

Recapturing the Heart of the City: Effective Water Resource Management in Urban Areas



Thesis- In urban areas, an integrated approach to water resource management that focuses on improving a river's water quality, functionality and socio-economic value, is most effective when implemented at a sub-basin or watershed scale.

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Background

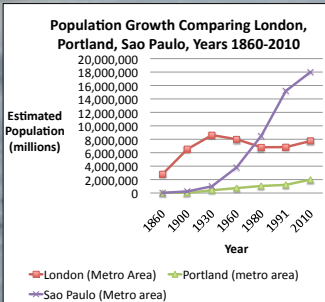
- Historically, cities that have effectively and sustainably made their water resources manageable, navigable, and potable, have been the most successful
- In the 20th and 21st centuries, societies must adapt their management of water resources to changes in demographic, environmental and political trends
- Failure to adapt to issues such as population growth, urbanization, and climate change can result in water pollution, water scarcity, public health and economic issues, especially in metropolitan regions

Integrated Water Resource Management (IWRM)

- Adapted in 1992 by UN
- Articulated as "a problem solving approach to address key water-related development challenges in ways that balance the economic efficiency, social equity, and environmental sustainability" (Article 21m, Earth Summit)
- The term 'integrated' has many different meanings:
 - Interconnectedness between human and natural systems
 - Bridging the different levels of the decision-making process (decentralization)
 - Uniting sectoral projects and plans into one under a common goal
- Scale: Ideally implemented at the whole river basin scale
- criticized as being ineffective and hard to implement due to the added complexity of basin-wide integration

Methods

- Chose to compare three cities that differ in geographical situation, population size (scale) and historical significance
- Comparative Analysis between Portland, London and Sao Paulo: comparing development of sewage infrastructure, historical management and current IWRM plans



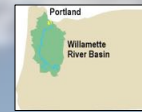
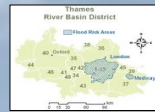
Further Reading

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Varis, Olli. 2006. "Megacities, development and water." International Journal of Water Resources Development 22: 199-225. doi:10.1080/07900620600648399.

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Comparative Analysis



Comparative Timeline of Water Management and Pollution Issues

Key: Dark Green textboxes: events in London, Red dates=height of pollution problem in Thames
Light green textboxes: events in Portland, Purple dates=height of pollution problem in Willamette

- 1700-1800: All sewage deposited directly into Thames first privatized water pipes bring water from the Thames to London homes
- 1800-1860: Three outbreaks of Cholera, a direct result of contaminated drinking water kills over 30,000 people
- 1929: First water quality assessment states that Willamette has low dissolved oxygen levels
- 1938: first sewage and industrial waste management system installed in city
- 1945: Poor water quality still apparent due to lack of fish populations in river

1700
1800
1858
1864
1929
1938
1969
1980
1990
2000
2008

- 1858: A toxic mixture of river water and effluent slowly backed up under London's streets, creating an awful stench
- 1864: First sewage system carries a majority of London's waste out of the city
- 1975-80, drinking water standards established
- 2000: EU implements the Water Framework Directive, focusing management at the basin level
- 1969: Establishment of Oregon DEQ, enforces strict water quality standards and waste permits
- 1972: National Geographic and EPA declares river a "river restored"
- 2001: Portland Harbor declared a superfund site by EPA
- 2008: Portland River Plan

Tiete River, Sao Paulo

- Main Water-related Challenges in Sao Paulo
 - Terrribly polluted due to human and solid waste: by 2015, 23% of population will not have access to basic sanitation
 - Water allocation issues: hydropower vs. drinking water creates false water scarcity issues, historically energy sector gets priority
 - Public health concern for squatter settlements located on floodplains and un-stable river banks, lack basic infrastructure, use polluted river water
 - Water Pricing, many people are opposed to paying for water and sanitation services



IWRM in Sao Paulo

- 1991, Sao Paulo Water Law follows an IWRM framework at basin scale: establishes a Basin Committee made up of community members, state government, municipalities, stakeholders Programa Mananciais:
 - Program funded by World Bank, third phase (2012)
 - Main Objective: maintain water quality of potable sources, improve quality of life for poor communities along river, enhance coordination between different levels of water management
 - Implementation: integrates existing plans and programs that each target specific social, environmental and development problems

Table Comparing IWRM Plans in Portland and London

	Portland	London
Current IWRM plan(s)	The River Plan (2008)- North, South and Central Reaches of the Willamette River; Portland Watershed Management Plan	Water for Life and Livelihoods, River Basin Planning- Working Together: Basin Wide Plan, River Basin Districts
Integration of prior policies/ plans/programs	Comprehensive plan (1980) Willamette Greenway Plan (1987), River Renaissance Plan (2001), River Concept (2006)	Water Framework Directive (EU), Integrated Pollution and Prevention Control (1996)
Main goals outlined in plan(s)	<ol style="list-style-type: none"> Increase public access to riverfront and public participation Ensure Portland harbor's long-term vitality by integrating water quality management and promotion of industry Integrate cities responses to regional, state and federal envt. Laws Make sure Cities activities are consistent with watershed health goals 	<ol style="list-style-type: none"> Expand scope of water protection to all waters, surface water and groundwater Enhance public and stakeholder involvement in decision-making process and implementation of policies Focus on developing long-term solutions
Planning Process	Portland Bureau of Environmental Services, River Plan Committee: citizens lead by Portland Planning Commission	EU, Environmental Agency, River Basin Districts.
Implementation of plan	River Plan Committee: citizens lead by Portland Planning Commission.	River basin districts, municipalities that are basin specific.

Is IWRM a realistic approach in megacities?

- Basin Committee only successful when further decentralized to sub-basin level
- Land-based solutions included in such as urban greenways are unrealistic options in short-term, due to informal settlements and urban density
- Hard to move away from a centralized system of water management: Political will still determines who has power in decision-making process
- People generally un-willing to pay for use of water: leads to unsustainable use of water resources

Further Conclusions

- In both Portland and Sao Paulo, a sub-basin or watershed scale for IWRM plans is more effective
- Suggests that full basin integration involves too many complex networks of actors to make management efficient
- High populations, political un-willingness to decentralize, and social inequities make the implementation of IWRM far more complex (Portland vs. Sao Paulo)