SKRI

SUSTAINABLE KAZAKHSTAN
RESEARCH INSTITUTE

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NARXOZ
UNIVERSITY

Natural Solutions

Protection, management and restoration of natural ecosystems affected by industrial waste; while benefiting people and nature.

- SKRI's work on NbS is recognized as a good practice under the UNECE Water and Industrial Accidents Convention. JEG meeting in October 2022;
- A commercial agreement with our partners from JSC "AK Altynalmas";
- Funded NbS project on pollution of mine tailings with our partners from Tauw Engineering Firm (Netherlands);
- Narxoz University received 300 million tenge from RG Gold as part of a 1% research contribution for the study of NbS, among other works

Example: Phytocapture

Phytocapture
Application for the industrial sector

Dust suppression

- Expensive (annual costs $10–20,000 per 1.5 km)
- Inefficient
- Scheduled maintenance
- Environmental impact: Chlorides leach from road surfaces. Corrosive to metals, damaging plant growth, altering the chemistry of nearby soils (further harming native vegetation) and toxic to aquatic life)

Phytocapture helps companies comply with regulations and save money!

Code of the Republic of Kazakhstan on subsoil and subsoil use Article 129: 2) for financing research, scientific and technical and (or) development work in the amount of one percent of the cost of production

Environmental Code of the Republic of Kazakhstan
Principles of the best available technologies: independent domestic and foreign experts in the relevant fields of application of the best available technologies; 3) focus on the best world experience;

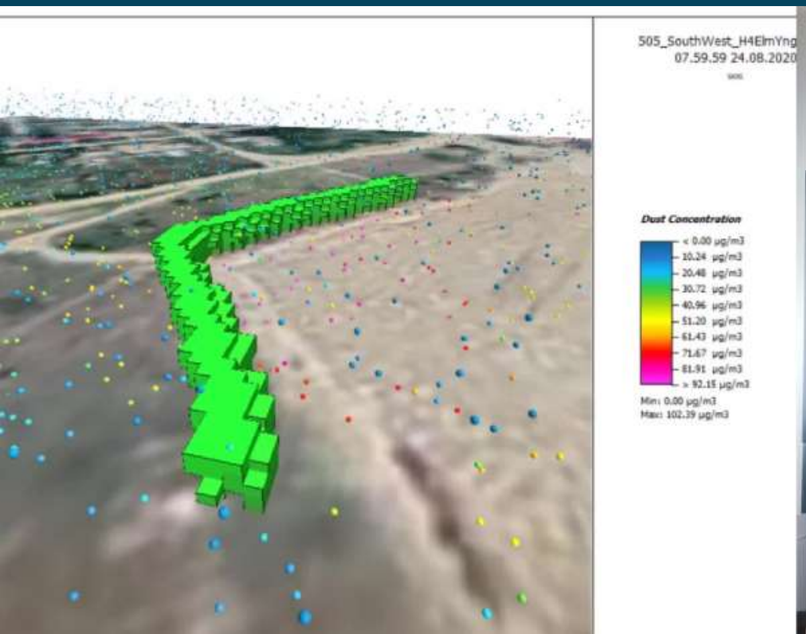
Requirements of the sanitary protection zone: 40% of the territory is planted with vegetation

Companies can use research funds to pay for sanitary zone requirements and save money!

GOLD MINE - AKSU

SKRI Services Provided

1. Initial review (remotely or on site depending on needs);
2. Scientific modeling on a supercomputer of the interactions of a plant with the surface and atmosphere related to the external environment; Recommended options for the design of vegetable plantings
3. Barrier Implementation, Work Promotion



Natural solutions for mine wastewater treatment in Central Asia

- Literature review of the world's best practices of nature solutions
- Site visit and preliminary design of nature solution for selected sites (Ak Tuz in Kyrgyzstan. One not yet selected site in Kazakhstan)

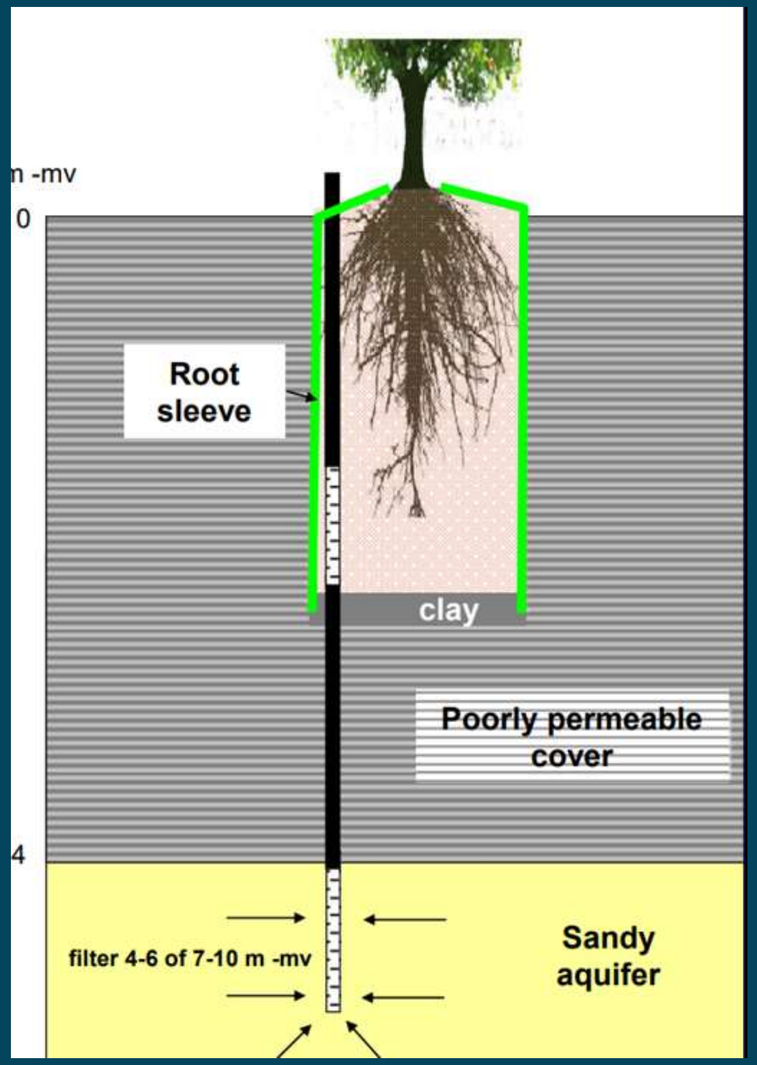
- Consultation/fundraising with international stakeholders for their application

wood wells (Tauw Engineering Firm)

- BTEX Groundwater Pollution Control at DOW Benelux, Terneuzen, The Netherlands;
- Control of groundwater pollution by chlorinated hydrocarbons;
- Phytoisolation: geohydrological barrier to pollutants;
- Phytostabilization: immobilization of pollutants by adsorption;

- Phytoextraction: removal of contaminants by absorption and excretion;
- Poplars, eucalyptus, willows

Wood wells


m -mv
0
Root sleeve
clay
Poorly permeable cover
4
filter 4-6 of 7-10 m -mv
Sandy aquifer

Reactive Biosorption Mat (Tauw Engineering Firm)

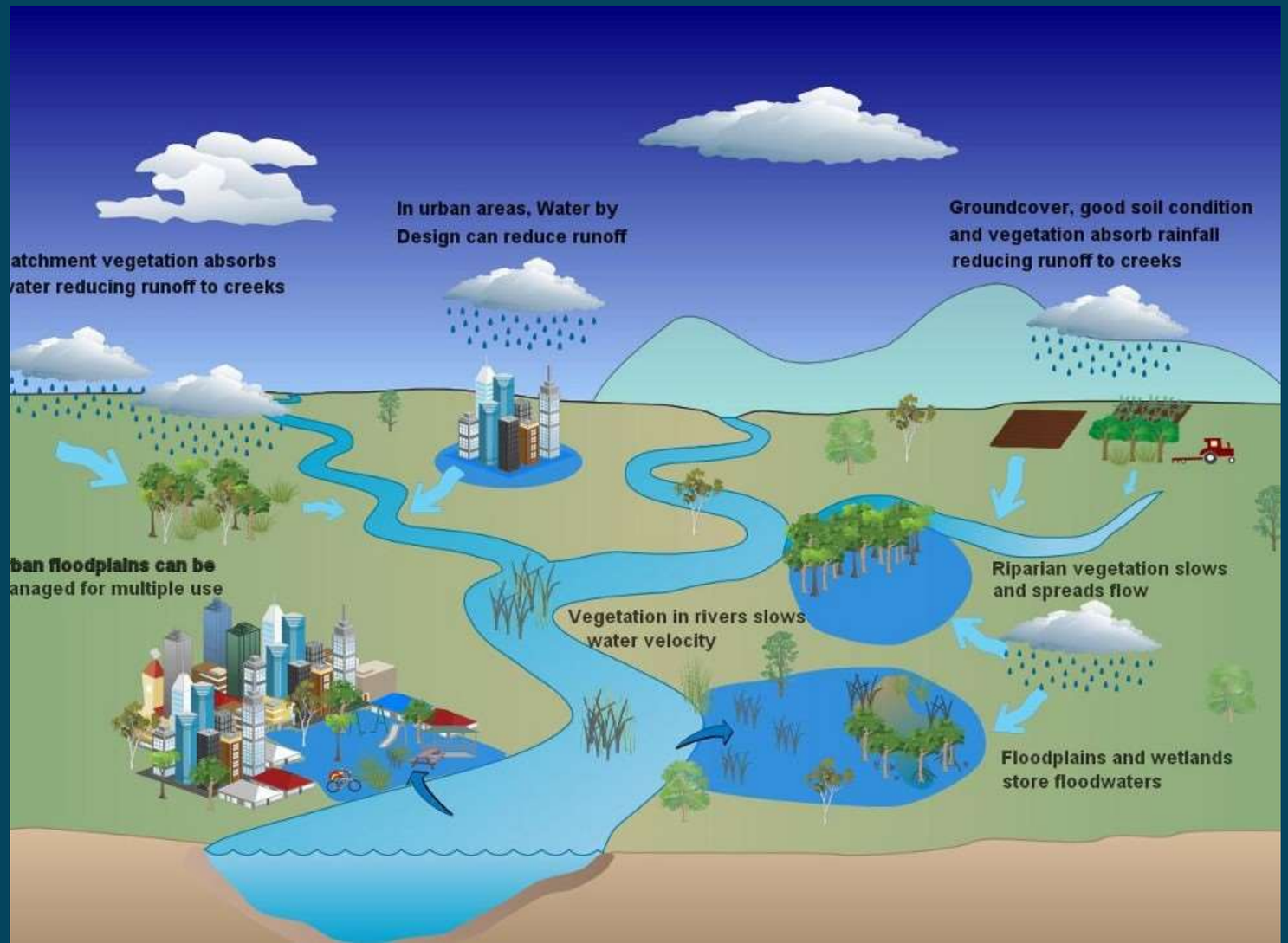
- A polluted canal near Ghent, next to an old asphalt plant, Belgium;
- Pollution with aliphatic and aromatic hydrocarbons;

- Jet mat with biochar and peat;

- Reducing pollutants substances from 85 to 100%;
- Replacement every 10 years

Biosorption Reactive Mat

Natural solutions to prevent and mitigate tailings disasters



Conclusions and future work

- Natural solutions require space and time to work
- Further commercialization of natural solutions (water, air and soil);
- Exploring expanding phytocapture work with other business partners and deepening our work with current partners such as AK Altynalmas JSC.

Thank you for your attention!

Research Institute Sustainable Kazakhstan "Providing technical solutions to the world's most pressing sustainability challenges"

If you are interested, please contact us!:
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