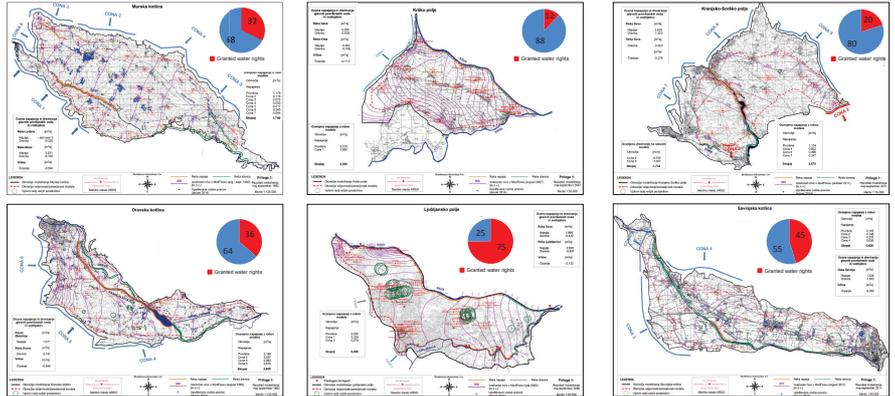
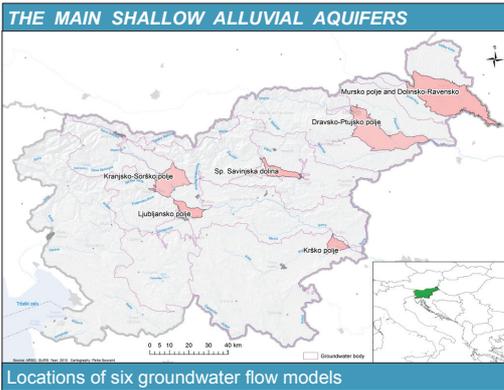


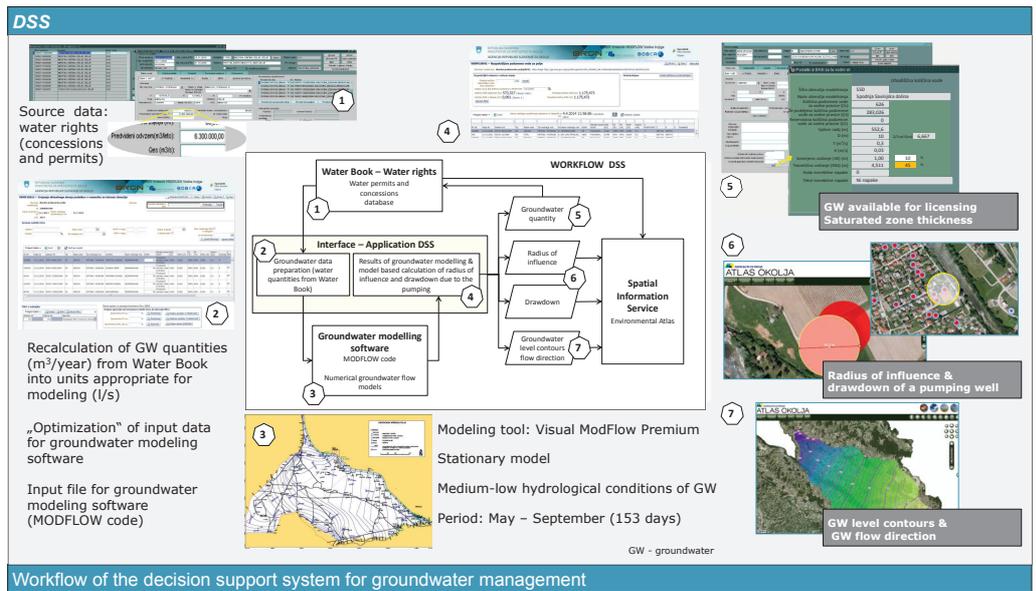
Regional groundwater flow models in shallow alluvial aquifers

The decision support system for groundwater management in the main shallow alluvial aquifers links regional groundwater flow modeling results with the water permits and concessions databases in a complex decision support system. The aim is to help water rights managers to quantify groundwater reserves for a given aquifer and provide additional information about quantity of groundwater for water rights licensing.

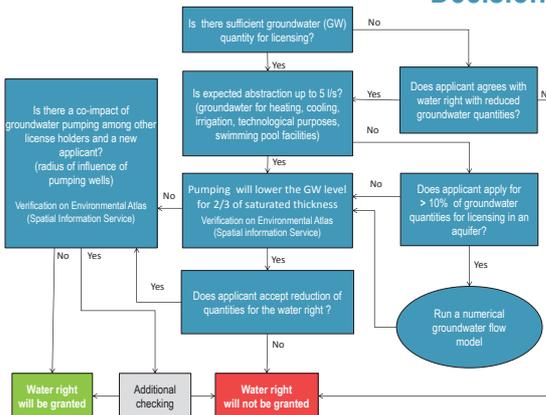


The decision support system (DSS)

The basis for the DSS are six regional groundwater flow models which were set up for the aquifers within groundwater bodies under large abstraction stress. To obtain the information about quantity of groundwater for a given aquifer, the DSS, in conjunction with the models, uses the data from the water permits and concessions databases and ensures a control mechanism on groundwater level decline at a given location due to pumping, as well as a mechanism to control co-impact of groundwater pumping (radius of influence). With the DSS, exactly defined quantities of groundwater are predicted for granting the water rights. The DSS works in a way that a certain amount of groundwater could be reserved as well.



Decision making process in water rights licensing



The goal of the presented DSS is to provide control mechanisms in order to verify the granting of water rights for the sustainable use of groundwater resources.

The system enables that the water quantity data from water permits and concessions in conjunction with the numerical groundwater modeling results are used in the managing process of granting water rights to users in terms of:

1. their long-term access to groundwater (sufficient quantity of groundwater);
2. relation to the water rights of other users (co-impact of groundwater pumping);
3. groundwater access must be managed in such a way that it does not cause unacceptable local impacts (pumping must not lower the water level for more than 2/3 in the aquifer in the medium-low hydrological conditions).