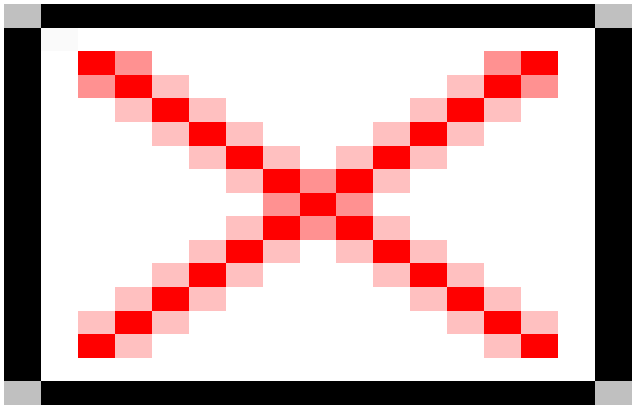
IMDC
Locks
Water resources management / Water quality
Location:
Belgium
Client:
Hydraulic Research Laboratory (SPW)



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Seine-Scheldt-East project in the Walloon Region

The Seine-Scheldt-East project in the Walloon Region, Belgium, implies the upgrade to class Va of the ?Dorsale Wallonne?. This artificial link between Scheldt and Sambre Rivers comprises the following canals: Pommeroeul-Condé, Nimy-Blaton-Péronnes, Centre and Charleroi-Bruxelles. As the link crosses the drainage divide between the Scheldt and Sambre basins, the natural catchment areas of the canals are restricted and most of the water consumption of the locks is supplied by pumping, from either River Scheldt or River Sambre. Additionally, low waters on River Sambre can be supported through water release from the Eau d?Heure reservoirs.

As the traffic is expected to grow significantly after the opening of the Seine-Scheldt link, the total water consumption of the system will also increase. On the other hand, as a consequence of climate change, the total water availability could significantly reduce in the future. The Service Public de Wallonie (SPW), represented by the Hydraulic Research Laboratory, has therefore requested from IMDC a global investigation of the long term water balance of the canals system.

The water balance has been modeled using DHI Mike Basin software. The model represents all the canals reaches as reservoirs, connected through the locks, spillways, turbines and pumping stations. All the relevant water fluxes are taken into account:

1. lock consumption, as a function of traffic ?amount and type of vessels;
2. natural water supply balance by rain, run-off from the catchment and evaporation;
3. transfers by pumps and turbines fluxes between reaches, or by release from the Eau d?Heure reservoirs;
4. losses due to evaporation, infiltration, spillways, gates leakages, etc.

The transfers by pumping or release are governed by deficit laws: typically, pumps are switched on when the reach level decreases below an alarm level, and switched off when the level raised up to a second reference level.

After a validation of the model for the present-day situation and a sensitivity analysis, consumption was increased according to traffic prediction, and water resources were altered according to climate change forecast (year 2050). The impact of several structural and/or operational changes to the system was tested.

The water volume remaining in the Eau d?Heure during dry season served as an indicator of the system?s sustainability.

When pessimistic climate change forecast is considered, the study highlighted serious concerns regarding the system?s sustainability in the future if no action is taken. It also pointed out some solutions that could help to maintain navigation at long term, such as:

1. increase of water quality and thus reduction of some unnecessary consumptions;
2. re-evaluation of minimum discharge in River Sambre;
3. increase of Eau d?Heure reservoir catchments by pumping; etc.