# On the scenic value of alpine rivers

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## perceptional judgements and stated preferences of river recreationists in Austrian case studies

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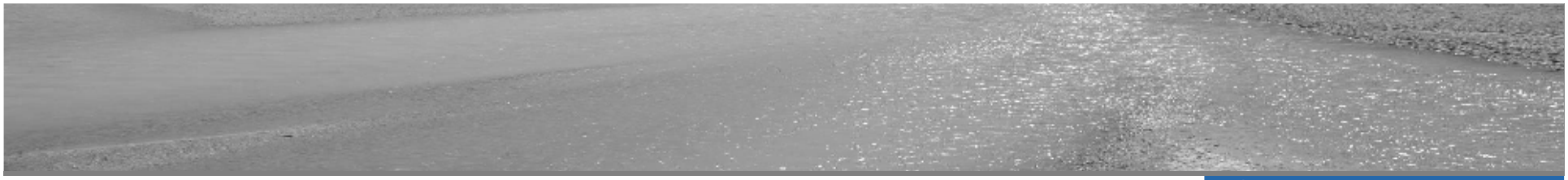
# Content

- Ecological River Management
- Integrated management concepts
- The scenic value of rivers
- Case studies in Austria
- Résumé



# Ecological River Management

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Diverse impacts led to reduced ecological integrity

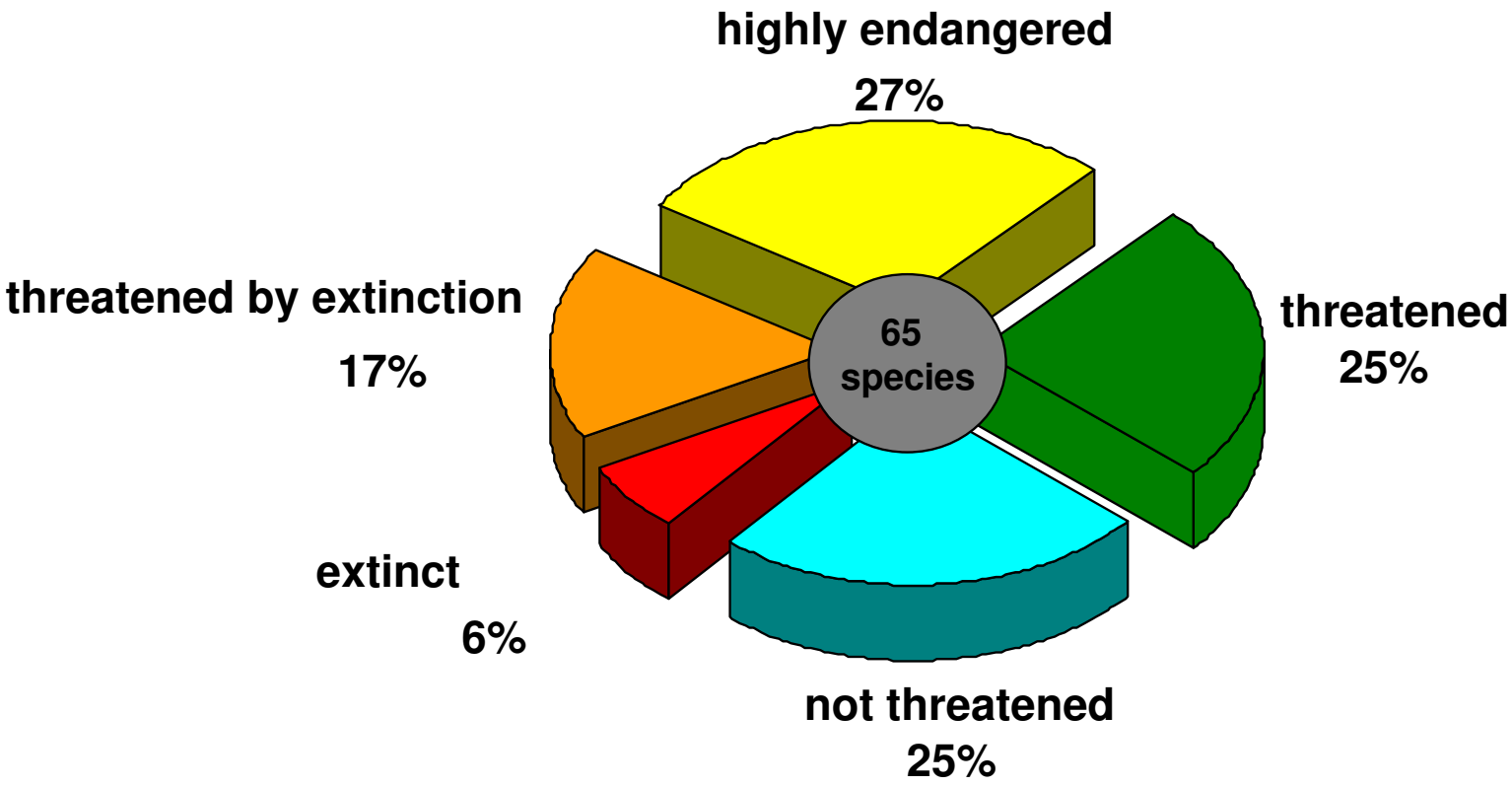
- Regulation
- Damming and hydro power production
- Gains of arable land
- Flood protection measures
- Water abstraction
- Dredging

…

# Ecological River Management – need for action

***Red List: Fish fauna of Austria***

(Wolfram G. & E. Mikschi, 2007)



# Ecological River Management - legal requirements

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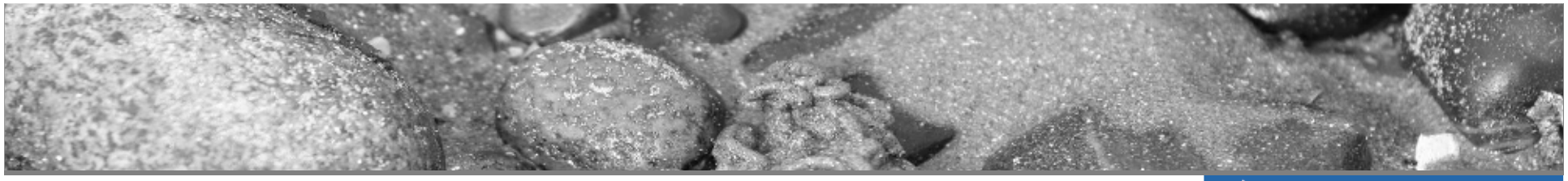
- EU **Water framework directive** (2000)
  good surface water status by 2015 + prevent deterioration



# Ecological River Management - legal requirements

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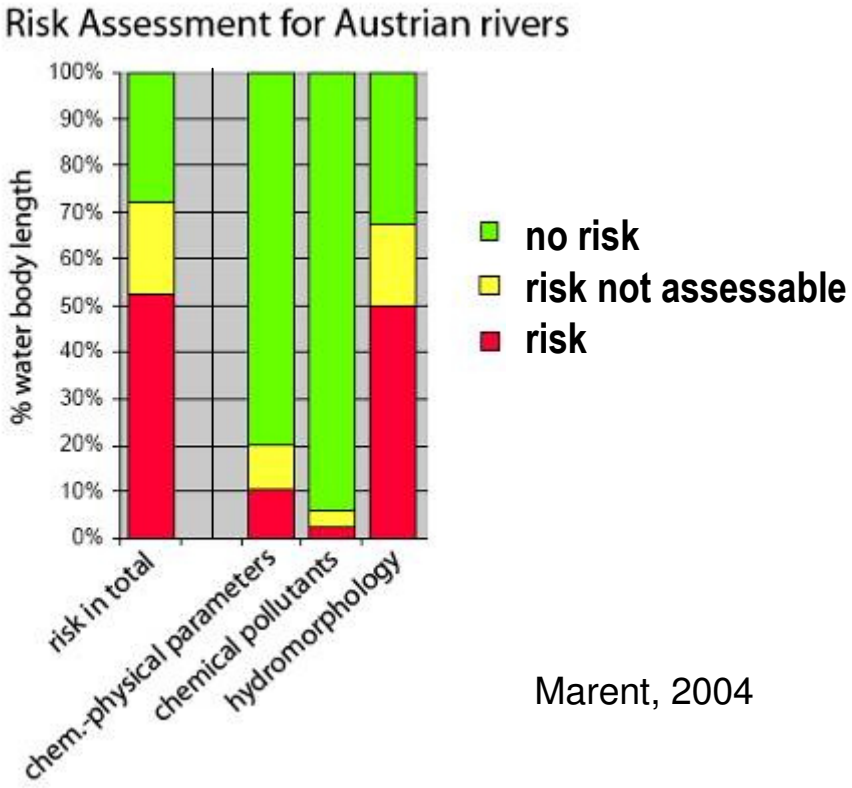
  good surface water status by 2015 + prevent deterioration

Main challenge in Austria:

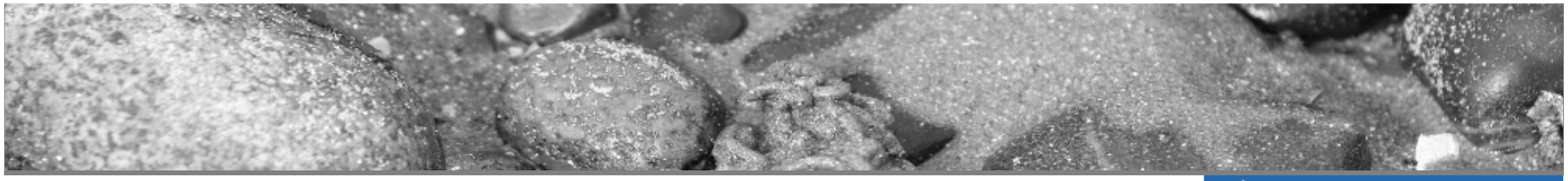
**hydromorphological deficits**

-> Reduced ecological integrity

-> Reduced social functionality




Marent, 2004



# Ecological River Management - legal requirements

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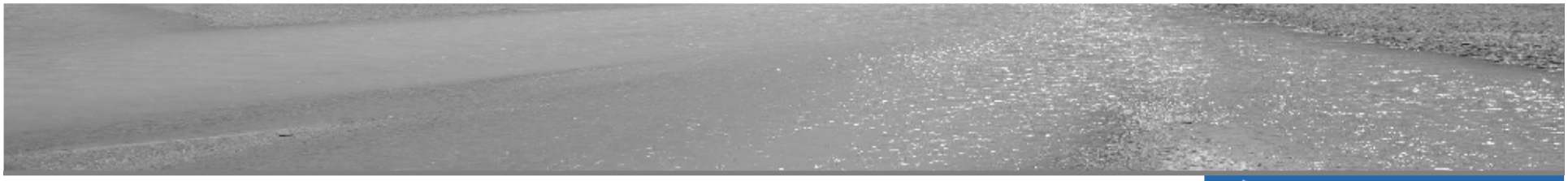
- **EU Water framework directive** (2000)
  good surface water status by 2015 + prevent deterioration

- **EU Habitats directive** (1992) + **Birds directive** (1979)
  favorable conservation status (species and habitats)

- **Austrian Water Law Act** (1959)
  „One function of public waters is to provide recreational opportunities“
  „It is allowed to swim, wash, water animals […] in public waters“



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# How to get there?

## River Restoration

- …… to *re-establish predisturbance aquatic functions* and related physical, chemical, and biological characteristics".

(National Research Council, 1992)

- ……. maintaining or *restoring the key processes* that enable riverfloodplain systems to maintain, repair and regenerate themselves. (Sparks,1995)

## River Rehabilitation

- …...attempts to *partially restore* or *simulate* processes, structures or other features of the former natural system.

(Henry & Amoros,1995)

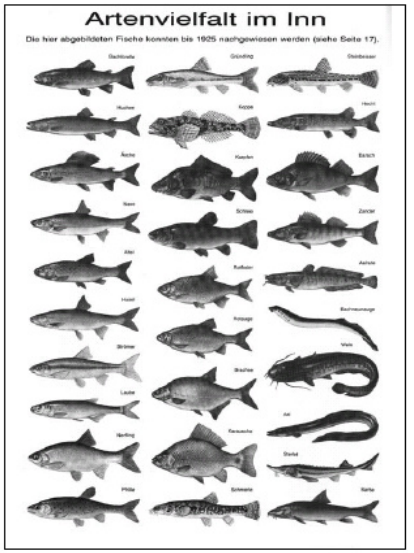
# How to get there?

## „Leitbild“- Concept (target view)

(Kern 1992, Muhar 1996)

- “Leitbild” as ‘ideal’ target (pristine, undisturbed condition) relating to the natural potential of a river system without economic or political constraints
- “Leitbild” core issue for planning and evaluating restoration projects

Leitbild specification based on historical abiotic/biotic data




Muhar 2009

# „Leitbild“-Concept

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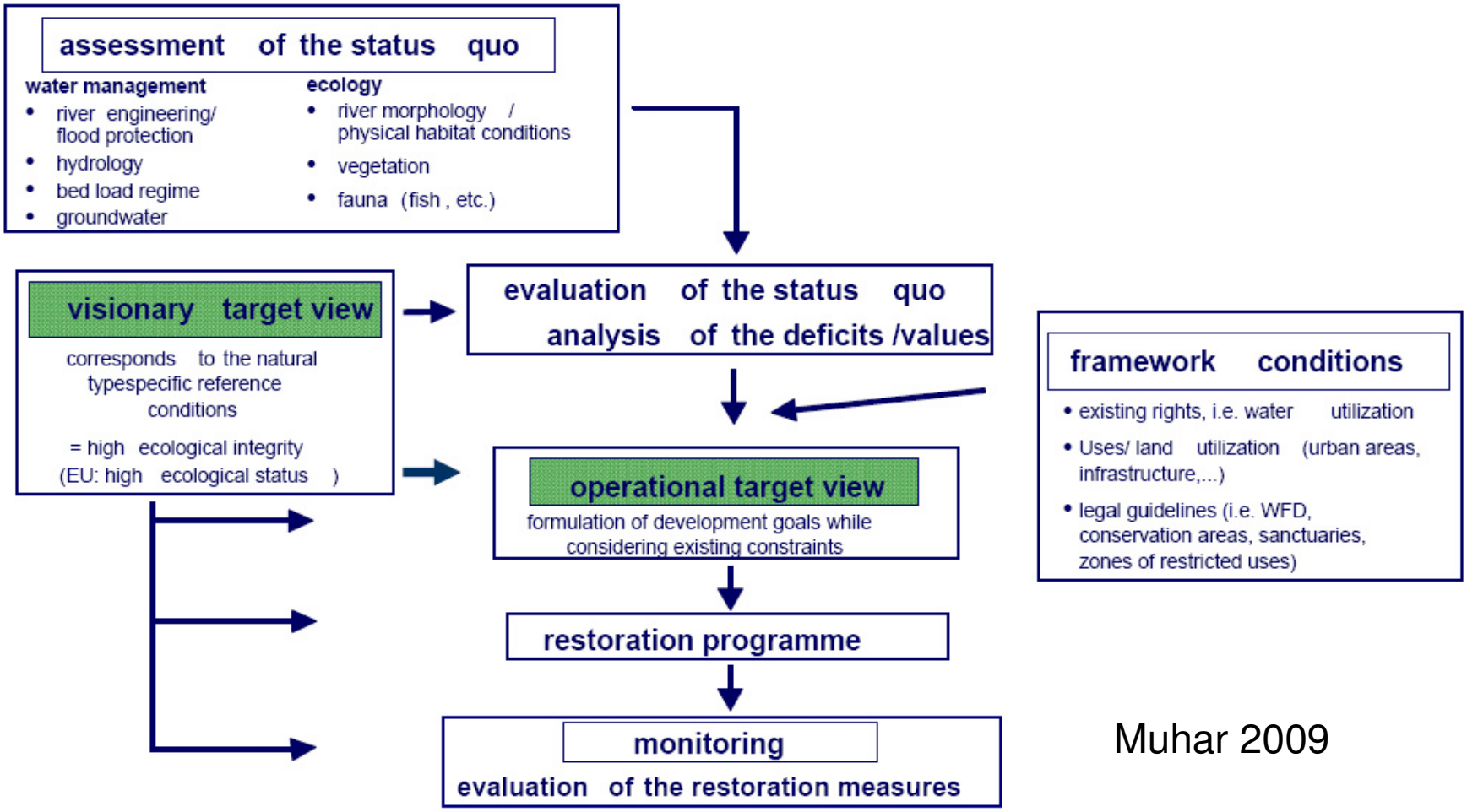


Muhar 2009

# Concepts toward integrated management practices

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**Aquatic Ecosystem services**
Millenium Ecosytem Assessment 2005

- Provisioning services
- Regulating services
- Cultural services
  - Aesthetic value
  - Recreation
  - Educational value
  - Spiritual / inspirational value
- Supporting services

**Functions, goods and services**
De Groot et al 2006, Costanza 1997

- Production functions
- Regulation functions
- Information functions
  - Aesthetic information
  - Recreation / eco-tourism
  - Cultural / artistic information
  - Spiritual / historic information
  - Science / education
- Habitat functions
- Carrier functions





# Concepts toward integrated management practices

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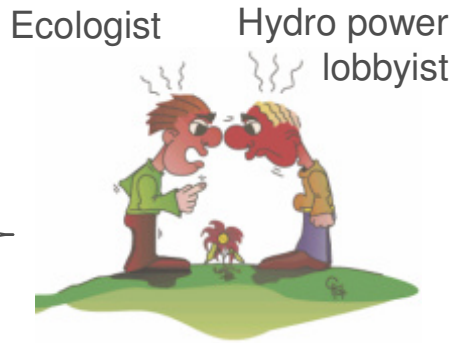
## Three pilar structure of Management values

| Economic values | Social values | Ecological values |
|---|---|---|
| (Reclamation of land) | Recreation | Ecolog. Integrity |
| Electricity production | Identification | Conservation value |
| Flood protection | Scenic value | … |
| Fisheries | … | |
| Tourism | | |
| … | | |

No matter which concept we apply….




…there will be conflicting demands

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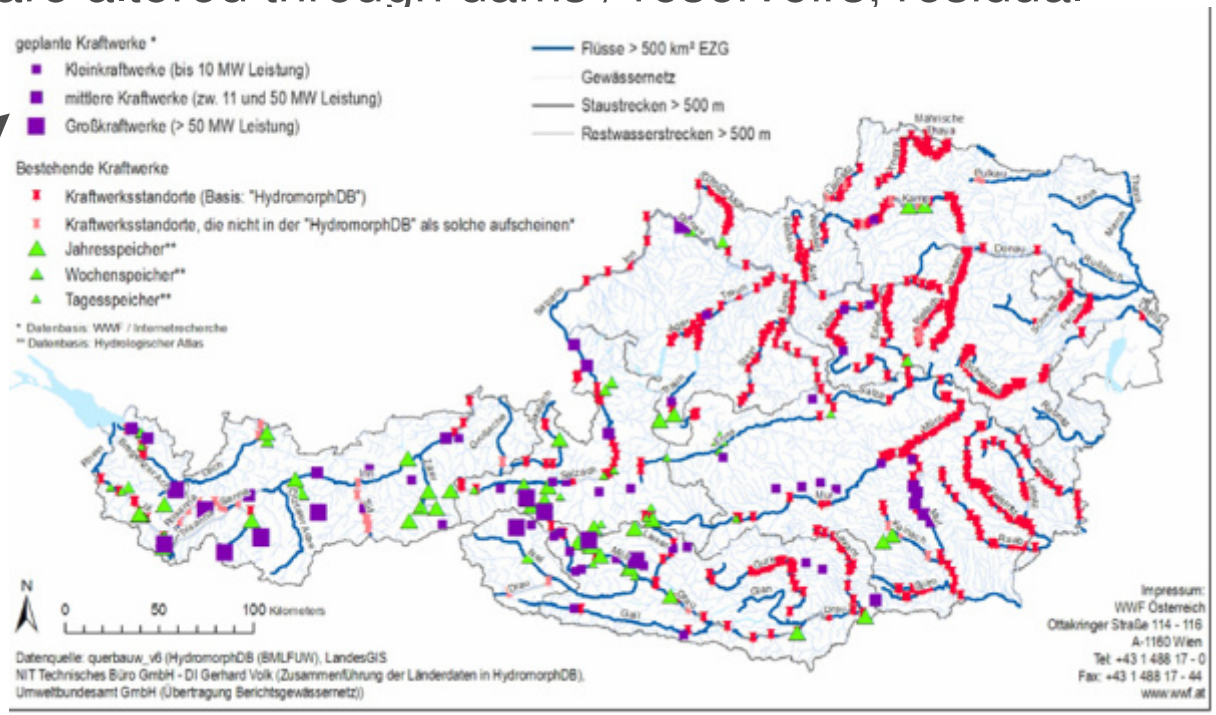
# Conflicting demands in Austria

## Hydropower vs. Ecology

- in Austria **75 % of the total potential to gain hydro power is already used**
- ca. 80 % of rivers degraded due to regulations or power production
- ca. 30 % of the rivers are altered through dams / reservoirs, residual flow

Projected power plants

Existing power plants




(WWF, 2010
„Ökomasterplan“)

# Conflicting demands in Austria: Recreation vs. Ecology

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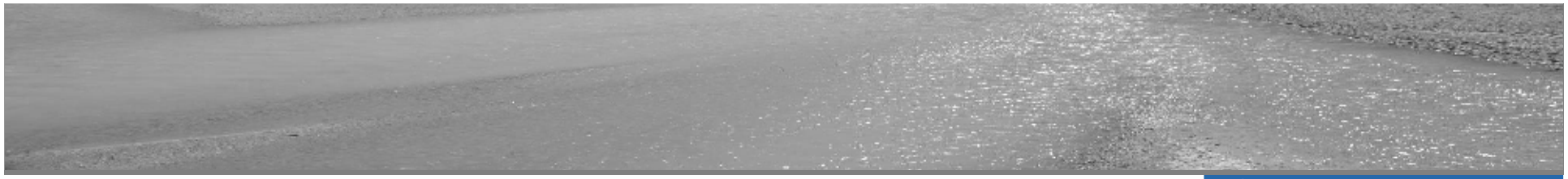
**Reduced social and ecological functionality**

- Regulation, damming, fragmentation…
  -> only few rivers still provide attractive recreational use options
- Close-to-nature and restored sites popular for recreational use
- Often recreational use not considered in planning processes
- Use concentration in areas restored for ecological purposes
- High levels of recreational use counteract ecological aims

➨ Need to understand use patterns and aesthetic preferences



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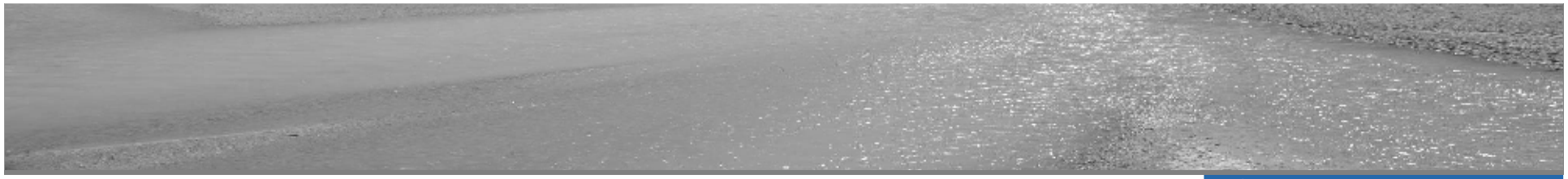
# Taking a closer look at scenic values

**Rivers provide unique recreational values:**

- **scenic beauty** of untamed riverscapes
- **acoustic scenery**: the sound of rushing water
- **haptic experience** when crossing the land-water boundary (Tunstall, 2001)
- wild, manipulable natural environments act as **adaptable play places** (Nicholson 1971, Greenman 1988, Matthews, 1995)



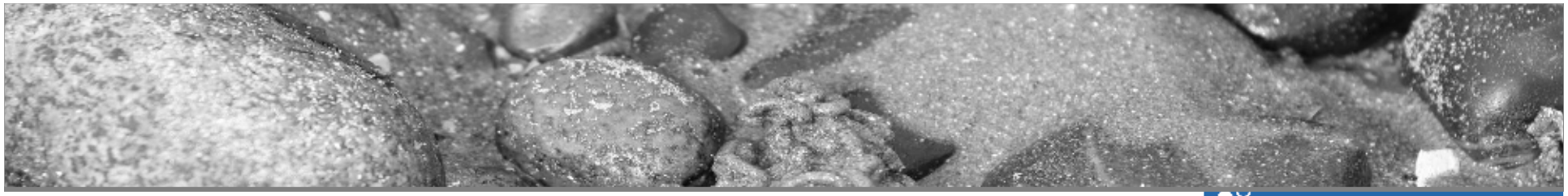
# What determines the perception of rivers?


**Type of activity pursued:**

- **"Wet" uses**
  e.g. traditional uses e.g. Boating, Angling, Swimming
- **Riverside uses**
  e.g. BBQ, picnicking, sunbathing, skimming stones…

"Many of the qualities that make riverscapes sought and appreciated are **available by the river's side**"

"Much of the enjoyment that waterscapes provide is **low in action**." (Kaplan 1977)



# What determines the perception of rivers?

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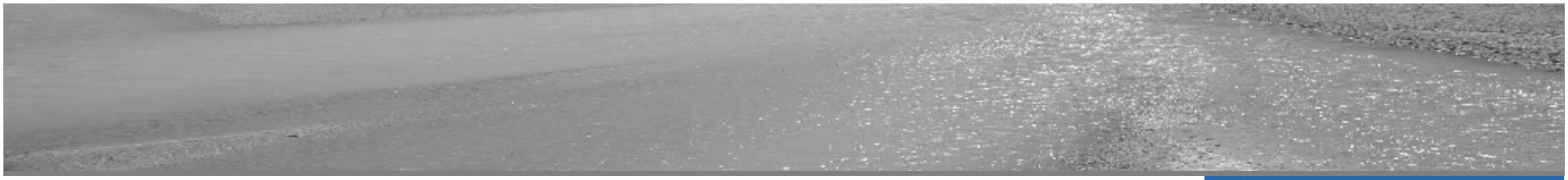
## Biophysical components

- **Water**
  - Flow level (Brown and Daniel 1991, Pflueger et al, 2011)
  - Water clarity and colour (Smith et al. 1995)
- **River Morphology / Percentage of Sediments exposed**
  - Sediments exposed(Pflueger et al, 2011)
- **Vegetation**
  - Genetic “preferencial” heritage: preference for scenes with trees / vegetation (Asakawa 2004, Ulrich 1986, Kaplan and Kaplan, 1989)
- **Woody debris**
  - Scenes with wood perceived less aesthetic, more natural and more dangerous (Piegay et al. 2005)

# Scenic value – what determines our perception

- **Security issues**
  e.g. perceived flood risk (Harashina et al. 1989)
- **Sense of orderliness** (Bulut et al. 2009, Kaplan & Kaplan 1989)
- **Sense of involvement** / **sense of mystery** (Kaplan 1977)
- **Perceived naturalness**
  (Junker & Buchecker 2008, Kaplan 1977)



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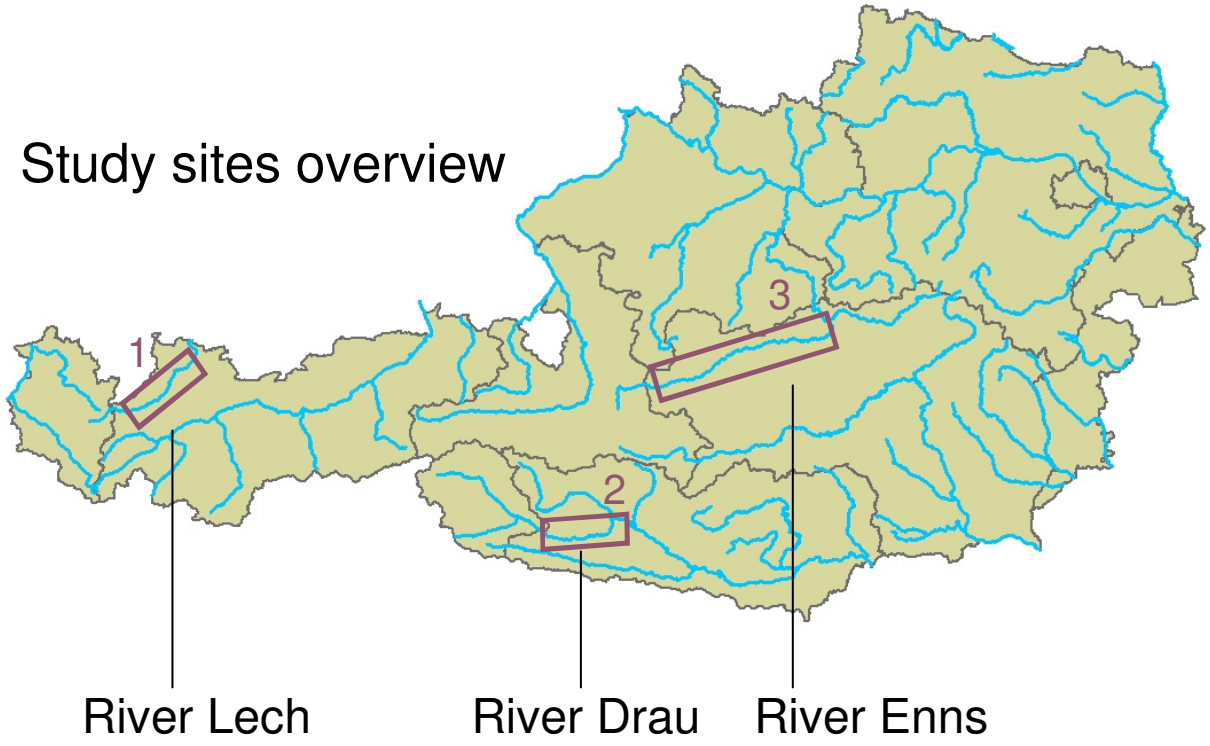
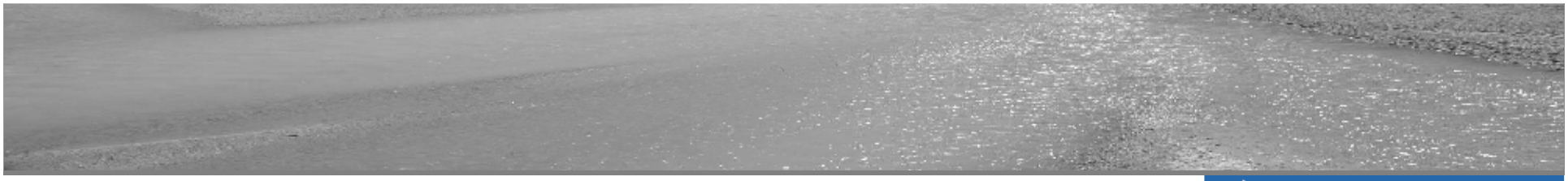
# Case studies in Austria

- Study on ***scenic and recreational value*** of alpine rivers
- Special regard to the added value of close-to-nature and restored sites: investigating **synergies** / **conflicts** between ecological and social functions





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# Case studies in Austria

**River Enns**

- Partly regulated
- Partly restored
- Partly Natura 2000 and Nationalpark-Area
- 5 power plants projected along the last free flowing section


# Case studies in Austria


**River Drau**

- Partly regulated
- Large-scale restoration measures realised (EU-LIFE-Projects)
- Natura 2000 area

## Case studies in Austria

**River Lech**

- Last remnant of a braiding river system
- Natura 2000 area
- LIFE-Project: Restoration measures
  (river widening, dam removal in the upper catchment etc.)

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# Study design

## Exploratory study

N: 46

Method: In depth interviews

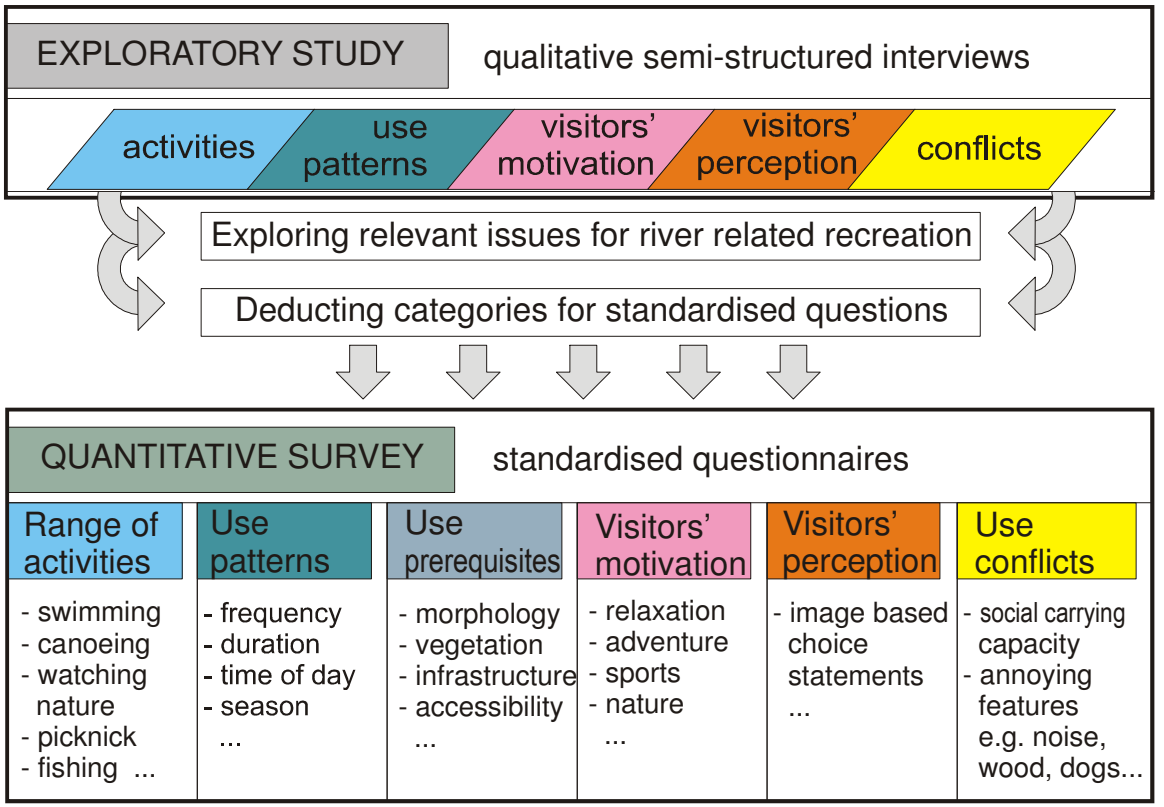
River: Enns

## Main study

N: 664

Method: semi-stand. survey
20 Questions +
6 Image evaluations

Rivers: Enns, Drau, Lech




Chiari et al. 2008

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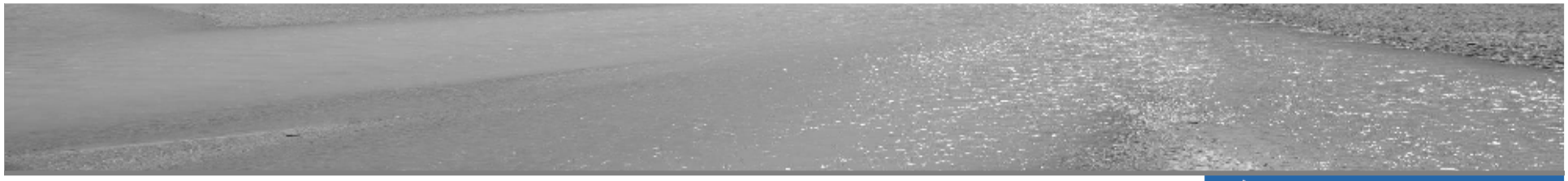
# Study design

On-site data collection:

- Visitors‘ interviewed while using the river
- Countings and direct observation to document use patterns



# Characterising river recreation

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