



**MINISTERIUM
FÜR EIN
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ÖSTERREICH**

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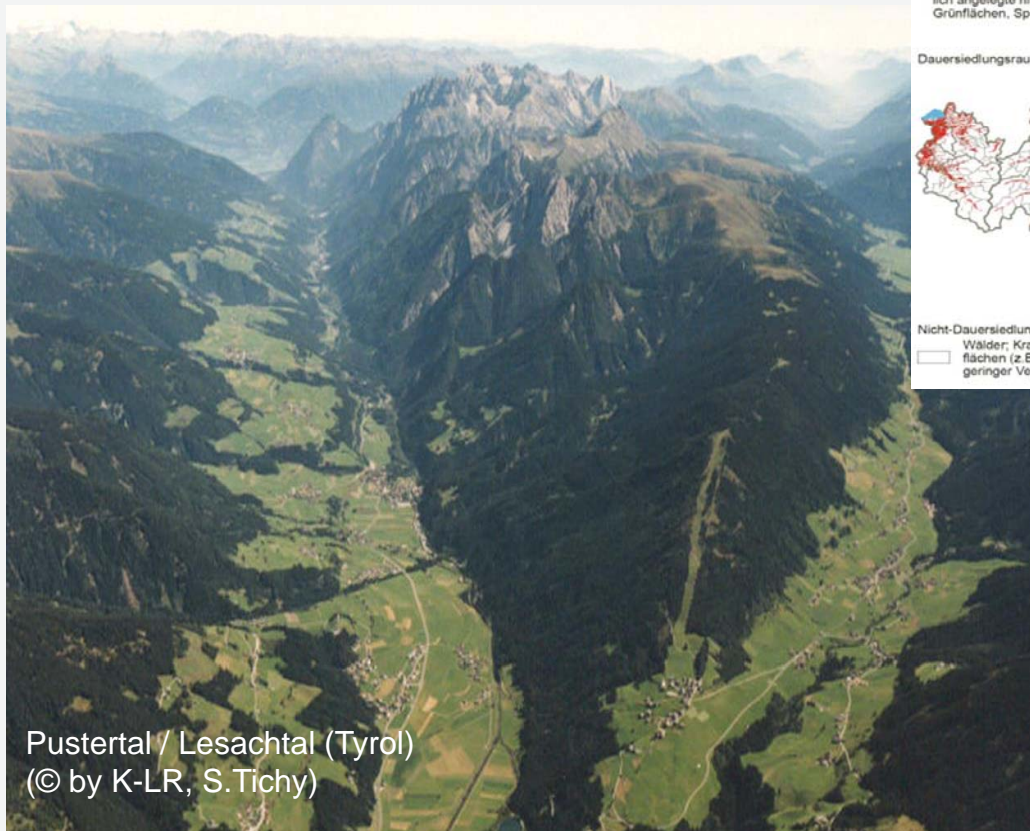
NWRM IN AT

**CLEMENS NEUHOLD
AUSTRIAN FEDERAL MINISTRY OF AGRICULTURE,
FORESTRY, ENVIRONMENT AND WATER MANAGEMENT**

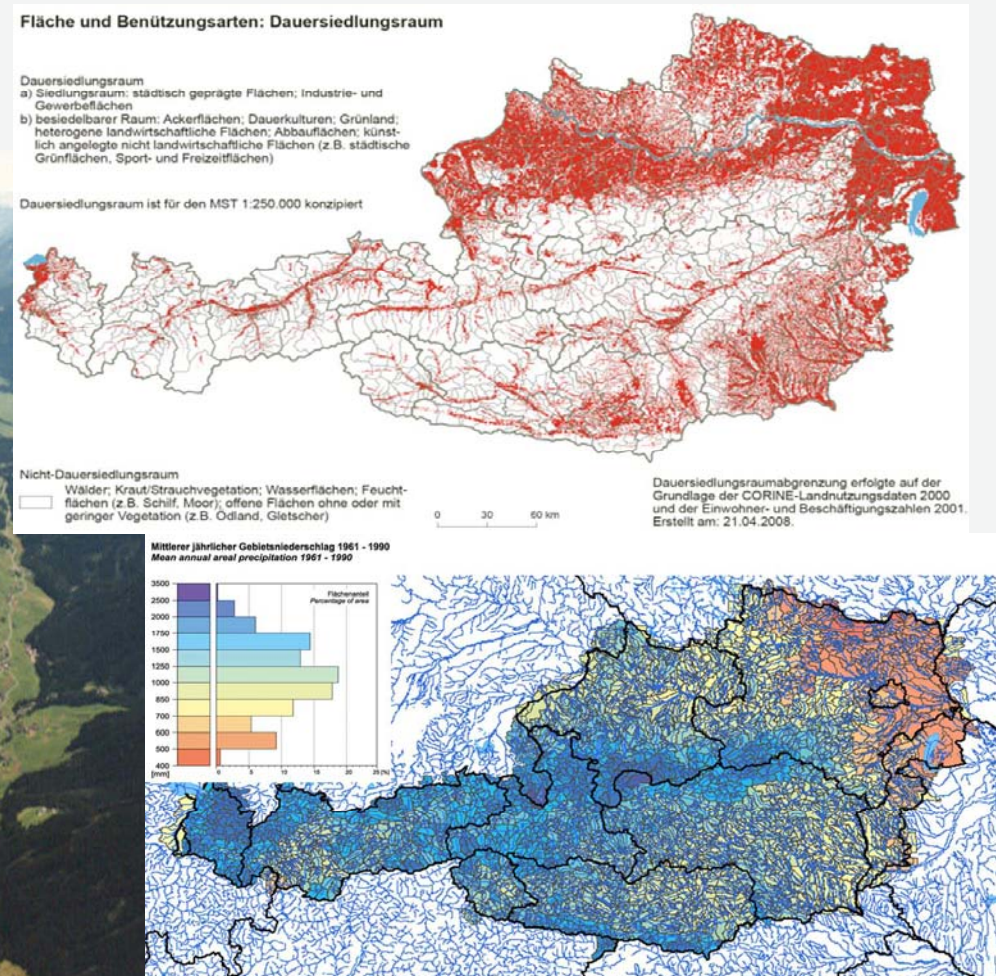


CHARACTERISTICS / BOUNDARY CONDITIONS

- Austria: 2/3 alpine; 37 % available for permanent settlement (valleys)
- pot. high precipitation (altitude)



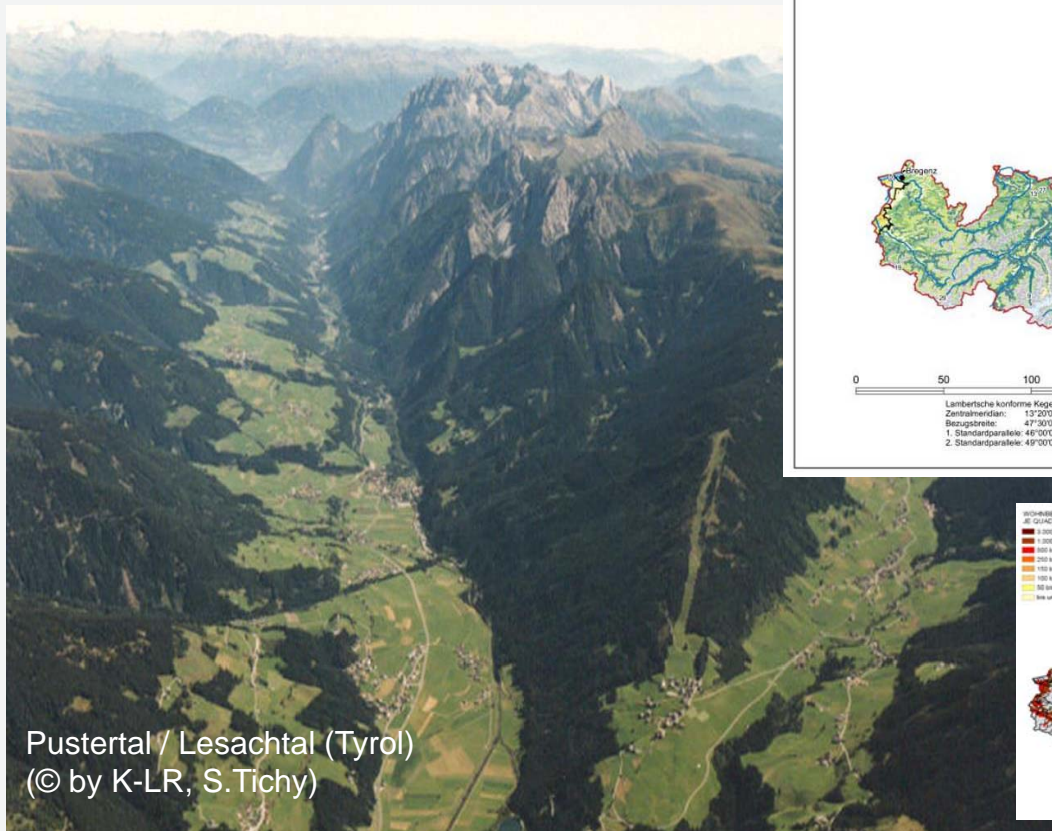
Pustertal / Lesachtal (Tyrol)
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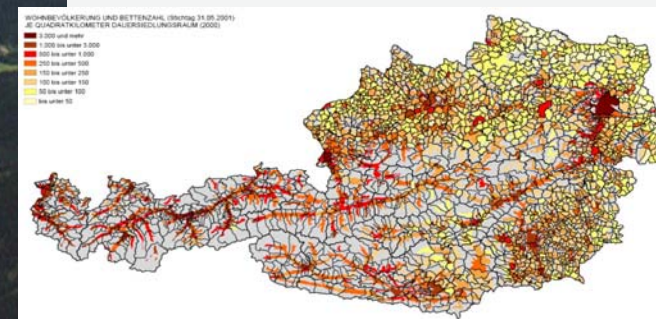
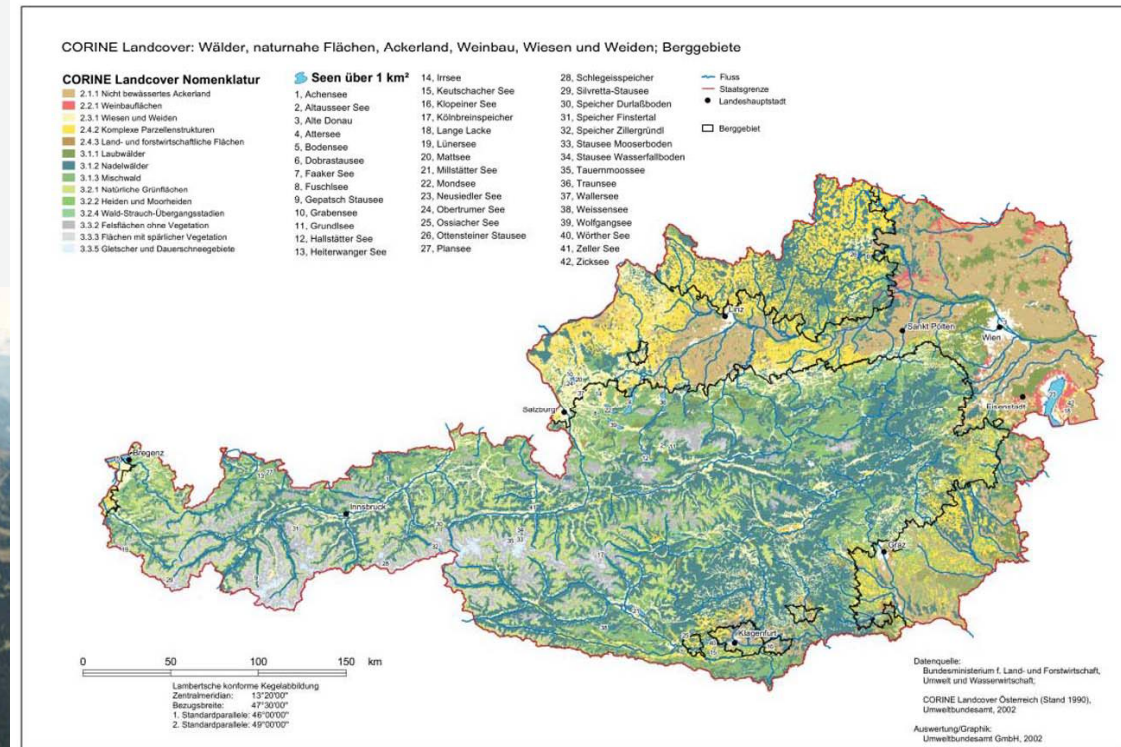


CHARACTERISTICS / BOUNDARY CONDITIONS

- Austria: 2/3 forested area
- high population densities



Pustertal / Lesachtal (Tyrol)
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CHARACTERISTICS / BOUNDARY CONDITIONS

- numerous pressures from different natural hazards such as floods, avalanches, mud flows, etc.
- limited areas for settlements and development (including high population densities)
- **need for protection / risk management**
- NWRM not an easy task

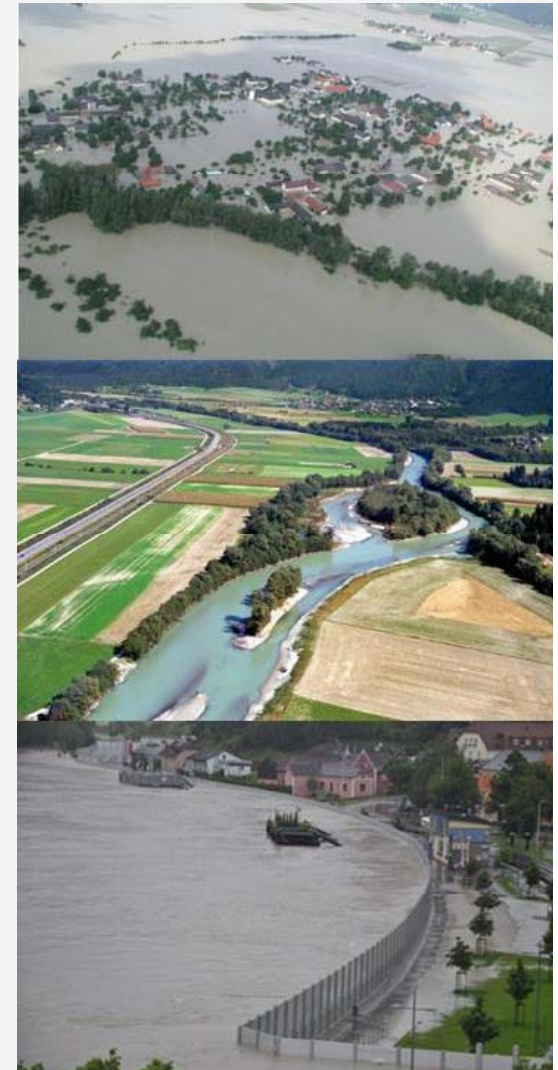


Pustertal / Lesachtal (Tyrol)
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GENERAL PRINCIPLES FOR FLOOD PROTECTION

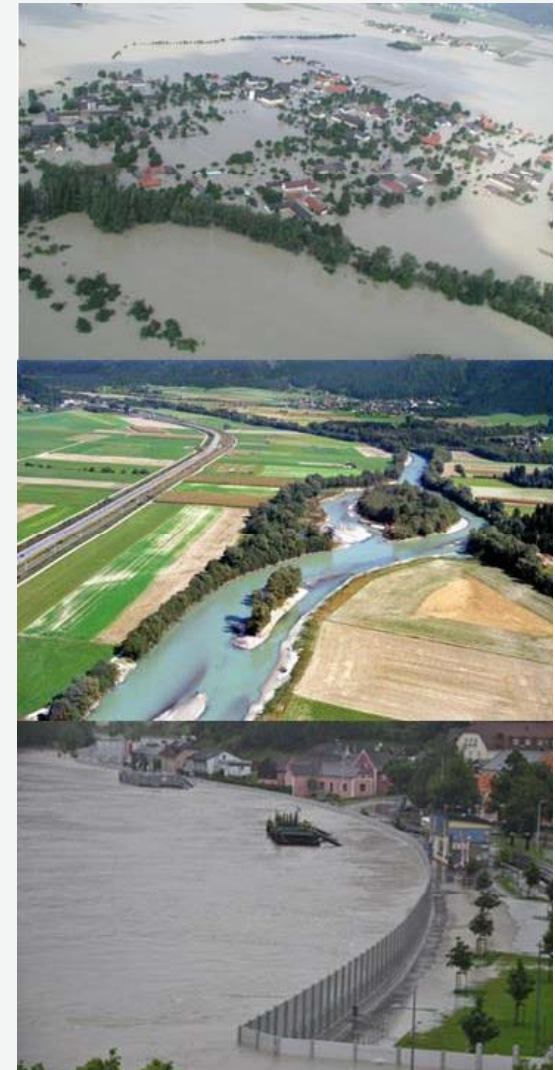
- No deterioration downstream
- Avoidance of erosion and discharge increase
- Adaptation of land use to floods
- Support of water retention and bed load balance
- Conservation and reactivation of natural run-off and retention areas
- Ecological functioning of water bodies
- Preferential use of near-natural methods
- Consideration of river basin / catchment scale when implementing measures





HIERARCHY OF MEASURES

- Passive (non-structural) flood protection has priority over active (structural) measures
- Measures in the catchment area (land use adaptation, avoidance of sealing, etc.) have priority over measures at / along the main channel
- Retention measures have priority over linear structural measures
- Natural and near-natural methods of building have priority over technical methods





FIRST CHOICE NON-STRUCTURAL MEASURES

- Avoidance of activities which may increase hazard
- Adapting to events of exceedance (design level) and failure
- Governmental acquisition of land
 - To keep free from settlement and development
 - To exchange for land needed in the frame of implementing new measures (such as giving more room for the rivers)
- Flood aware settlement and development (where possible) – transposition of land use to areas with low flood risk (outside 300-years flood inundation)
- Use, maintenance, adaptation of existing retention areas

Retention areas available in AT ~ 110 Mio. m³

Creation of new retention areas in 2012 ~ 3 Mio. m³

COSTS OF NWRM

Natural retention in AT is generally more expensive than technical measures

Implementing flood risk management measures in AT:

- several options have to be evaluated
- not the „cheapest“ will be implemented automatically
- as also ecological objectives have to be met.

Hochwasserschutzmaßnahmen an der Aist in Oberösterreich



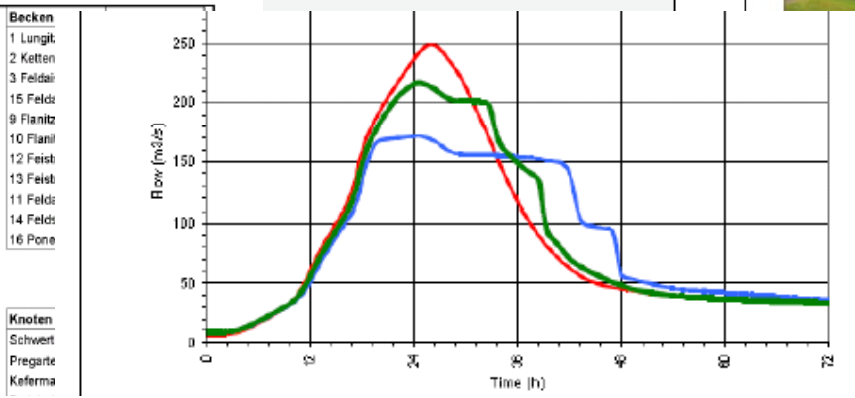
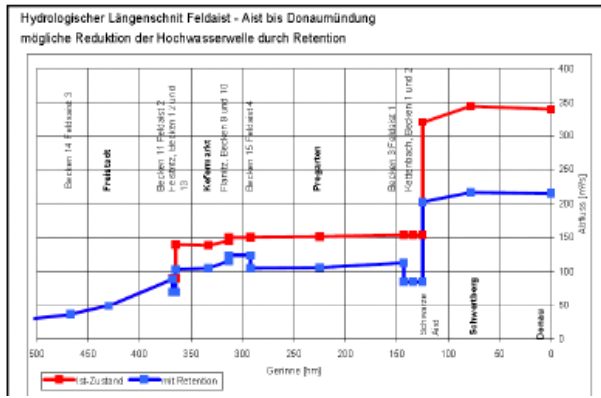
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Dr. Helmut Habersack
istelly
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nersdorf, Dezember 2012



rix zur Lösungsfindung (sind nur Beispiele, müsste vor Umsetzung noch im Detail geprüft werden)

Kriterien:	Wirksamkeit					Kosten					Ökologie					soziale Verträglichkeit					Summe
	HQ ₁₀	HQ ₃₀	HQ ₅₀	HQ ₁₀₀	>HQ ₁₀₀	sehr hoch	hoch	mittel	niedrig	sehr gering	Rote-Liste-Arten bedroht	Fischwanderungen werden ständig unterbunden	Fischaufstieg funktioniert, Geschiebe wird zurückgehalten	Fischaufstieg funktioniert, Geschiebe wird periodisch weitertransportiert	Durchgängigkeit für Wasser, Biota und Feststoffe ständig gegeben	HW-Schutzmaßnahme wird gegen den Widerstand der Anrainer durchgeführt (z. B. Zwangsenteignung)	HW-Schutzmaßnahme berührt massiv Anrainerinteressen	?	HW-Schutzmaßnahme durch Zustimmung der Anrainer	HW-Schutzmaßnahme berührt keine Anrainerinteressen	
Zielerfüllung:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	



CONCLUSIONS

- In Austria NWRM in general are costly (due to mentioned boundary conditions) and do not have the best benefit cost ratios...
- Indirect and intangible benefits are hard to be assessed reliably – nevertheless, we know that NWRM pay off in terms of recreation, ecology, implementation of the WFD, flood risk reduction, etc.
- Although, these measures are costly numerous projects have been implemented in Austria
- In Austria the philosophy (and priority setting) is that if it's possible nature oriented measures have to be implemented and funded – of course when the comparativeness is given.



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THANKS FOR YOUR KIND ATTENTION!

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