Main parallel session topics for the NBS 2017 conference

1. Blue-green infrastructure in smart cities

Currently, 73% of Europe's population lives in cities and this is increasing. Because of this, there is a high need for sustainable urbanization. Smart cities aim at using digital technologies (ICT) to achieve better public services for citizens, better use of resources and less impact on the environment. To make cities more sustainable, these technologies can be used in combination with nature-based solutions to increase the resilience of cities and the wellbeing of its citizens even further. For example, Information and communication Technology (ICT) can be used as a supportive tool in city planning, better assessing and monitoring blue-green infrastructure projects, and thus allowing for enhanced analysis of their functions. With this topic, we intend to direct attention on ICT's environmental, social aspects, and potential links with sustainability-driven visions, which are often intentionally using ecosystem services in addition to grey infrastructure solutions. We intend to highlight ways in which blue-green infrastructure can complement smart cities in the near future.

Questions in this topic include:

- How can NBS create cities with higher wellbeing and health for its citizens?
- How can blue-green infrastructure projects improve the resilience of cities?
- How can modern ICT technology help implement blue-green infrastructure in cities?
- What are the best policy practices in the implementation of NBS in cities and should this be steered by the EU?
- How can NBS be best financed in local governance through business cases and how will the business cases change in the short-term future?

Relevant EU policies and initiatives:

- *Green Infrastructure Strategy* http://ec.europa.eu/environment/nature/ecosystems/index_en.htm
- *Innovating cities* http://ec.europa.eu/research/environment/index.cfm?pg=future_cities
- *Smart cities* https://ec.europa.eu/digital-single-market/en/smart-cities
- *Nature-based solutions* https://ec.europa.eu/research/environment/index.cfm?pg=nbs

2. Integrated water management through natural systems

The commonly used water treatment solutions pose many challenges, among them the high demand for energy and the low success rate in removing some problematic pollutants. In addition to that, many urban areas offer very little resilience to flooding and high rainfall events sometimes with the current water treatment systems failing entirely. Many researchers are looking towards natural water treatment systems for answers to these issues and have been successful in many cases. With this topic, we intend to focus on the different technological aspects of natural systems used for water management.

Questions in this topic include:

- How to best implement nature based urban drainage systems in cities to reduce the risk of flooding?
- What are the current advances in engineered reed beds/wetlands and target ponds/wetlands?
- How can NBS help to reduce the nutrient load to water bodies near human habitat?
- How can water policy in the EU improve the adaption of natural water treatment systems?
- What kind of governance arrangements and partnerships or forms of participation are needed to implement NBS for the Water Framework Directive in cities?
- What are the benefits for water management if NBS solutions are used for restoring of terrestrial ecosystem?

Relevant EU policies and initiatives:

- *Water Framework Directive* *http://ec.europa.eu/environment/water/water-framework/index_en.html*
- *Natural Water Retention Measures* *http://nwrm.eu/*
- *Nature-based solutions* *https://ec.europa.eu/research/environment/index.cfm?pg=nbs*
- *Urban Wastewater Directive* *http://ec.europa.eu/environment/water/water-urbanwaste/index_en.html*

3. ICT as a supporting tool for nature based solutions and ecosystems

Information and Communications Technology (ICT) solutions such as Geographic Information Systems (GIS) environmental data analysis or mobile phone apps for the monitoring, planning and better management of natural systems can have a strong supporting effect on the development of NBS. There is a lot of environmental data available and through the right analysis, it can help inspire, develop and maintain NBS. ICT could also help measure the environmental impact of NBS compared to “traditional solutions”, thus supporting their implementation. In addition to this, ICT can play an important role in raising general awareness of NBS through citizen science projects and community led urban development.

Questions in this topic include:

- How can environmental data be used for the development of NBS?
- What solutions can help make the large amounts of environmental data available more practical to use in urban planning or ecosystem protection?
- How can we use remote sensing to help increase species diversity?
- How can GIS aided planning help create better-integrated risk management solutions for flooding?
- How can ICT solutions and citizen science help educate people about NBS and support community led urban transformations?

Relevant EU policies and initiatives:

- *Nature-based solutions https://ec.europa.eu/research/environment/index.cfm?pg=nbs*
- *EU initiative on CAPS/DSI (Collective awareness platforms/digital social innovation) http://cordis.europa.eu/research-eu/research-focus_en.html*
- *Digital earth lab http://digitalearthlab.jrc.ec.europa.eu/apps*
- *INSPIRE directive http://inspire.ec.europa.eu/*
- *Copernicus program http://copernicus.eu/main/overview*

4. Ecological restoration through eco-innovation

Innovative solutions have spurred on human development from the very beginning. Unfortunately, this development has had many negative aspects on the environment. With this topic, we want to highlight ways in which innovative NBS can help us achieve human development highlighting opportunities on achieving a more sustainable development. This can include using micro-organisms to help utilize nutrients in soil to restore ecosystems, plants that aid bioremediation or pheromones as pest deterrents to name a few. The focus on this topic is on the ecological restoration of natural ecosystems through natural methods. Demonstration of multiple benefits of NBS solutions is expected (e.g. in addition to economic aspects also social benefits should be introduced).

Questions in this topic include:

- What innovative NBS could be used to restore ecosystems?
- What are the most promising nature-based technologies today in natural ecosystem improvement?
- How can governance promote the use of NBS for ecological restoration?
- What are the advantages in using NBS in comparison to “traditional solutions”?

Relevant EU policies and initiatives

- *Eco-innovation http://ec.europa.eu/environment/eco-innovation/*
- *Restoration in the EU Biodiversity Strategy http://ec.europa.eu/environment/nature/biodiversity/strategy/target2/index_en.htm*
- *European agriculture policy https://ec.europa.eu/agriculture/cap-overview_en*
- *Nature-based solutions https://ec.europa.eu/research/environment/index.cfm?pg=nbs*

5. Nature-Based Solutions in circular economy

The move towards a more circular business model is of high importance in all fields. Natural resources and solutions are the long-term basis of the circular economy, but this would need to be reflected in closing the loop of the entire value chain. Main contributions of NBS to circular economy might be to demonstrate use cases of systemic resource-efficient and cost-effective approaches. A second effect is the lower impact on biodiversity due to lesser resource use (raw materials, energy, water, air, land and products that are made of and depend upon ecosystems and their services). As nature operates in circular, closed loops, there is a lot to learn from it for industrial ecology and urban systems, using systems thinking lens. This means NBS can be an important inspiration for the development of circular economy. With this topic, we intend to highlight ways NBS can make consumption patterns more sustainable such as using organic waste in green infrastructure projects and replacing chemical intensive processes that create difficult-to-use waste with more natural processes. NBS could also help land-reuse projects and thus limit urban sprawl.

Questions in this topic include:

- How can waste be used as a resource in blue-green infrastructure projects?
- What policy decisions restrict the use of organic waste for NBS?
- How can NBS contribute to circular economy?
- How can natural processes be used instead of toxic chemicals in the production of consumer goods?

Relevant EU policies and initiatives:

- *Circular economy* http://ec.europa.eu/environment/circular-economy/index_en.htm
- *Green Infrastructure Strategy* http://ec.europa.eu/environment/nature/ecosystems/index_en.htm
- *Nature-based solutions* https://ec.europa.eu/research/environment/index.cfm?pg=nbs