



Renaturalising the
water courses:
dynamic interactions
between communities
and nature

 #WATEFCON 2018

By Eleni Tracada & Francesco Varone

Water Efficiency Conference
5-7 September 2018
University of Aveiro, Portugal

wat**f**
Water Efficiency Network

#WATEFCON 2018

Water courses, ecosystems and community interaction

- Combined with urban design, landscape architecture has the power to stimulate human experiences by alluding to dynamic patterns of still or rushing water.
- Our urban cultural ecosystems blend harmoniously with water.
- Transformed into polluted artificial waterways or fiercely running rainwater discharges, sometimes our meandering water courses can endanger people as well as the environment.
- Can we re-establish a balance between our ecosystems and the anthropocentric remodelling of our cities?
- We shall discuss the trends of renaturalisation/renaturation of water courses in some European countries, where previously water management has implied working against nature to ensure progress for mankind.

Green infrastructure and water courses

- Influences to humans by ecosystems, such as water courses, are getting stronger and stronger. New management and design solutions have also emerged in many contemporary cities in which ‘we build with nature’ in order to accept ‘living with water’.
- There is a growing understanding of what green infrastructure is and what social, ecological and economic value it can deliver in cities today; designers and policy makers are able to set its role for our sustainable and resilient cities of the future.
- Although green infrastructure is a simple approach to landscape planning, it is also a complex approach, because of the large range of its principles; it has been anticipated that green infrastructure preserving and promoting ecosystems can promote landscape multi-functionality.
- “Green infrastructure includes the network of green spaces and other natural elements such as rivers and lakes that are interspersed between and connect villages, towns and cities. Individually these elements are green infrastructure assets and the roles that these assets play are green infrastructure functions” (Natural England & Landuse Consultants. Green Infrastructure Guidance. Peterborough, UK; 2009)

Green infrastructure and urban design and planning

- With the increasing impacts of climate change, landscape planners and urban designers working together are now looking at alternative solutions to establish more effective and sustainable landscape practice.
- Water management, biodiversity conservation, as well as climate change, are some areas where a green infrastructure approach has been successfully applied.
- By relying on International policies, such as the Water Framework Directive, green infrastructure practitioners have managed to make use of spatial characteristics to scope management at a regional and landscape scale.
- Green infrastructure investments can be often presented as an approach to landscape resource management that promotes the use of landscape networks/ecosystems (as an integrated approach to investment).
- The renaturalisation of the water courses is included as a dynamic part of several contemporary projects, which propose innovation in green infrastructure, and therefore, offers new opportunities for investment at a variety of scales (we discuss this in our case studies).

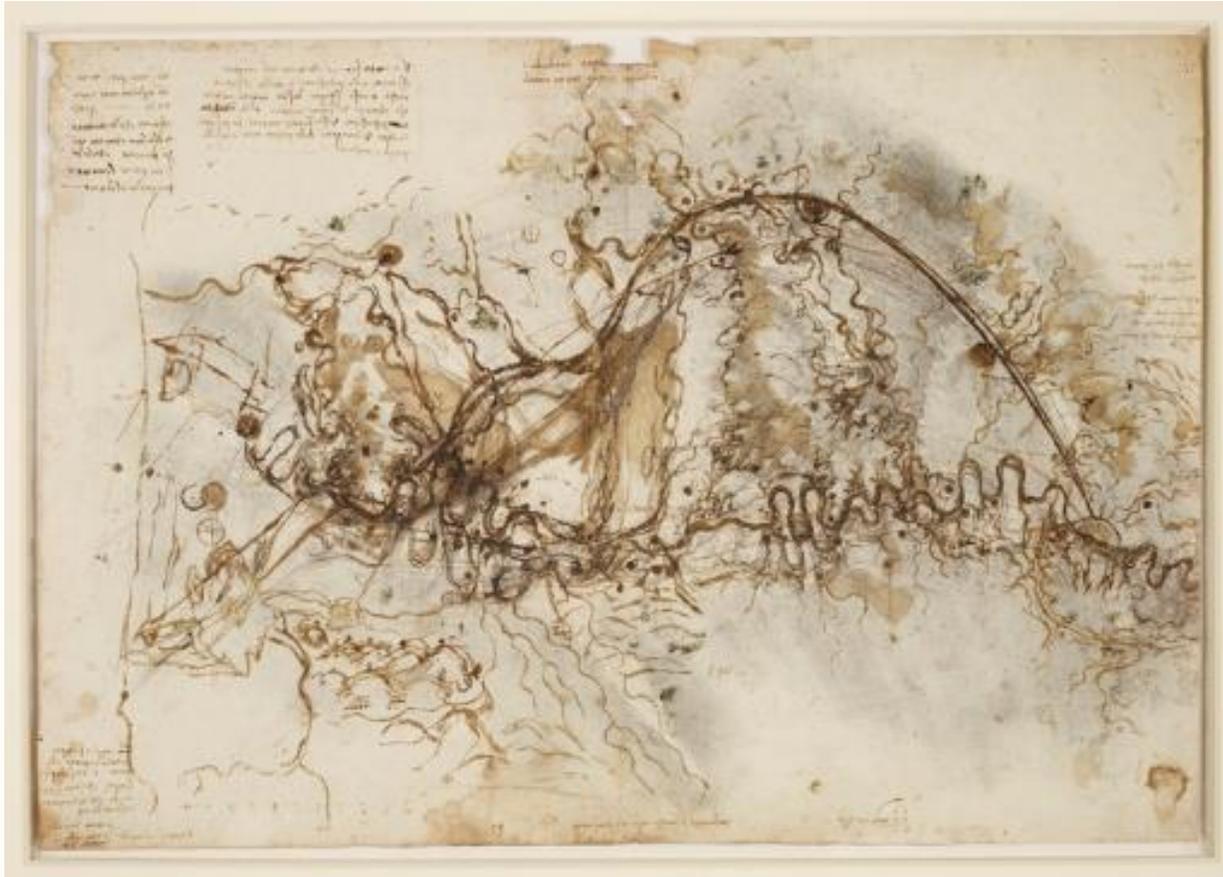
Renaturalising the water courses

- The notion of renaturalisation has appeared, when life styles had to be improved to accommodate healthy living via mobility by walking or by using a bicycle.
- Recently many projects refer to ‘riverside (re-)developments’, which extend to recreating natural environments in conjunction with artificial interventions; the intention is to revitalize heavily polluted and/or neglected areas around water courses, which have been abandoned for many years.
- Riverside areas are developed to provide modern cities with both built environment growth and integrated green infrastructure. We are now dealing with ‘water-sensitive’ design and ‘blue infrastructure’ management.

Water courses-Historical Context

- Leonardo Da Vinci in his Art of Water suggests that “the body of the earth is of the nature of a fish ... because it draws water as its breath instead of air” (Yan K. Da Vinci and the Art of Water. International Rivers. People-Water-Life. 2010).
- Leonardo spent as much time observing and drawing rivers and waterways as he did by observing dissected bodies in Santa Maria Nuova Hospital morgue; he compared the human body’s vascular system – veins and arteries with the flow of rivers and their feeding streams, thus, he perfectly understood the importance of healthy systems and patterns of arteries preserving healthy lifecycles.

Water courses-Historical Context

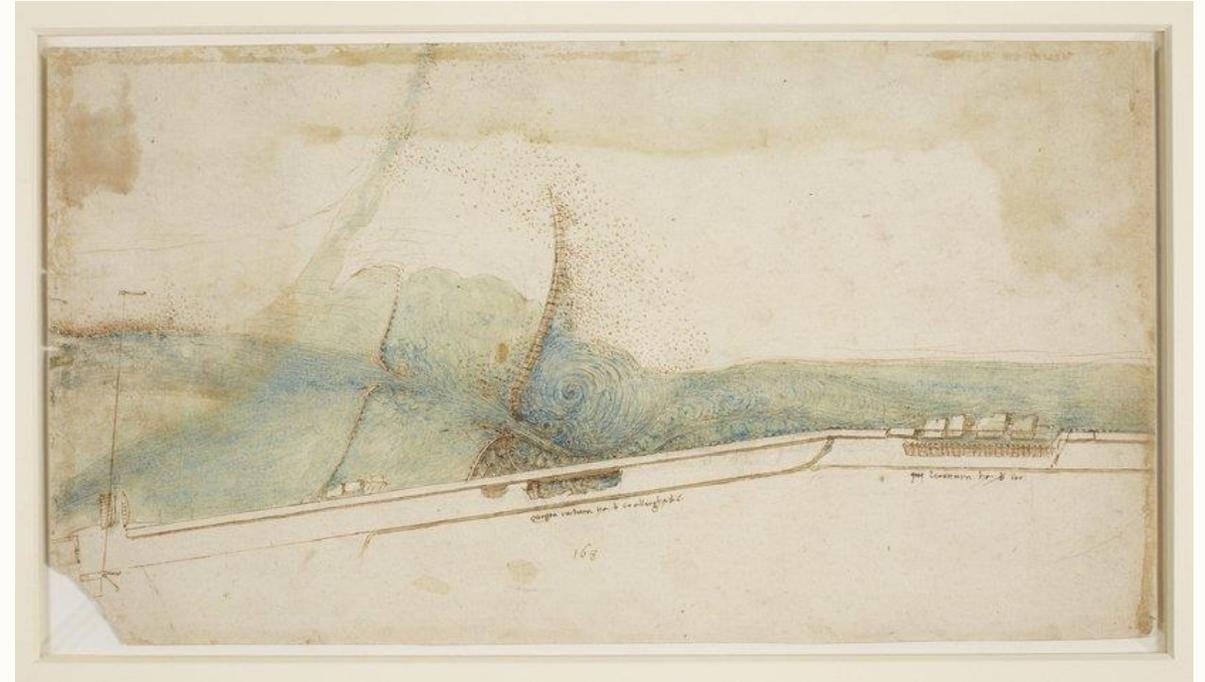


Leonardo's deviation of the Arno River; bypassing a stretch of the river with an artificial canal (never put into practice). (Source: Royal Collection Trust at <https://www.royalcollection.org.uk/collection/912279/a-scheme-for-a-canal-to-bypass-the-arno>)

Leonardo's legacy with water courses- Hydrology projects

- Leonardo is known to many scholars across a variety of disciplines for “his fascination with water and rivers, which pervaded his art and science” (Humphries, P. River Ecology and Research. Leonardo da Vinci: rivers, water, science and art - Part 3: diverting the Arno. 2014).
- Leonardo's deeds were often related to or combined with defense projects or masterminded political trickery, such as “Niccolò Machiavelli's dream to change the course of Florentine history” by diverting the Arno River as part of the war effort against the nearby seaside city of Pisa (Masters, R. Fortune is a River: Leonardo Da Vinci and Niccolò Machiavelli's magnificent dream to change the course of Florentine history. New York: The Free Press; 1998).
- This project above failed as the Arno River destroyed the weir and related canals after a heavy rainfall and flood.

Leonardo's legacy with water courses- Hydrology projects



A plan of a weir and embankment on the Arno east of Florence 1504(Source: Royal Collection Trust at <https://www.royalcollection.org.uk/collection/912279/a-scheme-for-a-canal-to-bypass-the-arno>)

Leonardo and the Art of Water



River systems and veins



Leonardo da Vinci, Landscape drawing for Santa Maria della Neve on 5th August 1473.
Licensed under Public domain via Wikimedia Commons

Leonardo and the Art of Water



Leonardo's fascination with hydrology and evolution of natural environment is also present in one of his most famous paintings: Mona Lisa or La Gioconda; he had included one of the most important natural developments in the history of the plain between Florence, Prato and Pistoia. This plain was occupied by a huge lake for several millions of years until Roman times. Because of erosion caused by water, a crevice was created and a river (the Ombrone River) went through it to flow in the Arno River. The lake waters which were pressing the massive rock of Gonfolina disappeared and the entire landscape was transformed; hills are visible, as we can see in Zocchi's far fetching view, including the Lastra a Signa Bridge on the right in Zocchi's painting as well.

Leonardo and the Art of Water



Modern hydrology: Blue infrastructure

- The most famous greenway development included in available literature was constructed in Boston by Frederick Law Olmsted; it aimed to help the city's adaptation to its specific climate. Boston's Emerald Necklace covers an area of more than 1,100 acres; it was designed to manage the ice or snow melt of the Charles River, which led to annual flooding.
- The success of this investment helped the city of Boston to limit some of the negative impacts of urbanization through the development of a constructed wetland system. The investment also brought extensive socio-economic benefits to the city, with Boston Common acting as a hub for community activities, which is still the case today.

Modern hydrology: Blue infrastructure



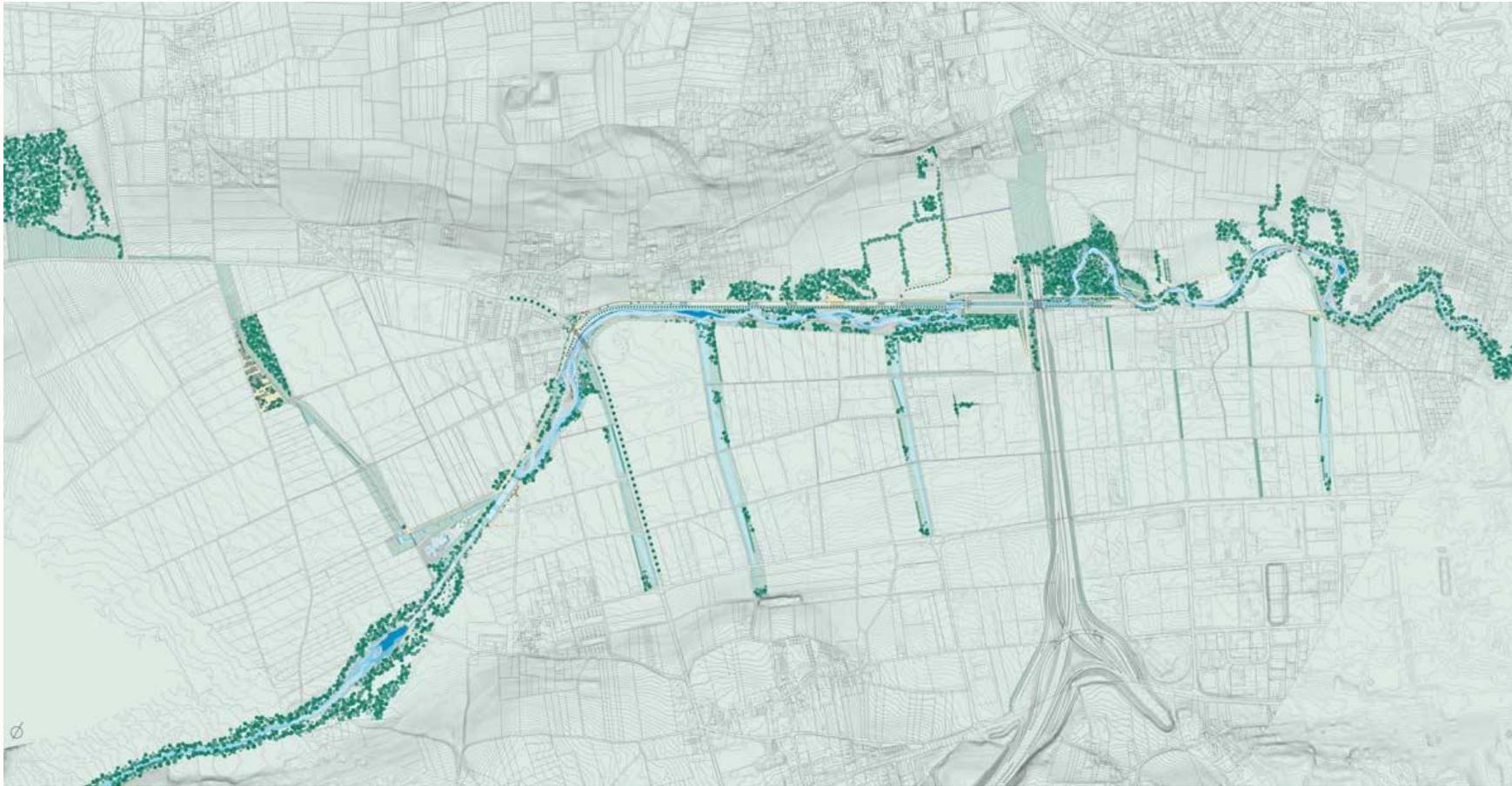
Boston's Emerald Necklace_Frederick Law Olmsted

<https://s-media-cache-ak0.pinimg.com/600x315/84/b5/c3/84b5c384996d76d3342eb5ec31bd0820.jpg>

#WATEFCon 2018

Modern hydrology: Blue infrastructure

The Aire River project by Atelier Descombes & Rampini, Superpositions group



#WATEFCon 2018

Modern hydrology: Blue infrastructure

The Aire River project by Atelier Descombes & Rampini, Superpositions group



http://www.landezine.com/wp-content/uploads/2016/06/10-Naturalization-river-channel-landscape-architecture-EasyToMap_e%CC%81volution-juin-2014-mai-2015.jpg

Modern hydrology: Blue infrastructure

The Aire River project by Atelier Descombes & Rampini, Superpositions group

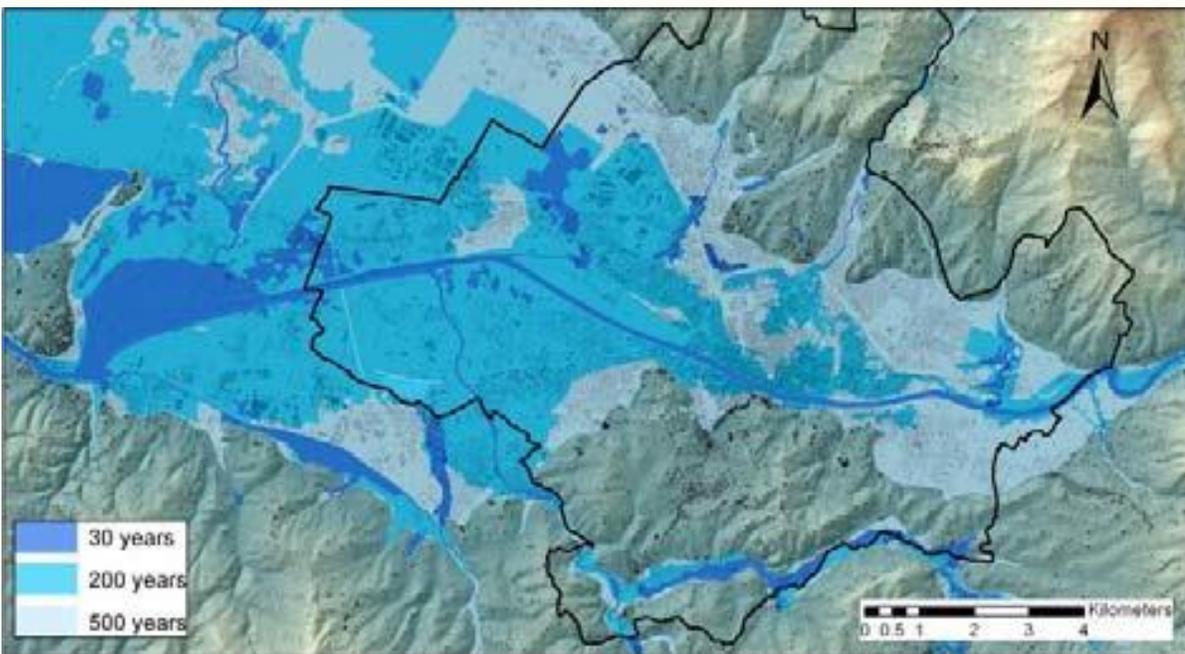


@Superpositions group

#WATEFCon 2018

Modern hydrology: Blue infrastructure

The Aire River project by Atelier Descombes & Rampini, Superpositions group



Projects, such as the Aire River renaturation/renaturalisation in Geneva could be easily compared with Leonardo's hydrology ideas in Renaissance for the areas surrounding Florence. We find Leonardo's ideas in his Treatise on Water, in which he focuses on moving waters and trained rivers in relation to their water cycles and the tectonics of the earth's surface. All his studies and efforts managed to reduce problems in Florence and adjacent plane areas.

Nevertheless, today danger of floods and damages is still a threat for central urban areas in proximity of the Arno River. More needs to be done along the extension of this river, and mostly in discharge areas.



**Thank you for your attention
Any questions?**

#WATEFCon 2018