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Thesis title: Shaping ecosystem services in Russia: Sustainability concerns over Saint Petersburg waterfront transformation

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Summary

This research argues for a multi-stakeholder approach to be a possible Ecosystem Services (ES) provider in urban waterfront areas of Saint Petersburg, Russia.

This research aims to give more insights into the ES provision in the context where the mechanism is not formally established. The research's main question is: To what extent do stakeholders' interventions stimulate the provision of ecosystem services within waterfront transformation developments in Saint Petersburg?

The literature review unpacks the meaning of sustainable waterfront transformation and provides a basis for its understanding. The role of urban waterfront with its multiple functions is argued to be crucial for adaptation and disaster risk reduction. Besides, within the contextual peculiarities, these areas showed to be central for diverse socio-cultural activities, including creative interventions and place-making processes. The types of benefits citizens acquire through these multifunctional areas were systemized with the internationally established ES framework. Using this framework, the waterfront socio-environmental benefits and their provision level were assessed in particular transformations. Therefore, to answer the question, the research (1) explores how sustainable is the provision of ES on waterfronts of Saint Petersburg, (2) identifies strategies for the ongoing waterfront revitalization, (3) reveals institutional constraints for ES implementation, (4) examines the influence of diverse stakeholders on waterfront developments.

The research is qualitative in nature with methods including (1) expert interviews, (2) focus group discussions (FGDs), and (3) secondary data analysis. The interview respondents are sampled following their expertise in waterfront development. FGDs are conducted with the users of the developed areas. Secondary data appeared to be essential due to the novelty of the topic for the study's context and a lack of quantitative databases on Russian ES.

The research finds that stakeholders' interventions played a substantial role in providing recreational and cultural ES on the waterfront areas, enchasing new activities and cultural values. However, a weak role of regulative functions puts certain concerns over the environmental safety of the city. This finding reveals the need to explore the demand for this type of service and its role in city development. The research assumes that 'soft' adaptation measures incorporated in future waterfront developments would facilitate more sustainable city growth. These measures could be achieved through network governance processes and relevant stakeholders in place, such as city ecologists and water-related experts. However, to ensure these networks' creation, the city government has to develop a legislative basis for information exchange. Especially relevant for public space production and urban waterfronts, the process of public participation similarly has to be regulated to make it a commonly-used practice. In general, the study outlines certain gaps in state and city regulation and provides some recommendations for further improvements.

Keywords

Waterfront; sustainability; Ecosystem Services; governance; communication.

Acknowledgements

To my beloved IHS family, with a special appreciation for the EULG specialization.

Abbreviations

IHS	Institute for Housing and Urban Development Studies
ES	Ecosystem Services
RF	Russian Federation
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
TEEB	The Economics of Ecosystems and Biodiversity
UWT	Urban Waterfront Transformation
SDGs	Sustainable Development Goals
NBS	Nature-Based Solutions
IPBES	The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IAD	The Institutional Analysis and Development
IV	Independent Variable
DV	Dependent Variable
CPT	Causal-Process Tracing
FDGs	Focus-Group Discussions
CEO	Chief Executive Officer
EAU	Ecosystem Accounting Units
FPFC	Flood Prevention Facility Complex
CUPA	Committee for Urban Planning and Architecture

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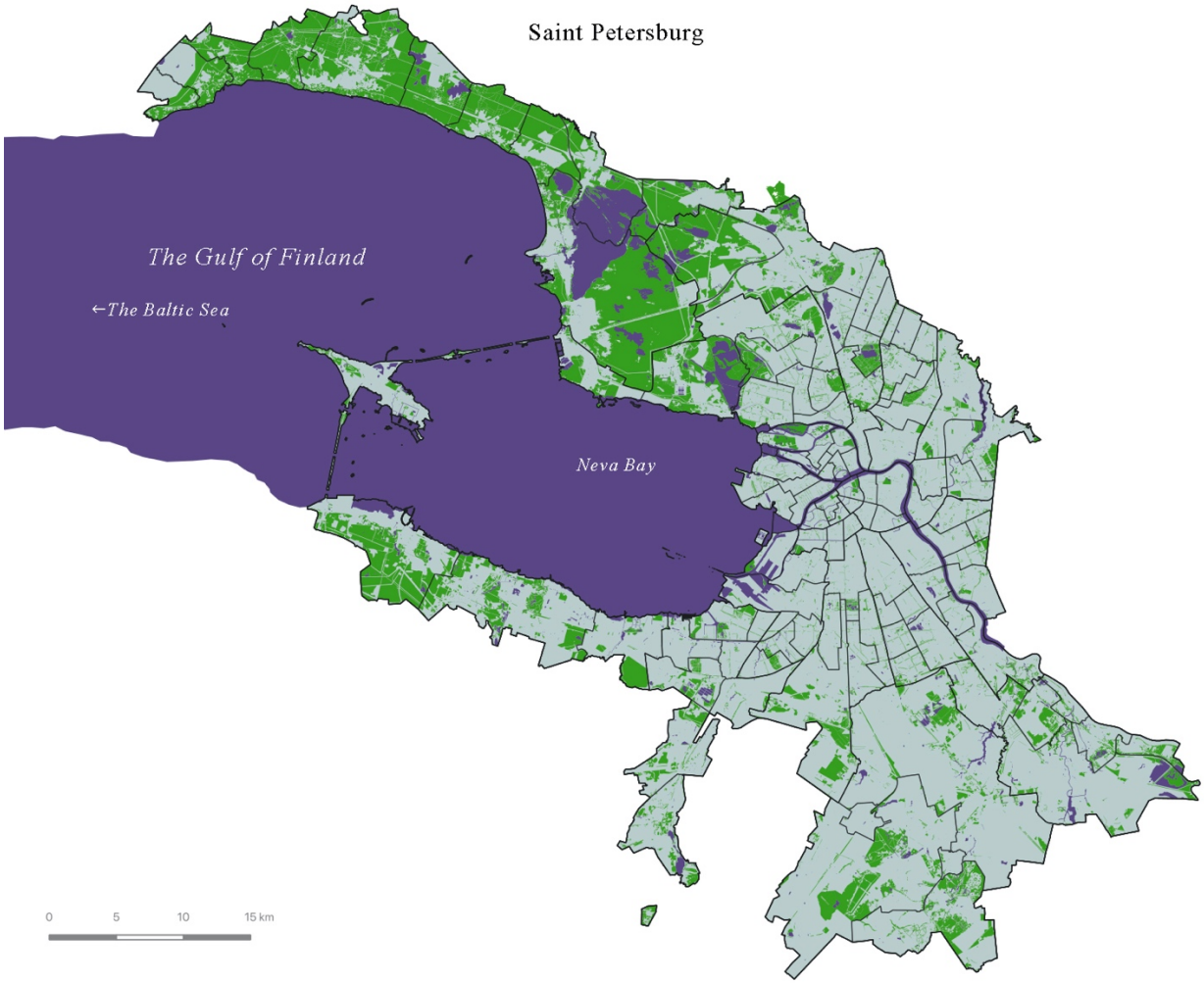
Chapter 1: Introduction

1.1 Background information

In the city of Saint Petersburg, located in Northwest Russia and officially called the 'water-capital' of the country, the unique waterfront structure is extensively incorporated in the city layout. This structure explains development patterns and the high-tended interest of citizens in the improvement of coastal and riverfront areas. The recent global recognition of the waterfronts' role as a provider of well-being reveals its potential for a holistic improvement of urban life (UNESCO World Water Assessment Programme, 2020). It is established that water, as a type of good, cannot be associated with exclusivity, but instead forms unique landscapes and promotes social interaction with diverse activities (Ostrom et al., 1994). Such characteristics proved to have substantial potential for improving 'socio-nature' relationships in a holistic way (Bunce & Desfor, 2007). The vibrant topic of waterfront quality, being sensitive for the knowledgeable and active citizens of Saint Petersburg, shifted attention to existing water-related activities and the way people access them. As evidence of this, fragmented local activities and temporary events, promoted by private and public actors, regularly appear intending to improve the connection between residents of the city and their main natural resource.



Map 1: Saint Petersburg and Water

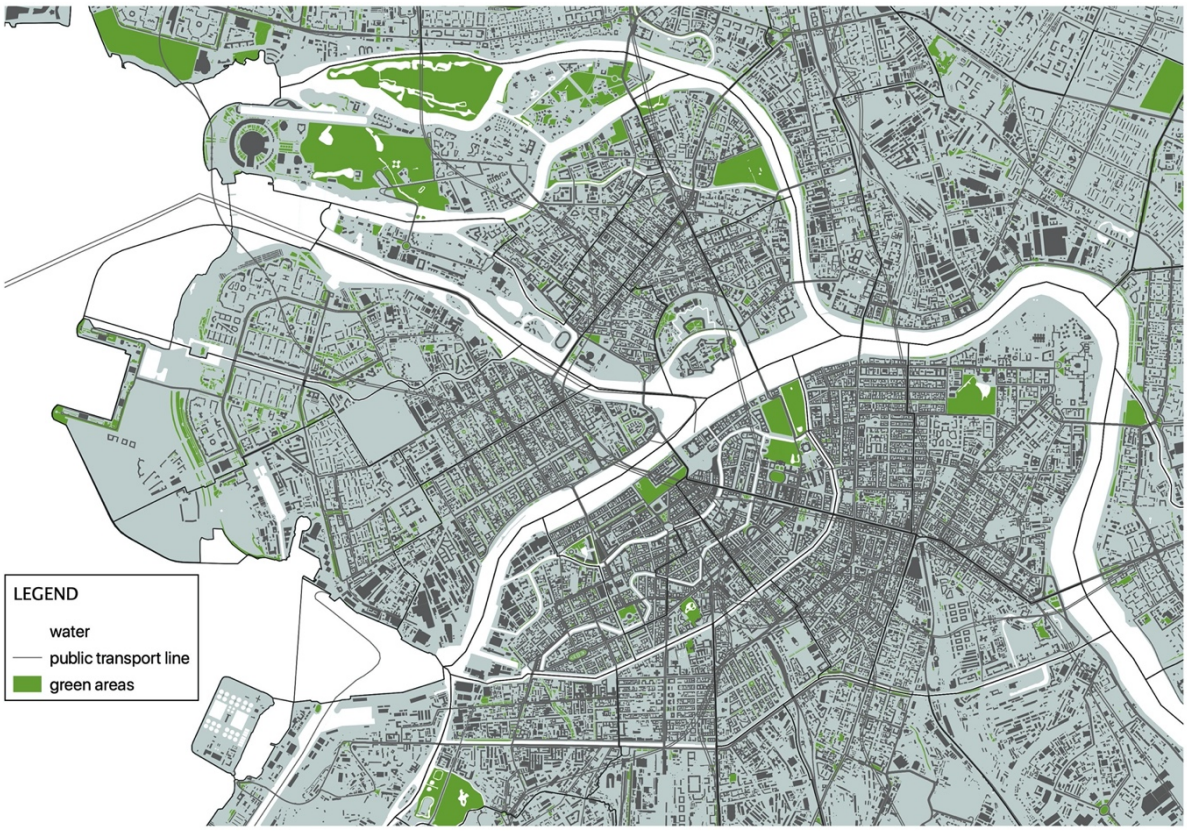
To embrace this tendency, a special city-wide Water Revitalization Program was announced by the city government in 2017 to improve the quality and usage of open public space and facilitate the development of an active social environment in waterfront areas. Additionally, this program focuses on improving pedestrian accessibility, combining goals within the federal project “Development of comfortable urban environment.” With the help of active and creative civil society, this recent governmental attention shifted an understanding of public space provision in the city.

From a development perspective, these recent changes show significant improvements in the livability qualities of waterfront areas. However, it is established that waterfront reorganization requires contemporary governing mechanisms to achieve multiple socio-environmental benefits (Bettencourt, 2013; UNESCO World Water Assessment Programme, 2020). For urban waterfront development, the mechanism of active participation of ‘users’ and involvement of diverse actors in decision-making are perceived by scholars as critical for outcomes of developments (Ostrom 2010; Lilli et al., 2020). Recognition of network benefits and multi-stakeholder approach brought new qualities to waterfront reorganization in the city, promoting waterfront values through art and creativity, adding new public facilities, and stimulating the area socially and economically. This evolution of the institutional dimension in waterfront-oriented developments constitutes a particular interest in this research. Although revitalizing the social dimension through these changes can be seen as significant, it is still unclear how these mechanisms deliver environmental benefits to society. This aspect brings the discussion to the main problem of the research.

1.2 Problem Statement

Defined by historical and geographical patterns of growth as a city-port and advances in industrial activities, the waterfront areas of Saint Petersburg do not bring much social and environmental gains. It is established that cities with such development characteristics today require comprehensive re-organization to revamp the future of their image and improve the quality of urban life (UNESCO World Water Assessment Programme, 2020). Scholars outline that in the Russian context, the ecological aspects vital for urban sustainability and well-being continue to be a fragile part of the city transformation and pose considerable threats for urban ecosystems (Environment & Rights, 2019). In Saint Petersburg, the shortage in green space, especially along numerous rivers and canals, is evidential and can eventually cause the city to lose out on the many potential socio-cultural, environmental, and economic benefits.

This issue requires exploring the socio-ecological advantages of waterfront for human well-being and assessing their quality in a particular context. For this purpose, the concept of Ecosystem Services (ES) is used as the most recent and developed in the existing body of academic knowledge (UN Habitat, 2005). The theoretical ES framework structures the complex socio-environmental influences into particular services that the environment can provide and establishes their influence on the constituents of well-being. However, this mechanism's benefits are still not well quantified economically and poorly recognized by policy-makers in Russia. The underdevelopment of such instruments in the state regulation raises certain concerns over the sustainability of the current practices available for waterfront transformation. Consequently, this novel for the research country concept requires thorough exploration and careful application.



Map 2: Green areas of Saint Petersburg city center

1.3 Relevance of the research

Even though ES is of great interest to the international academic community, it yet had not been given a political priority in the country of research. At the global level, the implementation of ES in Russia is essential to sustain environmental safety "*since the ecosystems of the RF, and northern Eurasia generally is a key factor in the overall biosphere*" (Bukvareva et al., 2015, p. 491). To prevent environmental degradation of these valuable natural areas, the most effective measure is to integrate potential values of these resources into economic and political decision-making. Several studies for the Russian context already exist and represent the first steps in providing ES methodology. Scholars outline the difficulty of the framework applicability in the context of the Russian Federation. The issue of scale combined with superior heterogeneity of ecosystems on its territory requires additional classification and a unique approach. However, these theoretical milestones do not yet consider the peculiarities of urban ecosystems and their maintenance mechanisms on the micro-level (Bobilev & Porfirjev, 2016; Bukvareva & Sviridova, 2020.). Therefore, the research aims to reveal this dimension concerning urban water bodies and their frontiers.

The point of departure for this research is that ES has not been established formally in the chosen context of Saint Petersburg and Russia in general. However, it is important to understand that many of these ES still exist and are provided, thus directly impacting urban life. Therefore, building on existing academic knowledge, such as The Millennium Ecosystem Assessment (2005), the TEEB studies («The Economics of Ecosystems and Biodiversity»), and others, the mechanism of this provision needs to be explained to make it more effective and consistent in the future.

The ongoing waterfront transformation process in Saint Petersburg is seen as an opportunity to provide diverse benefits and incorporate the environmental element into developments. Being a very 'European' city, Saint Petersburg has a unique potential to use its federal status and look into the value of water and its effects on urban development.

1.4 Research objectives

The research investigates the ES, which can be addressed to Saint Petersburg waterfront, and looks at the mechanism of its provision. With this aim, the study traces waterfront development practices within the city and assesses their outcomes with particular interest to the governing schemes. The research focuses on the quality and effectiveness of contemporary governing practices within the context of the city. For this, the study examines existing stakeholders' influences on the complex process of waterfront transformation in the city, unpacking these influences into multiple measurable components. To do so, the study looks into particular developments, which include waterfront transformation and provide multiple benefits for citizens. Although slightly similar in their 'pubic' functions, these developments have contrasting forms of institutional arrangements. This means that the decision-making process in these developments is arranged in various ways, potentially causing fluctuating outcomes.
Tracing this complex city waterfront transformation, the research aims to reveal the evolution of institutional dimensions in developments, which changes according to 'by whom' and 'how' the development is conducted. To add to this, the research will try to identify possible formal constraints towards the arrangement of local ecosystem services in the context of the study in order to elaborate on the 'provision' mechanism from the perspective of the city government.

1.5 Main research question and research sub-questions

The list of preliminary research questions is defined as follows:

To what extent do stakeholders' interventions stimulate the provision of ecosystem services within waterfront transformation developments in Saint Petersburg?

- Which factors lead to a sustainable provision of ecosystem services in waterfront developments?
- What kinds of development strategies are used within the Waterfront Revitalization Program in Saint Petersburg?
- What institutional constraints for sustainable development do the waterfront developments in Saint Petersburg meet?
- How does interest among stakeholders influence these developments, and which type of ES can it provide?

These questions will be refined and specified in Chapter 3, after the review of the state of the art knowledge on the theoretical aspect of the research topic.

Chapter 2: Literature review

This Chapter presents the state-of-the-art literature on the research topic and introduces the most relevant concepts. It provides valuable theoretical contributions to the study and prepares a basis for research methodology. The review of contemporary literature is followed by a conceptual framework. This framework explains the way literature is approached for the purpose of the research.

2.1 State-of-the-art of the theories of the study

2.1.1 Value and Potential of Water

In the current era of rapid urbanization, the vulnerability of growing settlements undeniably increases, facing threats caused by drastic transformations in land use and climate change (UN Habitat, 2005). With a growing physical detachment of individuals from their natural habitats, paradoxically, humanity tends to depend on Nature more than ever. A need for access to water, which has always been historically fundamental for any settlement, makes this access of great importance for all kinds of activities, including transportation, communication, trade, cultural exchange, etc. Therefore, the layout of water bodies in urban areas in many ways defines these areas' development patterns (Bolund & Hunhammar, 1999; Bunce & Desfor, 2007). Surface water bodies in urban areas include open water, such as seas and lakes, and running water streams, such as creeks and rivers (Gessner et al., 2014). To bring effectiveness to their use, their urban waterfronts have been constantly reconsidered (Bunce & Desfor, 2007). The recent changes in political priorities and shifts in behavioral patterns posed a critical need to reevaluate city-water-human relationships to achieve prosperity for the population.

Being a guiding principle for many countries nowadays, the aim to improve the quality of life emphasizes 'socio-nature relationships' as a concept of rising importance (Bunce & Desfor, 2007). These relationships, being continually remade, define the socio-ecological products, or in other words, the ways by which society reproduces nature (Bunce & Desfor, 2007). An emblematic value of vegetation and biodiversity in urban areas, such as recreational and cultural values, proved to be physically and psychologically vital for health and stress reduction (Bolund & Hunhammar, 1999). However, the pressure put on urban ecosystems by processes, such as rising levels of pollutants, disrupted nutrient cycle, increasing density of built environment, and others, directly affect those benefits acquired from urban ecosystems, making them poorer quality than their rural counterparts. Therefore, the degradation of urban ecosystems is proven to clearly reflect the overall state of the urban environment (Bolund & Hunhammar, 1999). Understanding this feature triggered a particular interest in 'green' facilities, a considerable part of which is formed by water bodies in many cities. Within this, waterfront revitalization can be seen as a unique opportunity to combine diverse goals with one focus – well-being improvement.

The phenomena of active waterfront re-development occurred over fifty years ago in North America and the industrial cities of Europe. The pattern of waterfront developments, once defined by the industrial revolution due to these areas' economic profitability, became outdated as soon as activities started to shift away from such forms of production. This led to an idea of reimagining spaces between water and urban inhabitants in order to bring new functions to these declining areas and stimulate 'return to the water movement' (Bige & Zeynep, 2014). Environmental, social and economic benefits of water, being indicated by decision-makers at that time, become more and more evidential globally nowadays.

2.1.2 Sustainable Urban Waterfront Transformation (UWT)

2.1.2.1 The role of UWT

Urban waterfronts provide multiple benefits for people and are always considered "*places where everything happens*" (Bunce & Desfor, 2007, p. 256). These unique locations encourage recreational activities, provide aesthetic benefits, improve human health, and give a perfect opportunity for knowledge sharing and communication (ibid, 2007). Within the concept of 'political-ecologies', Urban Waterfront Transformation (UWT) is explained as "*a way of constructing a new social and environmental 'reality' that stimulates a re-thinking of political values and spatial uses*" (ibid, 2007). Considering the value of water in urban areas and these tangible benefits, scholars have perceived UWT to have the best opportunity for a holistic and effective solution due to its complex nature and multifunctionality.

According to existing studies, political ecologies of waterfront transformations *"(1) incorporates analyses of the complex and fluid connections in society and nature; (2) includes relationships between urbanization, scale, and policy in urban waterfront planning and development; (3) provides for analyses that view urban waterfronts as subjective, open, and constantly changing areas for research rather than static and insular sites of investigation"* (Bunce & Desfor, 2007). On top of that, waterfronts proved to indirectly affect the social and economic dimensions of well-being (UN Habitat, 2005). For example, a successful UWT usually results in indirect pay-offs, such as the market value increment for properties, encouraging the growth of local economies (Bunce & Desfor, 2007).

UWT tends to reflect economic, societal, and governmental changes in both the city and the country (Bunce & Desfor, 2007). In urban areas where access to water becomes a government's responsibility, particular attention should be shifted to understanding these needs. Some of them can be straightforward and easy to monitor, such as the need for recreational spaces, social interaction, and others. However, some of these concepts can be very complex and not stand out explicitly but are crucial for overall sustainability. These concepts can be 'understanding of urban dynamics' or 'changing the meaning of nature' (Bige & Zeynep, 2014). To enhance these tendencies and ensure the social acceptability in urban transformations, it is fundamental to create a holistic vision that connects all developments and steer the urban transition in a certain desirable way (Lilli et al., 2020). For UWT, this vision will be "*a functional ecosystem restoration project that protects the river in a sustainable way, improves its biodiversity and water quality and improves the quality of life and social cohesion*" (Lilli et al., 2020). For this purpose, climate change adaptation and mitigation measures should be established through the multifunctional green infrastructure to contribute to resilience and provide ecological and social benefits (Lovell &Taylor, 2013). Green infrastructure is defined as "*a network of green spaces planned and managed as an integrated system to provide synergetic benefits through multifunctionality*" (Lovell & Taylor, 2013). Multifunctionality is also vital for enhancing the heterogeneity of habitats and users, which prove to be contributive to urban transformations (Cadenasso & Pickett, 2008 in Lovell &Taylor, 2013). Therefore, planning for multiple functions within a common vision can serve as the most successful adaptive strategy for UWT.

2.1.2.2 Adaptation and disaster risk-reduction

Recently published, the UN World Water Development Report (2020) emphasizes the role of water as one connecting Sustainable Development Goals (SDG's) in the most sustainable way across policy frameworks. It states that "*combining climate change adaptation and mitigation, through water, is a win-win-win proposal*" (p. 11). This idea continues to shift the attention of the governments to urban waterfronts, putting re-vitalization of urban water bodies on their agendas, aiming for more efficient land use (Bige & Zeynep, 2014).

The strategies for steering the urban adaptation process, categorized in UN World Water Development Report (2020) as "*hard and soft measures*" (p.4), include structural solutions and policy instruments accordingly. Structural solutions, placed in urban areas, such as dams and dikes or water storage constructions, are aimed to provide climate-proof conditions and protect the city from floods and seasonal water level fluctuations. At the same time, 'soft' measures in cities can include such techniques as careful land use planning, building capacity through awareness and education, forecasting and warning systems, or special flood insurance programs (ibid, 2020). Similarly, the recent studies on the effect of land use planning prove its significant influence on urban areas' environmental context, especially on urban water bodies (Zhao et al., 2004; Liu et al. , 2019). The scholars argue that water bodies' critical role for the sustainability of urban areas while having a role of water provision and regulation function has also an implication for biodiversity regulation (ibid, 2019; McCartney et al., 2001).

2.1.2.2.1 ‘Hard’ measures

From the list of possible structural water-regulating solutions, one has proven its effectiveness through ages, a dam. Used from ancient times to regulate river flows and water supply, these constructions have shifted the development activities and improved people's well-being in many regions. Dams have unique impacts defined by the structure type, geographic location, climate peculiarities, local flora and fauna, and other factors (McCartney et al., 2001). Therefore, it is also established that the dam construction consequences are difficult to predict due to the complexity of the relations between the construction and its environment (ibid, 2001; Chen et al. 2011).

Despite sufficient results for water regulation, the recent debates among scholars about such engineering solutions and their outcomes question the suitability of these methods. Along with socio-economic factors, the main argument against 'hard' solutions perceived by experts is the environmental consequences (McCartney et al., 2001; Freeman et al., 2003). Numerous studies examining long-term environmental payoffs outline a significant impact of dams on the upstream and downstream water ecosystems. The upstream area experience permanent destruction of terrestrial ecosystems and their biota through inundation. Simultaneously, the downstream flow usually affected by reduced water discharge puts the chemical composition of the water body under threat (McCartney et al., 2001). All these outcomes, multiplied by climate change and rapid urbanization, put enormous pressure on biodiversity, causing its loss and degradation. To add to this, this problem discussed by Freeman M.C et al. (2003) highlights the place for such loss on different scales. The reason argued is that water bodies and waterfronts provide a home for many stream-dependent species. Fragmentation and destruction of natural habitats cause alterations in populations and, finally, loss of more species.

2.1.2.2.2 ‘Soft’ measures

Identified by scholars, the most effective non-structural measure for steering sustainability of the city is the land-use change. The concept of land use, established in contemporary literature as one of the major aspects of urban governance, plays a crucial role in urban transformation (Mitchell et al., 2015). Scholars are conscious that the regulation of the city's metabolic requirements that supports its day-to-day activities, or in other words its urban 'metabolism,' is calling for an integrated response of the governments for a sustainable future social and environmental change (Serrao-Neumann et al., 2017). In this sense, increased demand for water supply and decreased water quality driven by urbanization and climate change threats pushed decision-makers to reconsider the importance of the connection between land use and water management (ibid, 2017). In this context, the integration of 'water' and 'land' domains has great potential to be explored through urban waterfronts and their development (Bige & Zeynep, 2014).

Simultaneously, the drivers named above accompanied by the change in the development and activity patterns are seen in the academic field as the main factor for the degradation of the ecosystems (Liu et al., 2019). To sustain the landscape fragmentation caused by the urban sprawl and ensure environmental benefits for the city, the land use planning mechanism offers certain instruments. For example, the establishment of ecological corridors on the city level has the potential for biodiversity maintenance, climate change regulation, and environmental purification. Therefore, implemented in accordance with the water bodies and existing biodiversity patterns, these corridors have an exceptional potential to reduce negative environmental impacts in urban areas (Rodriguez-Iturbe et al., 2009; Liu et al. , 2019).

Another planning response provoked by rapid urbanization and high demand for land is the phenomena of land reclamation. Being extensively used by governments to maximize economic gain, the ecological consequences of this method are barely considered in developing countries (Wang et al., 2010; Yu et al., 2017). Explored in diverse studies and mathematical models worldwide, land reclamation is agreed to have extensive and not always predictable outcomes for the local biota (Yu et al., 2017). Although the outcomes vary following the reclamation type, generally observed environmental consequences include changes in the water composition, impact on the water level, the degradation of the macrobenthos, alteration in marine species and birds, etc. (ibid, 2017). It is important that coastal regions, which are mostly affected by this practice, enhance more saturated biodiversity by their nature and, therefore, are more sensitive and important for the environmental domain.

2.1.2.2.3 Nature-based solutions

In recent years, as an effective approach to ensure ecological benefits and address some social and economic issues in urban transformations, Nature-Based Solutions (NBS) are of rising importance in the global arena (Lilli et al., 2020). This approach defines a set of actions that arrange unique and diverse natural processes and features of the place in a resourceful and efficient way to address global challenges and "*promote synergies between nature, society, and the economy*" (ibid, 2020, p.2). From a development perspective, NBS requires the involvement of diverse actors and a participatory approach to achieve social consensus within transformations (Lilli et al., 2020; Lovell & Taylor, 2013).

For such solutions, first, 'co-design' and 'common vision' are fundamental to overcome difficulties in the approval process, especially when the optimal solution is non-mainstream. This helps avoid conflicts of interests between multiple governmental levels and institutions. Second, local stakeholders' involvement will add to social acceptability and even solve local societal problems (Lilli et al., 2020). By empowering residents to manage their resources, planners and decision-makers will trigger self-organization and a sense of local identity in the community (Lovell & Taylor, 2013). Consequently, this consensus will serve as a driver for achieving sustainable water and land transformations within nature-based solutions.

2.1.2.2.4 The multi-stakeholder approach

Similarly, the importance of the participatory multi-stakeholder approach for sustainable and effective water transformations was emphasized in the UN World Water Development Report (2020). It states the crucial role of this approach for disaster risk reduction in the context of climate change threats. The Report outlines that "*sectoral fragmentation and bureaucratic competition may pose serious challenges for the integration across scales. This calls for greater public participation to discuss and manage climate risk, building adaptive capacities at multiple levels, prioritizing risk reduction for socially vulnerable groups*" (2020, p.7). Lilli et al. (2020) indicate that such complex solutions as NBS should be established with vision-based decision-making and comprehensive support, such as policies and legislation base, finances and market instruments, and proper communication. It is also accepted that some solutions require a holistic approach and can lie beyond the nominal city or even country boundaries. Thus, the multi-layer coordination is decisive. Moreover, all the mechanisms discussed above rely on the amount and quality of the information available.

The multiple co-benefits of waterfronts in urban areas achievable through new scenarios and developed visions, planning instruments, strategies, and projects give an exclusive opportunity for a holistic re-organization of those urban areas in which development is influenced or defined by natural water bodies. Thus, the crucial importance of urban ecosystems for the quality of life for urban citizens needs to be understood and valued by city planners and decision-makers (Bolund & Hunhammar, 1999). To bring this understanding into real-life processes of city management, a particular way of assessing and integrating these values into the economy is introduced below.

2.1.3 Ecosystem services (ES) and assessment tools

2.1.3.1 ES definition and framework

The concept of ecosystem services (ES) defined by Costanza et al. (1997) as ‘‘*the benefits human populations derive, directly or indirectly, from ecosystem functions*’’ aims to shape the complex and fluctuating character of socio-nature' relationships. His framework analyzes ES as a number of ecological services consumed by not only people but also those vital for the sustainability of ecosystems. Further elaborated in the Millennium Ecosystem Assessment (UN Habitat, 2005), the ES framework was given a new shape of a particular assessment mechanism. The purpose of this mechanism is to introduce "*options that can enhance the contribution of ecosystems to human well-being*" (ibid., 2005, p. 1). Figure 1 from the Millennium Ecosystem Assessment document demonstrates a proposed framework, which groups diverse influences and indicates linkages between sections and their strengths.

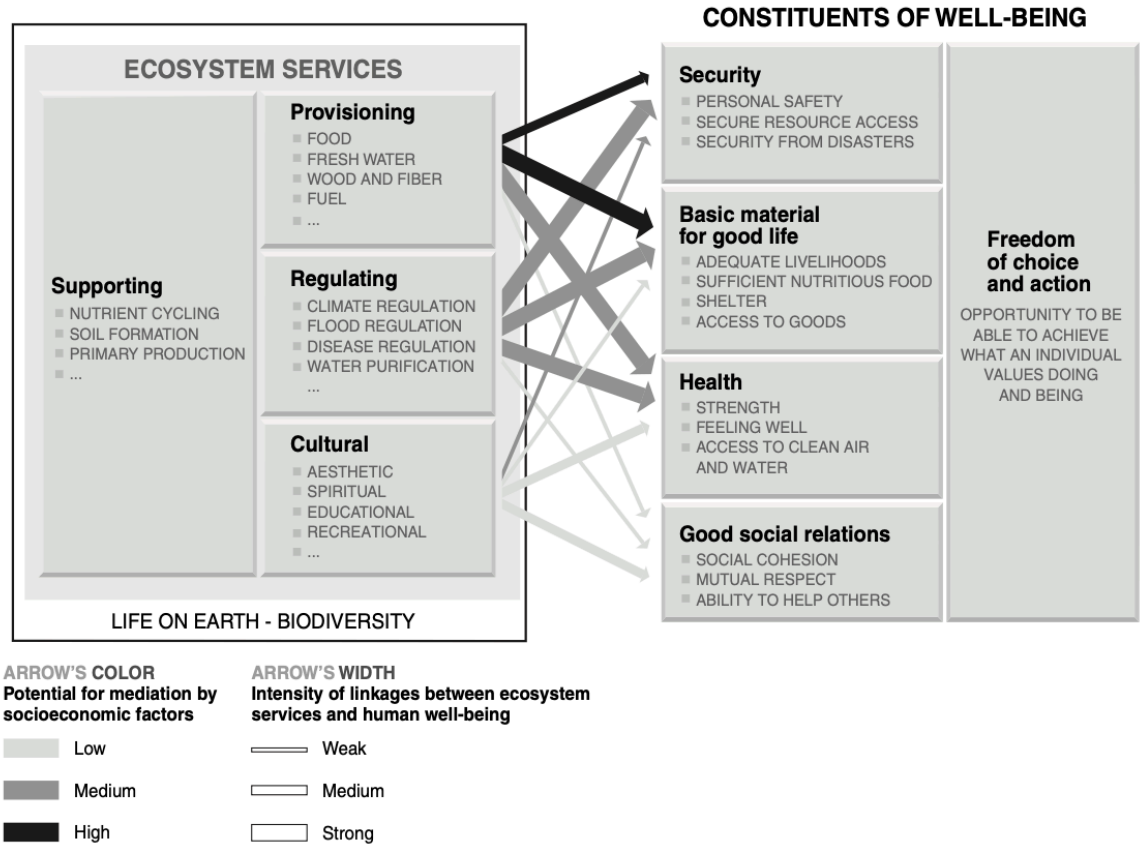


Figure 1: Linkages between Ecosystem Services and Human Well-being
Retrieved from the Millennium Ecosystem Assessment (UN Habitat, 2005, p.18)

Within this document, a special chapter dedicated to Inland Water ES illustrates water as a basis for human well-being, meaning a key-factor for providing water supply and sanitation services, which is the essential component for maintaining healthy life on earth (UN Habitat, 2005). It provides a generalized list of services and focuses on those derived from inland water, which are:

- Hydrological Regulation

  The potential of inland water to accumulate water and attenuate floods by retaining and storing water;

- Sediment Retention and Water Purification

  The role of vegetation and substrates in absorbing nutrients, sediments, and pollutants, which often lead to the disruption of the nutrient cycle when damaged;

- Recharge/Discharge of Groundwater

  Groundwater is vulnerable to contamination and overuse; does not always have direct contact with inland but feed many wetlands and water bodies;

- Climate Change Mitigation

  Water bodies serve as buffer systems for climate change impacts and are crucial for the regulation of greenhouse gases;

- Products from Inland Water Systems

  Inland water provides a major supply of products, including fish, meat, fruits and raisins, timber wood, and others;

- Recreation and Tourism

  Since the biodiversity of many inland water systems attract tourists, these areas can generate economic gain with its recreational use;

- Cultural Value

  Being closely connected to human culture through religion and near-sacred rituals, inland water systems are historically important.

The potential for mediation of these services across scales explained in this document gives new perspectives on the re-production of spatial areas to achieve more efficient land use (Bunce & Desfor, 2007). It also underpinned potential benefits of maintaining ES that would "*pay off in the long run through the value of ES*" (Lovell & Taylor, 2013).

2.1.3.2 ES assessment tools

As the framework was introduced, targeted assessment practices on different scales started to evolve. One of the global and the most holistic assessments was made by IPBES - The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Their Regional Assessment Report on Biodiversity and Ecosystem Services included global assessments for all parts of the world, intending to supply all levels of stakeholders with reliable data. The assessment for Europe and Central Asia critically analyses "*the importance, status, and trends of biodiversity and nature's contributions to people*" (Fischer et al., 2018, p.4). Along with the collection of statistical data, some specific key-messages for Europe and Central Asia were discussed in this document:

- The biodiversity is in continuous strong decline due to the extent of declining natural ecosystems. Although particular policies and actions have contributed to alter some negative biodiversity trends, the overall progress towards healthy ecosystems is still insufficient.
- Land-use change is the major direct driver of the loss of both biodiversity and ecosystem services. Although protected areas have expanded in the region, protected areas alone cannot prevent biodiversity loss.
- Trends in natural resource extraction, pollution, and invasive alien species, combined with climate change, continue to pose considerable threats.
- In order to adopt available governmental practices effectively, further commitment for private and public stakeholders is needed.
- The mobilization of sufficient financial resources would strengthen institutional capacities to support research, training, capacity-building, education, and monitoring activities.
- Long-term societal transformation through education, knowledge exchange, and Increasing participation and stakeholder involvement in decision making is the most effective way towards a sustainable future while promoting shared responsibility.
- Better integration and improved coordination across sectors would avoid negative outcomes for nature and people.

What is interesting, with regards to the gathered statistics, the study concluded that the highest valued contribution to people in Europe and Central Asia is the regulation of freshwater and coastal water quality (estimated to have a median value of $19654 per hectare per year). It is clear that monetary values for regulating contributions to people vary significantly across regions. However, nature's material contributions presented in conventional market prices give an understanding of their importance for decision-makers.

2.1.3.3 ES in the Russian Federation

Since ES is generated locally, a detailed national assessment of ES is essential for any country, following its international obligations. Being "*a key factor for the overall biosphere*" due to a great share of natural reserves, Ecosystems in Russia are also an area of international interest (Bukvareva et al., 2015). However, a preliminary meta-analysis showed that the system of ES assessment is completely missing in the field of state regulation. Indeed, scholars state that the economics of ES is poorly developed both in legal and policy documents (Bobilev & Goriacheva, 2019). Although several strategic documents of state policy in the field of nature protection and sustainable ecological development have been adopted, the lack of an economic perception on ES and inadequate monitoring and assessment is perceived to pose threats of mistaken political decisions (Titova, 2018). This provoked a critical reaction in the academic field. Much of scholars' indignation was justified in the following way: "*Russia has not even established a working group at the federal level to conduct nationwide ES assessment work in order to identify critical environmental zones and problems that can be mitigated*" (Titova, 2015). They also claim that despite the importance of implementing the assessment mechanism, the initiative for this process is only taken by fragmented governmental entities in certain regions (Tikhonova, 2016; Titova, 2015). The experts are sure that the formation of the monetary compensation mechanism for ES implementation is similarly important for an international conservation agenda considering the country's role as the world's largest ecological donor (Bobilev & Goriacheva, 2019).

The urgency of forming a national mechanism of ES was expressed in the Prototype of the National Report on Ecosystem Services of Russia (Bukvareva et al., 2015) initiated by the Russian-German project TEEB-Russia (The Economics of Ecosystem and Biodiversity). Not surprisingly, in attempts to apply a Western model to the specific context of Russia, such as enormous size and heterogeneity, multiple administrative levels, diversity of the ecosystems, recent socio-economic reforms, and many others, this complex process of methodological adaptation of the ES appeared not an easy task.

In attempts to identify the most effective standards for analysis, evaluating, and monitoring of ES in Russia, a preliminary analysis of the spatial scale was conducted (Bukvareva et al., 2015). Building on previous academic findings, research stated that the real value of ES could only be represented through their use, making the spatial scales of ES critical for integration into the economy and political decision-making. Therefore, the determination of the spatial scales of ES is important for ES management, for compensation mechanisms, and the integration of values into the economy (ibid, 2015; Bobilev & Goriacheva, 2019). Thus, the Russian territory's massive and diverse character requires a multi-layered mechanism for the estimation of ES. From this, the research concludes that (1) ES of local importance has to be addressed and compensated on the local level, meaning, by local residents, businesses, and governmental institutions; (2) those ES which connects several regions have to be addressed and compensated

by interregional market mechanisms. Considering all these peculiarities, a "working" standard for The Prototype of the National Report was organized like the principle of the "cascade model" (Bukvareva et al., 2015). Three main categories for ES assessment includes:

I. Supplied ES - produced by ecosystems regardless of the presence or absence of people; correspond to ecosystems' capacity to perform useful for people functions and meet their needs.
II. Demanded ES - correspond to the needs of a region's population and economy to meet acceptable environmental conditions; are often estimated by human population density and consumption rates.
III. Consumed ES - materially or immaterially being used by the population, or which people derive benefits from.

Map 3: Schematic comparison of supply and demand for ES on Russian territory
Retrieved from the Prototype of the National Report, Vol. I (Bukvareva et al., 2015, p. 502)

The interrelations between these three vary across regions and depend on characteristics of ecosystems, population density, and economic development level. One of the benefits of this model is the capacity to make comparisons across different regions, which are donors and consumers of ES. While a clear distinguishing between potentially supplied and used is not always possible, it is also difficult to evaluate potentially supplied ES because they are not represented on the market (Bukvareva et al., 2017). What is interesting in this ‘supply-demand-

consume' structure and was highlighted in the analysis of the spatial scale by its author, is that "*the demanded ES would be compared with a window between the natural and socioeconomic rooms, which allows a certain amount of ES to pass from nature to the socioeconomic system*" (Bukvareva et al., 2017, p.353).
Using the classification of the Millennium Ecosystem Assessment and National Strategy of Biodiversity Conservation in Russia (2001), a further methodological classification for Russian ES was applied and included the following groups:

ES Group	Definition	Representation in State Regulation
Provisioning (Productive)	production of biomass, which is removed from ecosystems by people	partially a subject to government regulation (the main biological resources)
Regulating ES (Environment-forming)	establishment and maintenance of the environmental conditions conducive to human life and economic development	practically not taken into account and are not regulated by the government, except for some forest ES
Cultural ES (Informational)	all kinds of information which is contained in natural ecosystems and can be used by people	completely absent in the governmental and legal regulation
Recreational ES	establishment and maintenance of natural conditions for different types of recreation	integrative, as they are coupled to all of the groups above to various extents; understood very limited

Table 1: Methodological classification of Russian ES
Adapted from the Prototype of the National Report, Vol. I (Bukvareva et al., 2015, p.7, 8)

Thus, the Prototype concludes that the availability of comprehensive information, together with local and regional capacity building, should be a primary focus on these first steps of introducing ES in the country. According to other scholars, the process of building the ES mechanism in the Russian Federation requires political will and patience in the first place (Slupchuk & Marjinskih, 2018). They state that the major difficulty for implementation and use of ES can depend on the change in mindset and shift in priorities of decision-makers. Similar attention was paid to the importance of integrating ES indicators into planning practice through state regulation (ibid, 2018).

The Second Edition of the Prototype of the National Report on Ecosystem Services of Russia (Bukvareva & Sviridova, 2020) was dedicated to biodiversity and its place in the ES assessment mechanism. Along with exploring the mechanisms of biodiversity regulation in the country, this Second Edition also reveals a plan of the TEEB-Russia for the future and provides some preliminary findings. It states that the focus of the next Third Edition will be on ES of the 15 biggest Russian cities, where the assessment of urban green areas will take place. This future publication aims to explore new methods of environmental assessment and ES integration to the planning processes (Bukvareva & Sviridova, 2020).

2.1.3.4 Russian cities

A certain amount of work prepared by scholars for the Third Edition on urban ES in Russia was presented (Bukvareva & Sviridova, 2020). The preliminary findings were shown in a limited way in the publication but showed an interesting tendency. The analysis of urban green infrastructure was conducted, using the indicator of changes in the share of urban green areas in the period 2000-2016. The direct comparison of examined cities was made and put into a graph.

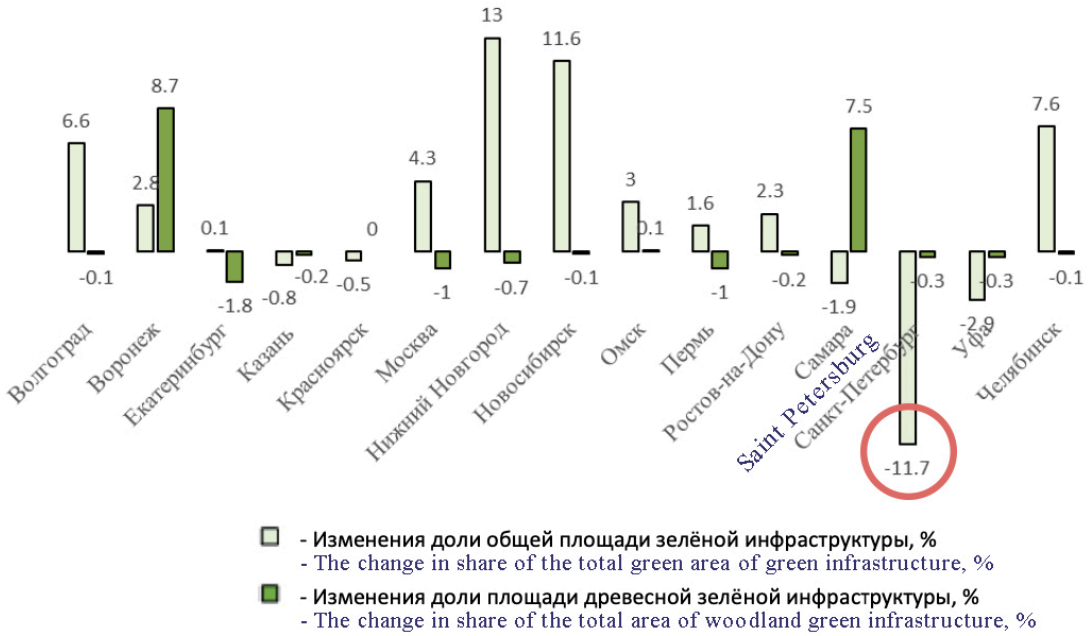


Figure 2: Changes in the share of urban green infrastructure for the period 2000-2016; 15 biggest Russian cities
Adapted from the Prototype of the National Report, Vol. II (Bukvareva & Sviridova, 2020, p.107)

The comparison between cities shows that, although the cities have relatively similar types of green infrastructure formation, there are substantial differences in population access to those. The evidential dramatic tendency in changes of 'urban green' that is seen on the figure brings our focus on a particular city, Saint Petersburg, where the need for ES is likely to be the most significant. It is important to mention here that this city, officially called 'the water capital of Russia,' is very water-dependent, where a great share of green infrastructure is comprised of water bodies.

From the discussed above, it is clear that in the chosen context of Saint Petersburg, the issue of ES provision can be seen as problematic and requires particular attention and cooperation. This means that to steer the transition of urban waterfronts in a desirable, effective way, a certain level of comprehensive governmental control over ES implementation is needed. Thus, it is important to consider the governmental mechanism and its contextual aspects and include them in this review.

2.1.4 Practice and Falsification

The contemporary approaches for UWT introduced previously in the discussion on sustainability require governmental qualities that can be seen as extremely demanding, such as political priority for environmental improvement, strong institutional capacities, the availability of detailed data on ES, a functional and fair judicial system in place, and substantial

financial and market mechanisms and proper 'horizontal' cooperation (i.e., across sectoral and administrative boundaries) for driving sustainable development (Lilli et al., 2020; Pahl-Wostl & Knieper, 2014). All these factors can be seen as barriers, especially in countries that struggle with the insufficiency of such qualities, which makes these methods difficult to achieve in countries "*different from those found in Western Europe*" (Lankford & Hepworth, 2010, p. 86).

2.1.4.1 Data availability

As indicated previously, the issue of data availability has an important role in the integration of the new assessment methods. In relation to water, multiple studies emphasize that "*water resource management is impossible without data*" (Lankford & Hepworth, 2010, p.86). The notion of the data important for sustainable urban development was similarly stressed in recent studies of Michael Batty (2020). In his article, he uses concepts of 'high frequency' and 'low frequency' city that brings academic knowledge away from understanding the city as a static system. He states that the amount of data generated by the 'high frequency,' or the '24-hour city', being structured for a theoretical basis, has a potential to significantly improve our knowledge about the 'low frequency' city, or the slow processes and patterns that affect its sustainability. To validate this statement and bring it closer to the research context, a real example of such an issue needs to be introduced.

An international project aimed to make a detailed economic assessment of the Baltic Sea and its coastal area faced the issue of data availability, which dramatically affected the whole study. Two regions, namely, Leningradskaya oblast (with St. Petersburg, Gulf of Finland) and Kaliningradskaya oblast, have access to the Baltic Sea and were included in the research. This study, namely, the Swedish Environmental Protection Agency Report (2008) in attempts to include the Russian ES into its analysis reports: "*because of the non-existence of market economic tradition in Russia it is not surprising that we failed to find any national studies aimed at economic assessments of natural resources and environmental policy impact evaluations*" (p. 206). This statement clearly shows the insufficient state of national, regional, and local systems of environmental regulation. Besides the shortage of data and analysis, another knowledge gaps were stressed, which are "*the shortage of trained environmental economists*," "*lack of coordination among existing ecological, sociological and economic research centers*," and "*insufficient international cooperation*" (p. 206) The document names and criticizes particular projects for the lack of adequate estimation of environmental losses in this region, particularly Nord Stream pipeline construction, construction of Ferry Terminal in Baltiisk, and submerged ships' salvaging. This example clearly shows the importance of data collection and its systematic processing on different levels to achieve better performance and knowledgeable guidance for urban development.

2.1.4.2 Governance of Urban Waterfronts

Since the urban waterfront provides access to the 'common-pool' resource, it requires a careful governmental system. The complexity of activities and functions taking place on the urban waterfront needs consideration of the city's contextual fabric for its comprehensive regulation (Lankford & Hepworth, 2010). Extensive empirical studies on water governance worldwide outline the difficulties and failures of a 'centralized' model due to inflexibility for incorporating contextual differences of particular governing systems (Ostrom 2010, Lankford & Hepworth, 2010; Pahl-Wostl & Knieper, 2014). Thus, the influence of the context, accompanied by a

substantial role of the user, or the final beneficiary needs to be explored to cover the gap between promoted sustainable practices and real-life settings.

The central place of context, an understanding of governing complex economic structure, which waterfront transformation definitely is, was brought into discussion with an alternative 'polycentric' model (Ostrom & Tiebout,1999). In contrary to 'centralized,' this model sees collective action with overlapping authority and coordination mechanisms between actors as a key driver for dealing with the immense diversity of social-ecological settings (Ostrom, 2010) and the difference in the performance of different regions, giving a central role to leadership rather than regulation (Pahl-Wostl & Knieper, 2014; Lankford & Hepworth, 2010). In other words, this model presents the 'user,' or the final beneficiary, as the best and most active monitors for governing common-pool resources. Similarly important, this model presents the way to improve water allocation knowledge and performance "*without recourse to flow measurements*" (Lankford & Hepworth, 2010, p.95). The fundamental work on the governance of complex economic systems, built on extensive empirical studies, explains the process of governing common-pool resources from the perspective of theories of the individual choice (Ostrom, 2010). It states that "*overharvesting common-pool resources and under-provision of local public goods*" relates to 'the tragedy of the commons' (Hardin, 1968) and therefore needs to be governed following behavioral theories (ibid., 2010, p. 648). The Institutional Analysis and Development (IAD) framework, formulated in this study, divides contextual settings into 'internal' and 'external' working parts influential to an action situation, separating environmental, social, and governmental attributes from personal or individual attributes. Consideration of individual choice theory emphasizes communication, where 'trust' plays a crucial role (Ostrom, 2010).

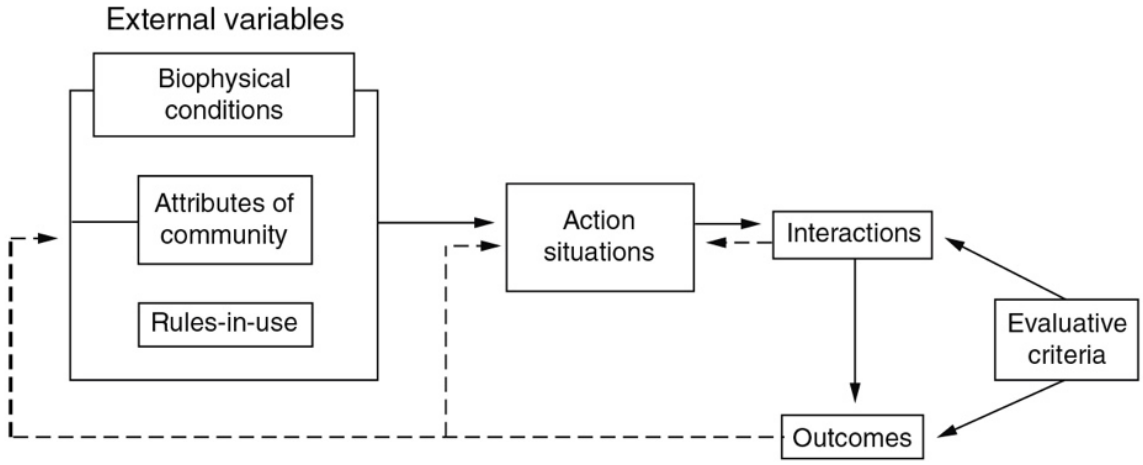


Figure 3: Framework for Institutional Analysis
(Retrieved from Ostrom, 2010, p.646)

Similarly, the view on the institutional design as a polycentric urban governance matrix for spaces of common interest was explored in the theory of 'governing of the commons' (Iaione, 2015). The study explains the current crisis of public space provision as (1) insufficient number and declining quality of the public or collective spaces, (2) loss of citizens' interest for the public spaces due to lack of perception on personal identity or sense of belonging to these places. The theory states that 'the real community well-being' can only be achieved through the alliance between institutions and civil society, which empowers their production and care of the general interest. This opportunity allows individuals to improve their social capabilities, build cooperation, influence the sense of local identity of the place, and "*create what is called*

an atmosphere of freedom, the overall environment in which individual choices make sense" (ibid, 2015, p.14). Therefore, the culture of individuality, encouraged by the government through policies and incentives will ensure the administrative strategy based on "*actions aimed to convince citizens to share the effort necessary for achieving targets of general interest through their behavior or their resources*" (ibid, 2015, p. 23).

From this, one can see that the academic and empirical understandings of many diverse fundamental studies ultimately conclude that 'communication' within bottom-up initiatives, as well as between governmental levels, is vital for the success of the transformation. This brings the research's focus to an understanding of how could urban common spaces, particularly waterfront areas, be effectively managed through local monitoring and assessment, giving 'the user' a sense of 'ownership' and responsibility for the area.

2.1.5 Place Identity and Creative Class

2.1.5.1 Place-making

Indeed, the idea around urban transitions emphasized previously by many scholars is that the most productive way of guiding these transitions is through "*focus on small manageable systems*" (Lovell & Taylor, 2013, p.1452). This principle will ensure the provision of social benefits "*by revealing and referring the natural/ecological characteristics and cultural features*" making a place 'local' (Bige & Zeynep, 2014, p.11). It is also established that the development of diverse spaces in urban areas "*shapes collective behavior, social action, and community building*" (Perevozkina, 2017, p.11). The 'people-centered approach,' which highlights local assets and serve public needs, can also be seen as a 'place-making' process (Bige & Zeynep, 2014). The concept of place-making explains 'urban reinvention' as strategic initiatives building identity in the area (Perevozkina, 2017). This "*physical reinvention also embraces efforts to introduce new comfortable infrastructure in public spaces, and to activate abandoned spaces, making them more livable*" (ibid, 2017).

2.1.5.2 Participatory art

One direct, active, and influential way of participation in urban reinvention and place-making by non-governmental actors is participatory art. By definition, participatory art comprises "*community art, activist art, new genre public art, socially engaged art, and dialogical art*" (Hand, 2010, p. 4 in Perevozkina, 2017). The underlying rationale behind this 'rural' behavioral habit is explained in contemporary academic literature as an attempt to create more attractive and friendly physical environments (Perevozkina, 2017). It is proved that this phenomenon that can discover new meanings and functions of the urban place, influence behavioral patterns in the area, stimulate interaction between citizens, increase civic engagement, enhance creativity and production within the community, and impact material and social change (ibid, 2017). Therefore, the city's artistic reinvention proves to be one of the active community instruments for promoting local interests. It is important to mention that this non-standard approach to urban places can also attract non-residential activities and promote tourism and the local economy's vitalization.
The approach to urban transformation through participatory art has proved to crucially depend on presence and attention to the problem of the 'creative class.' In academic literature, the creative class is defined as a set of actors, professionals from the creative sector, comprising a community's creative core (Baycan, 2011). The central role of this type of actors is highlighted

by many scholars within the concept of 'creative cities' as the one filling the gap between community participation and 'social creativity' (Bettencourt, 2013; Baycan, 2011). However, it is also true that these place-making activities can lead to opposite outcomes for the residents of developing areas. Along with community building and increasing social capacity, these transformations can also bring gentrification to the area due to its attraction for high-income residents. This link calls for a deeper understanding of individual choice theory for further formulation of reliable predictions and more knowledgeable steering of urban development towards a sustainable future.

2.1.5.3 Waterfront in the city

Bringing this discussion back to the context of interest, Saint Petersburg, the tendency to 'solve' societal issues through art is (1) very clearly observed empirically in the city, (2) proved by strong private and public organizations which focus on an artistic approach to city reinvention, (3) also emphasized by several scholars as a particular context quality.

Therefore, the influence of participatory art movements within the city is incorporated into the research's further strategy. To validate this, the research will introduce one of the unique water-related initiatives that influence waterfronts' evolution in the city through art and communication.

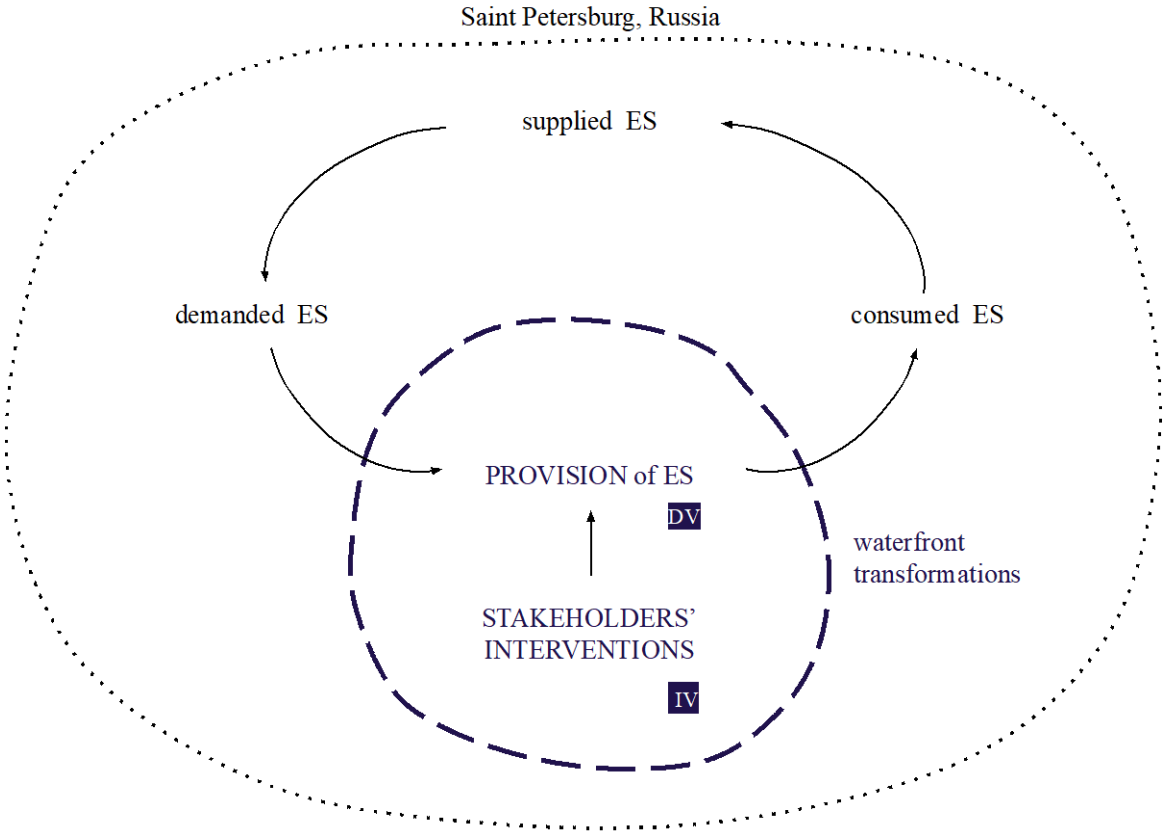
Initiated in autumn 2017, "Waterfront" is an international interdisciplinary project, a collaboration between the Institute of Street Art Research and the Danish Institute of Culture in St. Petersburg. The project is focused on the city's embankments, coastal areas, and the problems related to their use to change the space of the embankments and motivate citizens to reconsider their role in the process of urban improvement. The project leaders see the cooperation between residents and representatives of local government, business, and the art community as a key to creating an inclusive and comfortable urban environment in the city. By launching experimental platforms for research, collective design, and art interventions across the city, the "Waterfront" team stimulates the constant exchange of experience between experts and citizens. Experimental art objects created together with the active residents of the areas created a new dialogue between waterfront areas and their users, bringing a new experience to the citizens of Saint Petersburg. By the year 2020, the “Waterfront” project has managed to build an extensive network of diverse specialists whose areas of expertise overlap the waterfront development process and who can share their unique experience. Different online materials, such as recorded lectures, public talks, and panel discussions, organized and collected by the “Waterfront” project, are extensively used in this research due to their in-depth and up-to-date nature. This and many other water-related initiatives of diverse scales in the city indicate the importance of the city's waterfront state and its future.

2.1.6 Summary

To sum up, in order to sustain global ecological scenarios and “*make the value of ecosystem services an integral part of key policy decisions*” (Tallis & Kareiva, 2006, p.562) for waterfront transformations in Saint Petersburg, the integral role of communication within a multi-stakeholder network is proven to be one of the most influential on the success of this transformation. Within this network, transparent and fair democratic participation practices with local ‘users’ would ensure social acceptability and contribute to the local vision of the place, vital for ensuring local identity. Due to specific context and certain governmental

capacities currently available for waterfront transformations, 'local user' is also considered as the most reliable and knowledgeable actor for monitoring and assessing ES, thus, facilitating these transitions most sustainably. In many scenarios triggered by creative initiatives and crucial for encouragement and self-organization of these users in achieving goals of general interest, the sense of local identity can be ensured by a comprehensive administrative strategy, which brings policy support and a clear structure of responsibilities and final benefits on the first place.

2.2 Conceptual framework



The system of supplied-demanded-consumed ES, covered in the previous discussion on Russian ES arrangement, is incorporated in the framework as a bigger mechanism, where 'provision of ES' is seen as an intermediate step between demand and supply stages. 'Provision' itself in the framework is presented as a dependent variable to measure particular outcomes of observed cases. The independent variable, directly influencing these outcomes, is defined as 'Stakeholders' interventions,' where related 'stakeholders' include governmental institutions, private developers, profit and non-profit organizations, independent experts, active citizens, and the creative class. The context for these relationships is defined as 'waterfront transformations' within the overarching context of Saint Petersburg in Russia.

Chapter 3: Research design, methods and limitations

This chapter elaborates on the research design and methodology, explains the strategy and instruments used, and elaborates on the sampling method. It also discusses how collected data is going to be organized and analyzed for the purpose of this research to acquire valid conclusions and add to the existing knowledge.

3.1 Research question

This research looks at the influence among diverse stakeholders that shape the waterfront developments in the city of Saint Petersburg. Therefore, the main question that this research would answer is the following:

To what extent do stakeholders' interventions stimulate the provision of ecosystem services within waterfront transformation developments in Saint Petersburg?

In order to answer this main research question and steer the research process, four sub-questions are formulated:

1. Which factors lead to the sustainable provision of ecosystem services in waterfront developments?
   - This question allows us to elaborate on the definition of sustainability in water-related developments inside the city and look at the factors relevant to the topic.

2. What kinds of strategies are used within the waterfront revitalization developments in Saint Petersburg?
   - This question explores the qualities of actual developments in the city in order to define their relevance to this research. It also allows establishing a knowledgeable sampling for the analysis.

3. What institutional constraints for sustainable development do the waterfront developments in Saint Petersburg meet?
   - This question is important to understand the legal instruments available for the stakeholders' interventions. It helps to define a legal context for development activities and show their limitations.

4. How does interest among stakeholders influence these developments, and which type of ES can it provide?
   - This question elaborates on how exactly diverse stakeholders can take part in the waterfront developments and in which way this participation or influence can affect the process.

3.2 Research Strategy

Multiple Case Study - Causal-Process Tracing (CPT)

This particular type of question needs deductive research. The multiple case study strategy is chosen as the most appropriate way to address the significance of the context and explain a particular phenomenon within its diverse settings.

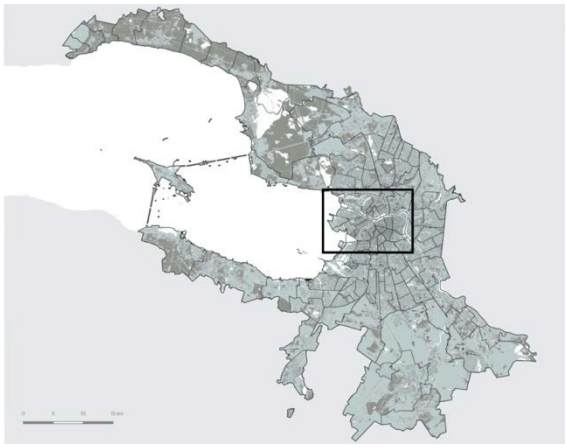
The case study strategy is commonly used for questions, answers for which are difficult to predict (Van Thiel, 2014). This research tries to identify and unfold diverse stakeholders' influences on waterfront transformations in Saint Petersburg and measure these influences using the most valid indicators. Thus, it is evident that the nature of this research is explanatory. Another proof of this is a small number of research units, namely, waterfront developments and a large number of unknown variables, which potentially explain the success of the provision of ES in these developments. It is important to say that the character of the research subject is unique in its nature and therefore leads the research to solutions for concrete social issues with a narrowed focus (Van Thiel, 2014). A detailed description of a limited number of units in a particular context allows the extensive level of depth within which results cannot be generalized to other situations (Van Thiel, 2014). Consequently, the external validity of this research is limited, while the internal validity is considerably high.

More specifically, Causal-Process Tracing (CPT) is chosen as a strategy to focus on the "*real-life setting*," or in other words, on factors in context (Van Thiel, 2014). For this reason, the research looks into the most significant projects implemented in the past five years, whose outcomes are visible, as well as the evolution of their qualities in the complex process of city waterfront transformation.

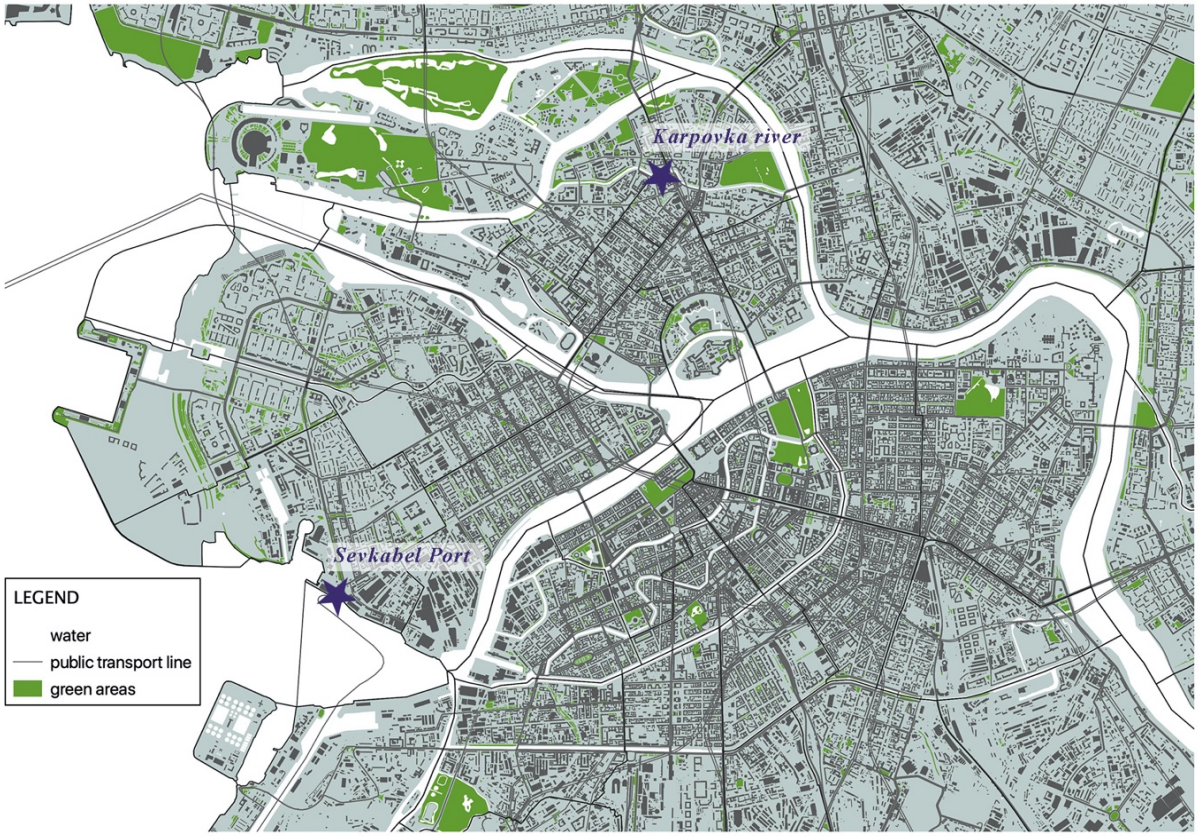
3.3 Sampling of Cases

The city of Saint Petersburg has a unique landscape. Located on the Gulf of Finland, divided by a deep river, and filled with many small rivers and artificial canals, this city has to deal with water in many ways. From the ecosystem perspective, it is also clear that all these water bodies have diverse conditions, therefore accommodate different species, and have different potential for ecosystem services. Following a basic classification of seawater and freshwater bodies, it is important to distinguish these two in this research (UN Habitat, 2005). Since it is not clear which type of water has a greater potential for ES improvement in the study, it is relevant to reveal relationships with both types. For this reason, at least two case studies have to be explored within this research – one on the river and one on the bank of the Gulf.

The quality of the transformation is established by the presence and success of promoted contemporary mechanisms covered in the discussion on sustainability previously. It is important to distinguish between those developments which incorporated these practices and which did not. Therefore, the research looks into those activities, which embodied waterfront transformations and had a direct effect on the quality of life in the city. Consequently, to establish the number and quality of relevant cases for this research, the purposive, or non-probability, sampling of developments is used. Therefore, the criteria for the most advantageous choice establish developments which (1) are located on the urban waterfront, (2) provide multiple social benefits, (3) have the potential to contribute to the provision of ES in the city. Examining these criteria can contribute to the understanding of complex urban processes and their outcomes. As a result of the preliminary analysis of city water-related developments, two main cases were established.



Map 4: Saint Petersburg. Center



Map 5: Two Case Studies: 'Sevkabel Prort' and 'Karpovka river'

• 'Karpovka river' | 2017-2019

Type of development: Public space development of the river embankment.
Location: The embankment of the Karpovka river, residential area in Petrogradsky district.
Leading actor: Local activists and District Administration.
Placemaking interventions: Transformation embraced network governance and public participation mechanisms.
Type of new infrastructure delivered: New developed area incorporates playgrounds, sports facilities, open space for recreation and education, urban garden, and other social benefits.

• 'Sevkabel Port' | 2017-2020

Type of development: Brownfield re-development; new ‘creative cluster.’
Location: A former factory on the coast of the Gulf of Finland on Vasilievsky island.
Leading actor: Private initiative.
Placemaking interventions: Placemaking is organized creatively; however, it does not include any public participation process due to the non-residential location of the development.
Type of new infrastructure delivered: Provides access to water and open public spaces, stimulates water and sports activities, generates job opportunities, and vibrant social life in the area. Recently an arranged water transport stop was included in the city water transportation system with a regular schedule.

Although having diverse institutional and governing characteristics, these two waterfront developments are comparable in terms of their pay-offs for civil society in the provision of ES benefits and improvement of the social dimension of urban life.

3.4 Operationalization, Data Collection and Analysis

Taking into consideration the number and quality of cases, the research provides measurements for two particular developments. The conducted meta-analyses of secondary data showed that the amount of information required for the study could only be acquired through qualitative methods due to the unavailability of relevant databases, lack of previous quantitative research on the topic, and in-depth nature of the research question. Therefore, the data collection methods and data analysis for this particular study is qualitative in nature.

It is true that qualitative analysis requires careful organizing and systematic coding before the actual analysis. The coding scheme, being vitally important for the comprehensibility of the analysis, was checked by another research expert before starting the search for patterns and cause and effect relations. This technique, as well as data triangulation and the accurate, transparent documentation of the research process mentioned above, contributed to the overall plausibility of the research conclusions. Additionally, re-coding the same data into variable categories revealed new patterns through cooccurrence tables and thorough networks’ analysis.

The established conceptual framework shows the direct influence on the ‘provision of ES,’ making it a dependent variable. The research builds on the framework of ES adapted for the Russian context. It looks at the possibility of acquiring data on ES indicators from the actual users of the developed areas. Thus, the dependent variable comprises the following indicators:

Dependent Variable : Provision of ES					
indicator	data type	data sourse	data collection method	measure unit	literature
Sub-variable: Regulating ES					
Positive change in quality of water	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Positive change in water level regulation (seasonal fluctuations)	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Positive change in potential to hold storm water/ provide flood control	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Provision of environment for stimulation biodiversity	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Sub-variable: Provisioning ES					
Positive change in local fishery	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Sub-variable: Recreational ES					
Positive change in quality of recreational space	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Positive change in quantity of recreational space	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Promotion of active water sports	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Provision of sport facilities	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Sub-variable: Cultural ES					
Positive change in cultural value of the place	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Provision of educational functions	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Stimulation of cultural diversity	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015
Stimulation the sense of local identity	QL	P	FGDs, expert interviews	yes / no	UN Habitat, 2005; Bukvareva et al., 2015

Table 2: Dependent Variable
QL – qualitative data type; P – primary data source; S – secondary data source, FDGs – focus-group discussions.

Since the research objective is to explore certain phenomena, which can only be measured over time, the most subjectively knowledgeable units for the research would be those who observe(d) the developments and their outcomes. Although this type of data is subjective by definition and can potentially result in loss of objectivity and reliability, the valid findings are ensured with certain data collection methods in place. In particular, the research uses focus-group discussions (FGDs), properly recorded and documented, with the purposive stratified sampling of 3 participants per group. This ensures a diversity of opinions and perspectives on the provision of ES, as well as helps control personal and biased attitude. These participants include the active users of the area, namely, present or former residents, workers, and frequent visitors to the area. Additionally, these findings are triangulated with experts who similarly track the process of developments and their outcomes. Therefore, some expert interviews similarly cover these indicators.

The independent variable, namely, stakeholders' interventions, is divided in the operationalization table into two major groups with the following indicators – network governance process and participation process:

Independent Variable : Stakeholders' interventions					
Sub-variable : Network governance process					
indicator	**data type**	**data sourse**	**data collection method**	**measure unit**	**literature**
Number of governmental stakeholders involved	QL	S	Governmental reports	Actual number	UNESCO World Water Assessment Programme, 2020; Lilli et al., 2020
Frequency of interaction/ information exchange	QL	P	Expert interviews	LS 1-5	UNESCO World Water Assessment Programme; Ostrom 2010; Pahl-Wostl & Knieper, 2014; Lankford & Hepworth, 2010
Level of trust	QL	P	Expert interviews	LS 1-5	Ostrom 2010
Presence of common language and vision	QL	P	Expert interviews	LS 1-5	Ostrom 2010; Lilli et al., 2020
Level of agreement between stakeholders in their visions (co-design)	QL	P&S	Expert interviews, media	LS 1-5	UNESCO World Water Assessment Programme; Ostrom 2010; Lilli et al., 2020; Pahl-Wostl & Knieper, 2014;
Level of financial support (sufficient/insufficient for desired outcomes)	QL	P&S	Policy documents, government reports	LS 1-5	UNESCO World Water Assessment Programme
Level of satisfaction with changes - actors involved in developments	QL	P&S	Expert interviews	LS 1-5	Lilli et al., 2020
Sub-variable : Participation process					
Number of participants	QL	S	Public reports	Actual number	Ostrom 2010
Types of participants	QL	S	Public reports	Actual types	Iaione, 2015
Frequency of interaction/ level of engagement	QL	P&S	Expert interviews, public reports	LS 1-5	Ostrom 2010
Opportunity for people to express creativity	QL	P&S	Interviews, media, public reports	Open/ limited/ no opportunity	Baycan, 2011; Iaione, 2015; Lovell & Taylor, 2013
Opportunity for people to contribute to local identity of the place	QL	P&S	Interviews, public reports	Open/ limited/ no opportunity	Lovell & Taylor, 2013; Iaione, 2015; Bige & Zeynep, 2014
Level of satisfaction with changes - active users	QL	P&S	Interviews, public reports	LS 1-5	Iaione, 2015; UNESCO World Water Assessment Programme, 2020

Table 3: Independent Variable.
QL- qualitative data type; P - primary data source; S - secondary data source; LS 1-5 - likert scales.

For the purpose of the research, the major insight into the process of governance and participation processes was established through expert interviews, making it the main collection method. It was important to involve a comparable set of actors for each case to provide fair and reliable data for further data analysis. The selection of the experts was sampled by self-selection and snowball sampling. When several valid representatives of the group were found, a stratified selection from these groups allowed the researcher to make a representative choice (Van Thiel, 2014). Along with the primary data collection, qualitative secondary data sources, such as policy documents, budget documents, trend analyses, reports, other research, journals, and periodicals, allowed for a meta-analytical approach to contribute to the findings' objectivity. This method is proven to increase the reliability and validity of the research (Van Thiel, 2014). It is important to elaborate on the type of data and actual research participants to establish a better understanding of their value.

3.5 Actual data source

3.5.1 Primary data

3.5.1.1 Interviews

Structured, semi-structured, and unstructured interviews were used with the respondents depending on the level of knowledge and purpose of the one discussion. To collect more new information and insights, open-ended questions were actively used. To confirm and triangulate some data, closed-ended questions were prepared. Overall, 8 expert interviews were conducted with the following stakeholders:

- Urban revitalization expert (Interview #1; unstructured, recorded)

Architect, urbanist, professor at the Department of Architectural Environment Design in St. Petersburg State University, member of an expert platform for urban revitalization. With great experience in urban development, this professional has been involved in many social-oriented development projects and is knowledgeable in almost every significant transformation in the city. He is the keeper of the hidden stories behind public projects, who gave some important in-depth perspectives on participation processes and network building in the city.

- A founder of the “Waterfront” Project (Interview #2; unstructured, recorded)

As stated previously in Chapter 2, the “Waterfront” project is a successful example of a platform that connects artists, diverse urban experts, and local communities with the aim to create an 'open dialogue' on waterfronts and their use. This interview developed a better understanding of real-time formal and informal movements around waterfronts in the city and introduced other useful experts to contact. Along with that, many important insights were obtained about two particularly chosen case studies.

- Ecologist, environmental journalist (Interview #3; semi-structured, recorded)

Journalist, director of the Environmental Information Bureau, working in Russian and international media for more than 20 years. She specializes in environmental policy, green economy, economy and climate change policy, UN climate negotiations, social-environmental movements, and sustainable urban development. By following all the local professional and public events on the city's ecology, she collected exclusive knowledge of the city's

environmental issues and waterfronts in particular. In addition, she is a permanent resident of the riverfront side.

- Architect, specialized in public spaces (Interview #4; semi-structured, recorded)

An architect bureau is involved in many urban revitalization projects across Russia. Some holistic projects developed for the city of Saint Petersburg by this team included:
/ a program for the revitalization of the Okhta river, another water frontier for the public-oriented development activity in Saint Petersburg;
/ a program for the revitalization of the 'grey belt,' or the brown-field development around Saint Petersburg that occurred during the period of extensive industrial activities;
/ a re-development projects for the sea-side neighborhood in the South-west part of the city.

- Independent Urban Expert: 'Karpovka river' (Interview #5; semi-structured, recorded)

A team member of the initiative group 'Karpovka Friends,' one of the four leaders of the movement, became a valuable interviewer since he was involved in the project from the beginning and had exclusive knowledge about the development process from different angles. Being a part of the public participation process, network meetings, and discussions with the governmental representatives, he gave many details on the project. He expressed some expert opinions that are not included in the official project reports.

- Sociologist ‘Karpovka river' (Interview #6; semi-structured, recorded)

Ph.D. in social science; CEO of the Center for Applied Research; took part in more than 30 research projects and many consulting projects on various aspects of urban development and real estate. In the 'Karpovka river' project, he is responsible for the public participation process and participatory design sessions with the citizens. This interviewer elaborated on the participation, meaning, explained the process, and introduced some hidden issues and ways for further improvement.

- CEO of the creative department, 'Sevkabel Port' (Interview #7; structured, recorded)

This man responsible for all creative work in the area of 'Sevkabel' works with the project from the beginning, from 2017. Responsible for all the exhibitions, public events, and creative development of the place, he explained the mechanism of benefits delivery in the area, gave some insights on particular arrangements, such as public water transport stop, and shared some future plans for further improvements.

- Architect, Designer, 'Sevkabel Port' (Interview #8; semi-structured, recorded)

With strong collaboration between architects and the creative department of 'Sevkabel,' architects of this bureau have an overall 'creative monopoly' on this development. The product of their design is successful in many ways and fully satisfy those who ask for it and those who use it. This interview did not bring any new information but proved many assumptions and helped to triangulate other interviewers.

Many other interviews failed due to diverse circumstances, which seriously affected the data collection methods and caused the eventual shift to other data sources. These circumstances included the overall pandemic peculiarities with long-lasting vacations and closed/partially closed governmental and private entities. Some experts happened to be locked out of the country borders in deep uncertainty. Also, the time of the study coincided with the annual vacation time for all universities in Russia, which made many professors and experts inaccessible. Moreover, with an exceptional sensitivity of the topic for many actors, one

interview failed because of the inability of the researcher to manage the state of the interviewer. These failed interviews included the following actors:

- Ecologist, a chairman of the legislative assembly
- TEEB-Rus representative
- Brownfield expert
- Activist ‘Karpovka Friends’
- Local administration representative, Petrogradsky district

3.5.1.2 Focus-Group Discussions (FGDs)

Focus-group discussions (FGDs) were conducted using online methods for each case. Fortunately, due to the pandemic and the lockdown, more people became familiar with online communication facilities. Therefore, three people per group were collected:

- FGD 'Karpovka river': an activist, a local resident, a visitor (FGD #1)

The Petrogradsky District, where the development is located, has proved to be very socially active due to many public events taking place with the help of public and private organizations, as well as the support of local administration. This will be elaborated further in the description of the case. Thus, many residents and activists know each other in person, which helped to use snow-ball sampling to select local knowledgeable actors for the purpose of the research.

- FGD 'Sevkabel Port': a resident of the nearest neighborhood, a business owner, a worker of 'Sevkabel' (FGD #2)

Since the development, or so-called 'creative cluster,' is located in the industrial coastal area, there are no permanent residents. However, a resident from the closest neighborhood was considered local enough to assess the development outcomes. An owner of a small café on the 'creative cluster' territory became a valuable participant since he spends considerable time in the area and is also familiar with some administrative aspects of the place. A worker of the area who is involved in many physical activities, such as building exhibitions and different temporary and permanent public objects in the area, also appeared as a consistent observer of the area for more than two years.

3.5.2 Secondary data

Along with primary sources, it was important to include more secondary data due to several factors. Firstly, the preliminary research about the cases, in particular, their chronology, actors involved, issues, and details, had to be made before shifting to the primary data in order to make it knowledgeable and effective. Secondly, a great consequence of the limitations discussed below in Chapter 3, with the following fails of many planned interviews, made secondary data of equal significance for the research as the primary. Therefore, the research used online sources such as recorded expert lectures, recorded panel discussions, presentation and promotion materials, governmental documents, reports, guides, independent monitoring reports, scientific articles, journals, etc.

3.6 Limitations

3.6.1 Strategy limitations

One of the major challenges of the chosen strategy is the potential loss of objectivity in data interpretation. According to scholars, this is a common issue for the case study strategy due to the in-depth nature of the problem and intensive contact of the researcher with the subject of the study (Van Thiel, 2014). To overcome this obstacle, the research combined expert interviews, focus-group discussions with users, qualitative secondary data, thus triangulating data and adding further to the internal validity of the research. In addition, to improve the reliability of the findings, the research keeps the study design open and transparent, where different methods of collecting data are used, and all steps are carefully documented.
The chosen process-tracing strategy, which usually requires multiple measurements through time, in this research is limited by the unavailability of statistical information. The qualitative source of subjective data chosen for this particular strategy can only ensure the reliability of measurements 'before' and 'after' developments due to a certain capacity of average humans' memory. Similarly, the time allocated for the research allows only a single measurement for the provision of ES. Consequently, although limited by certain constraints, this research will allow looking at which exact relationships between stakeholders' interventions and ES exist in the context and which are valuable and resulting in waterfront developments and should be studied further in-depth.

3.6.2 Pandemic restrictions

It is important to mention the deviating circumstances of the COVID-19 pandemic, which undeniably influence the design of this research and, as a consequence, its findings. These restrictions limit opportunities for the researcher to conduct interviews and focus-group discussions in person, as well as freely communicate with active users of completed developments. Although alternative methods of communication are quite common nowadays, needless to say that face-to-face conversations in practice prove to be much more effective. What may be more important is that online communication methods limited the research sample to those for whom this type of technology is available. Due to the complete lockdown in the city of study and worldwide, it was not feasible to visit the research area, make observations, and collect any additional information on the developed sights. Besides, the shift in the respondents' daily activities caused by the pandemic also shifted their attention from these developments, meaning they were less active in participation and discussions.

Although the Coronavirus pandemic seriously affected many regions of the country and keeps creating socially and economically devastating conditions, it also indirectly affects all human activities. Its deep uncertainty and unpredictability impacted many development activities and projects, making previously accepted plans irrelevant. This creates difficulties for any projections and further discussions about the future.

3.6.3 Political tension

At the same time, a series of politically shocking events in the country of the research created overwhelming political tension unpleasant for the study. Some events, such as a drastic change in the Constitution, directly impacted the legal basis for many processes, including environmental protection, public space development, public administration procedures, and many others. The lack of clarity in the new document, lacking capacities for its legal use, as

well as disagreements of many experts about its appropriateness, generates more questions than answers in the field of study.

"We have some permanent issues here, which I do not understand. I also have no idea at all how everything has changed after the Constitution was changed. It seems that the administration itself has completely died." (Urban revitalization expert, Interview #1, 2020)

Other political events, problematic of which goes beyond the scope of this research, caused a serious social resonance, in which many politically sensitive people are not really focused anymore on such issues as waterfront development or social and environmental improvements. These conditions undeniably influence respondents' sampling and the quality of the data collected.

Chapter 4: Presentation of data and analysis

This chapter contains a narrative presentation of the research findings. It is aimed to elaborate on the context of the study and explore possible institutional implications for the ES. It establishes certain trends and patterns in the data and discusses the findings. For the interpretation of data, several assumptions are made. These assumptions are built on state-of-the-art knowledge discussed previously in Chapter 2 of this thesis.

4.1 Framework Conditions

To connect findings presented earlier to the exciting settings of the research area, particular contextual conditions have to be revealed with the accent on the legal framework, administration aspects, and environmental context.

4.1.1 Sustainability concerns

In Russian cities, the existing regulating system "*considers the ecosystem services of green infrastructure to a minimum extent, although their problems are hidden in the General Urban Plans*" (Bukvareva & Sviridova, 2020, p.108). Since the mechanism of ES is absent in the field of governmental regulation, no quantitative assessments are available on its indicators. However, the overall trend of underdevelopment of the sustainable growth' regulation can be similarly tracked by the state of SDGs in the country. Therefore, the research uses SDGs' indicators presented by the Federal State Statistics Service to validate the scholars' concerns. The information from the Statistics Service is converted into a table for the purpose of the research and covers only indicators relevant for this particular study.

Progress phases:

developing
in process
not developing

SDG 11 - Sustainable Cities and Communities		
11.1.1	Share of urban population living in slums, informal settlements or in poor housing conditions	
11.2.1	Proportion of the population with easy access to public transport, disaggregated by sex, age and disability	
11.3.1	Ratio of development and population growth rates	
11.3.2	Proportion of cities with regular and democratic structures that ensure direct participation of civil society in urban planning and management	
11.4.1	Total per capita expenditure on conservation and protection of the entire cultural and natural population by a source of funding (private, public), type of heritage (cultural, natural), and level of state jurisdiction (national, regional, and local/municipal)	
11.6.1	Share of municipal solid waste that is collected and disposed of at controlled facilities, from the total mass of municipal solid waste, by city	
11.7.1	The average proportion of urban built-up area classified as open to all public spaces, with accessibility disaggregated by sex, age, and disability	

SDG 13 - Climate Action		
13.1.3	Percentage of local governments that have adopted and are implementing local disaster risk reduction strategies in line with national disaster risk reduction strategies	
13.2.1	Number of countries with nationally determined inputs, long-term strategies, national adaptation plans, strategies in line with information provided in adaptation and national communications.	
13.2.2	Total annual greenhouse gas emissions	
13.3.1	Degree to which (i) education for global citizenship and (ii) education for sustainable development are mainstreamed into (a) national education policies; (b) curricula; (c) teacher training; and (d) student assessment	

SDG 14 - Life Below Water		
14.1.1	a) Coastal eutrophication index and b) plastics scrap density	
14.2.1	Number of countries applying ecosystem approaches to marine area management	
14.3.1	Average acidity (pH) of seawater measured in an agreed group of representative sampling stations	
14.4.1	Proportion of fish stocks within biologically sustainable limits	
14.5.1	Proportion of marine protected areas	

SDG 15 - Life on Land		
15.1.2	Percentage of terrestrial and freshwater areas of importance for biological diversity protected by ecosystem type	
15.3.1	Area of degraded lands as a percentage of total land area	
15.9.1	a) Number of countries that have established in their national biodiversity strategy and action plan national targets in line with or similar to Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020 and monitor progress towards such targets; b) Biodiversity is integrated into national accounting and reporting systems as part of the implementation of the Environmental Accounting System	
15.a.1	a) The amount of official development assistance allocated to the conservation and sustainable use of biodiversity; and b) The revenue generated from and financing mobilized through economic instruments for biodiversity conservation.	

Table 4: The state of Sustainable Development Goals in Russia.
Adapted from the Federal State Statistics Service (Данные по показателям ЦУР, 2020).

The selected indicators show the current underdevelopment of particular SDGs, which correspond to the qualities discussed in the literature previously. These findings validate scholars' concerns over ES consideration in state regulation.

4.1.2 Ecosystem Accounting Units

The methods of evaluation of ecosystem services for inner-city districts tested by TEEB-Rus show the possibilities of including these indicators into the procedure of urban planning. For this reason, The Second Edition of the Prototype of the National Report identified certain accounting levels, or 'Ecosystem accounting units' (EAU). By definition, "*EAUs should be spatial areas that are fixed or largely stable over time and, for accounting purposes, may be*

considered ecosystem assets" (United Nations, 2014, p.28). For the Russian Federation, EAU is categorized as the following:

(1) Russian Federation
(2) Subjects of the Russian Federation
(3) Administrative areas
(4) Municipalities
(5) Protected areas (National Nature Reserves)

For a better understanding of the legal context for the ES implementation, a brief introduction to the governance of waterfronts is needed. This will give an understanding of tools available for the potential provision of ES in Saint Petersburg. Only governmental entities that have direct powers and responsibilities over waterfront-related developments are presented below.

4.1.2.1 Russian Federation

Federal level – North-Western Federal District

Map 6: North-Western Federal district.
Adopted from the governmental web page (Official website SZFO, 2020).

The North-Western Federal District's total territory is 1 million 687 thousand square kilometers or 9.9% of the Russian Federation. It is home to 13 million 660 thousand people or 9.5% of the Russian Federation population. (Official website SZFO, 2020)

Executive federal authorities related to waterfronts and public space development:

Federal Exacutive Authorities		
governmental body	**descriprion**	**subordinate institutions**
Ministry of Natural Resources and Environment of the Russian Federation	A Federal body of executive power, which carries out functions on development of state policy and normative-legal regulation in the sphere of study, use, reproduction and protection of natural resources	Department of the Federal Service for Supervision of Natural Resources Management in the North-Western Federal District
Ministry of Economic Development of the Russian Federation	A Federal body of executive power, which carries out functions on development and implementation of economic policy of the Government of Russia in a number of areas.	Federal State Statistics Service
Federal Service for Hydrometeorology and Environmental Monitoring	A Federal body of executive power, which performs the functions of providing public services in the field of hydrometeorology and related fields, monitoring of environment, its pollution, state supervision of works on active impact on meteorological and other geophysical processes	North-Western interregional territorial department for hydrometeorology and environmental monitoring North-West Territorial Administration of the Federal Agency for Fisheries
data source: Минприроды России, 2020; Министерство экономического развития Российской Федерации, 2020; Федеральная служба по гидрометеорологии и мониторингу окружающей среды – Главная страница, 2020		

Table 5: The Federal governmental entities with responsibilities over waterfronts.

National Laws and legislation:

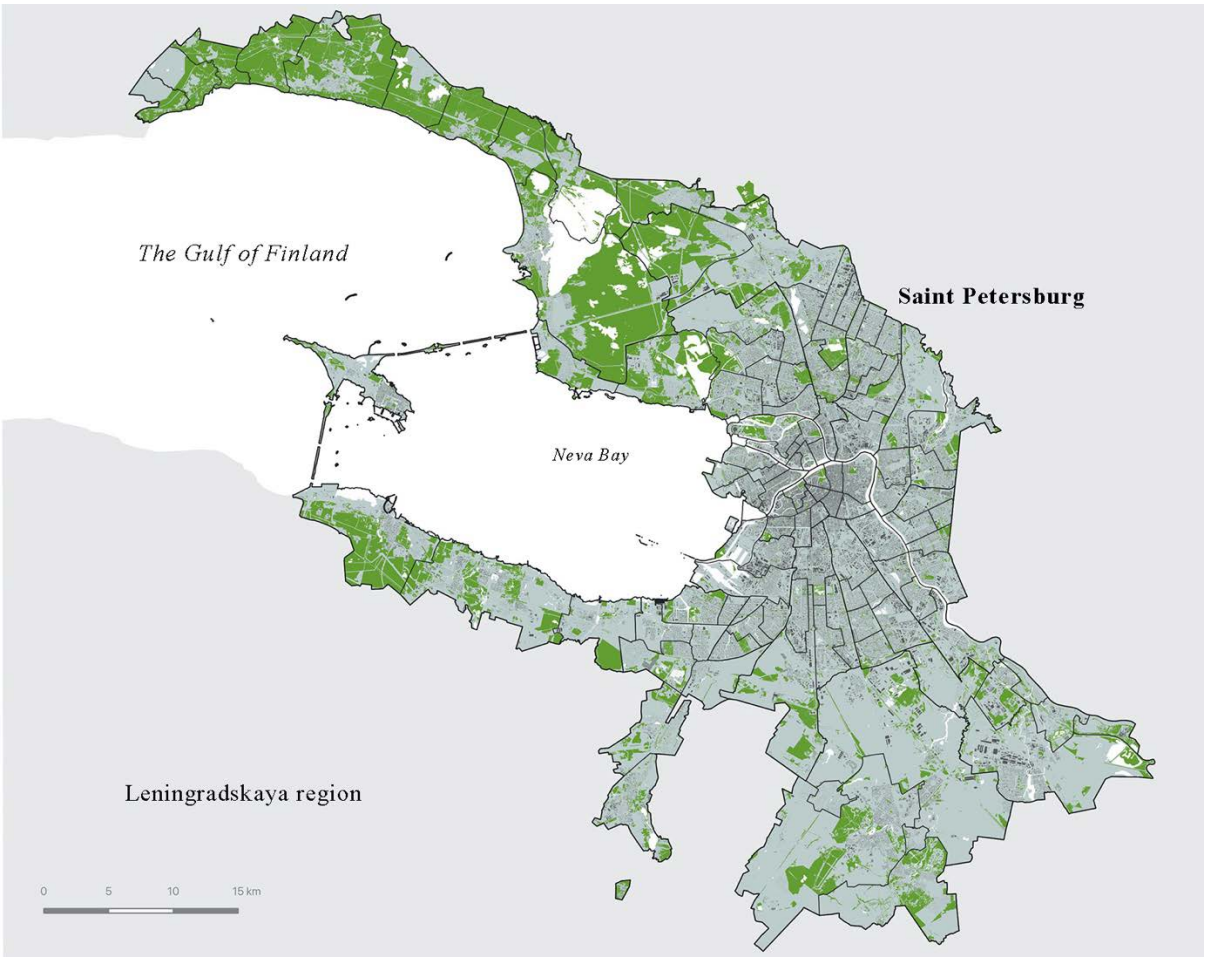
- Land Code
  The current Land Code is the first codified document regulating land relations of subjects in declared private land ownership. Before that, two Land Codes were adopted to regulate relations under the state monopoly of land. The 1991 Code provided the legal basis for the transition period. (The Government of the Russian Federation, 2018a)

- Water Code
  The Water Code of Russia was first adopted in 2006. It regulates relations between state and municipal bodies and between individuals and legal entities in the area of water use. (The Government of the Russian Federation, 2018b)

- Federal Law "On Environmental Protection"
  The present Federal law defines the legal bases of a state policy in the field of environmental protection, preservation of the environment, biological diversity and natural resources, and maintenance of ecological safety. (The Government of the Russian Federation, 2002)

4.1.2.2 Subjects of the Russian Federation

Regional level – City of Saint Petersburg



Map 7: The city of Saint Petersburg.

Saint Petersburg is a city with a Federal status. It was founded in 1703. The area is 1.4 thousand sq. km.; population (01.01.2019) - 5 million 383,89 thousand people. (Официальный сайт Администрации Санкт-Петербурга, 2020)

The executive city's authority is the Administration of Saint Petersburg. The subordinate institutional bodies related to waterfronts and public space development are categorized as follows:

Committees and services of St. Petersburg administration	
governmental body	**descriprion**
Committee for Nature Use, Environmental Protection, and Environmental Safety	The Committee pursues the state policy in the sphere of nature use, environmental protection, and environmental safety and coordinates other executive bodies of St. Petersburg's state power in this sphere.
Committee for the Improvement	The Committee ensures the state policy implementation and carries out state management in the sphere of improvement: gardening, forest park, road maintenance and other objects of improvement, waste management on the territory of St. Petersburg and coordinates the activity of other executive bodies of St. Petersburg state power in this sphere.
Committee for Urban Planning and Architecture	The Committee develops and implements measures aimed at implementing the state policy of St. Petersburg and the state administration in the sphere of town planning and architecture, as well as shaping the architectural appearance of St. Petersburg. Coordination of activities of executive bodies of St. Petersburg state power in the sphere of town planning and architecture.
Committee on Youth Policy and Cooperation with Public Organizations	The Committee is an executive body of St. Petersburg state power, a structural subdivision of St. Petersburg Government, established for the purpose of implementing the state policy and state management in implementation of the main directions of youth policy in St. Petersburg and cooperation with public organizations and associations located on the territory of St. Petersburg
Committee on Property Control of St. Petersburg	The Committee shall pursue the state policy in the sphere of control over the use and preservation of St. Petersburg's state property (except for housing facilities), ensuring the inventory of non-residential facilities, and in the sphere of land relations in part related to ensuring the inventory of land and the inventory of public green areas in St. Petersburg, exercising land control in St. Petersburg, and identifying and preventing unauthorized construction activities.
Committee for Territorial Development of St. Petersburg	The Committee carries out the state policy in the sphere of development of state management on the territories of districts of St. Petersburg, development of local self-government and municipal service in St. Petersburg, interaction with political parties and subjects of public control, and also coordinates the activity of other executive bodies of state power of St. Petersburg in this sphere, provides carrying out of actions for rendering assistance by executive bodies of state power of St. Petersburg to the election commission.
data source: Официальный сайт Администрации Санкт-Петербурга, 2020	

Table 6: Committees and services of St. Petersburg Administration with responsibilities over waterfronts.

The research wants to outline the complexity of the city's governance and administrative structure related to the waterfront and public space development. An example of this complexity can be seen if look further into the administrative structure of the committees. For instance, only the Committee for Nature Use, Environmental Protection, and Environmental Safety has four additional coordination groups and six subordinate organizations whose field of responsibilities directly overlap waterfront development and public space creation. It also takes part in the federal program "Development of Water Management Complex of the Russian Federation in 2012-2020" (the Government of Russian Federation, 2012) and the program of

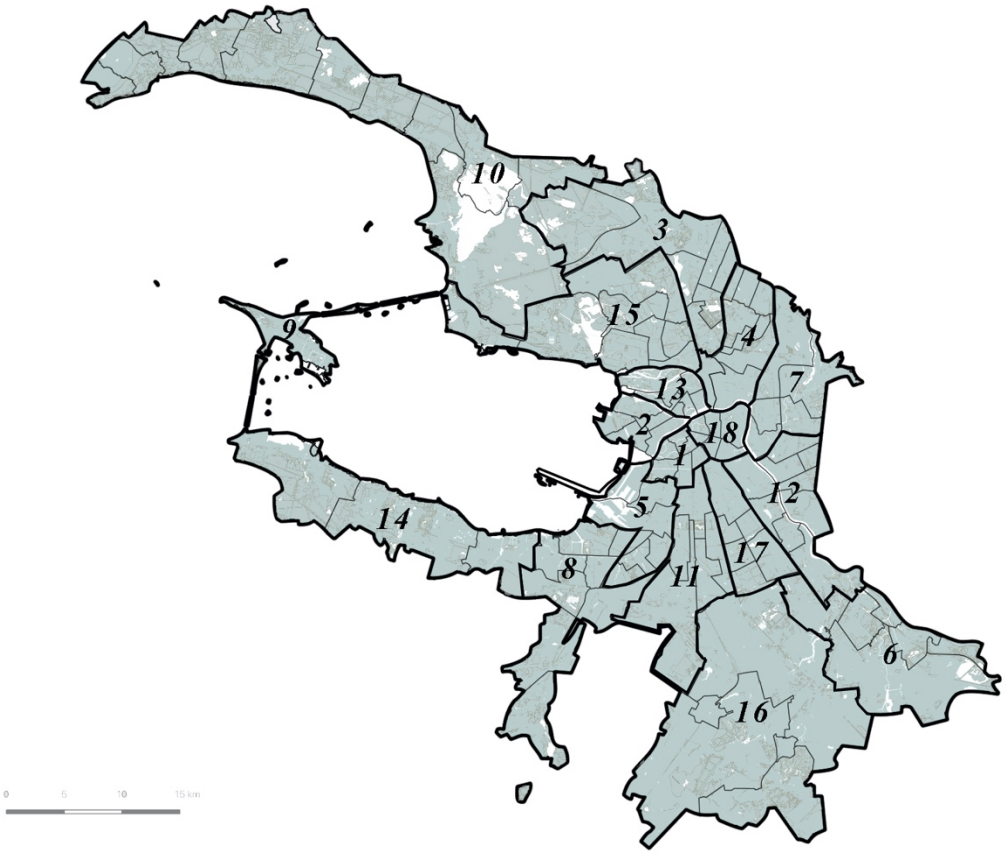
the city's government "Improvement and Environmental Protection in Saint Petersburg" (The Government of Saint Petersburg, 2014).

City's legislation:

- The general City Plan
- Policies of the Government of Saint Petersburg

4.1.2.3 Administrative areas

Administrative level – City districts



Map 8: Districts of Saint Petersburg.
1 – Admiralty; 2 – Vasileostrovsky; 3 – Vyborgsky; 4 – Kalininsky; 5 – Kirovsky; 6 – Kolpinsky; 7 – Krasnogvardeysky; 8 – Krasnoselsky; 9 – Kronstadt; 10 – Kurortny; 11 – Moskovsky; 12 – Nevsky; 13 – Petrogradsky; 14 – Petrodvortsov; 15 – Primorsky; 16 – Pushkinsky; 17 – Frunzensky; 18 - Central

The Administration of St. Petersburg District is the executive body of St. Petersburg's state authority, which pursues St. Petersburg's state policy and carries out the state management on the territory of the District of St. Petersburg. (Положение об администрации района Санкт-Петербурга - Администрация Санкт-Петербурга, 2017). The administrative structure of Saint Petersburg defines 18 administrative districts. The administration function is assigned to the District Administration and their subordinate sections. The responsibilities of local administration include such tasks as improvement and maintenance of the public environment, creating conditions for recreation, implementing measures for the development of physical culture, creating an inclusive environment for people with disabilities, etc.

4.1.2.4 Municipalities

Municipal level – Municipalities of the city districts.

City districts are divided into 111 municipalities.
The administration of this governmental level is established through local self-government, which by law includes the municipal entity's chief executive, a municipal council elected by the public, the executive body of the municipal entity, the local government body, and the supervisory body of the municipal entity. Through local self-government bodies, the population independently decides on issues of local importance and the provision of daily living activities (education, healthcare, improvement, social sphere, urban infrastructure, etc.
(Официальный сайт Администрации Санкт-Петербурга, 2020).

4.1.2.5 Protected areas (Nature Reserves)

The efficiency of ES is directly linked to biodiversity indicators. It is, therefore, necessary to take a possible change in biodiversity into account when particular ES are consumed (Bukvareva & Sviridova, 2020. p103). According to various scientific estimates, protected areas must occupy from 20 to 40% of the city's territory in order to fulfill their function (Environment & Rights, 2019). Besides, the creation of natural urban areas should be based on scientific research, which determines what is preserved (animals, plants, landscapes) and what the result will be obtained. (ibid, 2019)

Natural areas within the city limits may have different protection status and belong to the following categories: national parks (unique cases); natural parks, state nature reserves; nature monuments; dendrology parks and botanical gardens; or protected areas of other categories established by regions. Reserves are not created in cities because it is impossible to maintain a strict protection regime for these natural objects in the city.

The goal of creating protected areas is to maintain ecological balance and preserve biodiversity in the city (Environment & Rights, 2019). The establishment and operation of protected areas are regulated by the Federal Law "On Specially Protected Natural Areas." Local governmental bodies can also establish protected areas in their municipalities, but the law of a constituent entity of the Russian Federation requires that categories of local protected areas be established. Regulation on protected areas defines what can and cannot be done on its territory - all this is stipulated in the regulations for each protected area - federal, regional or municipal. The provisions are developed by the relevant executive authorities.

The scientific journal "Environment & Rights" (2019) reveals certain issues in this process. The expert states that the legal base for the establishment of the 'green framework' of the city does not exist in the field of state regulation:

"*So far, there are no documents either at the federal or regional level, which imply creating a 'green framework' in the city. Plans of green areas are more affected by the expected PR effect and the district's population density than environmental objectives. In my opinion, the introduction of an additional document, which implies developing a network of protected areas in the city, would significantly improve the situation*." (Environment & Rights, 2019, p.7)

According to the sources, one of the most common arguments for violating protection regimes with reduced borders is the weak conservation function of urban Protected areas or "*the high importance of infrastructure changes*" (ibid, 2019, p.8). Since the 'green framework' of the city is not regulated, and the system of protected areas in the city is not established, the green infrastructure is delivered in an unsystematic way. Therefore, a major characteristic of protected areas within the city is fragmentation (ibid, 2019).

Another peculiarity overlapping planning, regulation, and biodiversity protection is that the city's border of St. Petersburg passes directly along the coastline of the Gulf of Finland, not including the water area. This does not allow the implementation of regional protected areas for the protection of biodiversity. Triangulated by experts in two secondary resources, this finding represents new challenges in the field of biodiversity protection in the city.

4.1.3 Environmental settings

'Hard' adaptation measures discussed in the literature section previously could pose certain environmental threats and require special attention for their regulation. To link this aspect with the city's context, it is important to elaborate on the environmental settings. The discussion on these settings is limited for the research and covers only peculiarities highlighted by the experts as especially relevant to the context of waterfront development in the city, namely, flood prevention, land reclamation, and ecosystem quality.

4.1.3.1 The Saint Petersburg Dam

The Saint Petersburg Flood Prevention Facility Complex (FPFC), or the Saint Petersburg Dam, was constructed in the Gulf of Finland to save the city from regular floods. Construction of the Complex ended in August 2011 with the delivery of all protective facilities in operation. This Complex, which by its parameters is one of the largest hydraulic engineering structures in the world, consists of 11 protective dams with a total length of over 25 km. (Hydrotechnics 2 (59), 2020). This engineering construction, in many ways, defines the future of waterfront areas. It serves as an accumulating water area for the Neva River runoff during a response to sea surges, regulating water level and activities on the city's water bodies' fronts. (Официальный Сайт Дирекции комплекса защитных сооружений г. Санкт-Петербурга Министерства строительства и жилищно-коммунального хозяйства Российской Федерации, 2020).

Due to the exceptional performance of this engineering solution, the attention to small and local practices for flood prevention and water regulation was not cultivated. However, the current climate change trend and the need for extensive urban transformation explored in the literature review show that governmental authorities might overestimate the city's security level. This issue was brought to discussion relatively recently. The city ecologist and environmental journalist in her interview comments:

"*The Neva is a swift intensive river and a very short one. If we do not open the Dam, we will have internal flooding. So, we do not always close it for long in recent years. It is also warmer in winter, there is no ice, and the streams are increasing. That is why you cannot say it is 100% protective*." (Ecologist, environmental journalist, Interview #3, 2020)

Moreover, other city developments and their effects, namely, the land reclamation in the Gulf, undeniably affect the Dam's performance and can bring undesirable consequences in the long-

term. According to the official public report of the Saint Petersburg Flood Prevention Facility Complex, with the threat of global climate change and increasing frequency of sea surges, the work of the Dam is affected by a constantly decreasing area of the surface of the Nevskaya Bay, which is a direct consequence of the land reclamation process.

"*Such plans raise serious concerns of specialists who claim that the Defense Complex is already operating at the limit of its design capabilities. If the area of the Nevskaya Bay surface is further reduced, the accumulated capacity of the water area will reach critical values at which the FPFC will no longer be able to perform its protective function*."
(Hydrotechnics 2 (59), 2020)

4.1.3.2 Land reclamation

The land reclamation project in the Gulf of Finland took place in recent years and aimed to extend Vasilievky island territory by 476 hectares. This extensive project was approved and included in the general plan in 2007. It included residential and business land use. By now, 336 hectares are already complete and accommodate new residents. Another stage of the project starts in 2020.

Urbanists and ecologists do not share the enthusiasm of developers in expanding Vasilyevsky Island. Both are concerned about the qualitative changes in the ecosystems and the natural inhabitants of the island. According to ecologists, land reclamation on Vasilievsky Island harmed marine fauna. They state that not only the quality of water but also the biodiversity of the territory has decreased.

"*In the past, when the Neva delta was still marshy, migratory birds nest. Now there is no territory habitual for them, but following the genetic memory, the birds still tend to come here. The change of migration routes has already led to the loss of many species*", - says eco-architect of the Center of Applied Urbanism. – *The reclaimed land creates a new shape; it changes the outlines of the Nevskaya Bay accordingly. Together with it, the course and trajectory of the Neva River deform, which affects the quality of water in it*" (Churakova, 2019).

4.2. Case studies: Overview

4.2.1 Case study: ‘Karpovka river’

The project of public space on the Karpovka river's embankment was initiated by a group of activists and the District Administration. The project development process included thorough pre-development research and incorporated public participation practices that are new and innovative for the city context.

Project time frame: 2017-2019

Map 9: Petrogradsky District and the renovated area.
Adapted from 'Karpovka Friends', 2018, p. 32

Photograph 1: The central part of the development of the Karpovka river embankment. 'Before' and 'after.' (Retrieved from Landscape architecture and design agency "Neskuchny Sad", 2019).

4.2.1.1 Background information

In 2017 the embankment of the Karpovka River was included in the list of territories for the Program of "Continuous Pedestrian Zones" organized by the Committee for Urban Planning and Architecture of the Government of St. Petersburg (CUPA). The Urban Expert Community of St. Petersburg was concerned to ensure that the implementation of projects with federal funds would be preceded by serious and high-quality work to formulate the concept of developing public spaces in each of the territories included in the list by the State Administration. Thus, an initiative group was formed to work with the embankment of the Karpovka river.

Simultaneously, a private architectural bureau proposed to CUPA and the Petrogradsky District Administration a draft project for improvement of the Karpovka river embankment. This project seemed interesting to the initiative group in many aspects. However, it did not include any specific social groups' needs - actual or potential users of the territory. Therefore, to design a modern and effective and sustainable public space, it became important to accommodate and support the processes functions that are important for this territory and its users. For this reason, various city specialists joined the work on the concept of transformation of the Karpovka river embankment.

Scheme 1: The central part of the embankment. Functions and activities.
(Retrieved from Landscape architecture and design agency "Neskuchny Sad", 2019).

4.2.1.2 Initiative group

The initiative group received the working title 'Karpovka Friends,' which included city activists, socials researchers, architects, urbanists, and students. This initiative aimed to form the concept of the pedestrian embankment along the Karpovka river as a modern, accessible public space with relevant functions, created and developed with citizens' participation. That is how they express their intentions in their pre-development report:

"*We believe that citizens should be able to comfortably and interestingly spend time on the waterfront: to organize picnics by the water, sunbathe, make evening jogging, kayaks, walk with a family on the waterfront and at the same time not to shout out the noise of passing cars, admire, walk, communicate, relax and do many other things.*" ('Karpovka Friends', 2018)

4.2.1.3 Building networks and participation mechanisms

During the pre-development stage, the initiative group managed to organize several massive events in the area that introduced residents and users to each other and helped to understand each group's needs and expectations.

Events Calendar 'Karpovka river'		
July 2017		
type	**participants**	**description**
Open-air "Water Festival"	citizens, water sports communities, local administration	A 'Water festival' organized by urban water communities with support from the Administration of the Petrogradsky district. The idea behind the festival is to trigger a change in the attitude to water and coastal areas in the city and unite water community members through entertainment and communication on the waterfronts of St. Petersburg.
August 2017		
type	**participants**	**description**
A project seminar "Karpovka Friends"	20 young specialists and experts from different Russian cities	This seminar became a non-formal educational program in the field of urbanism and encouraged the exchange of experience between cities of Russia. It facilitated public rethinking of approaches and principles and helped professionals study the mechanisms of inclusion diverse stakeholders in urban development
September 2017		
type	**participants**	**description**
Workshop with citizens "Dialogue on Water"	"Karpovka Friends" initiative group, activists, local residents, and users of the area	The workshop helped to identify 'co-productors', or the active users of the area, who are ready to take part in the design process. It similarly resulted in ideas about the possibilities of developing the territory through means other than architecture and design, but organization of events, activities with the participation or by the forces of citizens.
June-July 2018		
type	**participants**	**description**
Local events on the waterfront "Your Neighborhood" and "Your Water"	activists, local residents, and users of the area	Local public events organized on the waterfront area of the Karpovka river with the aim to attract public attention and to build social coherence in the area.
September 2018		
type	**participants**	**description**
Test-project, "Big fish bench"	citizens, activists, "Karpovka Friends" initiative group	A test-project with the citizens included design and implementation of a small public art object on the river embankment. The project tested the process of public participation and co-production in real-life settings.
data source: 'Karpovka Friends', 2018		

Table 7: ‘Karpovka river’ events calendar.

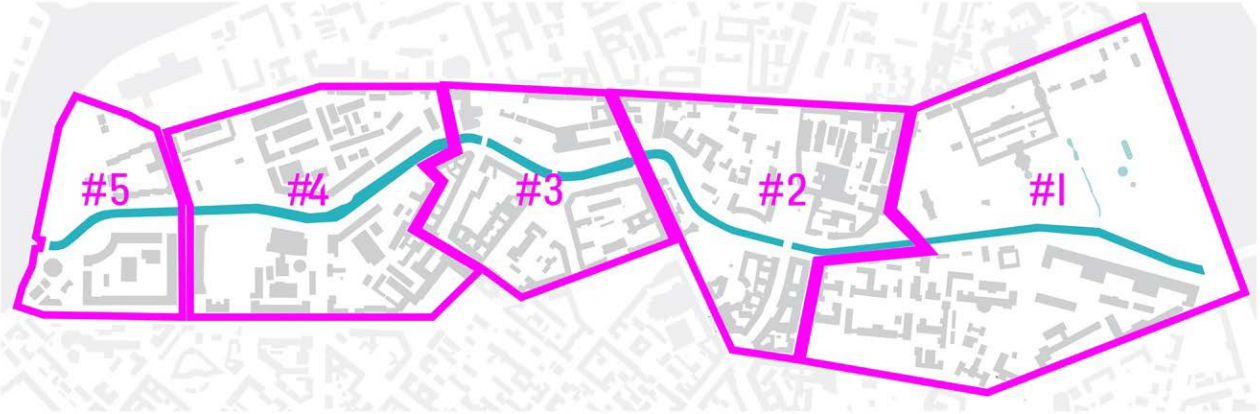
That is how one of the leaders comments on this process during her interview for the online magazine:
"*Probably, this is our main secret of success - we gradually built relationships, built bridges between citizens and administration. We were not interested in writing another book about how to live properly so that it would dust later - the goal was to do the project for the implementation*." (Morozova, 2019)

After a series of events and public talks with the citizens, it was agreed to organize thorough research on the area to analyze the neighborhood's context and needs. The research was officially assigned to the initiative group by the district Administration. Interviews, observations, and an online questionnaire were chosen as predominant data collection methods.

Karpovka's residents and visitors familiar with the place, 870 people in total, were asked questions on the quay's arrangement. Following the data collected, the characteristics of the area desirable by the interviewers were listed. According to this list, the new area:
- allocates social and cultural activities important for this particular area and provides the infrastructure for their implementation;
- provides an opportunity for self-realization of citizens in the public urban space and the right of citizens to independently transform the urban environment in their interests, taking into account the interests of other residents;
- teaches people tolerance and mutual respect through the co-presence of different groups of people;
- transformable and flexible space to meet the needs of the audience and time;
- space created and developed with the participation of citizens.

4.2.1.4 Zoning

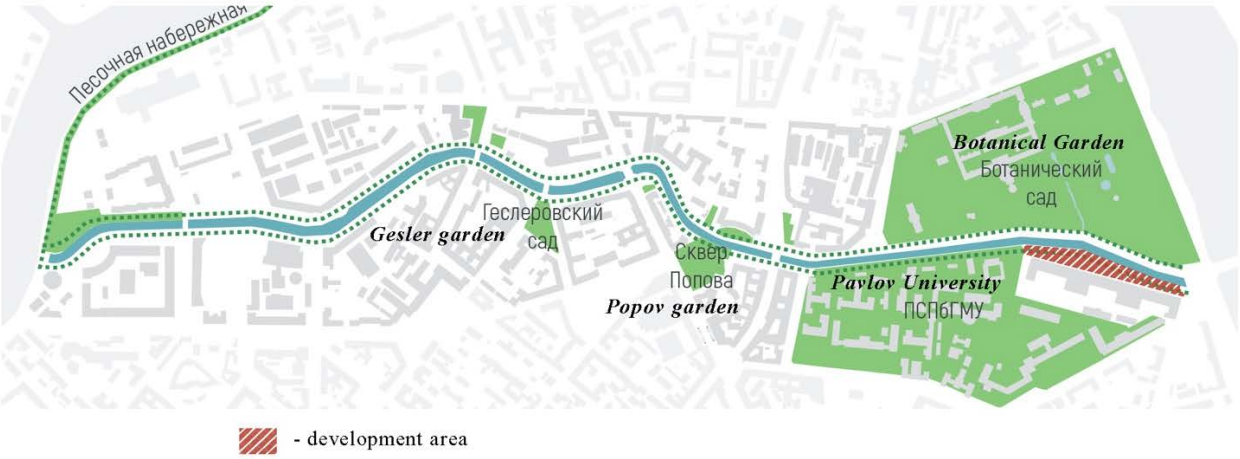
The total length of the river Karpovka is almost 6 km. The revitalization of the public space implies implementing various processes carried out by the city residents and operators of public functions that fill the territory with activities. According to their characteristics, each zone requires its own approach, strategy, and character of transformation. At the same time, it is necessary to ensure the integrity of the design and connectivity of zones and spaces both among themselves and with adjacent spaces and routes. Therefore, this territory required a step-by-step approach, with the identification of zones with clarification of each's specifics to ensure that the general logic of territory development is followed.



Scheme 2: Karpovka river. Zoning scheme
(Retrieved from 'Karpovka Friends', 2018, p. 46.)

4.2.1.5 Stage #1

As the first stage in this future holistic revitalization plan, zone 1 was chosen for development and project implementation. The initiative team further thoroughly explored this particular area.



Map 10: Karpovka river. Development area
(Adapted from 'Karpovka Friends', 2018, p. 72.)

According to the public report on the project, the design proposal for this area was developed gradually with the citizens' participation and comments of the district administration. The way of collecting opinions and suggestions from the residents about the future of the area was organized online and offline, with attention to those for whom computer technologies are not available. After the final version of the design proposal was presented to the local administration, it was immediately published and promoted among the residents.
However, an independent expert criticizes the method and results of this particular study with his critical view:

"*Unfortunately, since they were very much academicized, their social research never got to the design stage. Sociologists can't do social research for design purposes. I am deeply convinced that only architects can do them.*" (Urban revitalization expert, Interview #1, 2020)

Nevertheless, the initiative group's design proposal was accepted as a draft version of the planned development, and further arrangements followed. The district administration successfully promoted the project, and shortly, in November 2018, substantial finances were allocated from the city budget for the implementation of the first stage of the project.
The public procurement contract for the design won the architectural bureau mentioned earlier, which designed a draft project to improve the Karpovka River embankment in 2017.

4.2.1.6 Participatory design sessions

The initiative group 'Karpovka friends' proposed to organize several participatory design sessions to adjust changes in the actual project proposed by the architectural bureau to the residents' opinion. In January, three meetings took place. The first one was attended by 80 residents, which the initiative group perceives as an outstanding number. In a public interview, one of the leaders of the 'Karpovka Friends' group described participatory design sessions as following:

"*At the first one, we imagined a perfect embankment without any formal restrictions, made a master plan, and brought it to the designers. They explained what is possible and what is not, and in the second session, we corrected the project. After that, the bureau made a plan, which was presented at the last meeting. In the final dialogue, we finished everything, and on April 5, we managed to get an official approvement of the project.*" (Morozova, 2019)

However, it is important to understand that public reports and interviews for media are usually biased and organized to show how successful the project is. Therefore, many of the participation aspects were discussed with experts in the interviews to establish an objective, reliable picture of the process. Within this, one of the expert interviews revealed some more specific insights into this process. An independent urban expert invited by the 'Karpovka Friens' involved in the project from the very beginning in his interview stated that these sessions made little difference from the project that this bureau prepared for the area.

"*And at the last session, they presented these changes. In the opinion of absolutely all the participants, there were absolutely no changes. I mean, they were so slight that no one recognized them. Well, for various reasons, there were some objective and some questionable reasons. For instance, there is no dog walking area because there are no such regulations. Or, unfortunately, we can't make a floating embankment because of some restrictions and circumstances. There you go. And as a result, point by point, the project has returned to its original state*." (Independent urban expert 'Karpovka Friends,' Interview #5, 2020)

Such a viewpoint can be perceived as quite critical; however, it does not overlap with personal interests or emotional attitude to the project and therefore is more reliable. The research finds confusing this discrepancy of perspectives. Nevertheless, such failure of the architectural studio to incorporate changes requested by the population should not be left just for the architects' perceived incompetency or the regulation issues.

"*In my opinion, the participatory design method itself was also wrong. Well, the first session looked like a hackathon. You can't do that with the residents. The hackathon, if you imagine it's an absolutely manipulative practice. But those who have never dealt with such a format, they feel this strict manipulation, and it is certainly hard for the residents and for all other participants*." (Independent urban expert 'Karpovka Friends', Interview #5, 2020)

4.2.1.7 Outcomes

To evaluate outcomes of this particular development, collect the opinion of locals, and assess their plans for the future development of other zones on the river, the initiative group 'Karpovka Friends' organized a post-research, in which 233 citizens took part. The initiative group ‘Karpovka Friends’ conducted interviews with users and an online survey to identify: the attitude to the implemented project, strengths, and weaknesses of the project, necessary additions to the public space. According to the survey, the citizens' attitude is very positive – 96% of the respondents highly appreciate the new space.

4.2.2 Case study: 'Sevkabel Port'

The new development was organized on the territory of an old factory in the industrial area of Vasilievsky island. Located on the Gulf of Finland, the factory directly accessed the coastal area, where open public space was created. This project is a transformation of the historical industrial area of St. Petersburg Harbor into public cultural and business space. About 4 ha total area was opened for the public in September 2017.

Project time frame: 2017-2020

Map 11: Vasilievsky District and the renovated area.

4.2.2.1 Background information

Built at the end of the XIX century, 'Sevkabel' factory was the main supplier of telegraph equipment and electrical equipment for the Russian Empire. After the Revolution, the territory was nationalized and expanded, with some historic buildings being demolished or rebuilt. As soon as the Soviet Union collapsed, the factory was privatized. The current owner of the territory is a private company, "Sevkabel Group."

With the recent modernization of the factory, the old production machines were replaced by more modern ones. The management decided to give part of the vacant territory to the public and business space. One of the former owners of the territory proposed to initiate a 'creative cluster' in the area that would give a new 'spirit' to the district. The panel of directors supported the idea. For global reconstruction, the project involved the redevelopment company and the architectural bureau. The opening stared with the urban research exhibition organized by the "Waterfront" group.

"*The exhibition featured Russian and foreign artists who, by means of their works, tried to answer the main question of the project — how should the modern city near the water and its embankments look like? how does the proximity of water change the quality of citizens' everyday life?*" (Waterfront Project official webpage, 2020)

According to the interview with the person involved in the development from the beginning, the administrative and legal arrangements for the development, such as the land-use change from 'industrial' to 'business,' and required governmental approvements, did not cause any problems in management.

The end of the project's redevelopment stage is indicated as 2020 in the official resources, though all the transformations were finished in 2019. A vibrant place was given an unofficial name of 'creative cluster' and kept evolving and attracting creative class from all over the city. An interview with one of the area's CEOs revealed further ambitious plans about extending the territory and merging it with another former industry. This information was not published in any official resources or media and, for now, perceived by the researcher as hypothetic.

The phenomenon of public space on private territory is considered a contemporary development trend and can be separately researched in the future in the context of Russian cities.

4.2.2.2 Networks

The project's driving force is the panel of directors, who decides on the strategy and methods. No governmental actors on any stage were involved in the development, except the organization of formal approvements and other required documents. This is what one of the CEOs states about governmental participation:

"*Operationally, no. Various kinds of support are sometimes provided. Mostly informational support. Many city committees like culture, tourism, youth, education, investments, etc. like to organize their events here*." (CEO of the 'creative department' of 'Sevkabel Port,' Interview #7, 2020)

According to the interviews, the decision-making mechanism does not include any actors besides the private company itself. When invited for particular issues, the necessary experts do not constitute any project network but remain independent experts who keep changing. The only other consistent actor in the development chain appeared to be an architectural bureau assigned to develop a design and add creativity to space. The management of 'creative' development of the area is assigned to the 'creative department,' a group of 3 people, one of which happened to be an interviewer for the research:

"*There are separate meetings with educational institutions representatives, with project residents, with experts, with other developers, with artists, too*."
(CEO of the 'creative department' of 'Sevkabel Port,' Interview #7, 2020)

4.2.2.3 Participation

As mentioned previously, the development is located in the industrial area, where no residential buildings are located. Therefore, the private company's decision to implement the redevelopment without any public participation process is partially understood. That is how the interviewer comments on public programs:

"*These are, but usually, awareness programs or lecture meetings. No decisions are made at these meetings. Information is simply given to the citizens*." (CEO of the 'creative department' of 'Sevkabel Port,' Interview #7, 2020)

According to the respondent, the public meetings occur at least once a quarter, with the number of participants from 20 to 100 citizens. To track the reaction of certain changes by the users of the space, 'Sevkabel' launches online surveys and media reviews.

The research needs to define the 'users' of the area since they are very different from the 'residents' category. The 'creative cluster' with its vibrant cultural life, such as events, exhibitions, masterclasses and lectures, forums, competitions, facilities for children, sports, and recreation, create an environment completely different from the one that can be found in other public spaces. "*Something is always happening here*" – that is how citizens describe the new area in the FGD. However, some experts are sure that the phenomena of this development are questionable:

"*Sevkabel - it is just hipsters came together, and in general, how to say, attacked this territory and do what they like among themselves. And I think that other hipsters, as well as the people, will like it. I mean, first, the other hipsters, and then the people of the population. And they are convinced that they are doing it well and cleverly. In this sense, they are a little bit, in what is called 'a situation of easy self-deception*"' (Urban revitalization expert, Interview #1, 2020).
Nevertheless, the new area provides extensive social benefits that can be called waterfront-oriented in many ways.

4.2.2.4 Water-oriented development

The concept of the area is directly linked to its location and the advantages of the coastal side. To use this unique quality, 'Sevkabel Port' incorporated particular facilities and has further plans to improve its waterfront. First of all, one of the first stages of development became a

spacious public embankment with comfortable recreation facilities and a spectacular sunset view. This place became very popular from the very beginning due to its uniqueness.

Photograph 2: 'Sevkabel Port' embankment.
(Retrieved from Sevkabel Port webpage, 2020).

Second, the connectivity of the area was improved after regular transport was linked to the area. For this purpose, a collaboration with another independent private company occurred, which expressed to be a partner of such a project. A regular water-bus stop was designed, and the previously isolated coastal area became accessible by water transport.

Moreover, one of the CEOs of the 'creative cluster' shared their plans for further water-oriented development:

"*First of all, we plan to extend the territory and create a river tourism center based on the infrastructure of the "Sea Station." Next, we want to place some floating objects on the seaport's quay wall to accommodate additional functions, such as co-working space and cafes. After that, the plan is to design a summer pool on the roof.*"
(CEO of the 'creative department' of 'Sevkabel Port,' Interview #7, 2020)

The interviewer states that the development evolved according to the desired plan, and there was nothing significant that affected the process. Therefore, it is fair to conclude that the development was planned and managed as the one with no networking and public participation processes in place.

Despite a lack of the network and participation mechanisms in use for the actual development, 'Sevkabel' itself became an important hub for the waterfront revitalization movement:

"*The first year it was an exhibition on Sevkabel. Actually, it was the first exhibition that took place in this space, and Sevkabel became our home. Since then, we have done four projects there, and Waterfront conferences are held there, and the Waterfront office is there now*."
(A founder of the 'Waterfront' project, Interview #2, 2020)

These findings prove the importance of the project in the city's waterfront development and draw the area as an important and unique phenomenon for the city and its social dimension.

As discussed above, it is clear that the development of the 'Sevkabel Port' area is completely private-led. A lack of any interventions in the development process, particularly those who are operationalized, leaves the research with the only variable for analysis. This means that only the variable 'Provision of ES' for this case study is elaborated in the following section.

4.3 Indicators: Assessment and Analysis

4.3.1 Stakeholders' interventions (Independent Variable)

As stated earlier, the 'Sevkabel Port' project is private-led, in which no contemporary governance practices discussed in the literature were used. Namely, the research reveals that no networks were created for governing the project, as well as no public participation mechanisms were used. Although the researcher assumed this aspect before data collection, it still had to be checked and documented. Thus, the variable 'Stakeholders' interventions' discussed below does not include the indicators on the 'Sevkabel Port' case. This means that only findings on the 'Karpovka river' case are presented for this variable.

4.3.1.1 Network governance process (Sub-variable)

4.3.1.1.1 Number of governmental stakeholders involved

It appeared difficult for the researcher to establish a precise number of governmental actors involved in the development of the Karpovka river. Although the only active part in the development took the Administration of Petrogradsky district, other influential institutions also played their certain roles in the project. Therefore, the governmental stakeholders were categorized by groups:

Governmental stakeholders 'Karpovka river'		
Active participants in the development process		
no.	**governmental body**	**role**
1	**The Petrogradsky District Administration and the Head of Administration**	worked with sociologists, participated in public meetings, promoted the project, and gave governmental support
Direct influence on the development		
no.	**governmental body**	**role**
2	**The Committee for the Improvement and the Head of the Committee**	took part in network meetings, influenced the development project
3	**City Government**	gave the final approvement of the project and allocation of the funding
Indirect influence on the development:		
no.	**governmental body**	**role**
4	**the Ministry of Construction of the Russian Federation**	developed a framework for the development of public spaces of Russian cities with prospected funds for implementation
5	**the Committee for Urban Planning and Architecture**	launched the Program of "Continuous Pedestrian Zones" in the city
6	**the Water Resources Division of the Committee for Nature Use and Environmental Protection and Environmental Safety**	is responsible for the cleaning program for the rivers of Saint Petersburg and reducing wastewater discharges in Karpovka and other water bodies

Table 8: Governmental stakeholders involved. 'Karpovka river' case study.

Besides these actors, others' role remained unclear, despite their legal responsibilities that are prescribed by the regulation.

"*In case you noticed, in this whole chain of stakeholders, there are no municipalities. We have such a unique situation with municipalities; in general, it is in an absolutely deprived and misfunctioning institution.*" (Urban revitalization expert, Interview #1, 2020)

Indeed, the potential for municipalities to become a useful actor in urban development projects is supported by many successful European examples and was partially covered in the literature review of this research. However, the weak position and lack of municipalities' interest in any urban improvements require separate thorough research of the Russian legislation field with governmental financial schemes, detailed interviews of governmental actors, and other exercises that are not feasible for this particular study. Therefore, this study keeps this question open for further research.

4.3.1.1.2 Frequency of interaction/ information exchange

The interaction between stakeholders about future development cannot be called sufficient. Although it may seem that the local Administration took active participation, expert interviews still outline that the level of information exchange remains very weak. That is what one of the architects, who is actively involved in many urban revitalization projects, states about the network governance process:

"*Well, in St. Petersburg, this process is not established at all. I mean, it does not exist. And of course not officially, not from the 'top.' Maybe single initiatives like "Waterfront," different researchers and sociologists like 'Karpovka Friends' They carry out various studies, but you know, they work only with certain areas.*"
(Architect, Interview #4, 2020)

To triangulate this statement, another expert's story shows that little information exchange led to some mismatches during the project. This is how an independent urban expert explained this process in his interview:

"I told you that there is a deep dissolution going on. It turns out that another committee had planned the repair of some collector, and the whole embankment had to be closed for a year to dig up and move this collector. Which, by the way, would improve the ethological situation in Karpovka itself, on the one hand. On the other hand, it led to its shallowing. It was an unexpected result." (Independent urban expert 'Karpovka Friends,' Interview #5, 2020)

Indeed, the Committee for Nature Use and Environmental Protection and Environmental Safety work on the Karpovka river was not adjusted to the ongoing waterfront development managed by another Committee, the Committee for the Urban Improvement.

Therefore, the work on wastewater collector was not incorporated in the project's timeline and, moreover, was a surprise for another Committee of the same city government. What is important here is that such a fragile mechanism of the information exchange, even between the city government's committees, leaves little space for any joint solutions and effective urban transformation. As stated previously, the contemporary literature emphasizes the role of

communication and information exchange to aim environmentally, socially, and economically sustainable solutions (Bunce & Desfor, 2007; Elinor Ostrom, 2010; Lilli et al., 2020).

The main cause of these mismatches and lack of coordination presumably lies in the low level of communication. The literature on network governance explored previously, along with this assumption, outlines the importance of establishing some legal regulations for such processes, so the process is clear to everyone and effective (Iaione, 2015). The same perspective was stated in one of the expert interviews:

"*Well, I assume the main cause is the legal field. The fact that there is no such position in the legislation, it does not officially exist in the design field. Meaning, designers do not have to do it and, accordingly, when any project, whatever it is, happens, they do not have to do it - and they do not*." (Architect, Interview #4, 2020)

Thus, the research concludes that the causal chain between communication and outcomes explored in the literature indeed exists and is similarly proven by this case study.

4.3.1.1.3 Level of trust

The researcher finds the level of trust between the stakeholders in the development sufficient, meaning not harmful to the network governance process. The trust between the public and governmental entities is also proved to be in place. The evidence of this is seen in the public reports and interviews where the participants expressed their opinions. They actively promote each other and their joint work, thank local communities for their cooperation and make future plans for new projects. Other expert interviews, proved this tendency.

"*I have not noticed any lack of trust. I think that at all different interactions of the administration with residents which I have attended, like sessions of participatory design, or some public meetings, residents always actively come, express their position openly*." (Architect, Interview #4, 2020)

However, some experts highlight that the pattern of communication across the city is heterogeneous:

"*It depends on the specific situation. Where are the people with whom we have a dialogue, with whom we do not. Honestly, I do not see a general picture in it*." (Ecologist, environmental journalist, Interview #3, 2020)

Since no specific argumentation was found, that proves a lack of trust or any other extremes in relationships between stakeholders, the researcher considers that a low level of trust does not characterize this particular development and actors in the network.

4.3.1.1.4 Presence of common language and vision

According to the research findings, common language and vision between stakeholders in this development are questionable. In other words, the views of the actors involved mismatch in many ways.

First of all, the generally accepted definition of the social research required for sustainable, inclusive development did not correlate with the one that some governmental stakeholders imagine. A critical perspective on this was reviled during one of the interviews:

"*So, in general, the thoughts of the head of the Committee on Improvement were approximately the following - let these administrations do their social research, for God's sake. In the meantime, we'll draw a plan. And then we'll report that we have done huge social research, and here is the project*." (Independent urban expert 'Karpovka Friends,' Interview #5, 2020)

The interviewer is sure that the intention of the Committee of the Urban Improvement to push the project through served the purpose of following the current trend of making socially accepted developments and imitate some sense of public involvement.

Simultaneously, the local administration's perspective on the same social research also did not match the one that the initiative group 'Karpovka Friends' had. Before the actual thorough pre-development research was done, the Administration of the district tried to conduct this research without a special group of sociologists. By organizing an online questionnaire with only a few questions and limited answer options, they tried to minimize the development time and resources. However, this work's results were not accepted by the residents and the initiative group that already started its formation by that time. Finally, the proposal for thorough social research was fulfilled, and sociologists were involved. This story has been confirmed by several sources, including expert interviews and a public report. It shows that the initial definitions of pre-development social research did not match between any actors.

Almost the same conflict of definitions appeared during the participatory design sessions with the population. This time, a misunderstanding appeared between the initiative group and an architectural studio. According to the findings presented earlier, the participatory sessions were not fruitful for the actual design process. First, because they were organized ineffectively. In particular, all three sessions took place in one month, which is not sufficient for such a project. The method used for these sessions was also arguable, which is confirmed by several expert interviews. Second, due to this process's novel nature, the architectural bureau was not prepared and consequently did not show such professionalism. Therefore, many of the needs and requests were not fulfilled in the project.

The overall common vision of the project was not achieved by the stakeholders and was described in one of the interviews the following way:

"*One major failure was the fact that there was some kind of picture inside the Committee on the Improvement about how to design this embankment. It was very different from what the group 'Karpovka Friends' imagined, and from the one which was imagined by the head of the district. This is very funny. They do not even know what is going on in the administration; they think that everything will be different*." (Independent urban expert 'Karpovka Friends,' Interview #5, 2020)

One of the possible keys to this unpleasant tendency might be the legislation base.

"*It should also be said that there is no such thing as a "master plan" in our country, although everyone uses it. Everyone puts their meaning into this magic phrase. Exactly because nobody has the idea that real space participants should participate in the master plan.*" (Urban revitalization expert, Interview #1, 2020)

Indeed, the master-plan level is the one which helps to establish clarity in actors, their responsibilities, the existing citizens' needs, the potential of the area, and finally, find some compromises. Since the master plan format does not exist in the legislative base, it is not surprising that a low level of information sharing took place, which affects the governance of networks and management of the public participation process.

4.3.1.1.5 Level of agreement between stakeholders in their visions (co-design)

Although it is evident that many stakeholders did not share the same vision about the development process, some compromises were still found. The 'co-design' that took place, although it was organized through the participatory design sessions, was poor and not sufficient. No 'co-design' sessions among network were organized.

These findings were proved by the expert interviews and one of the recorded lectures. The phenomena of 'co-design,' which, by definition, implies free communication and simultaneous involvement of many diverse actors with their own interests, did not occur due to complex factors. According to the findings, some of which were presented earlier, understanding 'public space development' did not match between the actors from the beginning.

One hypothesis of this research is that such concepts as 'co-design' and 'networking' are quite new for the outdated and weak legislation governing public projects in the country. This weakness of the legislation for urban improvement is partially explained by the age of the institutions formed after the Soviet power was changed in 1991. One of the professors expressed such an assumption in his recorded lecture (International University of Central Asia, 2019). This is a fair point that can explain the Russian legislation's mismatches with internationally accepted frameworks, including the ES framework.

Another assumption made by the researcher, which is partially deducted from the first one, is that the absence of 'co-design' mechanisms shows a low professional competency level of these professionals. This relates to all types of actors in the network, except the public. Nowadays, when urban development studies evolve so rapidly, it is not appropriate to use the knowledge and experience collected decades ago. According to many interviewers, 'Soviet' methods especially influence governmental entities and their representatives, somehow creating an 'outdated mindset.' However, the incompetency was similarly showed by the private bureau and even by sociologists to some extent. Therefore, it is important to pay attention to the educational aspect when discussing such complex and contemporary practices. This topic will be further explored in the section with supporting findings.

4.3.1.1.6 Level of financial support (sufficient/insufficient for desired outcomes)

The level of financial support for the development was sufficient. This was proved with expert interviews and similarly was stated in the public report. The allocation of funds was ensured by:

- the Ministry of Construction of the Russian Federation and its federal program,
- the Committee for the Urban Improvement and its program for waterfront revitalization,
- the City Government that gave the final approval of the budget allocation.

According to some interviewers, financial support was even more than sufficient:

"*Of course, 80 million has been allocated for this project, no less. Eleven of which were stolen by the bureau itself, who stole the rest I don't remember*."(Independent urban expert 'Karpovka Friends,' Interview #5, 2020)

This means that a certain level of corruption, which is typical for developing countries, remains in place. However, this statement was not proved by any documents, and overall does not make any difference for this particular study. The actual numbers behind the development remain hidden, though.

4.3.1.1.7 Level of satisfaction with changes - actors involved in developments

The level of satisfaction with the development among the stakeholders involved is proved to be ambiguous. First, a limited number of the actual actors' responses were collected. Therefore, the findings on this parameter are not fully reliable. However, the responses collected among experts show some controversial results.

As discussed earlier, the public interview with one of the leaders of the 'Karpovka Friends' group published in the online-magazine draws the project as a successful one with a fully satisfying result. Unlike this attitude, some other member of the initiative group in his interview states:

"*I do not think at all, unlike other participants, I do not think it is a successful project. I think it is a very good guiding lesson, but to call it successful would be a strong exaggeration from my point of view*." (Independent urban expert 'Karpovka Friends,' Interview #5, 2020)

Other actors that were not directly involved in the process of area development, in general, have a neutral or positive attitude. Many experts find this project an interesting experiment, which may lead to further improvements in the city's public space governance.

"*First of all, I consider it successful because, probably, for the first time in the city, some thorough social research was done on the open urban space. Secondly, not only the residents but also the entire city and local businesses were included there. This was also an innovation. And it was quite a good, I think, an ambitious program on how to make a master plan with actual participants of this process*." (Urban revitalization expert, Interview #1, 2020)

It is important that this development is one of the city's first attempts to facilitate and implement contemporary mechanisms for public space development. It is fair to conclude that there are not many other projects to compare. This means that the assessment of this development by the actors involved cannot be totally objective.

4.3.1.2 Participation process (Sub-variable)

4.3.1.2.1 Number of participants

The participation process in this development took place in three phases: pre-development research, participatory design sessions (3 sessions), and a post-development study. Therefore, information about the number of participants was divided accordingly.

1. Pre-development study

Thorough pre-development research, conducted by the ‘Karpovka Friends’ initiative group, comprised of 79 interviews, careful observation of the area, and an online questionnaire for 1000 respondents.

2. Participatory design sessions

The number of participants in the first session was 80 citizens. As mentioned earlier, the first session was the most active one, where people tried to imagine their ideal public space together. Thus, the research uses this number as an actual number of participants in the sessions.

3. Post-development study

To assess the development outcomes, the initiative group ‘Karpovka Friends’ conducted interviews with the users of the new space and initiated an online survey. The total number of participants is 233.

Considering that the developed area is quite compact, only 1,9 Ha, the researcher sees the number of participants as sufficient.

4.3.1.2.2 Types of participants

The participation process on all the stages included diverse types of participants. Among them: local residents, business owners, visitors of the area. The pre-development study elaborates on the actual type in the following scheme.

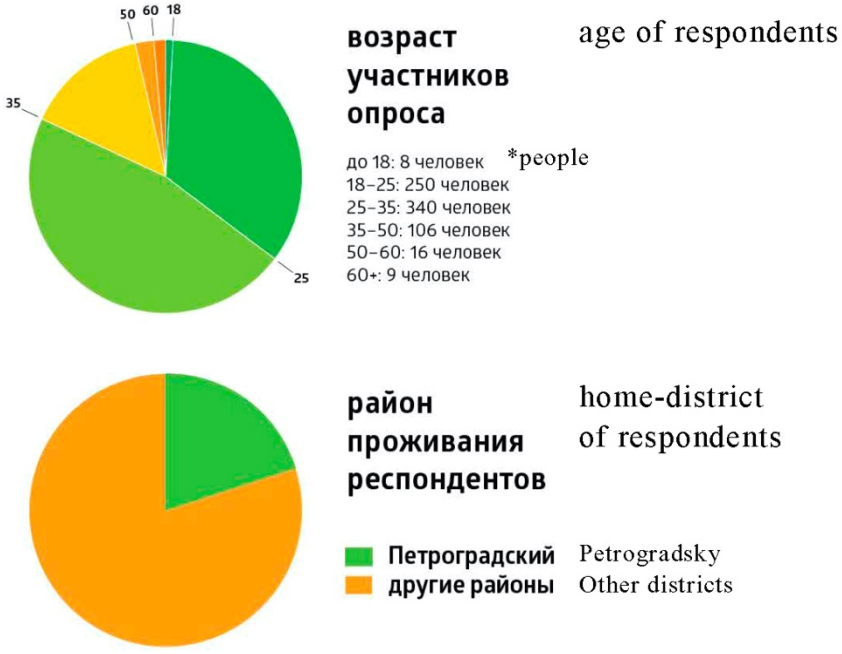


Figure 4: Karpovka. Types of participants.
(Adapted from 'Karpovka Friends', 2018, p. 35)

While the participants' types for the first study are documented in detail, other participation activities are left with less elaborated statistics. However, it is stated in the reports that respondents were taken from diverse strata.

4.3.1.2.3 Frequency of interaction/ level of engagement

The interaction with the public during the development was active. Citizens were extensively engaged with the project and always well-informed.

This quality can be observed in the extensive participation process that took diverse forms throughout the project and was discussed previously in the Chapter. The materials from public reports, interviews, and materials of the post-development study outline a high level of interaction between the initiative group 'Karpovka Friends' and citizens. The work on community-building that was done separately before any development arrangements similarly contributed to the overall attitude of the local residents and other participants.

4.3.1.2.4 Opportunity for people to express creativity / to contribute to local identity of the place

According to the examined materials, the opportunity for people to express creativity in the development was limited. On the one hand, the process of participation during the first stage was quite open – participants could respond honestly, make proposals, make creative requests. During the second stage, the first design session was also oriented on creativity and brainstorming. Participants imagined their dream-project and expressed it with a conceptual plan, on which they mapped desires, activities, and features.
On the other hand, according to the interviews with experts involved, the citizens' creative plans and ideas were never taken as guidance in the actual project. As discussed earlier in the Chapter, the architectural bureau responsible for the actual project development had the project ready a long way before any participation processes started. The participatory design sessions, from which all three took place in one month, were not directly oriented on significant changes from the perspective of those who were supposed to make these changes.

" *Well, for example. Any attempt to persuade them to make some kind of structure for kayakers and sup-surfers - solid "no". To run electricity so that the site could be connected to some equipment for events, for a projector, a microphone - no, that wasn't done on the project either. Then the funding was opened up; everything was built immediately*." (Independent urban expert 'Karpovka Friends,' Interview #5, 2020)

Therefore, the research concludes that the citizens' real opportunity was not given, but instead was imitated by the bureau assigned for the project development.

4.3.1.2.5 Opportunity for people to contribute to local identity of the place

Like the previous indicator, the public's opportunity to contribute to the local identity is presumed to be limited. With the same arguments covered in the creativity aspect, the research cannot argue that a real opportunity was in place.

However, it is important to outline that a strong answer for these two indicators requires more thorough research that will show which ideas and for which reasons were not included in the projects. To explore this, detailed documentation on the participatory design sessions should be processed. Unfortunately, the researcher could not manage to find these materials, thus is not particularly confident about the opportunities available for the citizens.

4.3.1.2.6 Level of satisfaction with changes - active users

According to all the examined sources, the users of the new area are delighted with the changes. First of all, the materials of the post-development study conducted by the initiative group showed the following statistics:

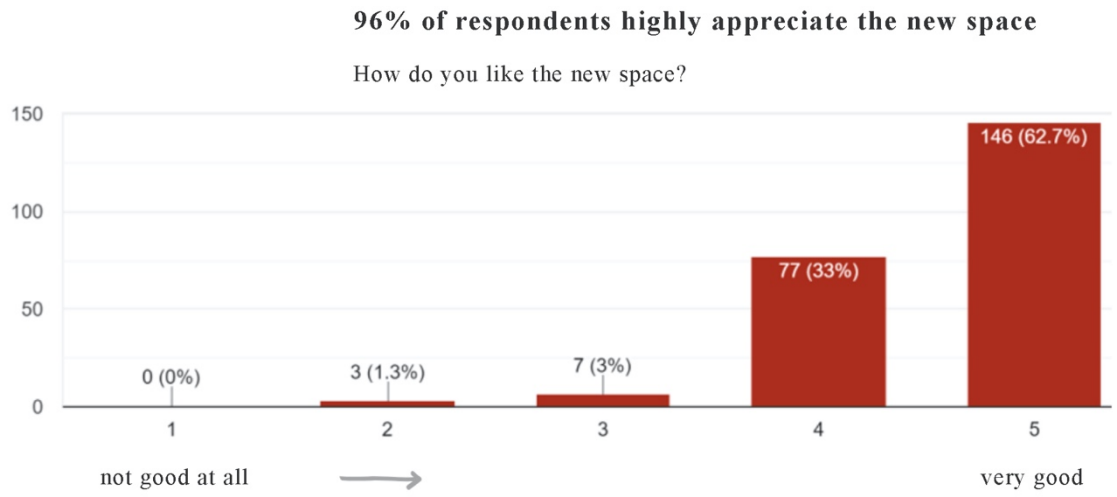


Figure 5: Karpovka. Satisfaction of local citizens with changes
(Adapted from 'Karpovka Friends', 2019, p. 6)

The report also states that the respondents outlined not sufficiently convenient bicycle and pedestrian connections with the city site. This means that the overall connection with the city is still weak. This very quality might be partially explained by a lack of the 'master-plan' level in the legislation base. Besides, the expert interviews revealed an interesting tendency in levels of satisfaction:

"*Opinions were divided there. Because there are residents who are, so to speak, just residents, and some residents who are super-activists, who really know a lot about their territory. They are really very educated, understand everything that happens, and have many questions*." (Architect, Interview #4, 2020)

This observation brings the research back to the literature review and the discussion on local professionals with their role in public space development.

4.3.1.3 Independent Variable: Summary

The independent variable 'Stakeholders' interventions,' unpacked into two sub-variables, namely 'network governance process' and 'public participation process,' can be summarized with the following points.

The number of governmental stakeholders in the network is decent. Direct and indirect involvement of the entities of different levels ensures promotion, implementation, and a sufficient level of finances for the development. At the same time, poor communication between these and other supporting actors leads to mismatches and eventual loss of time and resources. Along with this, the municipality's ambiguous and weak role in the project leaves

the gap between district administration, researchers, and the public. While the level of trust between the network participants remains normal, stakeholders' vision and language heavily mismatch. The lack of accepted definitions for certain processes, which should be prescribed by governmental regulation documents, makes the process unclear for all levels of participants. With all the controversies that occurred during the project, compromises were found on all the stages, which indicates a certain level of flexibility and openness of the stakeholders — this left participants with heterogeneous attitudes. However, the overall level of satisfaction of network participants is sufficient.

During all three participation levels, namely, pre-development research, participatory design sessions, and a post-development study, the number of participants remained sufficient. The type of participants for studies was diversified well and included residents and visitors from different age groups. The interaction with local citizens, which started a long way before the project occurred, created a sense of public involvement and co-production. During the participatory design sessions organized by the initiative group, the opportunity for creativity and contribution to local identity were provided. However, the attempts to incorporate these changes into the actual project overall failed, which is explained by the legal regulation's peculiarities and an ineffective participation method used for these sessions. Despite that, an overall level of satisfaction with changes expressed by the public is positive. People are happy to acquire a good public space despite their needs fulfilled or not.

4.3.2 Provision of Ecosystem Services (Dependent Variable)

Discussion on this variable is continued with a combination of two case studies and their parameters. Both developments proved to provide certain ES to the area and their users. Therefore, both are relevant to the study and explained in detail.

4.3.2.1 Regulating (Sub-variable)

4.3.2.1.1 Positive change in the quality of water

The transformation of the Karpovka river's embankment did not provide any visible change in water quality. This conclusion was made based on the reflection of residents and workers on the implemented project. Users of the new development stated that more effect on regulating qualities appeared after the measures aimed at reducing wastewater discharges managed by the Committee for Nature Use, Environmental Protection, and Environmental Safety. As covered previously in the discussion on project networks, these measures were not a part of the development process and appeared unexpectedly for many network participants. During one of the panel discussions, which were recorded and published online, the expert of the Water Resources Division of the Committee confirmed the installation of a wastewater collector on the Karpovka river. According to his words, reducing wastewater of pollutants into water bodies is now the main goal for the Committee.

"*This year we plan to start cleaning the Karpovka river. And why we can start cleaning it now – because the racks are switched, water objects can be cleaned and become part of the urban environment*." (Waterfront, 2020)

Thus, we understand that while the wide range of necessary works to improve the state of water in the water bodies take place in the city, the coordination between actors involved in the actual

transformation remains very weak. In this particular case, this miscoordination turned out to be time-consuming and, therefore, not benefit financially. Consequently, we can state that if the quality of water changes in this particular area of the river, it cannot be connected to the development of the embankment that is taken as a case study.

In the 'Sevkabel Port' area, the improvement of the water quality similarly was not included in the development of the area. The expert interview showed that the private company was not interested in environmental improvement. No water quality measurements were made during the development and after. Potentially, such measurements could be used for more knowledgeable management of water-related activities in the area. However, the development relies on governmental monitoring and does not go into additional data collection. It is important to mention here that the researcher's attempts to find any comprehensive information and statistics about water quality in the water bodies of Saint Petersburg showed unsatisfactory results. The information on the water quality provided by the governmental entities seems insufficient for any strong conclusion about the quality of water in this particular region. This topic brings us back to the literature review and the problem of comprehensive monitoring and data collection.

4.3.2.1.2 Positive change in water level regulation (seasonal fluctuations)

The regulation of the water level on the Karpovka river was not included in the development goal and, therefore, was not achieved. Although water level control in the city is quite acute, this particular quality of waterfront developments is still not on the city government's agenda.
As stated previously, the intervention of the Committee for Nature Use, Environmental Protection, and Environmental Safety with the program aimed to minimize a wastewater discharge in the city had some consequences, unexpected for other actors involved in the project of embankment revitalization.
"*It was to make sure that the stormwater and enterprises' sewage were discharged not into Karpovka, but into this collector. Accordingly, as it is called at water bodies, the flow rate, in short, fell. Karpovka's flow rate has fallen, and if earlier boats could walk along Karpovka, including touristic boats that go along the Neva, now even ordinary boats cannot go there; they scrub the bottom. That was the effect of these events. Well, now evaluate the environmental awareness of the Committee for the Improvement of Saint Petersburg*." (Independent urban expert 'Karpovka Friends,' Interview #5, 2020)

This alteration of the water level, besides its temporary inconvenience for local fishers and boat owners, as well and losses discussed previously, did not bring any other changes for the design of the embankment.

Similarly to the 'Karpovka river', the new development 'Sevkabel Port' did not incorporate any facilities and design features to regulate the water level. Due to the location and the neighboring dam, the water level's seasonal fluctuations are not extreme in the area. Besides, a high-leveled seafront protects the development from flooding and heavy rain. These qualities can be seen on the map, site pictures, as well as confirmed by the interviewers.

Other interviewed experts are sure that arguments for the incorporation of the water-level regulation in the city developments are already broadly discussed on the city government level. Although no documented plans or programs were found to prove this statement, the question of water-level regulation in the city is highly likely to be evolving in the upcoming years.

4.3.2.1.3 Positive change in the potential to hold stormwater/ provide flood control

On the Karpovka river, the potential to hold stormwater was not developed or improved during the project. In general, this quality was not perceived by actors as important for development. This finding was made with secondary data materials about the case and confirmed by several interviewers and FDG participants. Despite certain environmental aspects that were already partially covered in Chapter 2, the attention to water quality, level, and control in public space development remains weak. This questions the role of ecologists in the chain of actors and questions other participants' awareness.

In 'Sevkabel' project, the facilities to hold stormwater were similarly not incorporated. This was confirmed by the interviews and during the FGD. However, one of the FGD participants is sure that these qualities might be included in the later development stages. He states that the trends in water-regulating functions for the public spaces showed recently in many European cities could be partially implemented in the new planned territory. These assumptions were taken into consideration by the researcher but were not included in the case analysis.

4.3.2.1.4 Provision of environment for stimulation biodiversity

The conceptual plan for revitalizing 'Karpovka river' territory did not include any special facilities for biodiversity stimulation. Despite the people's overall positive attitude to green areas and biodiversity protection, no special requests for such methods from the residents and active users were acquired. This was observed in the report on the pre-development study and the post-development survey materials. This unexpected for the author finding triggered several assumptions, which were partially confirmed by the locals in the FGD and experts in their interviews. First of all, this development on the Karpovka river is geographically located right next to the Botanical garden. The huge and old garden is vibrant with species of plants and birds, and therefore, partially fulfills the need for the stimulation of nature in the area. However, the garden is not public, leaving people only with opening hours and requiring an entrance fee. The second assumption is that people are not aware of the possible measures for the stimulation of biodiversity. An independent expert in the development announced this idea during his interview.

"*Well, people talk about what is in their heads and what they have seen in their lives. And what did they see in their lives on the quays? Swings, treadmills, and benches, maybe trees. In fact, that is what the residents asked for. I'm not talking about water spaces. Of course, residents do not know anything about it. Honestly, sociologists did not know much about it either*." (Independent urban expert 'Karpovka Friends,' Interview #5, 2020)

From the perspective of governance of protected areas, no special status was given to the area neither on the city level nor on the municipal. The legislative base for the protected areas, as discussed previously, is a complicated and long process that might be seen too balky for such a small area. Moreover, some common activities for the city centers might be difficult to combine with the protection function.

The 'Sevkabel' redevelopment did not include any special arrangements for biodiversity stimulation neither. The analysis of the secondary data on the new area did not show any

facilities related to biodiversity. The interview with the expert confirmed this information. Besides, one of the respondents during the FGD stated:

"*I don't think there is anything more green in the whole area than that piece of grass on the embankment*." (FGD #2 'Sevkabel Port', 2020)

Indeed, the redevelopment project did not include any other green areas or trees. The initial concept of development can partially explain this phenomenon. Called 'a creative cluster,' this area was aimed to attract the creative community in the first place. Therefore, by using existing surfaces and buildings, the leaders of the project cut their expenses. In contrast, the design and implementation of new green spaces will turn to huge investments. Thus, the research considers a lack of biodiversity stimulation as a deliberate quality of the development that could change or could not change in the future.

4.3.2.2. Provisioning (Sub-variable)

4.3.2.2.1 Positive change in the local fishery

The 'Karpovka river' development did not incorporate any particular qualities to improve the river provisioning. In fact, this very quality can be seen as partially rudimental in the city center due to fishery's unpopularity in urban areas. However, the local fishery change in the development area undeniably depends on the quality and quantity of water in the water body. Therefore, it can be seen as an additional indicator of the water source's fish population and health. As it is clear from the findings on 'Regulating ES,' a great role for the quality and the quantity of water played the city program on reducing wastewater discharges, which occurred independently. According to experts and residents, this environmental improvement caused a significant drop in the water level. According to the secondary data acquired about such wastewater collectors in the city, full water level recovery can take several seasons. Therefore, the impact on the local fishery can be even longer. During construction and prolonged wastewater collection improvements, local fishers had to shift their activities from the developing area. Unfortunately, the attempts to contact fishers directly appeared not feasible due to pandemic restrictions. The outdoor activities in the research country were restricted since march; thus, no fishermen could be found along the river. This means that the information on the provisioning ES cannot be called accurate due to the main respondents' unavailability. Consequently, additional research can be required to establish a reliable link between the development and the provisioning ES.

Simultaneously, the development of 'Sevkabel Port' did not correlate with the local fishery's improvements. Although located on the Gulf of Finland, the development area is privately owned and had always been closed for the public before the project happened. The surrounded area also has a status of 'industrial' and directly serves its purpose. Therefore, no local fishermen or any fishermen activities ever took place on its waterfront. The same tendency remained after the project was implemented. Moreover, according to the observations of the FGD participants, the water in this area is high and stormy, thus, not particularly suitable for fishing. Thus, it is fair to conclude that the local fishery's indicator is not applicable to this particular case.

4.3.2.3 Recreational (Sub-variable)

4.3.2.3.1 Positive change in the quality and quantity of recreational space

On the Karpovka river, the quality and quantity of the recreational space were significantly improved. The recreational aspect is considered as the main social purpose of the development. According to the FGD, this territory served as a transit before the transformation happened. Moreover, respondents state that for a certain period of time, the area was not accessible for the public but instead was surrounded by a high blue blind fence. The same information was found in the reports prepared by the media (Morozova, 2019). It is important to mention here that the coastal and riverfront areas have to be public and accessible by law. All development activities on their territory are strictly regulated (The Government of Russian Federation, 2018a; the Government of Russian Federation, 2018b). This particular aspect exemplifies how urban land is monitored and which governmental responsibility level is in place.

During the pre-development social research in the area, conducted by 'Karpovka Friends' group, the following needs stood out explicitly in the questionnaires' responses:

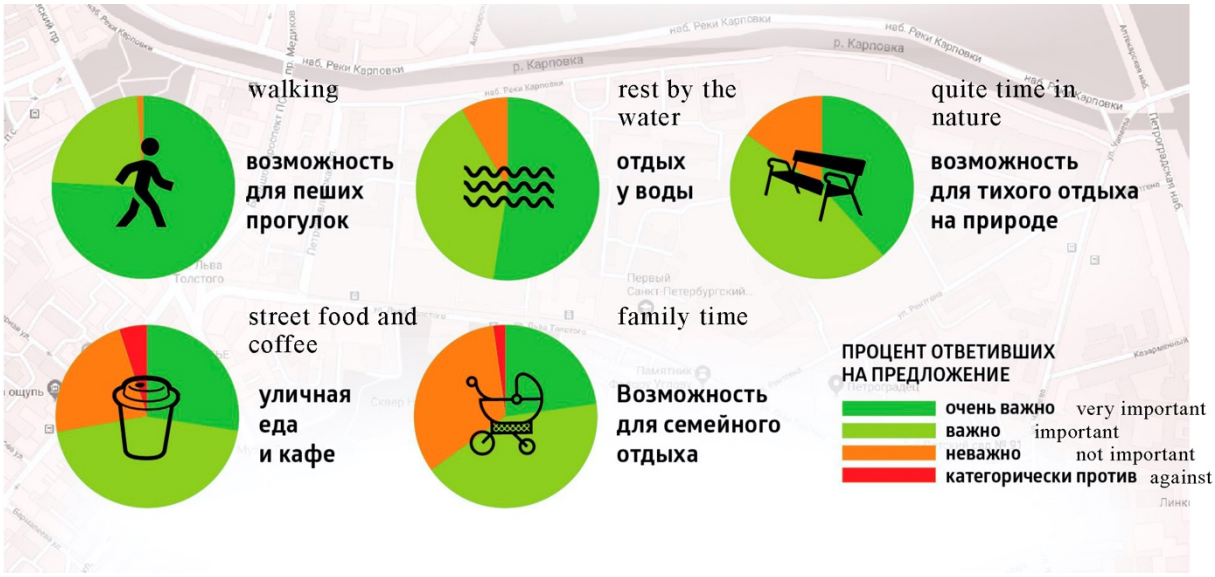


Figure 6: Citizens' request for Karpovka river revitalization. Desired functions.
(Adapted from 'Karpovka Friends', 2018, p. 36)

The citizens' predominant interest is expressed in a simple opportunity for rest and quiet activities. Consequently, the development itself included many benches, promenades, and art objects, which definitely improved the area's overall conditions and recreational aspect.

"*Even in such a small area, you can now find a secluded spot and look at the water. I like the variety of park architecture forms - different benches, differently designed descents to the water, my favorite swing. And remarkable decorative greenery*!" (FGD #2 'Sevkabel Port', 2020)

At the same time, a public report about the post-development study prepared by the 'Karpovka Friends' group included some citations from their post-research:
"*A wonderful experience of transforming an abandoned unsightly location into an attractive, friendly public space. The contrast with what it was is so great that I am overflowed with joy.*"
('Karpovka Friends,' 2019)

The recreational quality and quantity of the 'Sevkabel Port' area were also significantly improved. Inaccessible and abandoned before the redevelopment, this territory did not have any recreational qualities at all. After it was cleaned, improved, and made open for the public, it became a famous place for the nearby neighborhood residents, creative young people, and all other types of citizens who love the sea view. The 'creative cluster' keeps improving its open space with new facilities and art objects. Nevertheless, the main improvement for the recreation among locals was proved to be the coastal side:
"*I try to meet every sunset there. Every day*." (FGD #2 'Sevkabel Port', 2020)

These findings prove a significant shift in the recreational areas' quantity and quality, provoked by the developments, where accessibility played a central role. As proved earlier in the literature review, the crucial aspect of waterfront accessibility is directly linked to the inclusiveness and sustainability of the urban public space (UNESCO World Water Assessment Programme, 2020). Thus, it is fair to state that the developed area improved the neighborhood's overall sustainability by making the waterfront area public and suitable for recreation.

4.3.2.3.2 Promotion of active water sports

On the Karpovka embankment, a platform for active water sports was not included in the development. Despite the passion of Saint Petersburg citizens to water and water-related activities, such as kayaking, sup-surfing, wakeboarding, and many others, these facilities' requests were neither insufficient nor feasible. This is what one of the activists says during a recorded panel discussion:

"*I would also like to say that residents express a great desire to develop water activities on their rivers, would like to see them as platforms for water sports, would like to have a quay there, and would also like to use the potential of the rivers in winter, like sating and skiing*."
(Waterfront tools, 2020)

Theoretically, the precise reason for the lack of any water sports facilities could reveal an interview with a member of the architectural bureau that got a procurement contract for the area's design project. However, contact with this organization was not found. Moreover, according to the interview with one of the experts, this architectural company was taken to court for illegal financial operations during the project. Any supporting facts about this aspect were not further explored due to irrelevance and the time shortage.

Nevertheless, the water sports exclusion tendency was supported by the drop in the river basin's water level, which was described above in the discussion on Regulating ES. Therefore, the water sports facilities became physically not feasible and were excluded from the actual design project.

In 'Sevkabel's development, opportunities for some particular water sports were provided. However, the management or promotion of any additional functions did not follow. During summer 2019, water scooters became a daily activity on the sea quay in 'Sevkabel Port.' The announcements about this type of entertainment were not found in the media; however, pictures in social media and the FGD with the users prove this fact. A special wooden lower-level quay was built for this activity. Nevertheless, according to the expert interview, other water sports activities are limited in this area due to water flow in the area and regulations for water use. Therefore, it is concluded that no further improvements in water sport accessibility for the population will be arranged on the territory.

4.3.2.3.3 Provision of sports facilities

On the Karpovka river, few sports facilities and no space for any sports competitions were included in the development. What is interesting is that the locals were not supporting the idea of sports grounds from the beginning. According to the initiative group's pre-development study, the respondents were less interested in sports activities (31% - not interested) and more skeptical about public sports events on Karpovka.

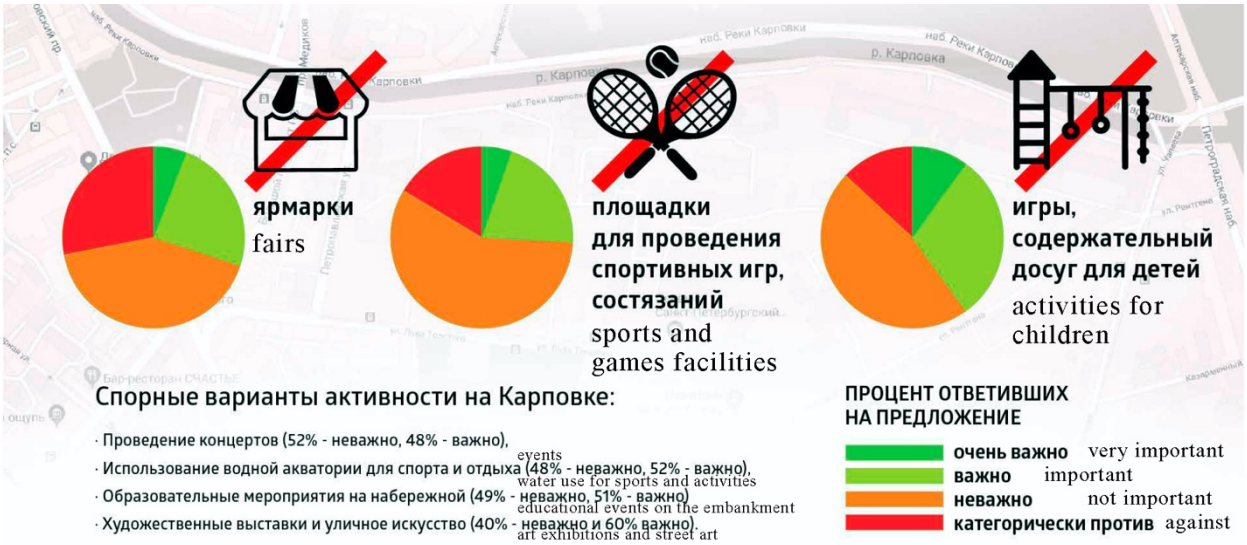


Figure 7: Citizens' request for Karpovka river revitalization. Undesired functions.
(Adapted from 'Karpovka Friends', 2018, p. 37)

This unusual lack of interest was reflected in the development. Nevertheless, a small place for morning exercises and comfortable biking and walking lanes are available in the newly developed area. Consequently, it is fair to conclude that the request for this particular characteristic is not high in the area. A nearby public area may probably have a good sports ground, or a percentage of the young and fit population is not very high in the neighborhood. However, these are just assumptions, which require detailed statistical information about the population, on-site observations, and more detailed interviews. Due to the shortage of time and precise research design, these measures cannot be fulfilled in this study but can be considered for future research on the topic.

In 'Sevkabel Port,' a certain number of free sports facilities were included in the redevelopment project. Among them, for example, an experimental skatepark in one of the factory departments. The park is oriented for beginners and teenagers. It is clear from the FDG that anyone can ride there for free during the daytime when at night the same space might turn into an exhibition or a party-hall. These transformations help to use space effectively by the actual demand for possible activities. Besides, FGD showed that free yoga sessions take place on the embankment during summertime every day. Along with such free and accessible activities, several private sports organizations are located in the area, such as a fitness studio, a boxing club, and a bicycle rent. These are available only for the fee and in certain open hours.

4.3.2.4 Cultural (Sub-variable)

4.3.2.4.1 Positive change in the cultural value of the place

The cultural value of Karpovka embankment developed territory has definitely improved in comparison to its previous state. As mentioned earlier, before the revitalization, this area was abandoned and isolated from the neighborhood, which means it was not representing cultural or any other value for the citizens. However, after development happened, the place became a new vibrant, and attractive public area that attracted people from the city. It is fair to say that the new development became representative in many ways, meaning really rich for diverse cultural activities. That is how a resident described these new qualities:

"*This is the only truly European-level public space in St. Petersburg*". (FGD #1' Karpovka Friends', 2020)

The local users are fully satisfied with the outcomes, which was concluded after an FGD and opinions placed in the post-development research conducted by the initiative group 'Karpovka Friends.' This might have a straightforward explanation – this kind of development is quite a unique phenomenon for the city.

"*More than this space, I like only the story of its creation. Those people were finally asked that everything worked out without government contracts and kickbacks. A miraculous precedent*." (FGD #1 'Karpovka Friends', 2020)

Overall, these appreciation and satisfaction illustrate the theory behind the public participation process discussed in the literature review. By co-creating local public spaces together with the citizens or making the design process in any way participative, the process of development becomes socially acceptable and desirable, improving the social sustainability and well-being of local communities.

In 'Sevkabel Port,' the place's cultural value was also significantly improved with the redevelopment project. The new qualities and activities brought to the area created a new cultural dimension to the territory that was never in place.

"*In this regard, "Sevkabel," in my opinion, showed a good example of how an industrial site can simultaneously make large festivals, events - and in parallel create zones for creativity*." (FGD #2 'Sevkabel Port', 2020)

In this area, an attractive for the 'creative class' environment facilitates the growth of the cultural value by multiplying creative actors and activities.

4.3.2.4.2 Provision of educational functions

The new area on the Karpovka embankment included a few educational functions within its design and provided some new comfortable places for self-education and group activities. Despite the absence of visible regard to the biodiversity by population before the development happened, it is needed to say that locals showed great excitement about small 'eco-features' that were added in the new development. For instance, informational guides for different plant species were mapped. They included QR-codes that bring a curious visitor to a web page with descriptions and interesting facts about a plant. Such insignificant but very interactive details

fill the new space with entertainment and definitely add to space's educational qualities. Another nice educational feature is located on the children's playground. It is a singing wheel that is playing famous local marine songs of old times. This is the one that almost all respondents mentioned positively during an FGD. Along with these and many other design aspects that undeniably improved the place's educational quality, the area is well-equipped with sitting places. With roofs and without, wooden or concrete, small and big – the area combines diverse, comfortable places that can be used in educational needs by groups or individually.

Unlike this riverfront, 'Sevkabel' development provided extensive educational functions. First of all, the cultural events, such as exhibitions, public events, and cultural forums, made the new development area a 'creative' and an 'informational' cluster. Spacious sections of the former factory, now clean and equipped with all necessary facilities and infrastructure, can comfortably accommodate many visitors at one time. This quality makes it attractive for public and private events. According to the expert interviews, some closed professional meetings and talks also take place 'Sevkabel' relatively often.

Some educational functions of the 'Sevkabel' area are temporary and represent different programs. For example, a series of free excursions took place in 2018. Visitors were guided through closed production sites, shown the equipment and electrical engineering offices (Feofanov, 2019). Educational programs for children usually take place during weekends are free of charge or require a little fee. These programs are usually oriented to new and interesting study fields, such as robotics, ocean study, or architecture. Such unique programs are top-rated among young families, so they attract parents from many other districts. All these qualities add to the place's educational functions and make it an important provider of cultural ES.

4.3.2.4.3 Stimulation of cultural diversity

The newly developed Karpovka river area has improved cultural diversity and cultivated interest in diverse groups of citizens. The FGD showed that the area became attractive not only for the locals but also for the city's guests and visitors. That is what one of the respondents observes:

"*It is also nice to see different people walking there - playing kids, students, hanging out, laughing and mastering the children's slide, cheerful pensioners jogging, love couples sitting on wooden slopes to the water*." (FGD #1' Karpovka Friends', 2020)

The analysis of the post-research report and other public reports found in the media shows the same results. This success can be explained through a diversity of leisure and various activities in the area, which may lead to the cultural vibrance and diversity of the place. Moreover, discussed previously, the scarcity of such public spaces in the city created the public's enormous attention to the development, which caused its high attractiveness.

The new 'Sevkabel' area similarly stimulates cultural diversity to a great extent. As mentioned earlier, the redevelopment area became a vibrant cultural place due to the elaborated event program that is interesting for many citizens. The endless entertaining program and a comfortable public environment attract and connect people from nearby neighborhoods and the whole city. With the interest of the citizens, the interest throughout the country appeared. Nowadays, the developed area is perceived as one of the 'must-visit' places in modern city guides. The city of Saint Petersburg is also trendy among the tourists who visit Russia. So, the city's guests can be found on 'Sevkabel' territory in a great number. These insights were

obtained during the FGD. According to the pictures on social media, 'Sevkabel Port' is a vibrant place that operates non-stop and is scheduled for weekends and working days. The diverse programs are focused on groups of people of different ages, gender, occupations, income levels, religions, beliefs, etc. This makes space inclusive, which adds to further stimulation of cultural diversity according to the theoretical knowledge.

4.3.2.4.4 Stimulation the sense of local identity

In the 'Karpovka river' area, the sense of local identity is significantly uplifted due to the participation process and special art objects with local materials included in the development's design. The community-building process that occurred before the development and built some sense of 'locality' for the neighborhood community illustrates active public participation and communication. This undeniably supplied local users with a sense of belonging to the place and a sense of responsibility for it. Besides, some chosen design principles introduced by the architectural bureau included local motives and materials. For example, local plats in green and decorative areas make the place feel natural and good in all seasons. Similarly, the local marine songs on the playground and marine design elements connect the place to the marine culture that all the citizens are so proud of. Along with other unusual design elements, some creative art objects were installed. These objects have no analogs in the city, which gives the place an explicit character and makes it recognizable. Reflecting on the literature, the research concludes that these revitalization project methods are effective by all means and improve the sense of local identity for the residents and other citizens.

The 'Sevkabel' area in its development re-imagined and stimulated, to a great extent, the sense of local identity. The former factory buildings with their unusual industrial shapes were used as a basis for the new 'creative' identity given to the area. The artists and designers were invited to make a place 'creative' and artistic added to this environment. Their work resulted in huge murals and smart minimalistic design of the public area that undeniably made the new 'cluster' a unique landmark.

"*The place is really unique. First of all, it is because of the embankment. But they never stop surprising me, always invent something new*." (FGD #2 'Sevkabel Port', 2020)

This means that the sense of local identity created with the help of artists and architects reflects the existing industrial environment making the new quality of the space local.

4.3.2.5 Dependent Variable: Summary

The data collected on the dependent variable 'Provision of ES' for the Karpovka river development showed certain patterns and trends and could be summarized as the following:

1. Regulating functions were not perceived by stakeholders as required in the development. With this, the deliberate changes in water quality, regulation of its level, the ability to withstand stormwater, and biodiversity stimulation facilities were not incorporated in any development. Besides, during the riverfront development, miscommunication between governmental entities and lack of clarity in responsibilities for regulating functions caused confusion and eventual financial and time losses.

2. The local fishery's improvement was not on the projects' agendas; thus, it did not occur. Since local fishery is not a common phenomenon for every environment, it appeared to be not applicable in one of the cases.

3. A significant shift in the recreational space occurred in both developments due to the increased accessibility and good recreational facilities. Some sports facilities and arrangements added to the diversity of recreational functions. In the residential area of the Karpovka river, the sports facilities correlate with the actual demand for them. However, the public's highly desired water sport functions did not find their place on the river embankment. Similarly, water sports activities in 'Sevkabel Port' are limited.

4. The positive trend in the newly developed areas' cultural value is accompanied by the increasing cultural diversity of its users. Some educational features and many spaces suitable for individual and group activities add to these areas' educational qualities. In the 'Sevkabel' area, a huge shift in the place's cultural value is explained by the active involvement of the 'creative class,' extensive educational functions, and the cultivated sense of the local identity. On the Karpovka embankment, different objects that reflect the spirit of the area and the usage of local materials make the place unique and add to the place's locality.

Therefore, the collected data show that while regulating ES is not included in the development, the indicators for the cultural and recreational ES show the direct opposite. Considering the environmental settings of the city, the research finds overall attention to the regulating ES insufficient. A lack of interest by public, private, and governmental stakeholders was not expected to be found in this study. Although the control over water in the city is given to the city dam, it is important to ensure local water regulation measures to improve the area's sustainability. This is especially relevant for the city centers where flood prevention does not always work immediately. When combined with a lack of any network governance, or its weak role, these trends underpin the necessity of this contemporary governing process concerning public space creation. As understood from the literature review, the network governance process can diversify the development's qualities by bringing together different opinions and expertise and finding compromises between them (Elinor Ostrom, 2010; Lilli et al., 2020). In the researcher's opinion, this could make both projects stronger from the sustainability point of view.

Chapter 5: Conclusions

This chapter connects the research findings with the research purpose and the problem statement explained in Chapter 1. Chapter restates hypotheses established in the previous sections and answers sub-questions and the main research question. It also fits the research findings into the existing body of knowledge about the topic and elaborates on the study's suitability, validity, and importance. Some recommendations for the solution of the research problem are formulated. These answers raise new questions and the need for further research.

5.1 Purpose of the research

This research aims to reveal the potential of local ES provision in urban waterfronts in Russia's context. For this, it explores certain contextual peculiarities addressed to sustainable urban development. Following the theory on contemporary governing practices for waterfront development, the research measures effectiveness of ones used in the city. It identifies various forms of decision making and elaborates on their impact on the transformation process. The influence of multiple stakeholders for waterfront developments is examined on the potential to mediate the provision of social-environmental qualities, measured through ES indicators. These findings allow understanding of the mechanism of ES provision on urban waterfronts through communication and participation in the city of Saint Petersburg and the Russian context in general.

5.2 Hypothesis and the research question

In Saint Petersburg, the 'water capital' of Russia, the urban waterfront plays an important role in its major influence on the city's layout and development patterns. The transformation of these areas proved to have unique potential – to improve the urban environment in a holistic way (UNESCO World Water Assessment Programme, 2020). The framework for this improvement was established through the mechanism of Ecosystem Services (ES) internationally accepted to mediate the contribution to the urban habitats' well-being (UN Habitat, 2005). In recent years, the vibrant topic of waterfront transformation in Saint Petersburg has triggered the public's attention and made it central to urban dwellers. In attempts to reconsider the ways of accessing water in the city, a process of self-organization came in the first place. This process provoked the formation of networks, which connect diverse stakeholders and influence the decision-making process. The study addresses this particular phenomenon and explores its influence on ES provision in the city. Therefore, this study considers that diverse stakeholders' interventions could be a possible provider of ES on the waterfronts of Russian cities. Consequently, the main research question for this research is formulated in the following way:

To what extent do stakeholders' interventions stimulate the provision of ecosystem services within waterfront transformation developments in Saint Petersburg?

In order to answer this complex question in this Chapter, the research will first elaborate on the supporting sub-questions.

5.2.1 Sustainable provision of ES

First, the research defines which factors lead to the sustainable provision of ES chosen as necessary for the waterfront areas. The ES that proved to be socially and environmentally beneficial for the context was defined as regulating, provisioning, recreational, and cultural. The overall picture of ES provided by both developments shows a huge discrepancy between socio-oriented and environmental-oriented qualities. This means that both projects incorporated more social functions than functions improving environmental conditions. The balance of 'socio-nature' relationships covered in details in the state-of-the-art literature review emphasizes the importance of both dimensions. At the same time, low interest and a lack of attention from governmental, public, and private stakeholders to the issue leave the researcher to make certain assumptions about the city residents' mentality, competency of the city's governmental institutions, and contextual peculiarities of the country and Saint Petersburg.

Another pattern which is a significant effect on recreational and cultural ES was found in both cases. It is true that before revitalization, both waterfronts were in devastating condition with no access for the public. In this sense, the two cases are clearly comparable. The new qualities brought new people and new activities to the areas, which diversified the cultural patterns. However, in both cases, the users of the new developments outlined weak connectivity of the areas to the rest of the city, predominantly related to the pedestrian sides and bike lanes. Citizens underlined the necessity of walkability and bike-lane connectivity, and continuous linkages with the existing city landscape. The absence of such linkages makes developments fragmented and not fitting to the city context. The issue of fragmentation similarly affects the provision of green infrastructure and the mechanism of biodiversity protection. A lack of the city's 'green framework' policy and easily deprived protected areas allow unregulated environmental degradation and loss of species. These aspects are further explored in the discussion on institutional constraints.

5.2.2 Strategies for waterfront revitalization

Led by the network of professionals ‘Karpovka river’ development and private-led 'Sevkabel Port' are completely different in their management. The network of professionals established for the Karpovka river revitalization, although showed weak communication between governmental entities, in general, brought a diversity of perspectives and, therefore, shaped the project in a variety of ways. The public-led initiative group comprised of stakeholders with various expertise in urban development was aimed to steer the process of development knowledgeably. However, miscommunication between stakeholders and a lack of comprehensive legislative base for diverse participants' guidance made the network governance process controversial. Another example of public space development showed a private-led project where no professional networks were built with the participants other than the private company itself. Supporting stakeholders, such as redevelopment specialists, architects, and artists, were invited when needed, keeping the governance and management in one hand. This contrasting quality of two case studies makes the research particularly interesting when discussing the outcomes.

The discussion on contemporary governmental practices revealed the necessity of a multi-stakeholder approach when dealing with public-oriented development (UNESCO World Water Assessment Programme, 2020). In the research context, the mechanisms of network governance and public participation are proved to be underdeveloped. Certain initiatives

provoked by sociologists and urban planners arise in the city and promote public involvement and diversity of opinions for decision-making. However, poor governmental attention to these processes and lack of legislative base to clarify and introduce those practices to other stakeholders leave them unrecognized among urban development specialists.

5.2.3 Institutional constrains

The research proves certain institutional difficulties that inhibit the sustainable urban transformation in the city. First, no regulation for network building and communication among stakeholders exists in the legal field of Russia. Similarly, the guidance for public participation is not developed and cause confusion of decision-makers about its implication. Therefore, the lack of clarity in these processes directly affects efficiency in projects of waterfront development.

Second, there is no such position as a 'master plan' in the Russian legal field. Similarly, no such regulation exists in the city's legislation. A lack of this instrument further supports the isolation and fragmentation of urban development. In the context of waterfront transformation, this peculiarity, again, does not facilitate any communication among decision-makers and results in a lack of connectivity and fragmentation in developments. The same result causes the weak role of municipalities, which was revealed during the research. In the countries with well-developed and clear governmental responsibilities over public space production, municipalities carry out coordination work, with the goal to achieve stakeholders' consensus and public acceptability. In the context of the research, municipalities proved to have a position of a deprived and weak institution that does not take part in the development process at all. Highlighted by experts, this quality further affects communication processes, which proved to be essential for sustainable urban transformation.

The mechanism of biodiversity protection also has substantial institutional constraints. To begin with, the city's border passes directly along the coastline of the Gulf of Finland, not including the water area. This does not allow the implementation of regional protected areas for the protection of biodiversity. This calls for special arrangements in the legislative base. The necessity of the city's authority over its waters has significant potential for improvement of water regulation and biodiversity protection (Environment & Rights, 2019). This would give local institutions more rights and responsibilities for improvement of regulation ES, which were proved to be a fragile part of the city's ES functions.

As mentioned earlier, the issue of fragmentation in protected areas is similarly caused by certain institutional peculiarities. One is the absence of 'green framework' regulation in the city. This framework would allow sustainable planning and a comprehensive structure for urban green areas. It would similarly facilitate the mechanism of biodiversity protection and improve the environmental qualities of the urban structure. One more characteristic is an easy violation of protection mechanisms, especially on the municipal level. According to experts, the legal base requires the development of policies to implement a system of protected areas with a strong priority of protection mechanisms over other urban influences (Environment & Rights, 2019). The improvement of this mechanism on the municipal level may facilitate sustainable growth and socio-environmental balance on a local scale.

Finally, to encourage local professionals and activists' capacities in relation to urban development, it is crucial to provide reliable and comprehensive data for public access. The open data issue highlighted in previous chapters of this thesis has a tremendous effect on urban

growth patterns, mobilization of experts, and public involvement. The availability of data is also a political issue that leads to the topic of 'political-ecologies' (Batty, 2020; Bunce & Desfor, 2007). Stimulation of public involvement through open data would allow re-thinking of spatial uses and may put additional pressure on governmental institutions. Similarly, for this research, the data availability issue resulted in the choice of qualitative methodology due to the unavailability of quantitative data for ES indicators. Scholars outline that recent improvement of computer technologies, which made them capable of managing big data and putting it together, allow to deal with the issue of scale and facilitate knowledgeable decision-making (Batty, 2020).

5.2.4 Influence of stakeholders

The research revealed the strong interest of Saint Petersburg citizens in waterfront development and revitalization. This triggered a tendency for self-organization and established the potential for an effective multi-stakeholder approach. However, this mechanism requires common vision and language among diverse stakeholders, estimated in case studies as unsatisfactory. This quality affects further co-design and co-production stages in an undesirable way.

However, self-organization processes around the waterfront of Saint Petersburg provoked a unique tendency of re-imagining these areas through art. The role of the creative class in the city, highlighted in previous studies, proved to have a tremendous effect on the development process (Perevozkina, 2017). It brings public attention to problematic waterfront areas and triggers urban improvement through public involvement and urban activism. The researcher sees this effective linkage between the creative class and public space production on urban waterfronts as a unique city’s quality that requires further exploration and in-depth research.

Regarding the outcomes of these influences, the analysis of case studies showed certain patterns in ES distribution. Recreational and cultural ES are presented in the developments to a great extent, required by the public, and proved to be important for governmental stakeholders. Some national and city-level governmental programs are launched to improve these qualities, consequently providing sufficient financial support for their implementation. However, the analysis proved crucial underdevelopment of regulating ES on the city’s waterfronts. The outcomes of developments show this pattern, similar for both cases. None of the developments incorporated any regulating ES in the project, leaving this quality completely out of attention. Although some experts state that such qualities are actively discussed for certain planned projects, none of such projects has been ever implemented in the city. This finding, along with particular environmental settings covered previously, brings the discussion to the issue of environmental safety.

At the same time, the isolation of governmental institutions revealed during the research limit their potential for knowledgeable and comprehensive waterfront improvement. Independent initiatives by city Committees to launch programs for environmental recovery are not coordinated among other governmental entities and affect the public space development process. Although such programs bring particular improvements, namely, advanced water quality, they should be better coordinated and communicated with other stakeholders interested in waterfront transformations.

5.2.5 The research question

As seen from the discussion above, the influence of multiple diverse stakeholders showed significant improvement in the city's waterfront transformation. Both private-led and public-led developments examined for the study showed certain influence patterns on the waterfront transformation projects.

The private-led project, being located in the industrial area on the Gulf of Finland, did not take into account the factor of social acceptability and left the decision-making process on the one hand. The public-led one, organized on the river embankment in the vibrant residential area, made first attempts to incorporate network governance and public participation mechanisms in its process. Both developments showed a tremendous influence on recreational and cultural ES in the improvement of their provision. However, the study finds a public-led strategy more sustainable since it examines the actual demand for certain qualities before its provision. In contrast, the private-led one builds its decisions on the opinions limited by the governing actor.

The regulating ES, considered in this research to be crucially important for sustainable waterfront transformation in the city, remained unrecognized by all examined decision-makers. This aspect calls for further thorough research and understanding of the demand for this particular type of ES. It may occur that the environmental threats, the possibility of which is proven in this research, are underestimated by decision-makers and require attention and mobilization. To clarify this issue, further decisions in the actual development processes should be based on the involvement of ecologists and other related experts. Moreover, the literature review proved that the multiple functions of 'soft' adaptation measures in urban areas that incorporate regulative ES bring multiple benefits to their users (UNESCO World Water Assessment Programme, 2020). Thus, These measures could indirectly benefit other ES in the city.

First attempts in network-building and participation, although demonstrate sufficient improvements in development outcomes, require comprehensive legislation for their establishment in practice. To guide the network governance process, certain policies need to be created to make this process transparent and clear to all participants. Moreover, these networks could be enhanced by introducing a master-plan level in the state or city regulation. This level of planning would clarify and communicate all interested stakeholders and find ways for compromises. The public participation process proved to be crucial for public space development in residential areas and similarly needs to be established in the regulation field. In this study, public involvement showed a certain level of influence on waterfront developments through urban activism. However, the role of public acceptance and participation has to be recognized by all levels of stakeholders related to urban waterfront transformation. Besides, building on expert interviews, these regulative acts should be accompanied by extensive education programs for the stakeholder related to waterfront development to expedite sustainable waterfront transformation in the city.

5.3 Suitability and validity of the study

The ES mechanism is proved to be globally important, although underestimated by policy-makers in the Russian Federation. The growing literature on Russian ES indicates high interest among scientists and draws it as a rapidly developing field of study. Due to the county's peculiarities, such as scale and ecosystem heterogeneity, the ES mechanism requires attention and further exploration on multiple scales (Bukvareva et al., 2017). This study underpins the importance of establishing the ES mechanism in state regulation, which has no legal framework in the country yet. The topic of urban ES, in particular, its assessment and implications, is not

thoroughly explored in the Russian context (Bobilev & Porfirjev, 2016). This research unpacks the ES provision mechanism on urban waterfronts and connects its features to contextual peculiarities. The introduction of this instrument on the city-level can holistically improve citizens' well-being. Highly related to water activities, the city of Saint Petersburg can incorporate socio-environmental aspects into the ongoing transformation. The process of reimagining urban waterfronts in the city is of great importance nowadays. Thus, this research addresses the underdeveloped dimensions of Russian ES that are of particular importance.

5.4 Suggestions for further research

The topic of ES in the Russian context is novel and requires further research. Regarding urban ES in Russia, similar to the supply or provision of ES, the demand for these services should be explored. This suggestion was made by scholars (Liu et al., 2019) and mentioned earlier in the research on the discussion on ES indicators. A better understanding of the spatial distribution of demand and supply, addressed to local contexts, would allow a more accurate understanding of ES provision. For instance, the research on the actual demand for regulating ES in the context of Saint Petersburg would ensure a better assessment of their actual performance.

Another fruitful dimension for the Russian context is policy recommendations. First, recommendations for the regulation of communication and co-production processes are proved their importance. Such mechanisms as network governance and public participation are thoroughly explored in the Western context and considered effective for public space production and significant for socially-acceptable urban transformation. Other policy recommendations for sustainable urban growth are also required, such as the one for the establishment of a ‘green framework’ in the legal regulation. Its importance is established in multiple studies and is crucial for ES provision in urban areas.

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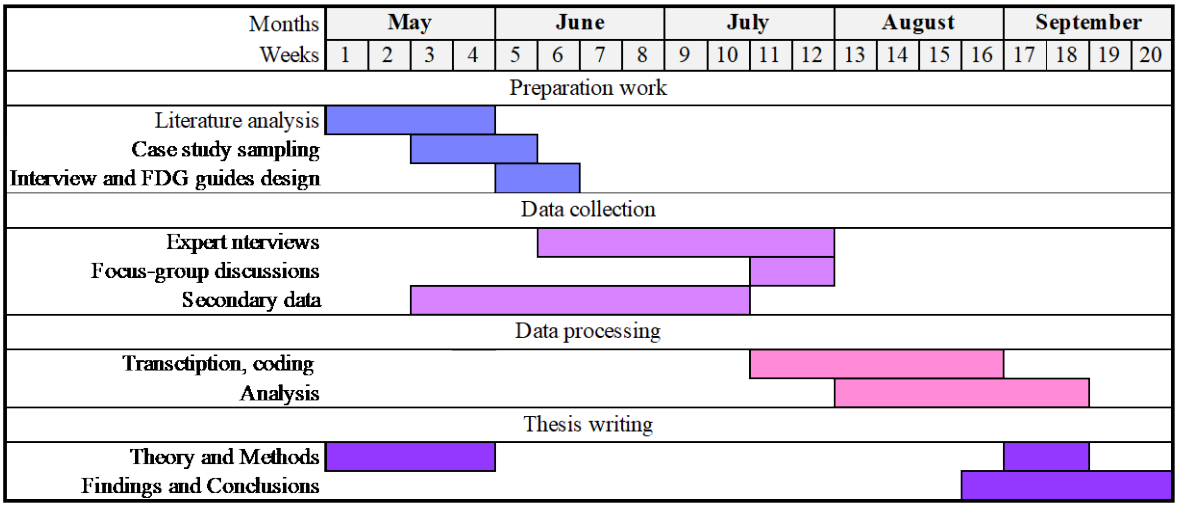
Annex 1: Research Instruments and Time schedule

Research time schedule



Research instruments

8	Expert Interviews
2	Focus-group discussions

General guidance for primary data collection:

1. Introduction and review of the discussion topic
2. Explanation of the purpose and data use
3. Acquisition of record permission
4. Clarification of interviewer's role: position in organization/responsibilities/duration of involvement
5. Ask main questions
6. Ask for additional information/comments if any
7. Ask for relevant secondary data/other respondents
8. Remind of a possibility to review/access thesis

Annex 2: Interview questions

Expert Interviews: Main questions

1. At which stage did you enter the project?

2. How long have you been involved in the development process?

3. Did the project face any considerable difficulties from that moment?

4. How can you describe the decision-making network you were operating in? How many people were constantly involved?

5. Were any governmental institutions involved in the development?

    5.1. How many governmental institutions/actors were involved?

    5.2. Did anyone from the local municipality attend regular meetings and discussions of the project?

    5.3. Who were they, and how many? Did they demonstrate an interest in the process?

    5.4. Within the network, what was the approximate ratio between governmental, private, and independent individual actors?

    5.5. Can you state that the government representatives were always willing to balance interests in this development?

6. How frequent were meetings and discussions of the network actors?

7. How formal these meetings were in terms of place, time, arrangement, etc.?

8. Did these discussions have any positive outcomes for the process of decision making?

9. During discussions, did you experience any type of misunderstanding or lack of common language between participants?

10. Were there any crucial failures in communication among participants?

    10.1. What consequences did this bring for the outcomes of the development?

11. According to your observations, did actors in the network had a joint understanding of this transformation or was there a strong common language between them?

12. Can you say that a certain level of trust between actors in the network was build during this development?

    12.1. Who of the actors managed to build trust?

13. Can you say that the development was steered according to a certain desirable scenario?

14. Was this process jointly developed or promoted/dominated by a particular actor or set of actors?

15. Are you familiar with any of the financial aspects of the development?

    15.1. Do you find the level of financial support for the project sufficient to achieve desired outcomes?

    15.2. Which actor predominantly provided this support?

    15.3. Do you think the level of financial support could influence the number and quality of the network actors?

16. Do you know an approximate number of required governmental approvements that took place during the development?

17. Were there any critical issues with the legislative dimension of implementation? What type of issues?

18. Was any participation of local residents of the area considered in the development?

    18.1. What was the type and an approximate number of the participants?

    18.2. How regular was the interaction with the public?

    18.3. What type of participation was this?

    18.4. Within this process, did people have sufficient opportunity to express their opinion about the project?

    18.5. Were participants ready to express their creativity in the project?

    18.6. Did they have this opportunity?

    18.7. Is there any observable quality of the final development that was promoted or triggered by public participation?

    18.8. Did public participation add to the sense of local identity of the place?

19. In your opinion, how satisfied are the actors of the networks with the outcomes of the development?

Annex 3: Focus Group Discussions questions

3 participants per group

Residents and users: Main questions

1. Does this new development encourage you to spend more time outside (not taking into account the recent COVID lockdown)?

2. Can you state that the developed area became more beautiful/clean/pleasurable?
   If yes - Is this change significant?
   If no - Is there any change in the quality of public space?

3. Does this new development encourage you to try new water sports?
   If yes - Which activities are these?
   If not - Do you think it can encourage somebody else?

4. After the development happened, did you notice any inexperienced intention to play sports in this new area or go jogging?
   If yes - What type of activities were these? Do you make it consistently?
   If no - Have you noticed more people doing this on and around the area of new development?

5. Do you spend more time near water during your free hours now than you used to before the development?
   If yes - Do you feel comfortable during this time?
   If no - What is missing there?

6. Do you think this development has anything with the improvement of quality? Have you noticed any positive changes?

7. Do you know anything about changes in the local fishery? Do you know any fishermen there?

8. Have you noticed any new types of plants or birds in the area recently?

9. Do you think that this development somehow affects fluctuations in the water level, for instance, during seasonal high water on during prolonged rainy periods?

10. Since the development happened, do more outdoor events, cultural or educational programs take place in the area of development?
    If yes - Are these programs open for everyone? Do you attend?
    If no - Do any activities usually take place?

11. Do you think people in the area started to behave more responsible and respectful to the ‘common’ property, for instance, more regularly put their trash in the bin, or something similar?

12. If your friends or relatives come to visit you, do you usually spend time in the area of this new development? What about your colleagues or those people who are not particularly close to you?

13. Do you observe more children in the developed area?

14. Do you think children acquire a positive experience of spending time in these areas? Do you think they can learn something new?

15. Do you see more new people in the area? Tourists? Students? Maybe street performers?

16. Have you noticed any changes in residents, meaning, their perceived income, age, lifestyle, or professional attributes? Are there more young people in the area of new development?

17. Do you think the area provides any benefits for those who maintain a quiet way of life? Is there enough place to sit, relax, and forget about the city noise?

18. Have you noticed any people with certain physical restrictions in the area? Do you think they feel comfortable?

19. Do you associate this place with your home, or work, or any other activity that connects you with this place?

20. If you meet new people and they ask you about the place you live/work/study, whatever connects you with this place, would you be willing to show the pictures of the place?

21. Do you think that this new development, in any sense, reflects your personal relationships with the city?

Annex 4: IHS copyright form

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1. A summary of 400 words should be included in the thesis.
2. The number of pages for the thesis is about 50 (without annexes).
3. The thesis should be edited

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