Perceptions of the impact of urban land use planning on surface water contaminations in a Mediterranean catchment

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The Montpellier metropolitan area is **densely urbanised**
- Highest population growth in France
- 277,639 inhabitants in Montpellier city
- 4,881 inhabitants/km²

The Lez river is a 29 km long river flowing across the urban area

What are the contaminants generated by the urban area of Montpellier?
Contaminations in the Lez catchment

- **PAHs** (road traffic, combustion processes) (Liu et al., 2016; Stein et al., 2006)

- **Trace metals** (road traffic, roof surfaces) (Egodawatta et al., 2007; Fallah Shorshani et al., 2014)

- **Fecal Indicator Bacteria** (sewage overflows and animals) (Marsalek and Rochfort, 2004; Ram et al., 2007)

- **Organotins** (Domestic activities, Priority substance of the water framework directive) (Bancon-Montigny, 2001; David et al., 2012)
Aim of the study

What is the influence of urban land use planning on surface water contaminations?

1. Hydrological modelling of contaminant loadings under three scenarios of urban land use planning
2. 15 Interviews with local stakeholders How do they consider water quality issues related to urban runoff?
Schéma Directeur d'Aménagement et de Gestion des Eaux (SDAGE)
Agence de l'eau Rhône-Méditerranée-Corse, DREAL, DDTM

Schéma de Cohérence Territoriale (SCoT)
Montpellier Méditerranée Métropole (M3M)

Plan Local d'Urbanisme intercommunal (PLUi)
M3M, Municipalités

Schéma d'Aménagement et de Gestion des Eaux (SAGE)
SyBLe

Comission Locale de L'eau (CLE)

Compatibility

Conformity

Planning authorisations
Presentation of local stakeholders

Surface water contaminations generated by the urban area of Montpellier

Consultancies
- Aquascop

Associations
- Ecologistes de l'Euzières (scientific mediation)
- Mosson coulée verte
- AAPPMA (users)
- Kayak club (users)

Experts

Communes
- Montpellier
- Prades-Le-Lez
- Grabels
- Clapiers
- Castelnau-Le-Lez
- Montferrier
- Lattes

CCGPSL

Delegation of Environment and sustainable development
Urban planning delegation
Delegation of risk management and aquatic ecosystems
(Ex water delegation)

‘EPCI’

Executive committee

M3M

Metropolitan council

Technical services
Urban planning
Water

DDTM

DREAL

Water agency

Definition of the SDAGE

Definition of the SAGE

EPTB

SyBLe

Definition of the SCO and PLU
Management of wastewater and stormwater
First results

- Limited knowledge of water quality issues compared to flood risk
- “Gap of knowledge” between elected representatives and technical services
- High variability in the approaches to reducing imperviousness
  - 4 different visions
    - C. Meunier, president of the SyBLé and mayor of Lattes
    - R. Revol, former elected representative in charge of the water delegation at M3M, mayor of Grabels
    - J-M Lussert, elected representative in charge of risk management and aquatic ecosystems and mayor of Prades-Le-Lez
    - M. Fraysse, mayor of Montferrier/Lez
How to reduce imperviousness in the urban area of Montpellier?

« Densification »
C. Meunier (high buildings)

« Re-Vegetate the city »
C. Meunier (green spaces, give back to the city the ability to accept vegetation)
J-M Lussert (re-vegetate river banks)

« Limit runoff quantity at the plot scale »
- Retention of a certain water volume
- Threshold of impervious surfaces
  R. Revol
  C. Meunier (ex of permeable car parks)
  J-M Lussert
  M. Fraysse

« Increase pervious surfaces in public spaces »
R. Revol (permeable car parks and squares)
J-M Lussert (hedges along roads)
Conclusion and perspectives

Urban runoff transfers various contaminants to surface waters

**What is the influence of urban land use planning on surface water contaminations?**

- Hydrological modelling + Scenarios of urban land use planning
- Interviews with local stakeholders
  - Territorial context of the study

**Participatory workshops** to sensibilize local stakeholders to the results of the modelling

Identification of **implementation tools** for mitigation measures
Thank you for your attention