



NORDES 2021

# CLOSER TO EARTH: SCALES OF PLANNING FOR URBAN WATERS

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## ABSTRACT

Climatic changes of waterbodies calls for new scales and approaches to planning of urban surface waters. Learning from a real-time case of planning practice, I display and discuss how limitations of sectorial logics, operational scales and schemes of planning, in addition to inherent epistemological prisons of dominant dichotomies, are obstacles of an actual *reorientation* of planning practice. On this background, I call upon further research – of a designerly and transformative kind, to explore novel approaches to municipal planning of surface waters. I speculate how this could evolve around a multidisciplinary rubber-boot approach with landscape architects performing as Sherpas, process instigators and compositing agents.

## OUTLINING THE SCALAR PROBLEM OF INQUIRY

*Scale* originates from the Latin word *scala* meaning ladder or staircase, depicted from the verb *scandere* - to escalate (Det Danske Sprog- og Litteraturselskab et al., 2003). The meaning of *Scalable*, includes "able to be scaled or climbed" or "able to be changed in size or scale" (Pearsall, 1998, p.1656).

Scale is an essential geographic and cartographic concept. Cartographic or representational scale refers to the measured relationship between the extent of the representation and that which it represents. The notion of scale is loaded with an assumption, that earth can be viewed 'objectively' from outside and that

(eco)systemic interrelations can be perceived through zooming in and out. Also, it is laden with an understanding, that the urban condition can be analysed and planned for in discrete scales of large (landscape), medium (urban) and small (building), as series of Russian Dolls.

*"Modernity is distinguished by its concern with the human eye's capacity to register and to visualize materiality at every scale"* (Cosgrove, 1999, p.18)

When we seek to produce an 'overview', we look at stuff in a larger scale. To do this we are climbing a ladder, or we hover in a satellite. But, this position is a 'view from no-where', as Thomas Nagel titles his book, in which he is questioning the intended objectivity of such a view (Nagel, 1989).

## SCALES OF PLANNING FOR URBAN WATERS

In a Danish physical planning context, scale is decisive for the level of inquiry and influence. It is closely linked to different administrative borders. Moving from the municipal plan of a thematically differentiated 'main structure' (Hovedstruktur) at the range of the whole municipal region, to local plans (Lokalplaner), concerned with the quality and design of urban space for distinct urban areas and finally down to building permits for single lots (Post & Dansk Byplanlaboratorium, 2009, p.7). It was not until 2013, that surface-water-relation of the lot and the region was addressed as an actual urban planning question, when mandatory climate-adaption-planning of municipalities, focusing on risk management, was introduced together with some new tools for addressing surface water in 'local plans' (Naturstyrelsen et al., 2013). In these years municipalities, water-service companies and other urban actors are testing and establishing new practises in the field. In this process, I call upon close attention to be payed to the issue of scale in the planning platforms and analytical methodologies. Changed patterns of

precipitation due to unstable changes in the atmosphere on a global scale, is in direct interplay with ‘close-up’ terrain elevation features, where only a few centimetres can change routes of flow paths and determine whether vast areas are flooded or not. When zooming in, the large structures and dependencies of up-stream watersheds, groundwater systems and down-stream recipients are not visible nor governable. When zooming out temporal material processes and exchanges like the circuit of waters fall, stall, flow, infiltration and recharge of largescale concern is not visible nor governable. Waters, it occurs, is a true trickster of scales.

In this article, I will bring results from my research, displaying inherent struggles in practise attempts on shifting the urban water paradigm. On a backdrop of a philosophical call for a renewed ontology and epistemology in the Anthropocene, I will evaluate and discuss the efforts of *reorientation* in the planning practise, and further speculate on some methodological attempts to engage differently with the scalar problem of inquiry.

#### CALL FOR REORIENTATION: IN RATHER THAN ON EARTH.

The ‘modern’ ontological and epistemological domain, which has had great influence on the planning system of discrete administrative scales, is intensely disputed in the age of the Anthropocene. The concept of the Anthropocene induces us to consider human activities as a natural force in the process of destabilizing the climate and causing the 6<sup>th</sup> extinction of species, with unpredictable consequences for Earth’s ecosystems (Steffen et al., 2011). This is not only changing the environment, it is also fundamentally changing humans, and in particular our understanding of the relationship between humans and environment (Latour, 2016). It establishes an understanding, that earth is not an ‘object’, and cannot be perceived as mere background for human culture. Life on earth does not consist of individual subjects acting on a stage of natural objects. It may rather be assessed as one embodied organism - Gaia – where geosphere, atmosphere and biosphere cooperates in performing and sustaining life on earth (Lovelock, 1995).

In this perspective, the view from above, is no view at all. The objective and largescale approach does not provide an overview, but devastatingly overlooks the site-specific material relationships. Latour et.al. is investigating and discussing how Gaia can be explored as a realm of Critical Zones – localities in the thin film from higher geosphere to lower atmosphere, stressing that these cannot be explored from anywhere but from the inside (Latour & Wiebel, 2020, p.14). This understanding leads us to appreciate landscape (geological, hydrological, climatic, biological) and

cultural (societal, urban) conditions as processes of mutual influence. Culture / nature, city / landscape can no longer be understood as opposites, (Hagan, 2014, p.9) nor can the relation between them (such as urban development) productively be described as one between a subject-and-object, where one regards only humans with agency. As a result, it is necessary to *re-orient* ourselves in an earthly world, which our previous mental (plus legal and methodological) frameworks has placed us outside (Latour, 2016a). In this act of *reorientation*, we may insist on integration of scales. We may try to recognize landscape conditions and processes, such as surface waters, as actors, rather than passive parameters or interests in planning. Moreover, we may work to overcome dichotomist understanding of wet/dry and linguistically limited notions of water as a “thing”, running in a “line”, fixed at a “scale” need to be revised (Cunha, 2018).

#### NEW PRACTISE APPROACHES TO URBAN WATERS

In my PhD research, I have executed a real-time case study of the conduction of a novel theme plan, which is a part of the municipality plan revision 2021 in Aarhus Municipality. The theme plan can arguably be seen as a brave attempt on a changed approach to spatial planning of urban surface waters. In the following, I will firstly elaborate on the changed role of surface water. Secondly, I will display and discuss some examples on how the investigated case responds to this, and to the act of *reorientation* brought forward in the previous section. Thirdly, I will argue that transformative research in alternative methodological approaches, integrating multiple scales, interdisciplinary knowledge production and including designerly competences is urgently called for.

#### FROM URBAN WASTE TO URBAN ACTOR

Since the revolution of sanitation of Paris, led by Hausmann in the second half of the 19th century, sewerage of urban settlements has become a design-state in the DK. In 2019, the vast majority of urban settlements redirect rainwater from roofs and pavements into sewers (Miljøministeriet, 2019). This practise of treating rainwater as waste goes hand-in-hand with a wider regime of water control, made possible by the art of engineering, including drainage of wetlands, regulating groundwater tables, diking, canalling, etc. (Hooimeijer, 2015). The approach has gradually build an industrial regime of water-control (Wiberg, 2018), which continues to promote “landscape illiteracy” (Whiston Spirn, 2005) in connection to spatial planning and urban development. Urban water management in Aarhus as most other Danish settlements has in large been assessed below surface, and most days of the year, rainwater has simply “disappeared” into the

underground. I will argue that this practise has caused the removal of water-issues from spatial and urban-organisational concern, and therefore from the field and scales of urban spatial planning. Climatic changes, are largely questioning this approach. Increasing extreme rainfall and average annual precipitation, causes changing levels of streams and lakes and changes of groundwater tables. These are spatial issues with spatial effects. Some urban fabrics are no longer able to resist the changing waterbodies. All urban fabrics are links in a continuum of water networks, reaching from the pavements underneath our feet to the vast catchments of Aarhus Å, Egå and Giber Å, and further on to global weather systems, in which all areas are affected by and/or affecting the network. Though a given area is not likely to be flooded, it may play a significant role in preventing other areas of being so. Hence the infrastructures of surface water is being re-designed these years, still scholars suggests, it should rather be re-defined (Bergen Jensen & Fryd, 2009; Hoffmann et al., 2018; Wiberg, 2018; Wenningsted-Torgard, 2017)

#### NOVELTY OF WATER-THINKING ACROSS SECTORS

From the case study, it has become evident, that surface water has not prior been an issue with influence on the scale and scope of the spatial planning conducted.

*“Landscape issues such as topography and waters flow has been out of municipality planning for decades” Planning Official, Aarhus Municipality, March 2019.*

The waterscape ‘illiteracy’ reveals itself as a lack of methodologies to investigate surface water as an urban actor. To overcome the shortages the brave planners were seeking advice from the actors usually concerned with water-relations, only to find their questions returned. Actors here was equally inexperienced in addressing surface waters as questions of planning for urban space and function. The discussions that followed were somewhat perplex and the planners found it difficult to conclude or move forward. Further analysis show that the conversations were leaping between different discourses on surface water. I have tracked the discourses to different sectorial and disciplinary domains, considering surface water from very different positions. Hans Fink has described how different understandings of the concept of “nature”, easily can lead to misunderstandings and malpractice in governing of such (Fink, 2003). I equally found the concept of surface water to be a contested one. Moreover the role of water as waste, a threat to health, a matter of anthropocentric control, and, in the wake of changing waterbodies, a flood risk towards existing urban structures seem to have greater impact. Though pursuing so called ‘synergy effects’ promoting environmental, recreational and aesthetic objectives in the climate adaptation efforts, these are still considered “add-ons”, not motors of a redefinition of surface water

infrastructure. I recollected, that greater leaps towards a collective understanding of the problem as well as possible novel solutions arose when the multidisciplinary actors were co-working in-situ on mapping activities and sketching (although this was not a ‘usual’ activity in this setting), than when merely discussing about maps and solutions.

To summarize, the case show a novel leap in redefining how urban planning deals with the issue of surface water. It shows strong efforts of inter-sectoral collaboration, but it also display some of the challenges on bridging different sectorial discourses and methods, in order to build a new **collective** understanding of and approaches to the future role of urban surface waters. This is no innovative discovery. Disciplinary integration may be one of the cornerstones mentioned across most literature concerned with ecological transition. Still, the recollection of a momentum emerging from working collectively with designerly methods of mapping and sketching gives hints towards ways to bridge the gap. The finding makes sense when consulting Design Theory, e.g. the concept of ‘co-evolution’ of solution and problem spaces from designerly methodologies, promoted by Nigel Cross (Cross, 2004, p.434) amongst others.

#### SCALES AND BOUNDARIES OF WATER

From the case study, I found that the geographical and administrative boundaries of the municipality plan, the municipal frames, the local plans, and the cadastral structure of Aarhus is quite arbitrary to pivotal landscape properties, those which guides waters flow, stall, infiltration, recharge and evaporation. Further, I found, that surface water issues tangles with the matter of scale and scalar interdependence in close connection to matters of material and the site-specific conditions, which challenges the scales (and scalar approach) of existing spatial planning platforms. Similar conclusions can be found in the work of Krarup and Wiberg (Krarup, 2015; Wiberg, 2018, p.92). Following this finding, it seems that planning for urban waters are questioning the existing scales and levels of planning. Other scholars has suggested introducing new levels of planning according to watersheds (Wiberg, 2018, pp.396–399; Whiston Spirn, 2005, p.7). Such an approach could be productive, bearing in mind, that watershed themselves are not a stable entity, why I will stress, that the planning space and scale has to be flexible, as is reality.

#### SCALABLE WATERS

In order to plan for ‘blue structures’, the planners took on a rather novel GIS-based software, Scalgo Live, as primary method of urban surface water mapping. It was utilised to perform quick representations of water-flows. With Scalgo Live it became possible for the planners to

visualize and represent flow paths, across urban and rural contexts, and across scales.

*"It seem unrealistic to pursue such an idea of planning according to the flow paths." Planning Official, Aarhus Municipality, February 2019.*

The maps suddenly represented former 'invisible' flow paths at the planning table. However, the flow paths were crossing administrative scales and functional as well as legal boundaries of the urban realm. These boundaries represent multiple actors, which the urban planners had (too) much experience in handling. Thus, the blue lines on the map seemed unrealistic to pursue as organisational structures of the urban. The politically constructed layers of organisation seem to appear more 'real', than the physically and climatically constructed ones. The maps from Scalgo Live gave a fraction of insight into the correlation of waterscapes and the urban realm. As a screening tool, it provides good insight, but it carries an embedded risk of over-simplifying. At least in my personal experience, on-site experiences of waters 'behaviour', is mandatory in order to understand what is represented in the maps provided, and even more important: what is not. Scalgo Live performs GIS analysis of a Digital Elevation Model – also called a 'glass model'. This represents the ground surface as pure shape with no materiality, which causes 100% runoff. Although the providers of the software are explicit about the inherent calculative limitations of this, it still promotes an embedded logic and understanding of 'environment' as a sum of objects, where form and substance are separable entities. Representing water as blue lines on a map, make them easily misinterpreted as singular entities, which are to be *handled, altered and redirected*.

Summarising, the utilised technologies seemed useful to ease readings of terrain and waters flow in connection to the urban layers. Still, methodologies that can provide tangible insight into both substance and states of wetness are necessary supplements. Such methodologies may be informed by 'climbing down' the largescale ladder, getting out of the office, putting on rubber boots and submit into subjective and sensational experiences of various water conditions, on-site.

## IMAGINING REORIENTATION

I mapped the controversies of spatial planning of urban waters in Aarhus Municipality, only to "*realize the disconnect between the size of the problems we face and our limited grasp and attention span*" as Latour criticises scholarly efforts to map scientific and disciplinary controversies (Latour, 2016b, p.26). I noticed how designerly collaborative approaches seemed beneficial as means of 'co-evolution' of solution and problem spaces. I have also registered the scalar disconnect of the planning platforms and the waterscapes of influence, and noticed that other levels

could be introduced, bearing in mind, that water is dynamic – why planning platforms may also need to be flexible. Finally, I have discovered how methodologies of visualising water-flow maintains a Cartesian and dichotomist gaze on wet/dry conditions, and I have hinted how such a gaze can be balanced by building situated knowledge of water. In conclusion, it seems that a *reorientation* of planning is out of scope of the case investigated. Still, if such turn lies beyond the municipal, then with whom does it belong? The effort investigated is one of many, conducted these years, across the country, slowly building a new paradigm of water management. I anticipate that the challenges reported here are recognisable, but not exhausted. On this note, I find it appropriate to call for further research on alternative methodological approaches of planning for urban surface waters, which is able to bridge the limits of sectorial logics, arrange new operational scales of planning and escape the prisons of dominant dichotomies.

In continuation of Latour's statement of the limited grasp of the sciences of today, he continues to recommend *Compositionism* as a way to move forward (Latour, 2016b, p.26). His collaboration with Alexandra Arènes and Jérôme Gaillardet on providing Critical Zone Observatories with new schemes of mapping and representation, embracing situational, sensational and site-specific data, are highly admirable efforts (Arènes et al., 2018). In this final passage, I will argue, that a transformative and designerly approach may hold a key to take a first small step forward into the messy realm of situated knowledge and planning. Martin Prominski argue, that design (defining design as an explorative process encompassing projection and proposals, not products) has the capacity to synthesize and project different future possibilities based on multidisciplinary knowledge input, and various types of data. He suggests research-through-design in real world labs, as transformative strategies (Prominski, 2019, p.45).

I imagine a planning-research setup, where the task is to compose various site-specific projections for future urban waterscapes, working across multiple scales. I imagine a task force of planning officials, local experts, property owners **and** scholars from a wide range of sciences. I imagine the team with their rubber boots planted in the soils and intensities of wetness, and landscape architects as site exploring 'Sherpas'. I furthermore imagine landscape architects as compositing agents, who aligns the cross-disciplinary knowledge production by negotiating the differentiated data into plan and design concepts, and as process instigators operating through their determination of generating proposals. I imagine, as fuels for such projections, a rich production of landscape-water-urban analysis on multiple scales and temporalities, utilising a variety of mapping techniques endorsing subjective and thick on-site data collection.

## CONCLUSION

Municipalities and water companies across Denmark are establishing new practises of urban planning of surface-waters these years, as a response to climatic changes. I have undertaken a case study of an innovative attempt on a new approach to in Aarhus Municipality. I have mapped how different sectorial positions and gazes confuses the quest. I have recollected how existing scales and scopes of spatial planning platforms seem inadequate to address such a fluid-scaled and dynamic actor as surface water. And I have pointed towards one example of technology utilised in the planning process, and discussed its adverse ontological impact and shortage in providing tangible insight into both substance, scales and states of wetness. I have concluded that the endeavour of *reorientation* of surface water planning lies somewhat beyond the scope of the case examined. Still I have asked - if such turn lies beyond the municipal, then with whom does it belong? Finally, I have called upon further research – of a designerly and transformative kind, to search for an approach to municipal planning of surface waters, that is able to climb down the ladder of largescale objective analysis, into situated co-evolution of problem and solutions. Such an endeavour may advise the transforming practise on how to orient itself, just an inch or two, closer to Earth.

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