Literature review

This section reviews the academic literature on blue spaces, and incorporates literature from wider concepts such as nature-based solutions and greening. First, it reviews the main benefits offered by blue spaces. Then, it critically analyses the consequences that blue urban renewal can have on people and the environment, and raises important questions that need to be addressed in order for cities to be inclusive, sustainable and just.

The benefits of blue spaces

Blue spaces have undeniable positive effects in cities, which Gascon et al. (2017) summarise as "stress reduction, increased physical activity, promotion of positive social contacts, increased place attachment and the reduction of extreme temperatures" (Gascon et al. 2017). The literature on the potential of blue spaces centres around three main topics relating to people and the environment.

Climate adaptation and mitigation In the context of climate change, blue carbon ecosystems can naturally alleviate pollution, heat stress, flooding or drought, and increase the climate resiliency of cities (Lin et al. 2020, Manteghi et al. 2015, O'Donnell et al. 2021). This is because blue spaces have a surface temperature lower than green space, high evaporation and thermal capacity which creates a cooling effect, and a spillover mechanism which extends the cooling effect inland (Lin et al. 2020). However, the potential of blue spaces for climate mitigation is not well known relative to green spaces. As a result, less urban planning recommendations exist, not to mention that they are more difficult to provide and maintain (Manteghi et al. 2015, Völker et al. 2013).

Health and well-being The best known way in which blue space has a positive impact is on people's physical and psychological health. Being exposed to water makes people feel better, happier, and be more active. There is an extensive repertoire of quantitative studies demonstrating these effects on people's health and well-being (Gascon et al. 2017, Britton et al. 2020). Qualitative studies also show that exposure to water improves mental health, regardless of how people interact with it (Garrett et al. 2019, van den Bogerd et al. 2021). In deprived neighbourhoods in particular, people tend to have poorer mental health and lower life satisfaction compared to wealthier areas. Dealing with this topic, van den Bogerd et al. (2021) discusses how projects that increase access to high quality blue spaces in socio-

economically disadvantaged neighbourhoods have the potential to significantly influence the well-being of their residents.

Connection and community Lastly, waterfronts give people with the opportunity to connect with each other and with nature. People develop a sense of place attached to water, and even polluted or degraded waterfronts can play a central role in the community, providing refuge, connection, entertainment, and even food (Toomey et al. 2021). Furthermore, blue space revitalisation projects can be an opportunity to create community bonds by engaging residents in the design and building process. During the "urban acupuncture" intervention conducted by BlueHealth in a deprived area of Plymouth, UK, residents who participated in the project reported a greater sense of well-being and life satisfaction due to feelings of community belonging and safety (van den Bogerd et al. 2021).

Social and environmental repercussions of urban renewal

Despite the undeniable benefits of water in the city, transforming waterfronts into high-quality public spaces can have harmful consequences on people and the environment. They can cause environmental damage and loss of biodiversity, disrupt human and nature relationships, displace people by way of gentrification, and reinforce social inequalities by excluding individuals and communities on the basis of socio-economic differences, or racist and sexist practices. The following section explores three of these avenues.

Exclusion through discrimination Due to historical but ongoing racial, sexist or ethnic discrimination, some groups may choose to avoid public spaces altogether. They may feel vulnerable and unsafe in public, especially in blue spaces that are most popular in the warmer months and where people have less coverage. When public space excludes a wide range of people from taking advantage of it, alternative experiences are kept invisible and are not normalised because they happen privately. Ultimately, this hinder's people from exercising their right to the city, and causes further discrimination.

Disrupting community In stark contrast to the social bonds that can be fostered when residents are involved in revitalisation projects, when the local community's perceptions and values are not understood by planners, changes can disrupt human-to-human or human-to-water connections (Toomey et al. 2021). This is susceptible to happen when a community's social practices do not fit with the social norms (Wessells 2014). Moreover, marginalised or stigmatised communities may find it hard or impossible to communicate their experience

to the mainstream because they lack the words to articulate their reality. And vice-versa: wealthy, white, males may not be capable of understanding the experience of 'others'. This of course does not mean that minority communities do not attach meaning to place - on the contrary, people are inextricably linked to place, and disrupting this relationship threatens their belonging or even existence.

Neoliberal urban renewal In perverse cases, cities prioritise growth over well-being and community. City officials are exploiting nature-based solutions to brand their cities as green and liveable[1], and to promote greening as a win-win strategy where "no one is left behind by the trickle-down of benefits from green infrastructure" (Anguelovski and Connolly 2021). With "glitzy green" renewal projects (Anguelovski and Connolly 2021), cities try to attract a new creative class rather than addressing public blue space as a common good and prioritising the concerns of existing residents (Wessells 2014, Anguelovski, Brand, et al. 2020, del Pulgar 2021 on revitalising the Amsterdam Noord waterfront). These strategies perpetuate inequalities by privileging the values of new groups over existing residents, who risk facing displacement. White, environmentally privileged upper classes who can afford to live near nature will move in and price out residents who will be forced to move to neighbourhoods with worse access to attractive natural space. This phenomenon challenges the well-being benefits observed in visitors of the waterfront - do they feel happier and healthier because they are using blue spaces, or because they can afford to and choose to live near them?

Achieving equity and justice in urban blue spaces

Promoting nature-based solutions for the sake of environmental sustainability ignores wider social, economic, and cultural needs which need representation if a city is to be 'sustainable'. By ignoring the consequences of urban renewal projects, cities are increasing inequalities and marginalising socio-economically disadvantaged groups.

Thus, how can cities provide equal access to high-quality urban blue spaces, so that everyone in the city can share their benefits? How can access to blue space for marginalised communities be prioritised, over the privileged few who already have the best access to nature? How can blue space be designed to be inclusive to a diversity of values and experiences?

[1] For example, Madrid promoting the Madrid Río project on the official tourism website (EsMadrid 2022), or Oslo advertising its new urban waterfront promenade along which "you find yourself surrounded by some of Oslo's world-renowned architectural gems" (VisitOslo n.d.).

References

Anguelovski, I., Brand, A. L., Connolly, J. J., Corbera, E., Kotsila, P., Steil, J., Garcia-Lamarca, M., Triguero-Mas, M., Cole, H., Baró, F. et al. (2020). Expanding the boundaries of justice in urban greening scholarship: Toward an emancipatory, antisubordination, intersectional, and relational approach. *Annals of the American Association of Geographers*, *110*(6), 1743–1769.

Anguelovski, I., & Connolly, J. J. (2021). *The green city and social injustice: 21 tales from north america and europe*. Routledge.

Britton, E., Kindermann, G., Domegan, C., & Carlin, C. (2020). Blue care: A systematic review of blue space interventions for health and wellbeing. *Health Promotion International*, *35*(1), 50–69.

del Pulgar, C. P. (2021). Dismantling the just city: The unevenness of green experiences in amsterdam noord. *The Green City and Social Injustice: 21 Tales from North America and Europe*.

EsMadrid. (2022). Madrid río park. https://www.esmadrid.com/en/tourist-information/madrid-rio-park

Garrett, J. K., White, M. P., Huang, J., Ng, S., Hui, Z., Leung, C., Tse, L. A., Fung, F., Elliott, L. R., Depledge, M. H. et al. (2019). Urban blue space and health and wellbeing in hong kong: Results from a survey of older adults. *Health & place*, *55*, 100–110.

Gascon, M., Zijlema, W., Vert, C., White, M. P., & Nieuwenhuijsen, M. J. (2017). Outdoor blue spaces, human health and well-being: A systematic review of quantitative studies. *International journal of hygiene and environmental health*, *220*(8), 1207–1221.

Kampa, E., Langaas, S., Anzaldua, G. et al. (2016). Rivers and lakes in european cities: Past and future challenges. *European Environment Agency*, 13.

Kohsaka, R., & Uchiyama, Y. (2021). "urban agriculture, forestry and green-blue infrastructure as "re-discovered commons": Bridging urban-rural interface".

Lin, Y., Wang, Z., Jim, C. Y., Li, J., Deng, J., & Liu, J. (2020). Water as an urban heat sink: Blue infrastructure alleviates urban heat island effect in mega-city agglomeration. *Journal of Cleaner Production*, *262*, 121411.

Manteghi, G., bin Limit, H., & Remaz, D. (2015). Water bodies an urban microclimate: A review. *Modern Applied Science*, *9*(6), 1.

O'Donnell, E. C., Netusil, N. R., Chan, F. K., Dolman, N. J., & Gosling, S. N. (2021). International perceptions of urban blue-green infrastructure: A comparison across four cities. *Water*, *13*(4), 544.

Toomey, A., Campbell, L., Johnson, M., Strehlau-Howay, L., Manzolillo, B., Thomas, C., Graham, T., & Palta, M. (2021). Place-making, place-disruption, and place protection of urban blue spaces: Perceptions of waterfront planning of a polluted urban waterbody. *Local Environment*, *26*(8), 1008–1025.

van den Bogerd, N., Elliott, L. R., White, M. P., Mishra, H. S., Bell, S., Porter, M., Sydenham, Z., Garrett, J. K., & Fleming, L. E. (2021). Urban blue space renovation and local resident and visitor well-being: A case study from plymouth, uk. *Landscape and Urban Planning*, *215*, 104232.

VisitOslo. (n.d.). Oslo's new harbour promenade. https://www.visitoslo.com/en/articles/the-harbour-promenade/

Völker, S., Baumeister, H., Classen, T., Hornberg, C., & Kistemann, T. (2013). Evidence for the temperature-mitigating capacity of urban blue space—a health geographic perspective. *Erdkunde*, 355–371.

Wessells, A. T. (2014). Urban blue space and "the project of the century": Doing justice on the seattle waterfront and for local residents. *Buildings*, *4*(4), 764–784.