provides direct payments to farmers (and also funds other measures such as market interventions and export refunds).
 - Pillar 2 offers a wide range of measures to support farmers and other land managers and rural communities, implemented through multiannual Rural Development Programmes (RDP) prepared by national or regional administrations.
- The new legislation introduces significant changes that are relevant to support Natura 2000 farming from both Pillars of the CAP.

- **Pillar 1** continues to be the provision of decoupled income support payments to farmers, but the structure and range of payments has changed considerably.
- From 2015 there will be some compulsory payments: a new Basic Payment Scheme (or continuation of the Single Area Payment Scheme), a 'greening' payment and an additional payment for young farmers.
- Member States can choose to offer two additional components of direct payments, to farmers in areas facing natural constraints, and coupled payments to environmentally, economically or socially important types of farming that are facing difficulties. As an alternative to all these payments a much simpler direct payment scheme can be set up specifically for small farmers.

- The '*green payment*' for agricultural practices beneficial to climate change and the environment comprises three measures with which most farmers entitled to Pillar 1 direct payments must comply: maintenance of *permanent grasslands*, and (in relation to arable land) *crop diversification* and *Ecological Focus Areas* (at least 5 per cent of arable land eligible for direct payments to be managed for ecological purposes, eg. as landscape features, fallow land, terraces and buffer strips).
- Farmers in Natura 2000 areas will only have to implement the greening practices that are compatible with Natura 2000 objectives.
- Certified organic farmers will receive the payment automatically without a specific obligation to comply with greening practices, and recipients of the Small Farmers Scheme are exempted from these obligations.

- To protect *permanent grasslands*: within Natura 2000 areas Member States must designate environmentally sensitive grasslands which need protection (including those on peat and wetlands). For farmers in these areas the ‘greening’ requirement is to not convert or plough the grassland. Member States can choose to apply similar designations and protection to other environmentally important grasslands outside Natura 2000 areas.
- The requirement at more general level is the maintenance of the ratio of permanent grassland to the total agricultural area (compared to a specified, earlier reference year) does not fall by more than 5 per cent.
 - MS can choose to apply this requirement nationally or regionally.
 - They can also set this obligation at the level of individual farms.

- **Pillar 2**, a wide range of measures can be used to support Natura 2000 farmland, in terms of land management, conservation planning and knowledge transfer and advice.
- One of the new EAFRD focus areas is “restoring and preserving biodiversity, including in Natura 2000 areas and high nature value farming, and the state of European landscapes”. Relevant changes in relation to the previous EAFRD include:
 - broadened scope of the agri-environment measure by renaming it ‘agri-environment-climate’;
 - recognition of the environmental and climatic benefits of collaborative action in particular but not only at the landscape scale, through the possibility of granting higher transaction costs in case of contracts involving more than one land manager;
 - flexible rules on the duration of contracts after the initial period of applying the commitments;
 - and extending the scope of the Natura 2000 compensation measure to cover farmland and/or forest land in other nature protection areas with environmental restrictions which contribute to improve habitat connectivity (Article 10 of the Habitats Directive).

- Member States can also create thematic sub-programmes within their RDPs, showing how they will use the measures available to contribute to the priorities set in the new regulation and to address specific needs in their national or regional contexts. The regulation identifies:
 - the needs of young farmers,
 - small farms,
 - mountain areas,
 - short supply chains
 - and climate change mitigation and adaptation and
 - biodiversity as topics for thematic sub-programmes
- and allows Member States to raise the maximum rate of support for operations within these sub-programmes

- The two pillars of the CAP use different instruments but it is important that at farm level the **potential synergies** between them are used to support both Natura 2000 farming systems and management practices. It is important to consider the local conditions and to analyse which measures are best adapted to support the conservation objectives in each area.
- It is also very important to **combine the different measures so as to ensure that effective support is provided** to extensive and High Nature Value farming systems.
- Pillar 1 payments are often needed alongside Pillar 2 agri-environment management payments if farming is to be maintained in areas with extensively managed semi-natural habitats (O'neill et al, 2007; Polakova et al, 2011).
- All farmland in Natura 2000 should be considered for eligibility for CAP payments under both Pillar 1 and Pillar 2.
- In a number of Member States substantial areas of Natura 2000 farmed habitat have been deemed ineligible for direct payments under Pillar 1 in the CAP period 2007-2013. This is the responsibility of the Member States, and eligibility issues are often related to characteristic features of Natura 2000 farmland which are an essential part of their biodiversity value, but do not fit within the Member State's implementation decisions or within the flexibilities provided by EU eligibility rules. Issues include the presence of trees, shrubs and scrub on pastureland, farm or parcel size, land tenure, outdated land registration records, and difficulties with GAEC standards that Member States have designed for more intensive farming systems.

CAP support to ensure economic viability of extensive Natura 2000 farming systems

- The first critical step in ensuring that farming continues in Natura 2000 areas is to carefully consider possibilities provided in respect of the eligibility requirements for Pillar 1 payments taking account of the particular characteristics of Natura 2000 farming systems. When eligibility of the land and the farmer has been assured there are several payments from both Pillars of the CAP which can be used, often in combination, to underpin the economic viability of these farms, including:
 - Basic Payment Scheme, Single Area Payment Scheme (Pillar 1)
 - ‘Greening’ payment (Pillar 1)
 - Payments for Areas with Natural Constraints (Pillar 1 and Pillar 2)
 - Voluntary coupled support (Pillar 1).
 - Or, as an alternative to all Direct Payments under Pillar 1, Small Farmers Scheme (Pillar 1)

CAP support for building the capacity of the Natura 2000 farm

- Long-term economic and environmental viability of Natura 2000 farming systems depends on building the administrative and environmental capacity of the farmer and the economic capacity of the farm. Public support for capacity building comes from both Pillars of the CAP, but it is essential that this support is tailored to the specific needs of Natura 2000 farmers and farming systems in meeting the environmental objectives. The range of capacity building support includes:
 - farm advisory services (Pillars 1 and 2)
 - knowledge transfer and information and raising environmental awareness among Natura 2000 land farmers (Pillar 2)
 - Investment in physical assets (Pillar 2)
 - farm and business development (Pillar 2)
 - income support and other payments for young farmers (Pillar 1 and Pillar 2)

- The provision of advice, support and training for farmers is crucial for the survival of Natura 2000 farming systems and the successful management of key habitats and species. There is still a substantial unmet need for advice and support amongst farmers in the EU - in 2008 only around 5% of farmers receiving direct payments were given one-to-one advice (European Commission, 2010a). The proposed scope and requirements for the FAS from 2014 offers Member States an opportunity to provide very specific advisory services tailored to the environmental and economic needs of Natura 2000 farmers.

CAP and other support for adding value to the produce of Natura 2000 farms

- Many farmers on Natura 2000 and HNV grasslands face challenges selling their products, because they are often small producers in remote areas where there are few customers who can pay premium prices.
- On the other hand, some are well-placed to take advantage of direct marketing to eco-tourists and tourist services such as hotels and restaurants. In some regions Natura 2000 farmers have built up successful direct marketing connections to supermarkets. The range of support for farmers seeking to add value to their produce includes:
 - Setting up producer groups (Pillar 2)
 - Quality schemes for agricultural products (Pillar 2)
 - Labelling and Protected Designation of Origin

CAP support for the management of Natura 2000 farmland habitats and species

- The management of Natura 2000 farmland addressing the particular needs of key habitats and species can be carried out using a range of support from Pillar 2 that includes:
 - Preparing and updating Natura 2000 management plans
 - Agri-environment-climate payments
 - Non-productive investments linked to agri-environment and Natura 2000
 - Natura 2000 compensation payments
 - Animal welfare payments
 - Prevention of damage to forests from forest fires and restoring agricultural production potential
- Agri-environment measures are an especially important measure for Natura 2000. Under their 2007-2013 Rural Development Programmes, several Member States have already successfully developed agri-environment schemes specifically tailored to the management of Natura 2000 sites or High Nature Value (HNV) farmland with Natura 2000 habitats and species.
- The new Pillar 2 should enable Member States and their regions develop further similar agri-environment-climate schemes that are best suited to their own Natura 2000 farmland areas.

CAP payments for co-operation projects and local partnerships

- Local partnerships play a crucial role in implementing Natura 2000 conservation management on the ground. The EAFRD contains various possibilities to fund farmer action groups, or partnerships between farmer groups and other local organisations, for example local authorities or NGOs, including the Leader approach, producer groups, and cooperation projects. This range of support from Pillar 2 includes:
 - Co-operation projects to promote short supply chains and local markets, and facilitate collective approaches to environmental projects and environmental practices, from a local to a transnational level.
 - Local partnerships – Leader approach.

Other EU funds for Natura 2000

- **LIFE** is the main EU funding instrument dedicated to the promotion of the environment within the EU. Although its budget is small compared to other EU financing instruments, LIFE has strategic importance for Natura 2000, because it finances very specific, targeted conservation measures which are more difficult to fund from other EU sources, such as monitoring and surveying, definition and establishment of management techniques, and management of risks to Natura 2000 sites (Gantioier et al, 2010; Kettunen et al, 2011).
 - LIFE funding is particularly important for sites where agricultural management has been abandoned and Natura 2000 management planning has not progressed far enough to allow application for funding from other sources (Kettunen et al, 2011). Many Natura 2000 restoration projects have successfully combined LIFE funding with the development of agrienvironment funding to ensure long-term financial support (WWF and IEEP, 2009).
 - The new LIFE Integrated Projects, included in the LIFE fund regulation for 2014-20204, could also prove relevant for Natura 2000 habitat conservation by improving the integration of environmental aspects in other EU policies, and by focusing on the implementation of plans and strategies on a larger territorial scale (e.g. regional, multi-regional, national). Integrated projects should also contribute to mobilise other funding sources to achieve conservation objectives and implement the measures required in Natura 2000 areas.
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- **European Structural Funds** can provide significant funding for Natura 2000 restoration, conservation, management and monitoring actions (European Commission, 2011). The funding can also be used to support eco-tourism, awareness-raising and communication, training and education activities in Natura 2000 areas.
 - **European Regional Development Fund (ERDF)** allows for allocation of funds to biodiversity, particularly under the objective of preserving and protecting the environment and promoting resource efficiency, including through natural heritage, Natura 2000 and green infrastructure5.
 - **European Social Fund (ESF)** can support capacity building aimed at the creation of new job opportunities related to Natura 2000 and small businesses. The funds also allow for allocation of funding to transnational, cross-border and interregional cooperation which can benefit Natura 2000 sites and species, for example projects to develop eco-tourism, and to protect, restore and manage river basins, coastal zones, marine resources, and wetlands.

Market-based instruments and innovative instruments

- A range of other potential instruments exist through which public funding and/or policy actions can potentially stimulate increased private sector funding of biodiversity, often in combination with public funding, for example from not-for profit organisations (e.g. NGOs, foundations), philanthropic donations by companies, or from rural communities.
- There is a key potential for micro-finance for pro-biodiversity local businesses and cooperatives, such as **direct marketing initiatives**. The added value offered by visitors and tourists in Natura 2000 areas could also be captured more effectively through integrated local development and conservation projects.
- **Payments for Ecosystem Services** schemes can also provide an incentive for the conservation and restoration of farmland biodiversity and habitats in order to safeguard (or potentially increase) the provision of the ecosystem services it provides. Typical ecosystem services that PES schemes are designed to support are groundwater quality, river water quality (restricting nutrient run-off and soil erosion), and carbon sequestration. PES schemes can operate between land managers or farmers and public organisations (such as municipal water companies) or private businesses (such as breweries), and may operate at the local, regional, river catchment or national scale. For example, the Sustainable Catchment Management Programme (SCaMP)⁶, developed by a UK water company in association with the RSPB, applies a Payment for Ecosystem Services scheme to the maintenance of grazing on upland heathland. The water company benefits from improved water quality by reducing erosion of the peat soils from burning and over-grazing (see this case study in Annex E for further details).