



# Ecological Restoration both for Ecological Health and Human Health

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**EUROPARC**  
FEDERATION



- To **see the best practices** of ecological restoration in protected area and **understand the philosophy of the ecological restoration** approach at European protected areas
- To learn and evaluate **benefits of ecological restoration** on protected areas as means of **ecosystem health and human health,**
- To **offer gained experience** as an intention for restoration of degraded ecosystems **in Turkey.**

**The purposes of study visits were;**

- Firstly “restoration enables **recovery of a healthy eco-system** through ecosystem management”.

**there are also very close linkages between human health and ecological health.**

- Secondly “a healthy ecosystem is one that provides the **ecosystem services supportive of the human communities’ health and wellbeing**”



**There is a two-way relationship between restoration and health concept.**

Ecological restoration in protected areas defined **as a useful tool;**

**“to support societal goals such as poverty alleviation, sustainable livelihoods, human health etc.”**

**by IUCN**





Effects of restoration on **different ecosystems** searched;

- **Doñana National Park** (Spain)– wetland restoration,
- **Sierra de Guadarrama National Park** (Spain) - scrub and natural grassland formation habitats restoration
- **Bayerischer Wald National Park** (Germany) - recovering of natural forest through assisted natural regeneration.

**Selected Protected Areas;**

- **Ecosystem health indicators** for different kinds of ecosystems **specified**.
- **Effects of restoration on indicators** evaluated according to the **face to face meeting** and **field studies** with national park managers during the study visits.



**Methodology:**

- Also **questionnaires** applied **with visitor** for specifying **effects of restoration on human health** (social, psychological and physical) and **welfare**



**Methodology:**



- **Composition of flora/fauna**
- **Species diversity/biomass**
- Situation of **target species**,
- **Landscape patches** (vegetation cover/wetland area)
- **Water-quality** indicators,
- Decrease in **erosion/sedimentation**



**Specified ecosystem health indicators...**



TABLE 1

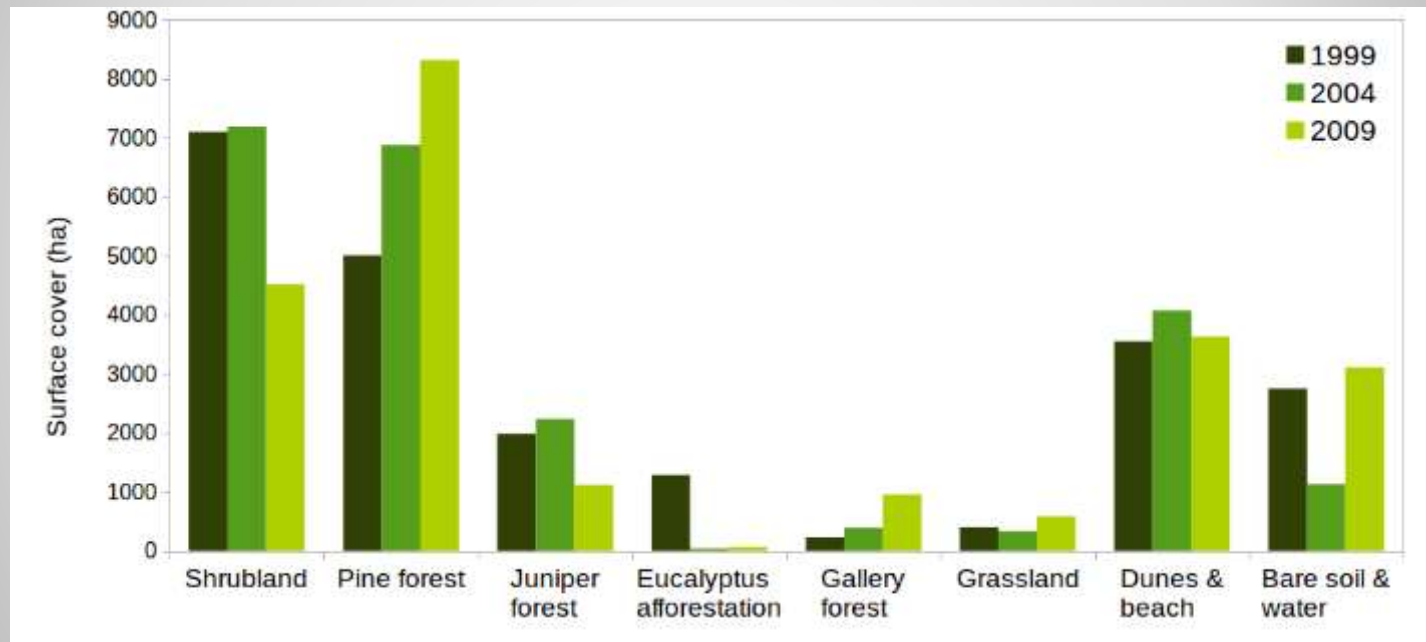
Main interventions of hydrological restoration in the Doñana National Park - 1973-1998.

Year	RESTAURATION UNDERTAKING
1974	Marilópez, Lobo and Almajal wells. Artificial flooding.
1981	Hydrological regeneration.
1984	Restoration of <i>Montaña de Río</i> levee New sluices built. South-North intervention.
1986	Travieso Nuevo Canal
1986-1990	Old riverbeds regain flow. Restoration of Cangrejo Chico pond. Control of trenches in levees to Estuary.
1998 -	Doñana 2005 Project. Guadamar "Green Corridor" Project.

In «Doñana 2005» project more than 2,600 ha of **marshes**, transformed decades ago into **arable farmland**, is being restored by **removal of dykes and drainage ditches**.

## Details of Restoration Activities in Doñana National Park;

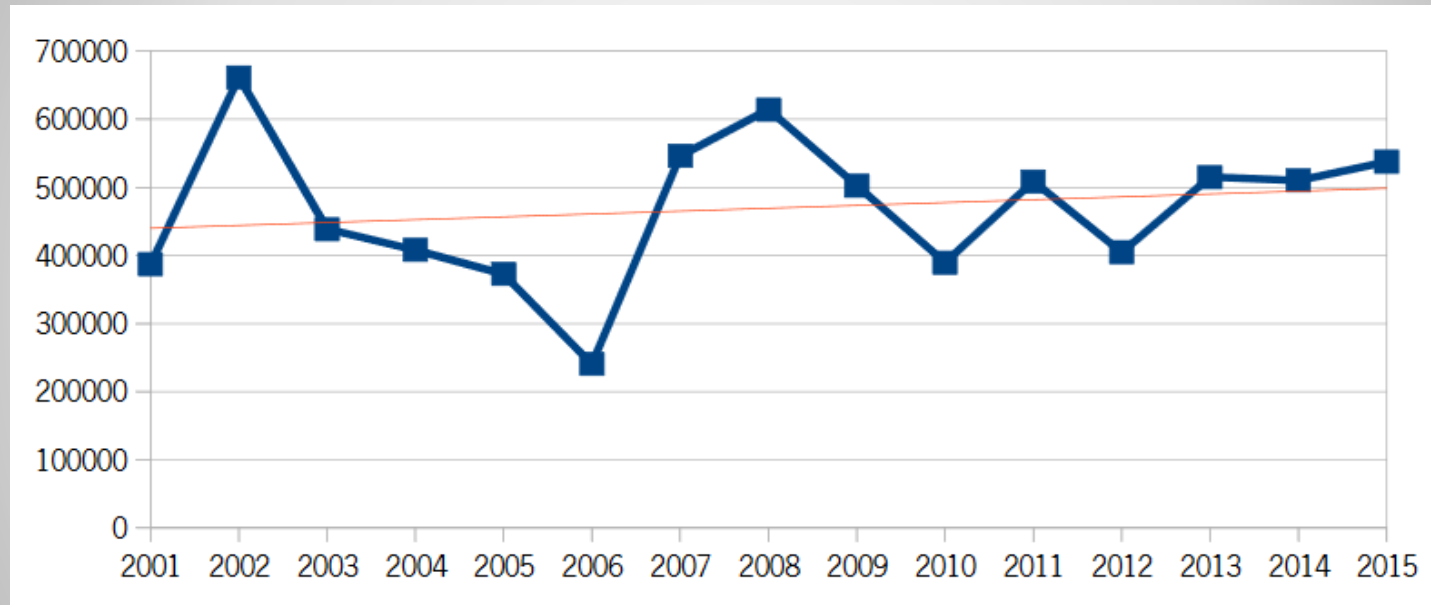
Changes in the **cover of terrestrial vegetation** at the Doñana National Park between 1999 and 2009;



**Development of ecosystem health indicators for Doñana National Park;**

Abundances of **common waterbird** and other **non-passerine species** present in the Doñana wetlands.

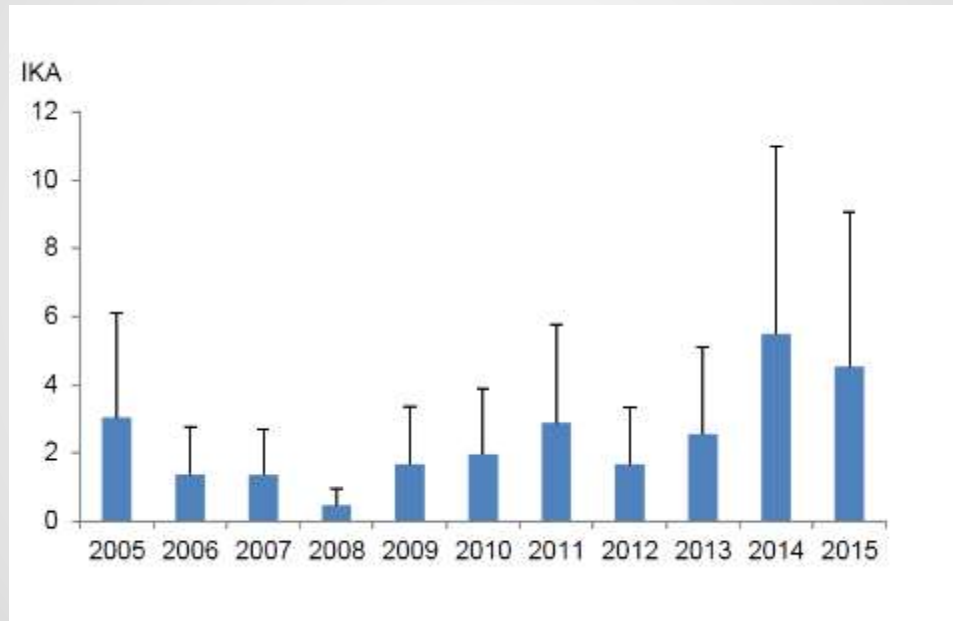
;



**Development of ecosystem health indicators for Doñana National Park;**



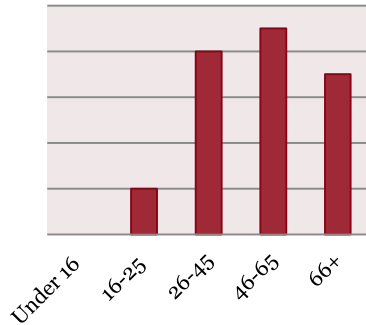
Relative **abundance** (IKA: number of individuals observed per kilometer) of **red deer**



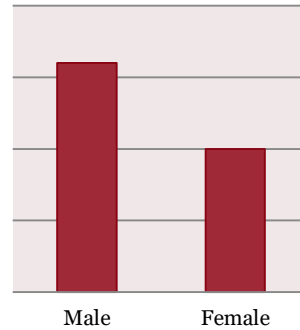
**Development of ecosystem health indicators  
for Doñana National Park;**

## Visitor profile;

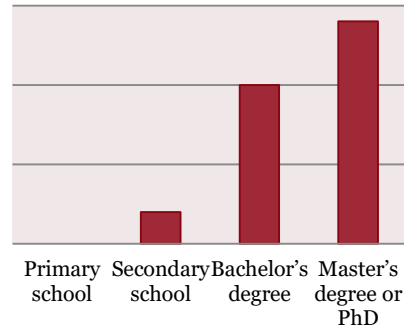
**Age**



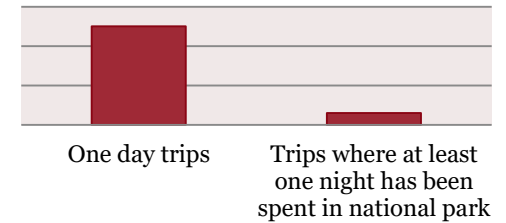
**Gender**



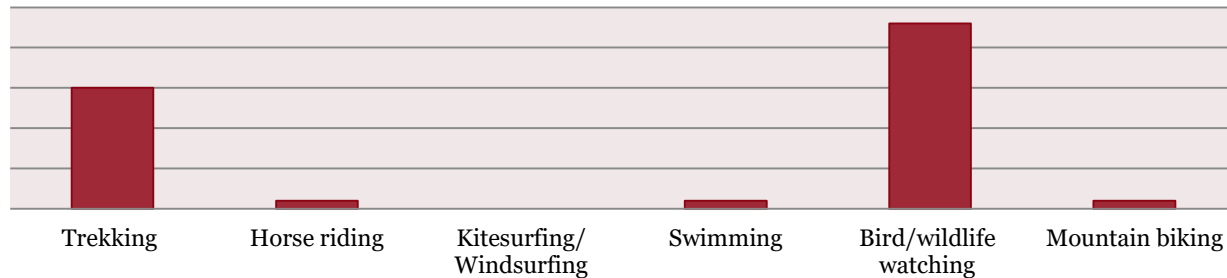
**Education level**



**How many times have you visited this national park, during the last 12 months?**



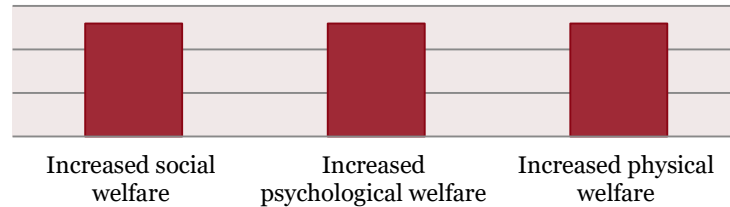
**Which activities have you done at Doñana National Park?**



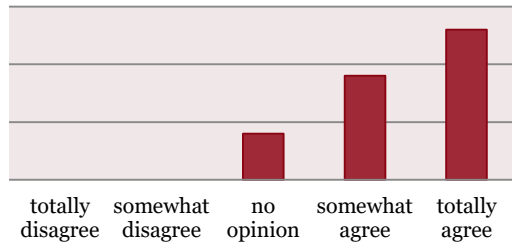
**Evaluation of Doñana National Park visitor surveys;**

# Visitors opinion on how did this visit to National Park influences the state of their health and well-being;

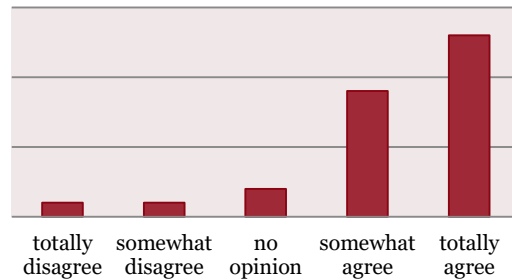
How did this visit to Doñana National Park influences the state of your health and well-being in the following sectors?



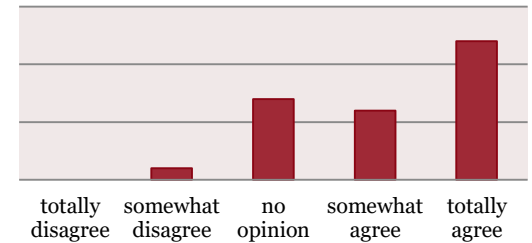
## Increased psychological welfare



## Increased social welfare



## Increased physical welfare



# Evaluation of Doñana National Park visitor surveys;



**Sclerophyllous scrub and natural grassland formation**  
habitats restoration:

- dismantling the artificial infrastructure
- topographic refund
- regeneration of vegetation cover

**Fresh water habitats** conservation and **high mountain wetlands** restoration:

- control of eutrophication through paleolimnology studies;
- control of erosion;
- non-native fish eradication (*Salvelinus fontinalis*);
- amphibians and macroinvertebrate community monitoring.

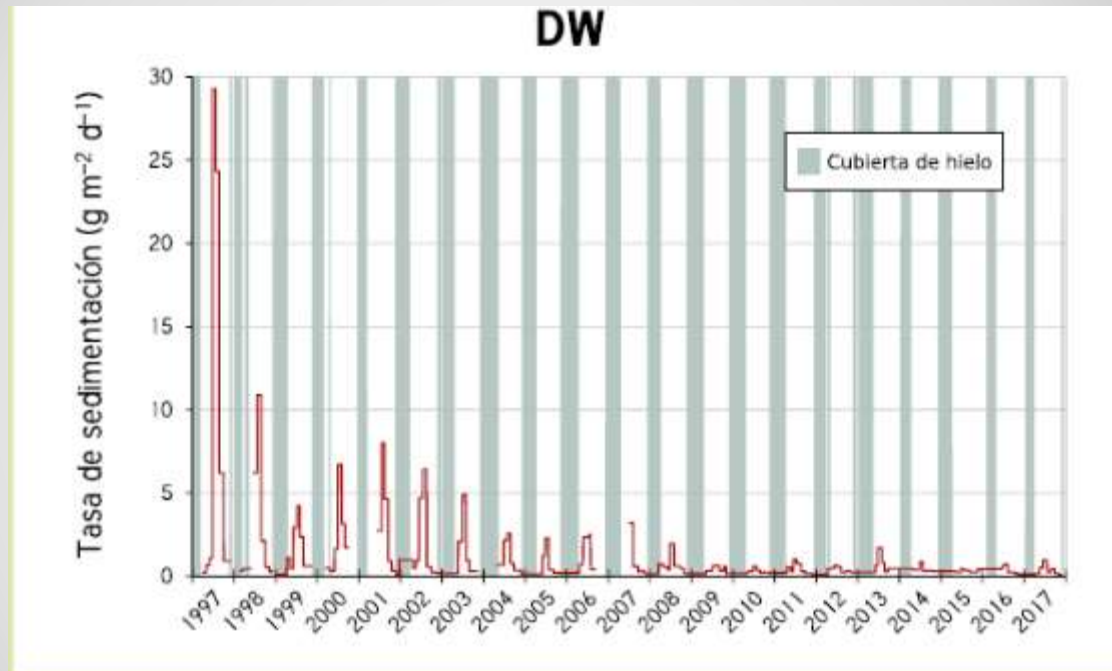
**Details of Restoration Activities in Sierra de Guadarrama National Park;**

## Development of **forest regeneration**



**Development of ecosystem health indicators  
for Sierra de Guadarrama National Park;**

Decrease in **sedimentation**;

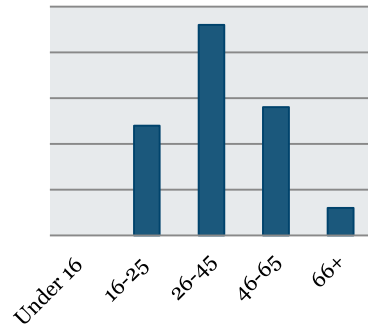


**Development of ecosystem health indicators  
for Sierra de Guadarrama National Park;**

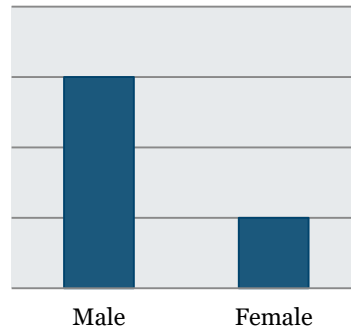


## Visitor profile;

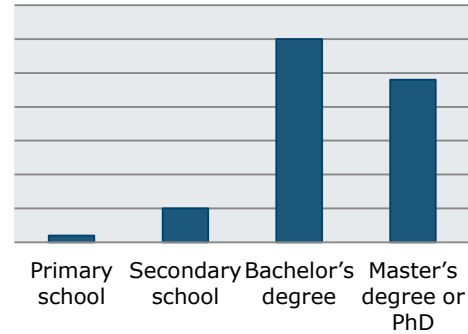
**Age**



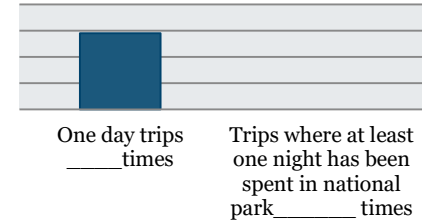
**Gender**



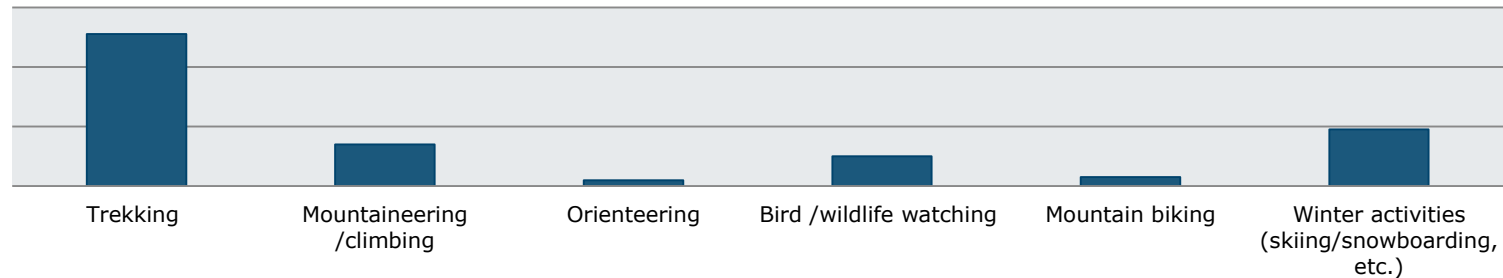
**Education level**



**How many times have you visited this national park, during the last 12 months?**



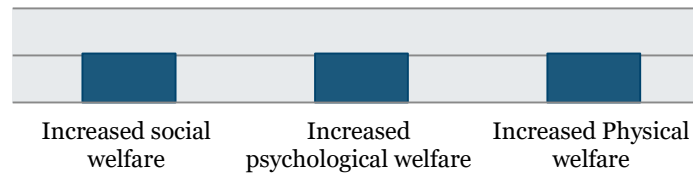
**Which activities have you done at Sierra de Guadarrama National Park?**



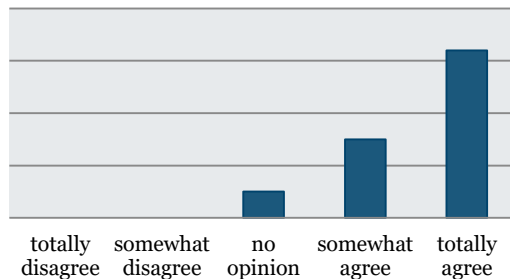
**Evaluation of Sierra de Guadarrama National Park visitor surveys;**

## Visitors opinion on how did this visit to National Park influences the state of their health and well-being;

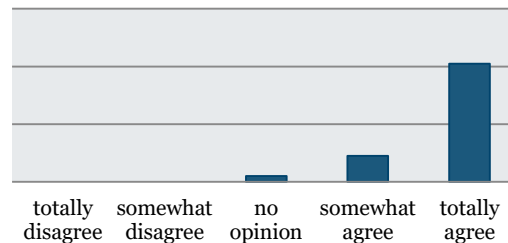
How did this visit to Sierra de Guadarrama National Park influences the state of your health and well-being in the following sectors?



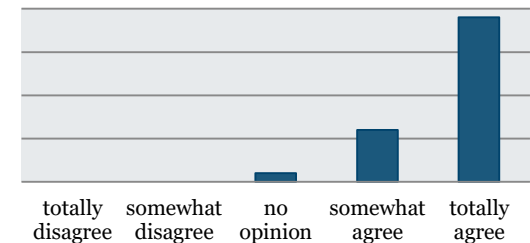
### Increased social welfare



### Increased psychological welfare



### Increased Physical welfare



## Evaluation of Sierra de Guadarrama National Park visitor surveys;

In 1990's the **spread of the Norway spruce bark beetle** has dramatically altered the forests of the Bayerischer Wald National Park.

After the die-back of the old stands in the National Park, it was questioned whether **regeneration of the forest would be able proceed at all**.

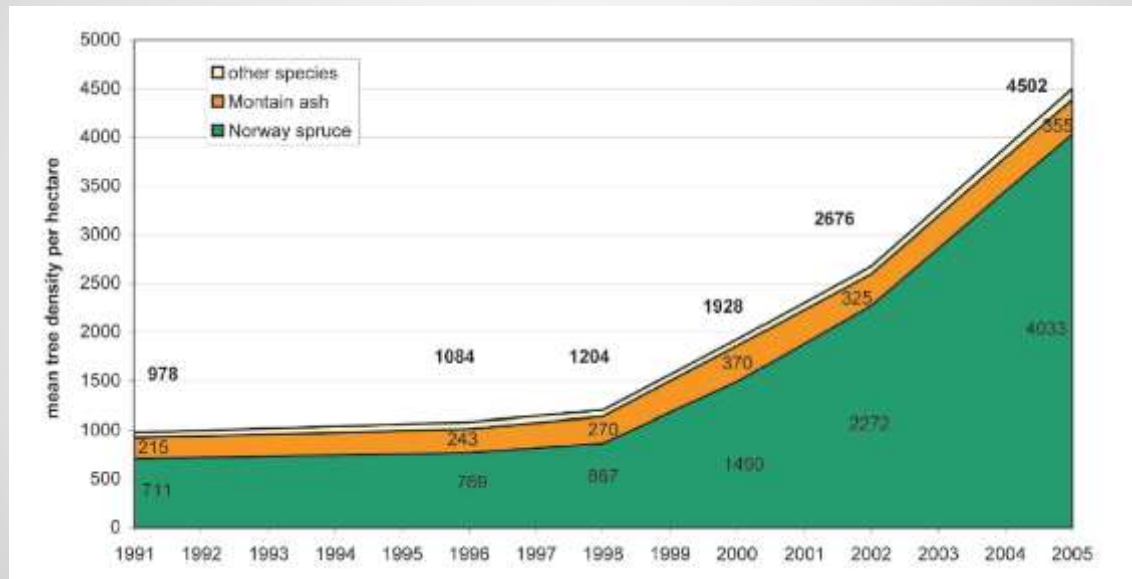
Consequently the guiding principle selected for Bayerischer Wald National Park was "**let nature be nature**".

By this philosophy, the forest with its bogs, mountain streams and summits may develop into **a limitless forest wilderness according to its very own laws**.

**Details of Restoration Activities in Bayerischer Wald National Park;**

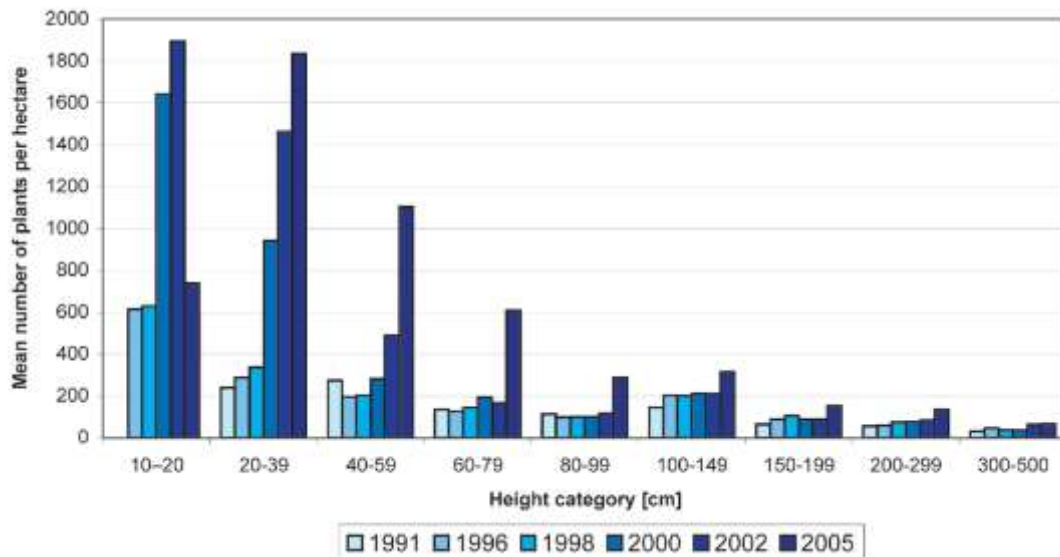


Development of **regeneration density for the trees** taller than 20 cm;



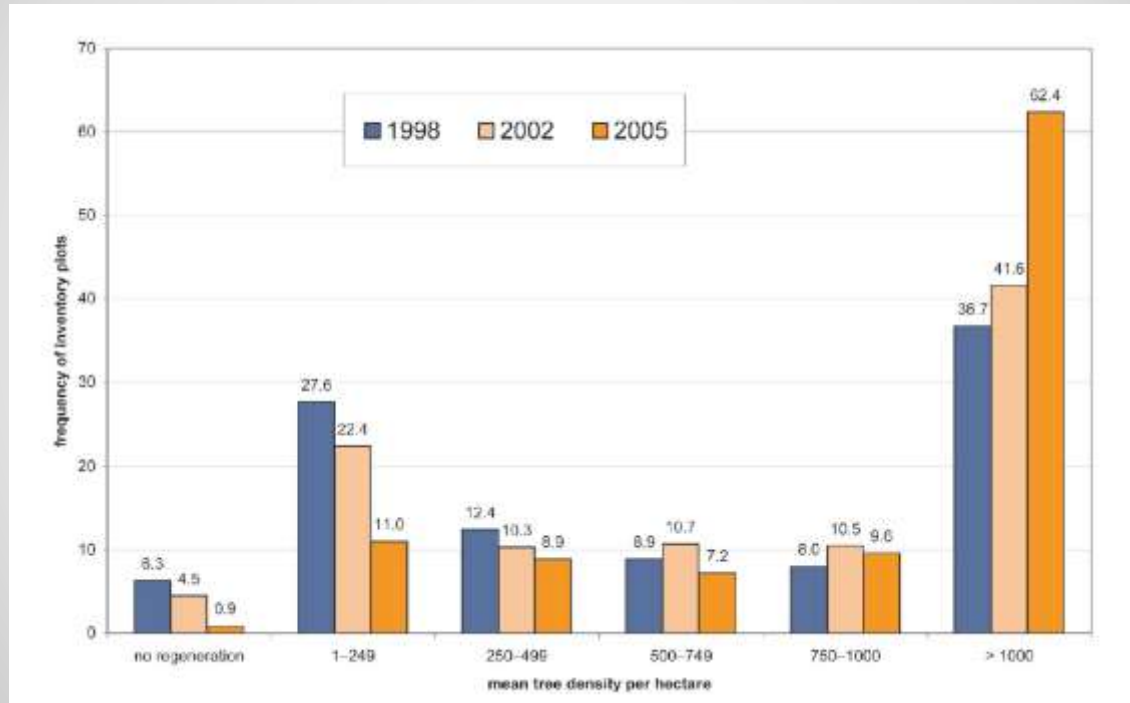
**Development of ecosystem health indicators for Bayerischer Wald National Park;**

## Development of of height composition in the forest regeneration



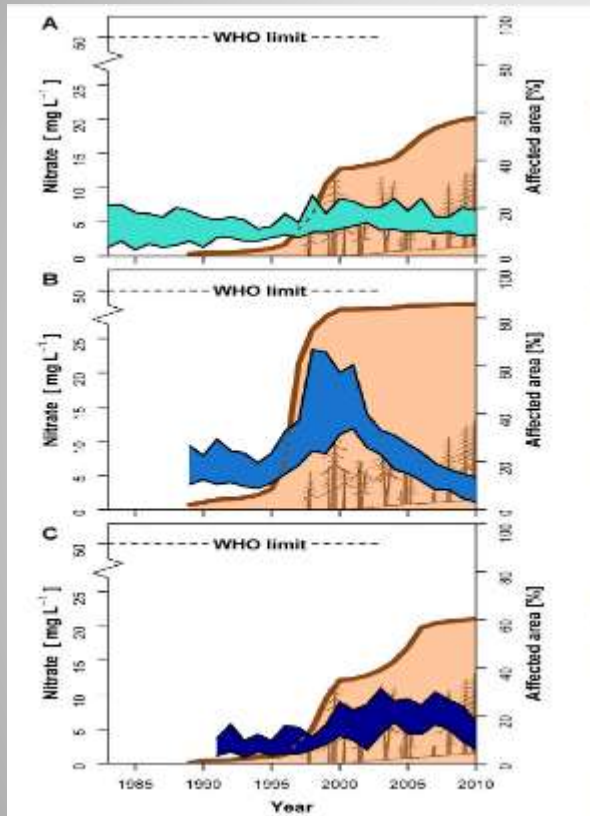
**Development of ecosystem health indicators for Bayerischer Wald National Park;**

Frequency distribution of **regeneration density** in the sample plots;



**Development of ecosystem health indicators  
for Bayerischer Wald National Park;**

## Times series of bark beetle-affected areas and nitrate concentrations.



**Brown shaded area:** cumulative percentage of bark beetle-affected areas of each catchment,

**Blue colored area:** the respective annual ranges of nitrate concentrations in runoff water.

A: Large catchment (Große Ohe), significant increase (GLS) with cumulative beetle area with ( $t = 2.59^*$ ) and without ( $t = 2.26^*$ ) temporal autocorrelation.

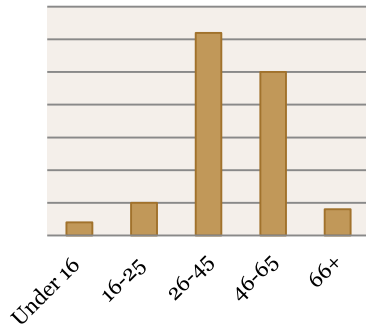
B, Medium subcatchment (Markungsgraben), significant increase with cumulative beetle area with ( $t = 2.84^*$ ) and without ( $t = 5.84^{***}$ ) temporal autocorrelation.

C, Small subcatchment (Forellenbach), significant increase with annual affected area without temporal autocorrelation ( $t = 2.22^*$ ).

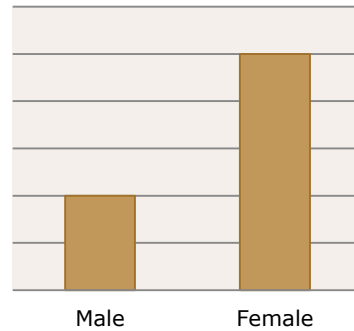
## Development of ecosystem health indicators for Bayerischer Wald National Park;

## Visitor profile;

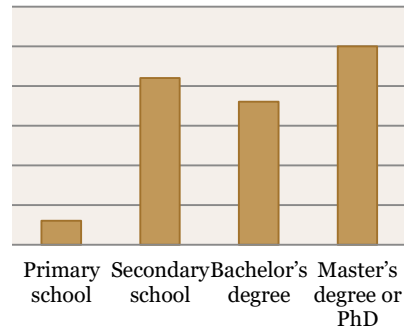
**Age**



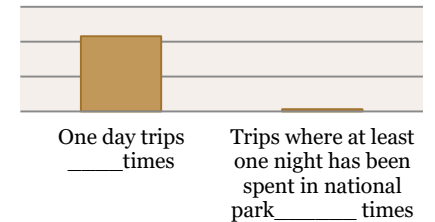
**Gender**



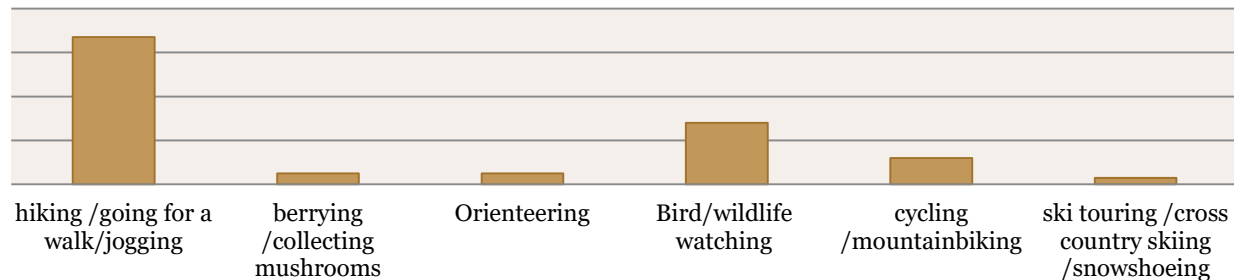
**Education level**



**How many times have you visited this national park, during the last 12 months?**



**Which activities have you done at Bayerischer Wald National Park?**

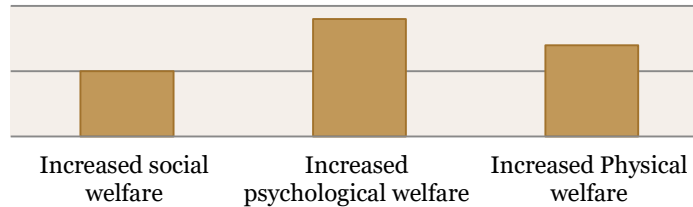


**Evaluation of Sierra de Bayerischer Wald National Park; visitor surveys;**

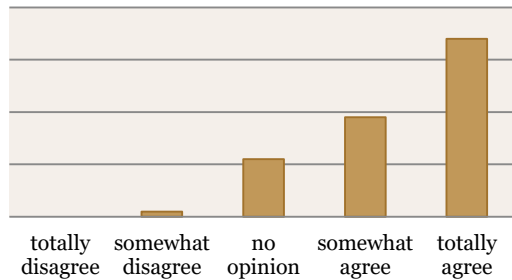


## Visitors opinion on how did this visit to National Park influences the state of their health and well-being;

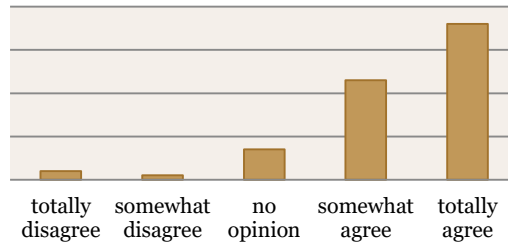
How did this visit to Bayerischer Wald National Park influences the state of your health and well-being in the following sectors?



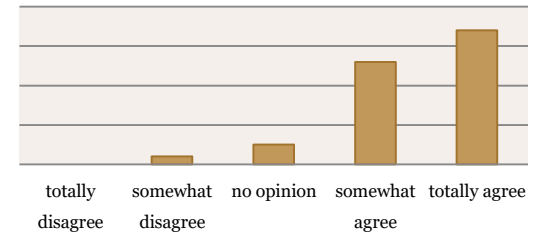
### Increased social welfare



### Increased psychological welfare



### Increased physical welfare



## Evaluation of Sierra de Bayerischer Wald National Park; visitor surveys;

- The aim of the research project was **bringing together ecosystem health and human health within the scope of ecological restoration in protected areas.**
- 
- Results of ecological monitoring programs shows that ecological restoration in protected areas restoration **enables recovery of a healthy eco-system through ecosystem management.**
- According to evaluation of visitor surveys it also **supports societal goals such as human health and wellbeing.**
- Visitors **feel socially, psychologically and physically healthier in restored protected areas.**



**Conclusion ;**



**Many thanks for listening...**