

Interactions eaux de surface – eaux souterraines

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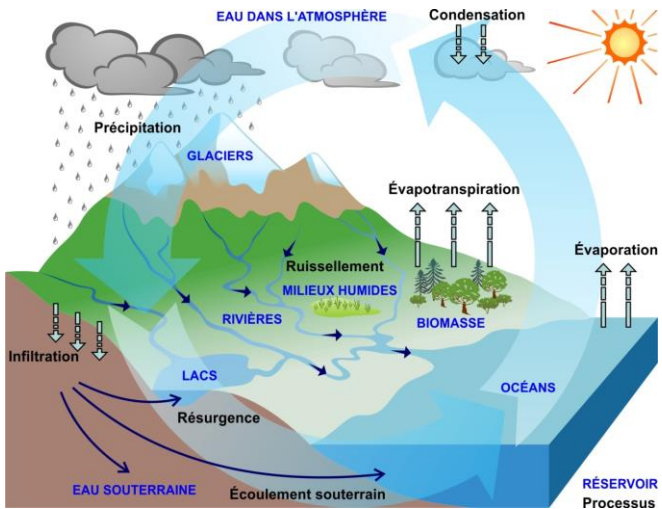


Chaire de recherche
Eau et conservation
du territoire



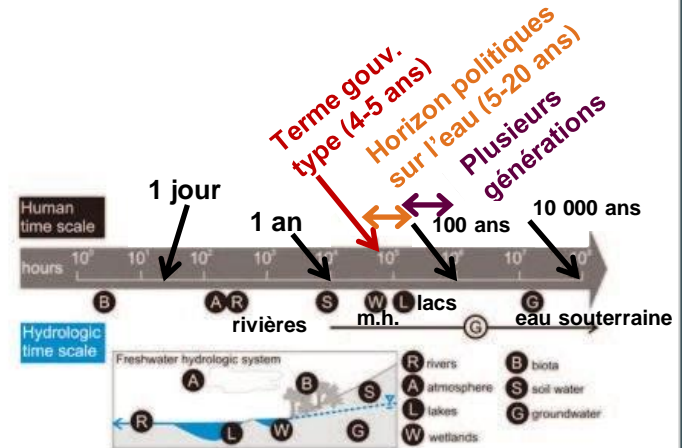
Pourquoi s'intéresser aux interactions?

Eaux souterraines et de surface: une même ressource



www.RQES.ca

Un horizon parfois éloigné

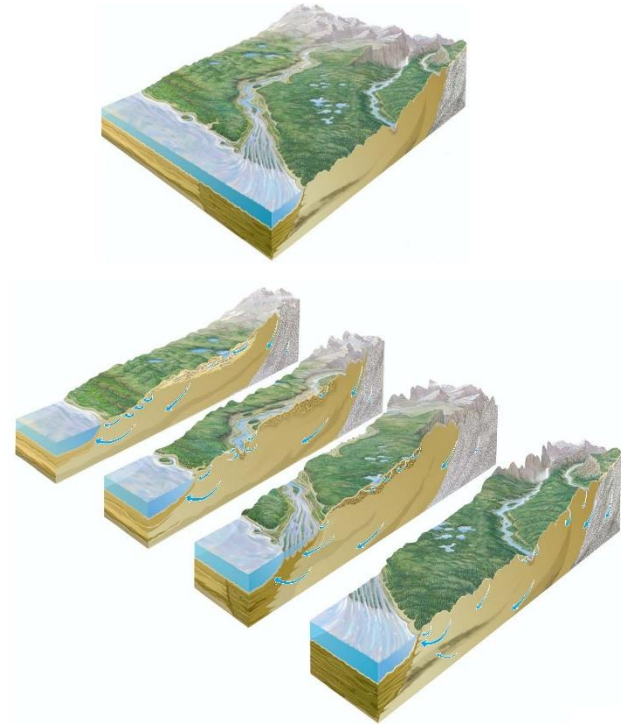


Gleeson et al. (2010)

Où se trouvent les interactions?

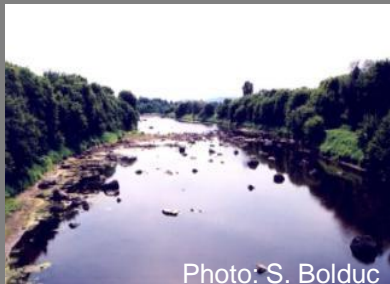
- Sources
- Lacs
- Rivières
- Milieux humides
- ➔ Différentes échelles

Les interactions sont partout, de la montagne à la mer



Winter et al. (1998)

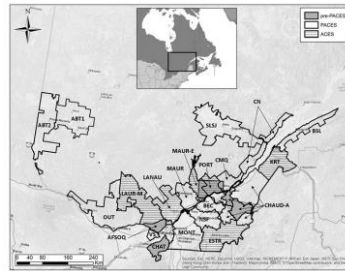
Quels services sont rendus par l'eau souterraine?



Comment s'écoule l'eau souterraine?

Quantifier la recharge (passée, actuelle et future) est nécessaire pour comprendre les interactions.

Connaissances sur les eaux souterraines

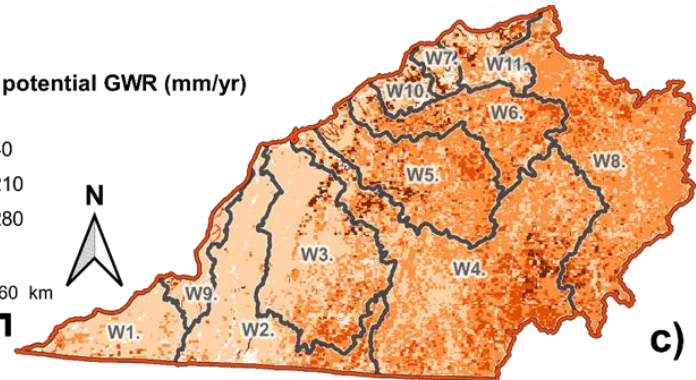
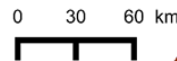
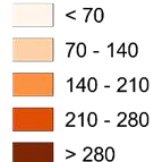


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Cartographie supra-régionale de la recharge

Simulated potential GWR (mm/yr)

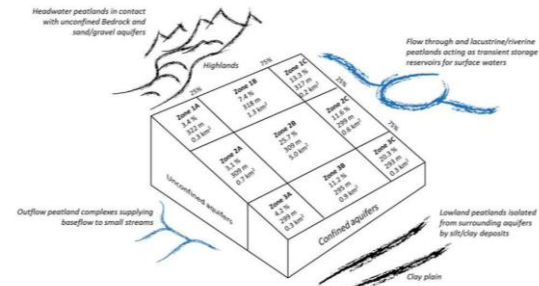
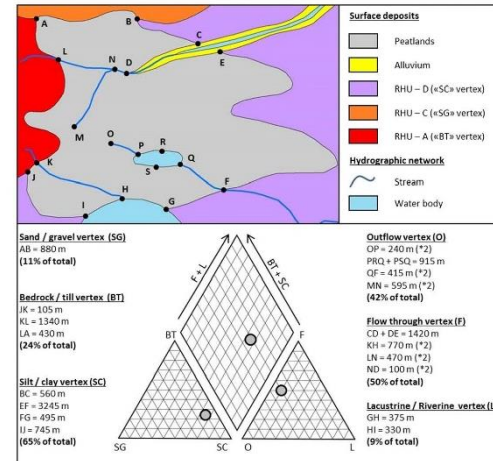


Dubois et al. (2020)

Comment identifier les interactions?

Exemple d'approche cartographique pour identifier l'hydrodiversité des tourbières

- ➔ Développée Abitibi
- ➔ Testée Laurentides



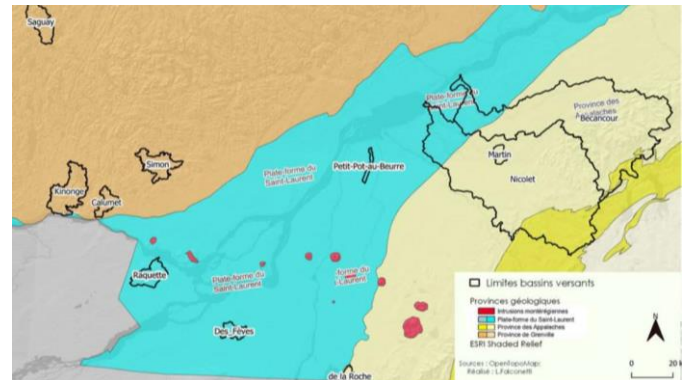
Rosa et al. (2018)

Comment identifier les interactions?

Exemple de traçage des apports d'eau souterraine aux cours d'eau (radon-222)

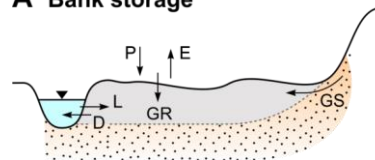
- Où et combien?
- Dans quelles conditions?
 - Topographie
 - Géologie
 - Utilisation du sol

Bassins versants où les apports d'eau souterraine ont été tracés

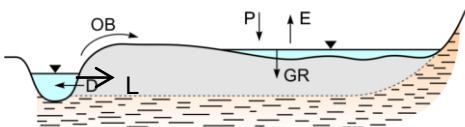


Aquifère - milieu humide - rivière

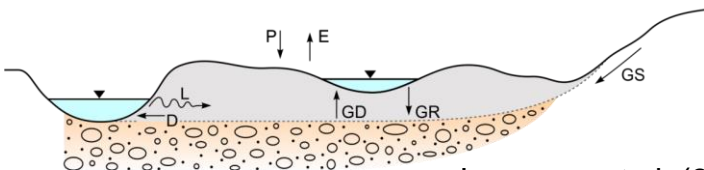
A Bank storage



B Overland storage



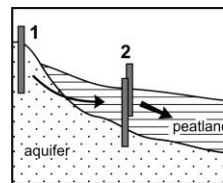
C Flood wave attenuation



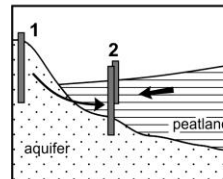
Larocque et al. (2016)

- P Precipitation
- E Evaporation
- L Lateral inflow
- D Drainage
- OB Over-bank flow
- GS Groundwater seepage
- GD Groundwater discharge
- GR Groundwater recharge
- Wetland
- Sandy silt
- Clayey silt
- Coarse sand/gravel

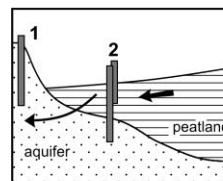
Aquifère - tourbière



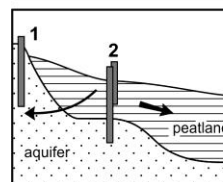
a) I_{par-in} : **parallel horizontal inflow**
Groundwater from the shallow aquifer flows into the peatland and peatland water flows in the same direction (LB2, SMB, SS, SN)



b) I_{conv} : **convergent horizontal flow**
Groundwater flows from the shallow aquifer into the peatland where it converges in the lagg with water flow from the peatland center to the peatland margin (LR1, LR2, MB)



c) $I_{par-out}$: **parallel horizontal outflow**
Peatland water flows out of the organic deposits and into the shallow aquifer (SSY, V1, V2)



d) I_{div} : **divergent horizontal flow**
From a piezometric mound at station 2, peatland water flows into the shallow aquifer and towards the peatland center (LB1, LC)

Ferlatte et al. (2015)

Vers une typologie des interactions

Comment étudier les interactions à long terme?

Instaurer des Laboratoires naturels

- Instrumenter et suivre
- Étudier et comprendre
- Développer et tester des approches
- Planifier

Laboratoire naturel du mont Covey Hill



Photos: Phil Norton

Réserve Kenauk Nature



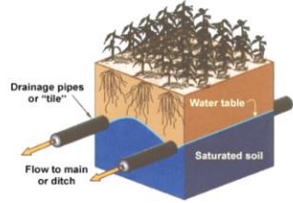
Photos: James Harris



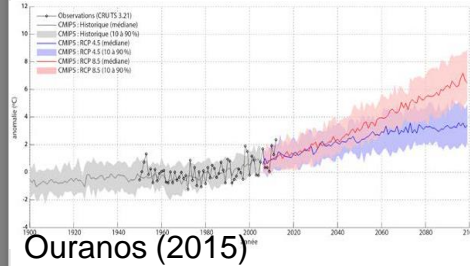
<https://multisite-sciences.uqam.ca/laboratoiresnaturels/>

Quelle vulnérabilité aux pressions (anthropiques et climatiques)?

Drainage



Climat changeant



Redressement



Foresterie



Urbanisation



Exploitation tourbe



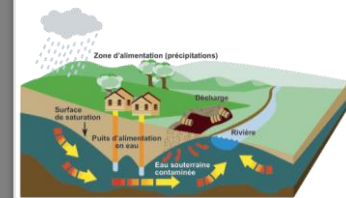
Pompage



Pollution diffuse

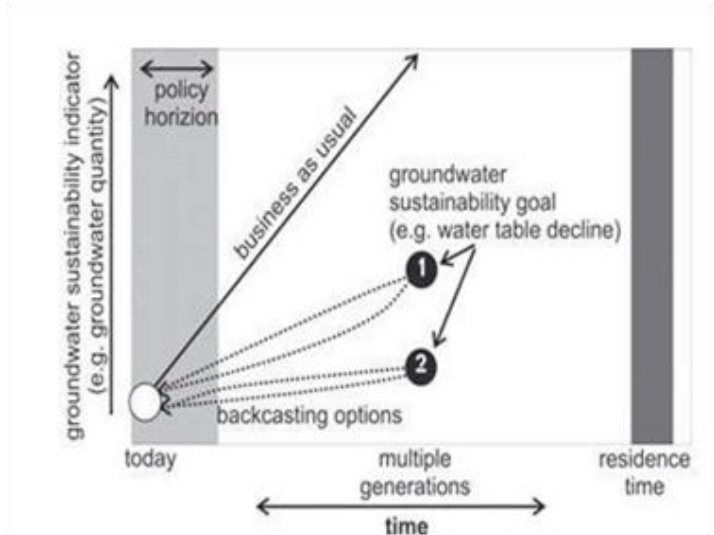


Pollution ponctuelle



Une démarche participative et à long terme

1. Identifier les besoins de connaissances*
2. Caractériser le milieu
3. Quantifier les limites de l'hydrosystème
4. Définir des seuils
5. Planifier les usages
6. Suivre les indicateurs
7. Ajuster la planification



* Sondage et entrevues en cours auprès des acteurs (mené par le RQES)

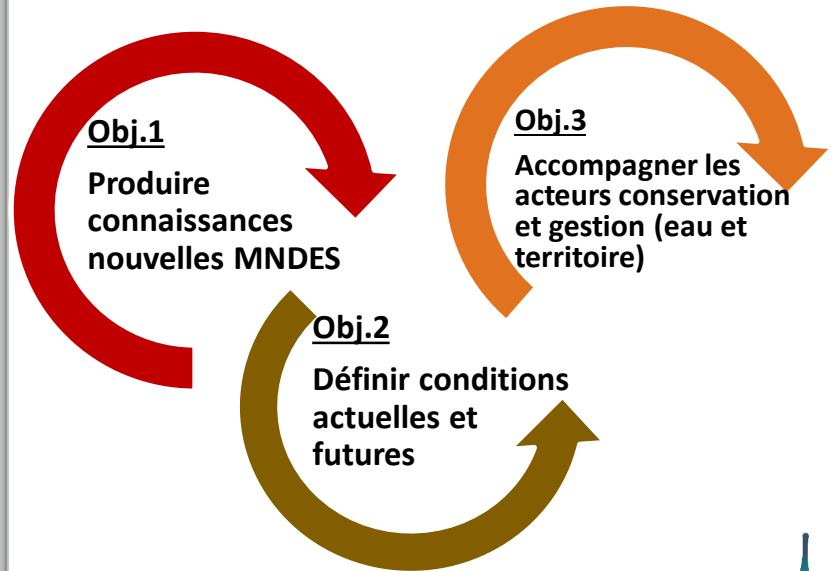
Gleeson et al. (2012)

**Compréhension,
planification, adaptation**

Chaire *Eau et conservation du territoire*

Mission

Comprendre comment les milieux naturels terrestres dépendent des eaux souterraines (MNDES) dans le but de faciliter leur protection.



Références

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Merci