



KWB

Performance assessment of Nature-based Solutions (NBS) Review & Outlook

City Blues – **Paul Schütz**, Fabian Wulf-Misaki, Nicolas Caradot –Tartu – 04.06.2024

Agenda

- Kompetenzzentrum Wasser Berlin (KWB)
- Performance of Nature-based Solutions (NBS)
- Outlook: What to expect in City Blues

Kompetenzzentrum Wasser Berlin (KWB)



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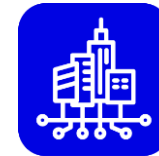
Water Treatment
& Reuse



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Performance of Nature-based Solutions (NBS)

Performance of NBS

Upcoming questions.

Maintenance guidance for NBS?!

What do we want to maintain?

What is the objective of NBS?

What is performance of NBS?

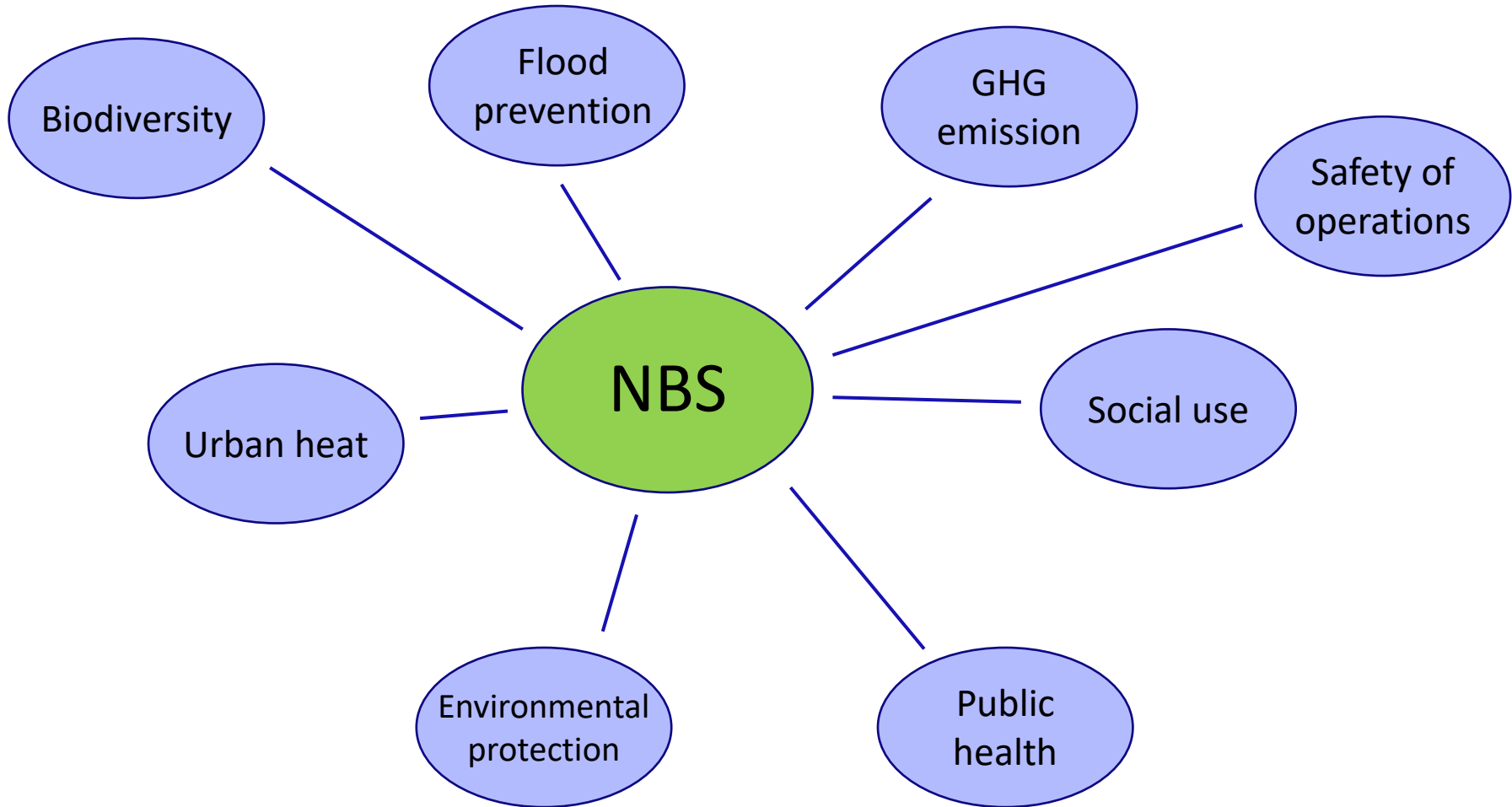
How can we quantify performance?

What are suitable monitoring approaches?

What is a usable maintenance guidance?

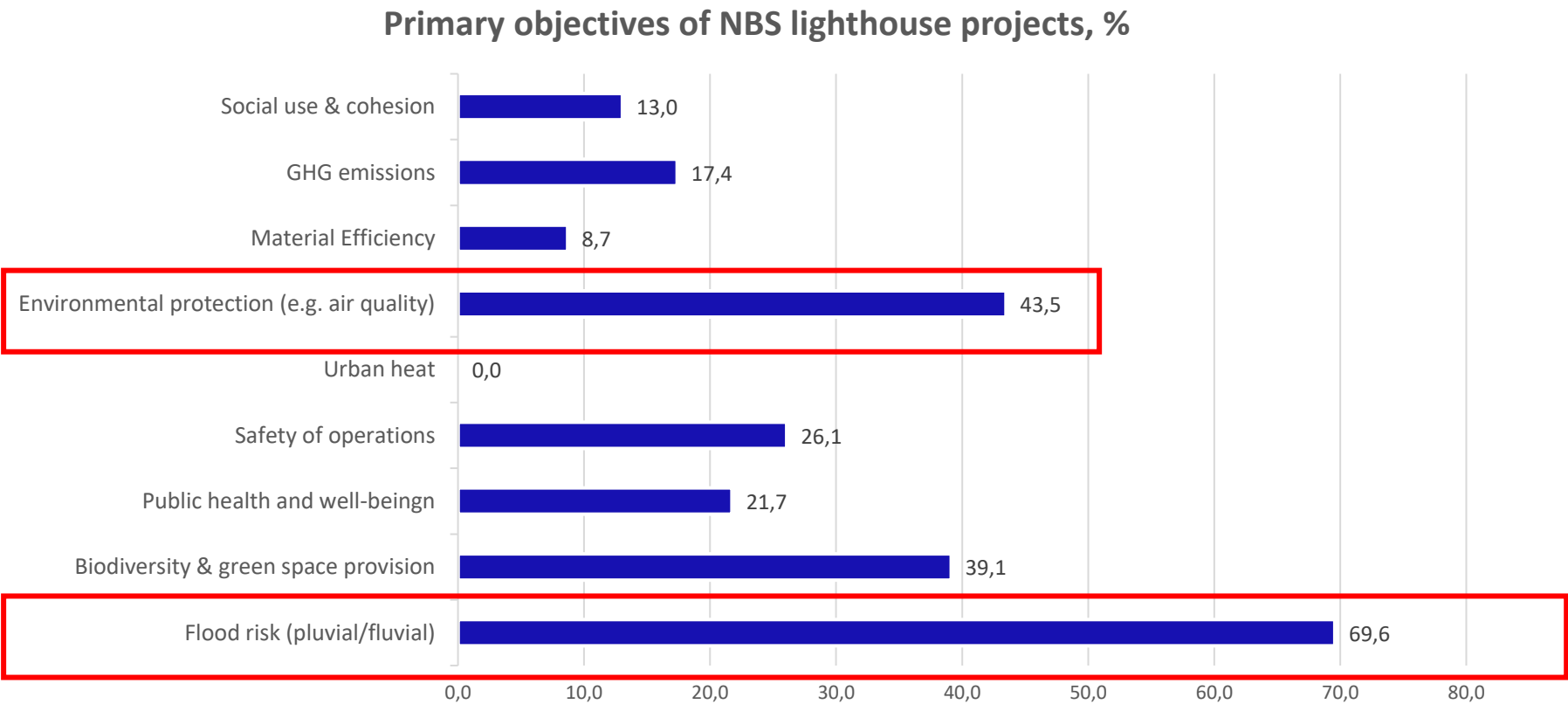
Performance of NBS

What is the objective of NBS?



Performance of NBS

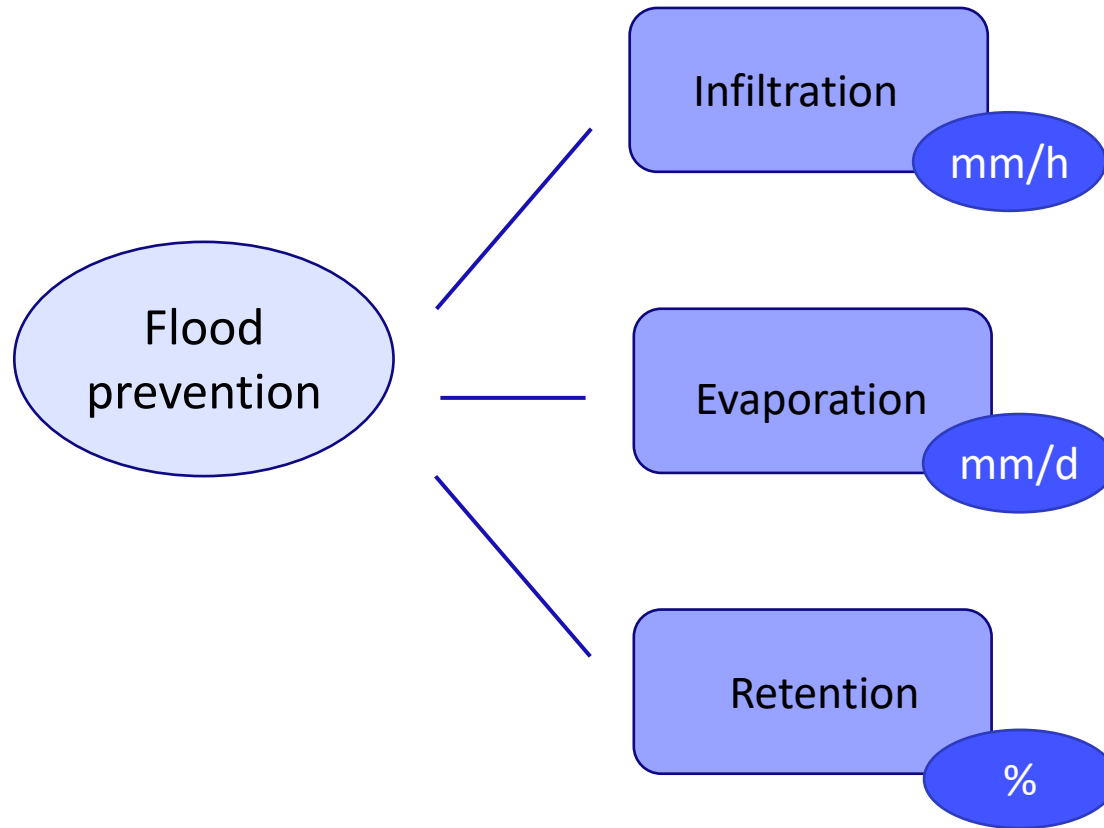
What are the objectives of NBS in City Blues?



Source: City Blues, D.1.1, 2024

Performance of NBS

Objective: Flood prevention



Performance of NBS

Objective: Flood prevention

Infiltration swale



Pond



All figures/pictures from sieker.de

Performance of NBS

Failure modes



- Inadequate vegetation



- Clogging
 - Outlet
 - Infiltration area
- Erosion
- Vegetation death
- Preferred pathways
- Debris build
- Pump failure
- ...



Performance of NBS

Internal & external factors

Internal factors

- Design of NBS
 - Geometries
 - Size
 - Depth of substrate
 - Vegetation



External factors

- Climate change & conditions
- Rain characteristics
- Maintenance

Precipitation

Stavanger: 1175 [mm/a]

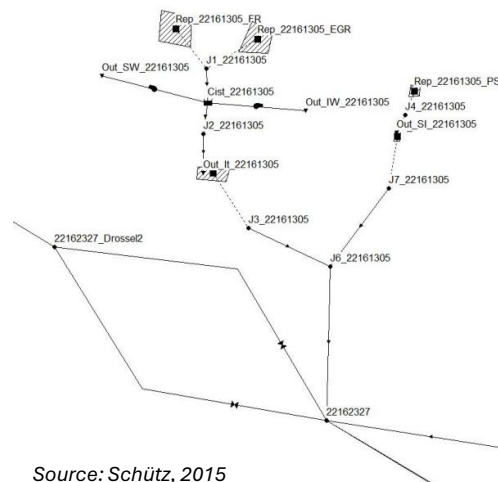
Berlin: 669 [mm/a]

Performance of NBS

Quantify the impact of failure modes

Modeling

- Rainfall – Runoff models
 - E.g.: *SWMM*
- NBS can be designed & parameters
 - Infiltration capacity
 - Clogging
 - Berm height
- Easy, fast, can results be trusted?!



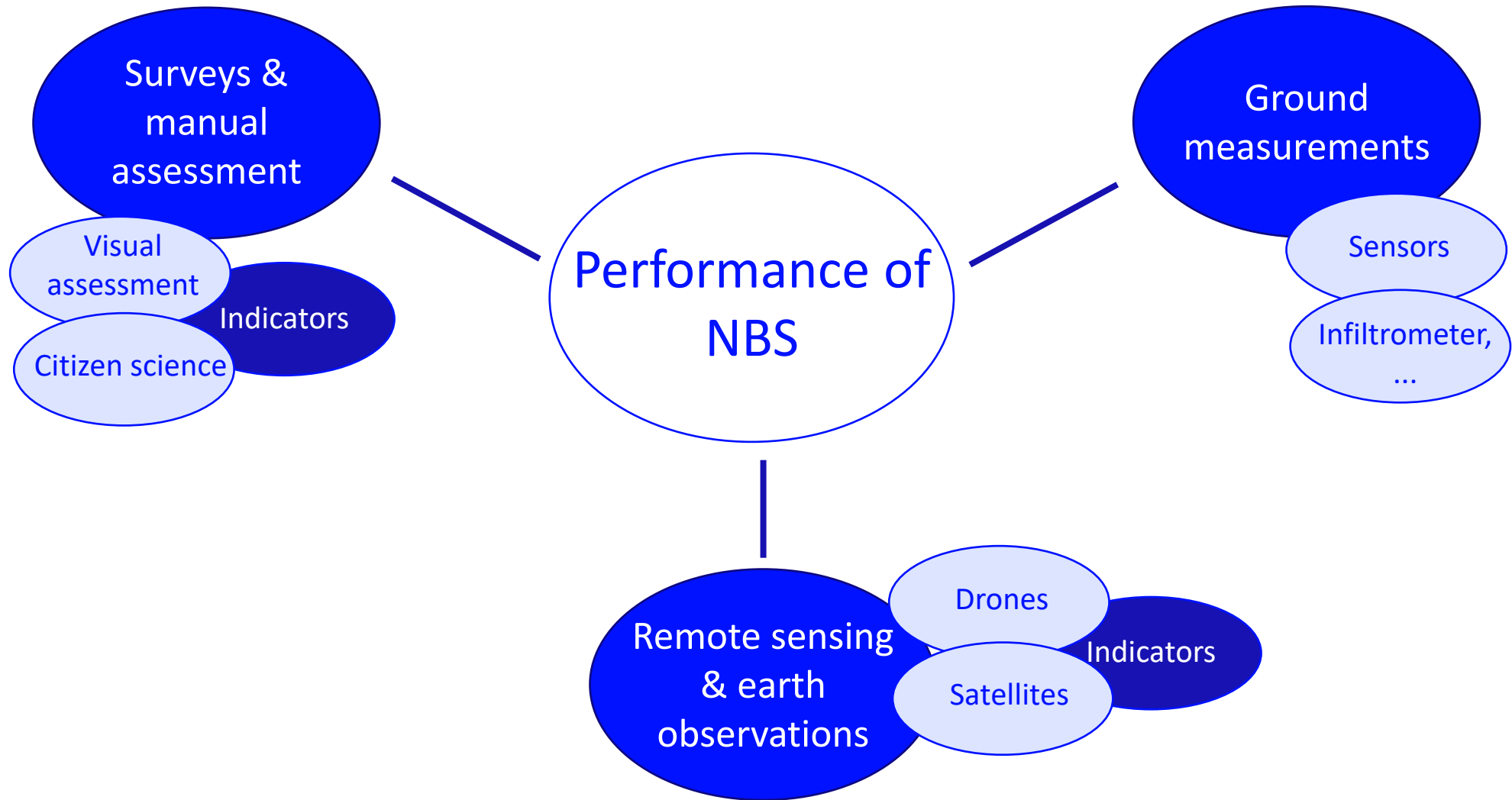
Monitoring

- Indicators or performance parameters
- Different approaches
- Complex, expensive, accurate?!



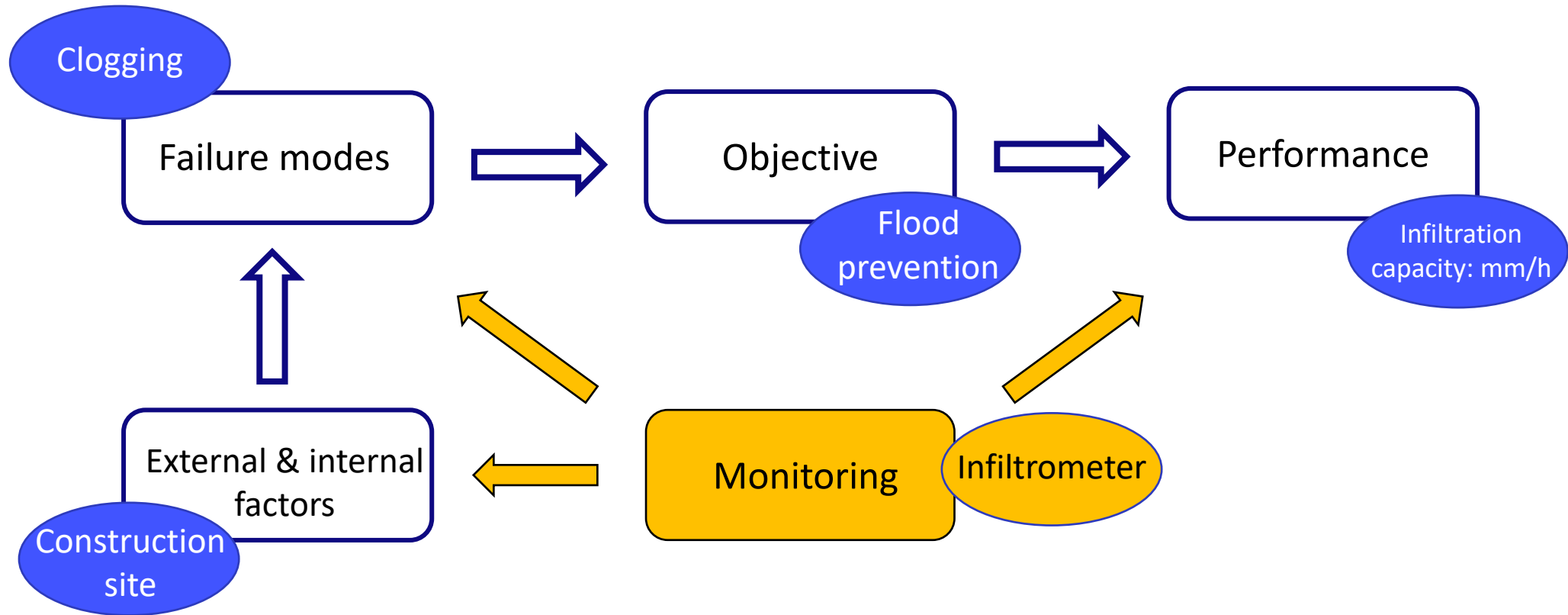
Performance of NBS

Monitoring approaches



Performance of NBS

Summary, e.g.: Infiltration swale

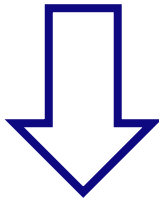


Outlook: What to expect in City Blues!

Outlook: What to expect in City Blues

CB – application:

~~„Maintenance guidance for NBS“~~



Develop „data-driven maintenance support system“

- What are typical failure modes of NBS?
- Where & when are they occurring?
- How to quantify the impact of failure modes on the performance?
- When are maintenance actions needed?



Outlook: What to expect in City Blues

Timeline & tasks

- June 24': Questionnaire
- July 24': Interviews with PP
- August 24': Planning of monitoring campaigns starts
- February 25': Onboarding event with PP
- April 25': Start of monitoring campaigns

The image shows a collage of overlapping questionnaire forms for the 'City Blues' project. The forms are titled '1. Planned & existing NBS', '2. Monitoring', '3. Maintenance', and '4. Maintenance'. They contain various questions about NBS categories, monitoring techniques, and maintenance plans.

1. Planned & existing NBS

Name of City: _____
Name of the respondent: _____

1.1 What NBS category is planned in Cityblues?
1.1.1 Where is the NBS?
1.1.2 Are there any plans?
1.1.3 Describe the function of the NBS?
1.1.4 Is the water stored?

1.2 What NBS category already exist?
1.3 Who is responsible for the NBS?
1.4 Are in your city target object)?
1.5 How does the NBS work?
1.6 Which is the water source?

2. Monitoring

2.1 Do you monitor the NBS in your city regarding quantitative data?
2.1.1 If yes, which monitoring technique is used?
a) Remote sensing
b) Ground measurements
c) Visual inspections
d) Citizen science
Other: _____

3. Maintenance

3.1 Are in your city any opensource datasets/maps?
3.2.1 Open data
3.2.2 Data cooperation

4. Maintenance

4.1 Is there a maintenance plan for NBS in your city? E.g. guidelines
4.1.1 If yes, how did it develop?
4.2 Who is responsible for the maintenance of NBS?
a) water utilities
b) municipalities
c) citizen/ land owner
d) others

Thank's for your attention!

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