

Fate of silver nanoparticles (AgNP) in constructed wetlands

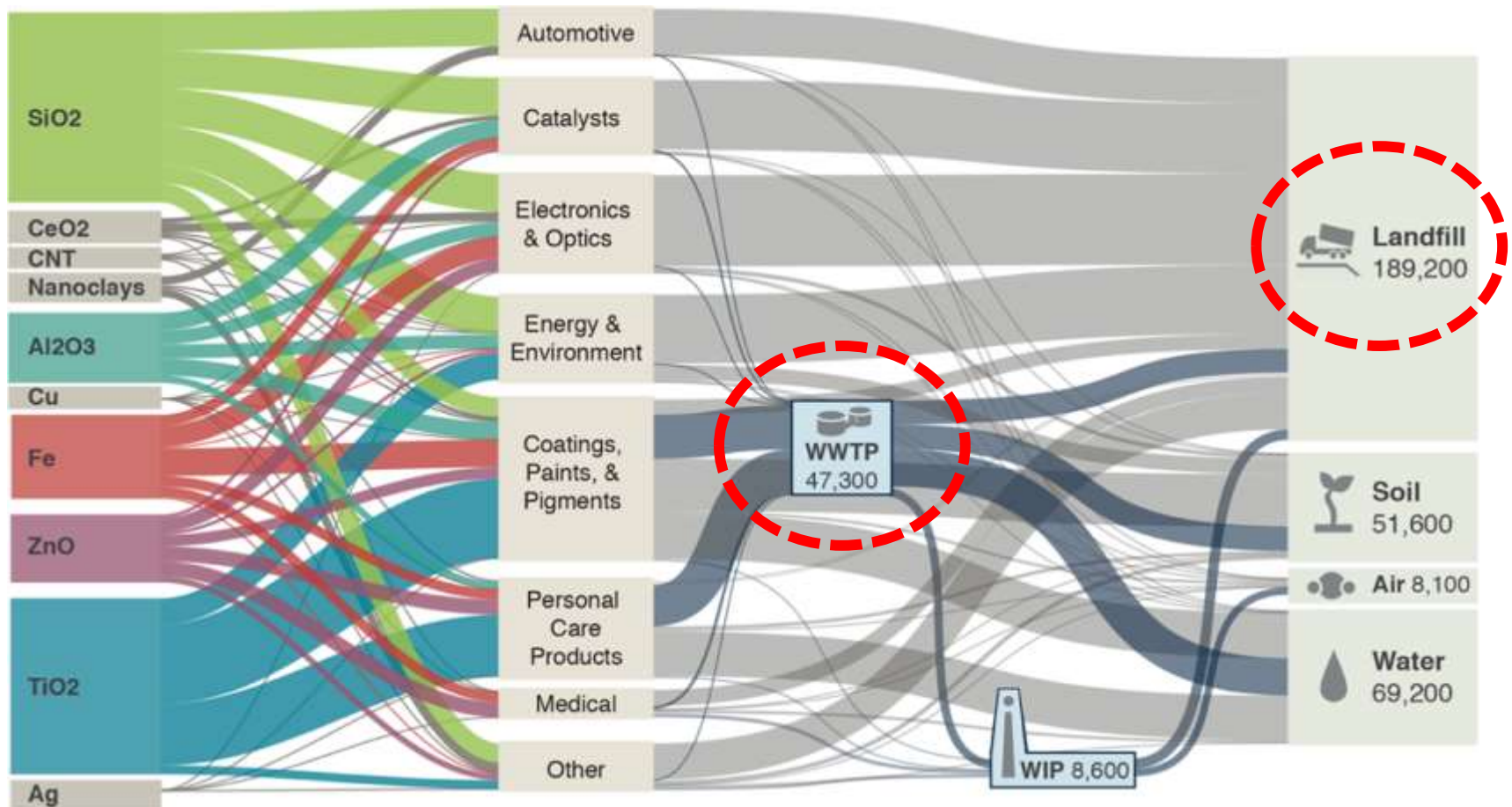


**CONSTRUCTED WETLANDS:
CHALLENGES AND OPPORTUNITIES
3.7.2014**

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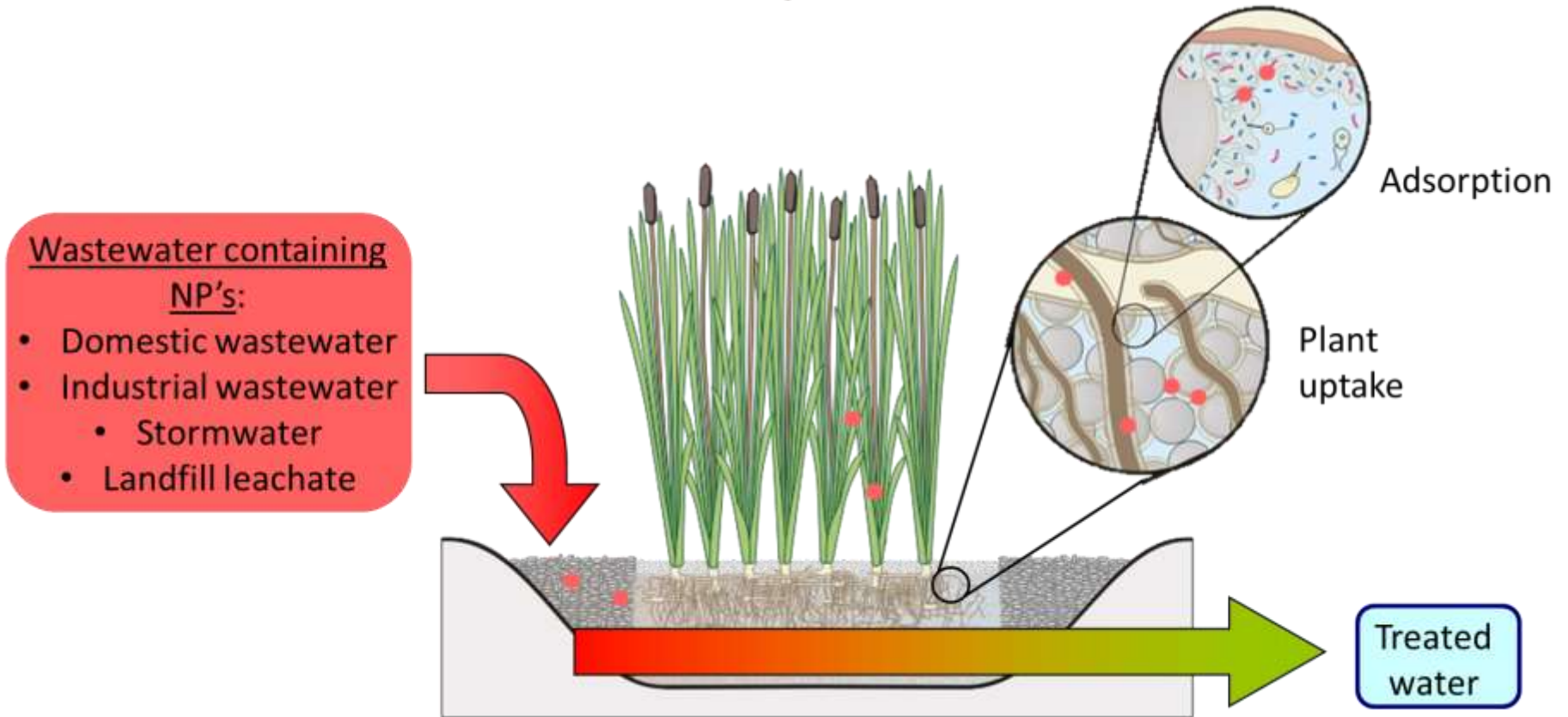


Problem: NP's in the environment?



From: Keller et al. 2013; values t/a

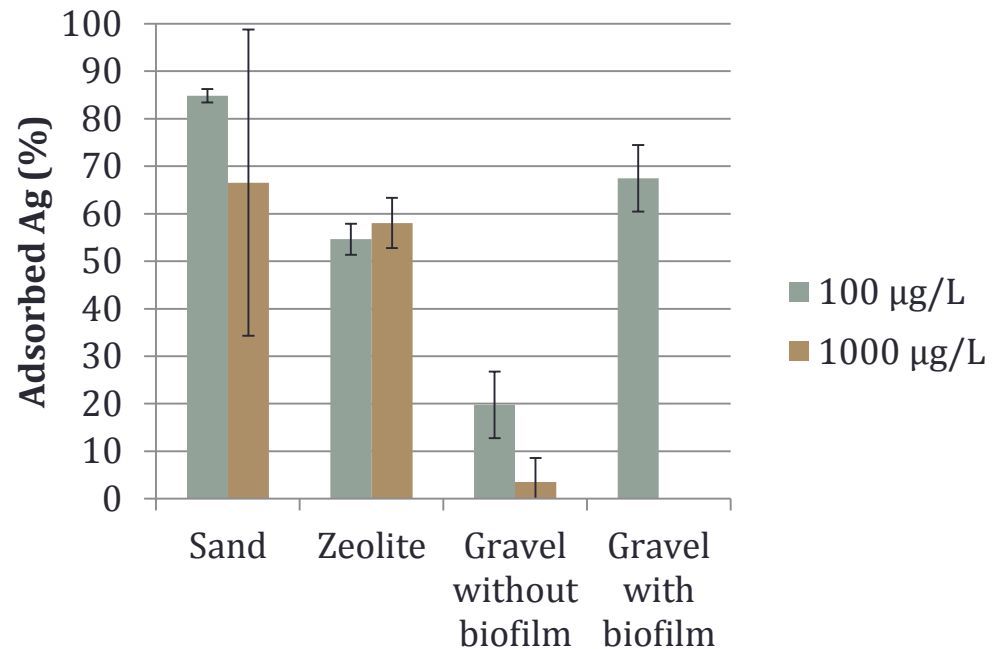
Retention of NP's in wetlands



Adsorption to the matrix and biofilm



- 24-h batch experiments on sand, zeolite and gravel with/without biofilm
- Synthetic wastewater
- Spiked with 100 ppb and 1000 ppb citrate-coated AgNP's
- Adsorbed mass: 0,06-1,69 $\mu\text{g Ag/g}$

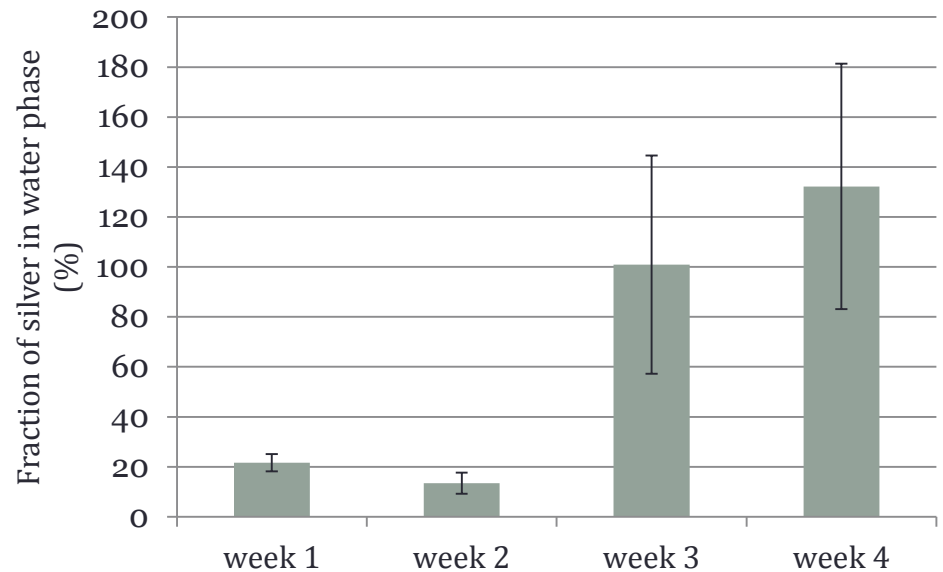
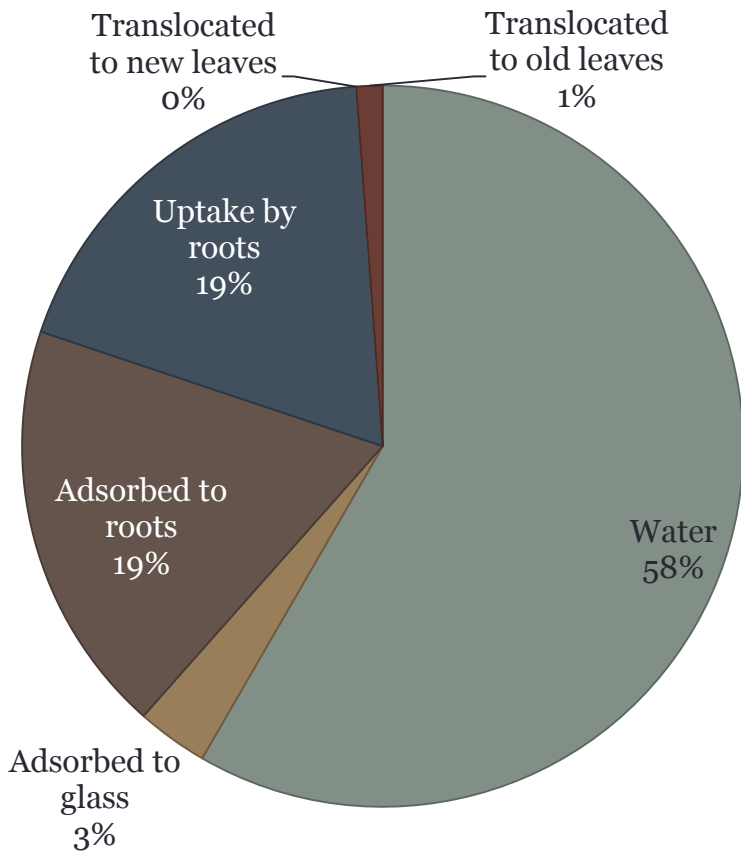


Adsorption and uptake by plant



- 4-week batch experiment
- *P. australis*
- Synthetic wastewater
- Spiked with 100 ppb citrate-coated Ag NPs

Adsorption and uptake by plant



Summary



- Literature from related fields of study:
 - Adsorption one of the most important retention mechanisms in environmental matrix
- Our experiments showed that:
 - Small particle sizes, porous materials and organic matter enhance the adsorption of AgNP's
 - *P. australis* can retain Ag from AgNP's
 - Adsorption and uptake by roots were the most important plant mediated processes
- Further research needed:
 - Stability of Ag in long-term
 - Mesocosms experiments
 - Other types of NP's



Thank you for your attention!