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Hydropower and Fish, 29-30 May 2017, Brussels

Strategic planning approach for new hydropower development in Austria

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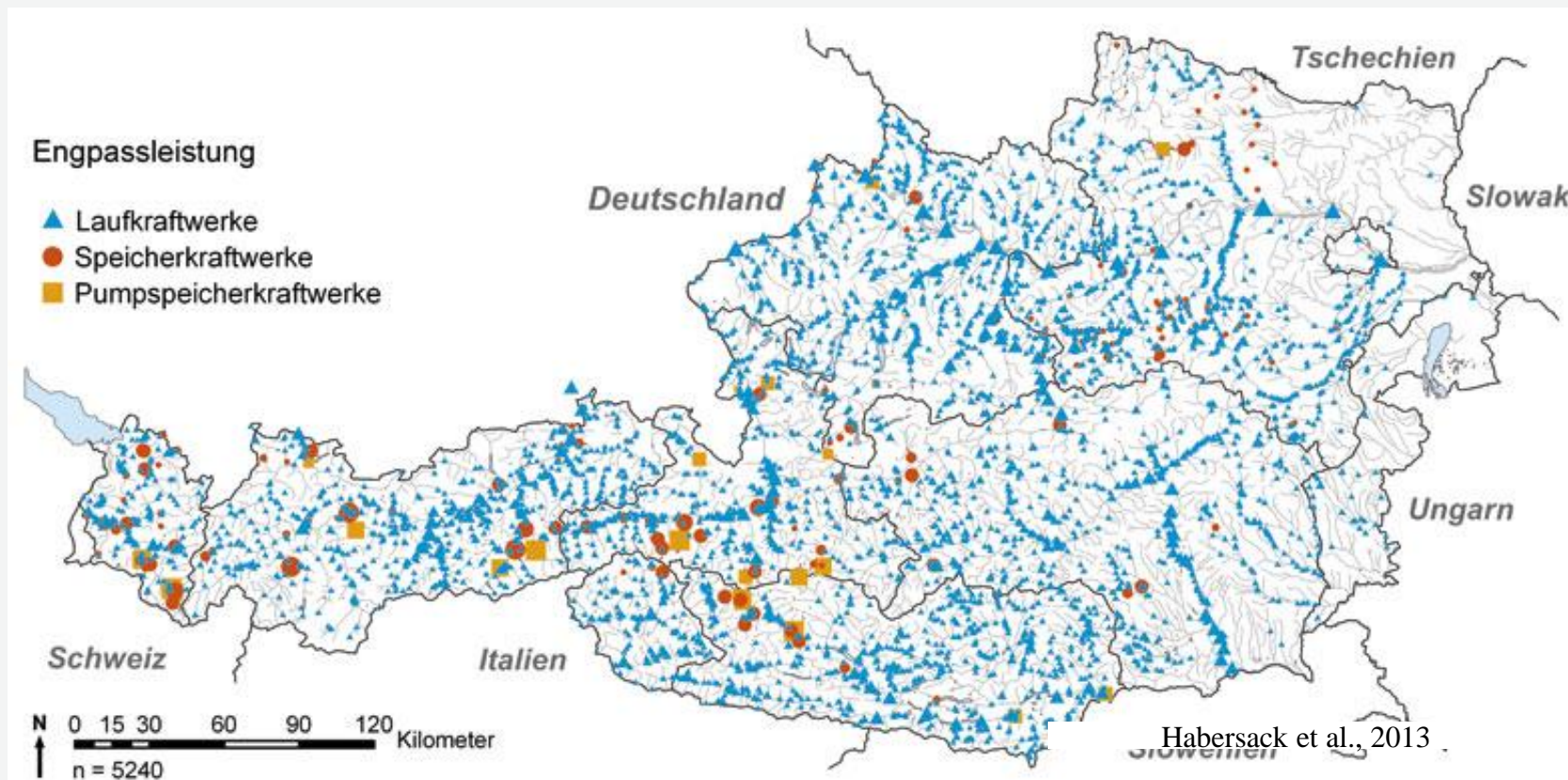
Hydropower in Austria

45.000 GWh

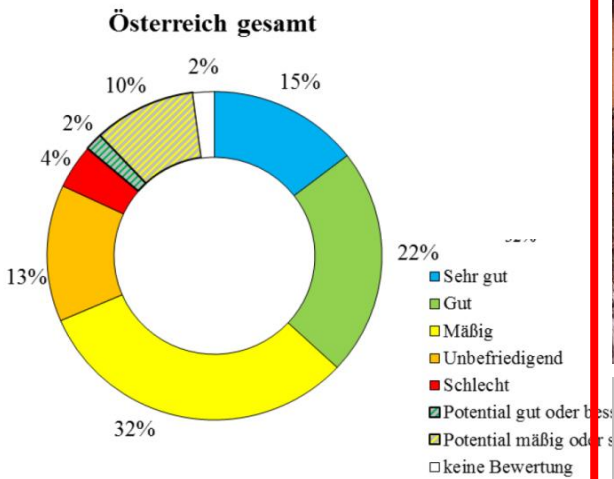
- 60% of national electricity demand
- 80% of potential already exploited

ca. 5 000 hp plants

>10 MW: 160
1-10 MW: 225
<10 MW: 4800



ECOLOGICAL STATUS 2015 - Responsible Pressures



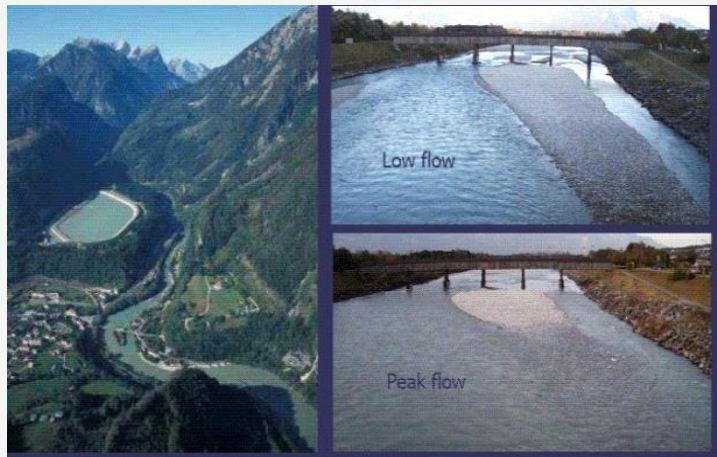
Migration barriers: 33.000 (1/km)
ca. 10% due to hydropower



Impoundments 4%



**Signif. morpholog.-
alterations: 30%**

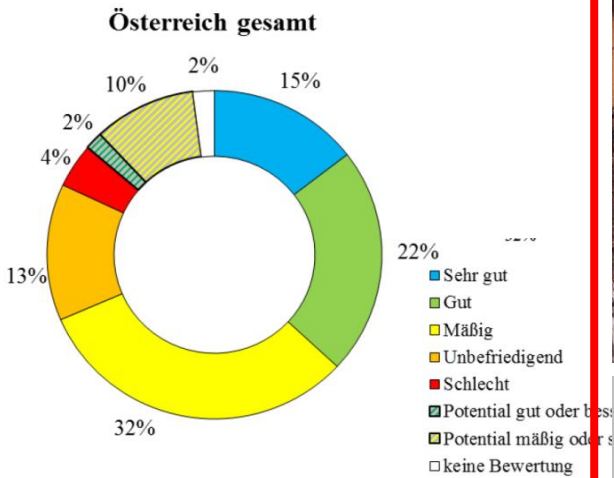


Rapid flow fluctuations: 1,6%



Missing Eflow: 10%

ECOLOGICAL STATUS 2015 - Responsible Pressures



**Signif. morpholog.-
alterations: 30%**

**Migra-
ca**

usually
most sensitive biological quality element

Rapid flow fluctuations: 1,6%

Missing Eflow: 10%



2/3 of the Austrian
fish species
are endangered

Mitigation climate change

- Increase hp generation to meet renewables goals

- **WFD environ. objectives**
- **FFH/ Nature 2000**
- **Biodiversity strategy**

Austrian Strategy for sustainable hydropower development

To minimise impacts on aquatic ecology

- Mandatory mitigation measures for new and existing hp plants

To boost hidden potential as win –wins

- Upgrading technical efficiency at existing plants and improving aquatic ecology at the same time

Strategic planning for appropriate site selection

- balancing conflicting interests - making use of synergies

Research and innovation to increase knowledge, find tailor-made solutions, minimise impacts on hydropower use

Mandatory mitigation measures

- legally fixed
- relevant for new and existing hydropower plants

Ensuring ecological continuity (fish pass) in natural fish zone



Ecological flow



Boosting hidden potential and improving ecology at the same time

Fostering technical efficiency by upgrading/ uprating/ refurbishment / site optimisation (e.g. residual flow turbine, ...)

Advisory services for small hydropower
to find win-win-solutions

Province of Upper Austria:

338 consultations – 243 plants technically
and ecologically upgraded



Average increase of electricity generation + 30%
(although ecological flow is provided as well)

Preplanning Activities

National River Basin Management Plan 2009 – Programme of Measures

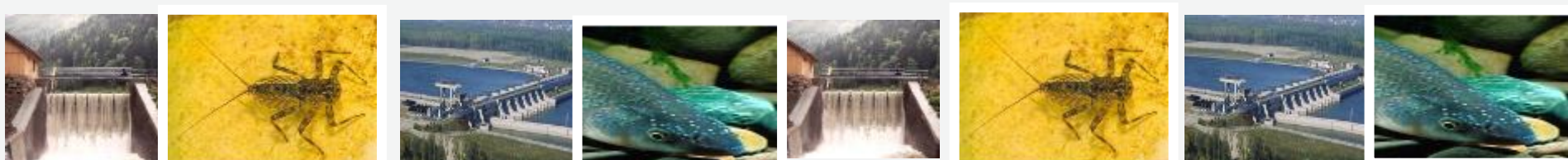
Decision support tool for balancing conflicting interest

in case of an expected deterioration of ecological status (WFD Art. 4.7 procedure)

- Decisions to be transparent, uniform and repeatative

Strategic planning on regional level

for **appropriate site selection** (cumulative effects, synergies, ...)



Decision support tool

General Principle: The higher the ecological value of a river stretch the higher the energy output has to be

Austrian Water Catalogue: Protecting Rivers - Using Rivers

Criteria for the assessment of a sustainable hydropower development (Jan 2012)

rating the value of hp projects and rivers/sites

Developed by the Ministry for Water Management

- in co-operation with the 9 regional governments
- involvement of all stakeholders
(energy sector, NGOs, ...)





Criteria Catalogue Hydropower

3 fields of public interests

Energy management
Assessment of project

- run-of-river plants
- (pumped) storage plants

Ecology

Assessment of value/
sensitivity of sites

4 criteria each (several indicators)

value rating: 3 levels
(*high - medium - low*)

**Other
water management interests**

Assessment of project

5 levels of effects

- ++ very positive
- + positive
- 0 indifferent
- negative
- very negative

Public interests – criteria for value rating

Energy Management

- security of supply
- quality of supply
- contribution to climate change mitigation
- technical efficiency

Ecology

- naturalness
- rarity
- specific ecological function within catchment
- dimension of negative project effects

Other water management interests

- flood control
- sediment management
- groundwater quantity
- groundwater quality
- drinking water supply
- surface water quality
- recreation/ tourism/ fisheries, ...
- effects on water bodies already restored

Austrian Criteria Catalogue hydropower

Example

	value		
	low	medium	high
Energy Management			
Security of supply: <ul style="list-style-type: none"> Amount of electricity production (GWh/a) 	< 5	5-50	> 50
Ecology			
Naturalness <ul style="list-style-type: none"> Status of ecological integrity – ecological status 	less than good	good	high
Rarity <ul style="list-style-type: none"> Type (Total length of type in near natural morphology) 	>1 000 km	750-1.000 km	< 750 km

Strategic Planning on regional level

For appropriate site selection

- based on national criteria catalogue



Intensive
discussions
with all relevant
stakeholders



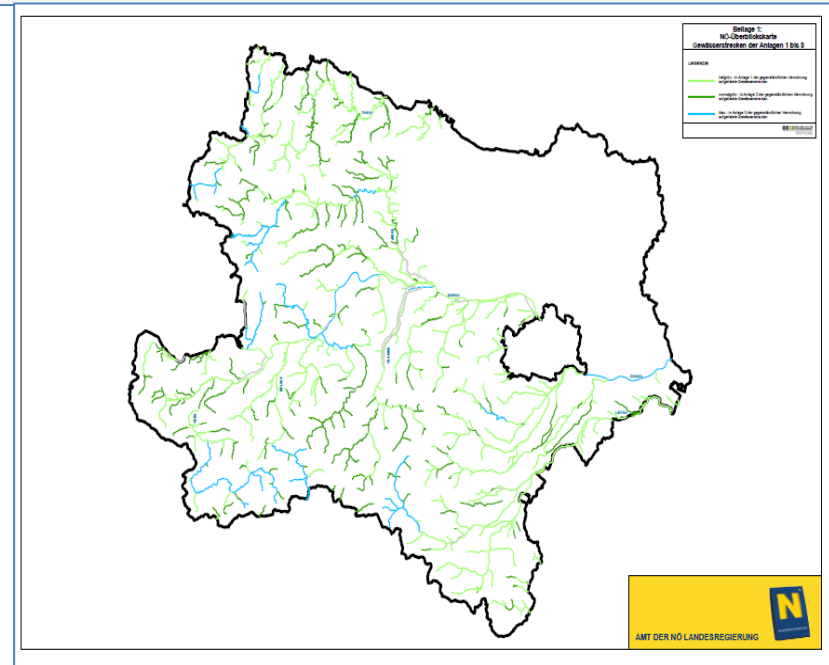
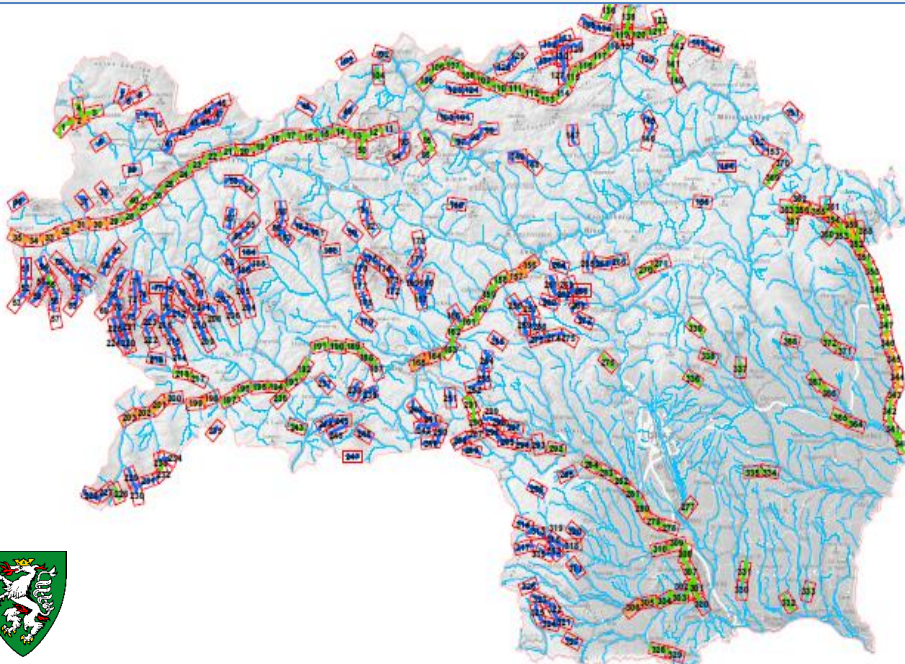
Plans

- underwent SEA
- legal implementation („Ordinance“)

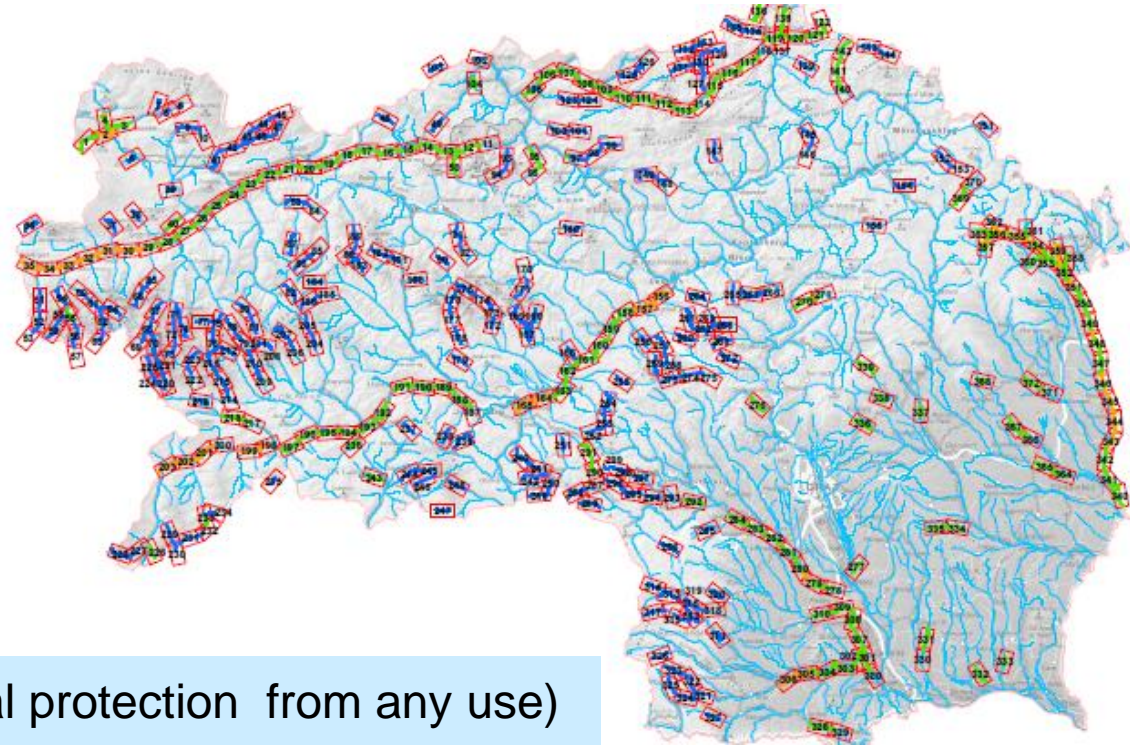
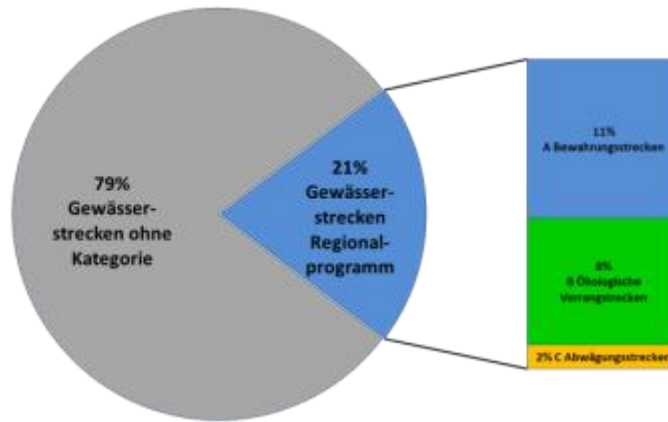
Strategic planning on regional level

2 approaches

- rivers with high value to be preserved
- designation river stretches for (specific) hydropower use



Regional Programme for the Protection of Rivers (Ordinance, May 2015)



A: Priority for preservation (total protection from any use)

B: Priority for ecology (ecologically important) – significantly restricted use

C: Weighting sites (high electricity potential)

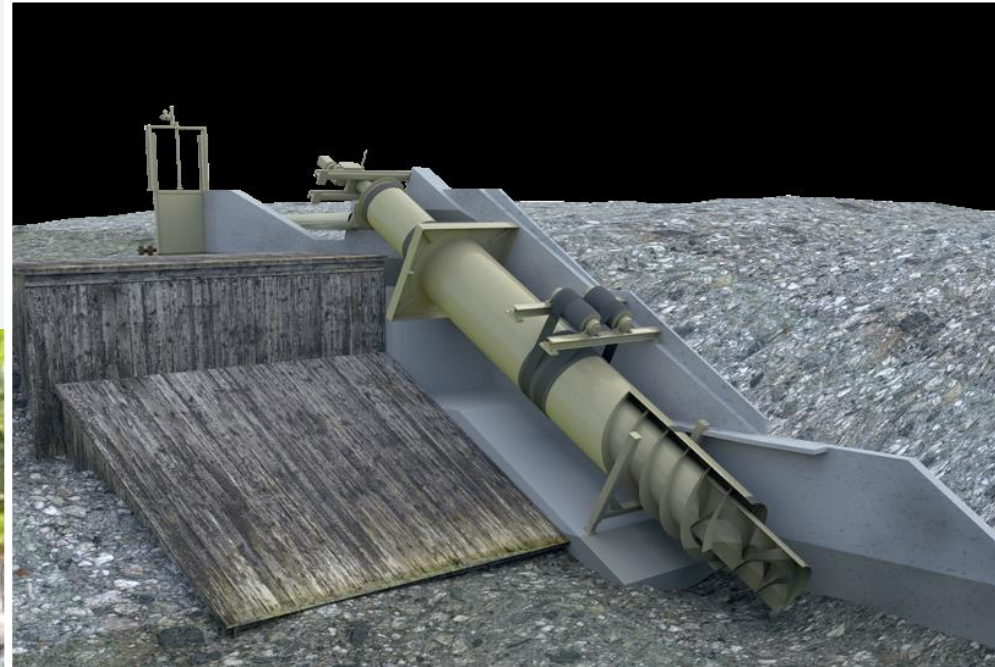
Hydropower use possible but no Art. 4.7 exemption allowed!



Innovation

e.g.

Hydropower screw
with fish lift inside



<http://www.hydroconnect.at/>

Research

Hydropeaking



Downstream fish migration



- BMLFUW
- Österreichs Energie

Sediment management



„TOGETHER“

- Science
- Hydropower sector
- Water authority





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