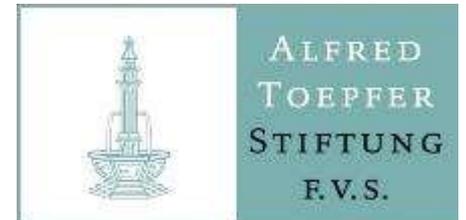


Ecological Restoration both for Ecological Health and Human Health

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EUROPARC Alfred Toepfer Natural Heritage Scholar



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

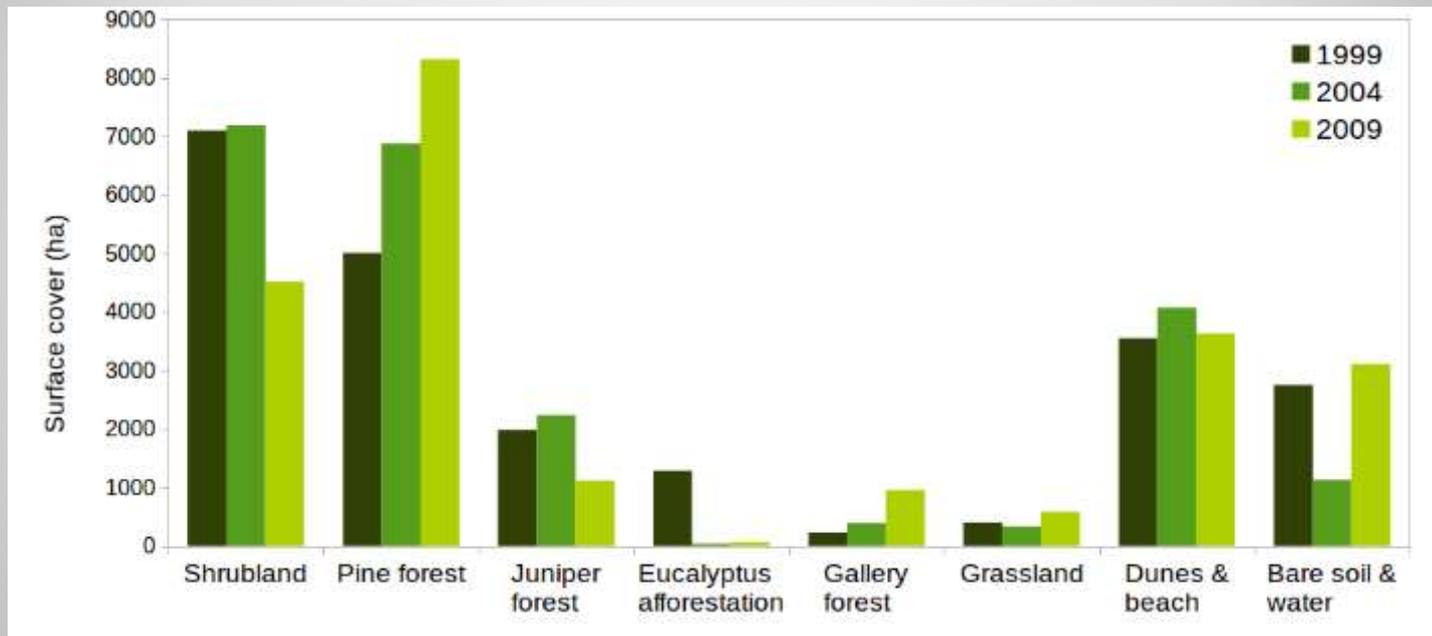
Main interventions of hydrological restoration in the Doñana National Park - 1973-1998.

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	Traveso 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;

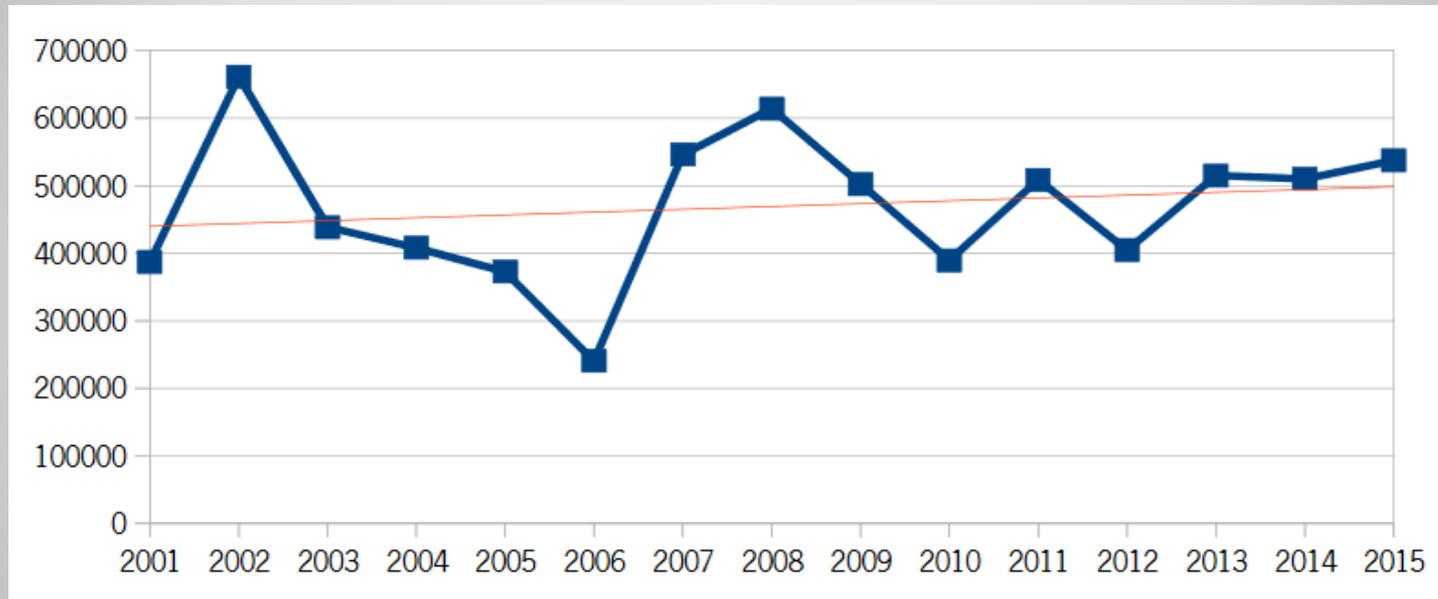
Changes in the **cover of terrestrial vegetation** at the Doñana National Park between 1999 and 2009;



Development of ecosystem health indicators for Doñana National Park;

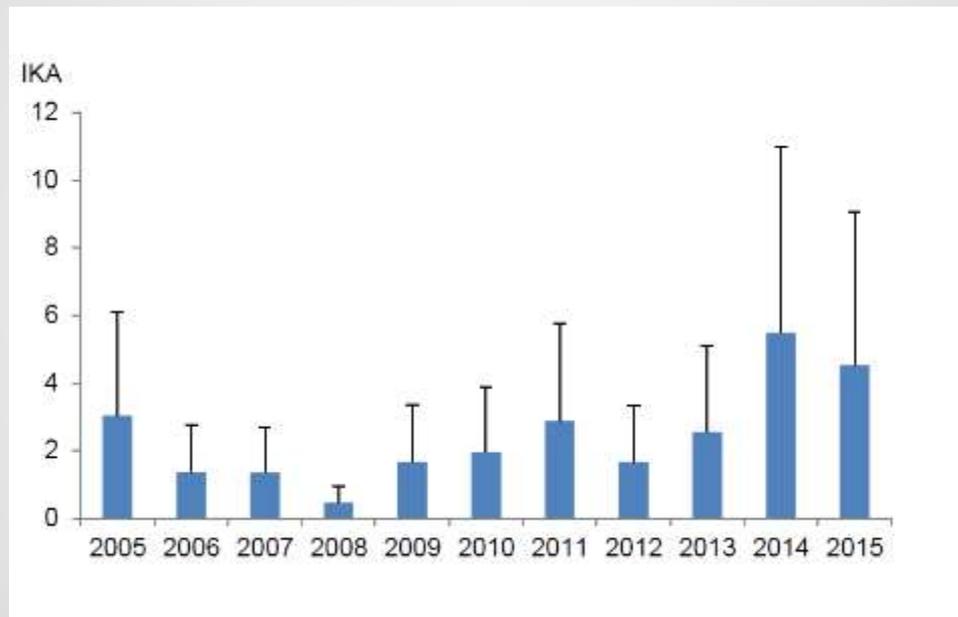
Abundances of **common waterbird** and other **non-passerine species** present in the Doñana wetlands.

;



Development of ecosystem health indicators for Doñana National Park;

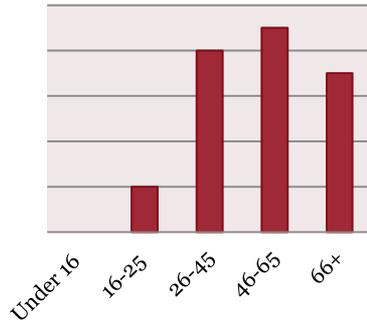
Relative **abundance** (IKA: number of individuals observed per kilometer) of **red deer**



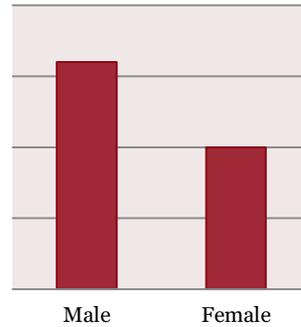
Development of ecosystem health indicators for Doñana National Park;

Visitor profile;

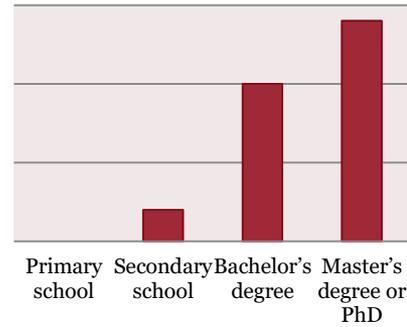
Age



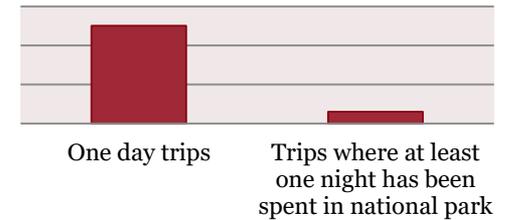
Gender



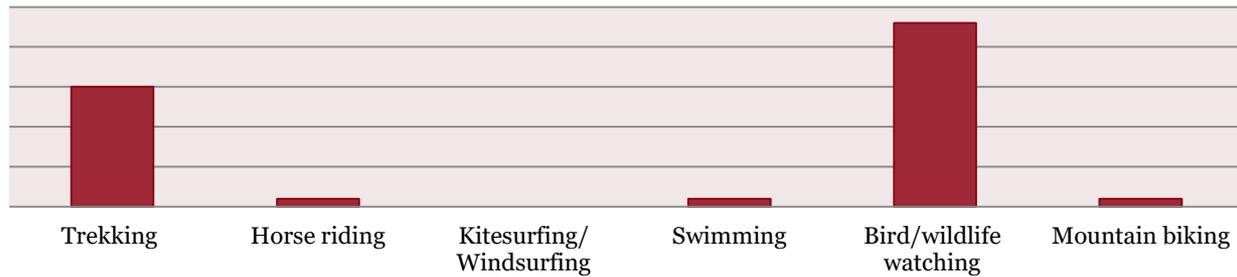
Education level



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



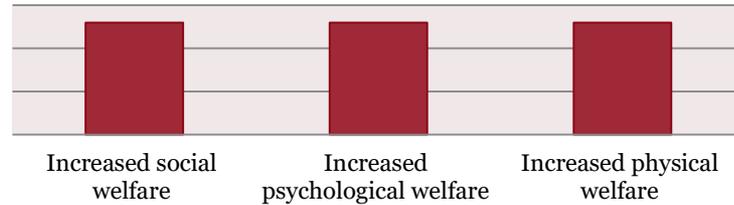
Which activities have you done at Doñana National Park?



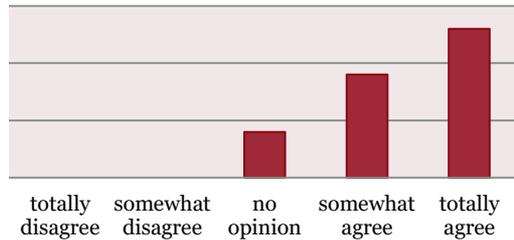
Evaluation of Doñana National Park visitor surveys;

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

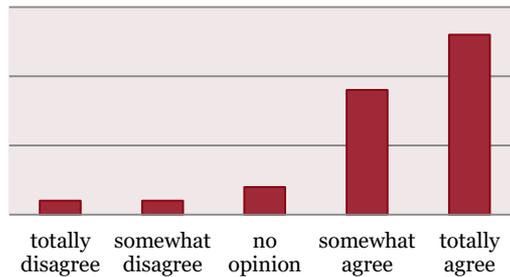
How did this visit to Doñana National Park influences the state of your health and well-being in the following sectors?



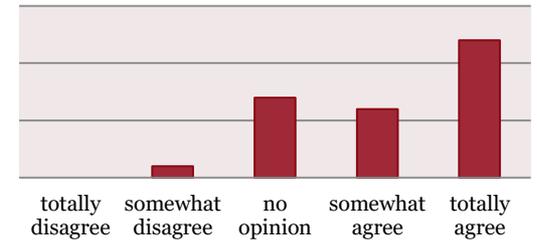
Increased psychological welfare



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.

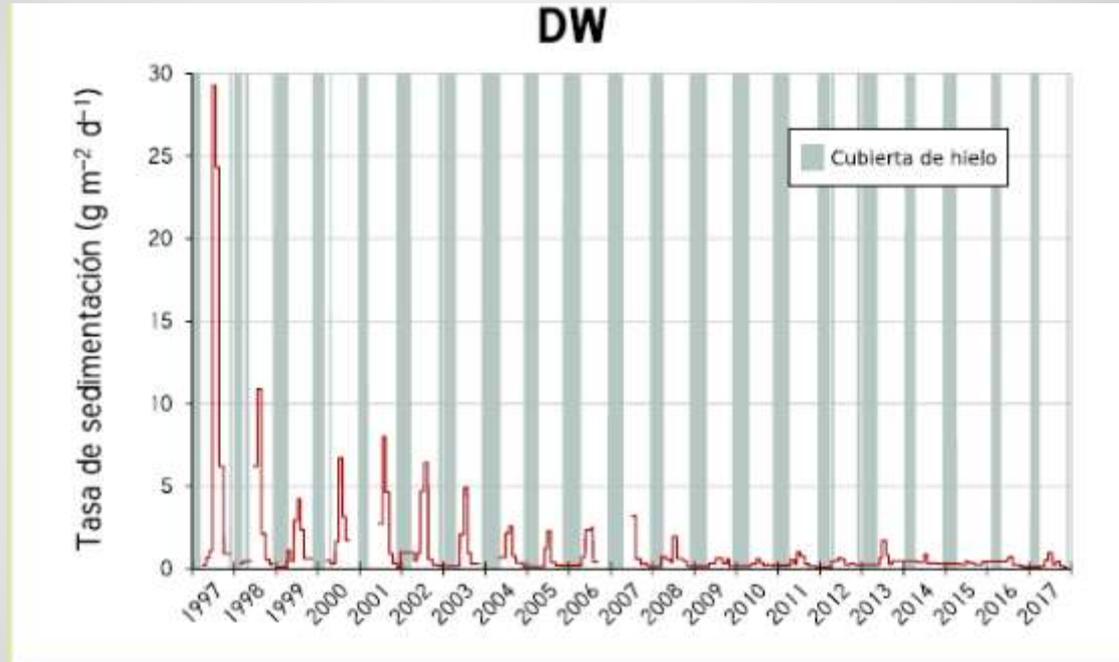
Details of Restoration Activities in Sierra de Guadarrama National Park;

Development of **forest regeneration**



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

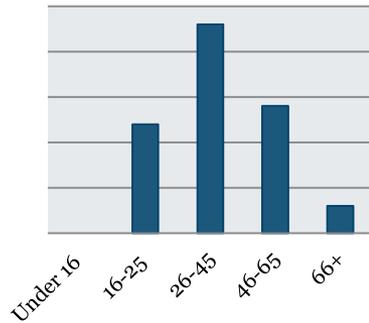
Decrease in **sedimentation**;



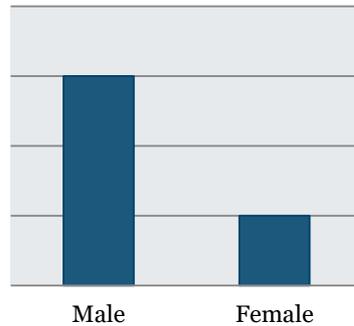
Development of ecosystem health indicators for Sierra de Guadarrama National Park;

Visitor profile;

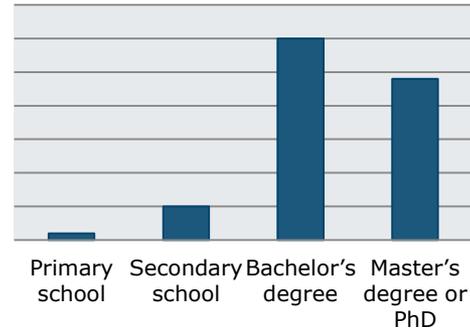
Age



Gender



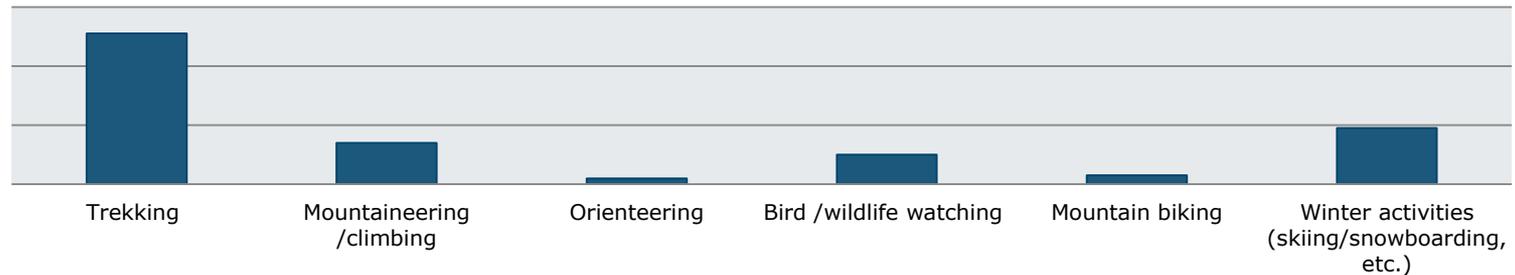
Education level



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



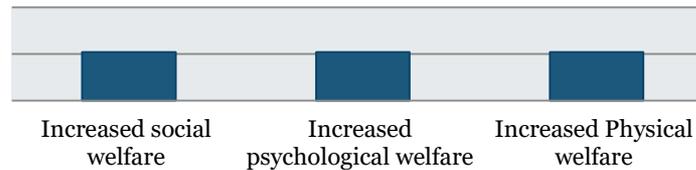
Which activities have you done at Sierra de Guadarrama National Park?



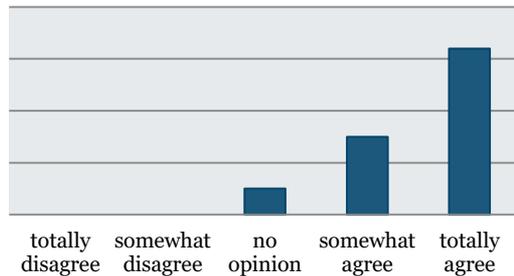
Evaluation of Sierra de Guadarrama National Park visitor surveys;

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

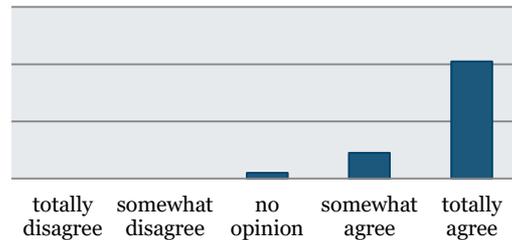
How did this visit to Sierra de Guadarrama National Park influences the state of your health and well-being in the following sectors?



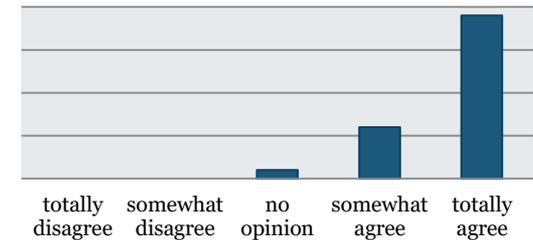
Increased social welfare



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.

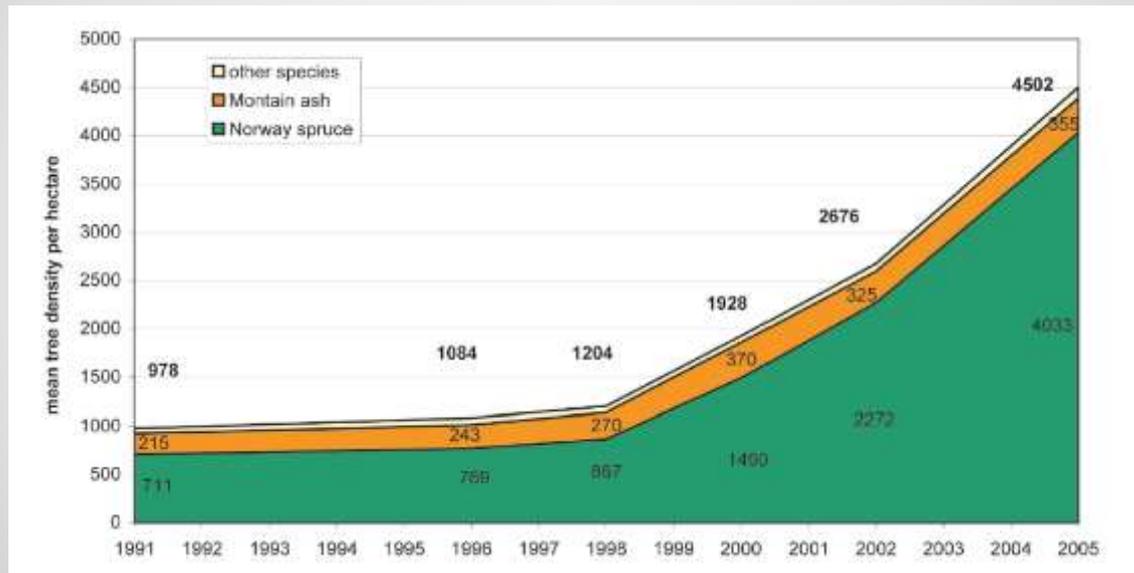
After the die-back of the old stands in the National Park, it was questioned whether **regeneration of the forest would be able proceed at all.**

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.**

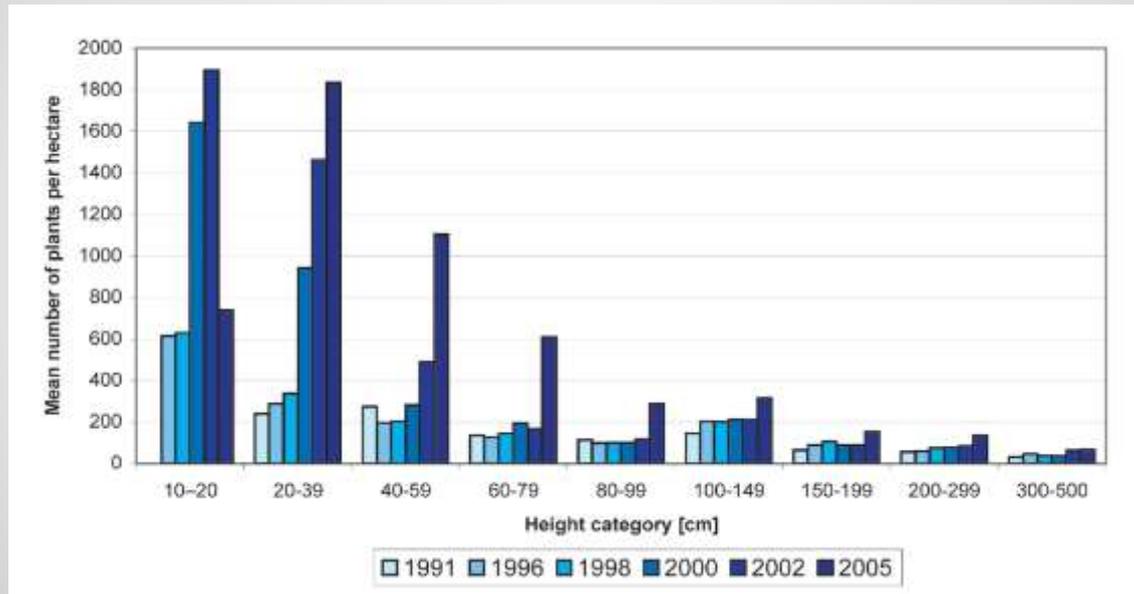
Details of Restoration Activities in Bayerischer Wald National Park;

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



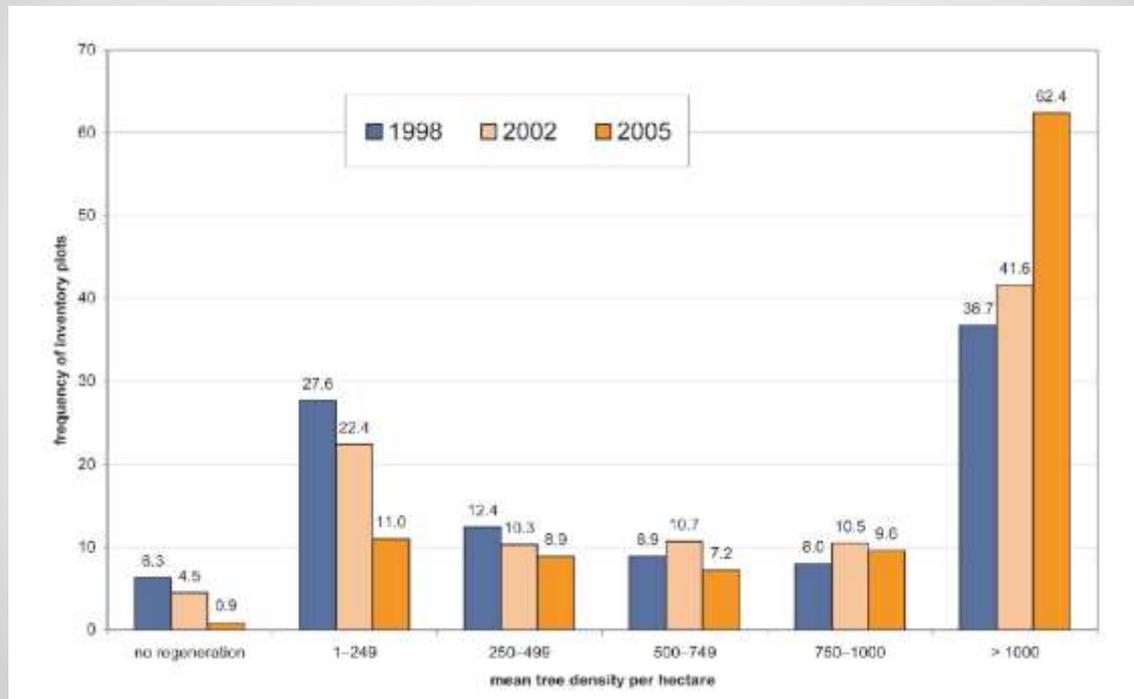
Development of ecosystem health indicators for Bayerischer Wald National Park;

Development of of height composition in the forest regeneration



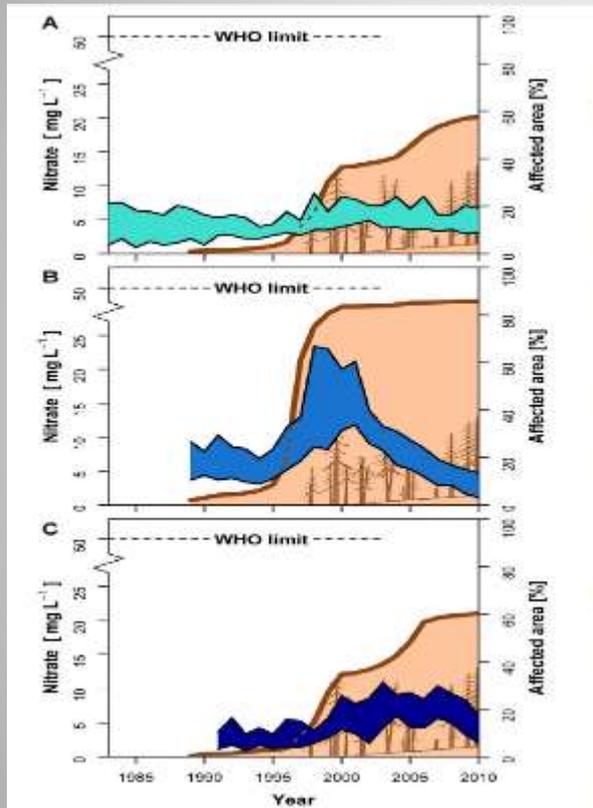
Development of ecosystem health indicators for Bayerischer Wald National Park;

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.

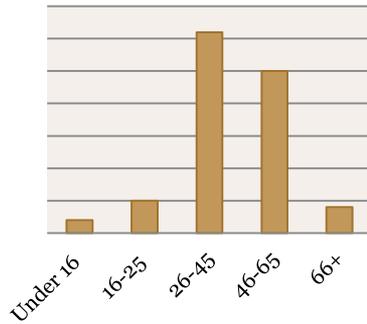
B, Medium subcatchment (Markungsgraben), significant increase with cumulative beetle area with ($t = 2.84^*$) and without ($t=5.84^{***}$) temporal autocorrelation.

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

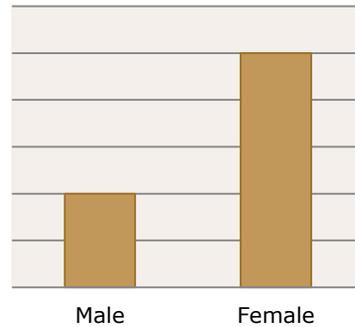
Development of ecosystem health indicators for Bayerischer Wald National Park;

Visitor profile;

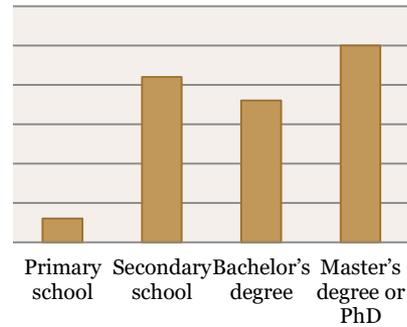
Age



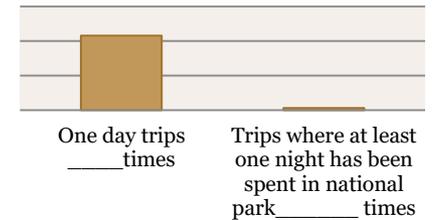
Gender



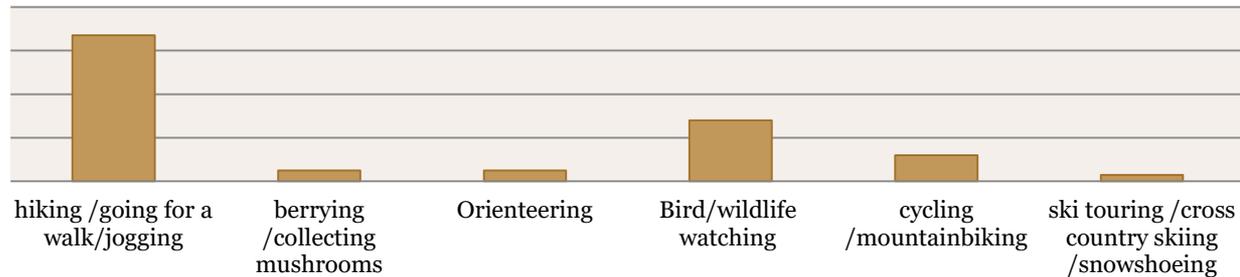
Education level



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



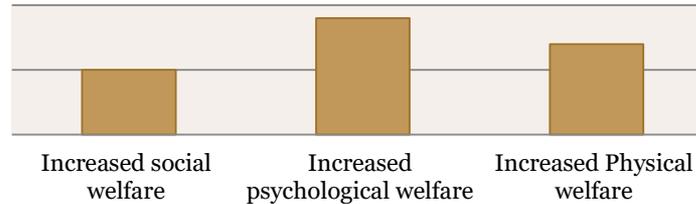
Which activities have you done at Bayerischer Wald National Park?



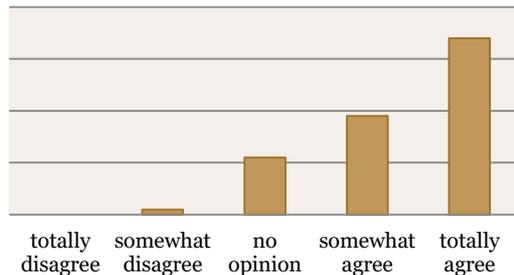
Evaluation of Sierra de Bayerischer Wald National Park; visitor surveys;

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

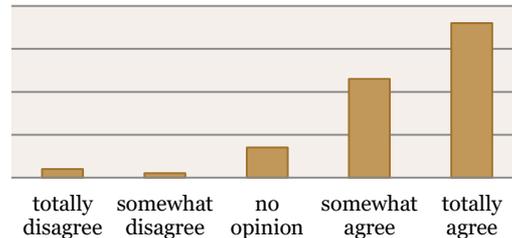
How did this visit to Bayerischer Wald National Park influences the state of your health and well-being in the following sectors?



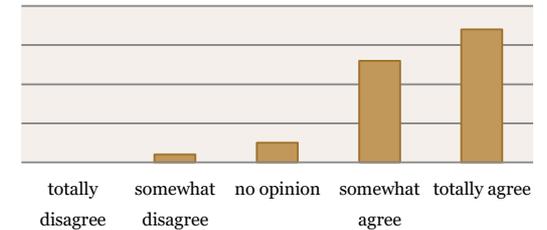
Increased social welfare



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...