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Integrated Water Design for a Decentralized Urban Landscape. The Case of the Veneto *Città Diffusa*

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Abstract

Summary

In the Veneto *Città Diffusa*, the decentralized urban landscape of the Veneto Region, Northeast Italy, the economic growth of recent decades brought about increased urbanization and agricultural intensification. The process of change has been accompanied by the extension and/or maximization of centralized services of drinking water, irrigation, waste water and drainage to meet greater demands for the provision and disposal of water. Accordingly, the structure of a formerly poor rural landscape has been adapted to support an affluent industrialized and urban one. However, all this has had detrimental side effects, which, in time might seriously compromise the quality of life in this landscape . On one side, the transformations that occurred have in fact given rise to unexpected problems of drought, flooding and pollution of water; and recent changes in climate patterns have further intensified these risks. On the other side, the long term fine grained carrying structures of the landscape fabric –like roads, field ditches, stream and river corridors, dirt roads, paths etc.-, as the very basis of the landscape's unique ecological diversity, and once used to convey the area's flows now risk general extinction. The existing road system is also increasingly under pressure to intensify traffic that creates congestion, pollution and unsafe conditions. From a planning and design perspective, this calls for adequate methods and tools that can help designers to tackle the needs for more sustainable water flows as well as the needs for a recovered ecological integrity (including spatial intelligibility) of this urban landscape. This can be of a great importance also for a better understanding of other territories of urban dispersion which are spreading especially over the European and –although in very different forms- the American continents. The present research aims to contribute to the planning and design answers to these urgent problems. For this purpose, the urban landscape of the Veneto *Città Diffusa* was approached with principles derived

from an Integrated Water Management approach (IWM) that, recently, has been successfully applied in the urban context as an alternative to the technocratic approach of maximizing flows. Storage of water is the key principle, for it can bring about decentralized storage, which means new and different water flow management and spatial arrangements. This can ultimately be obtained through the placement and implementation of small scale and decentralized infrastructures.

By focusing on the interrelation between flow patterns and spatial arrangements in a small portion of the Veneto *Città Diffusa* –i.e. the case study landscape- the study has elaborated and confirmed two specific closely related assumptions.

The first assumption is that the recent loss of landscape diversity and the increasing problems of flood, drought and water pollution of the Veneto *Città Diffusa* are closely related and ascribable also to the processes of centralization of the water flows that accompanied the area's economic growth. The changes of flow patterns and spatial arrangements of the case study area that happened over the last decades were systematically observed in a threefold area-flow-actor perspective. Insights into the present arrangements of irrigation, drainage, drinking water and waste water at the scale of the Consorzio di Bonifica Valli Grandi e Medio Veronese waterboard also accompanied the investigation. The diagnosis showed that the centralized systems arranged to perform greater inflows and outflows, draw heavily on resources and often risk exceeding the region's ecological carrying capacity. Moreover, the centralized arrangement often conflicts with the decentralized character of the settlements. No synergetic relations have been developed between the man-made water system and the existing pervasive fine grained elements of the landscape. Instead, this rich capital asset has been left behind and even neglected. And such forms of negligence have ultimately brought about a massive loss of biodiversity, accessibility and spatial intelligibility of the local landscape.

This leads to the second assumption that has been researched: in the decentralized urban landscape of the Veneto *Città Diffusa*, answers that design measures can give in response to increasing water-flow dysfunctions and loss of diversity can be based on decentralized water storage systems that make use of the existing fine grain structures of local landscapes -ditches, streams, land depressions, former pits, hedge-rows, dirt roads, paths etc.- and promote a local-based utilisation of resources (resilience), while fostering a stronger local identity, biodiversity and accessibility for more coherent spatial arrangements. Building on the Ecological Conditions Strategy conceived by Tjallingii (1996), a set of guiding models was developed. In the models, the principles of Integrated Water Management were tuned to those fine grained landscape elements that still structure the low plains of the Veneto –the built lot system, the agricultural field system, the road system, the stream system and the excavation site system. Principles and models of integration and decentralization drove the exploration of design options for different levels of decentralized management of water in the case study area. The creative design process of learning produced a useful toolbox of design models. The design exploration also proved that the dispersed urbanization of the *Città Diffusa* can be made suitable to accommodate modern integrated and decentralized water systems that, by re-activating the existing carrying structures, also contribute to recovering the landscape.

Decentralized urbanization can actually be an ally in the search for sustainable and legible settlements that also reuse and recycle water locally.

Designing an integrated water system that fits with the *Città Diffusa* and contributes to the ecological integrity of this urban landscape remains an important challenge. The tools that can be of practical help to designers and decision-makers who are willing to undertake this challenge were investigated and worked out. Nonetheless, the way to realize the outlined strategies is complex and affected by uncertainty. In this context more research is needed to investigate the effects of decentralization at the level of the region on one side, and on the other side to investigate how these integrated systems can be set to fit present institutional and market frameworks. In conclusion, the study generated concrete proposals for one or more pilot projects that will be extremely important to creating consensus in the decision process during the testing of models and strategies.