Chapter 13
Commentary: Urban Wetlands Restoration as NBS for Flood Risk Mitigation: From Positive Case to Legitimate Practice, in the View of Evidence-Based Flood Risk Policy Making

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From a policy development and implementation perspective in the light of adaptive governance, the case of wetland restoration in Pilsen raises issues of extreme complexity faced by positive case “enablers” when about to upscale from small-scale solution to acknowledged wide-scale outcome. Topics such as a higher degree of compliance with the core conventions of the EU Flood Directive (hydrologically sound, evidence-based planning and execution) as well as with other policy stepping stones are suggested and discussed.

Zooming in—From Flood risk Directive to NBS: Since the beginning of the 21st century, the persistent attempt to attack the “wicked problem” (Rittel and Webber 1973) of floods in a systematic manner has given rise to a variety of ideas and concepts. Integrated watershed (or catchment) management (IWM/ICM) is the keystone concept underlying the EU Flood Directive (2007/60/EC). In light of IWM principles, the Water Framework Directive (2000/60/EC) and the subsequent Floods Directive (2007/60/EC) refer to the watershed (catchment, basement) unit as the most appropriate framework to manage the ecological state of rivers and other water bodies as well as to manage flood risks. The reason behind this decision lies in the fact that the watershed is “just about right” for the intended function as it incorporates the entire water cycle in nature, the upstream and the downstream communities, the stressors causing or expanding the flood risk (FR) and the receptors of the flood risk (van Ruiten and Hartmann 2016). Only the watershed level allows full understanding of the structure and functioning of the eco-hydrological “big idea” on which the human activities are based. This “big idea” and the human dimensions in it allow for appropriate and resilient flood risk governance arrangements by informing where, why...
and what measures should be taken to enhance the resilience of social-ecological systems to flood risks (Dieperink et al. 2016). Though this holistic, watershed-based approach is not new, latest reports still highlight the need in bridging for improving upon fragmented flood risk measures (FRM) in the light of the entire watershed (Hegger et al. 2016a). One of the plausible reasons for absence of the watershed in the NBS discourse possibly lies in the fact that human senses cannot perceive watersheds, while NBS in urban areas are easily detected and experienced. A human watershed (Brunckhorst and Reeve 2006) is only a few blocks in size, corresponding to the urban—micro watersheds drained to the NBS.

NBS—time to deliver? During the last decade, EU countries have undertaken legal translation of the goals outlined in the Flood Directive’s goals into their existing FR management. This process strives to influence policy (for example, by establishment of watershed jurisdictions) as well as practice (evidence-based decision making using cost cost-benefit analysis, collaborative management by public participation, enhancing ecological status by win-win measures in the light of Water Directive and more). These days, a substantial body of research is dedicated to comparative analysis of EU-countries, their respective FR governance setting and resulting policies and policy tools in the view of legal, planning, economics and participatory aspects (Raška 2015; Hegger et al. 2016b; Liefferink et al. 2018). On the contrary, little if any research is undertaken regarding the actual effectiveness of the watershed (catchment) during floods in of the watershed (catchment) FR management plans (the fruits of the governance and policy tools)—most probably because 11 years are not a sufficient time span for determinations of this kind. At this point in time, we must be able, at least to some extent, to formulate indicators that may predict effectiveness of established or planned to be established policy tools and measures—grey and green. Perceived effectiveness might be substituted by another term—legitimacy (Melnychuk 2017). For NBS concept and practice—is enough being done to deliver the legitimacy of the practice?

Feet on the ground (of a wetland)—Realistic and useful assessment of NBS. A decade ago, in 2009, a milestone work by Daily et al. stressed the failure of the ecosystem services concept to reincarnate into common practice. The Pilsen case study, as many NBS case studies, struggles with a similar pitfall—the turnover from a positive project into a relevant, accepted and eventually desired and common in practice. Nature-based solutions are measures aiming to relieve natural risks, in our case, flood risks, by enhancing and restoring the regulation of ecosystem services and are part of a sustainable FR management. Like ecosystem services, sustainable FR management outputs seek recognition and legitimacy (Melnychuk 2017). Not only should they be hydrologically sound, economically feasible, ecologically acceptable and publically supported—legitimate sustainable FR management also aims to meet local perception of floods and flood risks, echoes the prevailing socio-institutional factors and provokes lively discourse within the professional community (Goulden et al. 2018). The latest bon ton of relating to NBS as a superior strategy (Keesstra et al. 2018), while the actual relief, though plausible, is still evidence deprived and needs to be empirically scrutinized (Hegger et al. 2016a, b; Niazi et al. 2017)
undermines the colossal multi-disciplinary efforts to provide NBS with a sound ground of evidence and hands-on legitimate experience.

Pilsen case—study in the light of FR governance capacity buildup. In the case of the City of Pilsen, Czech Republic, the small-scale NBS for frequent (though not in recent years) floods was a three-phase wetland area restoration in the urban floodplain of the Berounka river. The project aims for adequate prioritization of flood risks in spatial planning and public fund relocation for the rehabilitation of specifically designated urban “flood sponge” areas—flood water naturally retaining an area adjacent to the river bank. The first phase of the project was launched based on external (EU) funds and publicly owned land, and the subsequent phases (2 and 3) are dependent on the political will of local decision makers to spend public money for buying or long-term leasing privately owned land adjacent to phase 1.

- Challenges: Dominant public support favours grey infrastructure; the project has little impact on flood risk relief; a vast area of the planned project is privately owned; low level of political will—as decision makers are restrained from negotiating with private owners; policy makers are reluctant to undertaking undertake long-term trans-sectoral projects; their awareness of diverse measures was low; due to droughts, constructed wetlands did meet the groundwater.

- Opportunities: The landowners in the flood plain have limited opportunities for land use; the policy makers were reluctant to undertake vast upstream-downstream obligations and prefer to realize a local project.

From the mentioned public support for grey infrastructure and policymakers unaware of other possibilities, it seems that the prevailing capacity in Czech Republic’s flood risk governance is resistance (see Table 13.1). Capacity to absorb and recover possibly exists as well, since the authors mention available spatial planning instruments in the form of zoning plans that prohibit future development in flood prone areas—landowners near the river have limited opportunities for land use due to the floodplain, the Q100 active zone and the land-use plan. Described case study of wetland restoration belongs, as well to absorb and recover capacity. The described difficulties to communicate NBS benefits to policymakers imply low current capacity to transform and adapt.

The choice between one rationale (capacity) over another is inherently political, and the Pilsen case study describes the attempt of a group of “enablers” (the case description doesn’t expand on their identity nor on their institutional affiliation) to engage local politicians and stakeholders in what seems like capacity diversification. Only sincere examination and acknowledgement of prevailing FR capacity and its basis will allow solid strategic decision-making regarding FR policy tools development. Weather the decision is to diversify the existing capacity, Table 13.2 presents three aspects, without which new concepts and tools will not be realized.

Existing effective and legitimate case studies expand the aspects of “knowing” as well as “wanting” and “enabling” dimension among the local state, municipality and political stakeholders. This process will add, shift and re-set some of the core assumptions underlying the “territorial intelligence” of the specific district/municipality,
Table 13.1 Different types of strategies in dealing with FR

| Capacity type          | Implication to FR management                                                                 |
|------------------------|-----------------------------------------------------------------------------------------------|
| Resistance             | The ability to withstand disturbances—Mainly engineered structures. Dikes, Levees, etc.       |
| Adsorb and recover     | System is affected, but is still capable of responding and recovering—floodplains, NBS       |
| Transform and adapt    | Ability of a system and of institutions to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, cope with the consequences and learn |

Based on Hegger et al. (2016a)

Table 13.2 Three “must–haves” for expanding governance capacity

| Capacity type | Implication to FR management                                                                 |
|---------------|-----------------------------------------------------------------------------------------------|
| Knowing       | Actors need to be fully aware, understand, and learn the actual or possible risks and impacts of actions, policy, and strategic choices | • Increasing awareness and sense of urgency  <br> • Developing useful knowledge through available information  <br> • Cross-stakeholder learning |
| Wanting       | Actors need to commit to cooperate, express, and act upon ambitions, and apply their skills and capabilities to find solutions | Engaging actors and ensuring their commitment to collaborate and truly contribute their skills to find solutions, sometimes with assistance of visionary agents |
| Enabling      | Actors need to have the network, resources, and instruments to enable them to implement their ambitions | Defining authorities and responsibilities, developing and defining sources of reliable funding, collaborative policy development |

Koop et al. (2017)

eventually expanding the capacities of FRM in a certain area (Kaufmann and Wiering 2017).

Nature-based solutions as part of a whole-puzzle: Structured “window” to the specific case studies and their status in the light of the flood risk governance ecosystem are in need and they should elaborate on the following suggested topics: (1) Translation of flood risk Directive to national laws; (2) Establishment of new or rearranging existing watershed jurisdictions; (3) Institutional setting and funding to comply with the FRM in the light of the historical or expected flood impact; (4) FR “reflection” through the territorial intelligence prism; (5) Relevancy of the NBS in the light of hazard maps and risk maps—all of the above will provide the necessary framing, and ultimately, legitimacy, to the case (Dieperink et al. 2016; Hegger et al. 2016a; Goulden et al. 2018; Kaufmann and Wiering 2017; Koop et al. 2017, 2018; Nordin von Platen and Gustafsson 2018; Wiering et al. 2018). A solid example for such a type of “structured” window would be the study of Hedelin (2016). Further
theoretical examination of the “FR chain” in different states, different watershed types and climates will allow for the development of systematic evaluation tools according to the FR ecosystem typologies.

First things first—who is in charge? Studies in some EU countries show that, while the central state remained the core actor in flood risk governance, the decentralization process transferred significant responsibilities to the municipalities (Wiering et al. 2018; Liefferink et al. 2018). In other EU countries, such as Ireland, the National Office of Public Works (OPW) is the jurisdiction to map the risks and to run the FRM plans. A clear depiction of the players in charge sheds light on the type of constrains they might experience, which should be specifically addressed.

What flood risk atmosphere supports NBS? In the light of frequent floods in Pilsen of the past, the decision makers’ survey showed that floods are the most important hazard in the city. Nevertheless, the new strategic plan for Pilsen lacks any reference to flood risks. These two findings suggest that better communication of high flood risk to the planners, and other decision makers is in need. Though higher risk perceptions increase flood preparedness intentions, nothing assures that this preparedness will result in diversification in management measures. Once the flood risks is perceived as significant, and the prevailing FRM strategy is resistance, ‘NBS’ are a rather unexpected outcome. The question arises,—how to rise flood risk importance, but in a ‘NBS’—supportive way? What is the plausible ‘flood atmosphere’ so NBS are considered widely? Two strategies come into mind: (1) NBS as a tailor-made, win-win solution, supported by strong hydrological evidences, on the ground of a detailed, informative, clear watershed FRM plan. (2) NBS as a “better option” for parks in the city, which also act as some sort of relief during floods.

How ecological is the natural? Though the term “ecology” is abundant in the NBS agenda, it nearly never stands alone and is more often than not linked to economics (“ecological economics”), engineering (“ecological engineering”) and humans as in “socio-ecological aspects” (Kabisch et al. 2016). Resilience and liveability of the cities, presumably resulting from blue-green infrastructure, nearly never raise a discourse on the core-ecological dimensions of the NBS. Wetlands in general are poorly understood habitats. Though quite a few NBS, like those in the Pilsen case, rely on wetland runoff retention capacity, its reclamation efforts rarely aim for “a good ecological status” of the NBS. How important is the ecological state to the NBS’s function? What is the desired ecological state of an NBS relying on wetlands, meanders and river restoration?

NBS are about the process. The appropriateness of a particular NBS in a certain geographical, social, administrative and cultural context is of high importance. But even for the most appropriate project, the transaction costs are high—mapping the institutional setting and stakeholders’ interests and barriers, revealing attitudes regarding floods, setting steering committees, communicating the risks and the various possible measures, setting the financial grounds—it requires time, a strong will and patience.

Mapping internal and external barriers for NBS implementation: NBS marginalisation as a meaningful solution to FR is explained, in the case of Pilsen, by how unaware stakeholders were of the importance of NBS and their benefits.
This statement falls in line with the Linear Model of pro-environmental behaviour, prevailing during the 70s and 80s of the previous century, implying direct correlation between knowing and doing (Ervin and Ervin 1982). This model was proven to be insufficient by a massive body of research on barriers for environmental behaviour. Stakeholders’ setbacks can vary from internal (such as hate of risk, past personal experience) to external (such as institutional setting, lack of funding opportunities, etc.) (Kollmuss and Agyeman 2002). In the field of FR management research, mapping barriers is still rare although it can contribute vastly to a clearer understanding of the governance challenges (Dieperink et al. 2016; Goulden et al. 2018).

Strong pressure by specific interests (actor coalitions) is a major force of change in flood risk governance (Liefferink et al. 2018). Nature-based solutions are advocated for and promoted by different authorities, from the federal and/or state level, NGO’s, academia, local municipal “champions” or a semi-structured arrangement of all of the above-mentioned, together forming a bricolage of flood risk governance (Merrey and Cook 2012).

In the Pilsen case, the decision makers were reluctant to engage in the negotiation process with private landowners. Since phase 1 of the wetland restoration didn’t involve such negotiations, this capacity might be lacking and should be strengthened, or the part of negotiation could be performed by other actors—suggesting a possible intermediary role for a local NGO, similar to the case of the Thau Watershed (Etang de Thau), where all types of negotiations were led by animators—knowledge brokers between top-down public policies (including water policies) and bottom up development projects—supported by local population and politicians (Bouleau et al. 2009). The legitimacy of animateurs stems from the network they build around state offices, water professionals, local authorities and their services, elected politicians, NGOs, schools, journalists and the larger public. Animateurs gain their legitimacy from their interpersonal communication capacities, from their function as knowledge hubs and how they foster and support participation and commitment among the experts and stakeholders participation and commitment to within their networks (Plant et al. 2014).

Seize opportunities to communicate flood risks perception. Studies show that the level of interest in flood hazard and risk generally decreases between the individual events and that the flood risk is not perceived as a substantial and permanent characteristic of the local environment, but rather in terms of discrete flood events. This can also lead to perceiving the flood as less of a threat over time (Raška 2015). In Pilsen, it appears that even though the last years were characterized by drought rather than floods, decision makers agreed on the high degree of importance of floods and flood managing projects. In Pilsen, floodplains and other areas are under development restrictions (Q100 active zone) in the land-use plan of the city.

Complexity is no excuse—and we need more theory to guide us. Once developing policy in the light of its implementation, in an era when governance is beyond official title, policy makers as well as academia have little excuses to turn a blind eye to the realm of the FRM complexity. The seeming line between the physical inventories of the Watershed to its human dimensions, in the view of collaborative policy making, is stunningly complex. Utilising theory makes it easier to embrace this
complexity and its dimensions (Hedelin 2018). This calls for complementary theory-based approaches that allow for policies with a widened scope of principles (Kaufmann and Wiering 2017). This is especially true for NBS legitimacy acquisition as an FR easement.

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