

Global workshop
Conjunctive Management of Surface Water and
Groundwater: National to Transboundary Level

16-17 October 2023, Geneva Palais des Nations

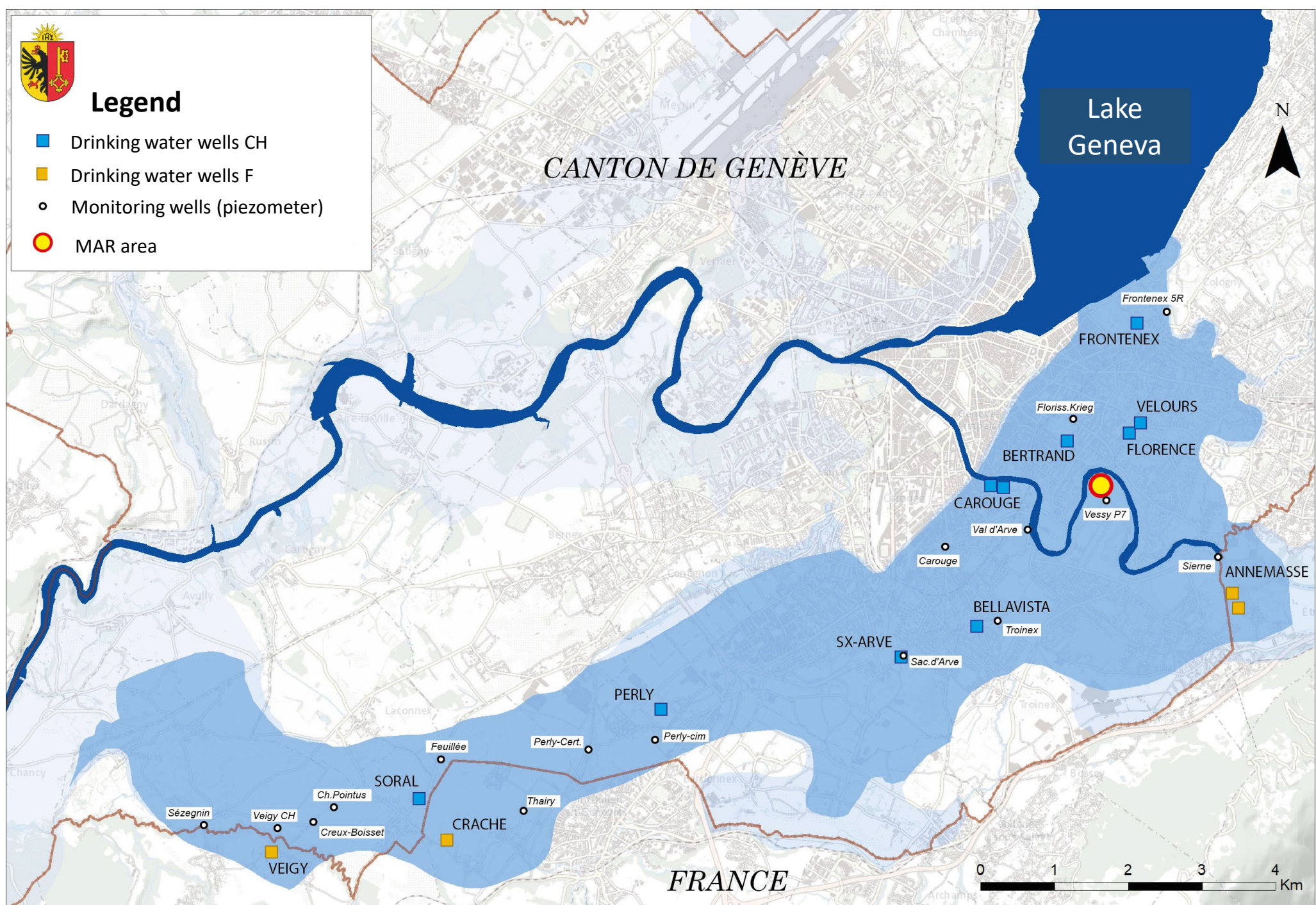
MANAGED AQUIFER RECHARGE AS A TOOL FOR THE GENEVESE AQUIFER MANAGEMENT

Dr Gabriel de los Cobos
OCEV/GESDEC
Canton of Geneva / Switzerland

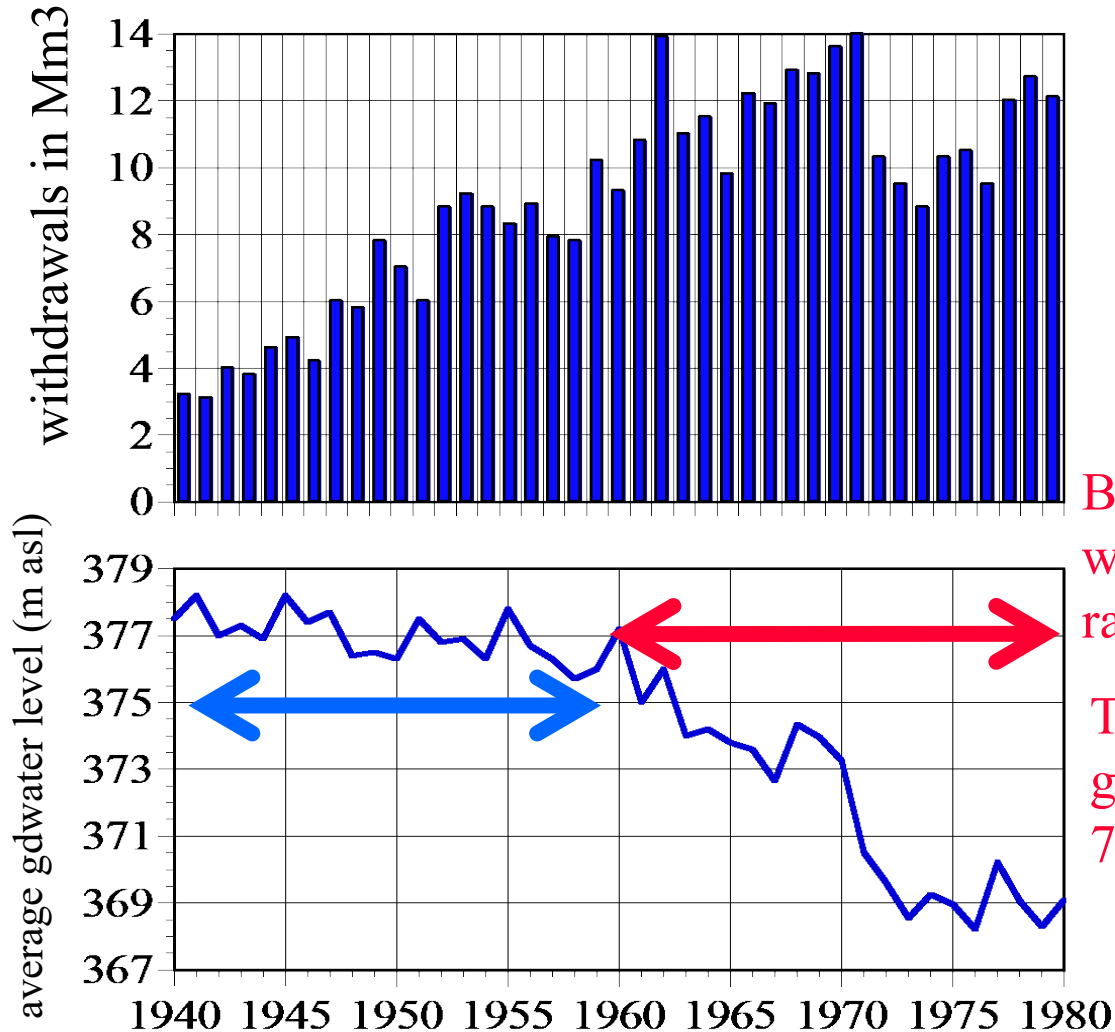


Legend

- Drinking water wells CH
- Drinking water wells F
- Monitoring wells (piezometer)
- MAR area



Behaviour of the “Genevois” groundwater level before A.R.



Between 1940 and 1960 the groundwater level was slowly decreasing without serious effects

Between 1960 and 1980 the aquifer was overdrafted with withdrawal rates up to 14 Mm³/year.

This overpumping lowered the groundwater level by more than 7 m in 20 years

Urgent hydraulic management:



To consider a decrease in withdrawal rate by using another water resource (the construction of a new water filtration and treatment plant in the lake)



To carry out a reinforcement of the natural capacity of groundwater by artificial recharge

2 criteria:

1 - water supply security (diversification of water resources)

2 - economical criteria (the cost of a groundwater A.R. is not the same as a new water treatment plant in the lake)

Geneva MAR concept

1 Water Intake

Water is pumped from the Arve River and sent to the water treatment plant

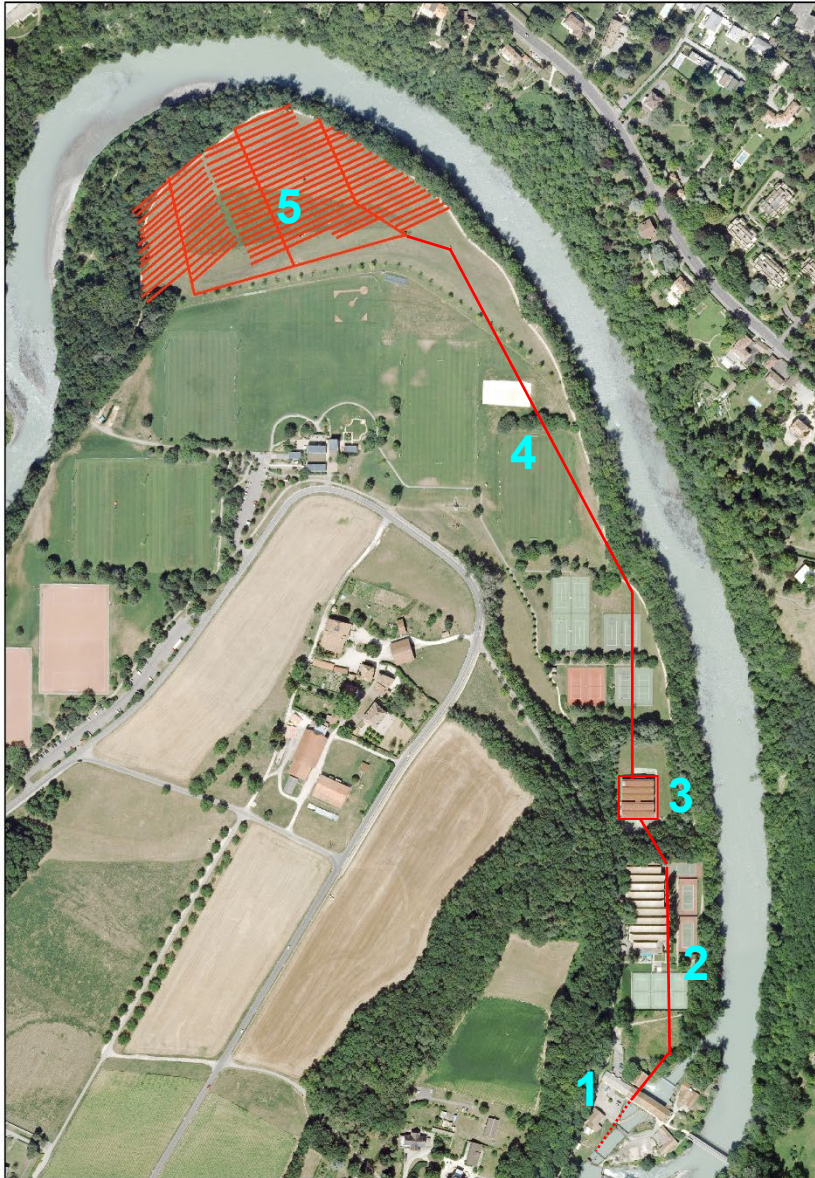
2 Water treatment

Water is filtered out and cleaned through different treatment steps

3 Infiltration of water into the underground

Water is injected into the underground by a reverse drainage system. In the aquifer, the water is naturally filtered by the ground to reach the water table.





Description of the artificial recharge system

5 Underground infiltration area
(perforated pipes-length 5000m)

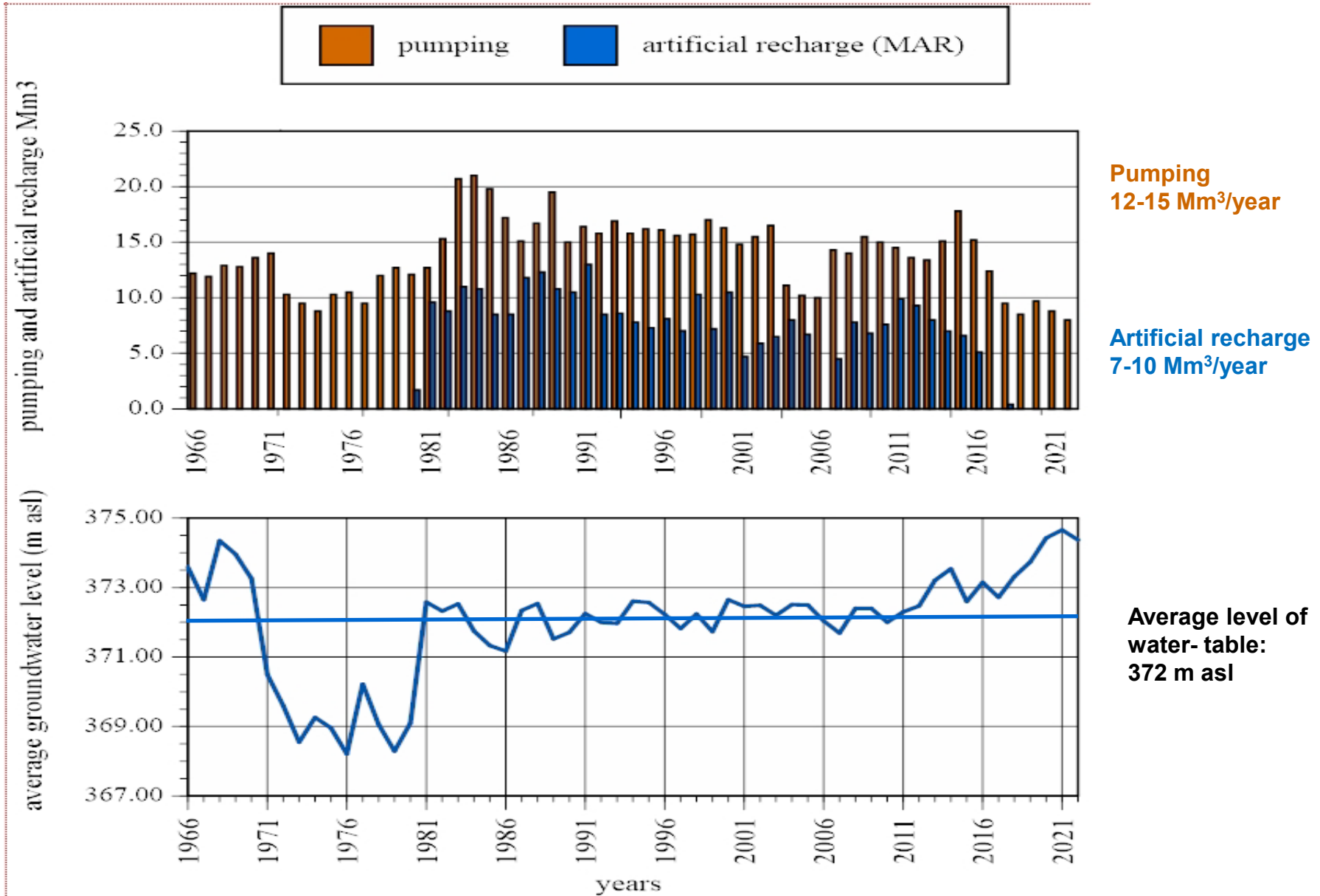
4 Pipe to the infiltration area
(length 700m)

3 Water treatment plant

2 Pipe to the plant (length 340m)

1 Water-intake structure

Impact of MAR after 40 years (1980-2022)



1978: Arrangement between the canton of Geneva & the prefecture of Haute-Savoie /1

- The basic idea was to create an arrangement to follow a pragmatic approach based on a rational management of the common resource

- The Arrangement covers the following matters:
 - The Commission
 - The annual aquifer management programme
 - The groundwater recharge installation
 - Water rights
 - Water pricing

- The arrangement entered into force on June 1978 and was agreed for 30 years. It became an official agreement in 2008 as a document outlining the management of Genevese aquifer for the next 30 years, with legal support and recognised at administrative and political levels

1978: Arrangement between the canton of Geneva & the prefecture of Haute-Savoie /2

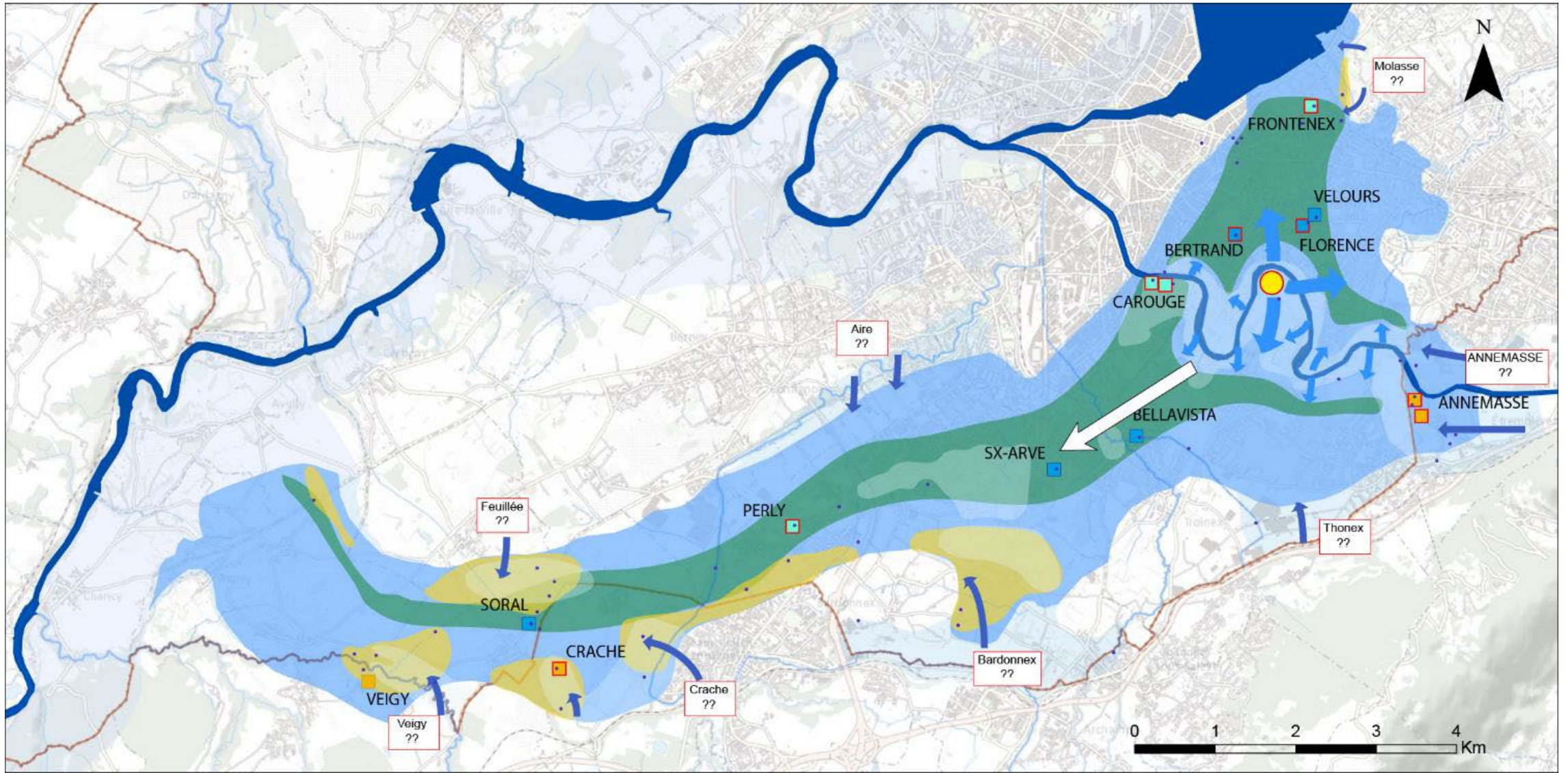
- The French authorities do not participate to the costs of construction of the plant, but wish to still benefitting from artificial recharge.
- The French authorities obtain an annual allowance (franchise) of 2 Mm³.
- Price per m³ over the franchise calculated on the basis of an equation with several factors (total pumping CH+F, the costs of operating the plant, depreciation, share in natural recharge, volume pumped by the French communities minus the franchise).

Key success factors

- The Arrangement ignores territorial sovereignty and territorial integrity concepts.
- To adopt a strategy for common use of the transboundary resource.
- To tackle a problem relating to international water resources at local level, rather than at the level of sovereign states (Canton of Geneva & Department of Haute-Savoie).
- The technical aspects (hydrogeological studies, management of pumping stations, local hydraulic assessments) well known and dealt with by local actors who would then relay the information to decision-makers at the local level.
- The Committee: as main stakeholder, being at the center of all discussions and meetings, this commission has been crucial to this success.

Genevese aquifer

Natural infiltration + MAR + lateral water inflows



Conclusions

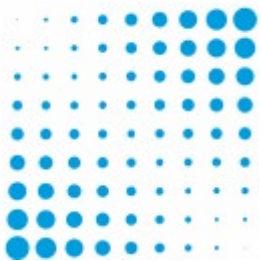
The Geneva aquifer constitutes a common strategic water reserve on both sides of the border.

The MAR plant is insurance that allows operators to sustain this resource and to exploit it to cover needs.

For more than 45 years, the agreement (and the aquifer recharge) has allowed the two parties to exploit it according to maximum quotas rarely reached.

Due to the climatic changes, the severe drought last two years and the increased needs of water, reflection around a common pot is necessary. The Swiss part proposes to end the franchise system and to calculate the financial participations in a logic of common pot. The objective is to set up a predictable financial participation independent of the volumes withdrawn by the other parties.

The results of this work could be presented next year. If they lead to a new agreement, it will represent an incredible historic step forward in the development of an agreement on a shared groundwater resource.



THANK YOU

Dr Gabriel de los Cobos
OCEV/GESDEC
Canton of Geneva / Switzerland
gabriel.deloscobos@etat.ge.ch

