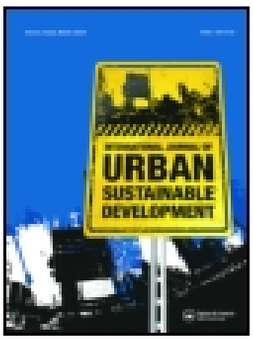

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ARTICLE

GOVERNANCE STRATEGIES TO PROMOTE HEALTH AND WELL-BEING: URBAN BLUE SPACE INFRASTRUCTURE INITIATIVES IN PLYMOUTH (UK)

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ABSTRACT

Building on evidence of the links between bluespace and public health, this study explores the governance of bluespace infrastructure to promote human health and well-being in Plymouth (UK). Using in-depth retrospective interviews and document analysis, this study focused on the role of governance in urban planning and development, specifically, the implementation phase of a bluespace infrastructure intervention. A deductive qualitative approach categorised content into themes related to pre-established water governance frameworks. Key findings from this study emphasise: the importance of health and welfare concerns around blue spaces as an incentive to getting started; collaborative stakeholder participation and engagement; the necessity of adequate funding; and the importance of continued monitoring and maintenance of urban blue space infrastructure. Based on reflective accounts of stakeholder experiences, the successes of the implementation process of the redevelopment are highlighted. More successful and sustainable bluespace interventions can be realised through ongoing considerations of effective water governance.

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KEYWORDS
Water governance; implementation; urban infrastructure; global change

1. Introduction

Research on the relationship between green and blue spaces and health is receiving increasing attention. In particular, blue space (e.g. lakes, canals, rivers, coastal, etc.) as a public health resource is now being evaluated for its potential benefits, as well as potential risks, for human health and well-being (White et al. 2020). Qualitative and quantitative systematic reviews of existing studies have highlighted that interactions around blue space produce restorative effects that help reduce stress and promote good mental health and physical activities (Völker and Kistemann 2011; Gascon et al. 2017). Especially in an urban environment, blue infrastructures may be an important contributor to the UN Sustainable Development Goals (SDGs) related to ensuring healthy lives and promoting well-being for all at all ages (SDG 3) and ensuring the availability and sustainable management of water and sanitation for all (SDG 6) (United Nations General Assembly 2015).

Cities and towns offer opportunities for governing, allocating and utilising natural resources, even in the midst of uncertain environmental risks and limitations on available natural resources (Keivani 2010; Koop et al. 2017). Although urban projects are dependent on the priorities of city authorities, urban planning and development require an interdisciplinary and trans-sectoral approach since any significant changes will affect the social, environmental, economic, and cultural dimensions of sustainability (Wessells 2011). The World Health Organisation (WHO) describes the determinants of health as *'the range of personal, social, economic and environmental factors which determine the health status of individuals or populations'* (World Health Organisation 1998). Hence, advanced strategies, policies, and projects developed and initiated

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in cities should seek the co-benefits of both the determinants of health and the determinants of environmental sustainability for solving environmental issues (de Oliveira et al. 2013).

More recently, there is increasing interest in the relationship between urban water management and promoting health for urban planning and development, particularly around the quantification of its effectiveness (Rietveld et al. 2016). How urban institutions and authorities develop, plan and implement policy initiatives can both encourage and obstruct how people access and enjoy blue space infrastructures (Völker and Kistemann 2011). Although climate change and extreme events raise serious concerns for health, the management of the natural environment is identified as a vital moderating driver to realising more urban blue space infrastructures which aim to promote health and well-being (Figure 1) (Grellier et al. 2017). The aim of this study is to explore and gain deeper knowledge of how conditions of governance contribute to the creation of urban blue space infrastructures that promote good human health and well-being.

Given the continued and increasing global environmental and anthropogenic risks facing cities (Bogardi et al. 2012; Diffenbaugh et al. 2015; OECD 2015), this study is significant. This study contributes to providing a deeper understanding of governance strategies concerning urban blue infrastructure in coastal urban areas with relatively deprived populations, and their effects on the health and well-being of the urban populace within the context of England. The study city, Plymouth, is among the 30% most deprived local authority districts in England (Public Health 2016). Further, this study explores the weaknesses and strengths in how urban planning and development strategies in the case study contribute to creating places for social cohesion among individuals, and promotes their health and well-being. In so doing, it adds support for the usefulness of applying water governance frameworks to urban blue space infrastructure developments whose primary aim is to foster good health and wellbeing (e.g. Wuijts et al. 2020).

This paper capitalises on a specific intervention conducted as part of the H2020 BlueHealth project (Grellier et al. 2017) to explore conditions for effective urban blue space governance in Plymouth, UK. It aims to highlight conditions of governance that contribute to realise sustainable and strategic blue space interventions that contribute to health and well-being. Thus, the conditions of governance are defined in this study as: *the requirements that are necessary in a governance strategy to create healthy blue spaces*. While the aim of this study was to document the governance situation in Plymouth broadly and not

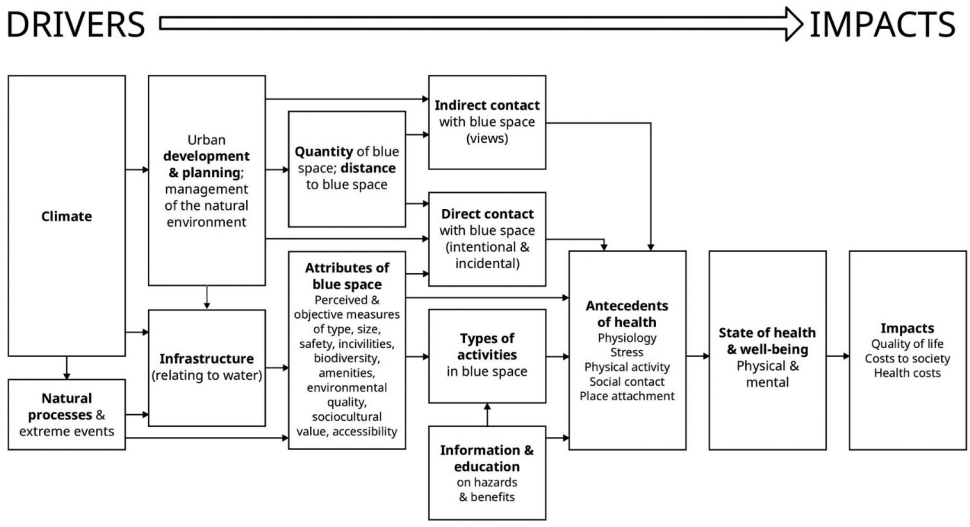

Figure 1. The mediating and moderating factors under investigation in the BlueHealth project.

to presuppose particular issues of contestability, we appreciate that given the involvement of stakeholders in the specific BlueHealth intervention (Bell et al. 2020) which involved complex stakeholder interaction and funding arrangements, that these aspects of governance may arise as particularly salient and/or contestable.

The study explores: (a) which governance conditions contribute to realising sustainable urban blue space initiatives in Plymouth? and (b) to what extent are these governance conditions integrated in urban planning and the development of blue space infrastructures in Plymouth city?

1.1. Water and health

There is growing evidence of greater well-being and mental health improvements when time is spent near water (e.g., rivers or beaches) for recreational use in both urban and rural settings (Gascon et al. 2017). Nevertheless, when water quality is not well-regulated, it can contribute to gastrointestinal and other diseases affecting the physical and mental well-being of users (Rietveld et al. 2016).

The quality of blue spaces for swimming, exercising, refreshing, or resting can be disturbed by negative water characteristics (e.g. surface and sewage runoffs, etc.), and consequently, can threaten the health of users (Schets 2011). Thus, the users of water-related ecosystems (e.g. lakes, canals, rivers, coastal, wetlands, aquifers, beaches, etc.) can enjoy the benefits and services associated with this blue infrastructure only if they are managed well and sustainably (UN-
Water 2018b 2019). In the face of climate and environmental changes, the management and maintenance of available resources to promote sustainable health and well-being of urban population are vital (Rietveld et al. 2016).

1.2. Water governance in the UK context

The objective of the EU Water Framework Directive (WFD, 2000/60/EC) to ensure 'good' water quality for the water-related ecosystems through different actors' involvement has led to the development of several frameworks for analysis. Among these frameworks are the Social-Ecological System framework (SESF) by (Ostrom 2009) and the Management and Transition Framework (MTF) by (Pahl-Wostl 2009; Pahl-Wostl et al. 2010). An interdisciplinary framework is useful to assess the management of complex systems and resources, even though policy solutions do not always succeed and there is no one-size-fits-all approach (Adger et al. 2003; Ostrom 2010; OECD 2015; Woodhouse and Muller 2017).

Specifically in the UK context, overall water policies emphasise inclusive governance, water quality objectives, reduction in pollution of rivers, and a policy environment with governance moving from a unitary state to governance through and by networks (i.e. polycentric governance) (OECD 2014). It is also important to note that as of 1989 in England and Wales, the provision of water and wastewater services was moved from the public to the private sector (Martin 2017). Therefore, the governance of urban blue space infrastructure redevelopments depends on the integration of the past and present histories of the location, diverse aims and objectives of stakeholders, and opinions of communities and localities (Hoyle 2000).

2. Analytical frameworks of water governance

This study used the framework for sustainable water governance of Van Rijswick et al. (2014) selected from various analytical frameworks on governance strategies for managing water safety, quality, and quantity for its ability to specifically address the implementation phase of policy interventions (Gober et al. 2011; Pahl-Wostl et al. 2012; Van Rijswick et al. 2014; OECD 2015). Conceptually, it is based on economics, law, public administration, and water system analysis and therefore has theoretical underpinnings concerning organisational processes. The framework for sustainable water governance is composed of 10 interdependent 'building blocks' which explore diverse elements of governance within the dimensions of content, organisation, and implementation (presented in Figure 2). All these elements are tested against the objectives aimed for in the governance strategy, using a set of standardised questions developed by Van Rijswick et al. (2014) and tailored to water quality governance by Wuijts et al. (2020). The availability of these elements in a governance strategy creates a system that is prepared and resilient for any unforeseen risks.

A continuous participatory consultation process between diverse stakeholders draws out interests,

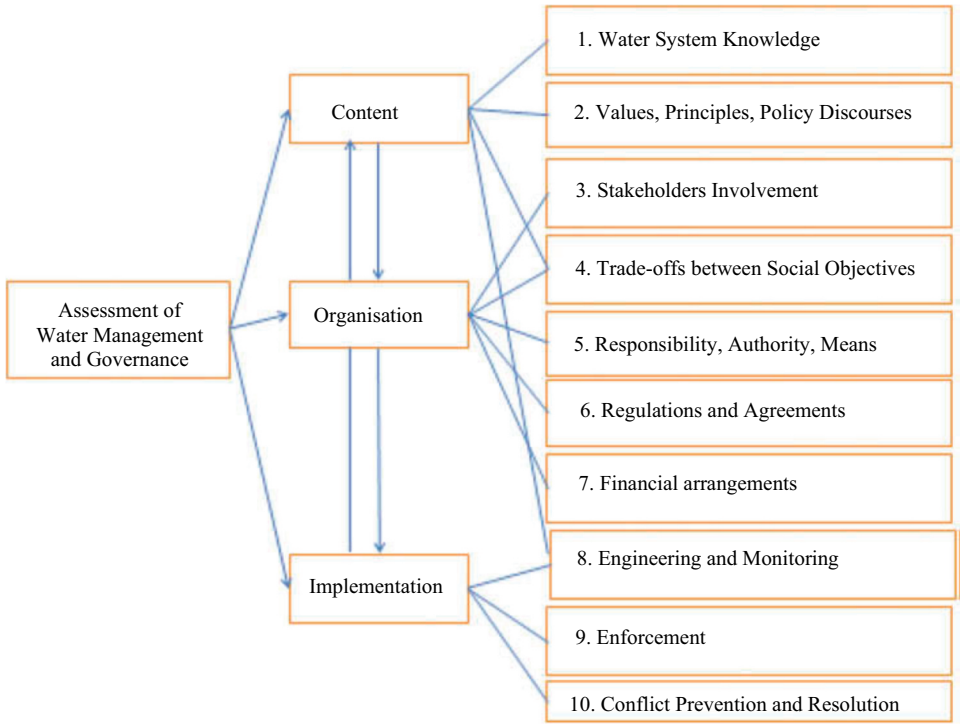

Figure 2. *Outline of the multiple dimensions of water management and governance. Source:* .Van Rijswick et al. (2014)

opinions, values, histories, and the framing of social and institutional aspects in water governance (Antunes et al. 2009). Also, the measuring and monitoring of performance against the service-level agreements (SLAs) of every structure provide the ability to trace where improvements are needed (Van Rijswick et al. 2014). Thus, the municipal objective to marry blue and green space design with the interests of the community is relevant to this study.

The efficiency, effectiveness, and legitimacy of water management and governance are dependent on the ability of a laid out structure to achieve agreed goals, whilst managing any conflicts that may arise during the planning through to the implementation phases (Van Rijswick et al. 2014). This must also take into account the maintenance or risk reduction of an infrastructure built for all users of the ecosystem, safeguarding the integrity principle of a system (Wiek and Larson 2012). Adaptive governance, which facilitates continuous monitoring and flexible learning from experiences and feedback, is a necessary condition for the effective implementation of policies (Pahl-Wostl et al. 2012; Green et al. 2013). In particular, the interdisciplinary aspect of this selected analytical framework (which emphasises legal, economic, engineering, and health domains of water governance) allows for the identification of the successes, strengths and weaknesses in the phenomenon under study.

3. Materials and methods

Prior to collecting the research data, formal ethical approval (eCORN001924) was obtained from the University of Exeter College of Life and Environmental Sciences Research Ethics Committee. No personal details of interviewees were collected in this study.

3.1. Plymouth case study setting

Plymouth City is surrounded by Tamar, Tavy, and Lynher Rivers and the Plymouth Sound, and is situated in Devon in the South West of England (see Figure 3). Plymouth now has a population of greater than 256,000 (Uncles and Torres 2013; Lambert 2015) with a population

Figure 3. Geographical location of Plymouth (UK) and its surrounding rivers. The European Environment Agency 2016 with study site, Teats Hill, indicated (*) and insert photo of the restoration.

density of ca. 3,300/km^2 (8,500/sq mi). Originally, a fishing community and grounded in maritime culture, 33% of its coastline consist of built infrastructure (Knights et al. 2016; Plymouth Population 2019).

The Plymouth study site, Teats Hill, is a waterside area situated east of Plymouth city (Figure 3) and is home to about 6,035 people (Plymouth Community Homes n.d; Waddington 2017). The overall score of the Index of Multiple Deprivation 2010 (IMD 2010) shows that this area of Plymouth is the 3rd most deprived neighbourhood of the city (Public Health PCC 2014). According to the 2016 Plymouth Public Health report, Plymouth City as a whole experiences significantly lower life expectancy in comparison with England for both males and females. To attempt to address this, Plymouth City Council has laid down strategies and programmes to promote the health and well-being of all population age groups, including through active outdoor activities (PCC 2017-2018; Bell et al. 2020).

More recently, Plymouth has experienced significant changes in the management of water resources to meet increasing population demands (Pooley 2017). In particular, the local government in 2013 adopted a subsidy strategy to support low-income earners and motivate the population to sustainably reduce their (potentially polluted) surface water drainage, which finds its way into local water bodies (South West Water n.d; Walker 2009).

Historically, Plymouth City Council have conducted projects which aim to mitigate the effects of socio-economic deprivation on poor health through nature-based means. For example, Richardson et al. (2013) describe the application of a Health Impact Assessment approach to a greenspace project of the council's and how it had the potential to provide health benefits to residents of a deprived area through increased physical activity, as well as mental and social well-being. The present study draws on a similar recent attempt (Bell et al. 2020) by recruiting interviewees who had been directly involved in it. The longevity of Plymouth City Council's efforts in this regard reflect a long-standing way of working and collaborating with multiple stakeholders (e.g. academia, wildlife trusts, public health bodies, and local NGOs) to evidence the wide-ranging health effects of their initiatives.

3.2. Study design

To explore which governance conditions contribute to realising sustainable urban blue space initiatives and how these conditions are incorporated in urban planning and development in Plymouth, a retrospective study was undertaken using a qualitative approach (i.e. in-depth interviews and document analysis).

3.3 Sampling procedure for interviews

A purposive, snowball, sampling procedure was used to reach out to key stakeholders. Members of the H2020 BlueHealth consortium were purposely chosen since they were also involved in stakeholder consultations. They were identified as having research expertise in how urban blue space infrastructure can promote health and well-being, as well as being involved in the Teats Hill redevelopment project (Bell et al. 2020).

Other key stakeholders from Devon Wildlife Trust, National Marine Aquarium, the Environment Agency, and the Public Health and Natural Infrastructure teams of the Plymouth City Council were then contacted through the recommendations of the H2020 BlueHealth project team. In total, ten (10) key stakeholders of different groups were interviewed for this study.

For transparency, Plymouth City Council oversaw the entire redevelopment of Teats Hill from its conception as a potential intervention site, through to its ongoing maintenance long after the proposed redevelopments took place. They approached the BlueHealth project team to: (a) evaluate its effects on the health and wellbeing of the local community and (b) provide landscape architecture expertise at no cost to facilitate particular aspects of the site's redevelopment (e.g. a small open air theatre; Bell et al. 2020).

3.4 Semi-structured interview method

The interview questions were developed from the framework for sustainable water governance (Van Rijswick et al. 2014) to map the perspectives of these stakeholders regarding their level of involvement, values and interests, and responsibilities, as well as their involvement in the implementation of the redevelopment at Teats Hill. Open interview questions were tailored and asked to aid the participants in reflecting on the planning and implementation of the redevelopment project to promote human health and well-being. At several stages during these interviews, the researchers evaluated the level of additional information obtained in the interviews in order to assess when a sufficient level of saturation had been achieved and interviews provided little additional information.

3.5. Document analysis method

The responses from the stakeholder interviews were substantiated with a review of policy documents, project application reports, project summaries, Plymouth 'vision' statements, and annual reports from the Plymouth City Council. Annual reports from the Plymouth City Council and the H2020 BlueHealth project were examined and subsequently followed up with additional interviews. Annual reports examined included the Active Neighbourhood report, and the Plymouth City Council (PCC) 2017-2018 annual report. Reviewing these annual documents led to two further key stakeholders being contacted as interview participants. Reports prepared by the Plymouth City authorities (between 2013 and 2019) and academic research papers accessed and examined were used to identify the integration of the governance conditions in the Teat's Hill redevelopment project and the wider Plymouth City policies. Both methods (interviews and document analysis) were triangulated (Figure 4) to achieve the overarching aim of the research by exploring the conditions for governing blue space infrastructure in Plymouth (UK).

3.6 Qualitative analysis methods

Audio–recorded interviews were transcribed with Microsoft Word and manually corrected. NVivo 12 software was used to code and categorise all interview transcripts into nodes and themes, and attributed to the building blocks of the framework for sustainable water governance (Van Rijswick et al. 2014). All classification of content into themes was performed by the first author. Similarly, documents were content analysed into the same nodes and themes. The analysis therefore followed a deductive approach (grounded theory) directed by the chosen

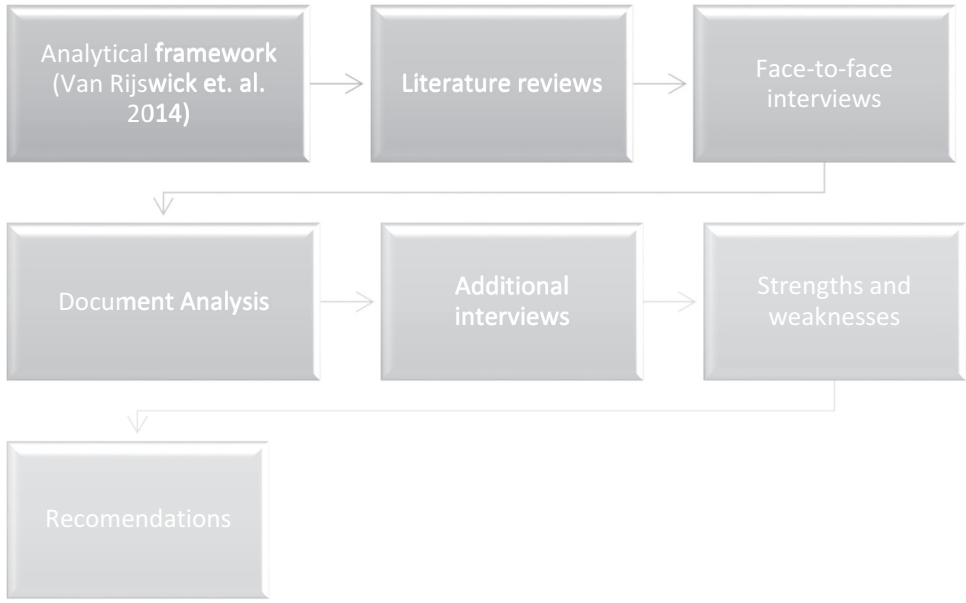

Figure 4. Outline of processes and method used to tackle research questions.

analytical framework to summarise data and develop themes that address the study questions (Gale et al. 2013; Mihas 2019, May 23).

4. Results

4.1. Which governance conditions contribute to realising sustainable urban blue space initiatives in Plymouth?

Questions asked during the interviews with the stakeholders explored the conditions of governance towards realising more sustainable blue space infrastructure in Plymouth. The outlined conditions were repeated and confirmed by all participants who took part in the interview. Results based on identified themes from the dimensions of the analytical framework are presented below (Table 1), and then further described and illustrated.

4.1.1. Health and welfare concerns

During the interviews, the participants emphasised the importance of the public health team from the municipality being involved in the planning of all urban blue space infrastructures. This is due to welfare concerns (e.g. quality, accessibility and safety), which can impact on human health and on the environment as a whole. For example, the rubbish (large amount of dog waste, plastic bags, and broken glass) collected at the Teats Hill beach was an indicator that the local people were disconnected from the site in the way that the site was being used.

> *'Urban planners and developers should view good quality green and blue space in the light of the 'broken window theory' around health inequalities. I think of it as a snowball that rolls down. I think it's like that with green spaces if they are maintained and they feel safe, people use them. If they look like they've just been abandoned and nobody cares about them then people start to get afraid of them and don't want to use it'*. (Participant C)

The accumulation of plastic and other litter and Teats Hill as an indicator of deprivation influenced the selection of the location for the redevelopment project.

> *'Teat's Hill was in poor condition, had no signage and a bad reputation with rubbish being washed into it, although, it sits next to the National Marine Aquarium and on Devon Coast Path. If the regeneration had not happened at Teat's Hill, it would not have occurred to the City Council to do anything in that part of the city'*. (Participant K)

The Teats Hill site is connected to the broader Plymouth sewage system and there is a new wastewater treatment plant not far from the site. This plant has no known influence on the actual water quality at the Teats Hill site. Nevertheless, the Plymouth city

Table 1. Outline of governance conditions identified in the Teat's Hill blue space redevelopment in Plymouth City clustered by the dimensions of the analytical framework.

	Building Blocks Water Governance	Governance conditions for the realisation of urban blue space infrastructure	Revealed by interviewees	Found in the policy document review
Content	 Water System Knowledge	*Health and welfare concerns *Health and environmental focus in all planning.		
	 Values, Principles, Policy Discourse	*Integration of range of objectives, histories and vested interest in the site.		
Organisation	 Stakeholders Involvement	*Engaging stakeholders beyond existing contacts. *Early consultations and engagement *Continued consultation and feedbacks to community.		
	Trade-offs between social  objectives	*Common vision *The preparedness to compromise designs.		
	 Responsibility, Authority and Means	*Clearly defined roles and responsibilities.		
	 Regulations and Agreements	*Driven by existing vision		
	 Financial Arrangements	*Funding and landownership concerns		

(*Continued*)

Table 1. (Continued).

	Building Blocks Water Governance	Governance conditions for the realisation of urban blue space infrastructure	Revealed by interviewees	Found in the policy document review
Implementation	 Engineering and Monitoring	*Adaptive learning *Practicality and functionality of the redevelopment *continued monitoring and maintenance with various groups		
	 Enforcement	*All risks accounted for during implementation *Communication of results with the stakeholders and the wider community		
	 Conflict Prevention and Resolution	*Compromise reached through common vision		

authorities were also concerned about the potential impacts of sanitation and water on human health and well-being, and on the immediate environment.

> *'The health and safety of humans and the environment are paramount because if the waters die, we have half of our economies gone. For Plymouth, we pride ourselves as being the "Ocean City"; and the city needs to have that connection with its blue space'*. (Participant M)

4.1.2. Early stakeholders involvement

The various stakeholders for the Teats Hill redevelopment were accessed and selected through Plymouth City Council existing networks and through the Port of Plymouth Marine Liaison Committee, which brings together different users and those who live and work in the local area.

> *'To get started in developing blue space interventions, I would say working with a range of partners (don't work with the usual suspects, try and find new partners). It's really important to engage not with the usual suspects'*. (Participant Z)

Each stakeholder meeting had an agenda with actions agreed on, and constant follow up on agreed tasks and responsibilities for successive meetings (though this was normally informal). During the planning stage of the redevelopment, stakeholder meetings were frequently held (monthly), and then less frequently (quarterly) after the implementation stage.

> *'I remember we brought stakeholders together in one room to discuss the improvements, there was a dialogue as we tried reaching consensus about what's possible, go through the options and finally reach agreement. There were also site visits, talks about what was possible, the heritage features to keep, engineering perspective, money available, and to have regard for health and safety impact'*. (Participant Z)

Most importantly, through the stakeholder partnership meetings, individuals and organisations were able to sufficiently contribute their views, ideas and questions on the redevelopment design. All participants reiterated that urban planning should embrace cross-sectoral collaboration with a range of partners who have much detailed knowledge than an individual.

> *'Well, I wouldn't take credit but, I must say that we can use Teat's Hill as an example of how different agencies, organizations, and stakeholders come together to work to get a lovely space for the community to share communion'*. (Participant M)

Even though the different parties' involvement was slightly hierarchical, all discussions were quite inclusive since all these parties had vested interests in the site. The Teats Hill redevelopment saw different stakeholders come together to achieve the aim of improving the health and well-being of a local socio-economically deprived community and environment.

4.1.3. Funding and land ownership

Financial resources are crucial to getting the project started and engaging stakeholders. The Plymouth City Council through the Heritage Lottery Fund and Plymouth Section 106 developer contribution funded the improvements at the site (plymouth.gov.uk). The H2020 BlueHealth Project had funding from the European Commission to install an amphitheatre at the site after a consultative process by BlueHealth landscape architect researchers with the local community and other stakeholders (Bell et al. 2020). The requirement of the funders, time scale and budget established the focus of the redevelopment and the choice of the location of the Teat's Hill project. The majority of interviewees classified the funding and the land ownership as very necessary if more blue space infrastructure locations in Plymouth are to be envisaged and realised.

> *'The main thing that drove the choice of Teats Hill was the funders: the Big Lottery Fund outlined 5 particular areas of Plymouth which were particularly suffering from social-economic deprivation and their related health effects. So Teat's Hill, is a socially, economically deprived area of Plymouth and we wanted to invest the funding to improve the health of the poorest people in society. And also, BlueHealth came in to say that, they can give us plenty of extra funding, landscape architecture and design work for evaluation, so it was a fruitful collaboration'*. (Participant J)

The Teats Hill site has multiple-ownership, but is broadly managed by Plymouth City Council. Locations with multiple landowners tend to constrain projects if they are less willing to accept changes and are not buying into similar projects.

> *'We had to reach a compromise since the landowners weren't willing to put sufficient money into putting the slipway back to how it was. Therefore, we had to find a more friendly solution (viewing platform now) to deal with any conflict of interest. To be in agreement in terms of land ownership was important to me*'. (Participant K)

Statutory powers are often required to speed up improvements that will promote the health and well-being of populations:

'Although there were different available sites to achieve the same aim which had a mixture of land owners, it would have been difficult to achieve the redevelopment within the time constraints set by funders'. (Participant Z)

4.1.4. Community consultation and feedbacks

Interview participants commented on the necessity of frequent and ongoing engagement with the communities to get these communities to accept and buy into the intervention. As mentioned in the interview, it is important to *'build local community-driven designs'*. Through a wide group of local stakeholders (e.g. National Marine Aquarium and Plymouth Community Homes), tree plantings, clean-ups and fun days were organised at the site to engage residents, families and visitors to share their views of the redevelopment.

'When designing the improvement, we were looking at robust things. In the Marine environment, you need to consider those things which aren't going to rust or fall apart. By working with organizations that are still there (for example, Plymouth Community Homes and National Marine Aquarium), the idea was to build their best interest so they will continue to be the eyes and ears of the site. You have to start with getting people to understand where they live, else they will never be ready to protect it'. (Participant Z)

4.1.5. Continued monitoring and maintenance

Natural environment infrastructures in Plymouth are managed and maintained by the Plymouth City Council. The operational team within the Council cares for the blue and green spaces around Plymouth to ensure good standards and conditions of the spaces. The redevelopment of Teats Hill has seen the local volunteering groups (the Friends Group) coming together to care for the redevelopment site. However, Participant M expressed that:

'I think the municipality needs to get hold of the continued maintenance – regular litter pick – ups and bins should be emptied regularly ensure the longevity and care of the space. If people could see that the council are actual looking after that space, I think that would be a way to motivate them to keep it clean'.

Representatives from the Plymouth City Council assured that going forward, there is going to be a new guideline that will make the Council to be more able to guide and influence the maintenance of interventions. Another objective of the Council prior to the redevelopment was to work with organisations such as Plymouth Community Homes (who manage social housing near the site) and the National Marine Aquarium (situated next to the site) to build their interest in the continued maintenance of the project.

'One of the things that is part of the Strategic planning and infrastructure environmental planning division's work is to deliver capital improvements to sites by working together with the local community. We go out to ask people what they would like to see on the site and support them to deliver those improvements'. (Participant Z)

Thus, by working with other groups, creative ways to maintain the quality and good conditions at the Teats Hill site will be ensured into the future.

4.2. To what extent are these governance conditions integrated in urban planning and the development of blue space infrastructures in Plymouth city?

Policy documents and reports obtained online were analysed to address the question of integration into urban planning and the development of Plymouth City. Documents accessed for analysis included the Heritage Lottery Fund project application report, PCC Health and Well-being topic paper, PCC Natural Environment topic paper, PCC Infrastructure, and Investment topic paper, and the Plymouth and South West Devon Joint Local Plan (www.plymouth.gov.uk).

4.2.1. Health and well-being priority in all policies

To ensure a thriving city for all populations, the Plymouth Plan follows the PCC Health and Wellbeing and the Natural Environment strategies, among others. The documents have a well-defined terminology of what is considered 'urban infrastructures' in Plymouth, with improving personal well-being and social cohesion as a central focus. Blue space is valued as one of the most beautiful and unique aspects of Plymouth with impacts on health and well-being, both positive and negative depending on how it is accessed and utilised:

'More than one third of Plymouth is greenspace and it's surrounded by blue space on its coast, with rivers and streams running through it. This unique green and blue city has the potential to deliver many health and well-being benefits for the people of Plymouth, as well as providing special spaces for nature'. (Active Neighbourhoods PCC 2016-2019).

Table 2. *Outline of governance conditions identified in both the Plymouth and the Netherlands* (Wuijts et al. 2020) *blue space redevelopments clustered by the dimensions of the analytical framework.*

	Building Blocks Water Governance	**Governance conditions for the realisation of urban blue space infrastructure**	**Found in Plymouth study**	**Found in** Wuijts et al. (2020)
Content	 Water System Knowledge	*Health and welfare concerns *Health and environmental focus in all planning.		
	 Values, Principles, Policy Discourse	*Integration of range of clear objectives, histories and interest in the redevelopment.		
Organisation	 Stakeholders Involvement	*Engaging stakeholders at all stages beyond existing contacts. *Continued consultation and feedbacks to community.		
	 Trade-offs between social objectives	*Common vision.		
	 Responsibility, Authority and Means	*Clearly defined roles and responsibilities.		
	 Regulations and Agreements	*Driven by clear existing vision		
	 Financial arrangements	*Funding resources		

(*Continued*)

Table 2. (Continued).

	Building Blocks Water Governance	Governance conditions for the realisation of urban blue space infrastructure	Found in Plymouth study	Found in Wuijts et al. (2020)
Implementation	 Engineering and Monitoring	*Continued monitoring, maintenance and adaptive learning with various groups		
	 Enforcement	*Communication of risks and results with the stakeholders and the wider community		
	 Conflict Prevention and Resolution	*Compromise reached through common vision		

4.2.2. Multiple stakeholders and a shared vision

Plymouth City Authorities embrace the need to work with various stakeholders to tap from resources that may not be readily available. The Joint Local Plan (JLP) recognises the 'duty to cooperate' where neighbouring local authorities (three councils) come together to identify cross-boundary issues and solutions to these issues (Plymouth and South West Devon Joint Local Plan 2014-2034 2019).

4.2.3. Continued community consultation and engagement

In light of this, there has been significant awareness of the importance of engaging the population of Plymouth to comment and express concerns on planning policies. The communication methods used to reach the population in order to collect their comments included '*social media platforms, emails, advertisement, letters, and various meetings*' to present development plans (Plymouth City Council PCC 2014).

> *'You can make comments on any neighbourhood, not just the neighbourhood you live in. Just let us know which neighbourhood you are commenting on'*. (Plymouth City Council PCC 2011)

In the Teats Hill re-development project, all interactions with community groups, businesses, public and private organisations were quite strong as diverse voices were represented through early and continuous consultations.

5. Discussion

This study has explored the governance conditions of blue space infrastructure to promote human health and well-being in Plymouth (UK). The crucial governance conditions identified were: stakeholder involvement and participation throughout the process; funding and land ownership; community consultation and feedback; and continued monitoring and maintenance of blue space infrastructure.

5.1. Governance conditions for successful blue space interventions

The global 2030 UN Sustainable Development Goals (SDGs) explicitly focus on enhancing both the health of humans and the ecosystems through targeted policies and management of water resources. The blue space infrastructure realised in Plymouth could be a means by which urban design can contribute to the SDGs. By creating both opportunities for enjoying healthy ecosystems, and for keeping fit and fostering social interactions, positive impacts on mental health and well-being can be achieved (McCay et al. 2017).

The cooperative approach to put the health, safety and access concerns of the population at the top of the design priorities of the intervention is an example of a strong and shared vision among collaborative parties. A primary challenge of many city waterfront redevelopments is agreeing on a shared vision amid varied interests, objectives, and influences of different partners involved (Hoyle 2000). Therefore, it is important to inquire about the common interests, values, perspectives, and contexts of the various stakeholders to help in identifying possible trade-offs (Van Rijswick et al. 2014; Wuijts et al. 2020).

At the same time, the complexity of delivering water management functions in a multi-level context often contributes to minimal stakeholder participation and commitment to objectives (OECD 2014; Wuijts et al. 2020). Multi-level governance, as several other researchers have noted, facilitates societal learning, monitoring, feedback, and boosts resilience (Cosens 2010; Pahl-Wostl et al. 2011; Pahl-Wostl et al. 2012; Green et al. 2013). As an example of multi-level governance, the Plymouth redevelopment exhibited significant and ongoing stakeholder participation and commitment, as well as feedback to shared visions and objectives.

A collaborative partnership between urban development and planning agencies, the public health team, researchers, and the local community was critical to realising more and sustainable blue spaces infrastructure in urban areas. The accessibility, approaches, expertise, and the willingness of all stakeholders and the community to mobilise resources are important conditions for utilising resources such as capital, people, and assets (Avelino and Rotmans 2009). Although involving varied views from different groups can slow down implementation, early participation can ensure the practicality and functionality of an intervention or project. Nevertheless, a certain amount of stewardship is necessary to ensure that public blue spaces can be used correctly and safely.

Moreover, an effective governance process requires the principles of inclusivity, accountability, participation, transparency, predictability, and responsiveness of varied stakeholders to promote development (Rogers and Hall 2003). On the contrary, the inability of the public to access, comment and

have their voices represented in planning issues and 'not in my back yard' (NIMBY) syndrome, can set barriers towards the definition and realisation of set objectives (Hartley and Wood 2005). The Plymouth case study exhibited effective coordinated structures in realising the intervention; this is consistent with findings from previous research by Dore and Lebel (2010) and Pahl-Wostl et al. (2012).

Lastly, using the Teats Hill case study as a model, adequate financial resources would be required to ensure continued improvement to blue space infrastructure. Infrastructure financing, disaster management, and ensuring the resilience of blue space infrastructure call for broader viewpoints of diverse groups of actors in order to create co-benefits (OECD 2015).

5.2. Application of water governance frameworks in different geographic and policy contexts

The Plymouth case study was developed to improve the physical and mental health of users by encouraging individuals to interact around blue space. The intervention drew on high stakeholder and community interactions that attempted to deal with all concerns. We believe this study to represent the first application of the cited water governance framework to a citizen – and stakeholder-led bluespace intervention whose primary purpose was to improve the health and wellbeing of the surrounding socioeconomically deprived community.

This demonstrates that the framework can be successful at uncovering the conditions for successful water governance in diverse contexts. For example, the same framework has been previously applied in the Netherlands to investigate user interactions with bathing water sites in the Netherlands (Wuijts et al. 2020). Successful conditions for water governance in this study included the use of incentives as a catalyst for interventions, the inclusion of urban bathing water policy into municipal planning, clear delineation of the roles and responsibilities of different authorities, and meaningful engagements with citizens and stakeholders. A number of similarities with the present findings (e.g. engagement of citizens and stakeholders in the intervention process) can be identified (Table 2), which may give indications about particular governance conditions that could apply regardless of geographic or policy context. However, we refrain from making such conclusions as: (a) more studies need to adopt and test this framework with similar methods to see what themes emerge and how these emerge and (b) the very different national arrangements for water governance in different countries preclude overarching generalisations such as this.

5.3. Strengths and limitations

Some of the stakeholders invited to participate in the study never responded to the invitation; therefore, the results of this study may not be truly representative of the whole governance process. The outcomes of the study may have missed some vital viewpoints that could have been added, although the information gathered from the interviews did reach a saturation point in the end: where viewpoints were merely confirmed and little additional information came up. Furthermore, the results found are consistent with the Netherlands case studies discussed above. Political devolution in the UK (Bradbury 2006), especially with regards to water governance, further means that the findings are limited in their generalisability. However, the aim in the present case was to highlight the importance and nuance of local water governance as it pertains to the impacts of bluespace developments on health and wellbeing. Methodologically, resource constraints did not permit double-coding of transcripts to check for the correct classification of content into themes, but we recommend this approach for future studies employing similar methods.

In the future, an online survey method with quantitative or mixed data collection could be used to compliment interviews and document analysis to expand the comparisons between European cities and reach stakeholders who may not be physically available as in the case of this study. Nevertheless, supplementing with reports and documents helped to deal with the biases that emerge from a single interviewer's perceptions (Hewitt 2007). Although interviews can be biased, combining different data sources (in this case,: reports, policy documents, and interview transcripts) in analysis

to show congruence can help to reduce these possible biases (Bowen 2009).

6. Conclusions

Interviews around a citizen – and stakeholder-led urban recreational bluespace intervention in a deprived area of Plymouth, UK, revealed that long-term engagement of stakeholders and citizens, adequate funding, cohesion around land ownership, rigorous consultation, and continued environmental monitoring and maintenance, are all successful governance conditions for the realisation of a bluespace intervention which provides health and wellbeing benefits to its surrounding community. Document analysis further underlined that these are consistent with city-level arrangements for urban blue infrastructures. Understanding successful governance conditions is crucial if policies and practices are to be transferred to other bluespace interventions in distinct geographical and policy contexts.

We also demonstrated the flexibility and utility of an established water governance framework in a context in which it has not previously been applied, but warn against generalisation of successful governance conditions more globally due to different national arrangements which may fundamentally alter how blue spaces are managed. Nonetheless, we assert that similar investigations be undertaken in order to make the 'story' of how such urban bluespace interventions are realised, more transparent which may illuminate or explain research findings which potentially accompany them.

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References

Active Neighbourhoods PCC 2016-2019. Urban nature delivering healthier communities for people and wildlife Final Report. [Accessed Aug 2019]. Available from: http://democracy.plymouth.gov.uk/mgConvert2PDF.aspx?ID=89015.

Adger WN, Brown K, Fairbrass J, Jordan A, Paavola J, Rosendo S, Seyfang G. 2003. Governance for sustainability: towards a 'thick' analysis of environmental decision-making. Environ Plan A. 35(6):1095–1110. doi:10.1068/a35289.

Antunes P, Kallis G, Videira N, Santos R 2009. Participation and evaluation for sustainable river basin governance.

Avelino F, Rotmans J. 2009. Power in transition: an interdisciplinary framework to study power in relation to structural change. Eur J Social Theory. 12(4):543–569. doi:10.1177/1368431009349830.

Bell S, Mishra SK, Elliott LR, Shellock R, Vassiljev P, Porter M, Sydenham Z, White MP. 2020. Urban Blue Acupuncture: a Protocol for Evaluating a Complex Landscape Design Intervention to Improve Health and Wellbeing in a Coastal Community. Sustainability. 12(10):4084. doi:10.3390/su12104084.

Bogardi JJ, Dudgeon D, Lawford R, Flinkerbusch E, Meyn A, Pahl-Wostl C, Vielhauer K, Vörösmarty C. 2012. Water security for a planet under pressure: interconnected challenges of a changing world call for sustainable solutions. Curr Opin Environ Sustain. 4:35–43. doi:10.1016/j.cosust.2011.12.002.

Bowen GA. 2009. Document analysis as a qualitative research method. Qual Res J. 9(2):27–40. doi:10.3316/QRJ0902027.

Bradbury J. 2006. Territory and Power Revisited: theorising Territorial Politics in the United Kingdom after Devolution. Polit Stud. 54(3):559–582. doi:10.1111/j.1467-9248.2006.00615.x.

Cosens B. 2010. Transboundary river governance in the face of uncertainty: resilience theory and the Columbia River Treaty. J Land Res & Envtl L. 30:229.

de Oliveira JAP, Doll CN, Kurniawan TA, Geng Y, Kapshe M, Huisingh D. 2013. Promoting win–win situations in climate change mitigation, local environmental quality and development in Asian cities through co-benefits. J Clean Prod. 58:1–6. doi:10.1016/j.jclepro.2013.08.011.

Diffenbaugh NS, Swain DL, Touma D 2015. Anthropogenic warming has increased drought risk in California. Proceedings of the National Academy of Sciences. 112:3931–3936.

Dore J, Lebel L. 2010. Deliberation and scale in Mekong Region water governance. Environ Manage. 46(1):60–80. doi:10.1007/s00267-010-9527-x.

European Environment Agency. 2016. Urban Atlas 2012.

Gale NK, Heath G, Cameron E, Rashid S, Redwood S. 2013. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. BMC Med Res Methodol. 13(1):117. doi:10.1186/1471-2288-13-117.

Gascon M, Zijlema W, Vert C, White MP, Nieuwenhuijsen MJ. 2017. Outdoor blue spaces, human health and well-being: a systematic review of quantitative studies. Int J Hyg Environ Health. 220(8):1207–1221. doi:10.1016/j.ijheh.2017.08.004.

Gober P, Wentz EA, Lant T, Tschudi MK, Kirkwood CW. 2011. WaterSim: a simulation model for urban water planning in Phoenix, Arizona, USA. Environ Plan. 38(2):197–215. doi:10.1068/b36075.

Green O, Garmestani A, van Rijswick H, Keessen A. 2013. EU water governance: striking the right balance between regulatory flexibility and enforcement? Ecol Soc. 18(2). doi:10.5751/ES-05357-180210.

Grellier J, White MP, Albin M, Bell S, Elliott LR, Gascón M, Gualdi S, Mancini L, Nieuwenhuijsen MJ, Sarigiannis DA, et al. 2017. BlueHealth: a study programme protocol for mapping and quantifying the potential benefits to public health and well-being from Europe's blue spaces. BMJ Open. 7. Available from:https://bmjopen.bmj.com/content/7/6/e016188

Hartley N, Wood C. 2005. Public participation in environmental impact assessment—implementing the Aarhus Convention. Environ Impact Assess Rev. 25(4):319–340. doi:10.1016/j.eiar.2004.12.002.

Hoyle B. 2000. Global and local change on the port-city waterfront. Geogr Rev. 90(3):395–417. doi:10.2307/3250860.

Knights AM, Firth LB, Thompson RC, Yunnie AL, Hiscock K, Hawkins SJ. 2016. Plymouth—a world harbour through the ages. Reg Stud Mar Sci. 8:297–307. doi:10.1016/j.rsma.2016.02.002.

Koop S, Koetsier L, Doornhof A, Reinstra O, Van Leeuwen C, Brouwer S, Dieperink C, Driessen P. 2017. Assessing the governance capacity of cities to address challenges of water, waste, and climate change. Water Res Manag. 31 (11):3427–3443. doi:10.1007/s11269-017-1677-7.

Lambert T 2015. A brief history of Plymouth, Devon, England, [Accessed Feb 2019] Available from: http://www.localhistories.org/plymouth.html.

Martin P 2017. 24 Years Later: a Look at Water Privatisation in England and Wales. https://www.bv.com/perspectives/24-years-later-look-water-privatisation-england-and-wales

McCay L, Bremer I, Endale T, Jannati M, Yi J. 2017. Urban design and mental health. UK: Oxford University Press. Chapter 3, Urban Design and Mental Health; p. 32-48.UK: Oxford University Press. Chapter 3, Urban Design and Mental Health; p. 32–48.

Mihas, P. (2019, May 23). Qualitative Data Analysis. *Oxford Research Encyclopedia of Education*. Retrieved 9 Feb. 2021, from https://oxfordre.com/education/view/10.1093/acrefore/9780190264093.001.0001/acrefore-9780190264093-e–1195

OECD 2015. Stakeholder Engagement for Inclusive Water Governance. OECD Studies on Water, OECD publishing Paris. [Accessed Aug 2019]. Available from: doi: 10.1787/9789264231122-en.

Ostrom E. 2009. A general framework for analyzing sustainability of socialecological systems. Science. 325(5939):419e422. doi:10.1126/science.1172133.

Ostrom E. 2010. Polycentric systems for coping with collective action and global environmental change. Global Environ Change. 20(4):550–557. doi:10.1016/j.gloenvcha.2010.07.004.

Pahl-Wostl C. 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. Global Environ Change. 19(3):354–365. doi:10.1016/j.gloenvcha.2009.06.001.

Pahl-Wostl C, Holtz G, Kastens B, Knieper C. 2010. Analyzing complex water governance regimes: the management and transition framework. Environ Sci Policy. 13(7):571–581. doi:10.1016/j.envsci.2010.08.006.

Pahl-Wostl C, Lebel L, Knieper C, Nikitina E. 2012. From applying panaceas to mastering complexity: toward adaptive water governance in river basins. Environ Sci Policy. 23:24–34. doi:10.1016/j.envsci.2012.07.014.

Plymouth & South West Devon Joint Local Plan consideration summary report January 2017. [Accessed Jul 2019]. Available from: https://www.plymouth.gov.uk/plymouthandsouthwestdevonjlppastconsultation.

Plymouth and South West Devon Joint Local Plan 2014-2034. [Accessed Aug 2019]. Available from: https://www.plymouth.gov.uk/sites/default/files/JLPAdoptedVersion.pdf.

Plymouth City Council (PCC) Annual report 2017-2018. Plymouth. [Accessed Jul 2019]. Available from: https://www.plymouth.gov.uk/sites/default/files/Annual_Report_2017_2018.pdf.

Plymouth City Council PCC 2011. Your Place Your Future: making your neighbourhood the place you want it to be. [Accessed Aug 2019]. Available from: https://www.plymouth.gov.uk/sites/default/files/SustainableNeighbourhoodKeySiteAllocationBooklet.pdf.

Plymouth City Council PCC 2014. Community and Stakeholder Engagement Strategy. [Accessed Aug 2019]. Available from: https://www.plymouth.gov.uk/plymouthandsouthwestdevonjlppastconsultation.

Plymouth Community Homes n.d. Your Neighbourhood Plan . [Accessed August 2019]. Available from: https://www.ply

mouthcommunityhomes.co.uk/media/1527/coxside-neigbourhood-plan.pdf.

Plymouth Population. 2019. World Population Review. [Accessed Apr 2019]. Available from: http://worldpopulationreview.com/world-cities/plymouth-population/.

Pooley A 2017. Aspen Woolf, 10 Fascinating facts about Historical Plymouth, UK. [Accessed Mar 2019]. Available from: https://aspenwoolf.co.uk/10-fascinating-facts-about-historical-plymouth-uk/.

Public Health 2016. Index of Multiple Deprivation (IMD) 2015 Plymouth summary analysis. [Accessed Aug 2019]. Available from: https://www.plymouth.gov.uk/sites/default/files/IMD%202015%20report_FINALv1.1.pdf.

Public Health PCC 2014. Area profile: east End Neighbourhood. [Accessed Aug 2019]. Available from: https://www.plymouth.gov.uk/sites/default/files/EastEndNeighbourhoodProfile.pdf.

Richardson J, Goss Z, Pratt A, Sharman J, Tighe M. 2013. Building HIA approaches into strategies for green space use: an example from Plymouth's (UK) Stepping Stones to Nature project. Health Promot Int. 28(4):502–511. [accessed 2017Dec11https://academic.oup.com/heapro/article-lookup/doi/10.1093/heapro/das033

Rietveld LC, Siri JG, Chakravarty I, Arsénio A, Biswas R, Chatterjee A. 2016. Improving health in cities through systems approaches for urban water management. Environ Health. 15(S1):S31. doi:10.1186/s12940-016-0107-2.

Rogers P, Hall AW, Effective water governance. 2003. TEC Background Paper 7. Global water partnership Stockholm.

Schets FM 2011. The microbiological safety of bathing water–Waterborne pathogens beyond bathing water legislation. [Internet]: Utrecht University. Available from: https://dspace.library.uu.nl/handle/1874/197430.

South West Water n.d. Drainage and Wastewater Management Planning – process Overview and Progress. [Accessed Aug 2019]. Available from: https://www.southwestwater.co.uk/siteassets/document-repository/business-plan-2020-2025/drainage-and-wastewater-management-plan.pdf.

Uncles R, Torres R. 2013. Estimating dispersion and flushing time-scales in a coastal zone: application to the Plymouth area. Ocean Coast Manag. 72:3–12. doi:10.1016/j.ocecoaman.2011.09.013.

United Nations General Assembly 2015. Transforming Our World: the 2030 Agenda for Sustainable Development. Draft resolution referred to the United Nations summit for the adoption of the post- 2015 development agenda by the General Assembly at its sixty-ninth session. UN Doc. A/70/L.1. [Accessed Aug 2019]. Available from: https://sustainabledevelopment.un.org/post2015/summit.

UN-Water2019. Water Quality and Wastewater. [Accessed May 2019]. Available from: http://www.unwater.org/water-facts/quality-and-wastewater/, accessed 2019 Apr 17.

Van Rijswick M, Edelenbos J, Hellegers P, Kok M, Kuks S. 2014. Ten building blocks for sustainable water governance: an integrated method to assess the governance of water. Water Int. 39(5):725–742. doi:10.1080/02508060.2014.951828.

Völker S, Kistemann T. 2011. The impact of blue space on human health and well-being–Salutogenetic health effects of inland surface waters: a review. Int J Hyg Environ Health. 214(6):449–460. doi:10.1016/j.ijheh.2011.05.001.

Waddington S 2017. The ambitious plan to transform Plymouth's forgotten estate and our most neglected beach. [Accessed Aug 2019]. Available from: https://www.plymouthherald.co.uk/news/plymouth-news/ambitious-plan-transform-plymouths-forgotten-336568.

Walker A 2009. Independent Review of Charging for Household Water and Sewerage Services. Final report. [Accessed Feb 2019]. Available from: https://www.southwestwater.co.uk/siteassets/documents/final_report-walker_review_of_charging_for_water.pdf.

Wessells AT. 2011. The Ultimate Team Sport?: urban Waterways and Youth Rowing in Seattle. In: The Paradox of Urban Space. New York: Springer; p. 53–71.

White MP, Elliott LR, Gascon M, Roberts B, Fleming LE. 2020. Blue space, health and well-being: a narrative overview and synthesis of potential benefits. Environ Res. 191:110169. doi:10.1016/j.envres.2020.110169

Wiek A, Larson KL. 2012. Water, people, and sustainability—a systems framework for analyzing and assessing water governance regimes. Water Res Manag. 26(11):3153–3171. doi:10.1007/s11269-012-0065-6.

Woodhouse P, Muller M. 2017. Water governance- An historical perspective on current debates. World Dev. 92:225–241. doi:10.1016/j.worlddev.2016.11.014.

World Health Organisation. 1998. Health Promotion Glossary. Switzerland: world Health Organisation. [Accessed Aug 2019]. Available from: https://www.who.int/healthpromotion/about/HPR%20Glossary%201998.pdf.

Wuijts S, Friederichs L, Hin JA, Schets FM, Van Rijswick HFMW, Driessen PPJ. 2020. Governance conditions to overcome the challenges of realizing safe urban bathing water sites. Int J Water Resour Dev. 1–25. doi:10.1080/07900627.2020.1755617