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Identification of potential sites of groundwater / surface water interaction at the Artois-Picardie basin scale

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Abstract :

To facilitate the assessment of the effects of “groundwater / surface water” interactions on water quality, within the framework of the Water Framework Directive (WFD), the Artois-Picardie Water Agency and BRGM have joined forces to develop an innovative multi-criteria approach, to better characterize these exchanges at basin level.

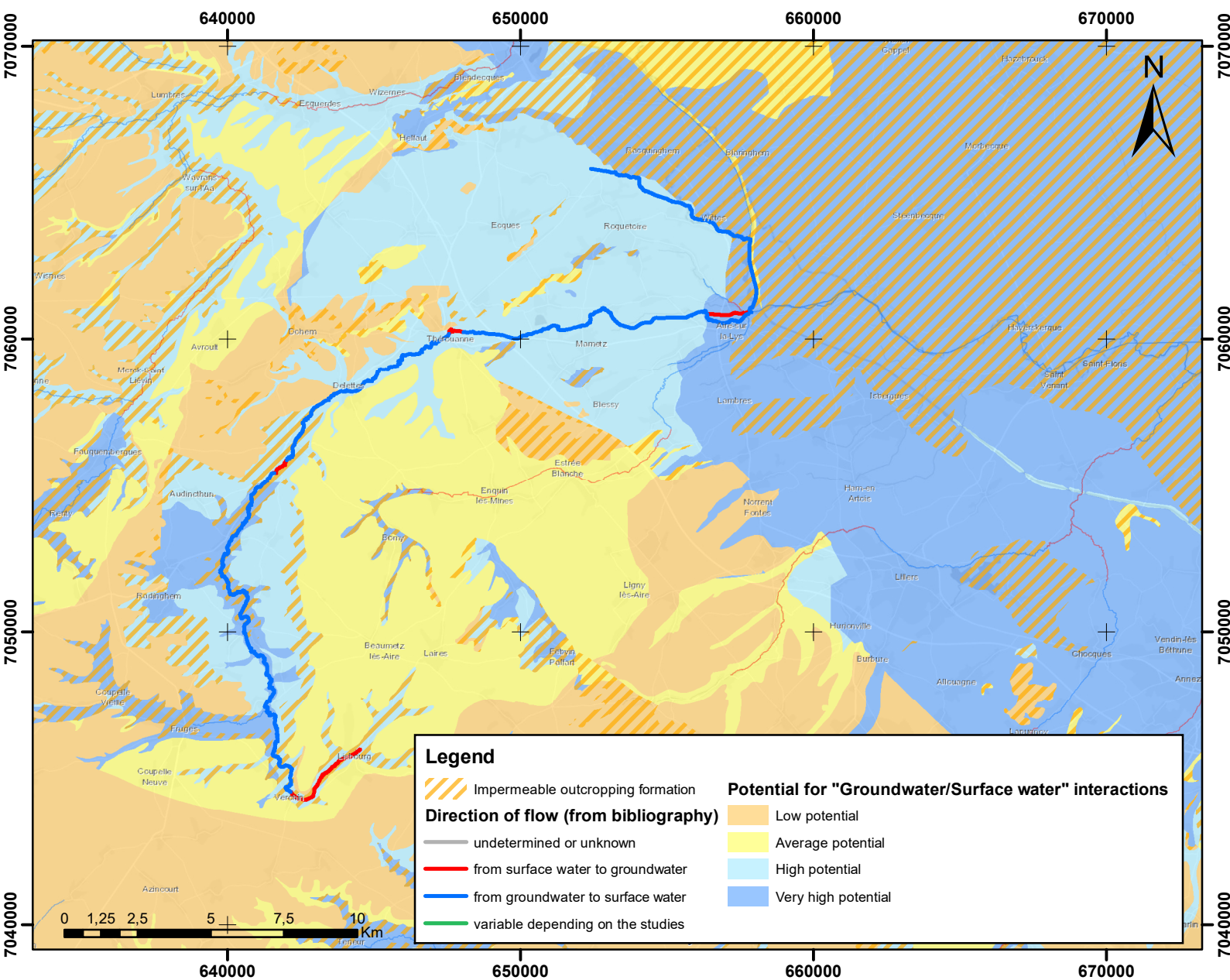
To meet the needs of the WFD aimed at verifying the non-degradation of surface water due to groundwater, it is necessary to have a good prior knowledge of the areas potentially favoring exchanges between groundwater and surface water. In Artois-Picardie, numerous studies carried out in recent years have made it possible to acquire knowledge, often local, but no capitalization or valorization has so far been really undertaken.

Different approaches have been carried out as part of this knowledge synthesis:

- a bibliographic inventory and the construction of a georeferenced database leading to the characterization of "groundwater/surface water", observed or supposed, interactions on more than 2000 hydrographic segments;
- the development and implementation of an innovative multicriteria approach combining geomatics and geostatistics to determine the areas with the greatest potential for interaction;
- the identification of the most relevant hydrogeochemical indicators to target the hydrographic segments benefiting from the strongest support by groundwater.

In the end, several areas were identified as very favorable to "groundwater / surface water" interactions, in particular the chalky valleys, the Marquenterre coastal aquifer on the western coastline, the pissard sands crisscrossed by watergangs on the northern coastline and the thanetian sands (only the outcropping parts outside the Orchies basin and outside the area undercover by the Flanders overconsolidated clays).

These conclusions were compared with the results of the work of the Water Agency on the ecological and chemical state of surface water, with the aim of locating the so-called “high-stake” areas. Several rivers, with degraded water quality and apparently fed by groundwater, have been identified: the upstream and middle Lys, the Souchez, the Scarpe river upstream, the Selle / Escaut and the Scardon. These areas will be the subject of additional investigations in order to characterize more precisely these “groundwater / surface water” interactions.



Results of the bibliographic inventory and the geomatics/geostatistics approach on the FRAR36 water body of the Lys river (source: BRGM)



The banks of the Somme from the marshes of Longpré-les-Corps-Saints, Picardie (source: © Stéphane BOUILLAND - Fotolia)