NATURA 2000 SEMINAR FOR THE MACARONESIAN REGION

GOBIERNO DE ESPAÑA
MINISTERIO PARA LA TRANSICIÓN ECOLÓGICA Y EL RETO DEMOGRÁFICO

VNIVERSITAT DE VALÈNCIA

Tragsatec
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FAVOURABLE REFERENCE VALUES FOR HABITAT TYPES OF COMMUNITY INTEREST

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EVALUATION OF THE CONSERVATION STATUS – MATRIX

WHERE DO FRV APPLY?

Annex E - Assessing conservation status of a habitats type

General evaluation matrix (per biogeographical/marine region within a MS)

Parameter	Conservation Status			
	Favourable ('green')	Unfavourable – Inadequate ('amber')	Unfavourable - Bad ('red')	*Unknown (insufficient information to make an assessment)*
Range (within the biogeographical/marine region concerned)	Stable (loss and expansion in balance) or increasing AND not smaller than the 'favourable reference range'	Any other combination	Large decrease: Equivalent to a loss of more than 1% per year within period specified by MS OR More than 10% below 'favourable reference range'	*No or insufficient reliable information available*
Area covered by habitat type within range[a]	Stable (loss and expansion in balance) or increasing AND not smaller than the 'favourable reference area' AND without significant changes in distribution pattern within range (if data available)	Any other combination	Large decrease in surface area: Equivalent to a loss of more than 1% per year (indicative value MS may deviate from if duly justified) within period specified by MS OR With major losses in distribution pattern within range OR More than 10% below 'favourable reference area'	*No or insufficient reliable information available*
Specific structure and functions (including typical species[b]**)**	Structures and functions (including typical species) in good condition and no significant deteriorations / pressures	Any other combination	More than 25% of the area is unfavourable as regards its specific structures and functions (including typical species)[c]	*No or insufficient reliable information available*
Future prospects (as regards range, area covered and specific structures and functions)	The habitats prospects for its future are excellent / good, no significant impact from threats expected; long-term viability assured	Any other combination	The habitats prospects are bad, severe impact from threats expected; long-term viability not assured.	*No or insufficient reliable information available*
Overall assessment of CS	All 'green' OR three 'green' and one 'unknown'	One or more 'amber' but no 'red'	One or more 'red'	Two or more 'unknown' combined with green or all 'unknown'

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EVALUATION OF THE CONSERVATION STATUS – MATRIX

WHERE DO FRV APPLY?

- Range (FRR)
- Area (FRA)

Annex E - Assessing conservation status of a habitats type

General evaluation matrix (per biogeographical/marine region within a MS)

Parameter	Conservation Status			
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Favourable Reference Values (FRVs) are quantifiable indicators established to set what is the favourable conservation status of species and habitats.

They are a tool to deal with the consideration of long-term viability of a species or habitat in their natural range including ecological variations.

FRV are still poorly developed and often inconsistently applied across Member States. Because:

- Methodologies to determine FRVs are often undocumented.
- FRV were sometimes not explicitly defined.
- Expert opinion was frequently applied for weighting FRV factors.
- The use of operators (>, >>, ≈) was not harmonised.
- Feasibility considerations had often not been used in setting FRV.

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Before setting the favourable reference values, it is advisable to collect all the relevant information about a habitat in order to understand their ecological and historical context:

- current situation and assessment of deficiencies, i.e. any pressures, problems;
- trends (short-term, long-term, historical, i.e. well before the Directive came into force);
- natural ecological and geographical variation (including variation in species composition, variation in conditions in which habitats occur, variation of ecosystems);
- ecological potential (potential extent of range, taking into account physical and ecological conditions, contemporary potential natural vegetation);
- natural range, historical distribution and causes of change
- connectivity and fragmentation.
- dynamics of the habitat type;
- requirements of its typical species.

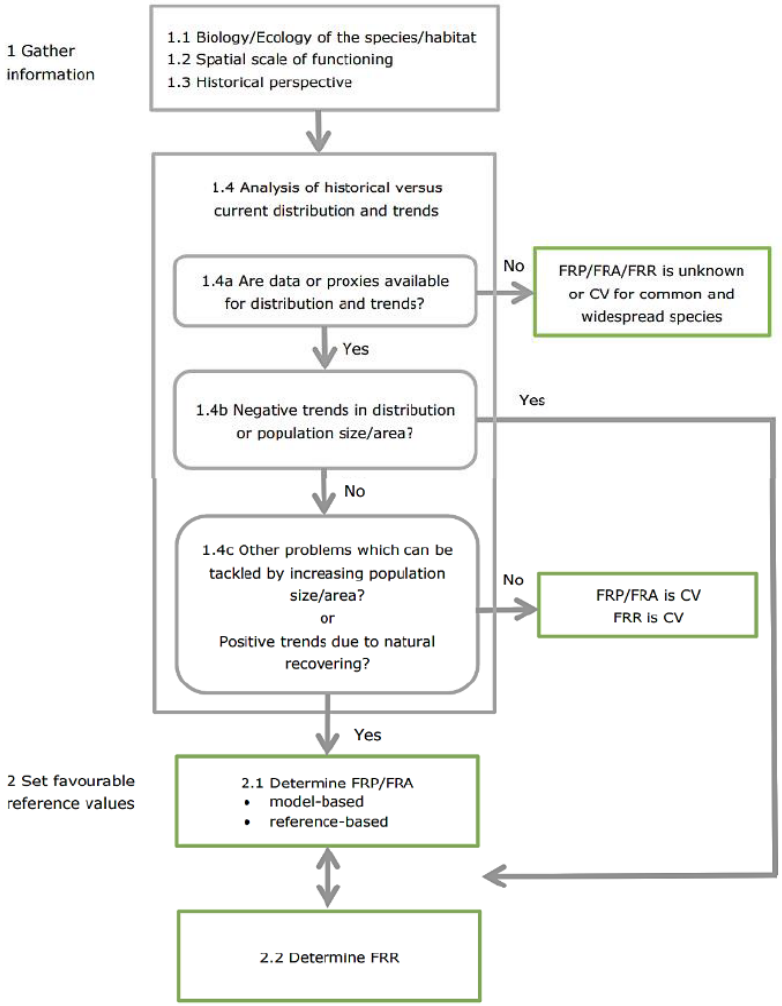
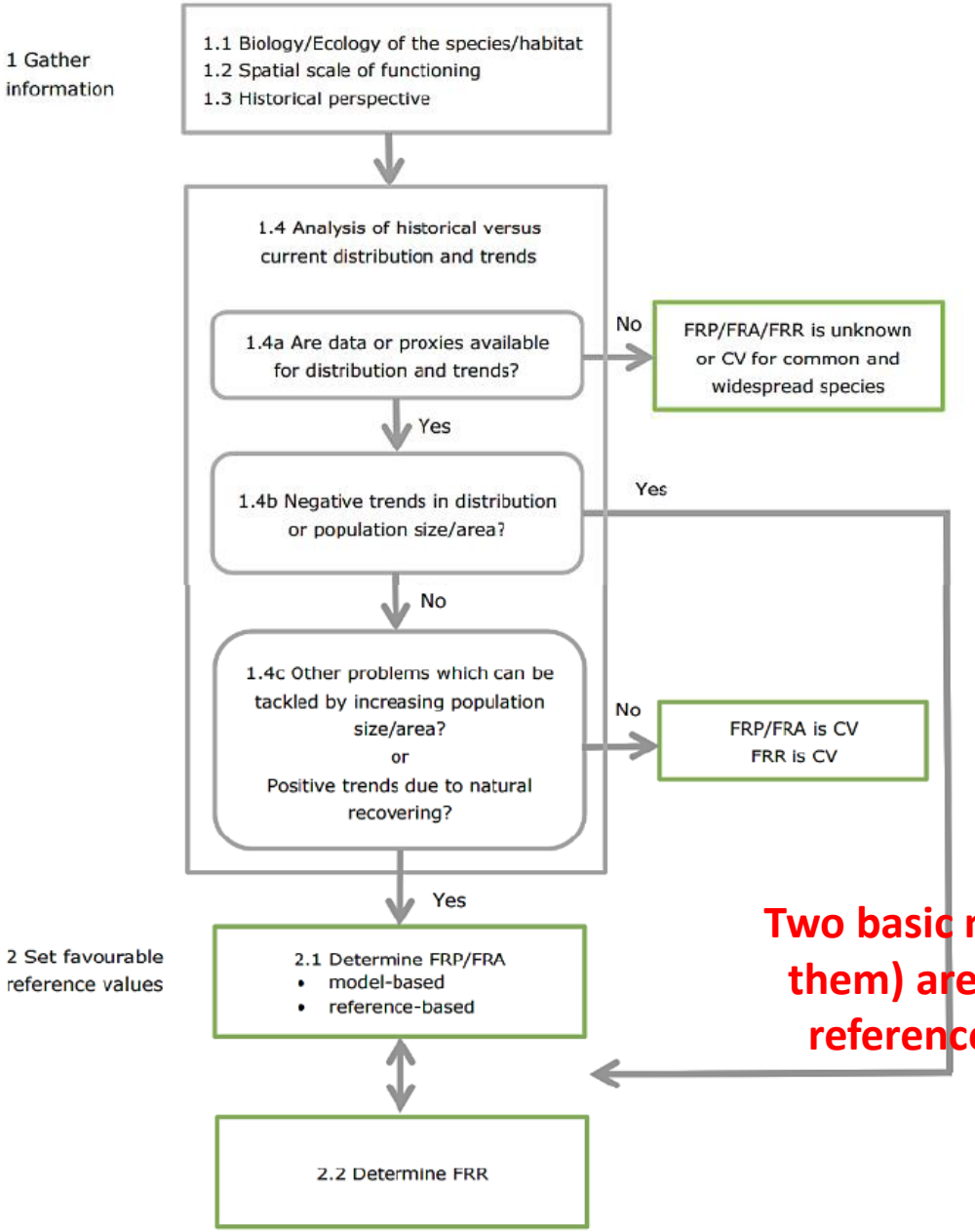


Figure 8: Flowchart for the stepwise process of setting FRVs for species and habitat types (Bijlsma, et al. 2016. Defining and applying the concept of Favourable Reference Values).

Two basic methods (or combinations of them) are applied to set FRV, namely reference-based and model-based.

(Bijsma et al, 2016)



Two basic methods (or combinations of them) are applied to set FRV, namely reference-based and model-based.

Figure 8: Flowchart for the stepwise process of setting FRVs for species and habitat types (Bijlsma, et al. 2016. Defining and applying the concept of Favourable Reference Values).

(Bijsma et al, 2016)

The reference-based approach considers the historical distribution or area of a habitat in a period when the habitat was supposed to be in a (stable) favourable condition. Empirical areas corresponding to a particular historical baseline are used to set FRV. The challenge is to determine how much of the baseline needs to be restored to represent a favourable area.

Model-based approaches use habitat type-specific features, such as habitat suitability or required area for proper functioning

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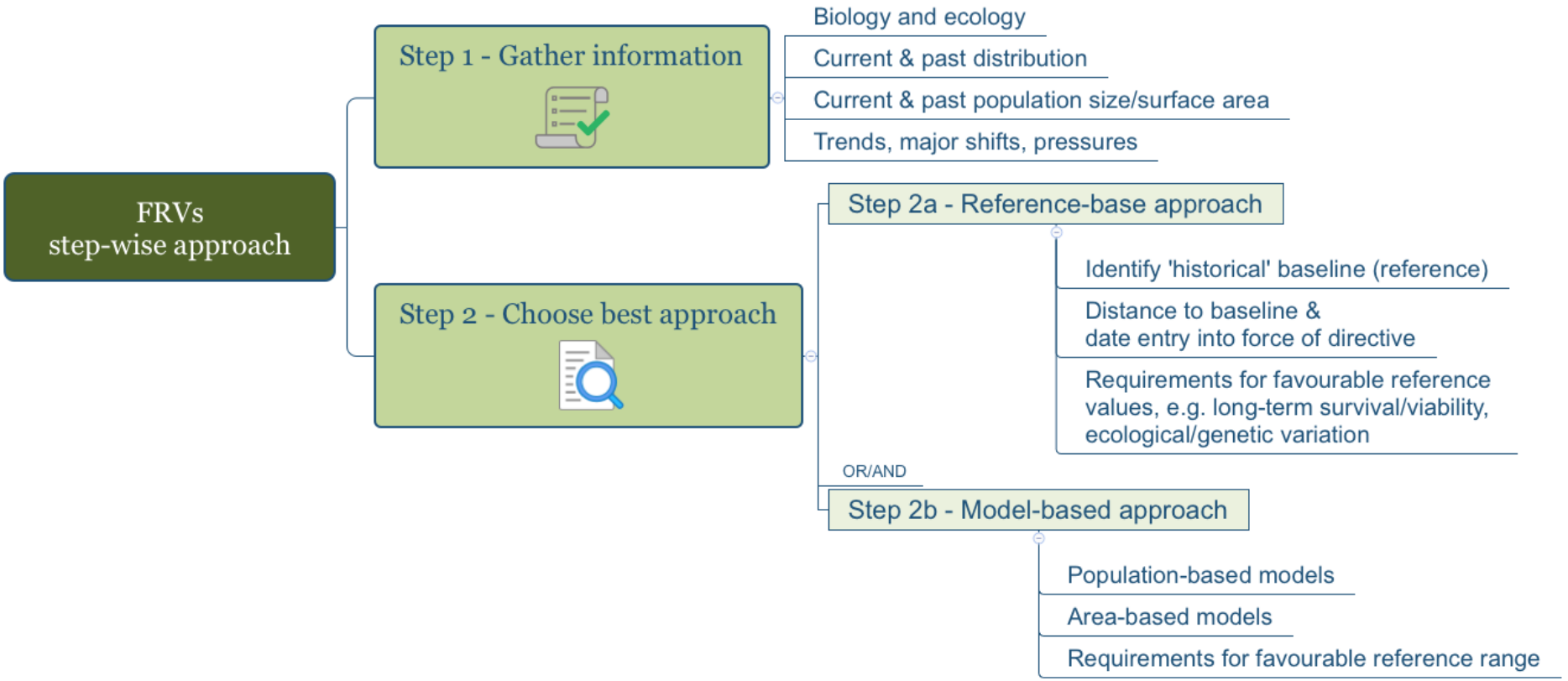

Illustration of the stepwise approach to set FRVs (Bijsma et al, 2016)

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General principles for the process of setting FRVs:

- FRVs should be set on the basis of ecological/biological considerations

- FRVs should be set using the best available knowledge and scientific expertise

- FRVs should be set taking into account the precautionary principle and include a safety margin for uncertainty

- FRVs should not, in principle, be lower than the values when the Habitats Directive came into force, as most habitats have been listed in the Annexes because of their unfavourable status.

- The area (and its distribution) at the date of entry into force of the Directive does not necessarily equal the FRVs

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FRVs are not necessarily equal to 'national targets': Setting targets would mean the translation of such reference values into operational, practical and feasible short-, mid- and long-term targets/milestones.

FRVs do not automatically correspond to a given 'historical maximum', or a specific historical date. Historical information (e.g. a past stable situation before changes occurred due to reversible pressures) should, however, inform judgements on FRVs

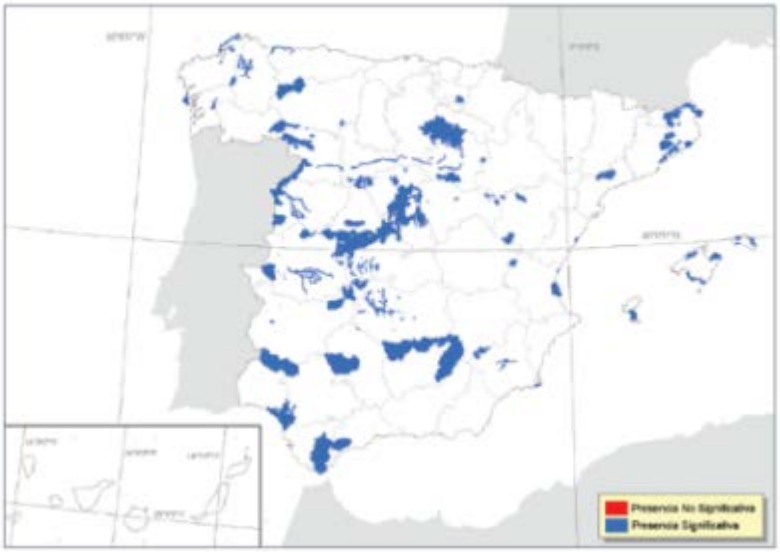
FRVs do not automatically correspond to the 'potential value' (maximum possible extent; e.g overlapping) which, however, should be used to understand restoration possibilities and constraints.

FRV for habitats – Some other possible approaches

- Based on **habitats features (related to area if FRA)**
- **Abiotic & Biotic** features
- **FRA**, is the area covered by the HCI being **enough to ensure long-term conservation of the habitat and its species** (within the biogeographic region?).
- Ideally, the **FRA should not be lower than that allowing all typical species to exist in the habitat type**
- **Additional** considerations can be made, for instance, that the **number of localities** in which the **rarest species** appear would not be lower than a certain number
- **Which typical species?** EUR28 Manual + (or selection)
- **Red list of Ecosystems**
- Minimum dynamic area (**MDA**)

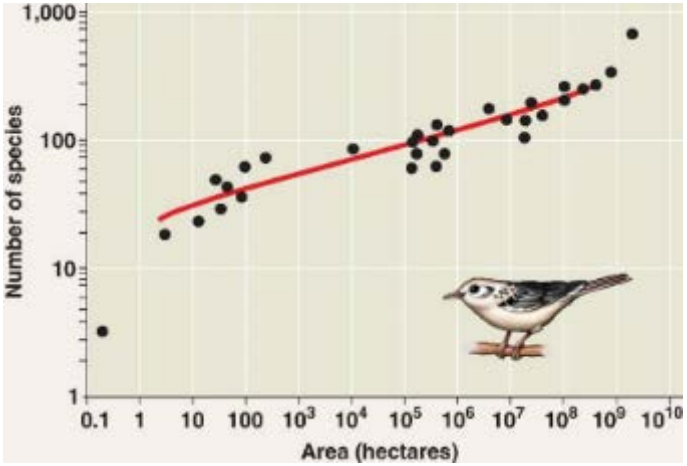
FRA for habitats - Example HCI 3170 Mediterranean temporary ponds

- **HCI 3170** in Spain occupies more than **32000 Ha**, from which nearly 40 % is located in up to 120 Special Areas of Conservation (SAC)
- In **most** of these (106 SAC) this **HIC occupies less than 5 %** of the SCA surface, in 12 SAC it occupies between 5 and 15 %, and only in 2 of them the HCI 3170 spans for up to 15 to 30 % of the SAC area.
- In Spain, up to 88 % of the surface of this HCI is located in the Mediterranean biogeographic region, and the remaining is found in the Atlantic region.



FRV for habitats – Community Approach (Camacho et al, 2017)

- The **community approach** is based on the **relative saturation in typical species of the community according to the area** of the HCI occupied within the biogeographic region of each member state.
- This approach uses the relationship between the number of **species and the area** of the habitat considering typical species. A higher area, hypothetically, offers **more niches** to be occupied by more species (species-area relationship) and additionally, according to island biogeography, larger habitat patches are bigger **targets for colonization** (Lomolino et al., 2016). Thus, **the larger the extent of the habitat, the higher the number of (typical) species it can harbor**



FRV for habitats 3170 MTP – Community Approach

• Typical species (EUR28 Manual) - 41 species:

- *Agrostis pourretii, Centaurium spicatum, Chaetopogon fasciculatus, Cicendia filiformis, Crypsis aculeata, C. alopecuroides, C. schoenoides, Cyperus flavescens, C. fuscus, C. michelianus, Damasonium alisma, Elatine macropoda, Eryngium corniculatum, E. galioides, Exaculum pusillum, Fimbristylis bisumbellata, Glinus lotoides, Gnaphalium uliginosum, Illecebrum verticillatum, #Isoetes boryana, I. delilei, I. duriei, I. heldreichii, I. histrix, #I. malinverniana, I. velatum, Juncus bufonius, J. capitatus, J. pygmaeus, J. tenageia, Lythrum castellanum (= L. baeticum), *L. flexuosum, L. tribracteatum, #Marsilea batardae, #M. strigosa, Mentha cervina, Ranunculus dichotomiflorus, R. lateriflorus, Serapias lingua, S. neglecta, S. vomeracea*.

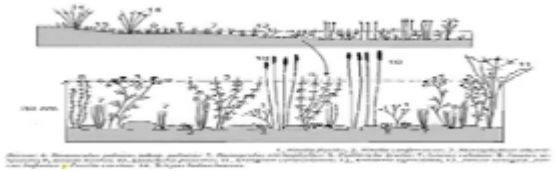
• But only 18 species in Spain

- *Agrostis pourretii, Cicendia filiformis, Eryngium corniculatum, Illecebrum verticillatum, Isoetes durieui, I. histrix, I. velatum, Juncus bufonius, J. capitatus, J. pygmaeus, J. tenageia, Lythrum castellanum (= L. baeticum), *L. flexuosum, L. tribracteatum, #Marsilea batardae, #M. strigosa, Mentha (Preslia) cervina, Ranunculus lateriflorus,*

• Plus other typical species (national level) (Spanish Society for Plant Conservation) + 26 spp:

- *Antinoria agrostidea* subsp. *annua, Baldellia ranunculoides, Blackstonia perfoliata, Briza minor, Centaurium pulchellum, Crassula vaillantii, Damasonium polyspermum, Gnaphalium luteo-album, Hypericum humifusum, Illecebrum verticillatum, Isoetes setaceum, Isolepis setacea, Lotus subbiflorus, Lythrum acutangulum, L. borysthenicum, L. hyssopifolia, L. thymifolia, Mentha pulegium, Myosurus minimus, Polypogon maritimus, Ranunculus batrachioides* subsp. *brachypodus, R. longipes, Sedum lagascae, Silene laeta, Solenopsis laurentia, Verbena supina*.

- **Up to 44 typical plant species** can be expected to appear in the whole set of localities where HCI 3170 appears.
- **Inventories of typical species (plants?)** for a representative set of localities are needed



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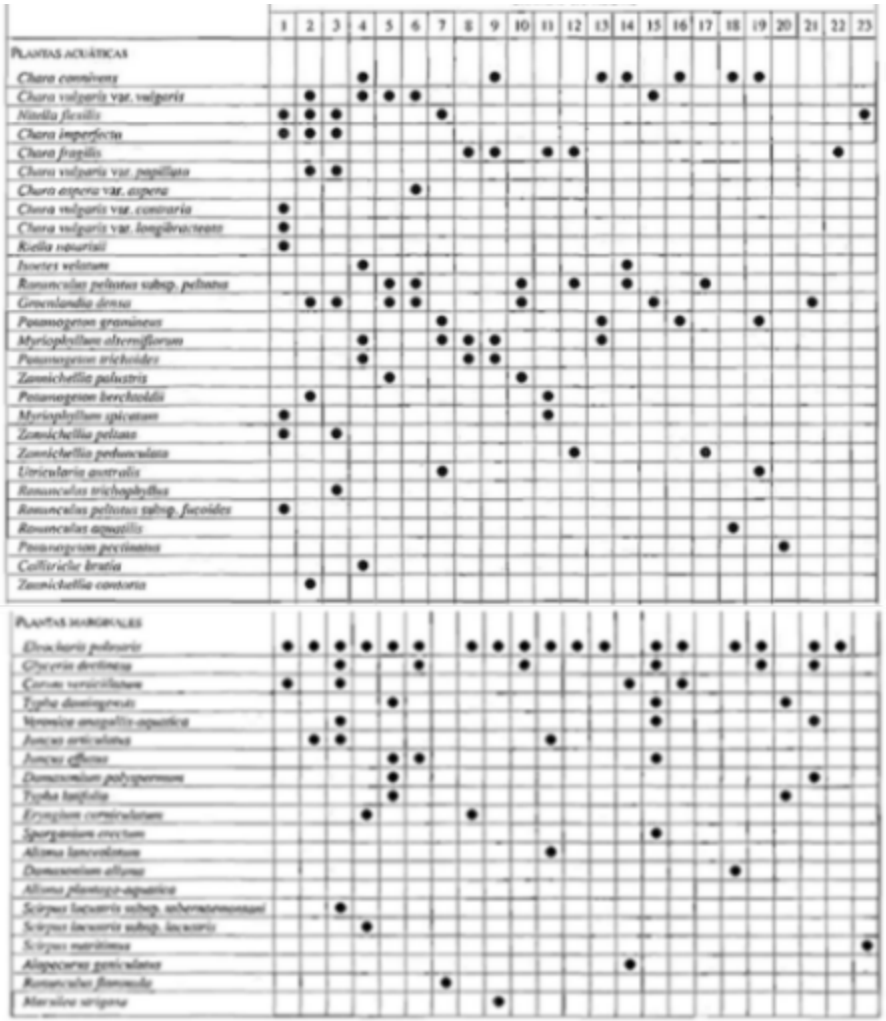
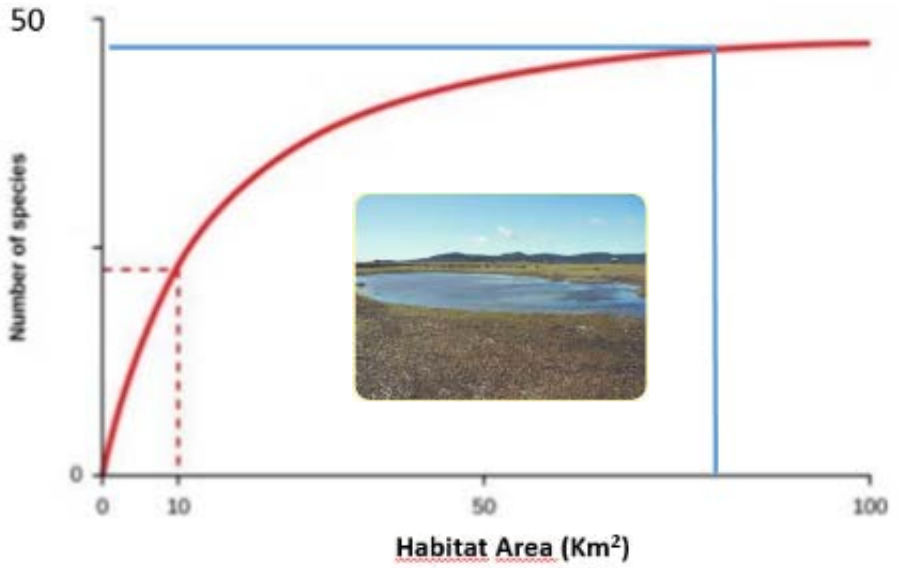


FRV for habitats Community Approach



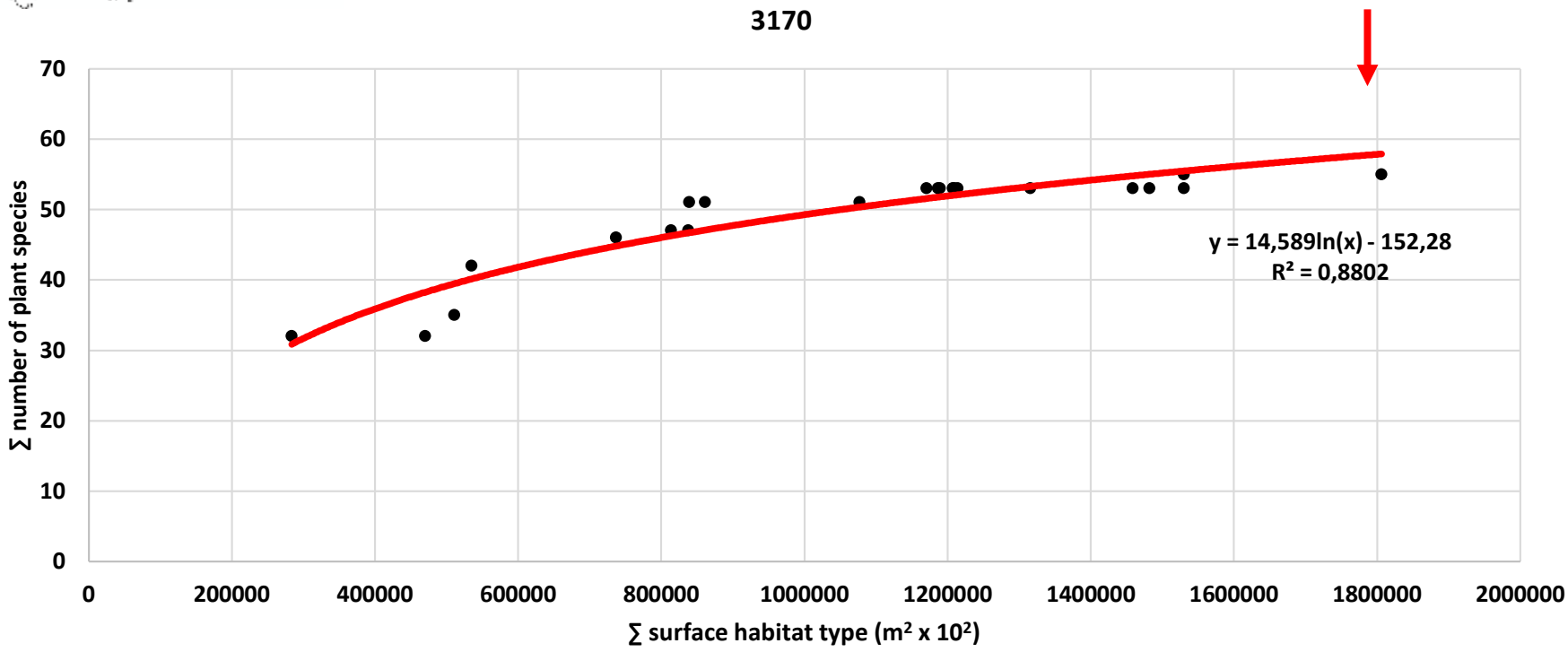
Other taxocoenoses (e.g. amphibians).

Alytes cisternasii, Bufo calamita, Bufo viridis, Discoglossus jeanneae, Discoglossus galganoi, Discoglossus pictus, Hyla arborea, Hyla meridionalis, Lissotriton boscai, Pelobates cultripes, Pelodytes ibericus, Pelodytes punctatus, Pleurodeles waltl, Rana perezi, Salamandra salamandra, Triturus marmoratus, Triturus pygmaeus

FRV for habitats – Community Approach

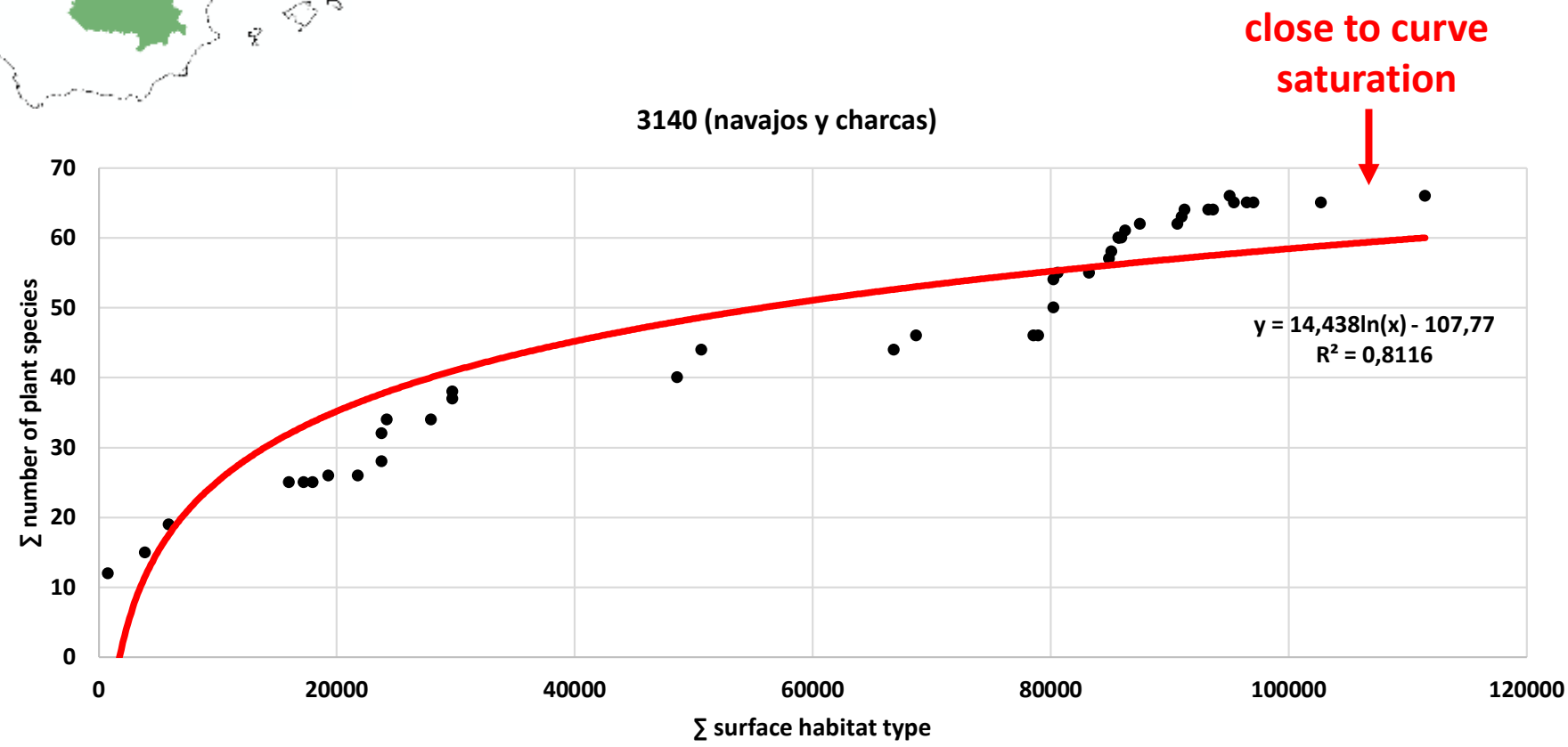
Inventoried **3170*** **habitats** with a catalogue of aquatic and marginal plant species

close to curve saturation



FRV for habitats – Community Approach

Inventoried **3140 habitat** with a catalogue of aquatic and marginal plant species



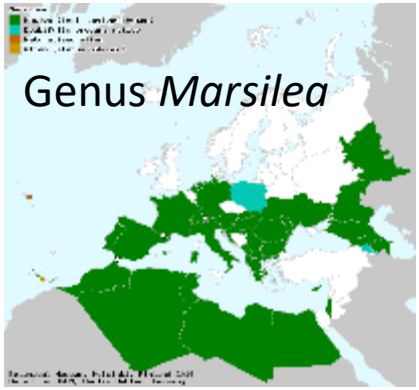
FRV for habitats – Species+ Approach (Camacho et al, 2017)

- This approach is exemplified by the **evaluation of the conservation status of a typical species**, but for a proper evaluation it needs to be complemented by the simultaneous assessment with other species also typical from the habitat.
- In this case **these typical species are also diagnostic**, this is, they are able to evaluate the conservation status of the HCI by themselves because of their ecological (including habitat area) requirements. As such, **this approach does not only consider areal requirements, but also combines it with the status of the structure and function**, since the ecological requirements of the targeted species must be fitted both in terms of enough area but also of enough ecological quality.
- This approach basically consists in **comparison of the number of localities (and its extension) where the HCI appears and the number where a typical and diagnostic species is found.**

3 main diagnostic plant species for the HCI 3170 in Spain (+ 5 spp) Spanish Society for Plant Conservation

- ***Marsilea strigosa*** Willd. This is a specialist species for the ecological conditions of the HCI 3170, with a circum-Mediterranean potential distribution, though more restricted current distribution.
- ***Juncus pygmaeus*** Rich. – This is an almost exclusive species for the HCI 3170, distributed in Western and southern Europe, Anatolia and the north of Africa.
- ***Mentha cervina*** L. This species, almost exclusive for the HCI 3170, has an important structural role in the habitat, being distributed in the Iberian Peninsula, south of France, and the north of Africa.

FRV for habitats – Species+ Approach



- Example with *Marsilea strigosa*

Most of the **occurrences of *Marsiliea strigosa* are associated to temporary ponds.** Thus**, a certain area** of the habitat is likely **needed** to ensure the **conservation of this typical species** of HCI3170.

This analysis shows that ***Marsilea strigosa* is present in 87 from 137 Mediterranean temporary ponds larger than 1 Ha**, this is, a 63.5 % of occurrence.

Weighted use of 3 + 5 typical & diagnostic species

Weighting criteria (e.g. species from annexes II and IV could have higher load on the index. (*Marsilea strigosa*, *M. batardae*, and *Lythrum flexosum)*

Other possible approaches– Red lists of Ecosystems

A+B More related to Range and Area

OPEN ACCESS Freely available online

Scientific Foundations for an IUCN Red Ecosystems

David A. Keith[1,2*], Jon Paul Rodríguez[3,4,5,6], Kathryn M. Rodríguez-Clar
Kaisu Aapala[8], Alfonso Alonso[9], Marianne Asmussen[3,5], Steven Bachm
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Mark A. Burgman[17], Patrick Comer[18], Francisco A. Comín[19], Franz Essl
Peter G. Fairweather[22], Robert J. Holdaway[23], Michael Jennings[24], Rich
Rebecca E. Lester[25], Ralph Mac Nally[26], Michael A. McCarthy[7], Justin Mo
Phil Pisanu[15], Brigitte Poulin[27], Tracey J. Regan[7], Uwe Riecken[28], Mark
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11 Department of Biological and Environmental Science, Ecotekne Center, University of Salento, Lecce, Italy, 12 IUCN
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Warnambool, Victoria, Australia, 26 Australian Centre for Biodiversity, School of Biological Sciences Monash Univ
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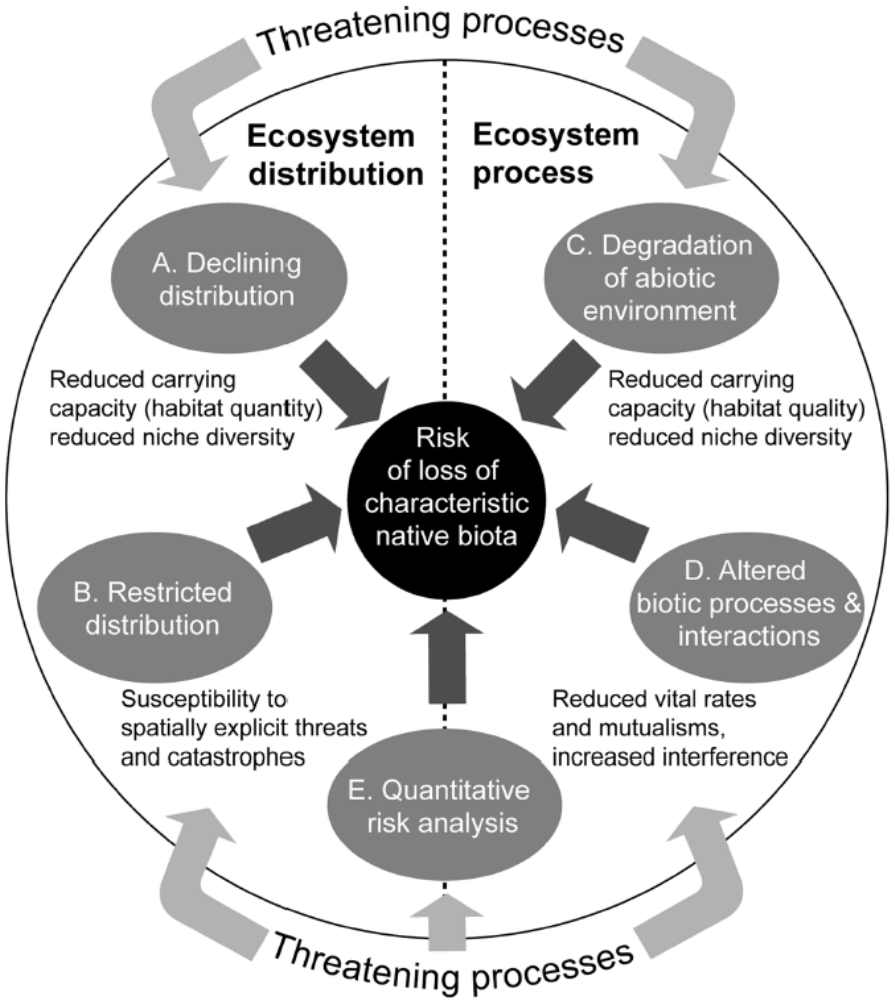


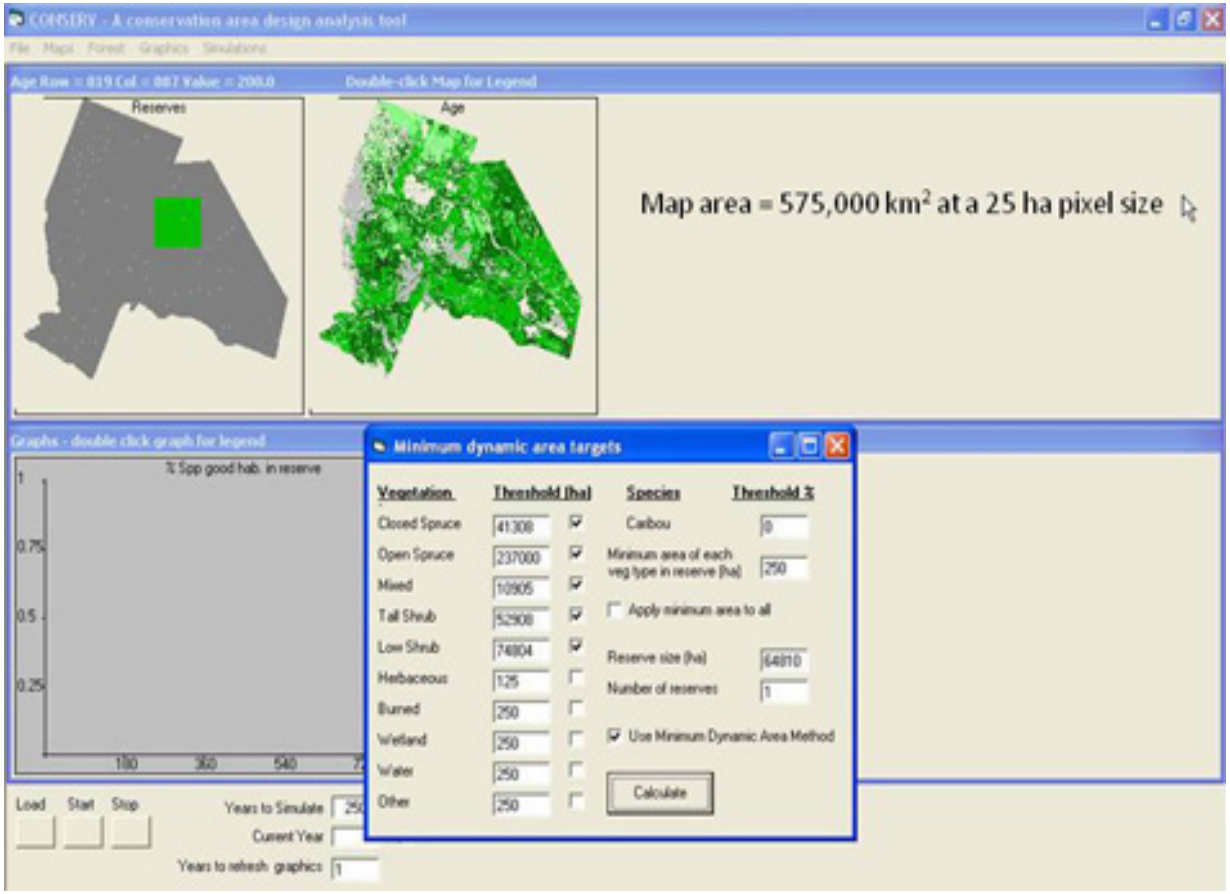
Figure 2. Mechanisms of ecosystem collapse, and symptoms of collapse risk.
doi:10.1371/journal.pone.0062111.g002

Minimum Dynamic Area

Pickett and Thompson (1978) defined a minimum dynamic area (MDA) as "the smallest area with a natural disturbance regime, which maintains internal recolonization sources, and hence minimizes extinction".

- While the MDA concept posits general design principles for self-sufficient reserves, no explicit or quantitative criteria on how to construct a MDA have been established,
- Dynamic simulation models (Peters *et al*. 1997) and temporal reconstruction of patch mosaics using forest history data (Baker 1989) have been proposed.
- By relaxing the restrictive conditions of the MDA and making criteria more explicit, it may be possible to identify practical approaches for the design of large reserves to incorporate natural disturbance and maintain ecological processes.

Minimum Dynamic Area



So far, “relaxed” approach used for reserve design

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WORKSHOP: FORMALISATION OF **CRITERIA AND APPROACHES TO SET THE FAVOURABLE REFERENCE VALUES** OF HABITAT TYPES OF COMMUNITY INTEREST

Procedures to establish the Favourable Reference Area

CY	- Area resulted from **mapping** - **Distribution** (area of occurrence of species communities) **of HCIs** (initially mapped/re mapped) - **Other existing informations** e.g. water bodies maps, vegetation maps - FRA was resulted after assessing the parameters and use of the operators in Access CDR tool (according to guidelines and experts opinion).
ES	**- Operators instead** of absolute values because of the high degree of uncertainty - Mostly the same value as when the HD came into force. **- Expert judgement** with the help of limited GIS analyses.
FR	**Unknown**
GR	- the **potential natural** distribution of HCI - the relation of the **potential natural distribution of HCI to the current area of HCI** - the consideration of **recent and historical changes and trends** of HCI area - the best **expert judgement**
IT	
MT	By the current situation of the habitat (with respect to pressures, ecological potential, habitat dynamics and typical species and their requirements) and comparing it with the **historical situation**, focusing on distribution and abundance. This is most of the time supported by **expert opinion**
PT	Any defined procedure to establish this value. References from "**Expert opinion**" to answer this question in the last Monitoring Report.

Favourable Reference Values reported

	3170* (Med. region)		9340 (Med. region)	
	FRR	FRA	FRR	FRA
CY	47 km^2	Unknown	-	-
ES	Unknown	Unknown	Approximately equal to current value	Approximately equal to current value
FR	-	-	-	-
GR	335 km^2	1.93 km^2	12211 km^2	1837 km^2
IT				
MT	Approximately equal to current value	Approximately equal to current value	More than CV (>)	More than CV (>)
PT	30300 km2	unknown	467000 km2	unknown

Subtypes defined for the HCI 3170*

	Subtypes 3170*
CY	none
ES	• Non-saline shallow ponds and wetlands with alkaline waters, temporary • Non-saline shallow ponds and wetlands (morphostructural origin) with low alkalinity waters, temporary • Mountain volcanic lakes
FR	• Mares temporaires méditerranéennes à Isoètes (*Isoetion*) • Gazons méditerranéens amphibies longuement inondés (*Preslion*) • Gazons méditerranéens amphibies haloitrophiles (*Heleochloion*) • Gazons amphibies annuels méditerranéens (*Nanocypertalia*)
GR	**Four** subtypes on the basis of phytosociological representing the alliances: • *Isoetion* • *Preslion cervinae* • *Nanocyperion flavescentis* • *Zachinellion*
IT	
MT	none
PT	none

Subtypes defined for the HCI 3170*

Parameters considered or interesting for considering when defining habitat subtypes

- Rocky/lithology: [CY] , [ES] , [GR] , [MT]
- Plant communities: [CY] , [ES]
- Species traits: [CY]
- Phytosociology: [ES] , [FR] , [GR] , [MT]
- Water mineralisation: [ES]
- Substrate (%rock/soil): [GR] , [PT]
- Altitude: [PT]
- Substrate texture: [PT]
- Phenology: [PT]
- Zonation: [PT]
- Turbidity: [PT]

Promising approaches to establish the Favourable Reference Values at the Member State scale

REFERENCE VALUES AT MEMBER STATE LEVEL	POINTS
Species-area curve	11
Potential distribution (modelling)	6
Historical references	2
Randomisation with spatial aspects	2
Viability analysis for (some) typical spp.	1
Ecological variability	1
Remote sensing	1

Workshop Formalisation of criteria and approaches to set the FRV of HCI _Madrid, November 2019

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