Centro Italiano per la Riqualificazione Fluviale

8 July 2021

Hydropower : the "green" energy threatening the last natural rivers

Andrea Goltara
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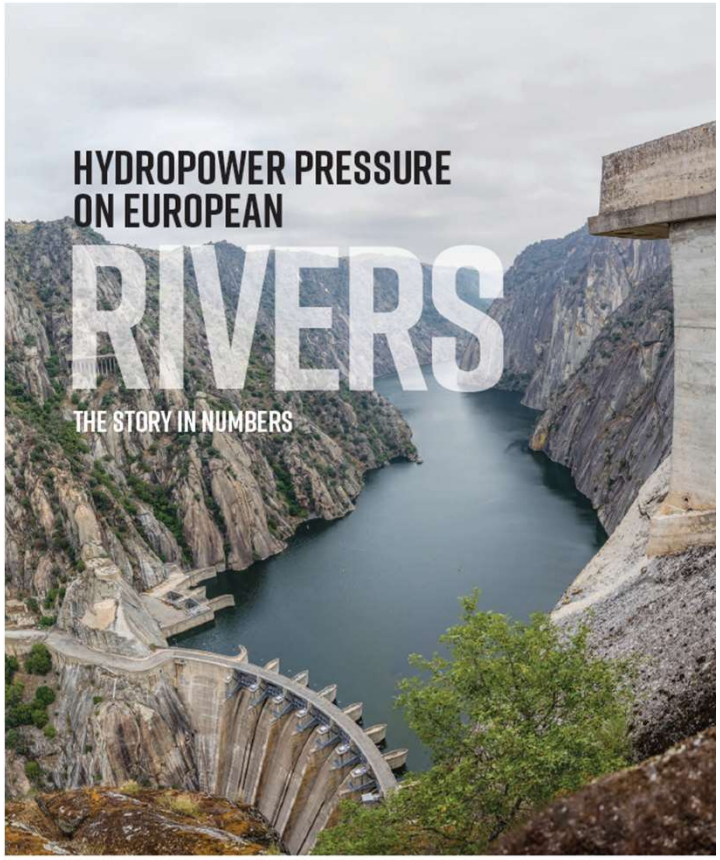
Hydropower is widely recognised as one of the most critical pressure factors on freshwater ecosystems



Hydropower is widely recognised as one of the most critical pressure factors on freshwater ecosystems

www.eea.europa.eu (8 febbraio 2021)

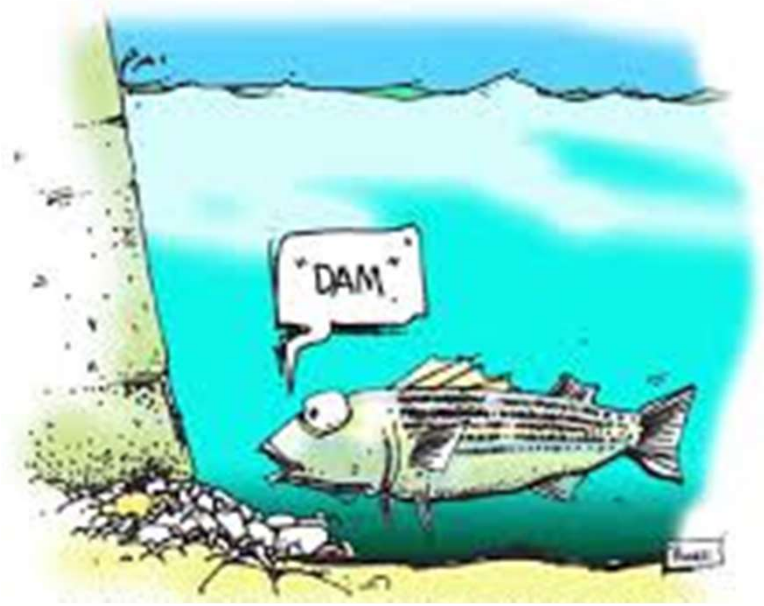
Two main types of hydropower schemes:

1) Storage

2) Run-of-the-river (no storage)

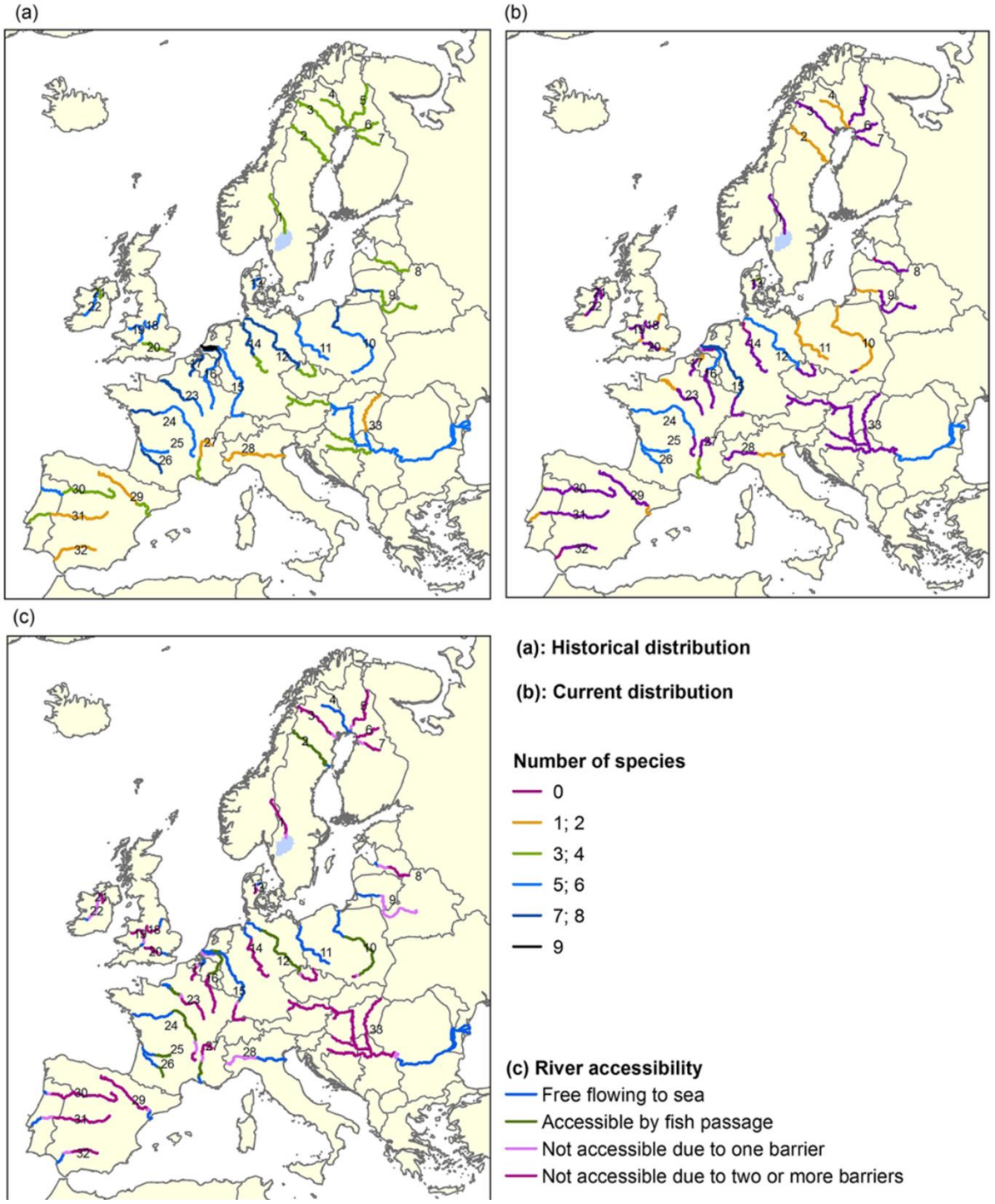
www.wild-metal.com

The impacts:
1) loss of longitudinal connectivity for fish fauna



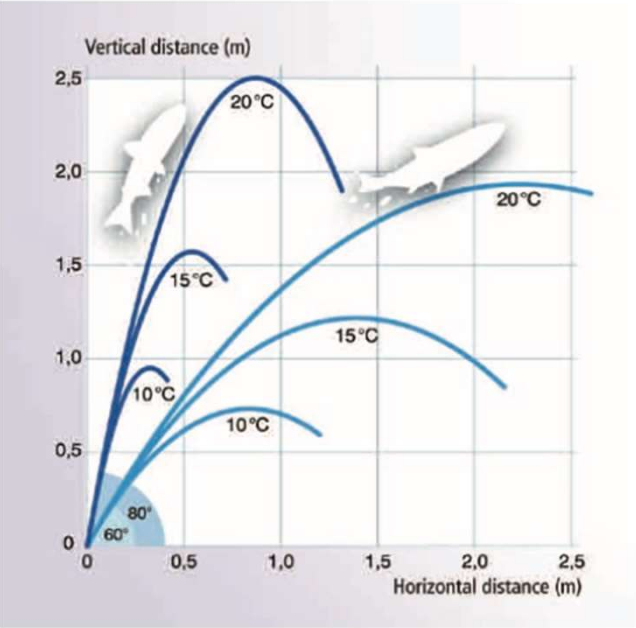
Storage	R o R
X	X

Decline in the number of fish species in European river basins



van Puijenbroek, PJTM, Buijse, AD, Kraak, MHS, Verdonschot, PFM. Species and river specific effects of river fragmentation on European anadromous fish species. *River Res Applic*. 2019; 35: 68– 77. https://doi.org/10.1002/rra.3386

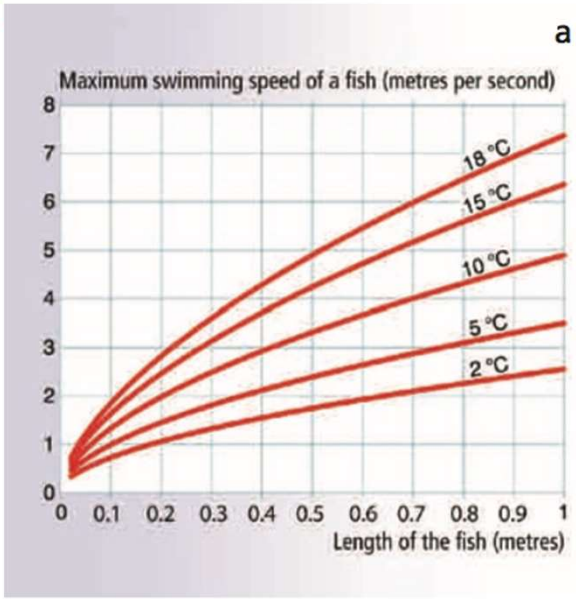
By the way…not all fishes can jump!

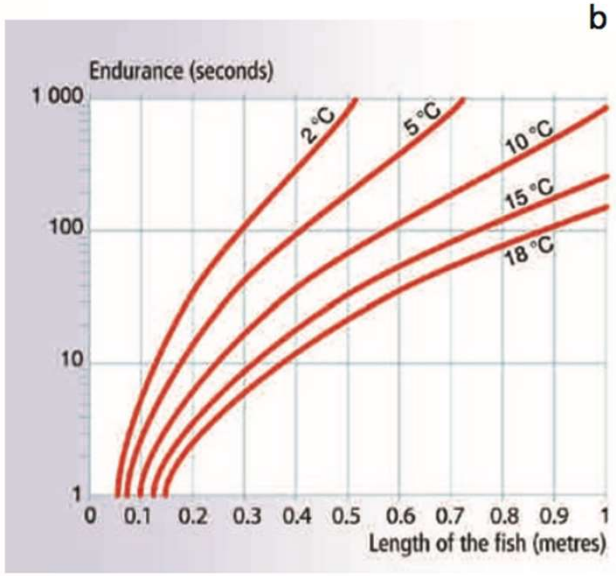


Only some fish species can jump to overcome obstacles and the jump height and distance, as well as swimming speed and maximum duration vary with the species and environmental conditions (especially T)

-> EVEN SMALL OBSTACLES CAN SIGNIFICANTLY DISRUPT CONTINUITY FOR MOST SPECIES

ICE Protocol, 2014

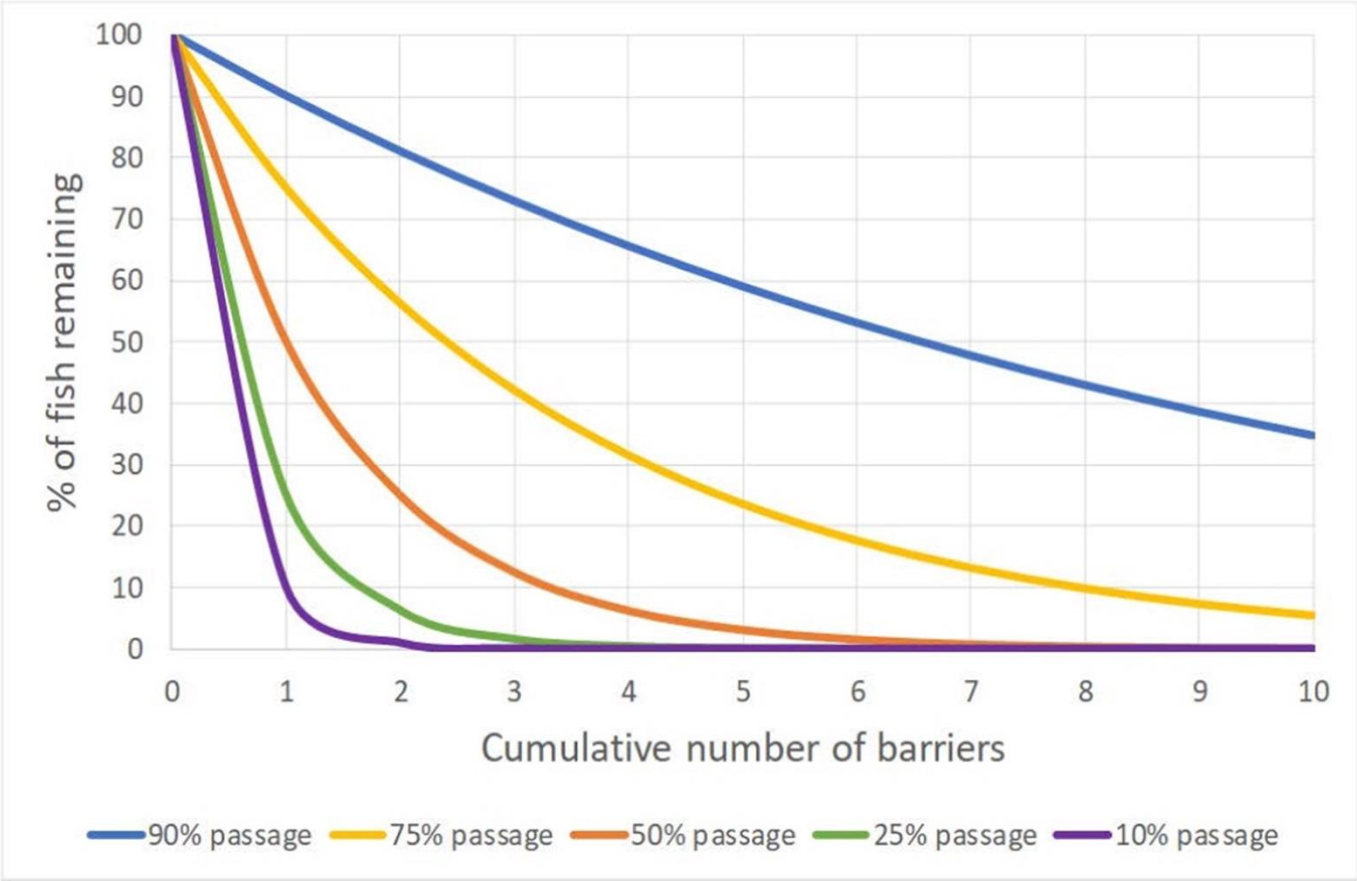




Is building a fish pass enough ?

Provincia Autonoma di Bolzano

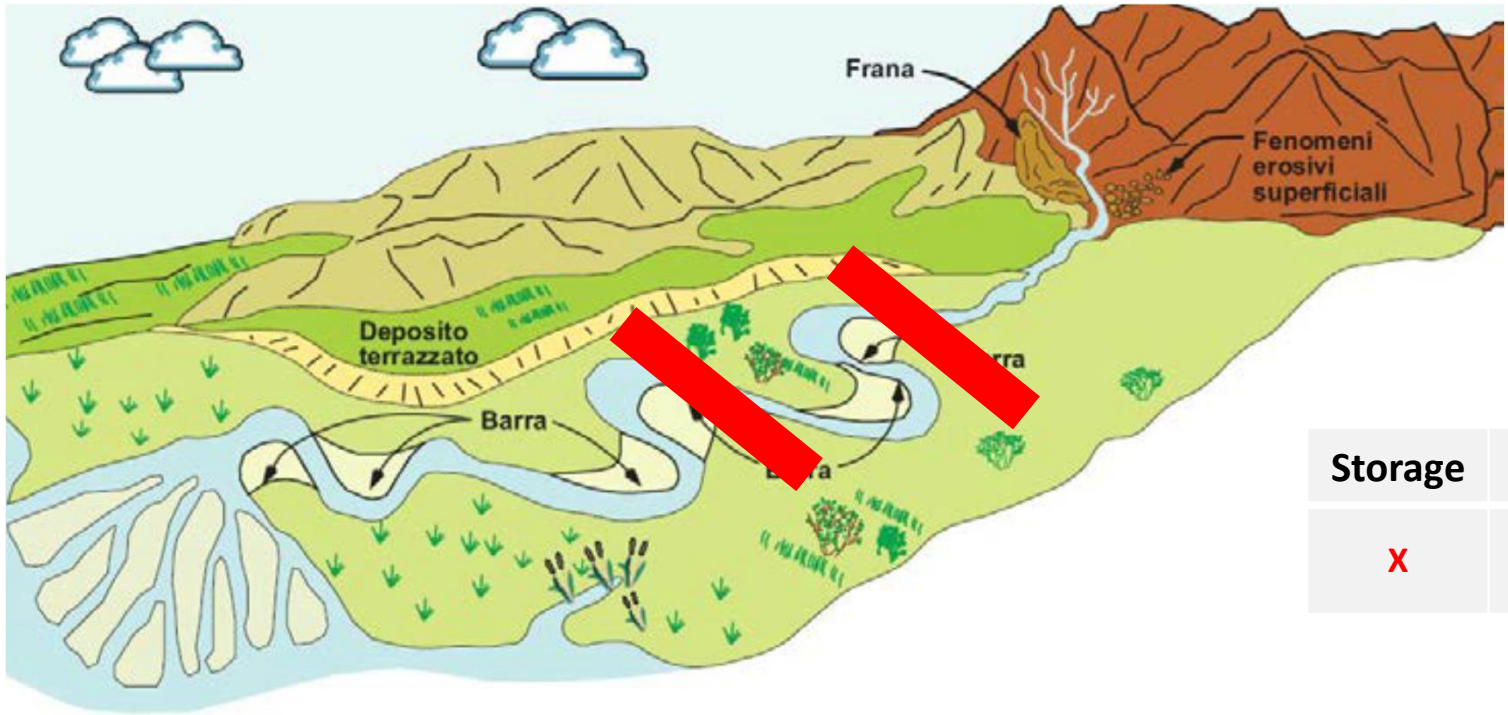
A fish pass can usually restore only partially the connectivity for fish



Theoretical cumulative effect on fish fauna of the presence of several fish passes in series. Different curves represent different pass effectiveness (From NIWA, 2018)

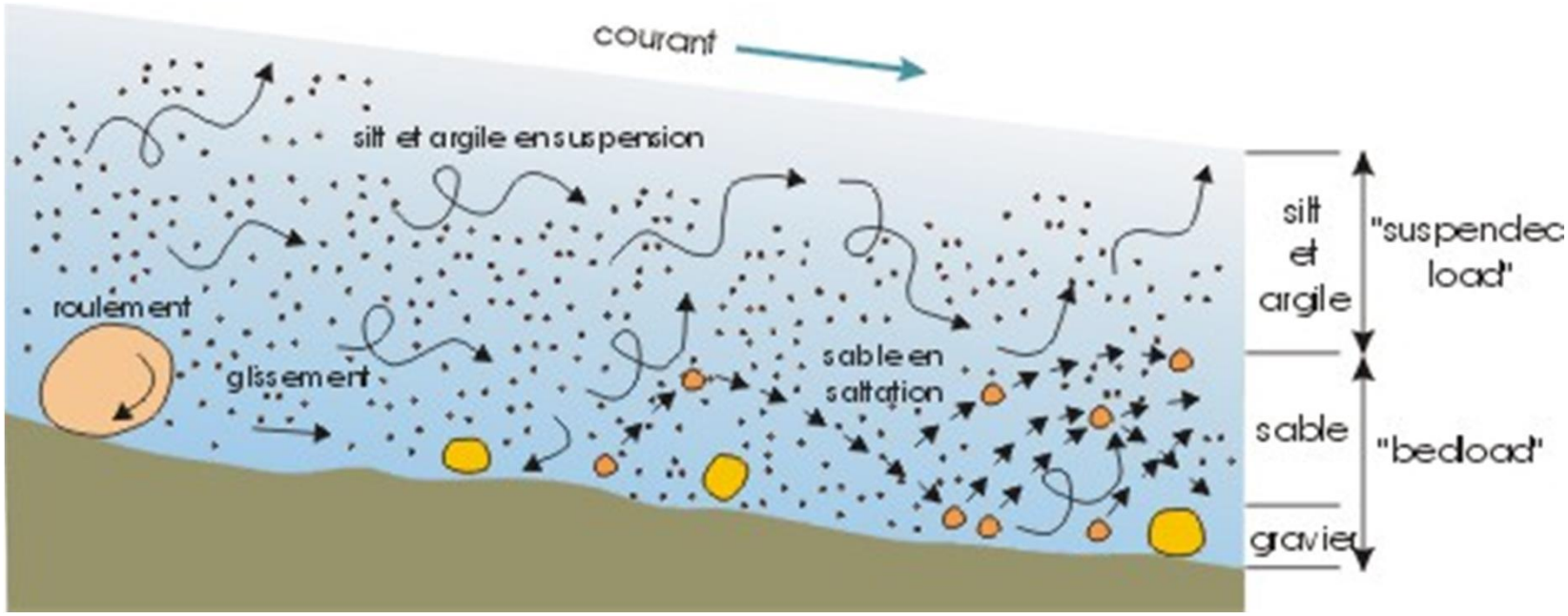
In the usual case of several obstacles in series, even if equipped with well-designed fish passes, the overall connectivity soon becomes very low

The impacts:
2) loss of longitudinal connectivity for sediments

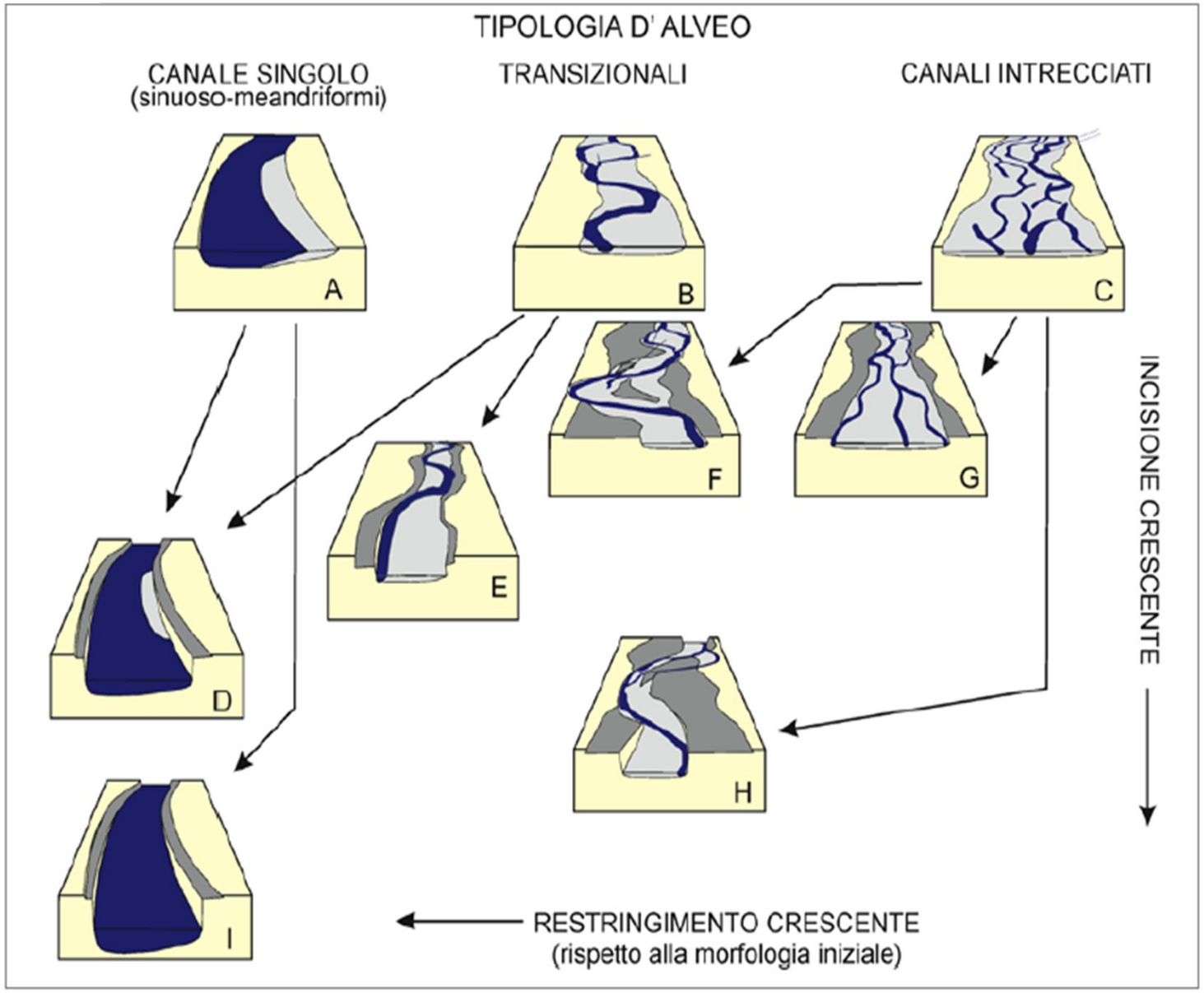


Storage	R o R
X	Less relevant

2.1 In particular: the alteration of bedload transport strongly affects river morphological dynamics!

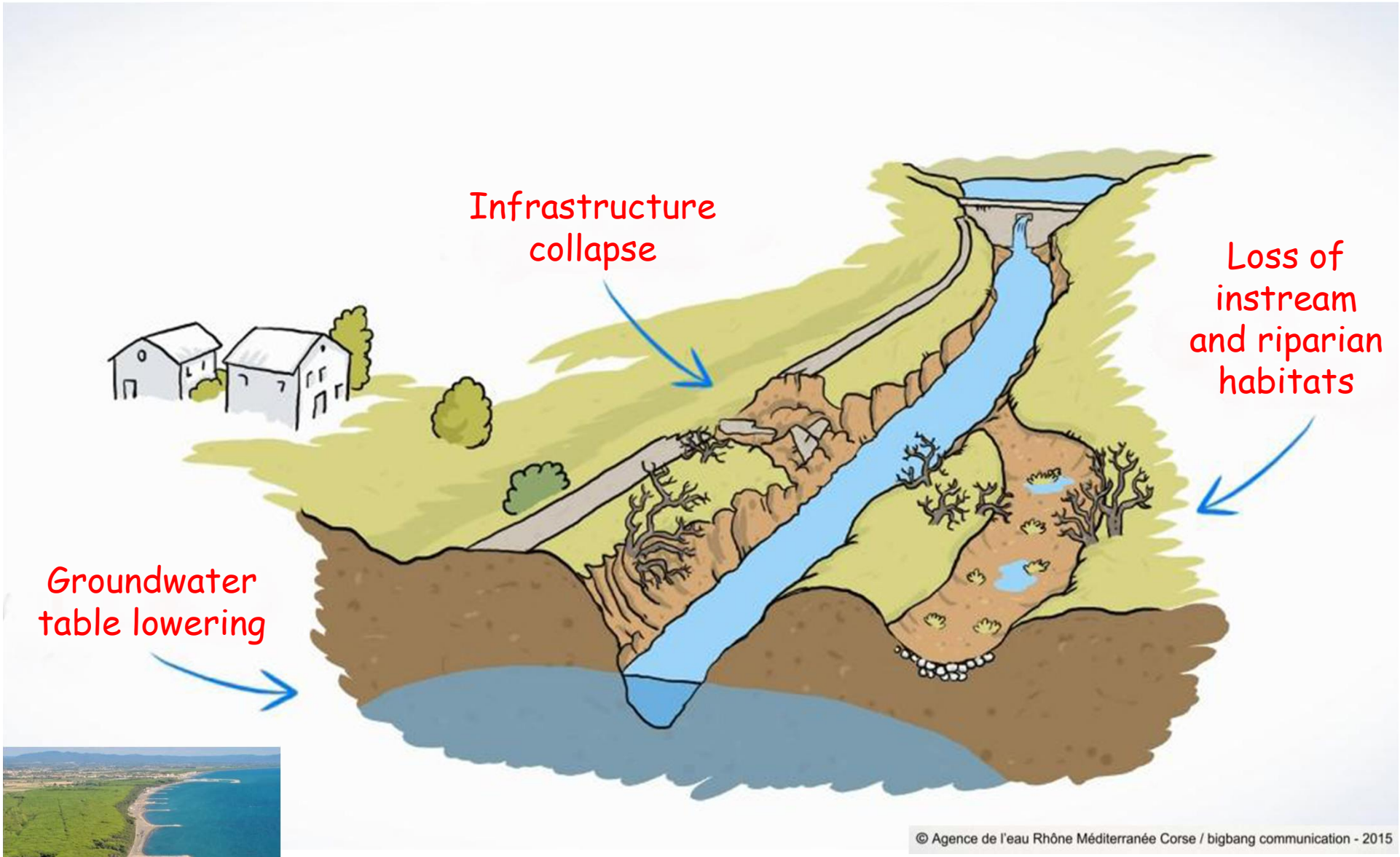


Morphological alteration of rivers



Rinaldi et al., 2014

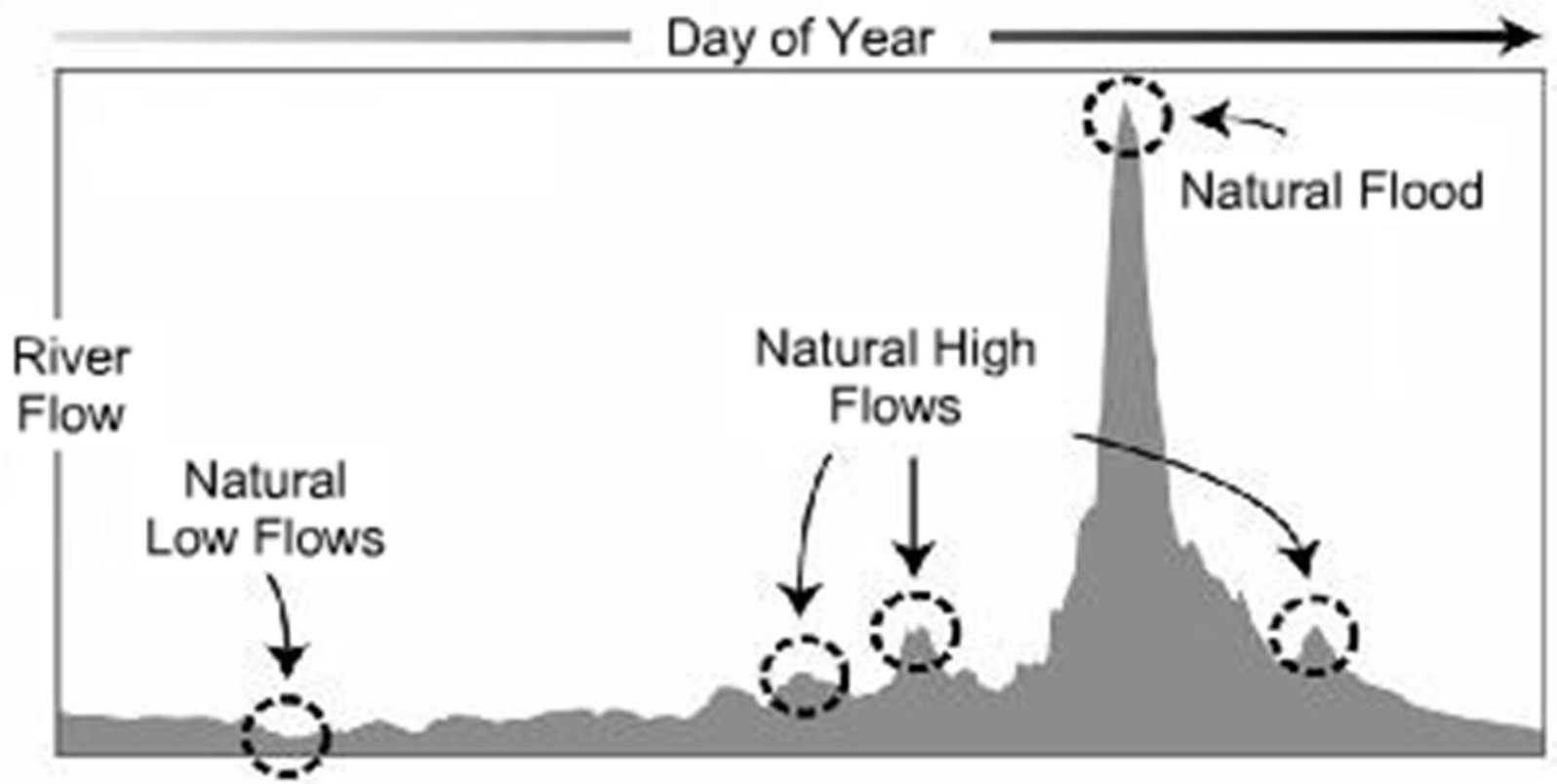
Riverbed incision downstream dams



Coastal erosion

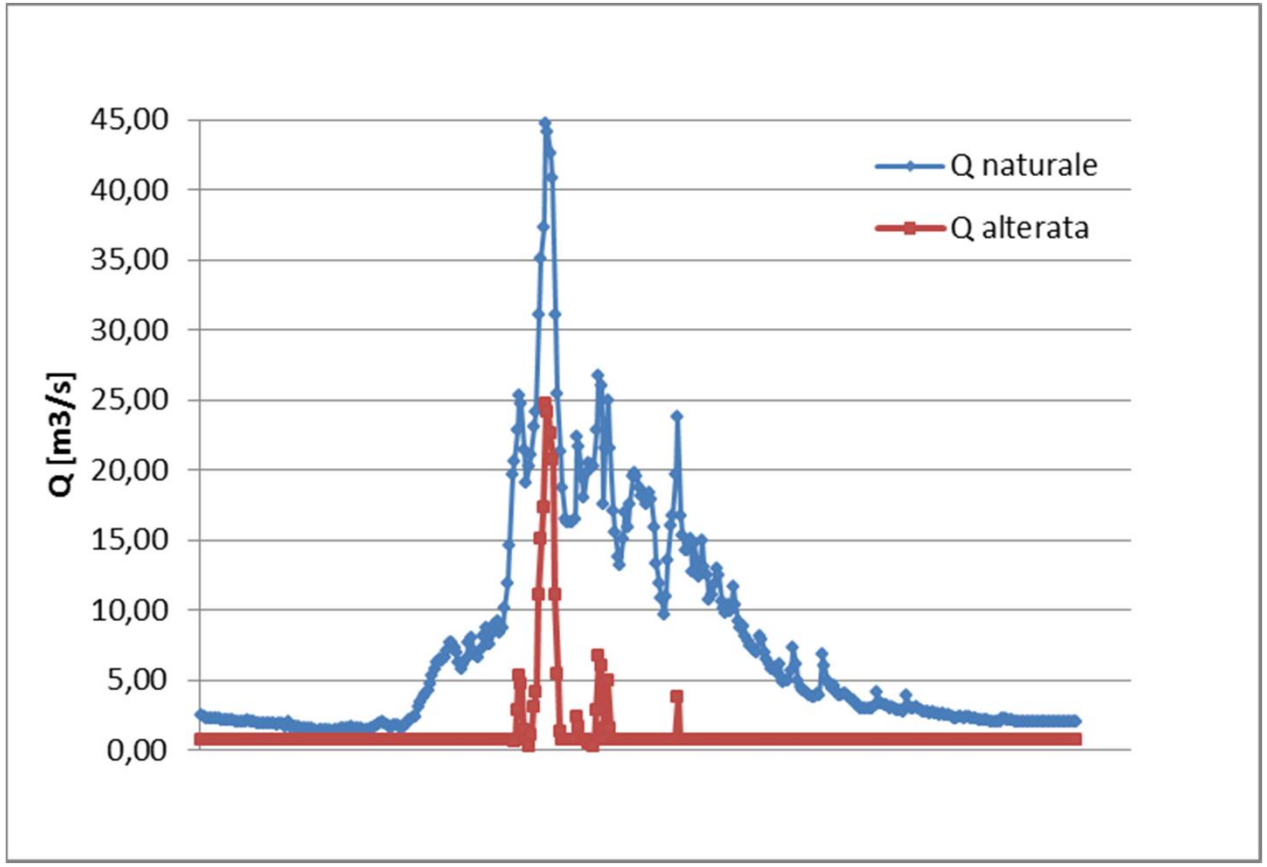
2.1 Impacts due to fine sediments management (flushing)

The impacts:
3) Alteration of the hydrological regime



Storage	R o R
X	X

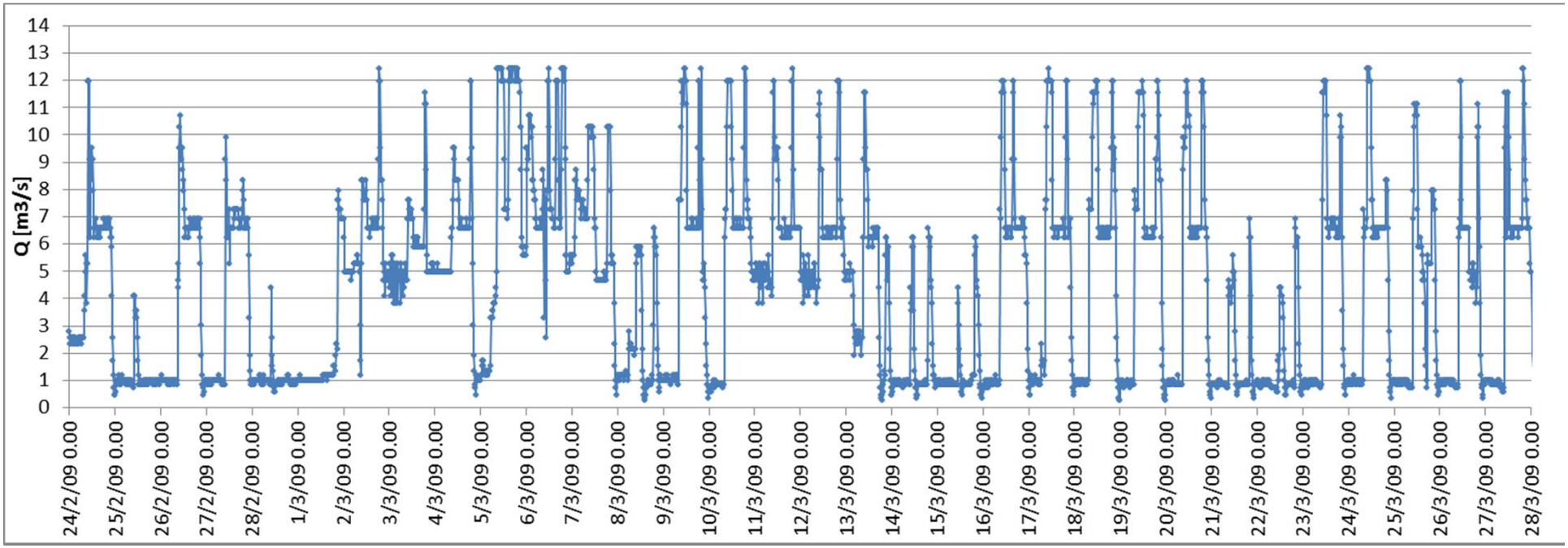
Ecological flows ?



This is still the most common situation in the bypassed reaches…

-> the physical and ecological processes linked to the complex and context-specific flow variability with time are disrupted

The impacts:
3.1) Alteration of the hydrological regime - hydropeaking



Storage	R o R
X	

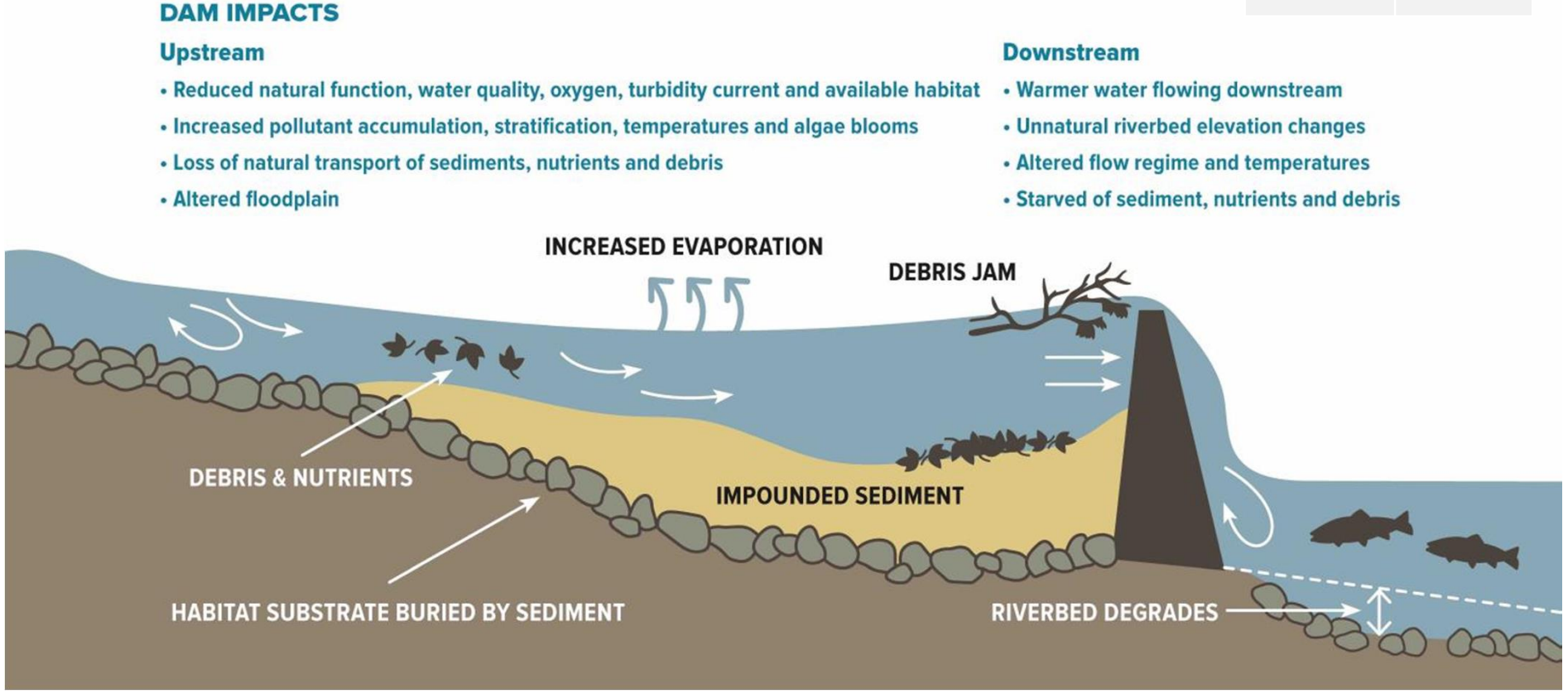
Stranding due to hydropeaking

Martin Pfaundler, 4th Int. Conference „Water in the Alps“, Munich, 22-23 Oct 2012

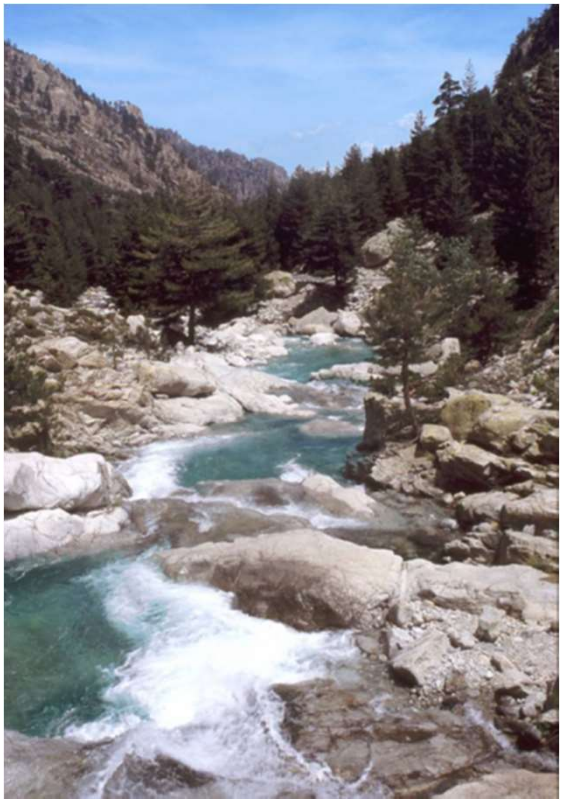
Other impacts (reservoirs):

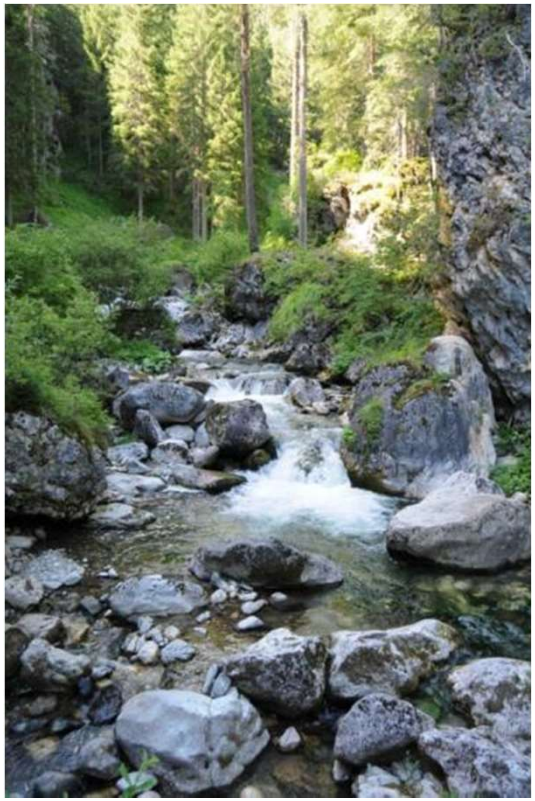
- Accumulation of pollutants in fine sediments
- Physico-chemical and thermal alteration of released water
- Loss of water due to evaporation…

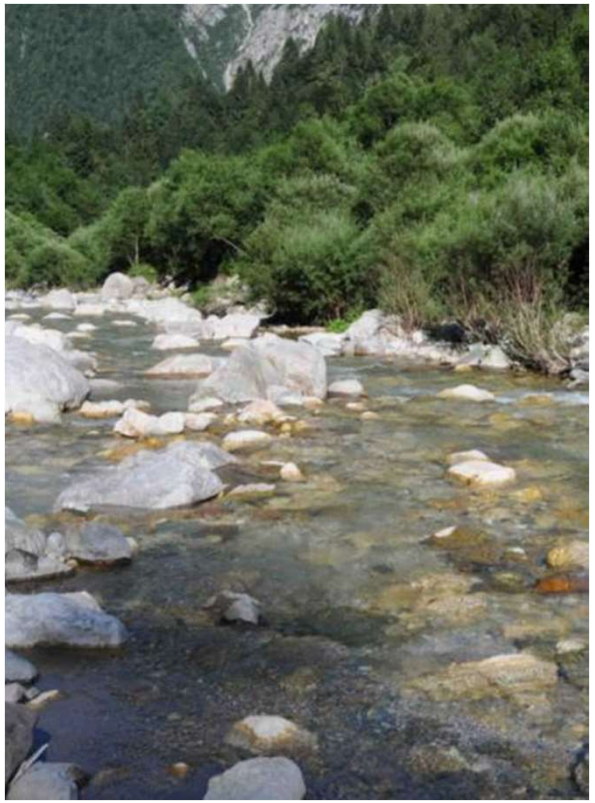
Storage	R o R
X	



In Italy (and other MS with highly exploited hydro potential) massive increase of demands for new HPPs (hundreds still pending!), almost only due to incentives







In Italy new plants are SMALL (mostly < 0,5 MW) and located at increasingly high altitudes and in increasingly smaller and often pristine streams

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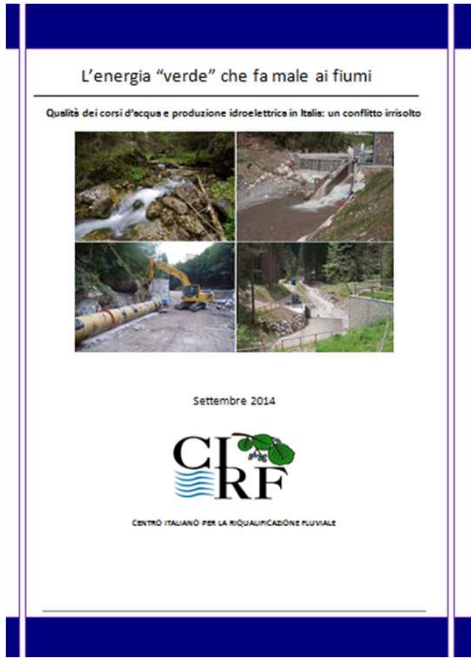
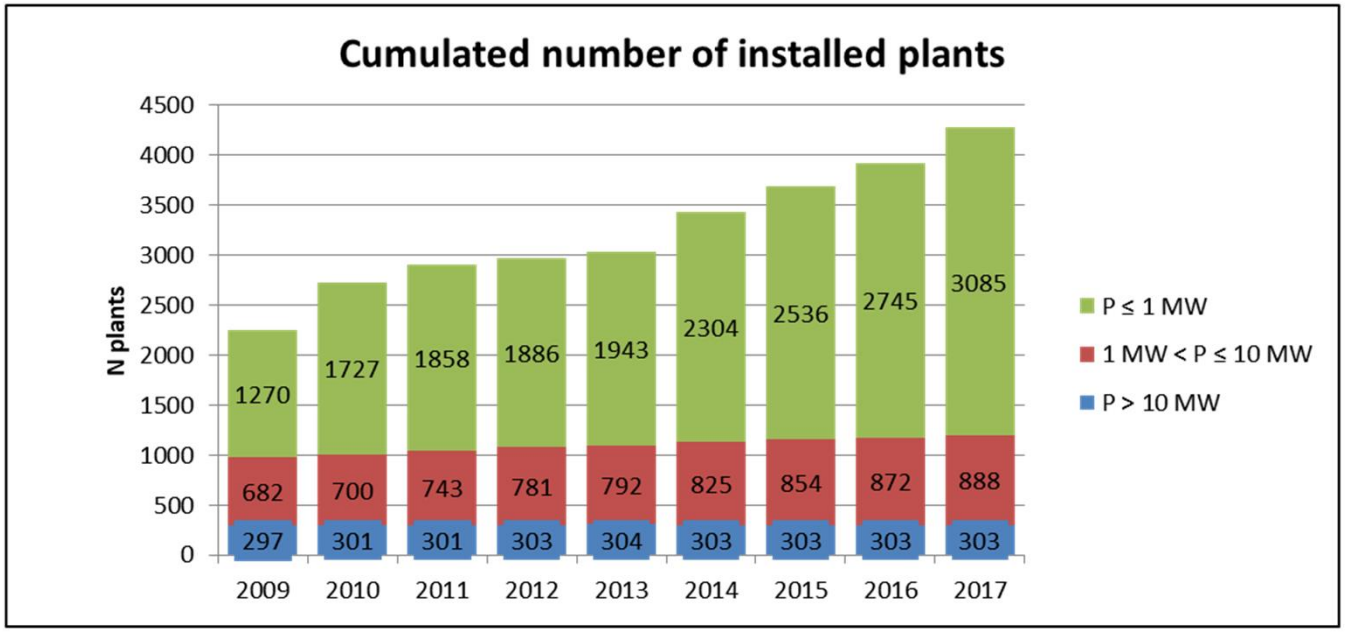
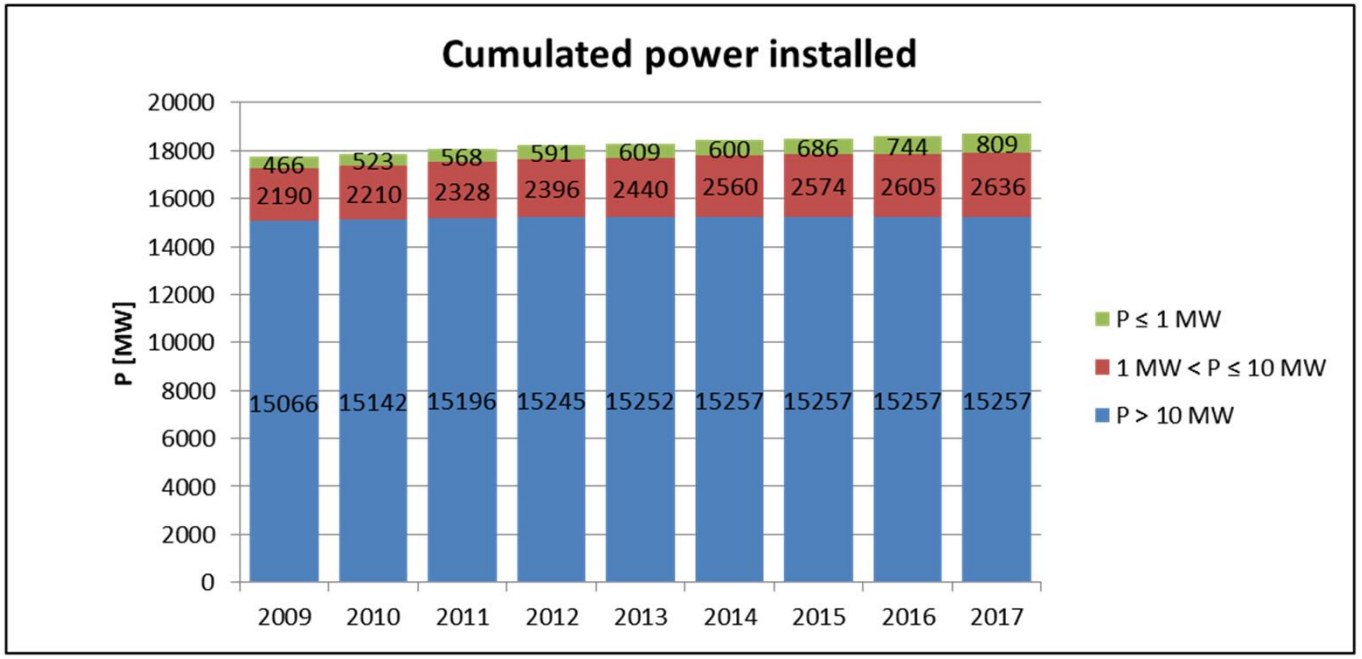
Between 2009 and 2010 the number of HPPs P< 1 MW + **36%** (1270 -> 1727) but only + 0,3% (compared to total hydro in 2009) in terms of additional installed power!







The creepy story of the public subsidies to hydro in Italy

In 2018, after several national campaigns and years of parliamentary work, the Italian government eventually decided to **exclude new hydropower in natural rivers** from the draft decree on subsidies for RES, which is sent to the EC.

BUT…last minute intervention from DG Competition: the subsidies have to be restored, "not to hamper competition between different RES" (?????)

DG ENV takes no position at all

…Italian consumers are still paying subsidies for useless new hydro in their energy bills

CIRF
Centro Italiano per la Riqualificazione Fluviale

Restoring 25,000 km of free-flowing rivers !

Great and let's go for it, but how many thousands of km would stilll be free-flowing if just we had stopped the incentives few years ago…?

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…and how many new barriers will be built while we struggle to remove some of the existing ones?

Historic opportunity to restore rivers…or fast track to widepsread additional artificialisation ?

The current strong calls for reforms to speed up and simplify the approval of new infrastructure are not very promising…
the role of the EC in this phase will be crucial

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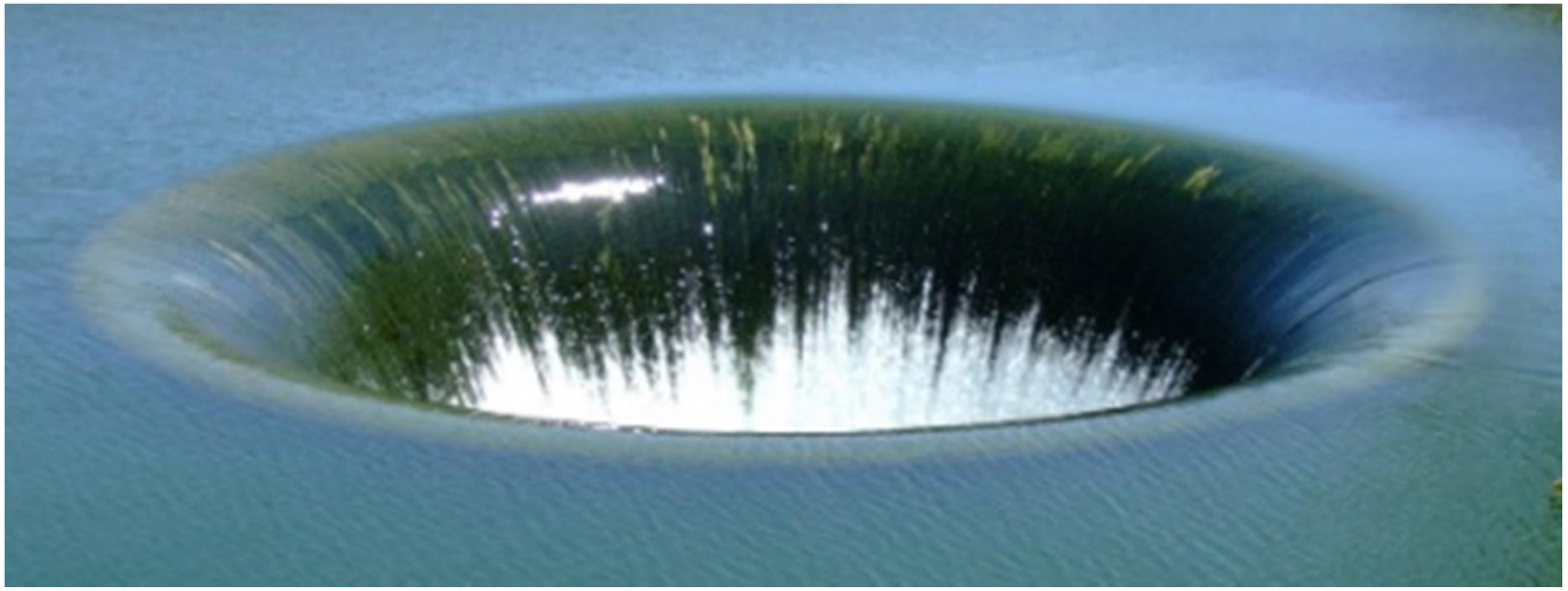

Thank you for your attention

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