



# GIOV&GO: FREE FLOWING GIOVENCO

## DAM REMOVAL ON THE GIOVENCO RIVER: CONNECTING STAKEHOLDER TO RECONNET THE RIVER



**International conference  
on protecting and restoring  
Free-flowing rivers in Europe**

April 15-17, 2024 Oosterport,  
Groningen, The Netherlands  
[Freeflowconference.eu](http://Freeflowconference.eu)

**Ing. Giandomenico Mercuri  
Dr.ssa Ileana Schipani**



# REWILDING APENNINES

Education & information

«Keystone Species» protection

Local cooperation

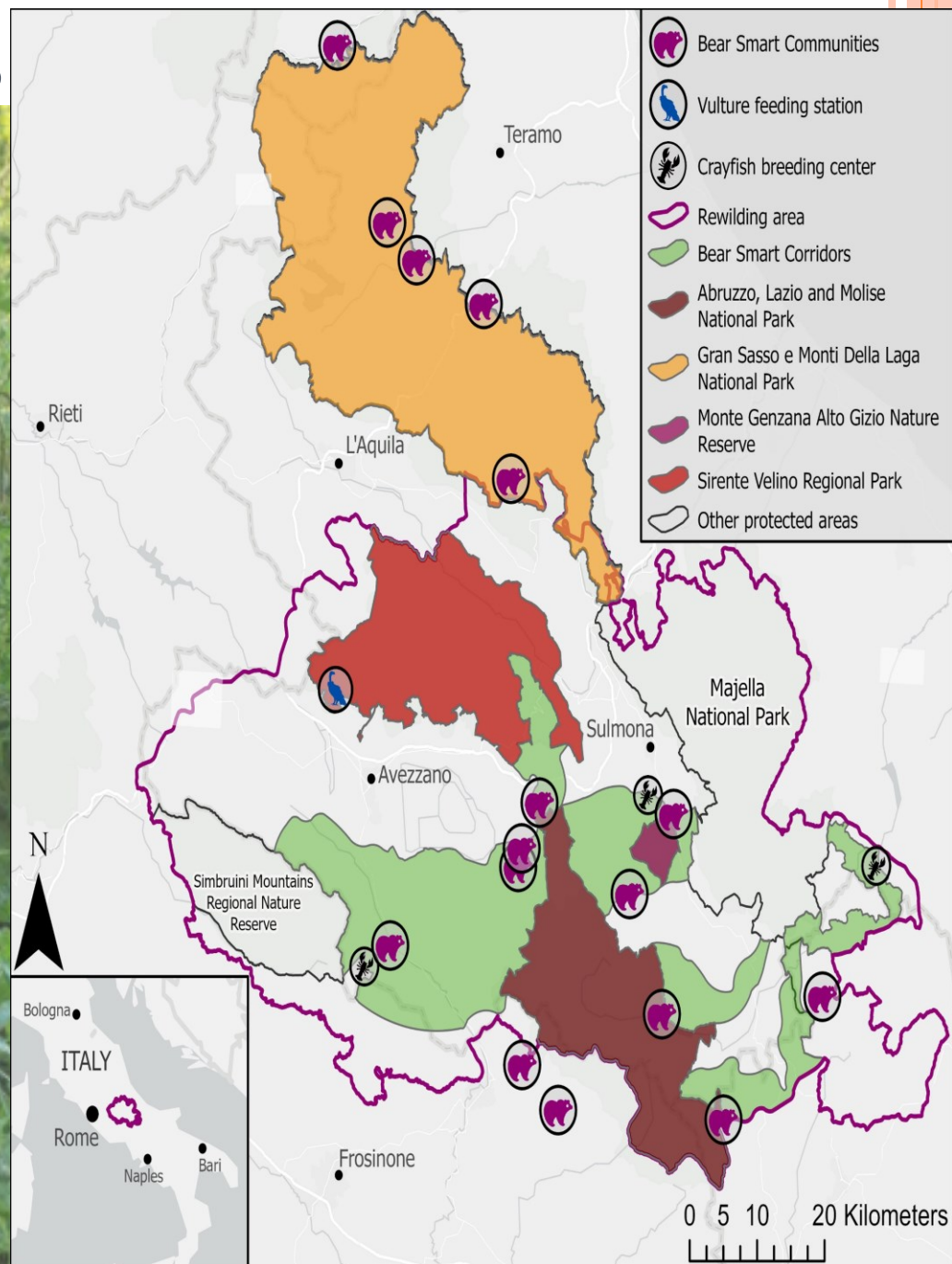
River & habitat restoration

Coexistence with bears and wolf

**Rewilding Europe**

A new beginning. For wildlife. For us.

**Rewilding Apennines**



<https://rewilding-apennines.com/>

# WORKING GROUP

A multidisciplinary group has been formed for the project:



*Project Team Coordinator  
(Mario Cipollone RA)*



*River ecologist  
(Ileana Schipani)*



*Environmental engineer  
(Giandomenico Mercuri)*



*Hydraulic engineer  
(Nino Minicucci)*



*Ichthyologist  
(Amilcare D'Orsi)*



*Biologist  
(Filippo Castellucci)*



*Communication Expert  
(Angela Tavone)*





# INTERVENTION AREA (GIOVENCO VALLEY)

Central Italy

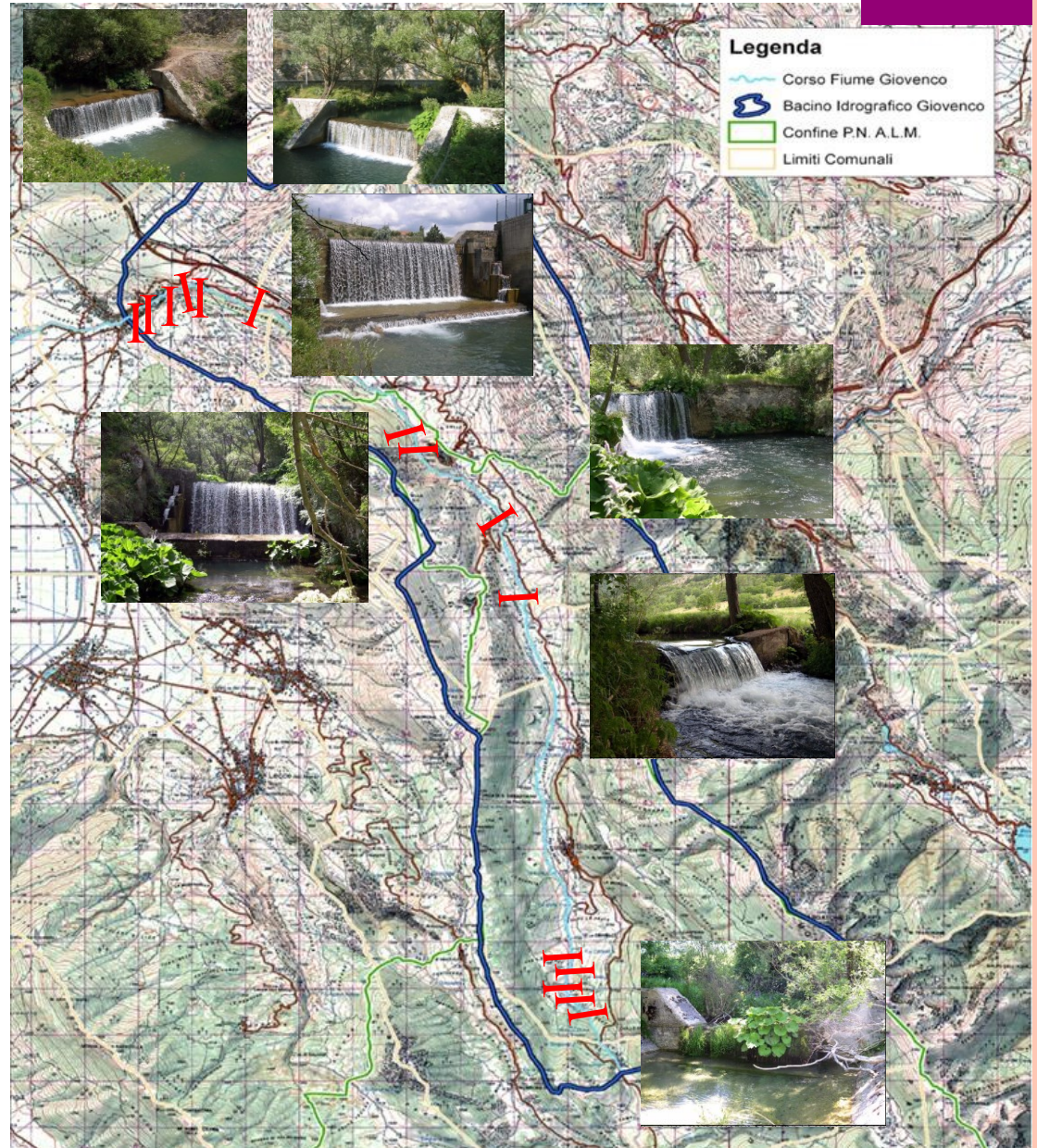
Abruzzo Lazio and Molise  
National Park.

Municipality of Bisegna

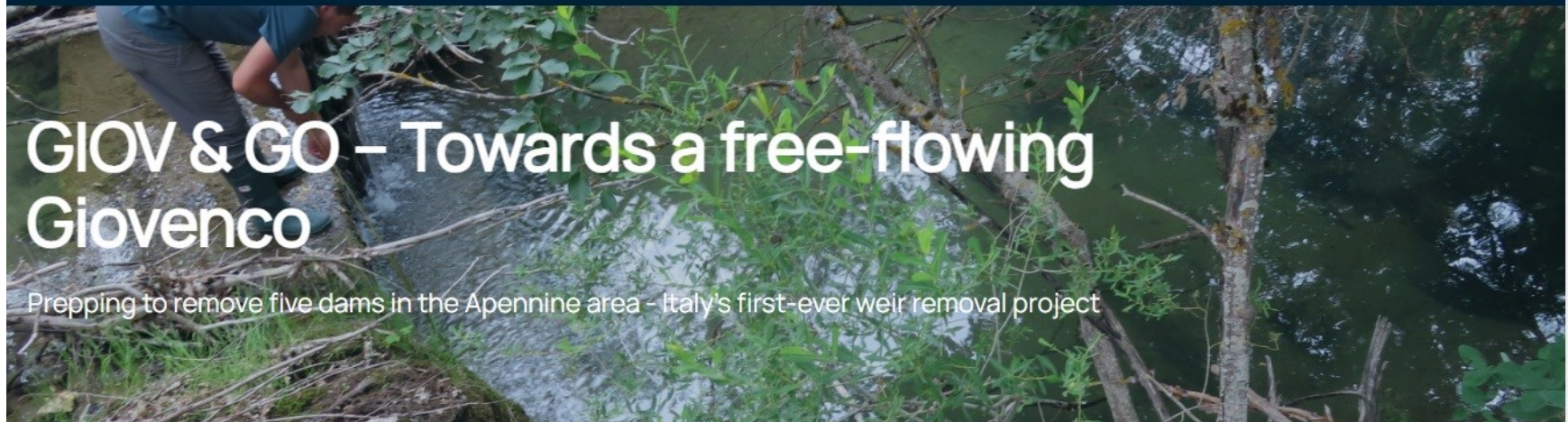
The Giovenco River:

- Spring at 2'000 m.a.s.l
- Runs for 25 km
- reaches Fucino's plain

15 weirs built for:  
hydraulic-forestry,  
hydroelectric, drinking use  
and irrigation purposes.








*Removing these dams would be the **first-ever weir removal project in the Apennine area and Italy**. It would offer a model that **can be replicated by other dam removal projects** within the same valley or similar catchment basins.*

- Applied and received a Feasibility study Grant in 2022
- Feasibility study started in February 2023 and completed in December 2023





# REMOVAL PROJECT - PREPARATORY STUDIES

- 
- Acquisition of bibliographic material + field investigations
  - Technical-economic feasibility study for removal (weirs and walls)
  - Assess hydraulic risk with and without weirs
  - Evaluate ecological aspects
  - Raise awareness about dams fragmenting rivers

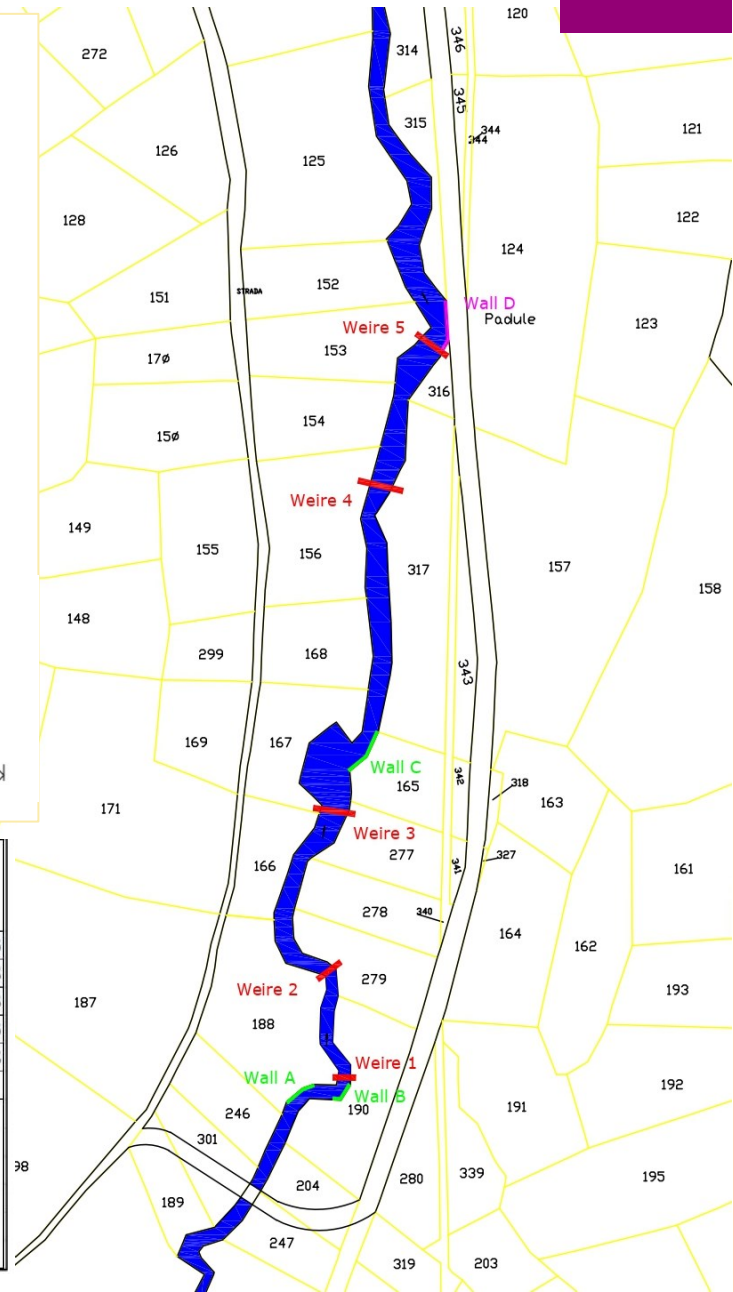
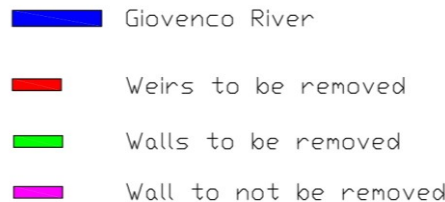


# HYDRAULIC-FORESTRY ARRANGEMENT PROJECT

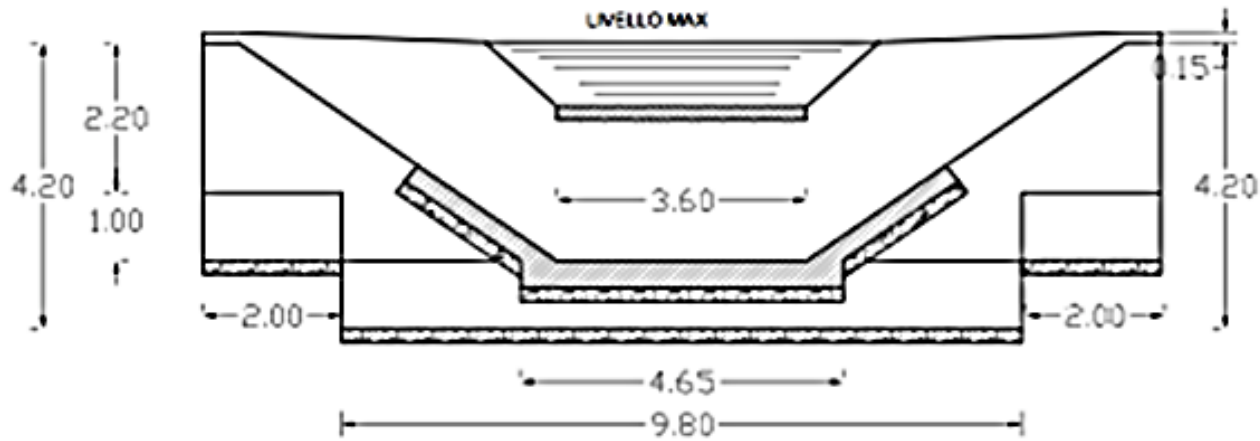
- Flood plain area
- 5 concrete weirs spaced approximately 100 m apart (built in 1980s)

Hydraulic-forestry management aimed at:

- stabilizing the banks of the riverbed
- reducing erosion.



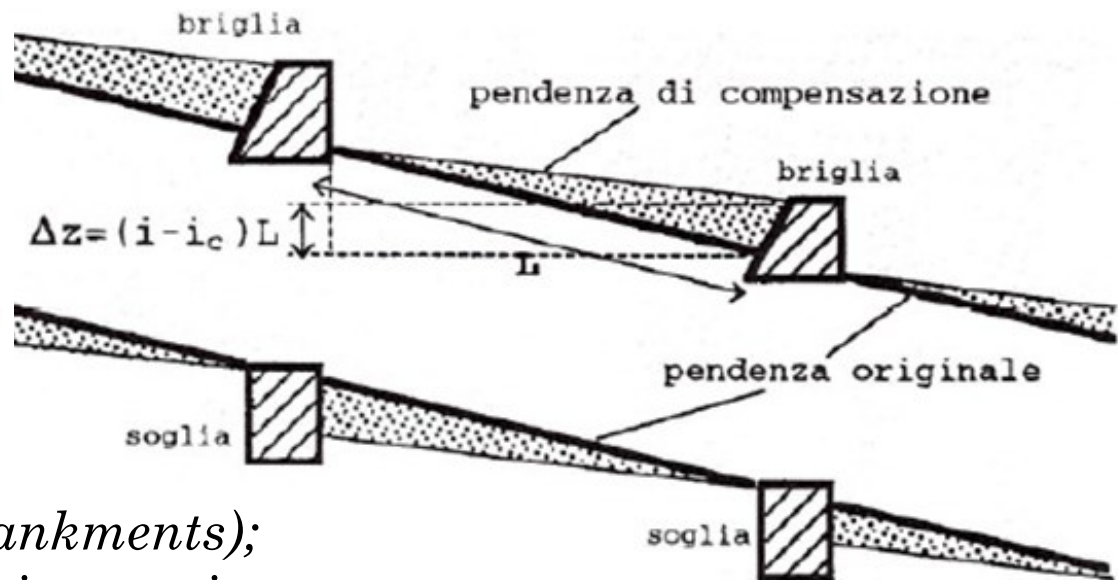
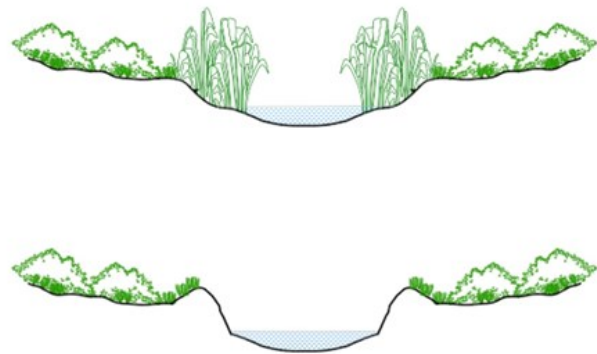
WEIR	widht overflow (m)	thickness (m)	height (m)	widht raft (m)	lenght raft (m)	crest widht (m)	tot m <sup>3</sup>
1	3,6	1	3,95	9,8	5,9	13,8	68,848
2	3,6	1	4,25	9,8	5,9	14,7	68,368
3	3,6	1	4,2	9,8	5,9	14,2	72,328
4	3,6	1	4,2	9,8	5,9	14,2	72,328
5	3,6	1	4,2	9,8	5,9	14,2	72,328
tot							<b>354,2</b>
WALL	lenght (m)	widht (m)	height (m)	tot m <sup>3</sup>			
A	11,1	1,2	1,5	9,99			
B	8	1,2	1,55	7,44			
C	18,8	1,9	2	71,44			
D	21,8	1,9	2,5	103,55			
tot				<b>88,87</b>			



Also:

River bank protection (longitudinal walls)

River dredged to deepen the riverbed and raise embankments



*River canalization (embankments);  
no more river-floodplain interaction*



# WEIR-INDUCED ALTERATIONS AFTER 40 YEARS

Effects in flow regulation,  
bedload transport and  
channel morphology

Upstream:

- Limited volume of sediment stored (did not evolve much since 1980s)
- Sand sedimentation/habitat lentification

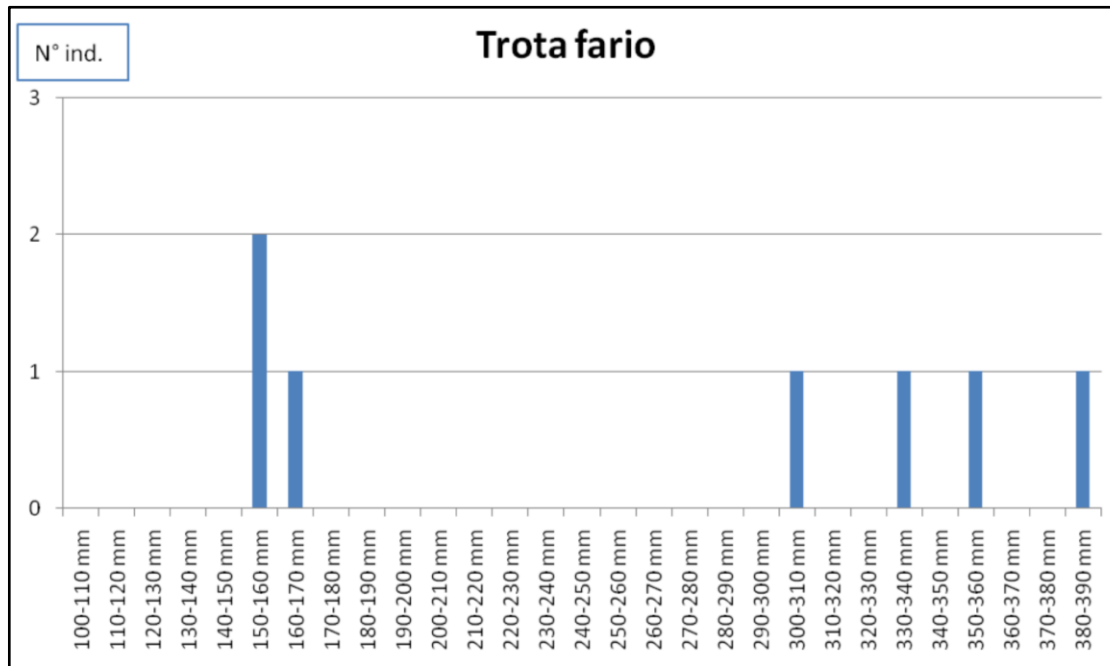
Downstream:

- erosion (riverbed and banks)
- deep holes
- banks instability



# EFFECTS IN FISH MIGRATION

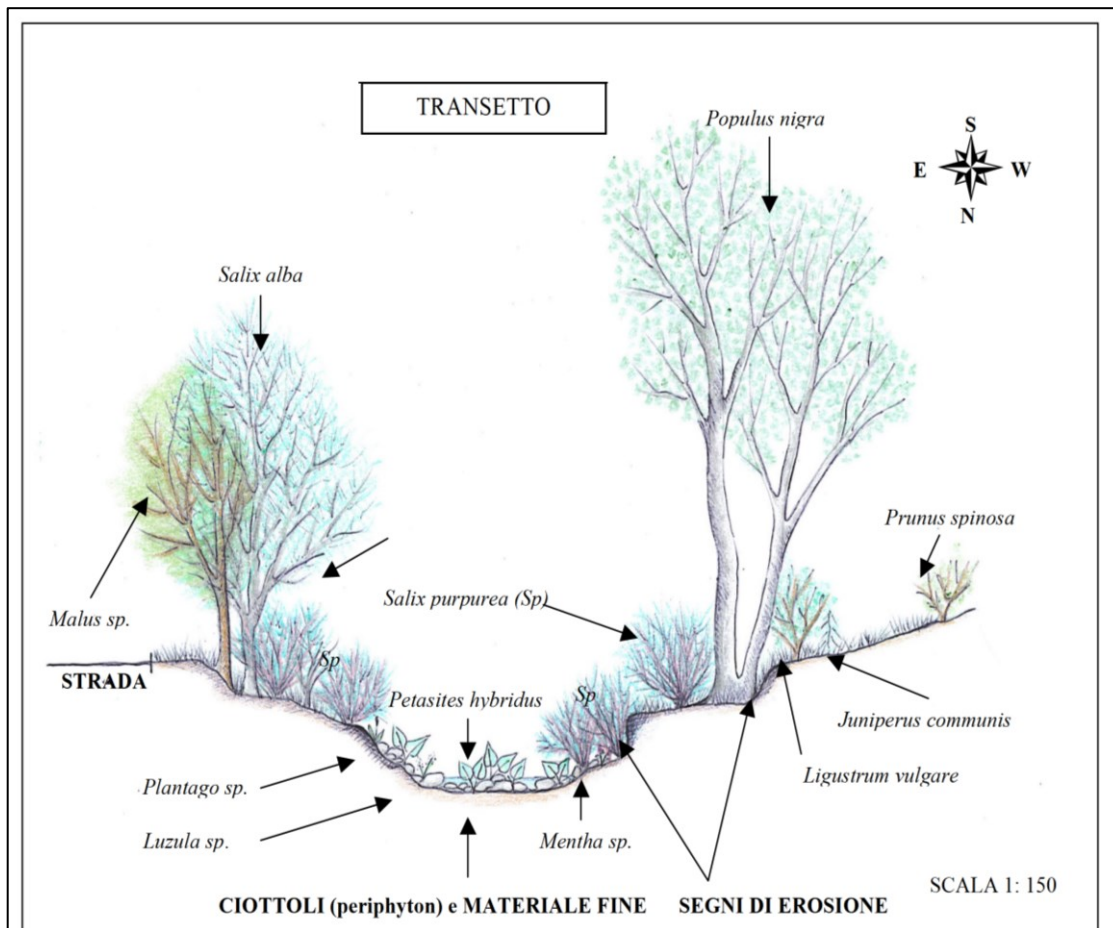
- Along the entire sampled stretch of the Giovenco: only *Salmo trutta* was present;
- The number of captured species **decreases drastically from downstream to upstream already after the second dam (of 5)**;
- The population shows basically three age classes with a very small number of individuals. Of the 8 species captured, **only one was present upstream of the second barrier starting from downstream.**





# EFFECTS IN RIPARIAN VEGETATION (LOW FLOW REGIME)

- Destructured vegetation with little or no herabceous and shrubby components;
- Prevalence of arboreal species with residual elements of the wood mantle;
- Presence of willows and poplars, homogeneous riverbed, absence of woody debris.



# AUTHORITIES AND STAKEHOLDER



Civil Department  
Abruzzo Region

*(Authorization procedure for dam removal)*



National Park of Abruzzo  
Lazio and Molise



Autorità di Bacino Distrettuale  
dell'Appennino Meridionale

Southern  
Apennine River  
Basin Authority



Municipalities of Bisegna,  
Ortona dei Marsi and Pescina

*Municipalities for  
THE RIVER CONTRACT*

Local associations

Schools

Citizen

Farmers

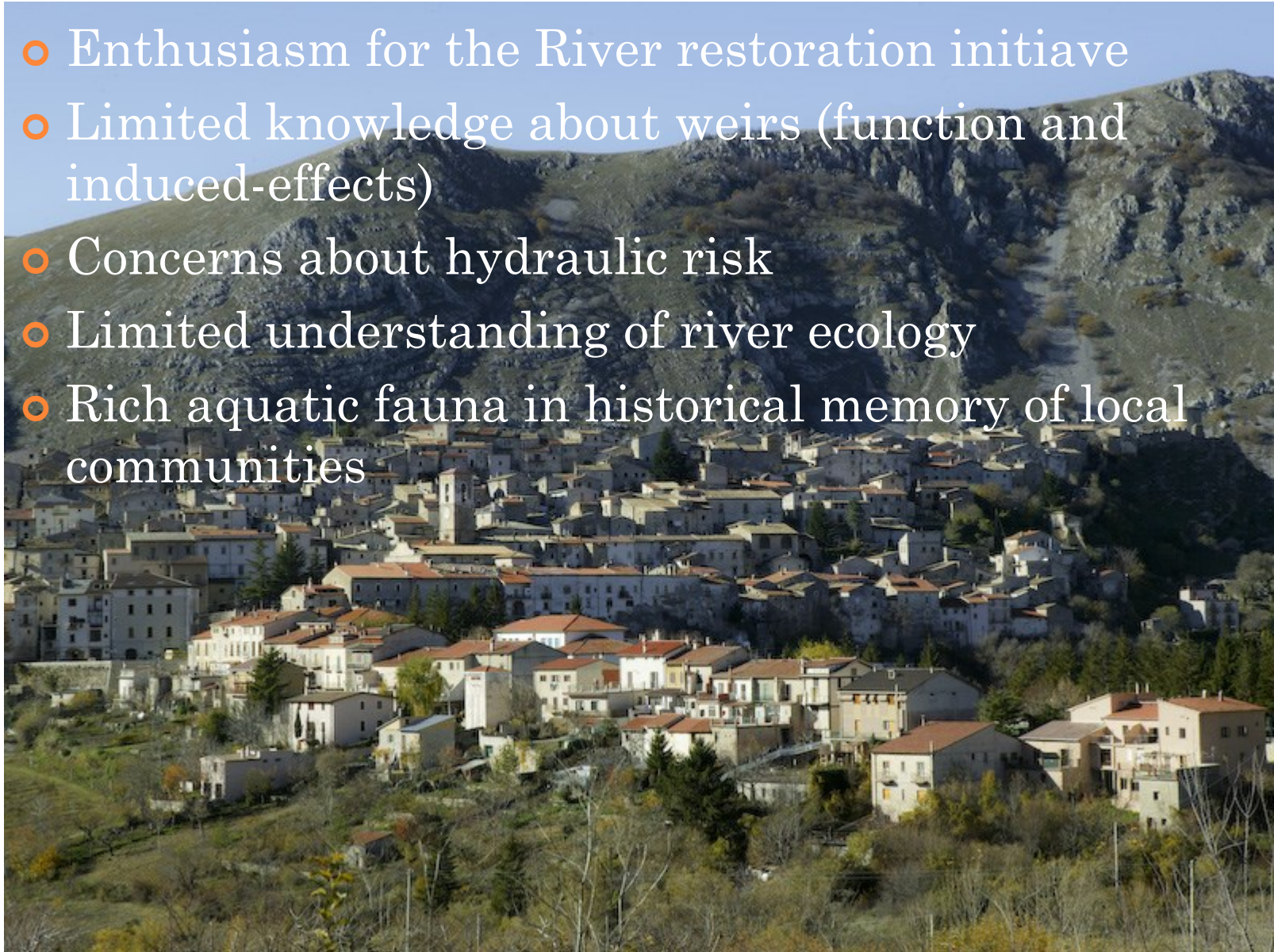
Local Fish & Game Association





# MEETINGS WITH ADMINISTRATIONS AND STAKEHOLDERS

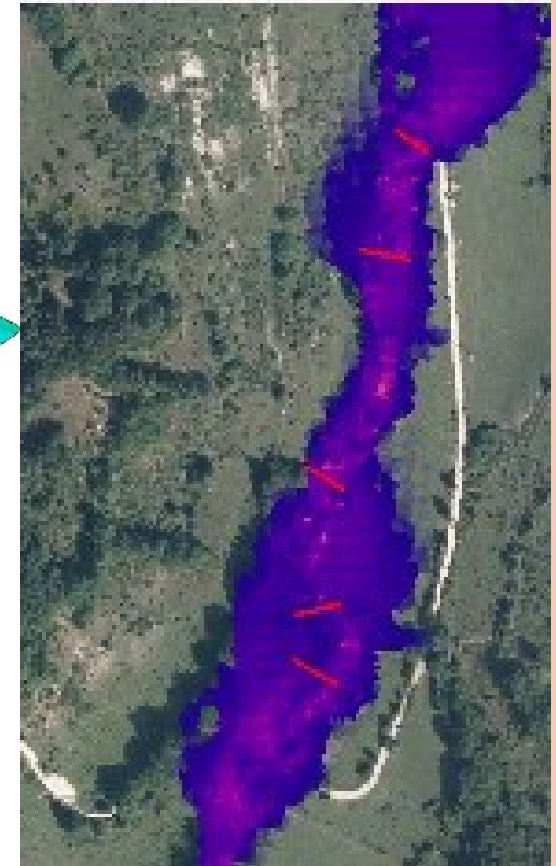
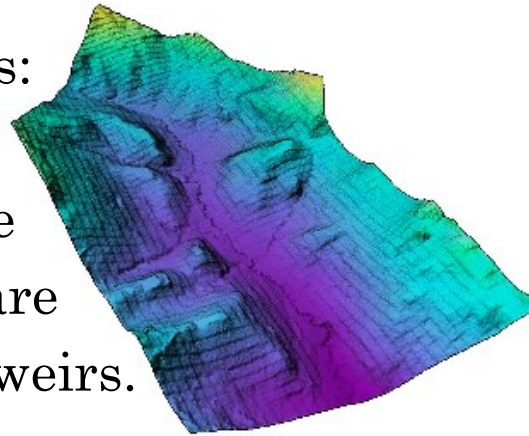
- Enthusiasm for the River restoration initiative
- Limited knowledge about weirs (function and induced-effects)
- Concerns about hydraulic risk
- Limited understanding of river ecology
- Rich aquatic fauna in historical memory of local communities





# FEARS ABOUT HYDRAULIC RISK: ASSESSING AND INFORMING

- Hydrodynamic evaluations:
  - Digital terrain modeling
  - critical rain and flood wave
  - calculation flowrate software
  - scenario with and without weirs.



→ *Demonstrating absence of flood risk.*



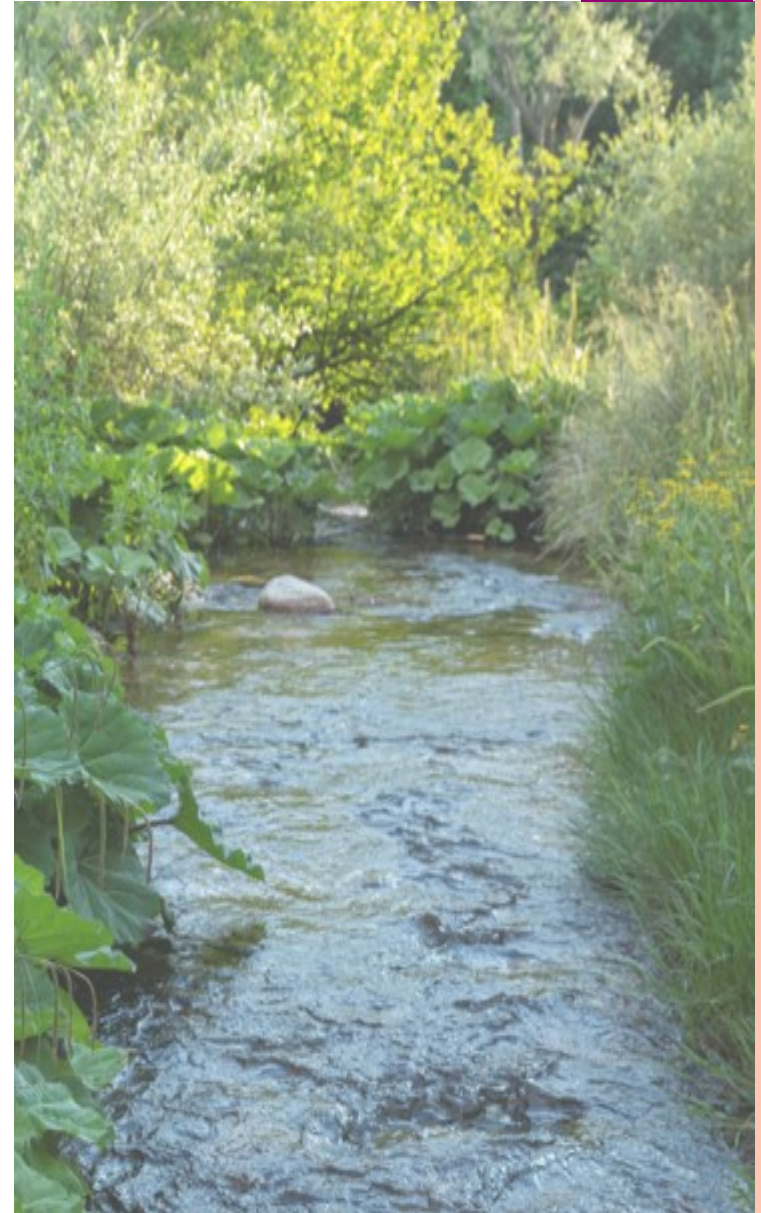
- Obtaining the Authorization by Hydraulic Authority
- Communicating with Authorities and stakeholders





# ECOLOGICAL ASPECTS

- Reconnecting 11.2 kilometers of river.
- Monitoring will improve predictions of responses without weirs.
- Experimental site for species-conservation projects (i.e. restocking of freshwater crayfish and Mediterranean trout).
- Complete coherence with Abruzzo National Park Management Plan for watercourses.
- New possibilities of lateral meandering of the watercourse along with the related processes of erosion/sedimentation (accumulation of woody debris; improvement in the colonization of the river stretch by fish, aquatic invertebrates, riparian vegetation; fish refuges availability)
- Potential “domino effects” to remove other weirs downstream.
- Catalyst for similar initiatives in other fragmented watercourses.



# PREPARATORY STUDY RESULTS

	With Weirs and Bank Walls	Without Weirs and Bank Walls
Hydraulic	No useful flood laminations Hydraulic jumps induce erosion.	No flood risk for urban areas and human activities. Slope rebalancing.
Morphodynamic	Uniform longitudinal sediment distribution. Presence of rigid discontinuity elements	Good morphological quality index. Mobilization of sediments currently retained by the barriers. Restoration of sediment transport processes
Economic:	Weir maintenance (sediment management and concrete structure degradation).	Monitoring costs (after dam removal).
Fish fauna	No fish upstream of the 5th weir; structured communities immediately downstream	Fish migration upstream
River habitat	Longitudinal and lateral discontinuity, biological impoverishment, habitat fragmentation,	Conservation projects for species Processes of erosion/sedimentation, Accumulation of woody debris, Improvement in the colonization by aquatic invertebrates, in fish refuges availability and in new colonization sites for riparian vegetation.
Riparian vegetation	River corridor fragmentation	Increase heterogeneity in vegetation structure and spatial distribution
Landscape	Threatened by abandonment and degradation.	Enhance and conserve the beauty and harmony of the river valley



# CONNECTING STAKEHOLDERS TO RECONNECT THE RIVER

## Educational aspects:

- Weirs structure and function
- Thinking river like an organism
- Positive effects of removal



## Training activities:

- Webinars for a wide public
- Information sharing meetings
- School Workshops



# ONGOING ACTIVITIES/FOLLOW-UP

In progress:

- Executive project
- Implement Civil Engineering Authority prescriptions
- Request for approval from Authorities
- Communication activities with schools.
- Proposal submission to Open Rivers Programme

Follow-up:

- Obtaining final permits and funding.
- Removal of the weirs.
- Monitoring plan
- A wide river restoration design





We are working to leave the  
Giovenco River free to Flow

Thank you for your  
attention